



**HELUKABEL®**



**■ Edition 27**

# CABLES, WIRES & ACCESSORIES

**Data sheets are as of date of print.  
You can find the latest versions online  
according to this principle:  
[www.helukabel.com/10001en](http://www.helukabel.com/10001en)\***

**\* Instead of 10001 please insert the wanted part number.**

[helukabel.co.uk](http://helukabel.co.uk)





## ■ INTRODUCTION

With our new main catalog "Cables & Wires" you are holding in your hands a version that has been revised in visual presentation as well as in content. Our objective was and is to guide you more quickly to your desired product. The tabular overviews that precede each product chapter should help in this regard. Furthermore, we have developed additional selection tables that facilitate navigation between the chapters.

We are proud of the fact that in the areas of industrial and infrastructure cables we are uniformly well-positioned with high in-stock availability. True to our motto, "All from One Source", in addition to the "Data, network & BUS technology" section, we also included a selection of accessory products in the main catalog for the first time. New products created since our last catalog are placed in their respective chapters.

In cases where more than 33,000 standard products are not enough to find the right cable product for a unique application our engineers are at your side to develop both a technically and economically superior solution. Your advancement is our driving force!



**Helmut Luksch**  
*Chief Executive Officer, HELUKABEL® GmbH*



# ■ HELUKABEL® AT A GLANCE

## FAMILY FOCUSED

- Family enterprise since 1978

## QUALITY-MINDED AND ECO-FRIENDLY

- ISO 9001 & 14001
- Energy supplied by the firm's own solar and bio-gas plant

## SUCCESSFUL

- 430 million Euro turnover
- 1000 employees

## GLOBAL

- 41 locations in 24 countries

## PRODUCTION

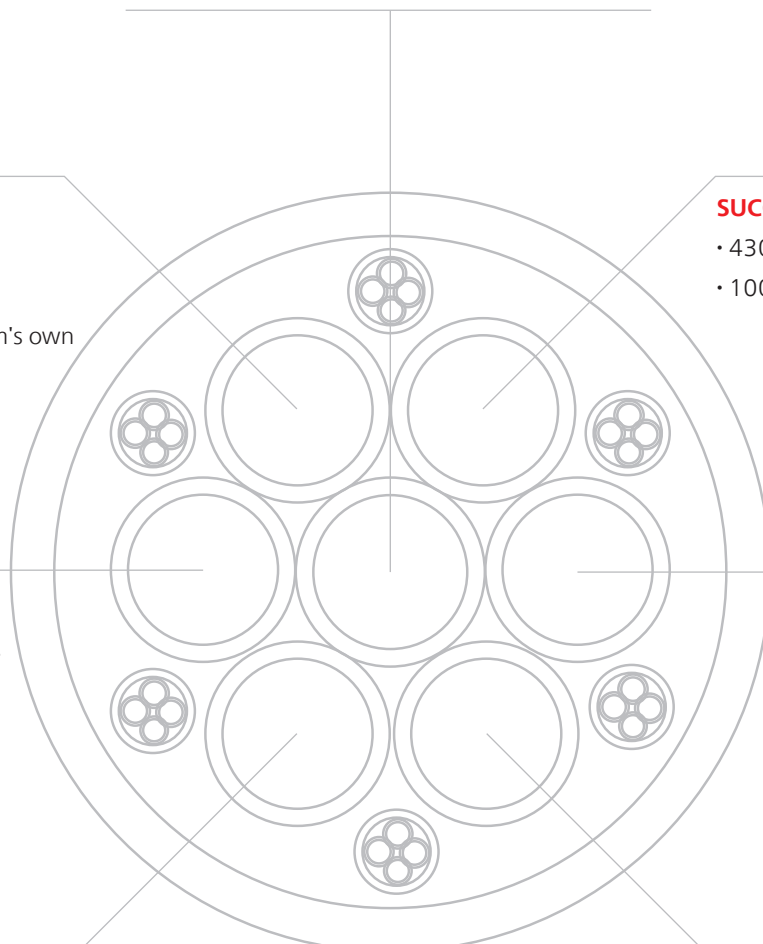
- 6 manufacturing and assembly locations worldwide

## LOGISTICS

- 33,000 products in stock, from the cable gland to the 2.40 m cable drum
- 24 h delivery service
- State-of-the-art logistics facility

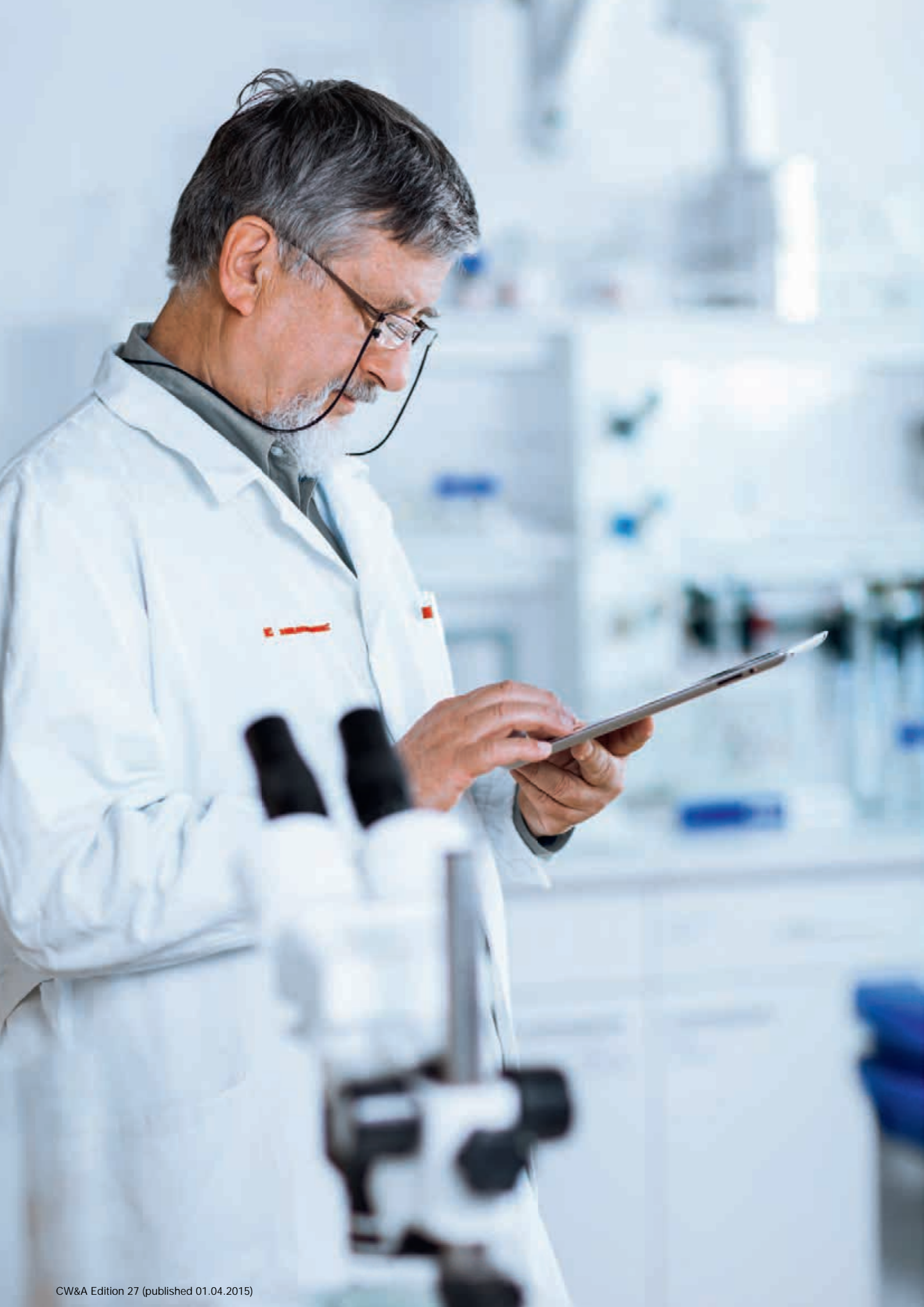
## PRODUCTS

- Cables, wires and cable accessories
- single-source supplier for industry and infrastructure



# ■ TABLE OF CONTENTS

<b>INTRODUCTION</b> .....	<b>1</b>
Research & development.....	4
Production .....	6
Logistics.....	8
Success through quality and innovation .....	10
Our branded products.....	12
Always close to you - 41 locations in 24 countries .....	14
Robotec Systems .....	16
Kabelmat Wickeltechnik.....	18
Chapter overview.....	20
<b>INDUSTRIAL CABLES &amp; WIRES</b> .....	<b>24</b>
<b>INFRASTRUCTURE CABLES &amp; WIRES</b> .....	<b>512</b>
<b>DATA, NETWORK &amp; BUS TECHNOLOGY</b> .....	<b>604</b>
<b>MEDIA TECHNOLOGY</b> .....	<b>764</b>
<b>RENEWABLE ENERGY &amp; TRANSPORTATION</b> .....	<b>794</b>
<b>PRE-ASSEMBLED CABLES</b> .....	<b>840</b>
<b>SPIRAL CABLES</b> .....	<b>906</b>
<b>SHIPWIRING &amp; MARINE CABLES</b> .....	<b>918</b>
<b>CABLE ACCESSORIES</b> .....	<b>940</b>
<b>TECHNICAL INFORMATION</b> .....	<b>1016</b>
Selection tables.....	1020
Assembly instructions .....	1034
Questionnaires.....	1038
Technical explanations .....	1044
Glossary of cables and wires.....	1151
Part number index.....	1158





## ■ RESEARCH & DEVELOPMENT

We develop optimal, tailored cable solutions for our customers.



Torsion test apparatus

### Our test facilities:

- Test systems for bending and torsion requirements
- Drag chain test systems with movement distances of 1 m, 3 m, 5 m, 6 m, 18 m, and 40 m
- Fire testing systems
- Abrasion testing systems
- Torsion test tower for wind turbine cables
- Aging ovens in accordance with UL, VDE, CSA, HAR, TÜV & CCC

Research and development are the foundation of our work and are an important engine for growth. In interdisciplinary teams we continuously push the boundaries to enhance our products and develop solutions to meet the latest technological demands. Moreover, we value our customer interactions and partnerships with regional colleges and research institutes to stay on top of emerging technologies.

The materials that we use are an important starting point of our work. In this regard, we place as much emphasis on searching for and utilizing new materials, as we do on manufacturing our plastic mixtures (granulates) ourselves, and influencing the improvement of technical characteristics, such as oil-resistance, temperature range or chemical compatibility. Moreover, we are capable of pulling a majority of the copper ourselves, thus ensuring a uniform,

high-quality product relative to properties and workmanship.

With continuous optimization of our manufacturing processes and systems we take into consideration both efficient and economical production, and the complex requirements of various applications (such as cables for industrial robots or for applications under cleanroom conditions) into account.

A crucial stage in the development process of our products is the work done at our Test Center. For example, cables suitable for drag chain implementation, can be tested using equipment that accelerates cables up to 10 g.

Temperature ranges from -50° to +250° are simulated in a special climate-controlled environment so that drag chain cables can be tested for series production readiness in applications such as refrigerated warehouses or steel mills.



Drag chain test system





## ■ PRODUCTION

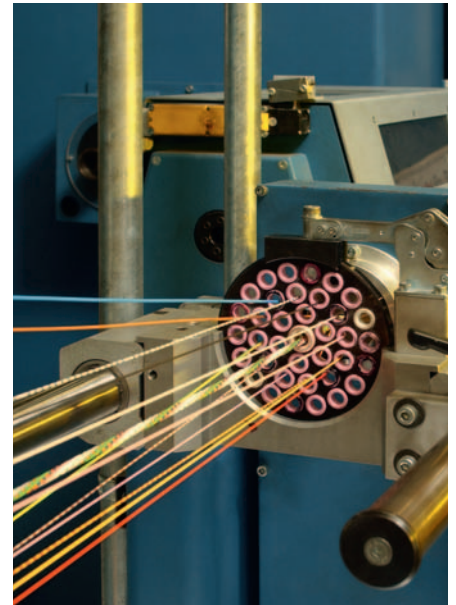
We specialize in the production of high-quality cables and wires.

Using the latest production methods, our two German plants manufacture approximately one million kilometers of conductors each year (= 77 times around the world). More than 300 qualified employees are specialized in the production of high-quality standard and custom cables. Through the use of the latest materials and collaboration with international test institutes, we drive innovation in the areas of automation, data technology, building system technology, and renewable energy.

Since 2014, in a 7,000 m<sup>2</sup> facility in the Chinese city of Taicang (approx. 50 km northwest of Shanghai) HELUKABEL® has been producing cable and wires, primarily for the Asian market. As is with our German plants, the focus is on high-quality, flexible and highly-flexible cables and wires that are manufactured in accordance with Chinese and international standards. The use of flexible manufacturing cells enable short delivery times.



Braiding machine



Stranding machine

Our production in numbers:

- 40,000 m<sup>2</sup> production area
- 23 extruder systems
- 19 stranding machines
- 50 braiding machines
- Cables & wires from 0.05 to 1,000 mm<sup>2</sup> (30 AWG to 2,000 kcmil)
- Manufacturing in accordance with: VDE, EAC (GOST-R), UL, CSA, HAR, CCC, Germanischer Lloyd, TÜV or customer specification







## ■ LOGISTICS

Redefining logistics in the cable industry.

### INDUSTRIAL CABLE

#### Our logistics center – Hemmingen/Stuttgart

- 40,500 Euro-pallet racks
- 16 aisles with 16 storage and retrieval devices
- 35,900 bin locations in the automatic small parts warehouse with a capacity of 1,000 bins per hour
- 670 storage spaces in the heavy load warehouse with max. reels of 4,000 kg and 2.20 m diameter
- 2 km conveyor line for pallets
- Conveyor connects direct to the cable-cutting machines
- Manual processes reduced to merely packing

### INFRASTRUCTURE CABLES

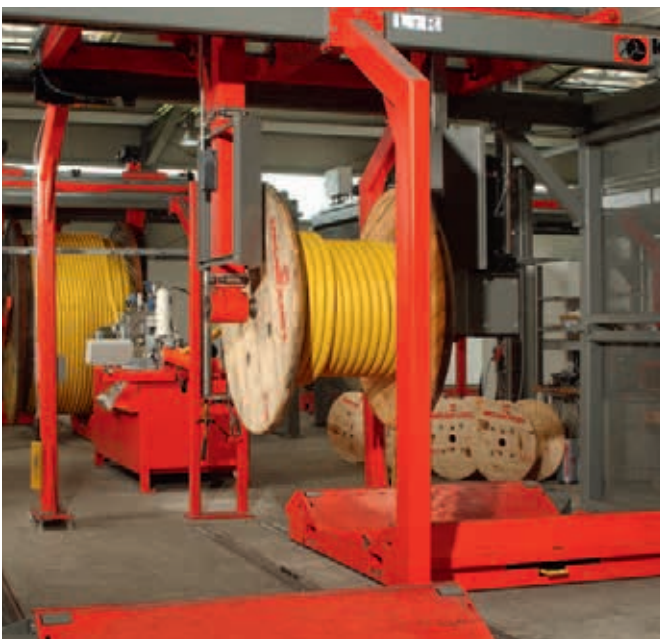
#### Our logistics center – Neuenhagen/Berlin

- 11,000 cable reels in stock
- Automatic processing of reels up to 2.80 m Ø and 10 t
- 10 rewinding machines
- Cut to length with state-of-the-art 1,200 mm<sup>2</sup> cutting tools
- 24-hr delivery is possible

At its corporate headquarters in the Swabian town of Hemmingen/Stuttgart, HELUKABEL® operates Europe's largest distribution center for cables and wires. Here a majority of the more than 33,000 products are located in a storage area of 160,000 m<sup>2</sup>. Through the use of state-of-the-art conveyor and control technology, more than 1,000 orders can be picked and dispatched daily to destinations around the world.

Neuenhagen/Berlin is the central warehouse location for underground, medium-voltage, and other infrastructure cables. Storage capacities of more than 5,000 m<sup>2</sup> (indoor) and 50,000 m<sup>2</sup> (outdoor) enable fast delivery of cable, configured from 1 – 30 kV, to construction sites and major projects. The patented heavy-load cable-cutting machines with a load capacity of more than 10 tons are the largest of their kind in Germany.

The new logistics center at the Taicang (Shanghai, China) production facility serves as a product distribution hub for the Asian market, and offers incredible advantages, particularly for servicing time- and volume-critical customer projects.



Heavy-load, cable-cutting facility



Small parts warehouse



# ■ SUCCESS THROUGH QUALITY AND INNOVATION

## Quality and environmental principles

HELUKABEL® GmbH is an independent enterprise that manufactures and sells cables, wires, and accessories. HELUKABEL® has a high commitment to quality and the environment. For this reason the executive board has introduced an integrated management system for quality and the environment based on DIN EN ISO 9001:2008 and DIN EN ISO 14001:2009 standards.

HELUKABEL® GmbH's quality and environmental policy is oriented to meet market needs and fulfill customer

requirements, as well as corporate environmental protection. Our standard is customer satisfaction and trust. Indicators of this are the economic success of the enterprise and long-standing customer relationships.

Fulfillment of our quality and environmental principles is an obligation and ongoing task of the executive board and each individual employee. Our high standards are expressed in the following criteria:

### Environment

Environmental protection in the enterprise is a principle of our work and is not only oriented to comply with legal requirements, but rather to avoid or minimize pollution and its effects on the environment.

### Employees

Qualified employees who work cooperatively in teams and combine a high level of individual responsibility and autonomy with a marked awareness of quality and the environment ensure the success of the management system at HELUKABEL® GmbH.

### Quality

Reliable products that meet the specifications to satisfy customer requirements.

### Objectives

Products complying with requirements and timely order processing, whereby environmental impact is avoided or kept to a minimum.

### Suppliers

Develop partnerships with suppliers who will work together with us to satisfy our quality and environmental standards.

### Conduct

Cost awareness and environmental awareness are maintained by every employee to satisfy customer requirements, while maintaining the ability to react effectively to changing circumstances.

### Approach

Upright action to maintain credibility in collaboration with our customers.

### Continuous improvement

Continuously develop and implement enhancements of the products, processes, environmental protection procedures, and occupational health and safety.



The integrated quality and environmental management system supports the success factors of HELUKABEL® GmbH and documents how we work; this is described in the management manual, which is binding for all employees.







## ■ OUR BRANDED PRODUCTS

### Cables & wires

- BIOFLEX-500® bio-oil resistant cables
- CLEANFLEX® cleanroom data and control cables
- DATAFLAMM® data and computer cables, halogen free
- DATAPUR-C® data and computer cables
- GALVANICABLE® high-voltage cathode cable
- HELUFLO® heat-resistant cables
- HELUTHERM® heat-resistant cables
- HELUTRAIN® train cables
- HELUTRUCK® vehicle cables/truck cables
- HELUWIND® wind power cables
- KOMPOFLEX® microbe-resistant cables
- KOMPOSPEED® bio-oil resistant drag chain cables
- LIFT-TRAGO® elevator control cables
- MEGAFLEX® flexible control cables, halogen free, UL/CSA
- MULTIFLEX 512® PUR drag chain cables
- MULTISPEED® drag chain cables
- NANOFLEX® PUR special control and data cables
- ROBOFLEX® robot cables
- SENSORFLEX® sensor cables
- SHIPFLEX® drag chain cables
- SOLARFLEX® photovoltaic cables
- SUPER-PAAR-TRONIC-C-PUR® drag chain cables, halogen free
- SUPERTRONIC® drag chain cables
- THERMFLEX® heat-resistant cables
- TOPFLEX® servo, feedback and motor cables
- TOPSERV® servo, feedback and motor cables
- TRAYCONTROL® exposed run cable
- TROMMPUR® easy-to-wind cables
- UNIPUR® PUR, flexible control cables

### Cable accessories

- HELUCHAIN® drag chain product line
- HELUTEK® industrial connector series
- HELUTOP® cable gland product line

### Data, network & bus technology

- HELUCOM® fiber optic cables
- HELUKAT® fiber optic connection technology
- HELUKAT® copper data cable
- HELUKAT® copper connection technology

### Media technology

- HELUEVENT® high-powered cable for TV studios
- HELULIGHT® cables for lighting control systems
- HELUSOUND® audio cable

# ■ ALWAYS CLOSE TO YOU - 41 LOCATIONS IN 24 COUNTRIES

## HELUKABEL® GmbH - Germany

### Headquarters

Dieselstrasse 8-12  
71282 Hemmingen / Stuttgart  
Telephone: +49 7150 9209-0  
Fax +49 7150 81786  
info@helukabel.de

### Sales office & warehouse - Berlin

Zum Mühlenfliess 1  
15366 Neuenhagen / Berlin  
Telephone +49 3342 2397-0  
Fax +49 3342 80033  
info@helukabel.de

### Sales office & warehouse - Pleiða

Eichelbergstrasse 7  
09212 Limbach-Oberfrohna  
Telephone +49 3722 6086-0  
Fax +49 3722 6086-420  
info@helukabel.de

### Sales office - North

Bahnhofstrasse 9  
25524 Itzehoe  
Telephone +49 4821 40394-0  
Fax +49 4821 40394-29  
info@helukabel.de

### Sales office - Rhein-Ruhr

Am Handwerkshof 2-4  
47269 Duisburg  
Telephone +49 203 73995-0  
Fax +49 203 73995-210  
info@helukabel.de

### Development & production

Neuseser Weg 11  
91575 Windsbach  
Telephone +49 9871 6793-0  
Fax +49 9871 1055  
info@helukabel.de

## Robotec Systems GmbH - Germany

### Head office

Carl-Friedrich-Gauß-Strasse 7  
47475 Kamp-Lintfort  
Telephone: +49 (0)2842 92148-0  
Fax: +49 (0)2842 92148-10  
www.robotec-systems.de  
info@robotec-systems.de

### Branch office - South

Willi-Bleicher-Strasse 4-6  
71282 Hemmingen  
Telephone: +49 (0)7150 9209-308  
Fax: +49 (0)7150 9209-164  
www.robotec-systems.de  
info-sued@robotec-systems.de

## Kabelmat Wickeltechnik GmbH - Germany

Steinbuckelweg 25  
72293 Glatten  
Tel. +49 7443 9670-0  
Fax +49 7443 9670-39  
kabelmat@kabelmat.com

## HELUKABEL® international locations



### HELUKABEL® Austria

Tel: +43 7224 90555 0  
Email: office@helukabel.at



### HELUKABEL® Malaysia

Tel.: +603 7885 8724  
Email: sales@helukabel.com.my



### HELUKABEL® Switzerland

Tel.: +41 56 4181515  
Email: contact@helukabel.ch



### HELUKABEL® Belgium

Tel.: +32 24 81 00 20  
Email: info@helukabel.be



### HELUKABEL® Middle East

Tel.: +971 48 87 95 94  
Email: info@helukabel.ae



### HELUKABEL® Thailand

Tel.: +66 2927 3570 3  
Email: info@helukabel.co.th



### HELUKABEL® Canada

Tel.: +1 289 444 5040  
Email: sales@helukabel.ca



### HELUKABEL® Netherlands

Tel.: +31 495 499 049  
Email: info@helukabel.nl



### HELUKABEL® Turkey

Tel.: +90 212 502 41 95  
Email: info@helukabel.com.tr



### HELUKABEL® China

Tel.: +86 21 58693999  
Email: info@helukabel.com.cn



### HELUKABEL® Poland

Tel.: +48 46 85 80 10 0  
Email: biuro@helukabel.pl



### HELUKABEL® UK

Tel.: +44 151 345 0808  
Email: info@helukabel.co.uk



### HELUKABEL® Czech Republic

Tel.: +42 0312 672 620  
Email: prodej@helukabel.cz



### HELUKABEL® Russia

Tel.: +7 812 449 10 60  
Email: info@helukabel.ru



### HELUKABEL® USA

Tel.: +1 847 930 5118  
Email: sales@helukabel.com



### HELUKABEL® France

Tel.: +33 389 627562  
Email: info@helukabel.fr



### HELUKABEL® Singapore

Tel.: +65 65 54 6170  
Email: sales@helukabel.com.sg



### HELUKABEL® India

Tel.: +91 22 25 18 58 41  
Email: info@helukabel.in



### HELUKABEL® South Africa

Tel.: +27 11 462 8752  
Email: info@helukabel.co.za



### HELUKABEL® Indonesia

Tel.: +62 213 848872  
Email: sales@helukabel.co.id



### HELUKABEL® South Korea

Tel.: +82 51 9728646  
Email: info@helukabel.co.kr



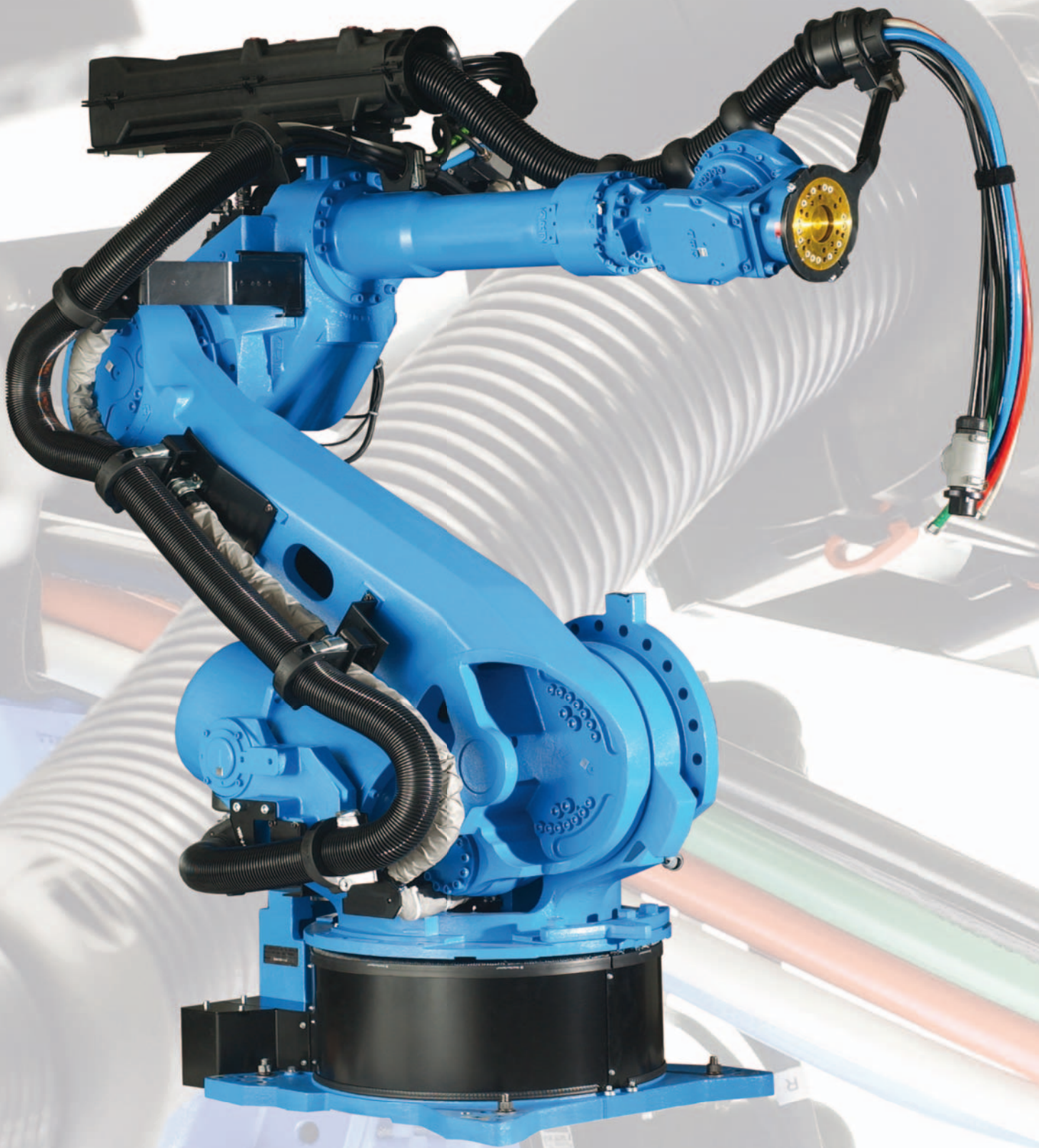
### HELUKABEL® Italy

Tel.: +39 039 6081503  
Email: info@helukabel.it



### HELUKABEL® Sweden

Tel.: +46 8 55 77 4280  
Email: info@helukabel.se







## ■ ROBOTEC SYSTEMS - UNMATCHED ROBOTIC COMPETENCE

Since its founding in 1998, Robotec Systems GmbH, headquartered in Kamp-Lintfort, Germany, has become one of the leading European companies for robot hose packages and associated fastening systems as well as for custom robot cables, cable assemblies, power screw-driver technology, controllers for measurement instrumentation and media systems such as air hoses and water hoses. The company has been a 100% subsidiary of HELUKABEL® GmbH since July 2012.

Robotec Systems develops tailored energy-supply systems that are pre-assembled

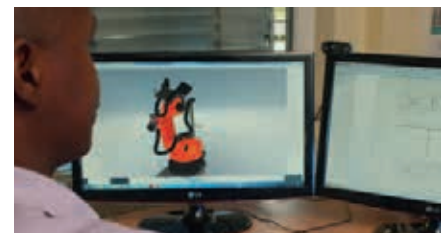
and ready to install. From the development of various design concepts to prototyping, to final installation and on-site service, Robotec is a single source for all robotic services.

Through the use of first-class components, as well as superstructures and material compositions tailored for the respective application, the highest level of reliability and productivity is achieved.

Robotec's products are used in applications, such as spot, laser and inert gas welding, robot handling, and tool changing systems.



Concept



Development



Prototyping



Installation/optimization



Documentation



Repair/maintenance

### Our components:

- Fastening elements & accessories
- Pivot bearings
- Spring clamps
- Protector /impact protection
- Trumpet & accessories
- Precision pipes
- Self-fastening hoses & accessories
- Cable protection hoses
- Attachment parts
- Primary cables
- Control cables
- BUS system cables
- Pre-assembled special cables

### Head office

Robotec Systems GmbH  
Carl-Friedrich-Gauß-Strasse 7  
47475 Kamp-Lintfort, Germany  
Telephone: +49 (0)2842 92148-0  
Fax: +49 (0)2842 92148-10  
www.robotec-systems.de  
info@robotec-systems.de

### Branch office – South

Robotec Systems GmbH  
Willi-Bleicher-Strasse 4-6  
71282 Hemmingen  
Telephone: +49 (0)7150 9209-308  
Fax: +49 (0)7150 9209-164  
www.robotec-systems.de  
info-sued@robotec-systems.de





## ■ KABELMAT WICKELTECHNIK GMBH

Kabelmat Wickeltechnik GmbH's history goes back to the 1960s and since then the company has been among the market leaders for winding systems in the cable and wire industry.

Customers include manufacturers, retailers, cable and wire processors, as well as cable assemblers, electricians, machine manufacturing companies, and many more.

The product range includes virtually all devices and machines for storing, winding and cutting cables, wires, rope, tubes, hoses, and profiles.

Winding from and onto drums, as well as from drums to rings are among the tasks that are efficiently executed worldwide with Kabelmat products.

We would be pleased to show you our products in our showroom. You are cordially invited to visit us at our facility.



MESSBOI® 40

### We offer:

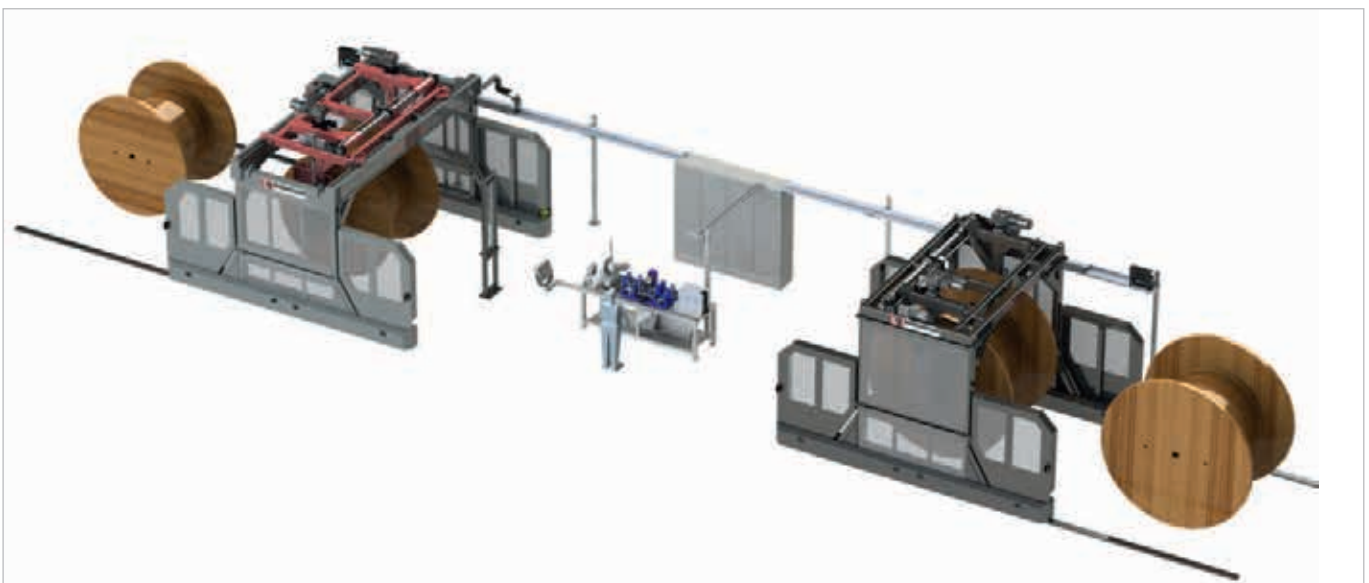
- Manual winding technology
- Automatic winding technology
- Measuring technology
- Storage technology

### Our services:

- Project planning & engineering
- Manufacturing & final assembly
- Service & maintenance

### Kabelmat Wickeltechnik GmbH

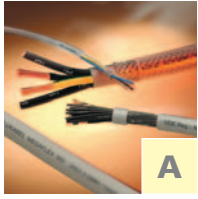
Steinbuckelweg 25  
72293 Glatten  
Tel. + 49 7443 9670-0  
Fax + 49 7443 9670-39  
kabelmat@kabelmat.com



PORTROL® 2600 - 3000

# CHAPTER OVERVIEW

## INDUSTRIAL CABLES & WIRES



### Flexible control cables

26 - 121

#### with international approvals

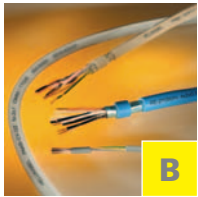
355 - 401

A



### Robot cables

260 - 267



### Data and computer cables

122 - 157

#### with international approvals

402 - 421

B



### Water-resistant cables

268 - 273



### Drag chain cables

158 - 193

#### with international approvals

422 - 451

C



### Flat & ribbon cables

274 - 283



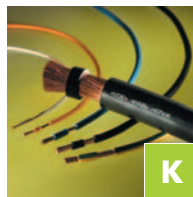
### Motor, servo & feedback cables

194 - 217

#### with international approvals

452 - 474

D

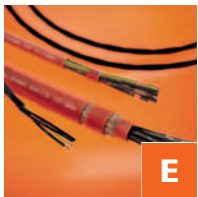


### Single Conductors

284 - 323

#### with international approvals

484 - 506



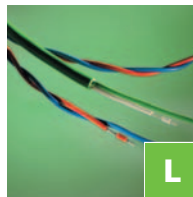
### Heat-resistant cables

218 - 237

#### with international approvals

475 - 478

E



### Compensating cables

324 - 335



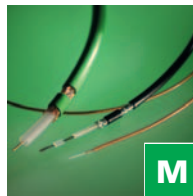
### Allweather & rubber cables

238 - 251

#### with international approvals

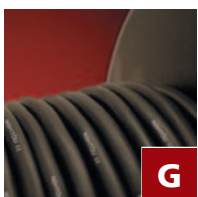
479 - 481

F



### Coaxial cables

336 - 347



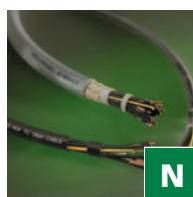
### Trailing cables

252 - 259

#### with international approvals

483

G



### Cables according to International Approvals

348 - 511

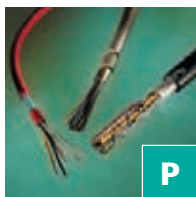
## INFRASTRUCTURE CABLES & WIRES



### Installation cables

512 - 521

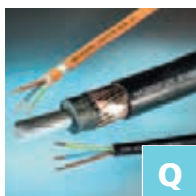
---



### Telephone & fire warning cables

522 - 533

---

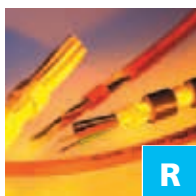


### Power, security & medium voltage cables

534 - 603

---

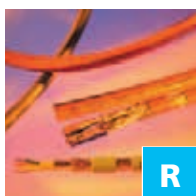
## DATA, NETWORK & BUS TECHNOLOGY



### Fiber optic cables

604 - 651

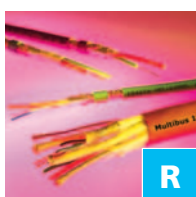
---



### Copper data cable

652 - 683

---



### BUS cables

684 - 763

---

## MEDIA TECHNOLOGY



### Media technology

764 - 793

---

## RENEWABLE ENERGY & TRANSPORTATION



### Cables for photovoltaic installations

794 - 801

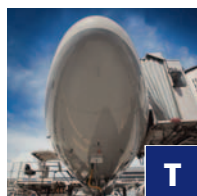
---



### Cables for wind turbines

802 - 821

---



### Cables for aircraft supply

822 - 825

---



### Cables for commercial vehicles

826 - 831

---



### Cables for train & traffic

832 - 839

---





# CHAPTER OVERVIEW

## PRE-ASSEMBLED CABLES



Servo motor, feedback & fan cables

840 - 877

U



ROBOFLEX® recycle

878 - 897

U



Connecting cables & extensions

898 - 905

U

## SPIRAL CABLES



Spiral cables

906 - 917

V

## CABLE ACCESSORIES



Cable glands

942 - 967

X



Cable protection tube systems

968 - 975

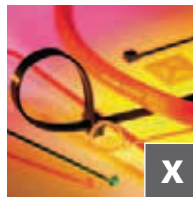
X



Shrink tubes

976 - 979

X



Cable ties

980 - 985

X



Core end sleeves & cable lugs

986 - 999

X

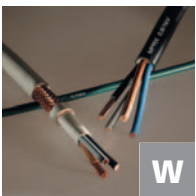


Tools

1002 - 1017

X

## SHIPWIRING & MARINE CABLES



Shipwiring & marine cables

918 - 939

W

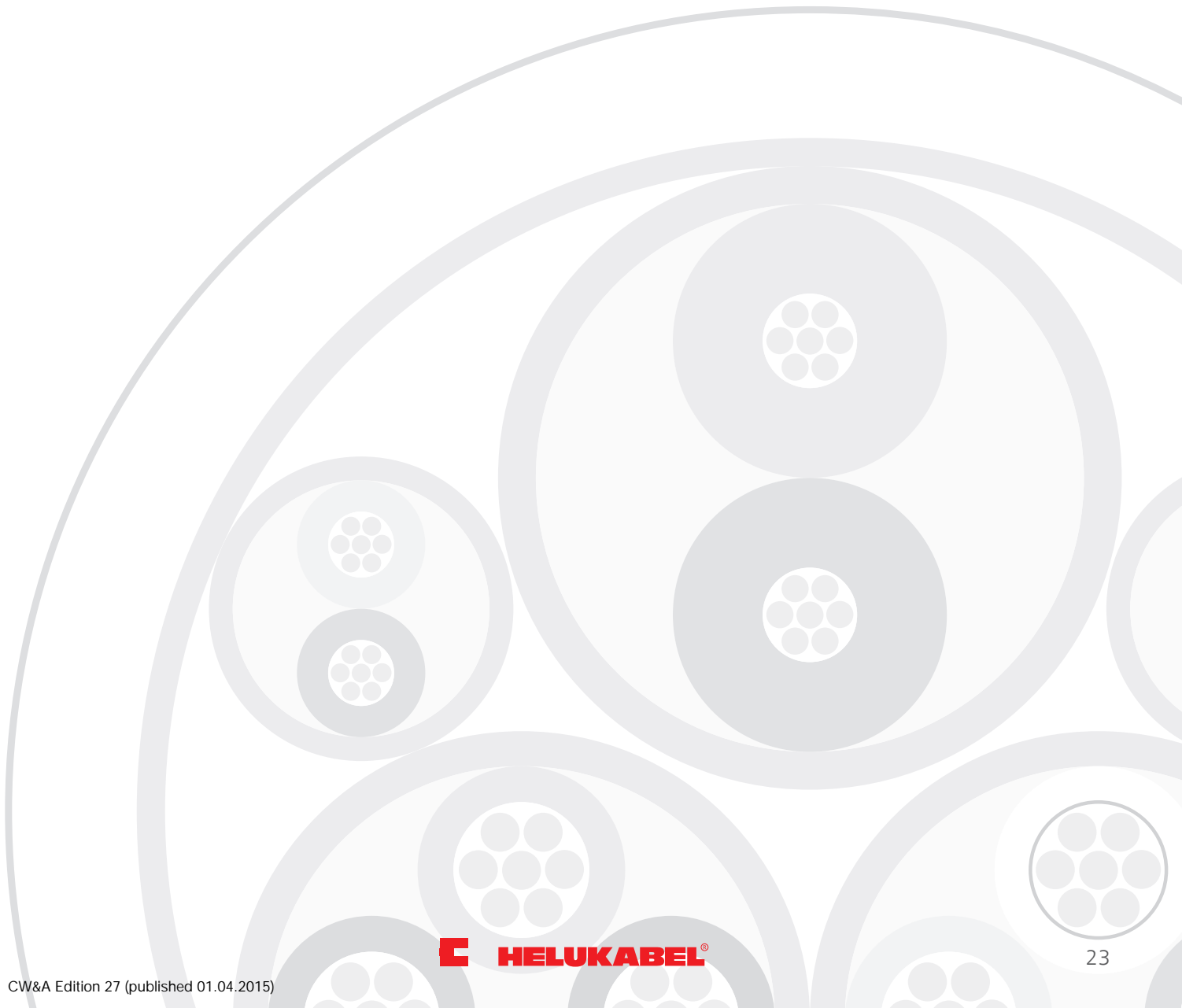
## TECHNICAL INFORMATION

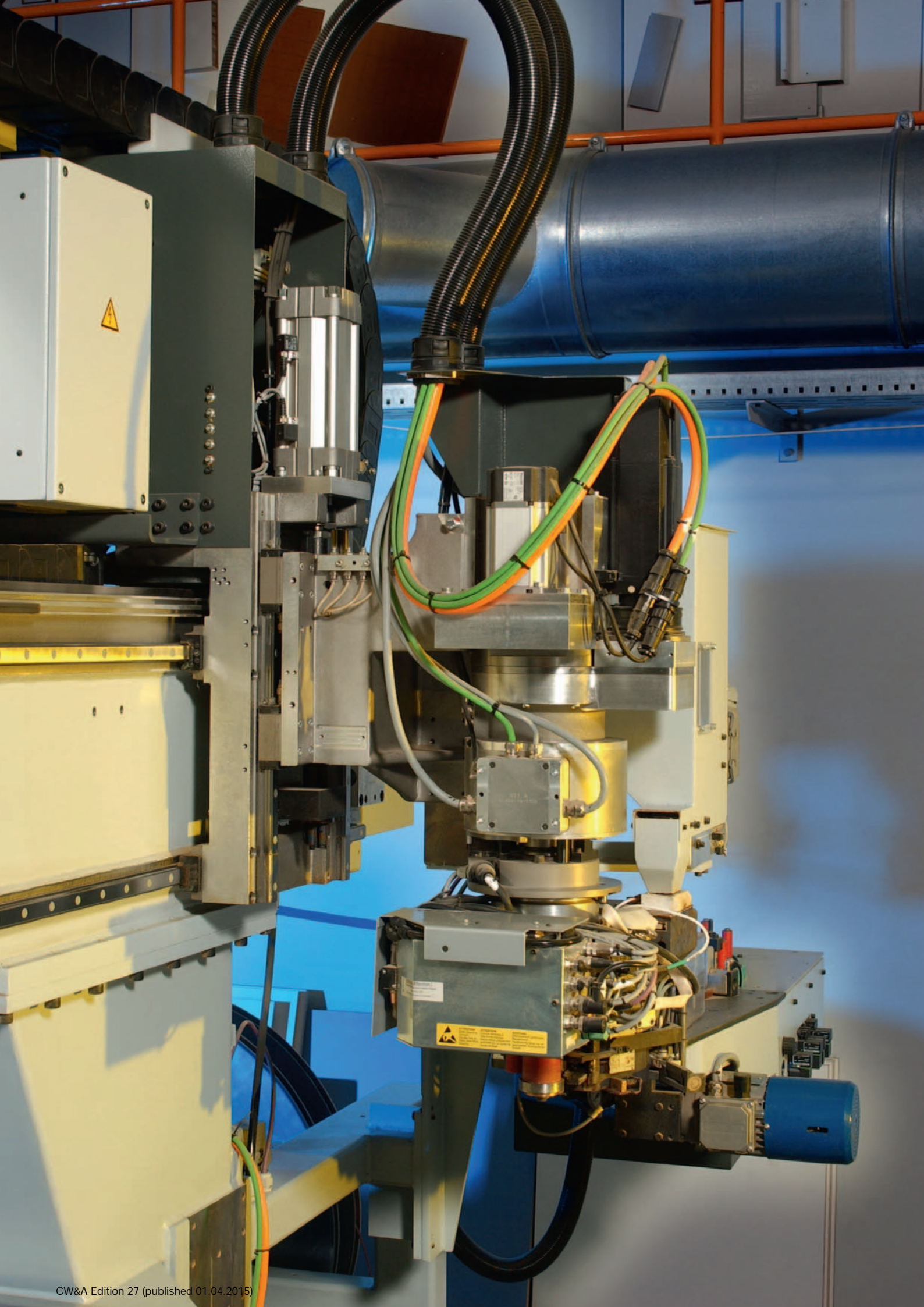


Technical information

1018 - 1172

---







## ■ INDUSTRIAL CABLES & WIRES

Flexible control cables 26

---

Data and computer cables 122

---

Drag chain cables 158

---

Motor, servo & feedback cables 194

---

Heat-resistant cables 218

---

Allweather & rubber cables 238

---

Trailing cables 252

---

Robot cables 260

---

Water resistant cables 268

---

Flat & ribbon cables 274

---

Single conductors 284

---

Compensating cables 324

---

Coaxial cables 336

---

Cables according to International approvals 348

H05VV-F

H03VV-F JZ-500 black

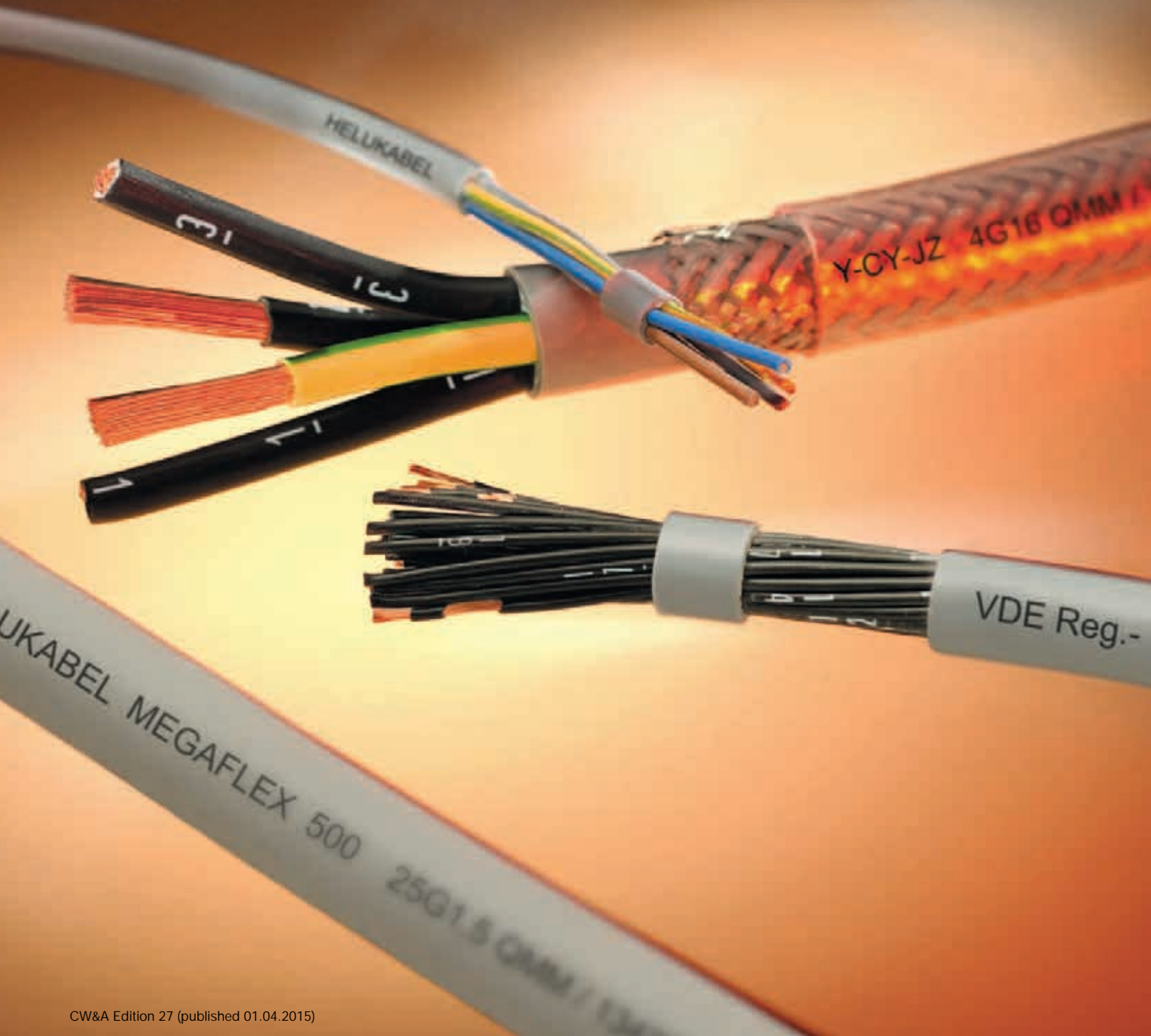
JZ-500 COLD

JB-500

# JZ-500

H05VV5-F (NYSLYÖ-JZ) JB-750

JZ-600 JB-750 yellow



# FLEXIBLE CONTROL CABLES

A

Temperature (°C) - flexing

Temperature (°C) - fixed

Nominal voltage U<sub>0</sub>/U

Bending radius - flexing x Ø

Bending radius - fixed x Ø

Halogen-free

UV-resistant

Outdoor use

Drag Chain

Colored cores/VDE 0293

Screened/shielded

HAR/VDE REG no./VDE  
UL/CSA

Page

PVC control cables														
	Temperature (°C) - flexing	Temperature (°C) - fixed	Nominal voltage U <sub>0</sub> /U	Bending radius - flexing x Ø	Bending radius - fixed x Ø	Halogen-free	UV-resistant	Outdoor use	Drag Chain	Colored cores/VDE 0293	Screened/shielded	HAR/VDE REG no./VDE	UL/CSA	Page
JZ-500	-15 to +80	-40 to +80	300/500	7.5x	4x							X		30
JZ-500 black	-15 to +80	-40 to +80	300/500	7.5x	4x	X	X							32
JZ-500 orange	-15 to +80	-40 to +80	300/500	7.5x	4x						X			33
JZ-500 COLD	-30 to +80	-40 to +80	300/500	7.5x	4x			X						34
H05VV5-F (NYSLYÖ-JZ)	-5 to +70	-40 to +70	300/500	7.5x	4x						X			35
(H)05VV5-F ((N) YSLYÖ-JZ)	-5 to +70	-40 to +70	300/500	7.5x	4x						X			37
JZ-750	-15 to +80	-40 to +80	450/750	7.5x	4x									38
JZ-600	-15 to +80	-40 to +80	0.6/1 kV	7.5x	4x	X	X							40
JB-500	-15 to +80	-40 to +80	300/500	7.5x	4x				X		X			42
JB-750	-15 to +80	-40 to +80	450/750	7.5x	4x				X					43
JB-750 yellow	-15 to +80	-40 to +80	450/750	7.5x	4x				X					44
H03VV-F	-5 to +70	-40 to +70	300/300	7.5x					X		X			45
H05VV-F	-5 to +70	-40 to +70	300/500	7.5x					X		X			46
H05VV-F	-5 to +70	-40 to +70	300/500	7.5x					X		X			47
F-CY-OZ (LIY-CY)	-10 to +80	-40 to +80	300/500	10x	5x					X	X			48
F-CY-JZ	-10 to +80	-40 to +80	300/500	10x	5x					X	X			50
JZ-500 C black	-10 to +80	-40 to +80	300/500	10x	5x	X	X			X				52
Y-CY-JZ	-15 to +80	-40 to +80	300/500	10x	5x					X	X			53
SY-JZ	-15 to +80	-40 to +80	300/500	20x	6x					X	X			55
H05VVC4V5-K (NYSLYCYÖ-JZ)	-5 to +70	-40 to +70	300/500	10x	5x					X	X			57
(H)05VVC4V5-K ((N)YSLYCYÖ-JZ)	-5 to +70	-40 to +70	300/500	10x	5x					X	X			59
JZ-600-Y-CY	-15 to +80	-40 to +80	0.6/1 kV	10x	5x	X	X			X				60
Y-CY-JB	-15 to +80	-40 to +80	300/500	10x	5x				X	X	X			62
SY-JB	-15 to +80	-40 to +80	300/500	20x	6x				X	X	X			64
PUR control cables														
JZ-500 PUR	-15 to +80	-40 to +80	300/500	7.5x	4x	X	X							67
PURö-JZ	-20 to +80	-40 to +80	300/500	7.5x	4x	X	X							68
PUR-ORANGE	-15 to +80	-40 to +80	300/500	7.5x	4x	X	X	X						70
PUR-YELLOW	-15 to +80	-40 to +80	300/500	7.5x	4x	X	X	X						71
H05 BQ-F / H07 BQ-F (NGMH11YÖ)	-40 to +80	-50 to +90	300/500	5x	3x	X	X	X	X		X			72
UNIPUR®	-40 to +90		300/500	10x	5x	X	X	X	X	X		X		73
PUR-750	-40 to +80		300/500	10x	5x	X	X	X	X					75
JZ 500-FC-PUR	-10 to +80	-40 to +80	300/500	10x	5x	X	X			X				76
F-C-PURö-JZ	-20 to +80	-40 to +80	300/500	10x	5x	X	X			X				78
Yö-C-PURö-JZ	-20 to +80	-40 to +80	300/500	10x	5x	X	X			X				80
UNIPUR®-CP	-40 to +90		300/500	12.5x	7.5x	X	X	X	X	X	X			82
PUR-C-PUR	-40 to +80		300/500	10x	5x	X	X	X	X	X	X			84



# FLEXIBLE CONTROL CABLES

Temperature (°C) - flexing

Temperature (°C) - fixed

Nominal voltage U<sub>0</sub>/U  
Operating peak voltage

Bending radius - flexing x Ø

Bending radius - fixed x Ø

Halogen-free

UV-resistant

Outdoor use

Drag chain

Colored cores

Screened / shielded

HAR / VDE REG no. / VDE

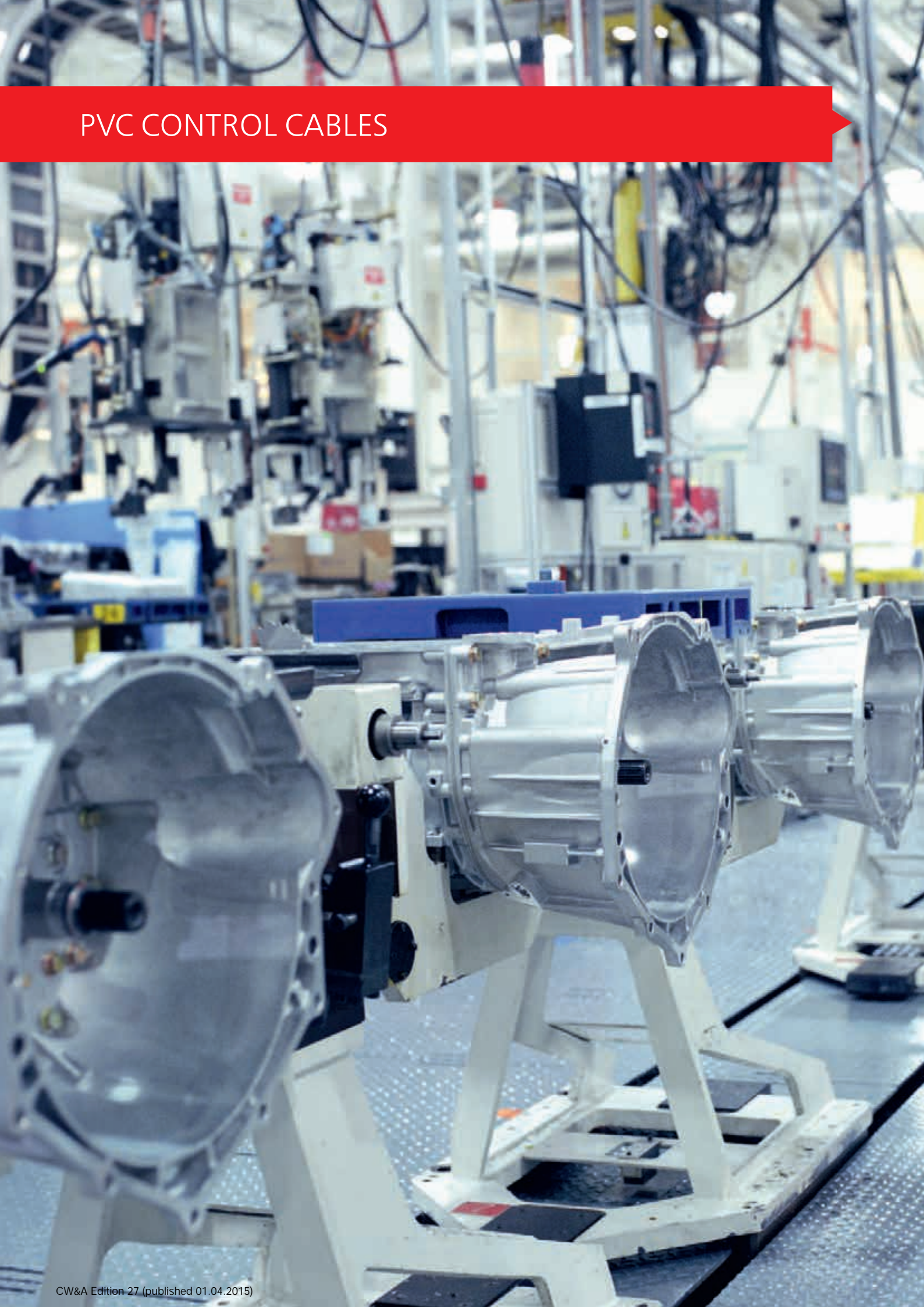
UL / CSA

Page

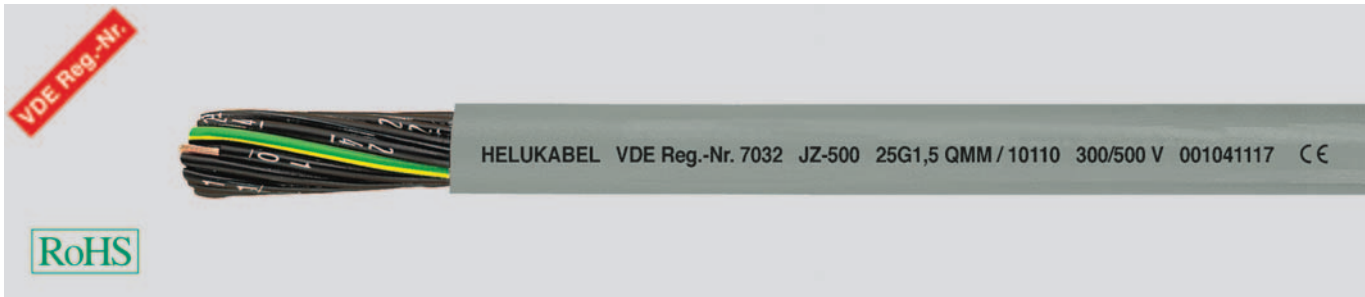
Halogen-free control cables														
JZ-500 HMH	-15 to +70	-40 to +70	300/500	12.5x	4x	X								86
MEGAFLEX® 500	-30 to +80	-40 to +80	300/500	10x	4x	X	X	X					X	88
H07 ZZ-F	-5 to +70	-20 to +70	450/750	10x	4x	X						X		90
JZ-600 HMH	-15 to +70	-40 to +70	0.6/1 kV	15x	7.5x	X		X						91
JB-750 HMH	-15 to +70	-40 to +70	450/750	12.5x	4x	X				X				93
(H)03 Z1Z1-F	-5 to +70	-40 to +70	300/500	7.5x		X				X				94
(H)05 Z1Z1-F	-5 to +70	-40 to +70	300/500	7.5x		X				X				95
JZ-500 HMH-C	-15 to +70	-40 to +70	200/500	12.5x	4x	X					X			96
MEGAFLEX® 500-C	-30 to +80	-40 to +80	300/500	10x	4x	X	X	X			X		X	98
JZ-600 HMH-C	-15 to +70	-40 to +70	0.6/1 kV	15x	7.5x	X		X			X			100
JB-750 HMH-C	-15 to +70	-40 to +70	450/750	12.5x	4x	X				X	X			102
Inherently safe PVC control cables														
OZ-BL	-15 to +80	-40 to +80	300/500	7.5x	4x							X		105
OZ-BL-CY	-10 to +80	-40 to +80	300/500	10x	5x						X	X		106
OB-BL-PAAR-CY	-10 to +80	-30 to +80	900	10x	5x					X	X			107
Bio-oil & microbe-resistant cables														
BIOFLEX-500®-JZ	-20 to +80	-40 to +80	300/500	15x	4x			X						109
BIOFLEX-500®-JZ-C	-20 to +80	-40 to +80	300/500	20x	6x			X			X			110
KOMPOFLEX® JZ-500	-30 to +90	-40 to +100	300/500	7.5x	4x	X	X	X						112
KOMPOFLEX® JZ-500-C	-30 to +90	-40 to +100	300/500	7.5x	4x	X	X	X			X			113
Hygienic cable														
NANOFLEX® HC*500	-5 to +80	-40 to +80	300/500	7.5x	4x		X	X						116
NANOFLEX® HC*500-C	-5 to +80	-40 to +80	300/500	10x	5x		X	X			X			117
NANOFLEX® HC*TRONIC	-5 to +80	-40 to +80	350	7.5x	4x		X	X		X	X			118
NANOFLEX® HC*TRONIC-C	-5 to +80	-40 to +80	350	10x	5x		X	X		X	X			120

The selection table is intended as an initial orientation.  
Please see the relevant page of the catalogue for detailed information on the product properties.

# PVC CONTROL CABLES





**JZ-500** flexible, number coded, meter marking**Technical data**

- Special-PVC control cable adapted to DIN VDE 0285-525-2-51 / DIN EN 50525-2-51
- **Temperature range**  
flexing -15°C to +80°C  
fixed installation -40°C to +80°C
- **Nominal voltage**  $U_0/U$  300/500 V
- **Test voltage** 4000 V
- **Breakdown voltage** min. 8000 V
- **Insulation resistance**  
min. 20 MOhm x km
- **Minimum bending radius**  
flexing 7,5x cable Ø  
fixed installation 4x cable Ø
- **Radiation resistance**  
up to 80x10<sup>6</sup> cJ/kg (up to 80 Mrad)

**Cable structure**

- Bare copper-conductor, to DIN VDE 0295 cl.5, fine-wire, BS 6360 cl.5, IEC 60228 cl.5
- Core insulation of special PVC compound type Z 7225
- Core identification to DIN VDE 0293 black cores with continuous white numbering (also available in other colours on request)
- GN-YE conductor, 3 cores and above in the outer layer
- Cores stranded in layers with optimal lay-length
- Outer sheath of special PVC compound type TM2 to DIN VDE 0207-363-4-1 / DIN EN 50363-4-1
- Sheath colour grey (RAL 7001)
- with meter marking

**Properties**

- Extensively oil resistant, oil-/chemical resistance see table Technical Informations
- conditional drag chain compatible
- conditional suitability for torsion
- The materials used in manufacture are cadmium-free and contain no silicone and free from substances harmful to the wetting properties of lacquers

**Tests**

- PVC self-extinguishing and flame retardant acc. to DIN VDE 0482-332-1-2, DIN EN 60332-1-2, IEC 60332-1 (equivalent DIN VDE 0472 part 804 test method B)

**Note**

- G = with green-yellow conductor  
x = without green-yellow conductor (OZ)
- We supply any "desired length" of stranded cores without outer sheath, core insulation colour acc. RAL 9005 with number combination acc. customers requirement.
- Please note the cleanroom qualification when ordering.
- AWG sizes are approximate equivalent values. The actual cross-section is in mm<sup>2</sup>.
- screened analogue type:  
**F-CY-JZ**, confer page 50  
**F-CY-OZ (LiY-CY)**, confer page 48  
**Y-CY-JB**, confer page 62  
**Y-CY-JZ**, confer page 53

**Application**

These cables are used for flexible use for medium mechanical stresses with free movement without tensile stress or forced movements in dry, moist and wet rooms but not suitable for open air, as measuring and control cables in tool machines, conveyor belts, production lines in machinery production, in air-conditioning and in steel production.

Selected PVC-compounds guarantee a good flexibility as well as an economic and fast installation.

CE = The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.	Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
10001	2 x 0,5	4,8	9,6	40,0	20	10025	50 G 0,5	17,5	240,0	513,0	20
10002	3 G 0,5	5,1	14,4	46,0	20	10169	52 G 0,5	17,5	252,0	534,0	20
10003	3 x 0,5	5,1	14,4	46,0	20	10026	61 G 0,5	18,5	293,0	625,0	20
10004	4 G 0,5	5,5	19,0	56,0	20	10027	65 G 0,5	19,4	312,0	682,0	20
10005	4 x 0,5	5,5	19,0	56,0	20	10028	80 G 0,5	21,4	384,0	780,0	20
10006	5 G 0,5	6,2	24,0	65,0	20	10029	100 G 0,5	24,0	480,0	980,0	20
10007	5 x 0,5	6,2	24,0	65,0	20	10030	2 x 0,75	5,3	14,4	46,0	19
10008	6 G 0,5	6,7	29,0	75,0	20	10031	3 G 0,75	5,6	21,6	54,0	19
10009	7 G 0,5	6,7	33,6	80,0	20	10032	3 x 0,75	5,6	21,6	54,0	19
10010	7 x 0,5	6,7	33,6	80,0	20	10033	4 G 0,75	6,3	28,8	66,0	19
10011	8 G 0,5	7,4	38,0	97,0	20	10034	4 x 0,75	6,3	29,0	66,0	19
10172	8 x 0,5	7,4	38,0	97,0	20	10035	5 G 0,75	6,9	36,0	80,0	19
10012	10 G 0,5	8,3	48,0	116,0	20	10036	5 x 0,75	6,9	36,0	80,0	19
10013	12 G 0,5	8,7	58,0	135,0	20	10037	6 G 0,75	7,5	43,0	99,0	19
10014	12 x 0,5	8,7	58,0	135,0	20	10177	6 x 0,75	7,5	43,0	99,0	19
10015	14 G 0,5	9,5	67,0	150,0	20	10038	7 G 0,75	7,5	50,0	110,0	19
10183	16 G 0,5	10,0	76,0	175,0	20	10039	7 x 0,75	7,5	50,0	110,0	19
10016	18 G 0,5	10,7	86,0	196,0	20	10040	8 G 0,75	8,3	58,0	130,0	19
10017	20 G 0,5	11,3	96,0	215,0	20	10173	8 x 0,75	8,3	58,0	130,0	19
10018	21 G 0,5	11,3	101,0	240,0	20	10041	9 G 0,75	8,9	65,0	153,0	19
10019	25 G 0,5	12,6	120,0	270,0	20	10042	10 G 0,75	9,2	72,0	162,0	19
10020	30 G 0,5	13,5	144,0	310,0	20	10043	12 G 0,75	9,8	86,0	179,0	19
10021	32 G 0,5	14,0	154,0	323,0	20	10044	12 x 0,75	9,8	86,0	179,0	19
10022	34 G 0,5	14,3	163,0	362,0	20	10045	14 G 0,75	10,6	101,0	214,0	19
10023	40 G 0,5	15,3	192,0	434,0	20	10046	15 G 0,75	11,4	108,0	218,0	19
10024	42 G 0,5	15,8	202,0	449,0	20	10047	18 G 0,75	12,2	130,0	257,0	19

Continuation ▶



**JZ-500** flexible, number coded, meter marking

A

Part no.	No. cores x cross-sec. mm²	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
10533	19 G 0,75	12,2	137,0	264,0	19
10048	20 G 0,75	12,7	144,0	286,0	19
10049	21 G 0,75	12,7	151,0	320,0	19
10050	25 G 0,75	14,3	180,0	365,0	19
10534	27 G 0,75	14,6	195,0	382,0	19
10051	32 G 0,75	15,9	230,0	455,0	19
10052	34 G 0,75	16,5	245,0	510,0	19
10182	37 G 0,75	16,7	266,0	537,0	19
10053	40 G 0,75	17,2	288,0	595,0	19
10054	41 G 0,75	18,1	296,0	607,0	19
10055	42 G 0,75	18,1	302,0	612,0	19
10056	50 G 0,75	19,8	360,0	735,0	19
10057	61 G 0,75	21,2	439,0	845,0	19
10178	65 G 0,75	21,8	468,0	895,0	19
10058	80 G 0,75	24,3	576,0	1070,0	19
10059	100 G 0,75	27,0	720,0	1322,0	19
10060	2 x 1	5,6	19,2	60,0	18
10061	3 G 1	5,9	29,0	72,0	18
10062	3 x 1	5,9	29,0	72,0	18
10063	4 G 1	6,6	38,4	86,0	18
10064	4 x 1	6,6	38,4	86,0	18
10065	5 G 1	7,3	48,0	104,0	18
10066	5 x 1	7,3	48,0	104,0	18
10067	6 G 1	8,1	58,0	125,0	18
10068	7 G 1	8,1	67,0	141,0	18
10069	7 x 1	8,1	67,0	141,0	18
10070	8 G 1	8,8	77,0	175,0	18
10071	9 G 1	9,7	86,0	200,0	18
10180	10 G 1	9,8	96,0	217,0	18
10170	10 x 1	9,8	96,0	217,0	18
10072	12 G 1	10,4	115,0	230,0	18
10073	12 x 1	10,4	115,0	230,0	18
10074	14 G 1	11,4	134,0	271,0	18
10075	16 G 1	12,3	154,0	300,0	18
10076	18 G 1	12,9	173,0	343,0	18
10174	18 x 1	12,9	173,0	343,0	18
10197	19 G 1	12,9	182,0	355,0	18
10077	20 G 1	13,8	192,0	375,0	18
10184	20 x 1	13,8	192,0	375,0	18
10179	21 G 1	13,8	205,0	420,0	18
10175	24 G 1	15,1	230,0	440,0	18
10078	25 G 1	15,4	240,0	485,0	18
10176	25 x 1	15,4	240,0	485,0	18
10196	26 G 1	15,5	252,0	500,0	18
10198	27 G 1	15,6	259,0	534,0	18
10168	30 x 1	16,4	308,0	550,0	18
10079	34 G 1	17,7	326,0	650,0	18
10080	36 G 1	17,9	346,0	668,0	18
10199	37 G 1	17,9	355,0	701,0	18
10081	40 G 1	18,5	384,0	755,0	18
10167	40 x 1	18,5	384,0	755,0	18
10082	41 G 1	19,5	394,0	770,0	18
10083	42 G 1	19,5	403,0	810,0	18
10084	50 G 1	21,3	480,0	936,0	18
10085	56 G 1	21,9	538,0	920,0	18
10086	61 G 1	22,5	586,0	1100,0	18
10087	65 G 1	23,6	628,0	1180,0	18
10088	80 G 1	26,1	768,0	1294,0	18
10089	100 G 1	28,8	960,0	1644,0	18
10090	2 x 1,5	6,4	29,0	70,0	16
10091	3 G 1,5	6,8	43,0	90,0	16
10092	3 x 1,5	6,8	43,0	90,0	16
10093	4 G 1,5	7,4	58,0	109,0	16
10094	4 x 1,5	7,4	58,0	109,0	16
10095	5 G 1,5	8,3	72,0	131,0	16
10096	5 x 1,5	8,3	72,0	131,0	16
10097	6 G 1,5	9,2	86,0	157,0	16
10098	7 G 1,5	9,2	101,0	184,0	16
10099	7 x 1,5	9,2	101,0	184,0	16
10100	8 G 1,5	10,0	115,0	216,0	16
10101	9 G 1,5	10,9	129,0	259,0	16
10181	10 G 1,5	10,9	144,0	275,0	16
10102	11 G 1,5	11,6	158,0	300,0	16
10103	12 G 1,5	11,8	173,0	309,0	16
10104	12 x 1,5	11,8	173,0	309,0	16
10105	14 G 1,5	13,0	202,0	345,0	16
10106	16 G 1,5	13,9	230,0	386,0	16

Part no.	No. cores x cross-sec. mm²	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
10107	18 G 1,5	14,6	259,0	440,0	16
10185	19 G 1,5	14,6	279,0	445,0	16
10108	20 G 1,5	15,6	288,0	490,0	16
10109	21 G 1,5	15,6	302,0	555,0	16
10110	25 G 1,5	17,4	360,0	620,0	16
10535	27 G 1,5	17,5	389,0	670,0	16
10111	32 G 1,5	19,5	461,0	790,0	16
10112	34 G 1,5	20,0	490,0	830,0	16
10536	37 G 1,5	20,2	533,0	892,0	16
10113	41 G 1,5	21,8	591,0	996,0	16
10114	42 G 1,5	21,8	605,0	1007,0	16
10115	50 G 1,5	24,2	720,0	1250,0	16
10116	56 G 1,5	24,9	806,0	1332,0	16
10117	61 G 1,5	25,8	878,0	1440,0	16
10187	65 G 1,5	26,8	936,0	1602,0	16
10118	80 G 1,5	29,8	1152,0	1871,0	16
10119	100 G 1,5	33,2	1440,0	2353,0	16
10120	2 x 2,5	7,8	48,0	112,0	14
10121	3 G 2,5	8,3	72,0	148,0	14
10122	3 x 2,5	8,3	72,0	148,0	14
10123	4 G 2,5	9,2	96,0	178,0	14
10124	4 x 2,5	9,2	96,0	178,0	14
10125	5 G 2,5	10,1	120,0	221,0	14
10126	5 x 2,5	10,1	120,0	221,0	14
10127	7 G 2,5	11,2	168,0	306,0	14
10128	7 x 2,5	11,2	168,0	306,0	14
10129	8 G 2,5	12,3	192,0	363,0	14
10548	10 G 2,5	14,1	240,0	429,0	14
10130	12 G 2,5	14,8	288,0	498,0	14
10131	14 G 2,5	16,0	336,0	569,0	14
10132	18 G 2,5	18,2	432,0	764,0	14
10133	21 G 2,5	19,2	504,0	914,0	14
10134	25 G 2,5	21,6	600,0	1044,0	14
10135	34 G 2,5	24,8	816,0	1470,0	14
10136	42 G 2,5	27,4	1008,0	1790,0	14
10137	50 G 2,5	30,0	1200,0	2095,0	14
10138	61 G 2,5	32,0	1464,0	2750,0	14
10139	100 G 2,5	41,4	2400,0	4450,0	14
10140	2 x 4	9,2	77,0	195,0	12
10141	3 G 4	9,8	115,0	230,0	12
10142	4 G 4	10,9	154,0	295,0	12
10143	5 G 4	12,1	192,0	361,0	12
10144	7 G 4	13,2	269,0	458,0	12
10145	8 G 4	14,7	307,0	590,0	12
10549	10 G 4	16,8	384,0	687,0	12
10146	12 G 4	17,7	461,0	790,0	12
10147	3 G 6	11,9	173,0	355,0	10
10148	4 G 6	13,0	230,0	424,0	10
10149	5 G 6	14,5	288,0	525,0	10
10150	7 G 6	16,2	403,0	625,0	10
10151	3 G 10	14,9	288,0	540,0	8
10152	4 G 10	16,5	384,0	701,0	8
10153	5 G 10	18,3	480,0	858,0	8
10154	7 G 10	20,2	672,0	1106,0	8
10190	3 G 16	18,3	461,0	827,0	6
10155	4 G 16	20,1	614,0	1035,0	6
10156	5 G 16	22,6	768,0	1259,0	6
10157	7 G 16	24,8	1075,0	1780,0	6
10191	3 G 25	22,3	720,0	1186,0	4
10158	4 G 25	25,0	960,0	1582,0	4
10159	5 G 25	27,7	1200,0	1999,0	4
10160	7 G 25	30,6	1680,0	2825,0	4
10192	3 G 35	25,9	1008,0	1585,0	2
10161	4 G 35	28,7	1344,0	2105,0	2
10162	5 G 35	31,9	1680,0	2633,0	2
10193	3 G 50	30,8	1440,0	2550,0	1
10163	4 G 50	34,1	1920,0	2940,0	1
10188	5 G 50	38,1	2400,0	2936,0	1
10194	3 G 70	36,4	2016,0	3180,0	2/0
10164	4 G 70	40,2	2688,0	4090,0	2/0
10189	5 G 70	44,7	3360,0	5443,0	2/0
10195	3 G 95	41,3	2736,0	4680,0	3/0
10165	4 G 95	46,0	3648,0	5540,0	3/0
10333	5 G 95	50,7	4560,0	6931,0	3/0
10166	4 G 120	51,0	4608,0	7000,0	4/0
13139	4 G 150	57,2	5760,0	8340,0	300 kcmil
13140	4 G 185	63,0	7104,0	9904,0	350 kcmil

Dimensions and specifications may be changed without prior notice. (RA01)



Suitable accessories can be found in Chapter X.

- Cable Gland - HELUTOP® HT-PA
- Cable Gland - HELUTOP® HT-MS

# JZ-500 black flexible, metermarking



HELUKABEL JZ-500 black 25G1,5QMM/10371 300/500V 0010917711 CE



## Technical data

- Special-PVC control cable adapted to DIN VDE 0285-525-2-51 / DIN EN 50525-2-51
- **Temperature range**  
flexing -15°C to +80°C  
fixed installation -40°C to +80°C
- **Nominal voltage** U<sub>0</sub>/U 300/500 V
- **Test voltage** 4000 V
- **Breakdown voltage** min. 8000 V
- **Insulation resistance**  
min. 20 MOhm x km
- **Minimum bending radius**  
flexing 7,5x cable Ø  
fixed installation 4x cable Ø
- **Radiation resistance**  
up to 80x10<sup>6</sup> cJ/kg (up to 80 Mrad)

## Cable structure

- Bare copper-conductor, to DIN VDE 0295 cl.5, fine-wire, BS 6360 cl.5, IEC 60228 cl.5
- Core insulation of special PVC compound type Z 7225
- Core identification to DIN VDE 0293 black cores with continuous white numbering
- GN-YE conductor, 3 cores and above in the outer layer
- Cores stranded in layers with optimal lay-length
- Outer sheath of special PVC compound type TM2 to DIN VDE 0207-363-4-1 / DIN EN 50363-4-1
- Sheath colour black (RAL 9005)
- with meter marking

## Properties

- Extensively oil resistant, oil-/chemical resistance see table Technical Informations
  - The materials used in manufacture are cadmium-free and contain no silicone and free from substances harmful to the wetting properties of lacquers
  - **UV-resistant**
- ### Tests
- PVC self-extinguishing and flame retardant acc. to DIN VDE 0482-332-1-2, DIN EN 60332-1-2, IEC 60332-1 (equivalent DIN VDE 0472 part 804 test method B)

## Note

- G = with green-yellow conductor  
x = without green-yellow conductor (OZ)
- AWG sizes are approximate equivalent values. The actual cross-section is in mm<sup>2</sup>.
- screened analogue type:  
**JZ-500-C black**, confer page 52

## Application

These cables are used for flexible use for medium mechanical stresses with free movement without tensile stress or forced movements in dry, moist and wet rooms and **in open air**. Must not be laid directly in soil or water. When screened for measurement, control and control line etc. in mechanical and plant engineering, machine tools, production lines and conveyor belts.

CE= The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

Part no.	No.cores x cross-sec. mm <sup>2</sup>	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
10340	2 x 0,5	5,4	9,6	40,0	20
10341	3 G 0,5	5,7	14,4	46,0	20
11630	3 x 0,5	5,7	14,4	46,0	20
10342	4 G 0,5	6,1	19,0	56,0	20
11631	4 x 0,5	6,1	19,0	56,0	20
10343	5 G 0,5	6,8	24,0	65,0	20
11632	5 x 0,5	6,8	24,0	65,0	20
10344	7 G 0,5	7,3	33,6	80,0	20
11633	7 x 0,5	7,3	33,6	80,0	20
10345	12 G 0,5	9,6	58,0	135,0	20
11634	12 x 0,5	9,6	58,0	135,0	20
10346	18 G 0,5	11,5	86,0	196,0	20
10347	25 G 0,5	13,5	120,0	270,0	20
10348	2 x 0,75	5,9	14,4	46,0	19
10349	3 G 0,75	6,2	21,6	54,0	19
11635	3 x 0,75	6,2	21,6	54,0	19
10350	4 G 0,75	6,7	28,8	66,0	19
11636	4 x 0,75	6,7	28,8	66,0	19
10351	5 G 0,75	7,5	36,0	80,0	19
11637	5 x 0,75	7,5	36,0	80,0	19
10352	7 G 0,75	8,3	50,0	110,0	19
11638	7 x 0,75	8,3	50,0	110,0	19
10353	12 G 0,75	10,8	86,0	179,0	19
11639	12 x 0,75	10,8	86,0	179,0	19
10354	18 G 0,75	12,8	130,0	257,0	19
10355	25 G 0,75	15,1	180,0	365,0	19
10356	2 x 1	6,2	19,2	60,0	18
10357	3 G 1	6,5	29,0	72,0	18
11640	3 x 1	6,5	29,0	72,0	18
10358	4 G 1	7,2	38,4	86,0	18
11641	4 x 1	7,2	38,4	86,0	18
10359	5 G 1	8,1	48,0	104,0	18
11642	5 x 1	8,1	48,0	104,0	18
10360	7 G 1	8,7	67,0	141,0	18
11643	7 x 1	8,7	67,0	141,0	18
10361	12 G 1	11,4	115,0	230,0	18
11644	12 x 1	11,4	115,0	230,0	18
10362	18 G 1	13,7	173,0	343,0	18

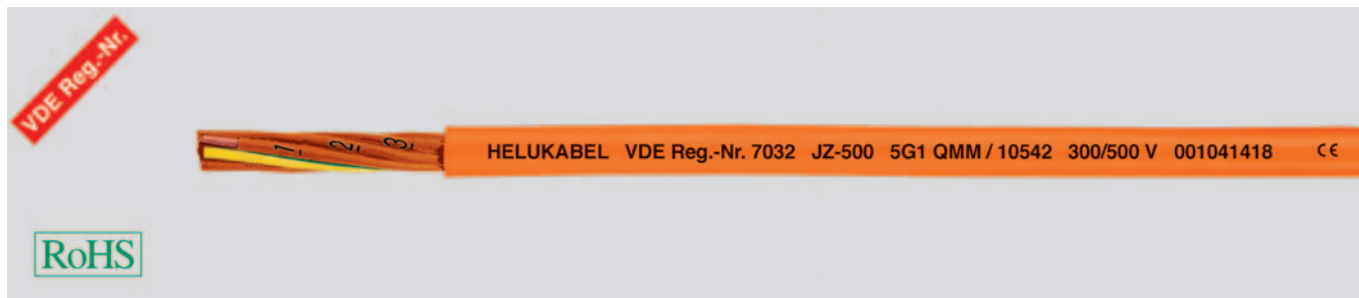
Part no.	No.cores x cross-sec. mm <sup>2</sup>	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
10363	25 G 1	16,2	240,0	485,0	18
10543	34 G 1	18,7	326,0	690,0	18
10364	2 x 1,5	7,0	29,0	70,0	16
10365	3 G 1,5	7,4	43,0	90,0	16
11645	3 x 1,5	7,4	43,0	90,0	16
10366	4 G 1,5	8,2	58,0	109,0	16
11646	4 x 1,5	8,2	58,0	109,0	16
10367	5 G 1,5	9,1	72,0	131,0	16
11647	5 x 1,5	9,1	72,0	131,0	16
10368	7 G 1,5	9,8	101,0	184,0	16
11648	7 x 1,5	9,8	101,0	184,0	16
10369	12 G 1,5	13,2	173,0	309,0	16
11649	12 x 1,5	13,2	173,0	309,0	16
10370	18 G 1,5	15,6	259,0	440,0	16
10371	25 G 1,5	18,6	360,0	620,0	16
10372	2 x 2,5	8,4	48,0	112,0	14
10373	3 G 2,5	8,9	72,0	148,0	14
11650	3 x 2,5	8,9	72,0	148,0	14
10374	4 G 2,5	9,8	96,0	178,0	14
11651	4 x 2,5	9,8	96,0	178,0	14
10375	5 G 2,5	10,9	120,0	221,0	14
11652	5 x 2,5	10,9	120,0	221,0	14
10376	7 G 2,5	12,0	168,0	306,0	14
11653	7 x 2,5	12,0	168,0	306,0	14
10377	12 G 2,5	15,9	288,0	498,0	14
11654	12 x 2,5	15,9	288,0	498,0	14
10378	18 G 2,5	19,0	432,0	764,0	14
10379	25 G 2,5	22,6	600,0	1044,0	14
10380	4 G 4	11,5	154,0	295,0	12
10381	5 G 4	12,8	192,0	361,0	12
10382	4 G 6	13,6	230,0	424,0	10
10383	5 G 6	15,1	288,0	525,0	10
10384	4 G 10	17,1	384,0	701,0	8
10388	5 G 10	18,9	480,0	909,0	8
10385	4 G 16	20,9	614,0	1035,0	6
10386	4 G 25	25,6	960,0	1582,0	4
10387	4 G 35	29,4	1344,0	2105,0	2

Dimensions and specifications may be changed without prior notice. (RA01)

# JZ-500 orange flexible, orange cores, control cable for interlocking purposes, meter marking



A



## Technical data

- Special-PVC control cable for interlocking purposes adapted to DIN VDE 0285-525-2-51 / DIN EN 50525-2-51
- **Temperature range**  
flexing -15°C to +80°C  
fixed installation -40°C to +80°C
- **Nominal voltage** U<sub>0</sub>/U 300/500 V
- **Test voltage** 4000 V
- **Breakdown voltage** min. 8000 V
- **Insulation resistance**  
min. 20 MOhm x km
- **Minimum bending radius**  
flexing 7,5x cable Ø  
fixed installation 4x cable Ø
- **Radiation resistance**  
up to 80x10<sup>6</sup> cJ/kg (up to 80 Mrad)

## Cable structure

- Bare copper-conductor, to DIN VDE 0295 cl.5, fine-wire, BS 6360 cl.5, IEC 60228 cl.5
- Core insulation of special PVC compound type Z 7225
- Core identification to DIN VDE 0293 orange cores with continuous black numbering
- JZ-version with GN-YE conductor 3 cores and above
- OZ-version without GN-YE conductor
- Cores stranded in layers with optimal lay-length
- Outer sheath of special PVC compound type TM2 to DIN VDE 0207-363-4-1/DIN EN 50363-4-1
- Sheath colour orange (RAL 2003)
- with meter marking

## Properties

- Extensively oil resistant, oil-/chemical resistance see table Technical Informations
- The materials used in manufacture are cadmium-free and contain no silicone and free from substances harmful to the wetting properties of lacquers

## Tests

- PVC self-extinguishing and flame retardant acc. to DIN VDE 0482-332-1-2, DIN EN 60332-1-2, IEC 60332-1 (equivalent DIN VDE 0472 part 804 test method B)

## Note

- G = with green-yellow conductor  
x = without green-yellow conductor (OZ)
- AWG sizes are approximate equivalent values. The actual cross-section is in mm<sup>2</sup>.

## Application

These cables are used for flexible use for medium mechanical stresses with free movement without tensile stress or forced movements in dry, moist and wet rooms but not suitable for open air, as control cable acc. to EN 60204 part 1 and VDE 0113 part 1. As per recommendation of the specified standards the insulated conductors of control current circuits should be coloured orange, when they are used for interlocking purposes. These control circuits are supplied with an external power and remain active under current when the main switch is disconnected or switched off.

CE The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
10537	2 x 1	5,6	19,2	60,0	18
10538	3 G 1	5,9	29,0	72,0	18
10539	3 x 1	5,9	29,0	72,0	18
10541	4 x 1	6,6	38,4	86,0	18
10540	4 G 1	6,6	38,4	86,0	18
10542	5 G 1	7,3	48,0	104,0	18
10544	2 x 1,5	6,4	29,0	70,0	16
10545	3 G 1,5	6,8	43,0	90,0	16

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
10546	4 G 1,5	7,4	58,0	109,0	16
10547	5 G 1,5	8,3	72,0	131,0	16
10747	3 G 2,5	8,3	72,0	148,0	14
10748	4 G 2,5	9,2	96,0	178,0	14
10749	5 G 2,5	10,1	120,0	221,0	14

Dimensions and specifications may be changed without prior notice. (RA01)



Suitable accessories can be found in Chapter X.

- Cable Gland - HELUTOP® HT-PA
- Cable Gland - HELUTOP® HT-MS



# JZ-500 COLD flexible at low temperature, number coded, meter marking



## Technical data

- Special-PVC control cable adapted to DIN VDE 0285-525-2-51 / DIN EN 50525-2-51
- **Temperature range**  
flexing -30°C to +80°C  
fixed installation -40°C to +80°C
- **Nominal voltage**  $U_0/U$  300/500 V
- **Test voltage** 4000 V
- **Breakdown voltage** min. 8000 V
- **Insulation resistance**  
min. 20 MOhm x km
- **Minimum bending radius**  
flexing 7,5x cable Ø  
fixed installation 4x cable Ø
- **Radiation resistance**  
up to 80x10<sup>6</sup> cJ/kg (up to 80 Mrad)

## Cable structure

- Bare copper-conductor, to DIN VDE 0295 cl.5, fine-wire, BS 6360 cl.5, IEC 60228 cl.5
- Core insulation of special PVC compound type Y14
- Core identification to DIN VDE 0293 black cores with continuous white numbering
- GN-YE conductor, 3 cores and above in the outer layer
- Cores stranded in layers with optimal lay-length
- Outer sheath of cold flexible special PVC
- Sheath colour black (RAL 9005)
- with meter marking

## Properties

- Extensively oil resistant, oil-/chemical resistance see table Technical Informations
  - The materials used in manufacture are cadmium-free and contain no silicone and free from substances harmful to the wetting properties of lacquers
- ### Tests
- PVC self-extinguishing and flame retardant acc. to DIN VDE 0482-332-1-2, DIN EN 60332-1-2, IEC 60332-1 (equivalent DIN VDE 0472 part 804 test method B)

## Note

- G = with green-yellow conductor  
x = without green-yellow conductor (OZ)
- AWG sizes are approximate equivalent values. The actual cross-section is in mm<sup>2</sup>.

## Application

This cold-flexible PVC hose cable is used under average stress for flexible applications with free movement, without tensile load and without forced motion guide in dry, moist, wet rooms and outside, as measuring and control cable at machine tools, conveyor belts and transport belts, production streets, in plant construction, in air condition construction and in refrigerated warehouses. Selected PVC mixtures guarantee good flexibility, efficient and fast installation.

CE= The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

Part no.	No.cores x cross-sec. mm <sup>2</sup>	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
10750	2 x 0,5	4,8	9,6	40,0	20
10751	3 G 0,75	5,6	21,6	54,0	19
10752	3 x 0,75	5,6	21,6	54,0	19
10753	4 G 0,75	6,3	28,8	66,0	19
10754	4 x 0,75	6,3	29,0	66,0	19
10755	5 G 0,75	6,9	36,0	80,0	19
10756	5 x 0,75	6,9	36,0	80,0	19
10757	7 G 0,75	7,5	50,0	110,0	19
10758	7 x 0,75	7,5	50,0	110,0	19
10759	12 G 0,75	9,8	86,0	179,0	19
10760	18 G 0,75	12,2	130,0	257,0	19
10761	25 G 0,75	14,3	180,0	365,0	19
10762	2 x 1	5,6	19,2	60,0	18
10763	3 G 1	5,9	29,0	72,0	18
10764	3 x 1	5,9	29,0	72,0	18
10765	4 G 1	6,6	38,4	86,0	18
10766	4 x 1	6,6	38,4	86,0	18
10767	5 G 1	7,3	48,0	104,0	18
10768	5 x 1	7,3	48,0	104,0	18
10769	7 G 1	8,1	67,0	141,0	18
10770	7 x 1	8,1	67,0	141,0	18
10771	12 G 1	10,4	115,0	230,0	18
10772	18 G 1	12,9	173,0	343,0	18
10773	25 G 1	15,4	240,0	485,0	18

Part no.	No.cores x cross-sec. mm <sup>2</sup>	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
10774	2 x 1,5	6,4	29,0	70,0	16
10775	3 G 1,5	6,8	43,0	90,0	16
10776	3 x 1,5	6,8	43,0	90,0	16
10777	4 G 1,5	7,4	58,0	109,0	16
10778	4 x 1,5	7,4	58,0	109,0	16
10779	5 G 1,5	8,3	72,0	131,0	16
10780	5 x 1,5	8,3	72,0	131,0	16
10781	6 G 1,5	9,2	86,0	157,0	16
10782	7 G 1,5	9,2	101,0	184,0	16
10783	7 x 1,5	9,2	101,0	184,0	16
10784	12 G 1,5	11,8	173,0	309,0	16
10785	18 G 1,5	14,6	259,0	440,0	16
10786	25 G 1,5	17,4	360,0	620,0	16
10787	2 x 2,5	7,8	48,0	112,0	14
10788	3 G 2,5	8,3	72,0	148,0	14
10789	3 x 2,5	8,3	72,0	148,0	14
10790	4 G 2,5	9,2	96,0	178,0	14
10791	4 x 2,5	9,2	96,0	178,0	14
10792	5 G 2,5	10,1	120,0	221,0	14
10793	5 x 2,5	10,1	120,0	221,0	14
10794	7 G 2,5	11,2	168,0	306,0	14
10795	7 x 2,5	11,2	168,0	306,0	14
10796	4 G 6	13,0	230,0	424,0	10
10797	5 G 6	14,5	288,0	525,0	10

Dimensions and specifications may be changed without prior notice. (RA01)



Suitable accessories can be found in Chapter X.

- Cable Gland - HELUTOP® HT-PA
- Cable Gland - HELUTOP® HT-MS

# H05VV5-F (NYSLYÖ-JZ) flexible, number coded, oil resistant, meter marking



A



## Technical data

- Spezial-PVC control cable with oil resistant outer sheath acc. to DIN VDE 0285-525-2-51 / DIN EN 50525-2-51 and IEC 60227/75
- **Temperature range**  
flexing -5°C to +70°C  
fixed installation -40°C to +70°C
- **Nominal voltage**  $U_0/U$  300/500 V
- **Test voltage** 2 kV, 5 minutes
- **Breakdown voltage** min. 4000 V
- **Insulation resistance**  
min. 20 MOhm x km
- **Minimum bending radius**  
flexing 7,5x cable  $\varnothing$   
fixed installation 4x cable  $\varnothing$
- **Radiation resistance**  
up to  $80 \times 10^6$  cJ/kg (up to 80 Mrad)

## Cable structure

- Bare copper-conductor, to DIN VDE 0295 cl.5, fine-wire, BS 6360 cl.5, IEC 60228 cl.5
- Core insulation of special PVC compound type T12 to DIN VDE 0207-363-3 / DIN EN 50363-3
- Core identification to DIN VDE 0293 black cores with continuous white numbering
- GN-YE conductor, 3 cores and above in the outer layer
- Outer sheath of special PVC compound type TMS5 to DIN VDE 0207-363-4-1/DIN EN 50363-4-1
- Sheath colour grey (RAL 7001)
- with meter marking

## Properties

- The materials used in manufacture are cadmium-free and contain no silicone and free from substances harmful to the wetting properties of lacquers

## Tests

- PVC self-extinguishing and flame retardant acc. to DIN VDE 0482-332-1-2, DIN EN 60332-1-2, IEC 60332-1 (equivalent DIN VDE 0472 part 804 test method B)
- Oil resistant to DIN EN 60811-404

## Note

- G = with green-yellow conductor  
x = without green-yellow conductor (OZ)
- AWG sizes are approximate equivalent values. The actual cross-section is in mm<sup>2</sup>.
- screened analogue type:  
**H05VVC4V5-K (NYSLYCYÖ-JZ)**, confer page 57

## Application

These cables are used for flexible use for medium mechanical stresses with free movement without tensile stress or forced movements in dry, moist and wet rooms but not suitable for open air. These are designed as control and connecting cables to machines, tool machineries, conveyor belts and production lines.

These cables are not effected to the chemical influences. Cables for moist and wet rooms, specially used for machines in breweries, bottling plants and car washing stations.

These cables may be allowed to move once installed provided that the cables are not mechanically stressed during movement.

CE = The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer Ø min. - max. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
13122	2 x 0,5	5,2 - 6,6	9,7	46,0	20
13001	3 G 0,5	5,5 - 7,0	14,4	54,0	20
13002	4 G 0,5	6,2 - 7,9	19,0	65,0	20
13003	5 G 0,5	6,8 - 8,6	24,0	80,0	20
13004	6 G 0,5	7,6 - 9,6	29,0	104,0	20
13005	7 G 0,5	8,3 - 10,4	33,6	119,0	20
13920	8 G 0,5	9,2 - 11,5	38,0	134,0	20
13006	9 G 0,5	10,1 - 12,5	43,0	136,0	20
13921	10 G 0,5	10,9 - 13,6	48,0	166,0	20
13007	12 G 0,5	10,4 - 12,9	58,0	186,0	20
13922	14 G 0,5	10,9 - 13,6	67,0	215,0	20
13008	18 G 0,5	12,3 - 15,3	86,0	251,0	20
13009	25 G 0,5	14,8 - 18,2	120,0	349,0	20
13923	27 G 0,5	15,1 - 18,6	129,6	373,0	20
13010	34 G 0,5	17,2 - 21,2	163,0	480,0	20
13924	36 G 0,5	17,0 - 20,9	172,0	510,0	20
13125	41 G 0,5	18,8 - 23,1	196,0	570,0	20
13011	50 G 0,5	20,5 - 25,2	240,0	658,0	20
13012	61 G 0,5	22,0 - 26,9	293,0	780,0	20
13925	65 G 0,5	22,8 - 28,0	312,0	810,0	20

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer Ø min. - max. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
13123	2 x 0,75	5,7 - 7,2	14,1	52,0	19
13013	3 G 0,75	6,0 - 7,6	21,6	68,0	19
13014	4 G 0,75	6,6 - 8,3	29,0	82,0	19
13015	5 G 0,75	7,4 - 9,3	36,0	107,0	19
13016	6 G 0,75	8,1 - 10,1	43,0	132,0	19
13017	7 G 0,75	9,0 - 11,3	50,0	145,0	19
13926	8 G 0,75	9,9 - 12,3	58,0	189,0	19
13018	9 G 0,75	10,6 - 13,2	65,0	194,0	19
13019	12 G 0,75	11,0 - 13,7	86,0	231,0	19
13927	14 G 0,75	11,7 - 14,5	101,0	274,0	19
13020	18 G 0,75	13,2 - 16,4	130,0	313,0	19
13021	25 G 0,75	15,8 - 19,5	180,0	461,0	19
13928	27 G 0,75	16,2 - 19,9	195,0	493,0	19
13022	34 G 0,75	18,4 - 22,6	245,0	614,0	19
13929	36 G 0,75	18,2 - 22,4	259,0	646,0	19
13126	41 G 0,75	20,1 - 24,6	295,0	730,0	19
13023	50 G 0,75	21,9 - 26,8	360,0	896,0	19
13024	61 G 0,75	23,4 - 28,7	439,0	1030,0	19
13930	65 G 0,75	24,4 - 29,8	468,0	1071,0	19

Continuation ▶

# H05VV5-F (NYSLYÖ-JZ) flexible, number coded, oil resistant, meter marking



Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer Ø min. - max. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
13119	2 x 1	5,9 - 7,5	19,0	66,0	18
13025	3 G 1	6,3 - 8,0	29,0	78,0	18
13026	4 G 1	6,9 - 8,7	38,0	104,0	18
13027	5 G 1	7,8 - 9,8	48,0	123,0	18
13028	6 G 1	8,7 - 10,8	58,0	152,0	18
13029	7 G 1	9,5 - 11,8	67,0	183,0	18
13931	8 G 1	10,5 - 13,0	77,0	220,0	18
13030	9 G 1	11,4 - 14,0	86,0	230,0	18
13031	12 G 1	11,8 - 14,6	115,0	269,0	18
13932	14 G 1	12,6 - 14,6	134,0	361,0	18
13032	18 G 1	14,0 - 17,2	173,0	400,0	18
13933	19 G 1	13,6 - 16,8	183,0	413,0	18
13033	25 G 1	16,9 - 20,8	240,0	546,0	18
13934	27 G 1	17,0 - 21,0	259,0	582,0	18
13034	34 G 1	19,7 - 24,1	326,0	724,0	18
13124	36 G 1	19,4 - 23,8	348,0	775,0	18
13935	37 G 1	19,4 - 23,8	355,0	785,0	18
13127	41 G 1	21,4 - 26,2	392,0	822,0	18
13035	50 G 1	23,3 - 28,5	480,0	1052,0	18
13036	61 G 1	25,0 - 30,6	586,0	1265,0	18
13936	65 G 1	25,2 - 30,8	624,0	1315,0	18
13120	2 x 1,5	6,8 - 8,6	29,0	77,0	16
13037	3 G 1,5	7,4 - 9,4	43,0	97,0	16
13038	4 G 1,5	8,2 - 10,2	58,0	128,0	16
13039	5 G 1,5	9,1 - 11,4	72,0	149,0	16
13040	6 G 1,5	10,2 - 12,6	86,0	196,0	16
13041	7 G 1,5	11,3 - 14,1	101,0	216,0	16
13937	8 G 1,5	12,2 - 15,1	115,0	271,0	16
13042	9 G 1,5	13,3 - 16,5	130,0	282,0	16
13043	12 G 1,5	13,8 - 17,0	173,0	324,0	16
13121	14 G 1,5	14,7 - 18,1	202,0	372,0	16
13044	18 G 1,5	16,5 - 20,3	259,0	485,0	16
13938	19 G 1,5	16,7 - 20,5	274,0	495,0	16
13045	25 G 1,5	19,9 - 24,4	360,0	671,0	16
13939	27 G 1,5	20,3 - 24,9	389,0	695,0	16
13046	32 G 1,5	22,2 - 27,1	461,0	820,0	16
13047	34 G 1,5	23,0 - 28,2	490,0	881,0	16
13940	36 G 1,5	23,0 - 28,2	518,0	905,0	16
13941	37 G 1,5	23,0 - 28,2	532,0	920,0	16
13128	41 G 1,5	25,2 - 30,9	590,0	1085,0	16
13048	50 G 1,5	27,7 - 33,9	720,0	1381,0	16
13049	61 G 1,5	29,4 - 35,8	878,0	1640,0	16
13942	65 G 1,5	30,3 - 37,0	963,0	1730,0	16

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer Ø min. - max. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
13943	2 x 2,5	8,4 - 10,6	48,0	110,0	14
13050	3 G 2,5	9,2 - 11,4	72,0	154,0	14
13051	4 G 2,5	10,1 - 12,5	96,0	212,0	14
13052	5 G 2,5	11,2 - 13,9	120,0	242,0	14
13053	7 G 2,5	13,6 - 16,8	168,0	350,0	14
13945	8 G 2,5	14,9 - 18,3	192,0	379,0	14
13054	12 G 2,5	16,8 - 20,6	288,0	543,0	14
13946	14 G 2,5	17,8 - 20,6	336,0	611,0	14
13055	18 G 2,5	20,2 - 24,8	432,0	787,0	14
13056	25 G 2,5	24,2 - 29,6	600,0	1175,0	14
13947	27 G 2,5	24,7 - 30,2	648,0	1280,0	14
13057	34 G 2,5	28,2 - 34,5	816,0	1529,0	14
13948	36 G 2,5	28,0 - 34,2	864,0	1791,0	14
13949	41 G 2,5	30,4 - 37,1	984,0	1905,0	14
13058	50 G 2,5	33,0 - 40,3	1200,0	2290,0	14
13059	61 G 2,5	35,0 - 42,7	1464,0	2724,0	14

Dimensions and specifications may be changed without prior notice. (RA01)



Suitable accessories can be found in Chapter X.

- Cable Gland - HELUTOP® HT-PA
- Cable Gland - HELUTOP® HT-MS



# (H)05VV5-F ((N)YSLYÖ-JZ) flexible, number coded, oil resistant, meter marking



A



## Technical data

- Spezial-PVC control cable with oil resistant outer sheath adapted to DIN VDE 0285-525-2-51 / DIN EN 50525-2-51 and IEC 60227/75 deviation of conductor cross sections
- **Temperature range**  
flexing -5°C to +70°C  
fixed installation -40°C to +70°C
- **Nominal voltage**  $U_0/U$  300/500 V
- **Test voltage** 2 kV, 5 minutes
- **Breakdown voltage** min. 4000 V
- **Insulation resistance**  
min. 20 MOhm x km
- **Minimum bending radius**  
flexing 7,5x cable  $\varnothing$   
fixed installation 4x cable  $\varnothing$
- **Radiation resistance**  
up to  $80 \times 10^6$  Cj/kg (up to 80 Mrad)

## Cable structure

- Bare copper-conductor, to DIN VDE 0295 cl.5, fine-wire, BS 6360 cl.5, IEC 60228 cl.5
- Core insulation of special PVC compound type T12 to DIN VDE 0207-363-3 / DIN EN 50363-3
- Core identification to DIN VDE 0293 black cores with continuous white numbering
- GN-YE conductor, 3 cores and above in the outer layer
- Cores stranded in layers with optimal lay-length
- Outer sheath of special PVC compound type TM5 to DIN VDE 0207-363-4-1/DIN EN 50363-4-1
- Sheath colour grey (RAL 7001)
- with meter marking

## Properties

- The materials used in manufacture are cadmium-free and contain no silicone and free from substances harmful to the wetting properties of lacquers
- ### Tests
- PVC self-extinguishing and flame retardant acc. to DIN VDE 0482-332-1-2, DIN EN 60332-1-2, IEC 60332-1 (equivalent DIN VDE 0472 part 804 test method B)
  - Oil resistant to DIN EN 60811-404

## Note

- G = with green-yellow conductor  
x = without green-yellow conductor (OZ)
- AWG sizes are approximate equivalent values. The actual cross-section is in mm<sup>2</sup>.
- screened analogue type:  
**(H)05VVC4V5-K**, confer page 59

## Application

These cables are used for flexible use for medium mechanical stresses with free movement without tensile stress or forced movements in dry, moist and wet rooms but not suitable for open air. These are designed as control and connecting cables to machines, tool machineries, conveyor belts and production lines.

These cables are not effected to the chemical influences. Cables for moist and wet rooms, specially used for machines in breweries, bottling plants and car washing stations.

CE= The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
13133	2 x 4	10,7	77,0	195,0	12
13134	3 G 4	11,3	115,0	230,0	12
13135	4 G 4	12,4	154,0	295,0	12
13136	5 G 4	13,9	192,0	361,0	12
13138	7 G 4	16,6	269,0	466,0	12
13141	12 G 4	20,8	461,0	810,0	12
13142	2 x 6	12,0	116,0	280,0	10
13143	3 G 6	12,9	173,0	358,0	10
13144	4 G 6	14,2	230,0	424,0	10
13145	5 G 6	15,9	288,0	525,0	10
13146	7 G 6	18,9	403,0	625,0	10
13148	3 G 10	16,3	288,0	540,0	8
13149	4 G 10	18,1	384,0	701,0	8
13150	5 G 10	20,3	480,0	858,0	8
13151	7 G 10	24,3	672,0	1106,0	8

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
13153	3 G 16	18,8	461,0	827,0	6
13154	4 G 16	20,9	614,0	1035,0	6
13155	5 G 16	23,4	768,0	1259,0	6
13156	7 G 16	28,5	1075,0	1780,0	6
13159	4 G 25	26,3	960,0	1582,0	4
13160	5 G 25	29,5	1200,0	1852,0	4
13161	3 G 35	26,5	1008,0	1614,0	2
13162	4 G 35	29,5	1344,0	2110,0	2
13163	5 G 35	32,8	1680,0	2652,0	2
13164	3 G 50	32,2	1440,0	2560,0	1
13165	4 G 50	36,1	1920,0	2972,0	1
13166	5 G 50	40,3	2400,0	3948,0	1

Dimensions and specifications may be changed without prior notice. (RA01)



Suitable accessories can be found in Chapter X.

- Cable Gland - HELUTOP® HT-PA
- Cable Gland - HELUTOP® HT-MS

**JZ-750** flexible, number coded, 750 V, meter marking

HELUKABEL JZ-750 25G2,5 QMM / 10880 450/750 V 001041521 CE

**Technical data**

- Special-PVC control cable adapted to DIN VDE 0285-525-2-51 / DIN EN 50525-2-51
- **Temperature range**  
flexing -15°C to +80°C  
fixed installation -40°C to +80°C
- **Nominal voltage** U<sub>0</sub>/U 450/750 V
- **Test voltage** 4000 V
- **Breakdown voltage** min. 8000 V
- **Insulation resistance**  
min. 20 MOhm x km
- **Minimum bending radius**  
flexing 7,5x cable Ø  
fixed installation 4x cable Ø
- **Radiation resistance**  
up to 80x10<sup>6</sup> cJ/kg (up to 80 Mrad)

**Cable structure**

- Bare copper-conductor, to DIN VDE 0295 cl.5, fine-wire, BS 6360 cl.5, IEC 60228 cl.5
- Core insulation of special PVC compound type T12 to DIN VDE 0207-363-3/DIN EN 50363-3
- Core identification to DIN VDE 0293 black cores with continuous white numbering
- GN-YE conductor, 3 cores and above in the outer layer
- Cores stranded in layers with optimal lay-length
- Outer sheath of special PVC compound type TM2 to DIN VDE 0207-363-4-1/DIN EN 50363-4-1
- Sheath colour grey (RAL 7001)
- with meter marking

**Properties**

- Extensively oil resistant, oil-/chemical resistance see table Technical Informations
- The materials used in manufacture are cadmium-free and contain no silicone and free from substances harmful to the wetting properties of lacquers

**Tests**

- PVC self-extinguishing and flame retardant acc. to DIN VDE 0482-332-1-2, DIN EN 60332-1-2, IEC 60332-1 (equivalent DIN VDE 0472 part 804 test method B)

**Note**

- G = with green-yellow conductor  
x = without green-yellow conductor (OZ)
- Cleanroom qualification tested with analog type. Please note "cleanroom qualified" when ordering.
- AWG sizes are approximate equivalent values. The actual cross-section is in mm<sup>2</sup>.

**Application**

These cables are used for flexible use for medium mechanical stresses with free movement without tensile stress or forced movements in dry, moist and wet rooms but not suitable for open air, wherever internationally recognized PVC cables are required. E. g. as a control or measurements cable on industrial machinery, on conveyor systems or in industrial plants, etc. The number coding has been brought onto the cores in such a way that it is easily identifiable and the core numbers are individually underlined to avoid confusion. The green-yellow earth core is laid in the outer layer.

CE= The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

Part no.	No.cores x cross-sec. mm <sup>2</sup>	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
10800	2 x 0,5	5,7	9,6	48,0	20
10801	3 G 0,5	6,0	14,5	65,0	20
10802	4 G 0,5	6,8	20,0	81,0	20
10803	5 G 0,5	7,4	24,0	98,0	20
10804	7 G 0,5	8,3	34,0	123,0	20
10805	8 G 0,5	9,1	38,0	155,0	20
10806	10 G 0,5	10,0	48,0	180,0	20
10807	12 G 0,5	10,8	58,0	208,0	20
10808	14 G 0,5	11,7	67,0	248,0	20
10809	16 G 0,5	12,5	76,0	260,0	20
10810	18 G 0,5	13,2	87,0	285,0	20
10811	21 G 0,5	13,8	96,0	375,0	20
10812	25 G 0,5	15,5	118,0	400,0	20
10813	30 G 0,5	16,6	144,0	475,0	20
10814	40 G 0,5	18,7	192,0	590,0	20
10815	50 G 0,5	21,5	240,0	710,0	20
10816	61 G 0,5	23,0	293,0	880,0	20
10817	2 x 0,75	6,2	15,0	60,0	19
10818	3 G 0,75	6,5	22,0	78,0	19
10819	4 G 0,75	7,3	29,0	104,0	19
10820	5 G 0,75	8,0	36,0	116,0	19
10821	7 G 0,75	8,9	51,0	148,0	19
10822	8 G 0,75	9,6	58,0	160,0	19
10823	10 G 0,75	10,7	72,0	195,0	19
10824	12 G 0,75	11,6	87,0	248,0	19
10825	15 G 0,75	13,2	108,0	295,0	19
10826	18 G 0,75	14,1	130,0	346,0	19
10827	21 G 0,75	14,8	151,0	395,0	19
10828	25 G 0,75	16,6	180,0	505,0	19
10829	34 G 0,75	19,3	245,0	684,0	19
10830	41 G 0,75	20,9	296,0	780,0	19
10831	50 G 0,75	22,9	360,0	940,0	19
10832	61 G 0,75	24,5	440,0	1125,0	19
10833	2 x 1	6,6	20,0	80,0	18

Part no.	No.cores x cross-sec. mm <sup>2</sup>	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
10834	3 G 1	7,0	29,0	92,0	18
10835	3 x 1	7,0	29,0	92,0	18
10836	4 G 1	7,8	39,0	122,0	18
10837	4 x 1	7,8	39,0	122,0	18
10838	5 G 1	8,6	48,0	137,0	18
10839	7 G 1	9,5	68,0	186,0	18
10840	7 x 1	9,5	68,0	186,0	18
10841	8 G 1	10,3	77,0	240,0	18
10842	12 G 1	12,7	116,0	293,0	18
10843	14 G 1	13,4	134,0	340,0	18
10844	16 G 1	14,4	154,0	400,0	18
10845	18 G 1	15,1	173,0	437,0	18
10846	21 G 1	16,1	205,0	505,0	18
10847	25 G 1	18,0	240,0	606,0	18
10848	34 G 1	20,9	326,0	770,0	18
10849	41 G 1	22,6	394,0	880,0	18
10850	50 G 1	24,8	480,0	1400,0	18
10851	61 G 1	26,5	586,0	1450,0	18
10852	2 x 1,5	7,2	29,0	90,0	16
10853	3 G 1,5	7,8	43,0	120,0	16
10854	3 x 1,5	7,8	43,0	120,0	16
10855	4 G 1,5	8,5	58,0	150,0	16
10856	4 x 1,5	8,5	58,0	155,0	16
10857	5 G 1,5	9,6	72,0	177,0	16
10858	7 G 1,5	10,4	101,0	220,0	16
10859	8 G 1,5	11,4	115,0	248,0	16
10860	9 G 1,5	12,5	130,0	278,0	16
10861	12 G 1,5	14,1	173,0	364,0	16
10862	14 G 1,5	14,9	202,0	390,0	16
10863	16 G 1,5	16,0	230,0	490,0	16
10864	18 G 1,5	17,0	259,0	550,0	16
10865	21 G 1,5	18,0	302,0	670,0	16
10866	25 G 1,5	20,2	360,0	745,0	16
10867	32 G 1,5	22,6	461,0	810,0	16

Continuation ▶

**JZ-750** flexible, number coded, 750 V, meter marking

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
10868	34 G 1,5	23,4	490,0	1010,0	16
10869	42 G 1,5	25,5	605,0	1115,0	16
10870	50 G 1,5	27,9	720,0	1430,0	16
10871	61 G 1,5	30,0	878,0	1750,0	16
10872	2 x 2,5	8,6	48,0	110,0	14
10873	3 G 2,5	9,3	72,0	190,0	14
10874	4 G 2,5	10,2	96,0	240,0	14
10875	5 G 2,5	11,4	120,0	270,0	14

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
10876	7 G 2,5	12,6	168,0	350,0	14
10877	12 G 2,5	16,9	288,0	600,0	14
10878	14 G 2,5	18,2	336,0	870,0	14
10879	18 G 2,5	20,4	432,0	1050,0	14
10880	25 G 2,5	24,4	600,0	1170,0	14

A

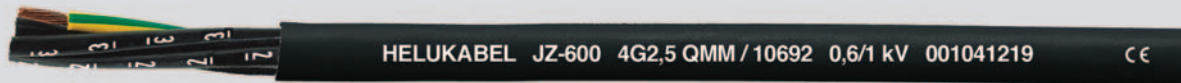
Dimensions and specifications may be changed without prior notice. (RA01)



Suitable accessories can be found in Chapter X.

- Cable Gland - HELUTOP® HT-PA
- Cable Gland - HELUTOP® HT-MS



**JZ-600** flexible, number coded, 0,6/1kV, meter marking**Technical data**

- Special PVC control cable adapted to DIN VDE 0262 and DIN VDE 0285-525-2-51 / DIN EN 50525-2-51, with insulation wall thickness for 1 kV
- **Temperature range** flexing -15°C to +80°C fixed installation -40°C to +80°C
- **Nominal voltage**  $U_0/U$  0,6/1 kV
- **Test voltage** 4000 V
- **Breakdown voltage** min. 8000 V
- **Insulation resistance** min. 20 MOhm x km
- **Minimum bending radius** flexing 7,5x cable  $\emptyset$  fixed installation 4x cable  $\emptyset$
- **Radiation resistance** up to  $80 \times 10^6$  cJ/kg (up to 80 Mrad)

**Cable structure**

- Bare copper-conductor, to DIN VDE 0295 cl.5, fine-wire, BS 6360 cl.5, IEC 60228 cl.5
- Core insulation of special PVC compound type T12 to DIN VDE 0207-363-3 / DIN EN 50363-3
- Core identification to DIN VDE 0293 black cores with continuous white numbering
- GN-YE conductor, 3 cores and above in the outer layer
- Cores stranded in layers with optimal lay-length
- Outer sheath of special PVC compound type TM2 to DIN VDE 0207-363-4-1 / DIN EN 50363-4-1
- Sheath colour black (RAL 9005)
- with meter marking

**Properties**

- Extensively oil resistant, oil-/chemical resistance see table Technical Informations
  - The materials used in manufacture are cadmium-free and contain no silicone and free from substances harmful to the wetting properties of lacquers
  - **UV-resistant**
- Tests**
- PVC self-extinguishing and flame retardant acc. to DIN VDE 0482-332-1-2, DIN EN 60332-1-2, IEC 60332-1 (equivalent DIN VDE 0472 part 804 test method B)

**Note**

- G = with green-yellow conductor  
x = without green-yellow conductor (OZ)
- AWG sizes are approximate equivalent values. The actual cross-section is in mm<sup>2</sup>.
- screened analogue type: **JZ-600-Y-CY**, confer page 60

**Application**

Wiring cable for measuring and controlling purposes in tool machinery, conveyor belts and production lines, for plant installations, air conditioning and in steel production plants and rolling mills. Suitable for installation for flexible use for medium mechanical stresses with free movement without tensile stress or forced movements in dry, moist and wet rooms as well as outside (fixed installation). Is not suitable to be used as direct burial (suitable from an outer diameter of 18,0 mm for direct burial) or as underwater cable. The cores have been numbered in such a way that the numbers are easily identifiable, even if the cable has only been stripped back a few cm. The core numbers have been underlined to avoid confusion. The earth core is located in the outer layer. The black, special PVC outer sheath is resistant to the ultra violet radiation. Mainly used in South-European, Eastern and Arabian countries.

CE= The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer $\emptyset$ approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
10550	2 x 0,5	6,3	9,6	56,0	20
10551	3 G 0,5	6,6	14,4	68,0	20
10552	3 x 0,5	6,6	14,4	68,0	20
10553	4 G 0,5	7,2	19,0	100,0	20
10554	4 x 0,5	7,2	19,0	100,0	20
10555	5 G 0,5	8,0	24,0	117,0	20
10556	5 x 0,5	8,0	24,0	117,0	20
10557	6 G 0,5	8,7	29,0	126,0	20
10558	7 G 0,5	8,7	33,6	138,0	20
10559	7 x 0,5	8,7	33,6	138,0	20
10560	8 G 0,5	9,5	38,0	150,0	20
10561	8 x 0,5	9,5	38,0	150,0	20
10562	10 G 0,5	10,3	48,0	176,0	20
10563	12 G 0,5	11,2	58,0	200,0	20
10564	12 x 0,5	11,2	58,0	200,0	20
10565	14 G 0,5	12,3	67,0	230,0	20
10566	16 G 0,5	12,9	76,0	250,0	20
10567	18 G 0,5	13,8	86,0	276,0	20
10568	20 G 0,5	14,4	96,0	293,0	20
10569	21 G 0,5	14,4	96,0	305,0	20
10570	25 G 0,5	16,1	120,0	335,0	20
10571	30 G 0,5	17,2	144,0	348,0	20
10572	32 G 0,5	18,0	154,0	355,0	20
10573	34 G 0,5	18,7	163,0	520,0	20
10574	40 G 0,5	19,5	192,0	590,0	20
10575	42 G 0,5	20,1	202,0	595,0	20
10576	50 G 0,5	22,1	240,0	715,0	20
10577	52 G 0,5	22,1	252,0	740,0	20
10578	61 G 0,5	23,6	293,0	840,0	20
10579	65 G 0,5	24,4	312,0	880,0	20
10580	80 G 0,5	27,2	384,0	960,0	20
10581	100 G 0,5	31,2	480,0	1050,0	20

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer $\emptyset$ approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
10582	2 x 0,75	6,6	14,4	66,0	19
10583	3 G 0,75	6,9	21,6	74,0	19
10584	3 x 0,75	6,9	21,6	74,0	19
10585	4 G 0,75	7,5	29,0	126,0	19
10586	4 x 0,75	7,5	29,0	126,0	19
10587	5 G 0,75	8,4	36,0	140,0	19
10588	5 x 0,75	8,4	36,0	140,0	19
10589	6 G 0,75	9,3	43,0	170,0	19
10590	6 x 0,75	9,3	43,0	170,0	19
10591	7 G 0,75	9,3	50,0	190,0	19
10592	7 x 0,75	9,3	50,0	190,0	19
10593	8 G 0,75	10,3	58,0	212,0	19
10594	8 x 0,75	10,3	58,0	212,0	19
10595	9 G 0,75	11,0	65,0	227,0	19
10596	10 G 0,75	11,0	72,0	238,0	19
10597	12 G 0,75	12,0	86,0	257,0	19
10598	12 x 0,75	12,0	86,0	257,0	19
10599	14 G 0,75	12,9	101,0	286,0	19
10600	15 G 0,75	13,8	108,0	319,0	19
10601	18 G 0,75	14,5	130,0	362,0	19
10602	20 G 0,75	15,4	144,0	394,0	19
10603	21 G 0,75	15,4	151,0	422,0	19
10604	25 G 0,75	17,2	180,0	486,0	19
10605	32 G 0,75	19,0	230,0	595,0	19
10606	34 G 0,75	19,9	245,0	638,0	19
10607	37 G 0,75	19,9	260,0	696,0	19
10608	40 G 0,75	20,7	288,0	726,0	19
10609	41 G 0,75	21,6	296,0	750,0	19
10610	42 G 0,75	21,6	302,0	770,0	19
10611	50 G 0,75	23,7	360,0	895,0	19
10612	61 G 0,75	25,3	439,0	1070,0	19
10613	65 G 0,75	26,3	468,0	1110,0	19
10614	80 G 0,75	28,9	576,0	1500,0	19
10615	100 G 0,75	32,2	720,0	1889,0	19

Continuation ▶

**JZ-600** flexible, number coded, 0,6/1kV, meter marking

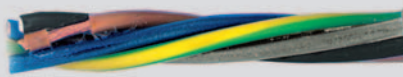
Part no.	No.cores x cross-sec. mm <sup>2</sup>	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.	Part no.	No.cores x cross-sec. mm <sup>2</sup>	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
10616	2 x 1	7,0	19,2	80,0	18	10690	3 G 2,5	10,1	72,0	175,0	14
10617	3 G 1	7,4	29,0	96,0	18	10691	3 x 2,5	10,1	72,0	175,0	14
10618	3 x 1	7,4	29,0	96,0	18	10692	4 G 2,5	11,2	96,0	203,0	14
10619	4 G 1	8,2	38,4	100,0	18	10693	4 x 2,5	11,2	96,0	203,0	14
10620	4 x 1	8,2	38,4	100,0	18	10694	5 G 2,5	12,5	120,0	251,0	14
10621	5 G 1	9,2	48,0	130,0	18	10695	5 x 2,5	12,5	120,0	251,0	14
10622	5 x 1	9,2	48,0	130,0	18	10696	7 G 2,5	13,8	168,0	330,0	14
10623	6 G 1	9,9	58,0	150,0	18	10697	7 x 2,5	13,8	168,0	330,0	14
10624	7 G 1	9,9	67,0	170,0	18	10698	8 G 2,5	15,1	192,0	400,0	14
10625	7 x 1	9,9	67,0	170,0	18	10699	12 G 2,5	18,3	288,0	553,0	14
10626	8 G 1	10,9	77,0	230,0	18	10700	14 G 2,5	19,6	336,0	630,0	14
10627	9 G 1	11,9	86,0	250,0	18	10701	18 G 2,5	22,0	432,0	795,0	14
10628	10 G 1	11,9	96,0	270,0	18	10702	21 G 2,5	23,3	504,0	930,0	14
10629	10 x 1	11,9	96,0	270,0	18	10703	25 G 2,5	26,2	600,0	1110,0	14
10630	12 G 1	12,8	115,0	290,0	18	10704	34 G 2,5	30,4	816,0	1450,0	14
10631	12 x 1	12,8	115,0	290,0	18	10705	42 G 2,5	33,0	1008,0	1750,0	14
10632	14 G 1	14,0	134,0	320,0	18	10706	50 G 2,5	36,2	1200,0	2100,0	14
10633	16 G 1	14,8	154,0	360,0	18	10707	61 G 2,5	38,8	1464,0	2540,0	14
10634	18 G 1	15,7	173,0	405,0	18	10708	100 G 2,5	49,8	2400,0	3850,0	14
10635	18 x 1	15,7	173,0	405,0	18	10709	2 x 4	11,0	77,0	180,0	12
10636	20 G 1	16,7	192,0	450,0	18	10710	3 G 4	11,7	115,0	230,0	12
10637	20 x 1	16,7	192,0	480,0	18	10711	4 G 4	12,9	154,0	310,0	12
10638	21 G 1	16,7	205,0	510,0	18	10712	5 G 4	14,4	192,0	410,0	12
10639	24 G 1	18,4	236,0	550,0	18	10713	7 G 4	15,8	269,0	540,0	12
10640	25 G 1	18,6	240,0	570,0	18	10714	8 G 4	17,5	307,0	710,0	12
10641	25 x 1	18,6	240,0	570,0	18	10715	12 G 4	21,0	461,0	860,0	12
10642	26 G 1	18,8	252,0	590,0	18	10716	3 G 6	13,1	173,0	370,0	10
10643	30 x 1	19,8	308,0	650,0	18	10717	4 G 6	14,5	230,0	430,0	10
10644	34 G 1	21,5	326,0	750,0	18	10718	5 G 6	16,2	288,0	650,0	10
10645	36 G 1	21,5	346,0	790,0	18	10719	7 G 6	18,0	403,0	860,0	10
10646	40 G 1	22,5	384,0	850,0	18	10720	3 G 10	16,8	288,0	660,0	8
10647	40 x 1	22,5	384,0	850,0	18	10721	4 G 10	18,5	384,0	790,0	8
10648	41 G 1	23,3	394,0	890,0	18	10722	5 G 10	20,5	480,0	960,0	8
10649	42 G 1	23,3	403,0	900,0	18	10723	7 G 10	22,5	672,0	1300,0	8
10650	50 G 1	25,6	480,0	1100,0	18	10724	3 G 16	20,2	461,0	700,0	6
10651	56 G 1	26,4	538,0	1190,0	18	10725	4 G 16	22,4	614,0	1100,0	6
10652	61 G 1	27,3	586,0	1266,0	18	10726	5 G 16	25,0	768,0	1600,0	6
10653	65 G 1	28,3	628,0	1560,0	18	10727	7 G 16	27,4	1075,0	1890,0	6
10654	80 G 1	31,4	786,0	1810,0	18	10728	3 G 25	24,8	720,0	1450,0	4
10655	100 G 1	35,0	960,0	1950,0	18	10729	4 G 25	27,4	960,0	1600,0	4
10656	2 x 1,5	8,2	29,0	95,0	16	10730	5 G 25	30,5	1200,0	2050,0	4
10657	3 G 1,5	8,6	43,0	112,0	16	10731	7 G 25	33,8	1680,0	2900,0	4
10658	3 x 1,5	8,6	43,0	112,0	16	10732	3 G 35	27,4	1008,0	1900,0	2
10659	4 G 1,5	9,6	58,0	139,0	16	10733	4 G 35	30,3	1344,0	2400,0	2
10660	4 x 1,5	9,6	58,0	139,0	16	10734	5 G 35	33,6	1680,0	2900,0	2
10661	5 G 1,5	10,7	72,0	170,0	16	10735	3 G 50	32,4	1440,0	2700,0	1
10662	5 x 1,5	10,7	72,0	170,0	16	10736	4 G 50	35,8	1920,0	3400,0	1
10663	6 G 1,5	11,6	86,0	190,0	16	10742	5 G 50	40,0	2400,0	4361,0	1
10664	7 G 1,5	11,6	101,0	225,0	16	10737	3 G 70	36,8	2016,0	3300,0	2/0
10665	7 x 1,5	11,6	101,0	225,0	16	10738	4 G 70	40,8	2688,0	4400,0	2/0
10666	8 G 1,5	12,9	115,0	250,0	16	10743	5 G 70	45,2	3360,0	5807,0	2/0
10667	9 G 1,5	13,9	130,0	280,0	16	10739	3 G 95	41,7	2736,0	5050,0	3/0
10668	10 G 1,5	13,9	144,0	300,0	16	10740	4 G 95	46,2	3648,0	6010,0	3/0
10669	11 G 1,5	14,8	158,0	330,0	16	10744	5 G 95	51,7	4560,0	7752,0	3/0
10670	12 G 1,5	15,0	173,0	370,0	16	10741	4 G 120	51,6	4608,0	7500,0	4/0
10671	12 x 1,5	15,5	173,0	370,0	16	10745	4 G 150	58,5	5760,0	8640,0	300 kcmil
10672	14 G 1,5	16,6	202,0	400,0	16	10746	4 G 185	63,3	7104,0	10380,0	350 kcmil
10673	16 G 1,5	17,5	230,0	450,0	16						
10674	18 G 1,5	18,6	259,0	520,0	16						
10675	19 G 1,5	18,6	279,0	550,0	16						
10676	20 G 1,5	19,7	288,0	600,0	16						
10677	21 G 1,5	19,7	302,0	600,0	16						
10678	25 G 1,5	22,5	360,0	730,0	16						
10679	32 G 1,5	24,3	461,0	880,0	16						
10680	34 G 1,5	25,3	490,0	950,0	16						
10681	40 G 1,5	26,6	576,0	990,0	16						
10682	42 G 1,5	27,4	605,0	1120,0	16						
10683	50 G 1,5	30,2	720,0	1400,0	16						
10684	56 G 1,5	31,2	806,0	1530,0	16						
10685	61 G 1,5	32,2	878,0	1700,0	16						
10686	65 G 1,5	33,5	936,0	1900,0	16						
10687	80 G 1,5	36,9	1152,0	2300,0	16						
10688	100 G 1,5	41,3	1440,0	2700,0	16						
10689	2 x 2,5	9,6	48,0	160,0	14						

Dimensions and specifications may be changed without prior notice. (RA01)



Suitable accessories can be found in Chapter X.

- Cable Gland - HELUTOP® HT-PA
- Cable Gland - HELUTOP® HT-MS

**JB-500** flexible, colour coded, metermarking

HELUKABEL VDE Reg.-Nr. 7032 JB-500 5G1,5 QMM / 11082 300/500 V 001041518 CE

**Technical data**

- Adapted to DIN VDE 0285-525-2-11 / DIN EN 50525-2-11
- **Temperature range**  
flexing -15°C to +80°C  
fixed installation -40°C to +80°C
- **Nominal voltage** U<sub>0</sub>/U 300/500 V
- **Test voltage** 4000 V
- **Breakdown voltage** min. 8000 V
- **Insulation resistance**  
min. 20 MOhm x km
- **Minimum bending radius**  
flexing 7,5x cable Ø  
fixed installation 4x cable Ø
- **Radiation resistance**  
up to 80x10<sup>6</sup> cJ/kg (up to 80 Mrad)

**Cable structure**

- Bare copper-conductor, to DIN VDE 0295 cl.5, fine-wire, BS 6360 cl.5, IEC 60228 cl.5
- Core insulation of special PVC compound type Z 7225
- Core identification to JB/OB colour code
- GN-YE conductor, 3 cores and above in the outer layer
- Cores stranded in layers with optimal lay-length
- Outer sheath of special PVC compound type TM2 to DIN VDE 0207-363-4-1 / DIN EN 50363-4-1
- Sheath colour grey (RAL 7001)
- with meter marking
- from 5 cores with VDE-Reg.-Nr.

**Properties**

- Extensively oil resistant, oil-/chemical resistance see table Technical Informations
  - The materials used in manufacture are cadmium-free and contain no silicone and free from substances harmful to the wetting properties of lacquers
- Tests**
- PVC self-extinguishing and flame retardant acc. to DIN VDE 0482-332-1-2, DIN EN 60332-1-2, IEC 60332-1 (equivalent DIN VDE 0472 part 804 test method B)

**Note**

- G = with green-yellow conductor  
x = without green-yellow conductor (OB).
- AWG sizes are approximate equivalent values. The actual cross-section is in mm<sup>2</sup>.
- screened analogue type:  
**Y-CY-JB**, confer page 62

**Application**

These cables are used for flexible use for medium mechanical stresses with free movement without tensile stress or forced movements in dry, moist and wet rooms but not suitable for open air, as measuring and control cables in tool machinery, conveyor belts, production lines, as well as in machinery production, in air-conditioning and steel production plants. The earth core is located immediately below the outer sheath. JB cables are suitable for use in all electrical equipment either in dry or damp areas. They should not, however, be installed in the open air.

CE= The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

Part no.	No.cores x cross-sec. mm <sup>2</sup>	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
11001	2 x 0,5	4,8	9,6	40,0	20
11002	3 G 0,5	5,1	14,4	46,0	20
11003	3 x 0,5	5,1	14,4	46,0	20
11004	4 G 0,5	5,5	19,2	56,0	20
11005	4 x 0,5	5,5	19,2	56,0	20
11006	5 G 0,5	6,2	24,0	65,0	20
11007	5 x 0,5	6,2	24,0	65,0	20
11008	6 G 0,5	6,7	29,0	75,0	20
11009	7 G 0,5	6,7	34,0	80,0	20
11010	7 x 0,5	6,7	34,0	84,0	20
11011	8 G 0,5	7,4	38,0	97,0	20
11012	10 G 0,5	8,2	48,0	116,0	20
11013	12 G 0,5	8,7	58,0	135,0	20
11014	14 G 0,5	9,5	67,0	150,0	20
11015	16 G 0,5	10,0	77,0	172,0	20
11019	30 G 0,5	13,5	144,0	310,0	20
11026	2 x 0,75	5,3	14,4	46,0	19
11027	3 G 0,75	5,6	21,6	54,0	19
11028	3 x 0,75	5,6	21,6	54,0	19
11029	4 G 0,75	6,3	28,8	66,0	19
11030	4 x 0,75	6,3	28,8	66,0	19
11031	5 G 0,75	6,9	36,0	80,0	19
11032	5 x 0,75	6,9	36,0	80,0	19
11033	6 G 0,75	7,5	43,2	99,0	19
11034	7 G 0,75	7,5	50,0	110,0	19
11035	7 x 0,75	7,5	50,0	110,0	19
11036	8 G 0,75	8,3	58,0	130,0	19
11037	9 G 0,75	8,9	65,0	153,0	19
11038	10 G 0,75	9,2	72,0	162,0	19
11039	12 G 0,75	9,8	86,0	179,0	19
11040	15 G 0,75	11,4	108,0	218,0	19
11041	18 G 0,75	12,2	130,0	257,0	19
11042	21 G 0,75	12,7	151,0	320,0	19
11043	25 G 0,75	14,3	180,0	365,0	19
11050	2 x 1	5,6	19,2	60,0	18
11051	3 G 1	5,9	29,0	72,0	18
11052	3 x 1	5,9	29,0	72,0	18
11053	4 G 1	6,6	38,4	86,0	18
11054	4 x 1	6,6	38,4	86,0	18
11055	5 G 1	7,3	48,0	104,0	18
11056	5 x 1	7,3	48,0	104,0	18

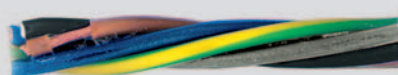
Part no.	No.cores x cross-sec. mm <sup>2</sup>	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
11057	6 G 1	8,1	58,0	125,0	18
11058	6 x 1	8,1	58,0	125,0	18
11059	7 G 1	8,1	67,0	141,0	18
11060	7 x 1	8,1	67,0	141,0	18
11061	8 G 1	8,8	77,0	175,0	18
11062	9 G 1	9,7	87,0	200,0	18
11063	10 G 1	9,8	96,0	207,0	18
11064	12 G 1	10,4	115,0	230,0	18
11065	14 G 1	11,4	134,0	271,0	18
11066	16 G 1	12,3	154,0	300,0	18
11067	18 G 1	12,9	173,0	343,0	18
11068	20 G 1	13,8	192,0	375,0	18
11069	24 G 1	15,1	230,0	468,0	18
11070	25 G 1	15,4	240,0	485,0	18
11077	2 x 1,5	6,4	29,0	70,0	16
11078	3 G 1,5	6,8	43,0	90,0	16
11079	3 x 1,5	6,8	43,0	90,0	16
11080	4 G 1,5	7,4	58,0	109,0	16
11081	4 x 1,5	7,4	58,0	109,0	16
11082	5 G 1,5	8,3	72,0	131,0	16
11083	5 x 1,5	8,3	72,0	131,0	16
11084	6 G 1,5	9,2	86,4	157,0	16
11085	7 G 1,5	9,2	101,0	184,0	16
11086	7 x 1,5	9,2	101,0	184,0	16
11087	8 G 1,5	10,0	115,0	216,0	16
11088	11 G 1,5	11,6	158,0	300,0	16
11089	12 G 1,5	11,8	173,0	309,0	16
11090	14 G 1,5	13,0	202,0	345,0	16
11091	16 G 1,5	13,9	230,0	386,0	16
11092	18 G 1,5	14,6	259,0	440,0	16
11093	20 G 1,5	15,6	288,0	490,0	16
11094	25 G 1,5	17,4	360,0	620,0	16
11104	2 x 2,5	7,8	48,0	112,0	14
11105	3 G 2,5	8,3	72,0	148,0	14
11106	3 x 2,5	8,3	72,0	148,0	14
11107	4 G 2,5	9,2	96,0	178,0	14
11108	4 x 2,5	9,2	96,0	178,0	14
11109	5 G 2,5	10,1	120,0	221,0	14
11110	5 x 2,5	10,1	120,0	221,0	14
11111	6 G 2,5	11,2	144,0	293,0	14
11112	7 G 2,5	11,2	168,0	306,0	14

Dimensions and specifications may be changed without prior notice. (RA01)



**JB-750** flexible, colour coded, 750 V, meter marking

A



HELUKABEL JB-750 5G2,5 QMM / 11166 450/750 V 001041419 CE

**Technical data**

- Special-PVC control cable adapted to DIN VDE 0285-525-2-11 / DIN EN 50525-2-11 and IEC 60227-5
- **Temperature range**  
flexing -15°C to +80°C  
fixed installation -40°C to +80°C
- **Nominal voltage**  
U<sub>0</sub>/U 450/750 V  
fixed installation, under protection  
U<sub>0</sub>/U 600/1000 V
- **Test voltage** 4000 V
- **Breakdown voltage** min. 8000 V
- **Insulation resistance**  
min. 20 MOhm x km
- **Minimum bending radius**  
flexing 7,5x cable Ø  
fixed installation 4x cable Ø
- **Radiation resistance**  
up to 80x10<sup>6</sup> cJ/kg (up to 80 Mrad)

**Cable structure**

- Bare copper-conductor, to DIN VDE 0295 cl.5, fine-wire, BS 6360 cl.5, IEC 60228 cl.5
- Core insulation of special PVC compound type T12 to DIN VDE 0207-363-3 / DIN EN 50363-3
- Core identification to JB/OB colour code
- GN-YE conductor, 3 cores and above in the outer layer
- Cores stranded in layers with optimal lay-length
- Outer sheath of special PVC compound type TM2 to DIN VDE 0207-363-4-1/DIN EN 50363-4-1
- Sheath colour grey (RAL 7001)
- with meter marking

**Properties**

- Extensively oil resistant, oil-/chemical resistance see table Technical Informations
  - The materials used in manufacture are cadmium-free and contain no silicone and free from substances harmful to the wetting properties of lacquers
- Tests**
- PVC self-extinguishing and flame retardant acc. to DIN VDE 0482-332-1-2, DIN EN 60332-1-2, IEC 60332-1 (equivalent DIN VDE 0472 part 804 test method B)

**Note**

- G = with green-yellow conductor  
x = without green-yellow conductor (OB).
- Cleanroom qualification tested with analog type. Please note "cleanroom qualified" when ordering.
- AWG sizes are approximate equivalent values. The actual cross-section is in mm<sup>2</sup>.
- screened analogue type:  
**Y-CY-JB**, confer page 62

**Application**

These cables are used for flexible use for medium mechanical stresses with free movement without tensile stress or forced movements in dry, moist and wet rooms but not suitable for open air, as measuring and control cables in tool machinery, conveyor belts, production lines, as well as in machinery production, in air-conditioning and steel production plants. The earth core is located immediately below the outer sheath. JB cables are suitable for use in all electrical equipment either in dry or damp areas. They should not, however, be installed in the open air.

CE= The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
11161	2 x 2,5	8,6	48,0	130,0	14
11162	3 G 2,5	9,3	72,0	164,0	14
11163	3 x 2,5	9,3	72,0	164,0	14
11164	4 G 2,5	10,2	96,0	200,0	14
11165	4 x 2,5	10,2	96,0	200,0	14
11166	5 G 2,5	11,4	120,0	247,0	14
11167	5 x 2,5	11,4	120,0	247,0	14
11168	6 G 2,5	12,6	144,0	301,0	14
11169	7 G 2,5	12,6	168,0	321,0	14
11121	2 x 4	10,6	76,8	195,0	12
11144	3 G 4	11,3	115,0	235,0	12
11122	4 G 4	12,5	154,0	295,0	12
11123	5 G 4	13,9	192,0	361,0	12
11124	7 G 4	15,4	269,0	498,0	12
11125	11 G 4	20,2	422,0	767,0	12
11126	3 G 6	12,8	173,0	355,0	10
11127	4 G 6	14,2	230,0	424,0	10
11128	5 G 6	15,8	288,0	525,0	10
11129	7 G 6	17,4	403,0	625,0	10
11153	3 G 10	16,2	290,0	611,0	8
11130	4 G 10	18,1	384,0	701,0	8
11131	5 G 10	20,1	480,0	858,0	8
11132	7 G 10	22,2	672,0	1106,0	8
11154	3 G 16	19,8	461,0	912,0	6
11133	4 G 16	22,0	614,0	1035,0	6
11134	5 G 16	24,4	768,0	1259,0	6
11135	7 G 16	27,0	1075,0	1780,0	6

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
11155	3 G 25	24,4	720,0	1388,0	4
11136	4 G 25	27,1	960,0	1581,0	4
11137	5 G 25	30,1	1200,0	1997,0	4
11156	3 G 35	27,0	1008,0	1767,0	2
11138	4 G 35	29,9	1344,0	2105,0	2
11139	5 G 35	33,4	1680,0	2636,0	2
11157	3 G 50	31,9	1440,0	2556,0	1
11140	4 G 50	35,5	1920,0	2940,0	1
11145	5 G 50	39,2	2400,0	3936,0	1
11158	3 G 70	36,4	2016,0	3182,0	2/0
11141	4 G 70	40,2	2688,0	4090,0	2/0
11146	5 G 70	44,9	3360,0	5443,0	2/0
11159	3 G 95	41,5	2736,0	4676,0	3/0
11142	4 G 95	46,0	3648,0	5540,0	3/0
11147	5 G 95	51,3	4560,0	6931,0	3/0
11160	3 G 120	45,9	3456,0	5630,0	4/0
11143	4 G 120	51,3	4608,0	7000,0	4/0
11148	4 G 150	58,7	5760,0	8340,0	300 kcmil
11149	4 G 185	64,3	7104,0	9904,0	350 kcmil

Dimensions and specifications may be changed without prior notice. (RA01)

# JB-750 yellow 750 V , connection cable für warning indication, flexible, colour coded, meter marking



## Technical data

- Special-PVC connection cable for warning indication adapted to DIN VDE 0285-525-2-11 / DIN EN 50525-2-11
- **Temperature range**  
flexing -15°C to +80°C  
fixed installation -40°C to +80°C
- **Nominal voltage**  $U_0/U$  450/750 V
- **Test voltage** 4000 V
- **Breakdown voltage** min. 8000 V
- **Insulation resistance**  
min. 20 MOhm x km
- **Minimum bending radius**  
flexing 7,5x cable  $\varnothing$   
fixed installation 4x cable  $\varnothing$
- **Radiation resistance**  
up to  $80 \times 10^6$  cJ/kg (up to 80 Mrad)

## Cable structure

- Bare copper-conductor, to DIN VDE 0295 cl.5, fine-wire, BS 6360 cl.5, IEC 60228 cl.5
- Core insulation of special PVC compound type T12 to DIN VDE 0207-363-3 / DIN EN 50363-3
- Core identification to DIN VDE 0293
- GN-YE conductor
- Cores stranded in layers with optimal lay-length
- Outer sheath of special PVC compound type TM2 to DIN VDE 0207-363-4-1 / DIN EN 50363-4-1
- Sheath colour yellow (RAL 1016)
- with meter marking

## Properties

- Extensively oil resistant, oil-/chemical resistance see table Technical Informations
- The materials used in manufacture are cadmium-free and contain no silicone and free from substances harmful to the wetting properties of lacquers

## Tests

- PVC self-extinguishing and flame retardant acc. to DIN VDE 0482-332-1-2, DIN EN 60332-1-2, IEC 60332-1 (equivalent DIN VDE 0472 part 804 test method B)

## Note

- G = with green-yellow conductor
- AWG sizes are approximate equivalent values. The actual cross-section is in mm<sup>2</sup>.

## Application

These cables are used for flexible use for medium mechanical stresses with free movement without tensile stress or forced movements in dry, moist and wet rooms but not suitable for open air, as connection cable with yellow outer sheath as a special warning indication. Recommendation in accordance to EN 60204 part 1 and DIN VDE 0113 part 1.

CE= The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer $\varnothing$ approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
10334	3 G 1,5	7,8	43,0	100,0	16
10335	4 G 1,5	8,5	58,0	121,0	16
10336	5 G 1,5	9,6	72,0	148,0	16

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer $\varnothing$ approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
10337	3 G 2,5	9,3	72,0	154,0	14
10338	4 G 2,5	10,2	96,0	208,0	14
10339	5 G 2,5	11,4	120,0	229,0	14

Dimensions and specifications may be changed without prior notice. (RA01)



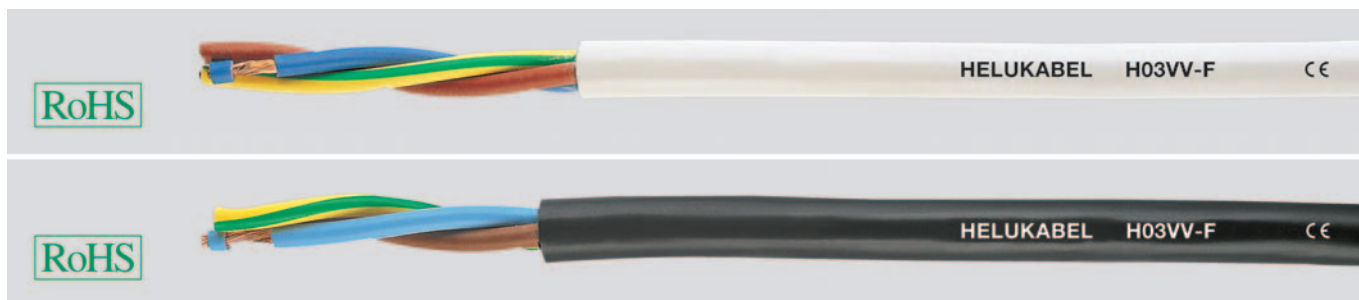
Suitable accessories can be found in Chapter X.

- Cable Gland - HELUTOP® HT-PA
- Cable Gland - HELUTOP® HT-MS

# H03VV-F



A



## Technical data

- PVC control cable acc. to DIN VDE 0285-525-2-11 / DIN EN 50525-2-11 and IEC 60227-5
- **Temperature range**  
flexing -5°C to +70°C  
fixed installation -40°C to +70°C
- **Nominal voltage**  $U_0/U$  300/300 V
- **Test voltage** 2000 V
- **Breakdown voltage** min. 4000 V
- **Insulation resistance**  
min. 20 MOhm x km
- **Minimum bending radius**  
flexing 7,5x cable Ø
- **Radiation resistance**  
up to  $80 \times 10^6$  cJ/kg (up to 80 Mrad)

## Cable structure

- Bare copper-conductor, to DIN VDE 0295 cl.5, fine-wire, BS 6360 cl.5, IEC 60228 cl.5
- Core insulation of PVC compound type TI2 to DIN VDE 0207-363-3 / DIN EN 50363-3
- Core identification to DIN VDE 0293-308  
- up to 5 cores coloured  
- from 6 cores, black with continuous white numbering
- GN-YE conductor, 3 cores and above
- Cores stranded in layers with optimal lay-length
- Outer sheath of PVC compound type TM2 to DIN VDE 0207-363-4-1 / DIN EN 50363-4-1
- Sheath colour black, white or in accordance to the customer

## Properties

- The materials used in manufacture are cadmium-free and contain no silicone and free from substances harmful to the wetting properties of lacquers

## Tests

- PVC self-extinguishing and flame retardant acc. to DIN VDE 0482-332-1-2, DIN EN 60332-1-2, IEC 60332-1 (equivalent DIN VDE 0472 part 804 test method B)

## Note

- G = with green-yellow conductor  
x = without green-yellow conductor
- 5 core and above in adaption (H).
- The above list contains a selection of the types we carry es stock. Other sizes available on request.
- AWG sizes are approximate equivalent values. The actual cross-section is in mm<sup>2</sup>.

## Application

These cable types are especially suited to use on small appliances with low mechanical stress and for connection for light household appliances, e. g. kitchen utensils, desk lamps, floor lamps, vacuum cleaners, office machines, radios, etc. , as far as this cable is admitted to the relevant specifications of the equipment.

These cables are not permitted to use with cooking or heating apparatus.

Cables with cross-section 0,75 mm<sup>2</sup> are not suitable for outdoor use or use of industrial or farmer machineries.

CE = The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Sheath colour	Outer Ø min. - max. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
29736	2 x 0,5	black	4,6 - 5,9	9,6	40,0	20
29737	2 x 0,5	white	4,6 - 5,9	9,6	40,0	20
29738	2 x 0,5	other colours	4,6 - 5,9	9,6	40,0	20
29739	3 G 0,5	black	4,9 - 6,3	14,4	49,0	20
29740	3 G 0,5	white	4,9 - 6,3	14,4	49,0	20
29741	3 G 0,5	other colours	4,9 - 6,3	14,4	49,0	20
29742	4 G 0,5	black	5,4 - 6,9	19,2	61,0	20
29743	4 G 0,5	white	5,4 - 6,9	19,2	61,0	20
29744	4 G 0,5	other colours	5,4 - 6,9	19,2	61,0	20
29400	2 x 0,75	black	4,9 - 6,3	14,4	49,0	19
29401	2 x 0,75	white	4,9 - 6,3	14,4	49,0	19
29402	2 x 0,75	other colours	4,9 - 6,3	14,4	49,0	19
29403	3 G 0,75	black	5,2 - 6,7	21,6	59,0	19
29404	3 G 0,75	white	5,2 - 6,7	21,6	59,0	19
29405	3 G 0,75	other colours	5,2 - 6,7	21,6	59,0	19

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Sheath colour	Outer Ø min. - max. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
29406	4 G 0,75	black	5,7 - 7,3	29,0	72,0	19
29407	4 G 0,75	white	5,7 - 7,3	29,0	72,0	19
29408	4 G 0,75	other colours	5,7 - 7,3	29,0	72,0	19
29409	5 G 0,75	black	6,5 - 8,2	36,0	87,0	19
29410	5 G 0,75	white	6,5 - 8,2	36,0	87,0	19
29411	5 G 0,75	other colours	6,5 - 8,2	36,0	87,0	19
29412	6 G 0,75	black	7,1 - 9,0	43,0	98,0	19
29413	6 G 0,75	white	7,1 - 9,0	43,0	98,0	19
29414	6 G 0,75	other colours	7,1 - 9,0	43,0	98,0	19
29415	7 G 0,75	black	7,1 - 9,0	50,0	108,0	19
29416	7 G 0,75	white	7,1 - 9,0	50,0	108,0	19
29417	7 G 0,75	other colours	7,1 - 9,0	50,0	108,0	19

Dimensions and specifications may be changed without prior notice. (RA01)

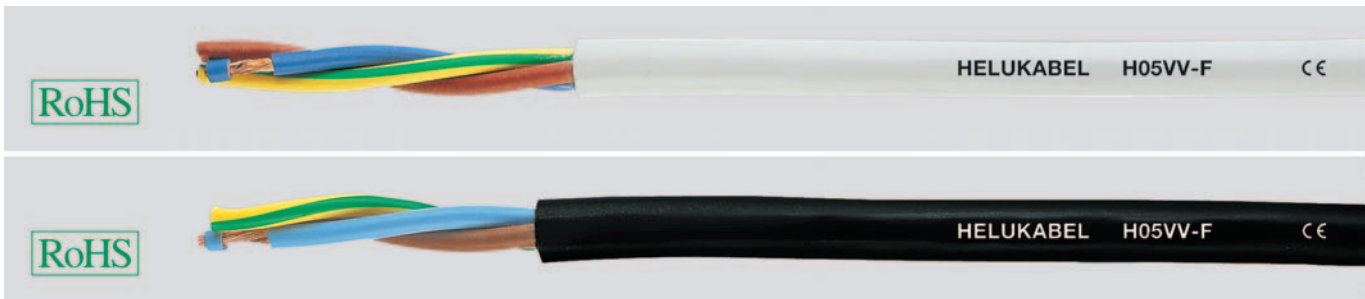


Suitable accessories can be found in Chapter X.

- Cable Gland - HELUTOP® HT-PA
- Cable Gland - HELUTOP® HT-MS



# H05VV-F



## Technical data

- PVC control cable acc. to DIN VDE 0285-525-2-11 / DIN EN 50525-2-11 and IEC 60227-5
- **Temperature range**  
flexing -5°C to +70°C  
fixed installation -40°C to +70°C
- **Nominal voltage** U<sub>0</sub>/U 300/500 V
- **Max. permissible operating voltage** in three-phase and one-phase a.c. system U<sub>0</sub>/U 318/550 V in direct current system U<sub>0</sub>/U 413/825 V
- **Test voltage** 2000 V
- **Breakdown voltage** min. 4000 V
- **Insulation resistance** min. 20 MOhm x km
- **Minimum bending radius** flexing 7,5x cable Ø
- **Radiation resistance** up to 80x10<sup>6</sup> cJ/kg (up to 80 Mrad)

## Cable structure

- Bare copper-conductor, to DIN VDE 0295 cl.5, fine-wire, BS 6360 cl.5, IEC 60228 cl.5
- Core insulation of PVC compound type T12 to DIN VDE 0207-363-3 / DIN EN 50363-3
- Core identification to DIN VDE 0293-308 - up to 5 cores coloured - from 6 cores, black with continuous white numbering
- GN-YE conductor, 3 cores and above
- Cores stranded in layers with optimal lay-length
- Outer sheath of PVC compound type TM2 to DIN VDE 0207-363-4-1/DIN EN 50363-4-1
- Sheath colour black or white

## Properties

- The materials used in manufacture are cadmium-free and contain no silicone and free from substances harmful to the wetting properties of lacquers

## Tests

- PVC self-extinguishing and flame retardant acc. to DIN VDE 0482-332-1-2, DIN EN 60332-1-2, IEC 60332-1 (equivalent DIN VDE 0472 part 804 test method B)

## Note

- G = with green-yellow conductor  
x = without green-yellow conductor
- These types are also available with UL-approbation.
- The above list contains a selection of the types we carry as stock. Other sizes available on request.
- Cables with 7 cores and cross-sec. 6 mm<sup>2</sup> are only available in adaption designation 05VV-F.
- AWG sizes are approximate equivalent values. The actual cross-section is in mm<sup>2</sup>.

## Application

These cables are especially suited to use for the appliance with medium mechanical stress in households, kitchens and offices, also for household appliances in damp and wet areas, e. g. refrigerators, washing machines, spin-driver etc. As far as this cable is admitted to the relevant specifications of the equipment.

These cables are suited to be used for cooking and heating apparatus under the condition that cable does not come in direct contact with hot parts of the apparatus and no other influences of heat.

The cables are suitable for fixed installation in furnitures, partition walls, decoration covering and in hollow spaces of prefabricated building parts. They are not qualified for use in outdoors or for use with industrial and farmer machineries, exceptionally in tailoring, etc.

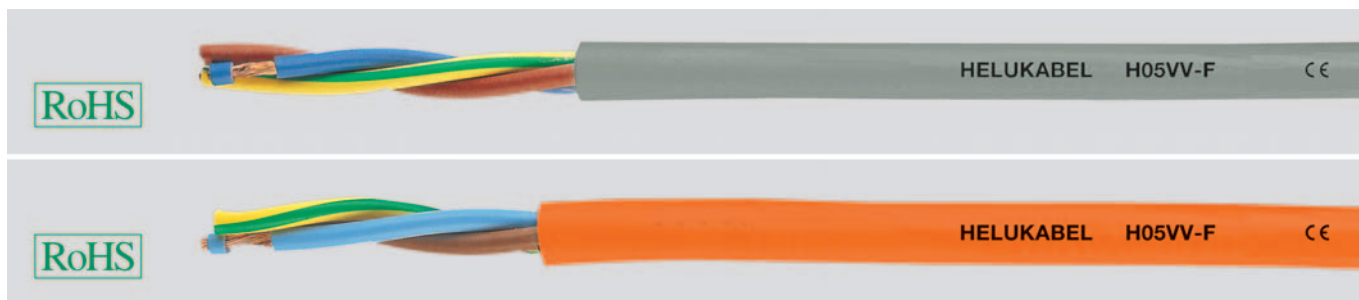
CE= The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Sheath colour	Outer Ø min. - max. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
29450	2 x 0,75	black	5,7 - 7,2	14,4	50,0	19
29451	2 x 0,75	white	5,7 - 7,2	14,4	50,0	19
29452	3 G 0,75	black	6,0 - 7,6	21,6	60,0	19
29453	3 G 0,75	white	6,0 - 7,6	21,6	60,0	19
29454	4 G 0,75	black	6,6 - 8,3	29,0	73,0	19
29455	4 G 0,75	white	6,6 - 8,3	29,0	73,0	19
29456	5 G 0,75	black	7,4 - 9,3	36,0	88,0	19
29457	5 G 0,75	white	7,4 - 9,3	36,0	88,0	19
29458	2 x 1	black	5,9 - 7,5	19,0	57,0	18
29459	2 x 1	white	5,9 - 7,5	19,0	57,0	18
29460	3 G 1	black	6,3 - 8,0	29,0	73,0	18
29461	3 G 1	white	6,3 - 8,0	29,0	73,0	18
29462	4 G 1	black	7,1 - 9,0	38,0	85,0	18
29463	4 G 1	white	7,1 - 9,0	38,0	85,0	18
29464	5 G 1	black	7,8 - 9,8	48,0	105,0	18
29465	5 G 1	white	7,8 - 9,8	48,0	105,0	18
29466	7 G 1	black	9,7 - 12,1	67,0	131,0	18
29467	7 G 1	white	9,7 - 12,1	67,0	131,0	18
29484	2 x 1,5	black	6,8 - 8,6	29,0	82,0	16
29485	2 x 1,5	white	6,8 - 8,6	29,0	82,0	16
29468	3 G 1,5	black	7,4 - 9,4	43,0	95,0	16
29469	3 G 1,5	white	7,4 - 9,4	43,0	95,0	16
29470	4 G 1,5	black	8,4 - 10,5	58,0	117,0	16
29471	4 G 1,5	white	8,4 - 10,5	58,0	117,0	16
29472	5 G 1,5	black	9,3 - 11,6	72,0	144,0	16
29473	5 G 1,5	white	9,3 - 11,6	72,0	144,0	16

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Sheath colour	Outer Ø min. - max. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
29474	7 G 1,5	black	11,3 - 14,0	101,0	183,0	16
29475	7 G 1,5	white	11,3 - 14,0	101,0	183,0	16
29478	3 G 2,5	black	9,2 - 11,4	72,0	152,0	14
29479	3 G 2,5	white	9,2 - 11,4	72,0	152,0	14
29480	4 G 2,5	black	10,1 - 12,5	96,0	192,0	14
29481	4 G 2,5	white	10,1 - 12,5	96,0	192,0	14
29482	5 G 2,5	black	11,2 - 13,9	120,0	243,0	14
29483	5 G 2,5	white	11,2 - 13,9	120,0	243,0	14
29486	7 G 2,5	black	13,8 - 17,1	168,0	316,0	14
29487	7 G 2,5	white	13,8 - 17,1	168,0	316,0	14
29825	3 G 4	black	10,5 - 13,1	115,0	235,0	12
29826	3 G 4	white	10,5 - 13,1	115,0	235,0	12
29488	4 G 4	black	11,5 - 14,3	154,0	300,0	12
29489	4 G 4	white	11,5 - 14,3	154,0	300,0	12
29490	5 G 4	black	13,0 - 16,1	192,0	361,0	12
29491	5 G 4	white	13,0 - 16,1	192,0	361,0	12
29492	4 G 6	black	12,9 - 15,9	230,0	490,0	10
29493	4 G 6	white	12,9 - 15,9	230,0	490,0	10

Dimensions and specifications may be changed without prior notice. (RA01)

# H05VV-F



A

## Technical data

- PVC-control cables to DIN VDE 0285-525-2-11 / DIN EN 50525-2-11 and IEC 60227-5
- **Temperature range**  
flexing -5°C to +70°C  
fixed installation -40°C to +70°C
- **Nominal voltage**  $U_0/U$  300/500 V
- Max. permissible **operating voltage** in three-phase and one-phase a.c. system  
 $U_0/U$  318/550 V  
in direct current system  
 $U_0/U$  413/825 V
- **Test voltage** 2000 V
- **Breakdown voltage** min. 4000 V
- **Insulation resistance**  
min. 20 MOhm x km
- **Minimum bending radius**  
flexing 7,5x cable Ø
- **Radiation resistance**  
up to  $80 \times 10^6$  cJ/kg (up to 80 Mrad)

## Cable structure

- Bare copper-conductor, to DIN VDE 0295 cl.5, fine-wire, BS 6360 cl.5, IEC 60228 cl.5
- Core insulation of PVC compound type T12 to DIN VDE 0207-363-3 / DIN EN 50363-3
- Core identification to DIN VDE 0293-308  
- up to 5 cores coloured  
- from 6 cores, black with continuous white numbering
- GN-YE conductor, 3 cores and above
- Cores stranded in layers with optimal lay-length
- Outer sheath of PVC compound type TM2 to DIN VDE 0207-363-4-1/DIN EN 50363-4-1
- Sheath colour by request

## Properties

- The materials used in manufacture are cadmium-free and contain no silicone and free from substances harmful to the wetting properties of lacquers

## Tests

- PVC self-extinguishing and flame retardant acc. to DIN VDE 0482-332-1-2, DIN EN 60332-1-2, IEC 60332-1 (equivalent DIN VDE 0472 part 804 test method B)

## Note

- G = with green-yellow conductor  
x = without green-yellow conductor
- Please add the individual part no. for order with the identification colour code:  
0 = approx. RAL 5015 blue  
1 = approx. RAL 6018 green  
2 = approx. RAL 8003 brown  
3 = approx. RAL 1021 yellow  
4 = approx. RAL 3000 red  
5 = approx. RAL 2003 orange  
6 = approx. RAL 4005 violet  
7 = approx. RAL 7001/7032 grey  
8 = gold  
9 = dusty gold  
Further colours on request.
- AWG sizes are approximate equivalent values. The actual cross-section is in mm<sup>2</sup>.

## Application

These cable are especially suited to use for the appliance with medium mechanical stress in households, kitchens and offices, also for household appliances in damp and wet areas, e. g. refrigerators, washing machines, spin-driver etc. As far as this cable is admitted to the relevant specifications of the equipment. These cables are suited to be used for cooking and heating apparatus under the condition that cable does not come in direct contact with hot parts of the apparatus and no other influences of heat. The cables are suitable for fixed installation in furnitures, partition walls, decoration covering and in hollow spaces of prefabricated building parts.

They are not qualified for use in outdoors or for use with industrial and farmer machineries, exceptionally in tailoring, etc.

CE= The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer Ø min. - max. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
3011x	2 x 0,75	5,7 - 7,2	14,4	50,0	19
3012x	3 G 0,75	6,0 - 7,6	21,6	60,0	19
3013x	4 G 0,75	6,6 - 8,3	29,0	73,0	19
3014x	5 G 0,75	7,4 - 9,3	36,0	88,0	19
3015x	2 x 1	5,9 - 7,5	19,0	57,0	18
3016x	3 G 1	6,3 - 8,0	29,0	73,0	18
3017x	4 G 1	7,1 - 9,0	38,0	85,0	18
3018x	5 G 1	7,8 - 9,8	48,0	105,0	18

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer Ø min. - max. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
3020x	2 x 1,5	6,8 - 8,6	29,0	82,0	16
3021x	3 G 1,5	7,4 - 9,4	43,0	95,0	16
3022x	4 G 1,5	8,4 - 10,5	58,0	117,0	16
3023x	5 G 1,5	9,3 - 11,6	72,0	144,0	16
3024x	3 G 2,5	9,2 - 11,4	72,0	152,0	14
3025x	4 G 2,5	10,1 - 12,5	96,0	192,0	14
3026x	5 G 2,5	11,2 - 13,9	120,0	243,0	14

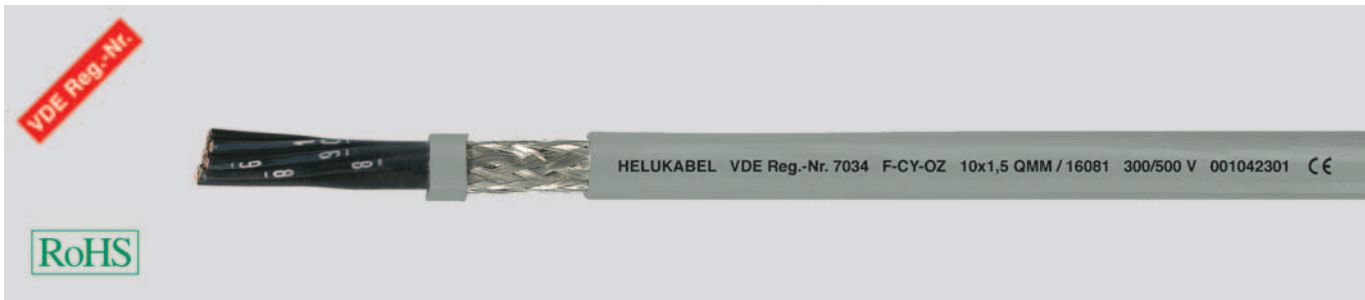
Dimensions and specifications may be changed without prior notice. (RA01)



Suitable accessories can be found in Chapter X.

- Cable Gland - HELUTOP® HT-PA
- Cable Gland - HELUTOP® HT-MS

# F-CY-OZ (LiY-CY) flexible, Cu-screened, EMC-preferred type, meter marking



## Technical data

- Special-PVC data cable adapted to DIN VDE 0285-525-2-51 / DIN EN 50525-2-51
- **Temperature range**  
flexing -10°C to +80°C  
fixed installation -40°C to +80°C
- **Nominal voltage**  
for 1-core (LiYDY) 1200 V  
from 2-cores  $U_0/U$  300/500 V
- **Test voltage** core/core 4000 V  
core/screen 2000 V
- **Breakdown voltage** min. 8000 V
- **Insulation resistance**  
min. 20 MOhm x km
- **Mutual capacitance**  
acc. to different cross-sections  
core/core approx. 150 nF/km  
core/screen approx. 270 nF/km
- **Coupling resistance**  
max. 250 Ohm/km
- **Minimum bending radius**  
flexing 10x cable  $\varnothing$   
fixed installation 5x cable  $\varnothing$
- **Radiation resistance**  
up to 80x10<sup>6</sup> cJ/kg (up to 80 Mrad)

## Cable structure

- Bare copper-conductor, to DIN VDE 0295 cl.5, fine-wire, BS 6360 cl.5, IEC 60228 cl.5
- Core insulation of special PVC compound type Z 7225
- Core identification to DIN VDE 0293 black cores with continuous white numbering
- Cores stranded in layers with optimal lay-length
- Core wrapping with foil
- - for **1-core** (LiYDY) copper screen of helically wound, approx. 85% coverage  
- from **2-cores** tinned copper braided screen, approx. 85% coverage
- Outer sheath of special PVC compound type TM2 to DIN VDE 0207-363-4-1 / DIN EN 50363-4-1
- Sheath colour grey (RAL 7001)
- with meter marking

## Properties

- Extensively oil resistant, oil-/chemical resistance see table Technical Informations
  - The materials used in manufacture are cadmium-free and contain no silicone and free from substances harmful to the wetting properties of lacquers
- ### Tests
- PVC self-extinguishing and flame retardant acc. to DIN VDE 0482-332-1-2, DIN EN 60332-1-2, IEC 60332-1 (equivalent DIN VDE 0472 part 804 test method B)

## Note

- x = without green-yellow conductor (OZ)
- Designation: LiYDY for **1-core** cable.
- Cleanroom qualification tested with analog type. Please note "cleanroom qualified" when ordering.  
For more information, see introduction
- AWG sizes are approximate equivalent values. The actual cross-section is in mm<sup>2</sup>.
- unscreened analogue type:  
**JZ-500**, confer page 30

## Application

For flexible use with free movement without tensile stress or forced movements in dry, moist and wet rooms but not in open air, as data cable in the control and regulation technology, tool and machinery, in computer systems, as well as signal line in the electronic. A stabilizing foil separator between wire bound and braid reduces the outer diameter essentially and allows smaller bending radius, lower weight etc. The disturbance free transmission of signals and impulses is ensured due to the high degree of screening. This is an ideal disturbance-free control cable for the above applications.

**EMC** = Electromagnetic compatibility

To optimize the EMC features we recommend a large round contact of the copper braiding on both ends.

CE = The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer $\varnothing$ approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.	Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer $\varnothing$ approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
16531	1 x 0,5	3,7	15,0	41,0	20	16544	20 x 0,5	12,3	172,0	240,0	20
16532	2 x 0,5	5,7	35,0	45,0	20	16545	21 x 0,5	12,3	188,0	250,0	20
16533	3 x 0,5	5,9	42,0	55,0	20	16546	24 x 0,5	13,6	235,0	300,0	20
16534	4 x 0,5	6,4	47,0	61,0	20	16547	25 x 0,5	13,7	240,0	314,0	20
16535	5 x 0,5	6,9	56,0	74,0	20	16548	30 x 0,5	14,4	295,0	360,0	20
16536	6 x 0,5	7,6	67,0	89,0	20	16549	32 x 0,5	14,9	301,0	425,0	20
16537	7 x 0,5	7,6	69,0	98,0	20	16550	34 x 0,5	15,5	312,0	433,0	20
16538	8 x 0,5	8,1	80,0	117,0	20	16551	36 x 0,5	15,5	318,0	446,0	20
16539	10 x 0,5	9,6	94,0	135,0	20	16552	40 x 0,5	16,5	343,0	475,0	20
16540	12 x 0,5	9,7	108,0	157,0	20	16553	50 x 0,5	18,5	406,0	573,0	20
16541	14 x 0,5	10,2	116,0	190,0	20	16554	61 x 0,5	19,7	508,0	653,0	20
16542	16 x 0,5	11,0	129,0	210,0	20	16555	80 x 0,5	22,6	680,0	784,0	20
16543	18 x 0,5	11,5	145,0	217,0	20	16556	100 x 0,5	24,9	804,0	995,0	20

Continuation ▶



# F-CY-OZ (LiY-CY) flexible, Cu-screened, EMC-preferred type, meter marking



A

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
16557	1 x 0,75	4,0	19,0	44,0	19
16558	2 x 0,75	6,1	40,0	59,0	19
16559	3 x 0,75	6,3	52,0	66,0	19
16560	4 x 0,75	6,8	60,0	77,0	19
16561	5 x 0,75	7,4	71,0	93,0	19
16562	6 x 0,75	8,2	80,0	113,0	19
16563	7 x 0,75	8,2	91,0	130,0	19
16564	8 x 0,75	9,0	110,0	145,0	19
16565	10 x 0,75	10,3	137,0	180,0	19
16566	12 x 0,75	10,5	142,0	202,0	19
16567	14 x 0,75	11,3	180,0	225,0	19
16568	16 x 0,75	11,9	200,0	275,0	19
16569	18 x 0,75	12,7	212,0	292,0	19
16570	19 x 0,75	12,7	230,0	308,0	19
16571	20 x 0,75	13,6	238,0	320,0	19
16572	21 x 0,75	13,6	246,0	378,0	19
16573	24 x 0,75	14,9	270,0	435,0	19
16574	25 x 0,75	15,0	281,0	415,0	19
16575	27 x 0,75	15,1	304,0	435,0	19
16576	30 x 0,75	16,0	320,0	450,0	19
16577	32 x 0,75	16,7	342,0	484,0	19
16578	34 x 0,75	17,2	345,0	502,0	19
16579	36 x 0,75	17,4	350,0	535,0	19
16580	37 x 0,75	17,4	361,0	592,0	19
16581	40 x 0,75	18,1	369,0	610,0	19
16582	50 x 0,75	20,3	461,0	777,0	19
16583	61 x 0,75	22,0	540,0	900,0	19
16584	80 x 0,75	25,3	711,0	1210,0	19
16585	100 x 0,75	28,0	900,0	1445,0	19
16050	1 x 1	4,1	21,0	47,0	18
16051	2 x 1	6,4	50,0	65,0	18
16052	3 x 1	6,7	60,0	81,0	18
16053	4 x 1	7,2	71,0	98,0	18
16054	5 x 1	8,0	88,0	127,0	18
16055	6 x 1	8,7	97,0	144,0	18
16056	7 x 1	8,7	111,0	158,0	18
16057	8 x 1	9,6	127,0	197,0	18
16058	10 x 1	11,2	150,0	232,0	18
16059	12 x 1	11,4	184,0	260,0	18
16060	14 x 1	12,0	196,0	302,0	18
16061	16 x 1	12,8	209,0	345,0	18
16062	18 x 1	13,6	260,0	380,0	18
16063	20 x 1	14,3	317,0	440,0	18
16064	24 x 1	16,0	320,0	495,0	18
16065	25 x 1	16,2	349,0	534,0	18
16066	28 x 1	17,0	408,0	595,0	18
16067	30 x 1	17,2	441,0	616,0	18
16068	34 x 1	18,5	486,0	741,0	18
16069	40 x 1	19,4	510,0	835,0	18
16070	50 x 1	22,0	625,0	1025,0	18
16071	61 x 1	23,5	702,0	1200,0	18
16072	80 x 1	26,9	920,0	1440,0	18
16073	100 x 1	30,2	1120,0	1610,0	18

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
16074	1 x 1,5	4,6	27,0	70,0	16
16075	2 x 1,5	7,0	63,0	88,0	16
16076	3 x 1,5	7,4	80,0	100,0	16
16077	4 x 1,5	8,1	97,0	126,0	16
16078	5 x 1,5	9,0	119,0	160,0	16
16079	7 x 1,5	9,8	147,0	208,0	16
16080	8 x 1,5	10,8	170,0	244,0	16
16081	10 x 1,5	12,6	193,0	316,0	16
16082	12 x 1,5	12,8	267,0	338,0	16
16083	14 x 1,5	13,5	283,0	383,0	16
16084	16 x 1,5	14,6	315,0	424,0	16
16085	18 x 1,5	15,6	374,0	479,0	16
16086	20 x 1,5	16,6	396,0	545,0	16
16087	24 x 1,5	18,1	458,0	690,0	16
16088	25 x 1,5	18,4	526,0	705,0	16
16089	28 x 1,5	19,3	541,0	810,0	16
16090	30 x 1,5	19,6	555,0	830,0	16
16091	35 x 1,5	21,2	645,0	890,0	16
16092	40 x 1,5	22,0	725,0	1060,0	16
16093	50 x 1,5	25,0	885,0	1440,0	16
16094	61 x 1,5	26,8	1100,0	1700,0	16
16095	80 x 1,5	30,8	1324,0	2000,0	16
16096	100 x 1,5	34,1	1641,0	2500,0	16
16097	1 x 2,5	5,4	39,0	50,0	14
16098	2 x 2,5	8,4	96,0	130,0	14
16099	3 x 2,5	8,8	144,0	167,0	14
16100	4 x 2,5	9,8	148,0	195,0	14
16101	5 x 2,5	10,8	181,0	223,0	14
16102	7 x 2,5	11,9	255,0	344,0	14
16103	12 x 2,5	15,8	441,0	522,0	14
16104	2 x 4	10,0	120,0	185,0	12
16105	3 x 4	10,6	174,0	240,0	12
16106	4 x 4	11,6	230,0	310,0	12
16107	5 x 4	12,8	273,0	400,0	12
16108	7 x 4	14,2	316,0	500,0	12
16109	2 x 6	11,7	173,0	268,0	10
16110	3 x 6	12,5	240,0	330,0	10
16111	4 x 6	13,8	305,0	415,0	10
16112	5 x 6	15,4	439,0	509,0	10
16113	7 x 6	17,0	505,0	672,0	10
16114	2 x 10	14,5	255,0	425,0	8
16115	3 x 10	15,6	350,0	500,0	8
16116	4 x 10	17,2	535,0	783,0	8
16117	5 x 10	19,1	592,0	856,0	8
16118	7 x 10	21,2	810,0	1300,0	8

Dimensions and specifications may be changed without prior notice. (RA01)



Suitable accessories can be found in Chapter X.

- Cable Gland - HELUTOP® HT-MS-EP4

**F-CY-JZ** flexible, Cu-screened, EMC-preferred type, meter marking**Technical data**

- Special-PVC control cable adapted to DIN VDE 0285-525-2-51 / DIN EN 50525-2-51
- **Temperature range**  
flexing -10°C to +80°C  
fixed installation -40°C to +80°C
- **Nominal voltage**  $U_0/U$  300/500 V
- **Test voltage**  
core/core 4000 V  
core/screen 2000 V
- **Breakdown voltage** min. 8000 V
- **Insulation resistance**  
min. 20 MΩm x km
- **Mutual capacitance**  
acc. to different cross-sections  
0,5 up to 2,5 mm<sup>2</sup>:  
core/core approx. 150 nF/km  
core/screen approx. 270 nF/km
- **Coupling resistance**  
max. 250 Ωm/km
- **Minimum bending radius**  
flexing 10x cable Ø  
fixed installation 5x cable Ø
- **Radiation resistance**  
up to 80x10<sup>6</sup> cJ/kg (up to 80 Mrad)

**Cable structure**

- Bare copper-conductor, to DIN VDE 0295 cl.5, fine-wire, BS 6360 cl.5, IEC 60228 cl.5
- Core insulation of special PVC compound type Z 7225
- Core identification to DIN VDE 0293 black cores with continuous white numbering
- GN-YE conductor, 3 cores and above in the outer layer
- Cores stranded in layers with optimal lay-length
- Foil separator
- Tinned copper braided screening, approx. 85% coverage
- Outer sheath of special PVC compound type TM2 to DIN VDE 0207-363-4-1 / DIN EN 50363-4-1
- Sheath colour grey (RAL 7001)
- With meter marking

**Properties**

- Extensively oil resistant, oil-/chemical resistance see table Technical Informations
- The materials used in manufacture are cadmium-free and contain no silicone and free from substances harmful to the wetting properties of lacquers

**Tests**

- PVC self-extinguishing and flame retardant acc. to DIN VDE 0482-332-1-2, DIN EN 60332-1-2, IEC 60332-1 (equivalent DIN VDE 0472 part 804 test method B)

**Note**

- G = with green-yellow conductor  
x = without green-yellow conductor (OZ)
- Please note the cleanroom qualification when ordering. For more information, see introduction.
- AWG sizes are approximate equivalent values. The actual cross-section is in mm<sup>2</sup>.
- unscreened analogue type:  
**JZ-500**, confer page 30

**Application**

For use as a data cable in control circuits, in tool-making and machine industries as well as a signal cable in computer systems and electronics. The more usual PVC inner sheath has been replaced in these cables by a stabilising foil separator, thus reducing the total diameter of the cables considerably and thereby reducing the bending radius, total weight etc. The high covering percentage of the copper screening offers interference-free signal transfer etc. The dense screening assures disturbance-free transmission of all signals and impulses. An ideal disturbance-free control cable for the above application.

**EMC** = Electromagnetic compatibility

To optimize the EMC features we recommend a large round contact of the copper braiding on both ends.

**CE** = The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
16320	2 x 0,5	5,7	35,0	45,0	20
16321	3 G 0,5	5,9	42,0	55,0	20
16322	4 G 0,5	6,4	47,0	61,0	20
16323	5 G 0,5	6,9	56,0	74,0	20
16324	6 G 0,5	7,6	67,0	89,0	20
16325	7 G 0,5	7,6	69,0	98,0	20
16326	8 G 0,5	8,1	80,0	117,0	20
16327	10 G 0,5	9,6	94,0	135,0	20
16328	12 G 0,5	9,7	108,0	157,0	20
16329	14 G 0,5	10,2	116,0	190,0	20
16330	16 G 0,5	11,0	129,0	210,0	20
16331	18 G 0,5	11,5	145,0	217,0	20
16332	20 G 0,5	12,3	172,0	240,0	20

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
16333	21 G 0,5	12,3	188,0	250,0	20
16334	24 G 0,5	13,6	235,0	300,0	20
16335	25 G 0,5	13,7	240,0	314,0	20
16336	30 G 0,5	14,4	295,0	360,0	20
16337	32 G 0,5	14,9	301,0	425,0	20
16165	34 G 0,5	15,6	312,0	433,0	20
16338	36 G 0,5	15,6	318,0	446,0	20
16339	40 G 0,5	16,4	343,0	475,0	20
16490	41 G 0,5	16,5	348,0	486,0	20
16340	50 G 0,5	18,5	406,0	573,0	20
16341	61 G 0,5	19,7	508,0	653,0	20
16342	80 G 0,5	22,6	680,0	784,0	20
16343	100 G 0,5	24,9	804,0	995,0	20

Continuation ►

**F-CY-JZ** flexible, Cu-screened, EMC-preferred type, meter marking

A

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
16344	2 x 0,75	6,1	40,0	59,0	19
16345	3 G 0,75	6,3	52,0	66,0	19
16346	4 G 0,75	6,8	60,0	77,0	19
16347	5 G 0,75	7,4	71,0	93,0	19
16348	6 G 0,75	8,2	80,0	113,0	19
16349	7 G 0,75	8,2	91,0	130,0	19
16350	8 G 0,75	9,0	110,0	145,0	19
16351	10 G 0,75	10,3	137,0	180,0	19
16353	12 G 0,75	10,5	142,0	202,0	19
16354	14 G 0,75	11,3	180,0	225,0	19
16355	16 G 0,75	11,9	200,0	275,0	19
16356	18 G 0,75	12,7	212,0	292,0	19
16447	19 G 0,75	12,7	230,0	308,0	19
16357	20 G 0,75	13,6	238,0	320,0	19
16358	21 G 0,75	13,6	246,0	378,0	19
16359	24 G 0,75	14,9	270,0	435,0	19
16360	25 G 0,75	15,0	281,0	415,0	19
16361	27 G 0,75	15,0	304,0	435,0	19
16362	30 G 0,75	16,0	320,0	450,0	19
16363	32 G 0,75	16,7	342,0	484,0	19
16166	34 G 0,75	17,2	345,0	502,0	19
16364	36 G 0,75	17,4	350,0	535,0	19
16448	37 G 0,75	17,4	361,0	592,0	19
16365	40 G 0,75	18,1	369,0	610,0	19
16491	41 G 0,75	18,2	400,0	622,0	19
16366	50 G 0,75	20,3	461,0	777,0	19
16367	61 G 0,75	22,0	540,0	900,0	19
16368	80 G 0,75	25,3	711,0	1210,0	19
16369	100 G 0,75	28,0	900,0	1445,0	19
16370	2 x 1	6,4	50,0	65,0	18
16371	3 G 1	6,7	60,0	80,0	18
16372	4 G 1	7,2	71,0	98,0	18
16373	5 G 1	8,0	88,0	127,0	18
16374	6 G 1	8,7	97,0	144,0	18
16375	7 G 1	8,7	111,0	158,0	18
16376	8 G 1	9,6	127,0	197,0	18
16377	10 G 1	11,2	150,0	232,0	18
16378	12 G 1	11,4	184,0	260,0	18
16379	14 G 1	12,0	196,0	302,0	18
16380	16 G 1	12,8	209,0	346,0	18
16381	18 G 1	13,6	260,0	380,0	18
16352	19 G 1	13,6	280,0	412,0	18
16382	20 G 1	14,3	317,0	440,0	18
16383	24 G 1	16,0	320,0	493,0	18
16384	25 G 1	16,2	349,0	534,0	18
16439	27 G 1	16,4	400,0	562,0	18
16385	28 G 1	17,0	408,0	595,0	18
16386	30 G 1	17,2	441,0	616,0	18
16387	34 G 1	18,5	486,0	741,0	18
16446	37 G 1	18,6	519,0	790,0	18
16388	40 G 1	19,4	510,0	835,0	18
16492	41 G 1	19,5	531,0	843,0	18
16389	50 G 1	22,0	625,0	1025,0	18
16390	61 G 1	23,5	702,0	1205,0	18
16391	80 G 1	26,9	920,0	1445,0	18
16392	100 G 1	30,2	1120,0	1613,0	18

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
16393	2 x 1,5	7,0	63,0	88,0	16
16394	3 G 1,5	7,4	80,0	100,0	16
16395	4 G 1,5	8,1	97,0	126,0	16
16396	5 G 1,5	9,0	119,0	160,0	16
16397	7 G 1,5	9,8	147,0	208,0	16
16398	8 G 1,5	10,8	170,0	244,0	16
16399	10 G 1,5	12,6	193,0	315,0	16
16400	12 G 1,5	12,8	267,0	338,0	16
16401	14 G 1,5	13,5	283,0	383,0	16
16402	16 G 1,5	14,6	315,0	424,0	16
16403	18 G 1,5	15,6	374,0	479,0	16
16449	19 G 1,5	15,6	386,0	508,0	16
16404	20 G 1,5	16,6	396,0	545,0	16
16405	21 G 1,5	16,6	425,0	560,0	16
16406	24 G 1,5	18,1	458,0	690,0	16
16407	25 G 1,5	18,4	526,0	705,0	16
16450	27 G 1,5	18,5	531,0	774,0	16
16408	28 G 1,5	19,6	541,0	810,0	16
16409	30 G 1,5	19,6	555,0	830,0	16
16410	35 G 1,5	21,4	645,0	890,0	16
16451	37 G 1,5	21,4	674,0	945,0	16
16411	40 G 1,5	22,0	725,0	1060,0	16
16493	41 G 1,5	22,2	801,0	1071,0	16
16412	50 G 1,5	25,0	885,0	1290,0	16
16413	61 G 1,5	26,8	1100,0	1705,0	16
16414	80 G 1,5	30,8	1324,0	2010,0	16
16415	100 G 1,5	34,1	1641,0	2505,0	16
16416	2 x 2,5	8,4	96,0	130,0	14
16417	3 G 2,5	8,8	144,0	167,0	14
16418	4 G 2,5	9,8	148,0	195,0	14
16419	5 G 2,5	10,8	181,0	223,0	14
16420	7 G 2,5	11,9	255,0	344,0	14
16421	10 G 2,5	15,5	340,0	460,0	14
16438	12 G 2,5	15,8	441,0	570,0	14
16452	18 G 2,5	19,0	570,0	681,0	14
16422	2 x 4	10,0	120,0	185,0	12
16423	3 G 4	10,6	174,0	240,0	12
16424	4 G 4	11,6	230,0	310,0	12
16425	5 G 4	12,8	273,0	385,0	12
16426	7 G 4	14,2	316,0	500,0	12
16427	2 x 6	11,7	173,0	268,0	10
16428	3 G 6	12,5	240,0	330,0	10
16429	4 G 6	13,8	305,0	415,0	10
16430	5 G 6	15,4	439,0	509,0	10
16431	7 G 6	17,0	505,0	672,0	10
16432	2 x 10	14,5	255,0	425,0	8
16433	3 G 10	15,6	350,0	500,0	8
16434	4 G 10	17,2	535,0	783,0	8
16435	5 G 10	19,1	592,0	856,0	8
16436	7 G 10	21,2	810,0	1305,0	8
16440	4 G 16	20,3	740,0	880,0	6
16437	5 G 16	22,2	895,0	1295,0	6
16441	4 G 25	24,7	1140,0	1570,0	4
16442	5 G 25	27,4	1380,0	1965,0	4
16443	4 G 35	28,4	1576,0	2070,0	2
16444	5 G 35	31,6	1930,0	2690,0	2
16445	4 G 50	34,2	2155,0	3015,0	1

Dimensions and specifications may be changed without prior notice. (RA01)



Suitable accessories can be found in Chapter X.

- Cable Gland - HELUTOP® HT-MS-EP4



**JZ-500-C black** EMC-preferred type, Cu-screened. flexible, meter marking

HELUKABEL JZ-500-C black 12G 1,5 QMM/10963 300/500V 0010917711 CE

**Technical data**

- Special-PVC control cable adapted to DIN VDE 0285-525-2-51 / DIN EN 50525-2-51
- **Temperature range**  
flexing -10°C to +80°C  
fixed installation -40°C to +80°C
- **Nominal voltage** U<sub>0</sub>/U 300/500 V
- **Test voltage**  
core/core 4000 V  
core/screen 2000 V
- **Breakdown voltage** min. 8000 V
- **Insulation resistance**  
min. 20 MOhm x km
- **Coupling resistance**  
max. 250 Ohm/km
- **Minimum bending radius**  
flexing 10x cable Ø  
fixed installation 5x cable Ø
- **Radiation resistance**  
up to 80x10<sup>6</sup> cJ/kg (up to 80 Mrad)

**Cable structure**

- Bare copper-conductor, to DIN VDE 0295 cl.5, fine-wire, BS 6360 cl.5, IEC 60228 cl.5
- Core insulation of special PVC compound type Z 7225
- Core identification to DIN VDE 0293 black cores with continuous white numbering
- GN-YE conductor, 3 cores and above in the outer layer
- Cores stranded in layers with optimal lay-length
- Foil separator
- Tinned copper braided screen, approx. 85% coverage
- Outer sheath of special PVC compound type TM2 to DIN VDE 0207-363-4-1 / DIN EN 50363-4-1
- Sheath colour black (RAL 9005)
- with meter marking

**Properties**

- Extensively oil resistant, oil-/chemical resistance see table Technical Informations
  - The materials used in manufacture are cadmium-free and contain no silicone and free from substances harmful to the wetting properties of lacquers
  - **UV-resistant**
- Tests**
- PVC self-extinguishing and flame retardant acc. to DIN VDE 0482-332-1-2, DIN EN 60332-1-2, IEC 60332-1 (equivalent DIN VDE 0472 part 804 test method B)

**Note**

- G = with green-yellow conductor  
x = without green-yellow conductor (OZ)
- AWG sizes are approximate equivalent values. The actual cross-section is in mm<sup>2</sup>.
- unscreened analogue type **JZ-500 black**, confer page 32

**Application**

For medium mechanical stress for flexible use with free movement without tensile stress or forced movements in dry, damp, wet rooms and **in open air**. Must not be laid directly in soil or water. When screened for measurement, control and control line etc. in mechanical and plant engineering, machine tools, production lines and conveyor belts.

**EMC** = Electromagnetic compatibility

To optimize the EMC features we recommend a large round contact of the copper braiding on both ends.

CE = The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
10934	2 x 0,5	6,1	35,0	45,0	20
10935	3 G 0,5	6,4	42,0	55,0	20
11479	3 x 0,5	6,4	42,0	55,0	20
10936	4 G 0,5	6,8	47,0	61,0	20
11480	4 x 0,5	6,8	47,0	61,0	20
10937	5 G 0,5	7,5	56,0	74,0	20
11481	5 x 0,5	7,5	56,0	74,0	20
10938	7 G 0,5	8,1	69,0	98,0	20
11482	7 x 0,5	8,1	69,0	98,0	20
10939	12 G 0,5	10,6	108,0	157,0	20
11483	12 x 0,5	10,6	108,0	157,0	20
10940	18 G 0,5	12,4	145,0	217,0	20
10941	25 G 0,5	14,7	240,0	314,0	20
10942	2 x 0,75	6,7	40,0	59,0	19
10943	3 G 0,75	7,0	52,0	66,0	19
11484	3 x 0,75	7,0	52,0	66,0	19
10944	4 G 0,75	7,7	60,0	77,0	19
11485	4 x 0,75	7,7	60,0	77,0	19
10945	5 G 0,75	8,2	71,0	93,0	19
11486	5 x 0,75	8,2	71,0	93,0	19
10946	7 G 0,75	9,0	91,0	130,0	19
11487	7 x 0,75	9,0	91,0	130,0	19
10947	12 G 0,75	11,6	142,0	202,0	19
11488	12 x 0,75	11,6	142,0	202,0	19
10948	18 G 0,75	13,7	212,0	292,0	19
10949	25 G 0,75	16,4	281,0	415,0	19
10950	2 x 1	7,0	50,0	65,0	18
10951	3 G 1	7,5	60,0	80,0	18
11493	3 x 1	7,5	60,0	80,0	18
10952	4 G 1	8,0	71,0	98,0	18
11495	4 x 1	8,0	71,0	98,0	18
10953	5 G 1	8,8	88,0	127,0	18
11496	5 x 1	8,8	88,0	127,0	18
10954	7 G 1	9,5	111,0	158,0	18
11497	7 x 1	9,5	111,0	158,0	18
10955	12 G 1	12,4	184,0	260,0	18

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
11499	12 x 1	12,4	184,0	260,0	18
10956	18 G 1	14,7	260,0	380,0	18
10957	25 G 1	17,5	349,0	534,0	18
10958	2 x 1,5	7,8	63,0	88,0	16
10959	3 G 1,5	8,2	80,0	100,0	16
11500	3 x 1,5	8,2	80,0	100,0	16
10960	4 G 1,5	8,9	97,0	126,0	16
11502	4 x 1,5	8,9	97,0	126,0	16
10961	5 G 1,5	9,8	119,0	160,0	16
11503	5 x 1,5	9,8	119,0	160,0	16
10962	7 G 1,5	10,8	147,0	208,0	16
11520	7 x 1,5	10,8	147,0	208,0	16
10963	12 G 1,5	14,0	267,0	338,0	16
11522	12 x 1,5	14,0	267,0	338,0	16
10964	18 G 1,5	16,8	374,0	479,0	16
10965	25 G 1,5	19,8	526,0	705,0	16
10966	2 x 2,5	9,2	96,0	130,0	14
10967	3 G 2,5	9,8	144,0	167,0	14
11523	3 x 2,5	9,8	144,0	167,0	14
10968	4 G 2,5	10,6	148,0	195,0	14
11524	4 x 2,5	10,6	148,0	195,0	14
10969	5 G 2,5	11,7	181,0	223,0	14
11526	5 x 2,5	11,7	181,0	223,0	14
10970	7 G 2,5	12,8	255,0	344,0	14
11527	7 x 2,5	12,8	255,0	344,0	14
10971	12 G 2,5	17,0	441,0	570,0	14
11550	12 x 2,5	17,0	441,0	570,0	14
10972	18 G 2,5	19,8	570,0	681,0	14
10973	4 G 4	12,4	230,0	310,0	12
10974	5 G 4	13,7	273,0	385,0	12
10975	4 G 6	14,7	305,0	415,0	10
10976	5 G 6	16,2	439,0	509,0	10
10977	4 G 10	18,2	535,0	783,0	8
10978	4 G 16	21,1	740,0	880,0	6
10979	4 G 25	25,8	1140,0	1570,0	4
10980	4 G 35	29,7	1576,0	2070,0	2

Dimensions and specifications may be changed without prior notice. (RA01)

**Y-CY-JZ** flexible, Cu-screened, transparent, EMC-preferred type, meter marking

A

**Technical data**

- Special-PVC control cable adapted to DIN VDE 0285-525-2-51 / DIN EN 50525-2-51
- **Temperature range**  
flexing -15°C to +80°C  
fixed installation -40°C to +80°C
- **Nominal voltage** U<sub>0</sub>/U 300/500 V
- **Test voltage** 4000 V
- **Breakdown voltage** min. 8000 V
- **Insulation resistance**  
min. 20 MOhm x km
- **Mutual capacitance**  
acc. to different cross-sections  
0,5 up to 2,5 mm<sup>2</sup>:  
core/core approx. 150 nF/km  
core/screen approx. 270 nF/km
- **Coupling resistance**  
max. 250 Ohm/km
- **Minimum bending radius**  
flexing 10x cable Ø  
fixed installation 5x cable Ø
- **Radiation resistance**  
up to 80x10<sup>6</sup> cJ/kg (up to 80 Mrad)

**Cable structure**

- Bare copper-conductor, to DIN VDE 0295 cl.5, fine-wire, BS 6360 cl.5, IEC 60228 cl.5
- Core insulation of special PVC compound type Z 7225
- Core identification to DIN VDE 0293 black cores with continuous white numbering
- GN-YE conductor, 3 cores and above in the outer layer
- Cores stranded in layers with optimal lay-length
- Inner sheath of PVC, grey
- Tinned copper braided screen, approx. 85% coverage
- Outer sheath of special PVC
- Sheath colour transparent
- with meter marking

**Properties**

- Extensively oil resistant, oil-/chemical resistance see table Technical Informations
- The materials used in manufacture are cadmium-free and contain no silicone and free from substances harmful to the wetting properties of lacquers

**Tests**

- PVC self-extinguishing and flame retardant acc. to DIN VDE 0482-332-1-2, DIN EN 60332-1-2, IEC 60332-1 (equivalent DIN VDE 0472 part 804 test method B)

**Note**

- G = with green-yellow conductor  
x = without green-yellow conductor (OZ)
- AWG sizes are approximate equivalent values. The actual cross-section is in mm<sup>2</sup>.
- unscreened analogue type:  
**JZ-500**, confer page 30

**Application**

For use as a data and control cable in machinery, computer systems etc. as well as a signal cable for electronics. The high level of screening ensures a high degree of interference protection. The screening density assures disturbancefree transmission of all signals and impulses. The PVC-inner sheaths of those cables raise the mechanical stress. The applied clear transparent PVC outer sheath accentuates the optical view of the tinned copper braid.

**EMC** = Electromagnetic compatibility

To optimize the EMC features we recommend a large round contact of the copper braiding on both ends.

CE = The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.	Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
16200	2 x 0,5	7,0	41,0	67,0	20	16219	50 G 0,5	20,7	407,0	740,0	20
16201	3 G 0,5	7,3	45,0	83,0	20	16220	61 G 0,5	22,0	520,0	850,0	20
16169	3 x 0,5	7,3	45,0	83,0	20	16221	80 G 0,5	25,0	690,0	1080,0	20
16202	4 G 0,5	7,9	54,0	94,0	20	16222	100 G 0,5	27,4	805,0	1350,0	20
16170	4 x 0,5	7,9	54,0	94,0	20	16223	2 x 0,75	7,7	46,0	87,0	19
16203	5 G 0,5	8,4	66,0	108,0	20	16224	3 G 0,75	8,0	57,0	98,0	19
16171	5 x 0,5	8,4	66,0	108,0	20	16173	3 x 0,75	8,0	57,0	98,0	19
16204	6 G 0,5	9,1	73,0	125,0	20	16225	4 G 0,75	8,5	63,0	113,0	19
16205	7 G 0,5	9,1	79,0	136,0	20	16196	4 x 0,75	8,5	63,0	113,0	19
17172	7 x 0,5	9,1	79,0	136,0	20	16226	5 G 0,75	9,3	76,0	130,0	19
16206	8 G 0,5	9,7	82,0	150,0	20	16174	5 x 0,75	9,3	76,0	130,0	19
16207	10 G 0,5	10,7	107,0	170,0	20	16227	6 G 0,75	9,9	82,0	156,0	19
16208	12 G 0,5	11,5	137,0	195,0	20	16228	7 G 0,75	9,9	100,0	184,0	19
16209	14 G 0,5	12,2	142,0	223,0	20	16175	7 x 0,75	9,9	100,0	184,0	19
16210	16 G 0,5	12,7	147,0	250,0	20	16229	8 G 0,75	10,6	112,0	221,0	19
16211	18 G 0,5	13,5	156,0	277,0	20	16230	10 G 0,75	11,8	140,0	270,0	19
16212	20 G 0,5	14,2	173,0	310,0	20	16231	12 G 0,75	12,7	175,0	292,0	19
16315	21 G 0,5	14,2	189,0	331,0	20	16232	14 G 0,75	13,3	190,0	315,0	19
16213	24 G 0,5	15,5	236,0	390,0	20	16233	16 G 0,75	14,1	204,0	335,0	19
16214	25 G 0,5	15,7	250,0	407,0	20	16234	18 G 0,75	14,9	240,0	358,0	19
16215	30 G 0,5	16,2	297,0	520,0	20	16235	20 G 0,75	15,4	262,0	420,0	19
16216	32 G 0,5	17,0	312,0	550,0	20	16316	21 G 0,75	15,4	274,0	454,0	19
16217	36 G 0,5	17,7	320,0	585,0	20	16236	24 G 0,75	17,3	291,0	480,0	19
16218	40 G 0,5	18,4	345,0	654,0	20	16237	25 G 0,75	17,5	306,0	508,0	19
16453	41 G 0,5	18,9	348,0	671,0	20	16238	27 G 0,75	17,7	326,0	535,0	19
						16239	30 G 0,75	18,3	340,0	640,0	19

Continuation ▶

**Y-CY-JZ** flexible, Cu-screened, transparent, EMC-preferred type, meter marking

Part no.	No.cores x cross-sec. mm <sup>2</sup>	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
16240	32 G 0,75	18,9	349,0	688,0	19
16241	36 G 0,75	19,7	358,0	730,0	19
16242	40 G 0,75	20,4	371,0	950,0	19
16454	41 G 0,75	21,0	403,0	971,0	19
16243	50 G 0,75	23,2	470,0	1100,0	19
16244	61 G 0,75	24,6	550,0	1290,0	19
16245	80 G 0,75	28,3	715,0	1510,0	19
16246	100 G 0,75	31,1	910,0	1640,0	19
16248	2 x 1	8,0	54,0	97,0	18
16249	3 G 1	8,3	64,0	103,0	18
16176	3 x 1	8,3	64,0	103,0	18
16250	4 G 1	9,0	76,0	146,0	18
16177	4 x 1	9,0	76,0	146,0	18
16251	5 G 1	9,7	89,0	169,0	18
16178	5 x 1	9,7	89,0	169,0	18
16252	6 G 1	10,3	101,0	199,0	18
16253	7 G 1	10,3	114,0	219,0	18
16179	7 x 1	10,3	114,0	219,0	18
16254	8 G 1	11,2	130,0	270,0	18
16255	10 G 1	12,6	156,0	330,0	18
16256	12 G 1	13,3	186,0	350,0	18
16257	14 G 1	14,1	198,0	400,0	18
16258	16 G 1	14,8	214,0	422,0	18
16259	18 G 1	15,6	284,0	514,0	18
16260	20 G 1	16,4	325,0	545,0	18
16261	24 G 1	18,2	366,0	640,0	18
16262	25 G 1	18,5	387,0	689,0	18
16263	28 G 1	19,1	421,0	710,0	18
16264	30 G 1	19,2	457,0	762,0	18
16265	34 G 1	20,9	500,0	910,0	18
16266	40 G 1	21,5	536,0	1070,0	18
16455	41 G 1	22,2	578,0	1092,0	18
16267	50 G 1	24,8	681,0	1315,0	18
16268	61 G 1	26,0	710,0	1370,0	18
16269	80 G 1	30,0	940,0	1610,0	18
16270	100 G 1	33,1	1180,0	1840,0	18
16271	2 x 1,5	8,6	64,0	130,0	16
16272	3 G 1,5	9,2	82,0	152,0	16
16180	3 x 1,5	9,2	82,0	152,0	16
16273	4 G 1,5	9,8	99,0	168,0	16
16181	4 x 1,5	9,8	99,0	168,0	16
16274	5 G 1,5	10,8	123,0	202,0	16
16182	5 x 1,5	10,8	123,0	202,0	16
16275	7 G 1,5	11,7	148,0	304,0	16
16183	7 x 1,5	11,7	148,0	304,0	16
16276	8 G 1,5	12,6	172,0	336,0	16
16277	10 G 1,5	14,2	198,0	420,0	16
16278	12 G 1,5	14,9	274,0	434,0	16
16279	14 G 1,5	15,8	294,0	480,0	16
16280	16 G 1,5	16,7	318,0	525,0	16
16281	18 G 1,5	17,4	386,0	640,0	16

Part no.	No.cores x cross-sec. mm <sup>2</sup>	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
16282	20 G 1,5	18,5	401,0	690,0	16
16317	21 G 1,5	18,5	447,0	720,0	16
16283	24 G 1,5	20,4	487,0	770,0	16
16284	25 G 1,5	20,8	531,0	805,0	16
16285	28 G 1,5	21,4	562,0	900,0	16
16286	30 G 1,5	21,6	598,0	950,0	16
16287	35 G 1,5	23,2	685,0	1100,0	16
16288	40 G 1,5	24,5	759,0	1350,0	16
16456	41 G 1,5	25,0	840,0	1381,0	16
16289	50 G 1,5	27,4	997,0	1675,0	16
16290	61 G 1,5	29,2	1120,0	1800,0	16
16291	80 G 1,5	33,4	1360,0	2300,0	16
16292	100 G 1,5	36,8	1690,0	2600,0	16
16293	2 x 2,5	10,1	110,0	180,0	14
16294	3 G 2,5	10,8	148,0	216,0	14
16295	4 G 2,5	11,5	169,0	267,0	14
16296	5 G 2,5	12,8	220,0	347,0	14
16297	7 G 2,5	14,0	284,0	407,0	14
16298	10 G 2,5	16,8	369,0	660,0	14
16318	12 G 2,5	17,9	470,0	722,0	14
16299	2 x 4	11,6	124,0	302,0	12
16300	3 G 4	12,5	178,0	340,0	12
16301	4 G 4	13,7	234,0	410,0	12
16302	5 G 4	14,9	284,0	502,0	12
16303	7 G 4	16,2	321,0	638,0	12
16304	2 x 6	13,7	176,0	350,0	10
16305	3 G 6	14,4	245,0	450,0	10
16306	4 G 6	15,7	316,0	559,0	10
16307	5 G 6	17,3	442,0	702,0	10
16308	7 G 6	19,0	530,0	907,0	10
16309	2 x 10	16,6	260,0	500,0	8
16310	3 G 10	17,6	367,0	750,0	8
16311	4 G 10	19,4	549,0	1020,0	8
16312	5 G 10	21,3	604,0	1115,0	8
16313	7 G 10	23,4	820,0	1500,0	8
16460	4 G 16	23,4	807,0	1380,0	6
16314	5 G 16	26,0	940,0	1553,0	6
16461	4 G 25	28,3	1169,0	1890,0	4
16462	5 G 25	31,5	1420,0	2270,0	4
16463	4 G 35	32,9	1680,0	2390,0	2
16464	5 G 35	36,9	2020,0	2885,0	2
16465	4 G 50	38,6	2370,0	3315,0	1
16157	5 G 50	43,5	2880,0	4150,0	1
16466	4 G 70	46,1	3257,0	4600,0	2/0
16158	5 G 70	50,5	4032,0	5750,0	2/0
16467	4 G 95	51,1	4060,0	6060,0	3/0
16159	5 G 95	56,0	5244,0	7580,0	3/0
16468	4 G 120	56,5	5231,0	7315,0	4/0
16160	5 G 120	62,1	6624,0	9150,0	4/0
16167	4 G 150	64,6	7760,0	9680,0	300 kcmil
16168	5 G 150	70,6	8496,0	10170,0	300 kcmil

Dimensions and specifications may be changed without prior notice. (RA01)



Suitable accessories can be found in Chapter X.

- Cable Gland - HELUTOP® HT-MS-EP4



**SY-JZ** flexible, number coded, with steel wire braiding, meter marking

A

**Technical data**

- Special-PVC control cable adapted to DIN VDE 0285-525-2-51 / DIN EN 50525-2-51
- **Temperature range**  
flexing -15°C to +80°C  
fixed installation -40°C to +80°C
- **Nominal voltage** U<sub>0</sub>/U 300/500 V
- **Test voltage** 4000 V
- **Breakdown voltage** min. 8000 V
- **Insulation resistance**  
min. 20 MOhm x km
- **Minimum bending radius**  
flexing 20x cable Ø  
fixed installation 6x cable Ø
- **Radiation resistance**  
up to 80x10<sup>6</sup> cJ/kg (up to 80 Mrad)

**Cable structure**

- Bare copper-conductor, to DIN VDE 0295 cl.5, fine-wire, BS 6360 cl.5, IEC 60228 cl.5
- Core insulation of special PVC compound type Z 7225
- Core identification to DIN VDE 0293 black cores with continuous white numbering
- GN-YE conductor, 3 cores and above in the outer layer
- Cores stranded in layers with optimal lay-length
- Inner sheath of special PVC
- Galvanized steel wire braid
- Outer sheath of special PVC
- Sheath colour transparent
- with meter marking

**Properties**

- Extensively oil resistant, oil-/chemical resistance see table Technical Informations
  - The materials used in manufacture are cadmium-free and contain no silicone and free from substances harmful to the wetting properties of lacquers
- Tests**
- PVC self-extinguishing and flame retardant acc. to DIN VDE 0482-332-1-2, DIN EN 60332-1-2, IEC 60332-1 (equivalent DIN VDE 0472 part 804 test method B)

**Note**

- G = with green-yellow conductor  
x = without green-yellow conductor (OZ)
- Further dimensions available on request.
- These cables can be also delivered with coloured conductors (SY-JB).
- Cleanroom qualification tested with analog type. Please note "cleanroom qualified" when ordering.
- AWG sizes are approximate equivalent values. The actual cross-section is in mm<sup>2</sup>.
- screened analogue type:  
**SY-JB**, confer page 64

**Application**

SY-JZ cables are used as measuring and control cables in tool machinery, plant installation, power stations and in data equipment. The braided screen offers best possible protection against mechanical damage. The galvanized coating on the steel wire braiding not only helps protect against corrosion, but also notably improves the soldering performance.

The clear transparent outer sheath gives the cable in addition an optical reevaluation.

CE = The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

Part no.	No.cores x cross-sec. mm <sup>2</sup>	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.	Part no.	No.cores x cross-sec. mm <sup>2</sup>	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
12001	2 x 0,5	7,2	9,6	80,0	20	12027	18 G 0,75	15,0	130,0	388,0	19
12002	3 G 0,5	7,5	14,4	92,0	20	12028	21 G 0,75	15,5	151,0	474,0	19
12003	4 G 0,5	8,1	19,2	102,0	20	12029	25 G 0,75	17,5	180,0	503,0	19
12004	5 G 0,5	8,6	24,0	119,0	20	12030	32 G 0,75	18,9	230,0	644,0	19
12005	7 G 0,5	9,3	33,6	157,0	20	12031	34 G 0,75	19,9	245,0	663,0	19
12006	10 G 0,5	10,7	48,0	205,0	20	12032	41 G 0,75	21,2	296,0	741,0	19
12007	12 G 0,5	11,7	58,0	218,0	20	12033	50 G 0,75	23,2	360,0	925,0	19
12008	14 G 0,5	12,3	67,0	242,0	20	12034	61 G 0,75	25,2	439,0	1082,0	19
12009	18 G 0,5	13,4	86,0	340,0	20	12035	2 x 1	8,2	19,2	112,0	18
12010	21 G 0,5	14,2	101,0	370,0	20	12036	3 G 1	8,5	28,8	132,0	18
12114	25 G 0,5	15,7	120,0	406,0	20	12037	4 G 1	9,2	38,4	143,0	18
12012	30 G 0,5	16,2	144,0	439,0	20	12038	5 G 1	9,9	48,0	166,0	18
12013	35 G 0,5	17,5	168,0	500,0	20	12039	6 G 1	10,5	58,0	22,0	18
12014	40 G 0,5	18,2	192,0	565,0	20	12040	7 G 1	10,5	67,0	227,0	18
12015	42 G 0,5	19,0	202,0	593,0	20	12041	8 G 1	11,4	77,0	277,0	18
12016	50 G 0,5	20,7	240,0	690,0	20	12042	9 G 1	12,8	86,0	295,0	18
12017	61 G 0,5	22,0	293,0	843,0	20	12043	12 G 1	13,4	115,0	340,0	18
12018	80 G 0,5	25,0	384,0	1050,0	20	12044	14 G 1	14,2	134,0	420,0	18
12011	100 G 0,5	27,4	480,0	1240,0	20	12045	18 G 1	15,7	173,0	500,0	18
12019	2 x 0,75	7,9	14,4	98,0	19	12046	20 G 1	16,4	192,0	532,0	18
12020	3 G 0,75	8,2	21,6	103,0	19	12047	25 G 1	18,4	240,0	664,0	18
12021	4 G 0,75	8,7	28,8	122,0	19	12048	34 G 1	20,8	326,0	845,0	18
12022	5 G 0,75	9,5	36,0	142,0	19	12049	36 G 1	20,9	346,0	857,0	18
12112	6 G 0,75	10,1	43,2	180,0	19	12050	41 G 1	22,2	394,0	993,0	18
12023	7 G 0,75	10,1	50,0	185,0	19	12051	50 G 1	24,4	480,0	1112,0	18
12188	8 G 0,75	10,8	57,6	201,0	19	12052	56 G 1	25,5	538,0	1225,0	18
12024	9 G 0,75	11,8	65,0	249,0	19	12053	61 G 1	26,1	586,0	1306,0	18
12113	10 G 0,75	12,0	72,0	252,0	19	12054	65 G 1	26,9	624,0	1504,0	18
12025	12 G 0,75	12,8	86,0	292,0	19	12055	80 G 1	30,0	768,0	1750,0	18
12026	15 G 0,75	14,2	108,0	335,0	19	12056	100 G 1	33,1	960,0	1950,0	18

Continuation ▶

**SY-JZ** flexible, number coded, with steel wire braiding, meter marking

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
12057	2 x 1,5	8,8	29,0	129,0	16
12058	3 G 1,5	9,4	43,0	149,0	16
12059	4 G 1,5	10,0	58,0	185,0	16
12060	5 G 1,5	10,9	72,0	205,0	16
12109	6 G 1,5	11,8	87,0	255,0	16
12061	7 G 1,5	11,8	101,0	285,0	16
12062	8 G 1,5	12,7	115,0	340,0	16
12063	9 G 1,5	13,9	130,0	347,0	16
12064	10 G 1,5	14,3	144,0	418,0	16
12065	11 G 1,5	14,8	158,0	430,0	16
12066	12 G 1,5	15,0	173,0	444,0	16
12067	14 G 1,5	15,8	202,0	533,0	16
12068	18 G 1,5	17,4	259,0	593,0	16
12069	25 G 1,5	20,8	360,0	781,0	16
12070	32 G 1,5	22,3	461,0	1015,0	16
12071	34 G 1,5	23,2	490,0	1124,0	16
12072	42 G 1,5	25,2	605,0	1401,0	16
12073	50 G 1,5	27,6	720,0	1583,0	16
12074	61 G 1,5	29,4	878,0	1810,0	16
12075	80 G 1,5	33,8	1152,0	2316,0	16
12076	100 G 1,5	37,2	1440,0	2900,0	16
12077	2 x 2,5	10,2	48,0	185,0	14
12078	3 G 2,5	10,9	72,0	248,0	14
12079	4 G 2,5	11,6	96,0	290,0	14
12080	5 G 2,5	12,9	120,0	347,0	14
12081	7 G 2,5	14,2	168,0	420,0	14
12082	12 G 2,5	17,7	288,0	660,0	14
12083	14 G 2,5	18,8	336,0	750,0	14
12084	18 G 2,5	21,0	432,0	893,0	14
12085	20 G 2,5	22,3	480,0	1169,0	14
12086	25 G 2,5	24,8	600,0	1458,0	14
12087	30 G 2,5	26,0	720,0	1686,0	14
12088	34 G 2,5	28,4	816,0	1869,0	14
12089	50 G 2,5	34,0	1200,0	2200,0	14
12090	61 G 2,5	36,2	1464,0	3000,0	14

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
12115	3 G 4	12,6	117,0	350,0	12
12091	4 G 4	13,7	154,0	428,0	12
12092	5 G 4	14,9	192,0	504,0	12
12093	7 G 4	16,2	269,0	640,0	12
12094	11 G 4	21,2	422,0	1204,0	12
12095	4 G 6	15,8	230,0	571,0	10
12096	5 G 6	17,3	288,0	671,0	10
12097	7 G 6	19,0	403,0	845,0	10
12098	4 G 10	19,4	384,0	943,0	8
12099	5 G 10	21,3	480,0	1065,0	8
12100	7 G 10	23,4	672,0	1551,0	8
12101	4 G 16	23,6	614,0	1360,0	6
12102	5 G 16	26,4	768,0	1740,0	6
12103	7 G 16	29,0	1075,0	2166,0	6
12104	4 G 25	28,5	960,0	2020,0	4
12105	5 G 25	31,7	1200,0	2465,0	4
12106	4 G 35	32,9	1344,0	2570,0	2
12107	5 G 35	36,9	1680,0	3185,0	2
12108	4 G 50	38,8	1920,0	3513,0	1
12116	5 G 50	43,7	2400,0	4248,0	1
12111	4 G 70	46,3	2688,0	4810,0	2/0
12117	5 G 70	50,5	3360,0	5880,0	2/0
12110	4 G 95	51,2	3648,0	6360,0	3/0
12118	5 G 95	56,1	4560,0	8071,0	3/0
12119	4 G 120	56,6	4608,0	8170,0	4/0
12327	4 G 150	64,7	5760,0	9970,0	300 kcmil

Dimensions and specifications may be changed without prior notice. (RA01)



Suitable accessories can be found in Chapter X.

- Cable Gland - HELUTOP® HT-MS-EP4

# H05VVC4V5-K (NYSLYCYÖ-JZ) flexible, number coded, oil resistant, EMC-preferred type



A



## Technical data

- Spezial-PVC control cable with oil resistant outer sheath acc. to DIN VDE 0285-525-2-51 / DIN EN 50525-2-51 and IEC 60227/74
- **Temperature range**  
flexing -5°C to +70°C  
fixed installation -40°C to +70°C
- **Nominal voltage**  $U_0/U$  300/500 V
- **Test voltage**  
core/core 2 kV, 5 minutes  
core/screen 2 kV, 5 minutes
- **Breakdown voltage** min. 4000 V
- **Coupling resistance**  
at 30 MHz 250 Ohm/km
- **Insulation resistance**  
min. 20 MOhm x km
- **Minimum bending radius**  
flexing 10x cable Ø  
fixed installation 5x cable Ø
- **Radiation resistance**  
up to  $80 \times 10^6$  cJ/kg (up to 80 Mrad)

## Cable structure

- Bare copper-conductor, to DIN VDE 0295 cl.5, fine-wire, BS 6360 cl.5, IEC 60228 cl.5
- Core insulation of special PVC compound type T12 to DIN VDE 0207-363-3 / DIN EN 50363-3
- Core identification to DIN VDE 0293 black cores with continuous white numbering
- GN-YE conductor, 3 cores and above in the outer layer
- Cores stranded in layers with optimal lay-length
- Inner sheath of special PVC compound type TM2 to DIN VDE 0207-363-4-1 / DIN EN 50363-4-1
- Tinned copper braided screening, covering approx. 85%
- Outer sheath of special PVC compound type TM5 to DIN VDE 0207-363-4-1 / DIN EN 50363-4-1
- Sheath colour grey (RAL 7001)

## Properties

- The materials used in manufacture are cadmium-free and contain no silicone and free from substances harmful to the wetting properties of lacquers
- ### Tests
- PVC self-extinguishing and flame retardant acc. to DIN VDE 0482-332-1-2, DIN EN 60332-1-2, IEC 60332-1 (equivalent DIN VDE 0472 part 804 test method B)
  - Oil resistant to DIN EN 60811-404

## Note

- G = with green-yellow conductor  
x = without green-yellow conductor (OZ)
- AWG sizes are approximate equivalent values. The actual cross-section is in mm<sup>2</sup>.
- unscreened analogue type:  
**H05V5-F (NYSLYÖ-JZ)**, confer page 35

## Application

These cables are used for flexible use for medium mechanical stresses with free movement without tensile stress or forced movements in dry, moist and wet rooms but not suitable for open air. These are designed as control and connecting cables to machines, tool machineries, conveyor belts and production lines.

These cables are not effected to the chemical influences. Cables for moist and wet rooms, specially used for machines in breweries, bottling plants and car washing stations.

These cables may be allowed to move once installed provided that the cables are not mechanically stressed during movement. The interconnection of parts of machines used for manufacturing purposes including machine tools where some degree of protection against electromagnetic interference is required.

**EMC** = Electromagnetic compatibility

To optimize the EMC features we recommend a large round contact of the copper braiding on both ends.

**CE** = The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer Ø min. - max. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.	Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer Ø min. - max. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
13951	2 x 0,5	7,7 - 9,6	41,0	92,0	20	13957	2 x 0,75	8,0 - 10,0	46,0	102,0	19
13060	3 G 0,5	8,0 - 10,0	45,0	109,0	20	13072	3 G 0,75	8,3 - 10,4	57,0	115,0	19
13061	4 G 0,5	8,5 - 10,7	54,0	126,0	20	13073	4 G 0,75	9,1 - 11,3	63,0	150,0	19
13062	5 G 0,5	9,3 - 11,6	66,0	156,0	20	13074	5 G 0,75	9,7 - 12,1	76,0	173,0	19
13063	6 G 0,5	9,9 - 12,4	73,0	176,0	20	13075	6 G 0,75	10,5 - 13,1	82,0	195,0	19
13064	7 G 0,5	10,8 - 13,5	79,0	192,0	20	13076	7 G 0,75	11,5 - 14,3	100,0	235,0	19
13952	8 G 0,5	11,7 - 14,5	82,0	211,0	20	13958	8 G 0,75	12,1 - 15,0	112,0	268,0	19
13065	9 G 0,5	12,8 - 15,8	94,0	230,0	20	13077	9 G 0,75	13,3 - 16,5	130,0	285,0	19
13066	12 G 0,5	13,3 - 16,5	137,0	280,0	20	13078	12 G 0,75	13,9 - 17,2	175,0	327,0	19
13953	14 G 0,5	13,4 - 16,6	142,0	302,0	20	13959	14 G 0,75	14,4 - 17,7	190,0	362,0	19
13067	18 G 0,5	15,1 - 18,6	156,0	384,0	20	13079	18 G 0,75	16,2 - 19,9	240,0	488,0	19
13068	25 G 0,5	17,7 - 21,7	250,0	556,0	20	13080	25 G 0,75	18,7 - 22,6	306,0	654,0	19
13954	27 G 0,5	18,0 - 22,1	255,0	599,0	20	13960	27 G 0,75	19,3 - 23,7	326,0	708,0	19
13069	34 G 0,5	20,1 - 24,7	316,0	634,0	20	13081	34 G 0,75	21,3 - 26,2	346,0	821,0	19
13955	36 G 0,5	20,1 - 24,7	320,0	620,0	20	13961	36 G 0,75	21,3 - 26,2	358,0	899,0	19
13129	41 G 0,5	21,7 - 26,6	348,0	770,0	20	13130	41 G 0,75	23,1 - 28,3	403,0	970,0	19
13070	50 G 0,5	24,0 - 29,3	407,0	970,0	20	13082	50 G 0,75	25,3 - 31,0	470,0	1160,0	19
13071	61 G 0,5	25,5 - 31,1	520,0	1072,0	20	13083	61 G 0,75	27,0 - 32,9	550,0	1402,0	19
13956	65 G 0,5	26,1 - 31,9	563,0	1198,0	20	13962	65 G 0,75	27,8 - 34,0	594,0	1504,0	19

Continuation ▶

# H05VVC4V5-K (NYSLYCYÖ-JZ) flexible, number coded, oil resistant, EMC-preferred type



Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer Ø min. - max. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
13963	2 x 1	8,2 - 10,3	54,0	114,0	18
13084	3 G 1	8,8 - 11,0	64,0	142,0	18
13085	4 G 1	9,4 - 11,7	76,0	175,0	18
13086	5 G 1	10,3 - 12,8	89,0	205,0	18
13087	6 G 1	11,0 - 13,6	101,0	236,0	18
13088	7 G 1	12,2 - 15,1	114,0	264,0	18
13964	8 G 1	13,1 - 16,2	130,0	301,0	18
13089	9 G 1	13,9 - 17,2	144,0	335,0	18
13090	12 G 1	14,7 - 18,1	186,0	420,0	18
13965	14 G 1	15,3 - 18,8	198,0	433,0	18
13091	18 G 1	16,9 - 20,8	284,0	561,0	18
13966	19 G 1	16,9 - 20,8	307,0	584,0	18
13092	25 G 1	19,8 - 24,2	387,0	766,0	18
13967	27 G 1	20,2 - 24,7	410,0	822,0	18
13093	34 G 1	22,5 - 27,6	500,0	996,0	18
13968	36 G 1	22,5 - 27,6	511,0	1001,0	18
13969	37 G 1	22,5 - 27,6	523,0	1018,0	18
13131	41 G 1	24,7 - 30,2	578,0	1155,0	18
13094	50 G 1	26,8 - 32,7	681,0	1300,0	18
13095	61 G 1	28,5 - 34,7	710,0	1500,0	18
13970	65 G 1	29,4 - 35,8	769,0	1510,0	18
13971	2 x 1,5	9,3 - 11,6	64,0	146,0	16
13096	3 G 1,5	9,7 - 12,1	82,0	176,0	16
13097	4 G 1,5	10,7 - 13,2	99,0	207,0	16
13098	5 G 1,5	11,8 - 14,7	123,0	235,0	16
13099	6 G 1,5	12,7 - 15,7	125,0	279,0	16
13100	7 G 1,5	14,1 - 17,4	148,0	314,0	16
13972	8 G 1,5	14,9 - 18,3	172,0	345,0	16
13101	9 G 1,5	16,0 - 19,7	187,0	380,0	16
13102	12 G 1,5	16,7 - 20,5	274,0	500,0	16

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer Ø min. - max. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
13973	14 G 1,5	17,6 - 21,6	294,0	560,0	16
13103	18 G 1,5	19,6 - 24,1	386,0	707,0	16
13974	19 G 1,5	19,6 - 24,1	394,0	723,0	16
13104	25 G 1,5	22,7 - 27,8	531,0	950,0	16
13975	27 G 1,5	23,4 - 28,6	546,0	1014,0	16
13105	32 G 1,5	25,4 - 31,1	638,0	1133,0	16
13106	34 G 1,5	26,6 - 32,5	671,0	1204,0	16
13976	36 G 1,5	26,6 - 32,5	700,0	1261,0	16
13977	37 G 1,5	26,6 - 32,5	720,0	1300,0	16
13132	41 G 1,5	28,5 - 34,8	840,0	1453,0	16
13107	50 G 1,5	31,2 - 38,0	997,0	1663,0	16
13108	61 G 1,5	32,7 - 39,9	1120,0	1852,0	16
13978	65 G 1,5	33,4 - 40,7	1197,0	1971,0	16
13985	2 x 2,5	10,7 - 13,3	110,0	190,0	14
13109	3 G 2,5	11,3 - 14,0	148,0	243,0	14
13110	4 G 2,5	12,6 - 15,5	169,0	280,0	14
13111	5 G 2,5	13,9 - 17,2	220,0	342,0	14
13112	7 G 2,5	16,5 - 20,3	284,0	439,0	14
13979	8 G 2,5	17,7 - 21,8	314,0	489,0	14
13113	12 G 2,5	19,9 - 24,4	470,0	760,0	14
13980	14 G 2,5	20,9 - 25,6	504,0	890,0	14
13114	18 G 2,5	23,3 - 28,5	572,0	1052,0	14
13115	25 G 2,5	27,4 - 33,5	740,0	1375,0	14
13981	27 G 2,5	28,2 - 34,5	971,0	1507,0	14
13116	34 G 2,5	31,5 - 38,5	1179,0	1892,0	14
13982	36 G 2,5	31,5 - 38,5	1268,0	1998,0	14
13983	41 G 2,5	33,5 - 40,8	1473,0	2286,0	14
13117	50 G 2,5	36,5 - 44,4	1660,0	2673,0	14
13118	61 G 2,5	38,8 - 47,2	1992,0	3085,0	14

Dimensions and specifications may be changed without prior notice. (RA01)



Suitable accessories can be found in Chapter X.

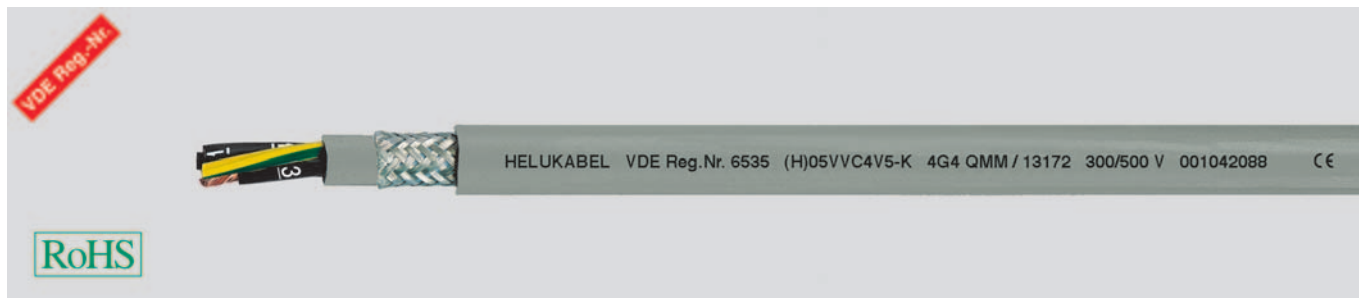
- Cable Gland - HELUTOP® HT-MS-EP4



**(H)05VVC4V5-K ((N)YSLYCYÖ-JZ)** number coded,

screened, oil resistant, EMC-preferred type

A

**Technical data**

- Spezial-PVC control cable with oil resistant outer sheath adapted to DIN VDE 0285-525-2-51 / DIN EN 50525-2-51 and IEC 60227/74 deviation of conductor cross-sections
- **Temperature range**  
flexing -5°C to +70°C  
fixed installation -40°C to +70°C
- **Nominal voltage** U<sub>0</sub>/U 300/500 V
- **Test voltage**  
core/core 2 kV, 5 min  
core/screen 2 kV, 5 min
- **Breakdown voltage** min. 4000 V
- **Coupling resistance**  
at 30 MHz 250 Ohm/km
- **Insulation resistance**  
min. 20 MOhm x km
- **Minimum bending radius**  
flexing 10x cable Ø  
fixed installation 5x cable Ø
- **Radiation resistance**  
up to 80x10<sup>6</sup> cJ/kg (up to 80 Mrad)

**Cable structure**

- Bare copper-conductor, to DIN VDE 0295 cl.5, fine-wire, BS 6360 cl.5, IEC 60228 cl.5
- Core insulation of special PVC compound type T12 to DIN VDE 0207-363-3 / DIN EN 50363-3
- Core identification to DIN VDE 0293 black cores with continuous white numbering
- GN-YE conductor, 3 cores and above in the outer layer
- Cores stranded in layers with optimal lay-length
- Inner sheath of special PVC compound type TM2 to DIN VDE 0207-363-4-1/DIN EN 50363-4-1
- Tinned copper braided screen, approx. 85% coverage
- Outer sheath of special PVC compound type TM5 to DIN VDE 0207-363-4-1/DIN EN 50363-4-1
- Sheath colour grey (RAL 7001)
- with meter marking

**Properties**

- The materials used in manufacture are cadmium-free and contain no silicone and free from substances harmful to the wetting properties of lacquers

**Tests**

- PVC self-extinguishing and flame retardant acc. to DIN VDE 0482-332-1-2, DIN EN 60332-1-2, IEC 60332-1 (equivalent DIN VDE 0472 part 804 test method B)
- Oil resistant to DIN EN 60811-404

**Note**

- G = with green-yellow conductor  
x = without green-yellow conductor (OZ)
- AWG sizes are approximate equivalent values. The actual cross-section is in mm<sup>2</sup>.
- unscreened analogue type:  
**(H)05VV5-F (N)YSLYÖ-JZ**, confer page 37

**Application**

These cables are used for flexible use for medium mechanical stresses with free movement without tensile stress or forced movements in dry, moist and wet rooms but not suitable for open air. These are designed as control and connecting cables to machines, tool machineries, conveyor belts and production lines.

These cables are not effected to the chemical influences. Cables for moist and wet rooms, specially used for machines in breweries, bottling plants and car washing stations.

These cables may be allowed to move once installed provided that the cables are not mechanically stressed during movement.

The interconnection of parts of machines used for manufacturing purposes including machine tools where some degree of protection against electromagnetic interference is required.

**EMC** = Electromagnetic compatibility

To optimize the EMC features we recommend a large round contact of the copper braiding on both ends.

CE = The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.	Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
13170	2 x 4	12,8	124,0	236,0	12	13190	3 G 16	23,0	653,0	993,0	6
13171	3 G 4	13,8	178,0	361,0	12	13191	4 G 16	25,2	807,0	1340,0	6
13172	4 G 4	14,9	234,0	430,0	12	13192	5 G 16	27,8	940,0	1626,0	6
13173	5 G 4	16,3	284,0	509,0	12	13193	7 G 16	33,9	1345,0	2080,0	6
13175	7 G 4	19,5	321,0	660,0	12	13196	4 G 25	30,7	1169,0	1692,0	4
13178	12 G 4	23,5	581,0	979,0	12	13197	5 G 25	34,1	1420,0	1972,0	4
13179	2 x 6	14,2	176,0	296,0	10	13198	3 G 35	31,0	1250,0	1704,0	2
13180	3 G 6	15,2	245,0	420,0	10	13199	4 G 35	34,1	1680,0	2320,0	2
13181	4 G 6	16,5	316,0	579,0	10	13189	5 G 35	37,3	2020,0	2780,0	2
13182	5 G 6	18,3	442,0	719,0	10	13194	3 G 50	35,7	1887,0	2661,0	1
13183	7 G 6	21,7	530,0	1031,0	10	13195	4 G 50	37,7	2370,0	3194,0	1
13185	3 G 10	18,8	367,0	655,0	8	13184	5 G 50	42,7	2880,0	4247,0	1
13186	4 G 10	20,7	549,0	894,0	8						
13187	5 G 10	22,7	604,0	927,0	8						
13188	7 G 10	27,8	820,0	1518,0	8						

Dimensions and specifications may be changed without prior notice. (RA01)

# JZ-600-Y-CY flexible, number coded, 0,6/1kV, Cu screened meter marking, EMC-preferred type



## Technical data

- Adapted to DIN VDE 0262 and DIN VDE 0285-525-2-51 / DIN EN 50525-2-51
- Temperature range**  
flexing -15°C to +80°C  
fixed installation -40°C to +80°C
- Nominal voltage**  $U_0/U$  0,6/1 kV
- Test voltage** 4000 V
- Breakdown voltage** min. 8000 V
- Insulation resistance**  
min. 20 MOhm x km
- Coupling resistance**  
max. 250 Ohm/km
- Minimum bending radius**  
flexing 10x cable Ø  
fixed installation 5x cable Ø
- Radiation resistance**  
up to  $80 \times 10^6$  cJ/kg (up to 80 Mrad)

## Cable structure

- Bare copper-conductor, to DIN VDE 0295 cl.5, fine-wire, BS 6360 cl.5, IEC 60228 cl.5
- Core insulation of Special PVC compound type T12 to DIN VDE 0207-363-3 / DIN EN 50363-3
- Core identification to DIN VDE 0293 black cores with continuous white numbering
- GN-YE conductor, 3 cores and above in the outer layer
- Cores stranded in layers with optimal lay-length
- Inner sheath of PVC
- Tinned copper braided screen, approx. 85% coverage
- Outer sheath of special PVC compound type TM2 to DIN VDE 0207-363-4-1 / DIN EN 50363-4-1
- Sheath colour black (RAL 9005)
- with meter marking

## Properties

- Extensively oil resistant, oil-/chemical resistance see table Technical Informations
  - The materials used in manufacture are cadmium-free and contain no silicone and free from substances harmful to the wetting properties of lacquers
  - UV resistant**
- ### Tests
- PVC self-extinguishing and flame retardant acc. to DIN VDE 0482-332-1-2, DIN EN 60332-1-2, IEC 60332-1 (equivalent DIN VDE 0472 part 804 test method B)

## Note

- G = with green-yellow conductor  
x = without green-yellow conductor (OZ)
- Further sizes are available on request.
- AWG sizes are approximate equivalent values. The actual cross-section is in mm<sup>2</sup>.
- unscreened analogue type:  
**JZ-600**, confer page 40

## Application

Wiring cable for measuring and controlling purposes in tool machinery, conveyor belts and production lines, for plant installations, air conditioning and in steel production plants and rolling mills. Suitable for installation for flexible use for medium mechanical stresses with free movement without tensile stress or forced movements in dry, moist and wet rooms as well as outside (fixed installation). Is not suitable to be used as direct burial- or as underwater cable. The cores have been numbered in such a way that the numbers are easily identifiable, even if the cable has only been stripped back a few cm. The core numbers have been underlined to avoid confusion. The earth core is located in the outer layer. The black, special PVC outer sheath is resistant to the ultra violet radiation. Mainly used in South-European, Eastern and Arabian countries. Interference-free transmission of signals and pulses is assured by the high degree of screening.

**EMC** = Electromagnetic compatibility

To optimize the EMC features we recommend a large round contact of the copper braiding on both ends.

**CE** = The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
11464	2 x 0,5	8,5	41,0	129,0	20
11465	3 G 0,5	8,8	45,0	150,0	20
11466	4 G 0,5	9,4	54,0	170,0	20
11467	5 G 0,5	10,2	66,0	199,0	20
11469	7 G 0,5	10,8	79,0	235,0	20
11472	12 G 0,5	14,3	137,0	320,0	20
11475	18 G 0,5	16,4	156,0	428,0	20
11478	25 G 0,5	19,3	250,0	503,0	20
11489	2 x 0,75	8,8	46,0	143,0	19
11490	3 G 0,75	9,1	57,0	155,0	19
11491	4 G 0,75	9,9	63,0	190,0	19
11492	5 G 0,75	10,6	76,0	228,0	19
11494	7 G 0,75	11,5	100,0	323,0	19
11498	12 G 0,75	15,0	175,0	410,0	19
11501	18 G 0,75	17,2	240,0	560,0	19
11504	25 G 0,75	20,6	306,0	730,0	19

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
11516	2 x 1	9,2	54,0	150,0	18
11517	3 G 1	9,8	64,0	163,0	18
11518	4 G 1	10,4	76,0	200,0	18
11519	5 G 1	11,4	89,0	239,0	18
11521	7 G 1	12,3	114,0	289,0	18
11525	12 G 1	15,9	186,0	464,0	18
11528	18 G 1	18,2	284,0	628,0	18
11532	25 G 1	22,0	387,0	855,0	18
11546	2 x 1,5	10,4	64,0	162,0	16
11547	3 G 1,5	10,8	82,0	187,0	16
11548	4 G 1,5	11,5	99,0	240,0	16
11549	5 G 1,5	13,0	123,0	289,0	16
11551	7 G 1,5	14,2	148,0	383,0	16
11556	12 G 1,5	18,4	274,0	592,0	16
11559	18 G 1,5	21,3	386,0	806,0	16
11563	25 G 1,5	25,4	531,0	1241,0	16

Continuation ▶

# JZ-600-Y-CY flexible, number coded, 0,6/1kV, Cu screened meter marking, EMC-preferred type

EAC

A

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
11574	2 x 2,5	11,8	110,0	272,0	14
11575	3 G 2,5	12,8	148,0	298,0	14
11576	4 G 2,5	13,8	169,0	345,0	14
11577	5 G 2,5	15,0	220,0	427,0	14
11578	7 G 2,5	16,3	284,0	561,0	14
11580	12 G 2,5	21,6	470,0	857,0	14
11582	18 G 2,5	25,2	572,0	1355,0	14
11584	25 G 2,5	30,0	740,0	1995,0	14
11590	2 x 4	13,6	124,0	306,0	12
11591	3 G 4	14,6	178,0	391,0	12
11592	4 G 4	15,7	234,0	527,0	12
11593	5 G 4	17,2	284,0	700,0	12
11594	7 G 4	18,9	321,0	920,0	12
11596	12 G 4	24,5	581,0	1510,0	12
11597	2 x 6	14,9	176,0	420,0	10
11598	3 G 6	15,9	245,0	629,0	10
11599	4 G 6	17,4	316,0	731,0	10
11600	5 G 6	19,2	442,0	1105,0	10
11601	7 G 6	20,9	530,0	1465,0	10
11602	2 x 10	18,6	260,0	845,0	8
11603	3 G 10	19,8	367,0	1125,0	8
11604	4 G 10	21,5	549,0	1345,0	8
11605	5 G 10	23,5	604,0	1635,0	8
11606	7 G 10	25,6	820,0	2210,0	8
11607	2 x 16	21,8	491,0	1150,0	6

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
11608	3 G 16	23,4	653,0	1395,0	6
11609	4 G 16	25,7	807,0	1870,0	6
11610	5 G 16	28,5	940,0	2720,0	6
11611	7 G 16	31,4	1345,0	3213,0	6
11612	3 G 25	28,2	920,0	2465,0	4
11613	4 G 25	31,3	1169,0	2750,0	4
11614	5 G 25	34,5	1420,0	3490,0	4
11615	7 G 25	37,8	1921,0	4980,0	4
11616	3 G 35	31,2	1250,0	3230,0	2
11617	4 G 35	34,5	1680,0	4100,0	2
11618	5 G 35	38,0	2020,0	4950,0	2
11619	3 G 50	36,5	1887,0	4590,0	1
11620	4 G 50	40,5	2370,0	5780,0	1
11621	5 G 50	45,2	2880,0	7210,0	1
11622	3 G 70	41,8	2516,0	5610,0	2/0
11623	4 G 70	46,0	3257,0	7480,0	2/0
11624	5 G 70	50,4	4032,0	9390,0	2/0
11625	3 G 95	46,8	3086,0	8585,0	3/0
11626	4 G 95	51,3	4060,0	10220,0	3/0
11627	5 G 95	56,1	5244,0	13800,0	3/0
11628	3 G 120	51,8	4176,0	11105,0	4/0
11629	4 G 120	56,3	5231,0	13750,0	4/0
13137	4 G 150	64,4	7760,0	15990,0	300 kcmil
13147	4 G 185	69,5	8104,0	18470,0	350 kcmil

Dimensions and specifications may be changed without prior notice. (RA01)



Suitable accessories can be found in Chapter X.

- Cable Gland - HELUTOP® HT-MS-EP4

**Y-CY-JB** flexible, Cu-screened, transparent, EMC-preferred type, meter marking**Technical data**

- Special-PVC control cable adapted to DIN VDE 0285-525-2-51 / DIN EN 50525-2-51
- **Temperature range**  
flexing -15°C to +80°C  
fixed installation -40°C to +80°C
- **Nominal voltage**  
up to 1,5 mm<sup>2</sup> U<sub>0</sub>/U 300/500 V  
from 2,5 mm<sup>2</sup> U<sub>0</sub>/U 450/750 V
- **Test voltage** 4000 V
- **Breakdown voltage** min. 8000 V
- **Insulation resistance**  
min. 20 MOhm x km
- **Mutual capacitance**  
acc. to different cross-sections  
0,5 up to 2,5 mm<sup>2</sup>:  
core/core approx. 150 nF/km  
core/screen approx. 270 nF/km
- **Coupling resistance**  
max. 250 Ohm/km
- **Minimum bending radius**  
flexing 10x cable Ø  
fixed installation 5x cable Ø
- **Radiation resistance**  
up to 80x10<sup>6</sup> cJ/kg (up to 80 Mrad)

**Cable structure**

- Bare copper, fine wire conductors, bunch stranded to DIN VDE 0295 cl.5, BS 6360 cl.5 and IEC 60228 cl.5
- Core insulation of special PVC compound type Z 7225
- Core identification to JB/OB colour code
- GN-YE conductor, 3 cores and above in the outer layer
- Cores stranded in layers with optimal lay-length
- Inner sheath of PVC
- Tinned copper braided screen, approx. 85% coverage
- Outer sheath of special PVC
- Sheath colour transparent
- with meter marking

**Properties**

- Extensively oil resistant, oil-/chemical resistance see table Technical Informations
- The materials used in manufacture are cadmium-free and contain no silicone and free from substances harmful to the wetting properties of lacquers

**Tests**

- PVC self-extinguishing and flame retardant acc. to DIN VDE 0482-332-1-2, DIN EN 60332-1-2, IEC 60332-1 (equivalent DIN VDE 0472 part 804 test method B)

**Note**

- G = with green-yellow conductor  
x = without green-yellow conductor (OB).
- up to 5 cores and conductor cross-section up to 1,5 mm<sup>2</sup> with VDE-Reg. No.
- AWG sizes are approximate equivalent values. The actual cross-section is in mm<sup>2</sup>.
- unscreened analogue type:  
**JB-500**, confer page 42  
**JB-750**, confer page 43

**Application**

For use as a data and control cable in machinery, computer systems etc. as well as a signal cable for electronics. The high level of screening ensures a high degree of interference protection. The screening density assures disturbance-free transmission of all signals and impulses. The PVC-inner sheaths of those cables raise the mechanical stress. The applied clear transparent PVC outer sheath accentuates the optical view of the tinned copper braid. These cables are suitable for flexible use for medium mechanical stresses with free movements. The dense screening assures disturbance-free transmission of all signals and impulses. An ideal disturbance-free control cable for the above application.

**EMC** = Electromagnetic compatibility

To optimize the EMC features we recommend a large round contact of the copper braiding on both ends.

**CE** = The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
16121	2 x 0,5	7,0	41,0	67,0	20
16122	3 G 0,5	7,3	45,0	83,0	20
16123	4 G 0,5	7,9	54,0	94,0	20
16124	5 G 0,5	8,4	66,0	108,0	20
16125	2 x 0,75	7,7	46,0	87,0	19
16126	3 G 0,75	8,0	57,0	98,0	19
16127	4 G 0,75	8,5	63,0	113,0	19
16128	5 G 0,75	9,3	76,0	130,0	19
16129	2 x 1	8,0	54,0	97,0	18
16130	3 G 1	8,3	64,0	103,0	18
16131	4 G 1	9,0	76,0	146,0	18
16132	5 G 1	9,7	89,0	169,0	18
16133	2 x 1,5	8,6	64,0	130,0	16
16134	3 G 1,5	9,2	82,0	152,0	16
16135	4 G 1,5	9,8	99,0	168,0	16
16136	5 G 1,5	10,8	123,0	202,0	16

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
16137	2 x 2,5	11,1	110,0	180,0	14
16138	3 G 2,5	11,6	148,0	216,0	14
16139	4 G 2,5	12,7	169,0	267,0	14
16140	5 G 2,5	14,1	220,0	347,0	14
16141	2 x 4	13,3	124,0	302,0	12
16142	3 G 4	14,0	178,0	340,0	12
16143	4 G 4	15,3	234,0	410,0	12
16144	5 G 4	16,7	284,0	502,0	12
16145	2 x 6	14,7	176,0	350,0	10
16146	3 G 6	15,6	245,0	450,0	10
16147	4 G 6	17,0	316,0	559,0	10
16148	5 G 6	18,6	442,0	702,0	10
16149	2 x 10	18,0	260,0	500,0	8
16150	3 G 10	19,0	367,0	750,0	8
16151	4 G 10	21,1	549,0	1020,0	8
16152	5 G 10	23,1	604,0	1115,0	8

Continuation ▶



**Y-CY-JB** flexible, Cu-screened, transparent, EMC-preferred type, meter marking

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
16153	4 G 16	25,3	807,0	1380,0	6
16154	5 G 16	28,0	940,0	1553,0	6
16469	4 G 25	31,1	1169,0	1890,0	4
16155	5 G 25	34,3	1420,0	2270,0	4
16470	4 G 35	33,9	1680,0	2390,0	2
16156	5 G 35	37,8	2020,0	2885,0	2

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
16471	4 G 50	40,1	2370,0	3315,0	1
16119	5 G 50	45,0	2880,0	4150,0	1
16472	4 G 70	46,0	3257,0	4600,0	2/0
16473	4 G 95	51,2	4060,0	6060,0	3/0
16474	4 G 120	56,3	5231,0	7315,0	4/0
16247	4 G 150	64,7	7760,0	9340,0	300 kcmil
16319	4 G 185	69,5	8104,0	11120,0	350 kcmil

A

Dimensions and specifications may be changed without prior notice. (RA01)



Suitable accessories can be found in Chapter X.

- Cable Gland - HELUTOP® HT-MS-EP4

**SY-JB** flexible, colour coded, with steel wire braiding, meter marking**Technical data**

- Special-PVC control cable adapted to DIN VDE 0285-525-2-51 / DIN EN 50525-2-51
- **Temperature range**  
flexing -15°C to +80°C  
fixed installation -40°C to +80°C
- **Nominal voltage**  
up to 2,5 mm<sup>2</sup> U<sub>0</sub>/U 300/500 V  
from 4,0 mm<sup>2</sup> U<sub>0</sub>/U 450/750 V
- **Test voltage** 4000 V
- **Breakdown voltage** min. 8000 V
- **Insulation resistance**  
min. 20 MΩm x km
- **Minimum bending radius**  
flexing 20x cable Ø  
fixed installation 6x cable Ø
- **Radiation resistance**  
up to 80x10<sup>6</sup> cJ/kg (up to 80 Mrad)

**Cable structure**

- Bare copper-conductor, to DIN VDE 0295 cl.5, fine-wire, BS 6360 cl.5, IEC 60228 cl.5
- Core insulation of special PVC compound type Z 7225
- Core identification to JB/OB colour code
- GN-YE conductor, 3 cores and above in the outer layer
- Cores stranded in layers with optimal lay-length
- Inner sheath of special PVC
- Galvanized steel wire screening
- Outer sheath of special PVC compound type TM2 to DIN VDE 0207-363-4-1 / DIN EN 50363-4-1
- Sheath colour transparent
- with meter marking

**Properties**

- Extensively oil resistant, oil-/chemical resistance see table Technical Informations
  - The materials used in manufacture are cadmium-free and contain no silicone and free from substances harmful to the wetting properties of lacquers
- Tests**
- PVC self-extinguishing and flame retardant acc. to DIN VDE 0482-332-1-2, DIN EN 60332-1-2, IEC 60332-1 (equivalent DIN VDE 0472 part 804 test method B)

**Note**

- G = with green-yellow conductor  
x = without green-yellow conductor (OB).
- up to 5 cores and conductor cross-section up to 2,5 mm<sup>2</sup> with VDE Reg.-No.
- AWG sizes are approximate equivalent values. The actual cross-section is in mm<sup>2</sup>.
- Please note the cleanroom qualification when ordering.
- screened analogue type:  
**SY-JZ**, confer page 55

**Application**

SY-JB cables are used as measuring and control cables in tool machinery, plant installation, power stations and in data equipment. The braided screen offers best possible protection against mechanical damage. The galvanized coating on the steel wire braiding not only helps protect against corrosion, but also notably improves the soldering performance.

CE= The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
12200	2 x 0,5	7,2	9,6	80,0	20
12201	3 G 0,5	7,5	14,4	92,0	20
12202	4 G 0,5	8,1	19,2	102,0	20
12203	5 G 0,5	8,6	24,0	119,0	20
12204	7 G 0,5	9,3	33,6	157,0	20
12205	10 G 0,5	10,7	48,0	205,0	20
12206	12 G 0,5	11,7	58,0	218,0	20
12218	2 x 0,75	7,9	14,4	98,0	19
12219	3 G 0,75	8,2	21,6	103,0	19
12220	4 G 0,75	8,7	28,8	122,0	19
12221	5 G 0,75	9,5	36,0	142,0	19
12312	6 G 0,75	10,1	43,2	180,0	19
12222	7 G 0,75	10,1	50,0	185,0	19
12223	9 G 0,75	11,8	65,0	249,0	19
12313	10 G 0,75	12,0	72,0	252,0	19
12224	12 G 0,75	12,8	86,0	292,0	19
12234	2 x 1	8,2	19,2	112,0	18
12235	3 G 1	8,5	28,8	132,0	18
12236	4 G 1	9,2	38,4	143,0	18
12237	5 G 1	9,9	48,0	166,0	18
12238	6 G 1	10,5	58,0	220,0	18
12239	7 G 1	10,5	67,0	227,0	18
12240	8 G 1	11,4	77,0	277,0	18
12241	9 G 1	12,8	86,0	295,0	18
12242	12 G 1	13,4	115,0	340,0	18
12256	2 x 1,5	8,8	29,0	129,0	16
12257	3 G 1,5	9,4	43,0	149,0	16
12258	4 G 1,5	10,0	58,0	185,0	16
12259	5 G 1,5	10,9	72,0	205,0	16
12260	6 G 1,5	11,8	87,0	255,0	16
12261	7 G 1,5	11,8	101,0	285,0	16
12262	8 G 1,5	12,7	115,0	340,0	16
12263	9 G 1,5	13,9	130,0	347,0	16
12264	10 G 1,5	14,3	144,0	418,0	16
12265	11 G 1,5	14,8	158,0	430,0	16
12266	12 G 1,5	15,0	173,0	444,0	16

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
12277	2 x 2,5	10,2	48,0	185,0	14
12278	3 G 2,5	10,9	72,0	248,0	14
12279	4 G 2,5	11,6	96,0	290,0	14
12280	5 G 2,5	12,9	120,0	347,0	14
12281	7 G 2,5	14,2	168,0	420,0	14
12282	12 G 2,5	17,7	288,0	660,0	14
12291	2 x 4	13,6	77,0	330,0	12
12318	3 G 4	14,3	115,0	375,0	12
12292	4 G 4	15,4	154,0	428,0	12
12293	5 G 4	16,9	192,0	504,0	12
12294	7 G 4	18,4	269,0	640,0	12
12295	3 G 6	15,6	173,0	543,0	10
12296	4 G 6	17,0	230,0	571,0	10
12297	5 G 6	18,6	288,0	671,0	10
12298	7 G 6	20,6	403,0	845,0	10
12319	3 G 10	19,2	288,0	735,0	8
12299	4 G 10	21,1	384,0	943,0	8
12300	5 G 10	23,3	480,0	1065,0	8
12301	7 G 10	25,4	672,0	1551,0	8
12320	3 G 16	23,0	461,0	1080,0	6
12302	4 G 16	25,5	614,0	1360,0	6
12303	5 G 16	28,2	768,0	1740,0	6
12304	7 G 16	30,8	1075,0	2166,0	6
12321	3 G 25	28,2	720,0	1630,0	4
12305	4 G 25	31,0	960,0	2020,0	4
12306	5 G 25	34,3	1200,0	2465,0	4
12322	3 G 35	31,0	1008,0	1932,0	2
12307	4 G 35	34,0	1344,0	2570,0	2
12308	5 G 35	38,0	1680,0	3185,0	2
12323	3 G 50	36,7	1440,0	2679,0	1
12309	4 G 50	40,4	1920,0	3513,0	1
12314	5 G 50	45,2	2400,0	4248,0	1
12324	3 G 70	42,3	2016,0	2790,0	2/0
12310	4 G 70	46,2	2688,0	4810,0	2/0
12315	5 G 70	50,5	3360,0	5880,0	2/0

Continuation ▶

**SY-JB** flexible, colour coded, with steel wire braiding, meter marking

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
12325	3 G 95	47,2	2736,0	4870,0	3/0
12311	4 G 95	51,3	3648,0	6360,0	3/0
12316	5 G 95	56,3	4560,0	8071,0	3/0

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
12326	3 G 120	51,9	3456,0	6230,0	4/0
12317	4 G 120	56,4	4608,0	8170,0	4/0
12328	4 G 150	64,4	5760,0	9970,0	300 kcmil

Dimensions and specifications may be changed without prior notice. (RA01)



Suitable accessories can be found in Chapter X.

- Cable Gland - HELUTOP® HT-MS-EP4

# PUR CONTROL CABLES





# JZ-500 PUR **tear and coolant resistant, meter marking**



## Technical data

- Special-PUR control cable adapted to DIN VDE 0285-525-1 / DIN EN 50525-1
- **Temperature range**  
flexing -15°C to +80°C  
fixed installation -40°C to +80°C
- **Nominal voltage** U<sub>0</sub>/U 300/500 V
- **Test voltage** 4000 V
- **Breakdown voltage** min. 8000 V
- **Insulation resistance**  
min. 20 MOhm x km
- **Minimum bending radius**  
flexing 7,5x cable Ø  
fixed installation 4x cable Ø
- **Radiation resistance**  
up to 100x10<sup>6</sup> cJ/kg (up to 100 Mrad)

## Cable structure

- Bare copper-conductor, to DIN VDE 0295 cl.5, fine-wire, BS 6360 cl.5, IEC 60228 cl.5
- Core insulation of special PVC compound type T12 to DIN VDE 0207-363-3/ DIN EN 50363-3
- Core identification to DIN VDE 0293 black cores with continuous white numbering
- GN-YE conductor, 3 cores and above in the outer layer
- Cores stranded in layers with optimal lay-length
- Outer sheath of special **full-polyurethane** compound type Tmpu to DIN EN 50363-10-2
- Sheath colour grey (RAL 7001) also available in other colours
- with meter marking

## Properties

- **Resistant to**  
UV-Radiation, Oxygene, Ozone and Hydrolysis, Microbes
- Low adhesion, matt surface
- The materials used in manufacture are cadmium-free and contain no silicone and free from substances harmful to the wetting properties of lacquers

## Note

- G = with green-yellow conductor  
x = without green-yellow conductor (OZ)
- AWG sizes are approximate equivalent values. The actual cross-section is in mm<sup>2</sup>.
- screened analogue type:  
**JZ-500-FC-PUR**, confer page 76

## Application

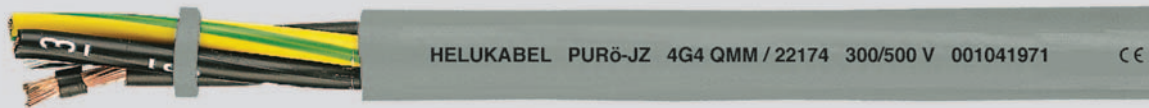
JZ-500 PUR is an extremely robust control cable with high abrasion and tear resistant properties. Due to its high resistance coolant emulsions, it is especially suited for use in the machine, tool making and plant industries as well as in the steel industry for difficult and problem areas. The high flexibility of this cable type makes it quick and easy to install. Suitable for outdoor lying.

CE= The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

Part no.	No.cores x cross-sec. mm <sup>2</sup>	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
23314	2 x 0,5	4,8	9,6	45,0	20
23315	3 G 0,5	5,1	14,4	55,0	20
23316	3 x 0,5	5,1	14,4	55,0	20
23317	4 G 0,5	5,5	19,0	65,0	20
23318	4 x 0,5	5,5	19,0	65,0	20
23319	5 G 0,5	6,2	24,0	75,0	20
23320	5 x 0,5	6,2	24,0	75,0	20
23321	7 G 0,5	6,7	33,6	90,0	20
23322	7 x 0,5	6,7	33,6	90,0	20
23323	10 G 0,5	8,3	48,0	120,0	20
23324	12 G 0,5	8,7	58,0	135,0	20
23325	18 G 0,5	10,7	86,0	205,0	20
23326	25 G 0,5	12,6	120,0	270,0	20
23327	34 G 0,5	14,3	163,0	380,0	20
23328	42 G 0,5	15,8	202,0	415,0	20
23329	2 x 0,75	5,3	14,4	44,0	19
23330	3 G 0,75	5,6	21,6	53,0	19
23331	3 x 0,75	5,6	21,6	53,0	19
23332	4 G 0,75	6,3	29,0	64,0	19
23333	4 x 0,75	6,3	29,0	64,0	19
23334	5 G 0,75	6,9	36,0	76,0	19
23335	5 x 0,75	6,9	36,0	76,0	19
23336	7 G 0,75	7,5	50,0	96,0	19
23337	7 x 0,75	7,5	50,0	96,0	19
23338	10 G 0,75	9,2	72,0	140,0	19
23339	12 G 0,75	9,8	86,0	170,0	19
23340	18 G 0,75	12,2	130,0	260,0	19
23341	25 G 0,75	14,3	180,0	282,0	19
23342	34 G 0,75	16,5	245,0	475,0	19
23343	42 G 0,75	18,1	302,0	600,0	19
23344	2 x 1	5,6	19,0	53,0	18
23345	3 G 1	5,6	29,0	63,0	18
23346	3 x 1	5,9	29,0	63,0	18
23347	4 G 1	6,6	38,0	75,0	18
23348	4 x 1	6,6	38,0	75,0	18
23349	5 G 1	7,3	48,0	89,0	18
23350	5 x 1	7,3	48,0	89,0	18
23351	7 G 1	8,1	67,0	115,0	18

Part no.	No.cores x cross-sec. mm <sup>2</sup>	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
23352	7 x 1	8,1	67,0	115,0	18
23353	10 G 1	9,8	96,0	166,0	18
23354	12 G 1	10,4	115,0	201,0	18
23355	18 G 1	12,9	173,0	289,0	18
23356	25 G 1	15,4	240,0	380,0	18
23357	34 G 1	17,7	326,0	645,0	18
23358	42 G 1	19,5	403,0	730,0	18
23359	50 G 1	21,3	480,0	890,0	18
23360	2 x 1,5	6,4	29,0	68,0	16
23361	3 G 1,5	6,8	43,0	87,0	16
23362	3 x 1,5	6,8	43,0	87,0	16
23363	4 G 1,5	7,4	58,0	106,0	16
23364	4 x 1,5	7,4	58,0	106,0	16
23365	5 G 1,5	8,3	72,0	131,0	16
23366	5 x 1,5	8,3	72,0	131,0	16
23367	7 G 1,5	9,2	101,0	173,0	16
23368	7 x 1,5	9,2	101,0	173,0	16
23369	12 G 1,5	11,8	173,0	293,0	16
23370	18 G 1,5	14,6	259,0	454,0	16
23371	25 G 1,5	17,4	360,0	641,0	16
23372	30 G 1,5	18,6	410,0	800,0	16
23373	2 x 2,5	7,8	48,0	110,0	14
23374	3 G 2,5	8,3	72,0	146,0	14
23375	4 G 2,5	9,2	96,0	183,0	14
23376	5 G 2,5	10,1	120,0	222,0	14
23377	7 G 2,5	11,2	168,0	293,0	14
23378	12 G 2,5	14,8	288,0	512,0	14
23379	4 G 4	10,9	154,0	291,0	12
23380	5 G 4	12,1	192,0	355,0	12
23381	7 G 4	13,2	269,0	503,0	12
23382	4 G 6	13,0	230,0	468,0	10
23383	5 G 6	14,5	288,0	570,0	10
23384	7 G 6	16,2	403,0	808,0	10
23385	4 G 10	16,5	384,0	720,0	8
23386	5 G 10	18,3	480,0	894,0	8
23387	7 G 10	20,2	672,0	1295,0	8
23388	4 G 16	20,1	614,0	1063,0	6

Dimensions and specifications may be changed without prior notice. (RA02)

**PURö-JZ** tear and coolant resistant, increased oil resistant, meter marking**Technical data**

- Special-PUR control cable adapted to DIN VDE 0285-525-1 / DIN EN 50525-1
- **Temperature range**  
flexing -20°C to +80°C  
fixed installation -40°C to +80°C
- **Nominal voltage** U<sub>0</sub>/U 300/500 V
- **Test voltage** 4000 V
- **Breakdown voltage** min. 8000 V
- **Insulation resistance**  
min. 20 MOhm x km
- **Minimum bending radius**  
flexing 7,5x cable Ø  
fixed installation 4x cable Ø
- **Radiation resistance**  
up to 100x10<sup>6</sup> cJ/kg (up to 100 Mrad)

**Cable structure**

- Bare copper-conductor, to DIN VDE 0295 cl.5, fine-wire, BS 6360 cl.5, IEC 60228 cl.5
- Core insulation of **oil resistant** PVC compound type T12 adapted to DIN VDE 0207-363-3 / DIN EN 50363-3, for better sliding abilities
- Core identification to DIN VDE 0293 black cores with continuous white numbering
- GN-YE conductor, 3 cores and above in the outer layer
- Cores stranded in layers with optimal lay-length
- Outer sheath of special **full-polyurethane** compound type TMPU to DIN EN 50363-10-2
- Sheath colour grey (RAL 7001)  
also available in other colours on request
- with meter marking

**Properties**

- **Resistant to**  
UV-Radiation, Oxygene, Ozone  
Hydrolysis, Microbes
- The materials used in manufacture are cadmium-free and contain no silicone and free from substances harmful to the wetting properties of lacquers

**Note**

- G = with green-yellow conductor  
x = without green-yellow conductor (OZ)
- AWG sizes are approximate equivalent values. The actual cross-section is in mm<sup>2</sup>.
- screened analogue type:  
**F-C-PURö-JZ**, confer page 78,  
**Yö-C-PURö-JZ**, confer page 80

**Application**

PURö-JZ is an extremely robust control cable with high abrasion and tear resistant properties. With high-grade oil resistant PVC core insulation. Due to its high resistance to mineral oils and especially to coolant emulsions, it is especially suited for use in the machine, tool making, plant construction as well as in the steel industry for difficult and problem areas. For medium mechanical stress for flexible use with free movement without tensile stress or forced movements in dry, damp and wet rooms and in open air. The high flexibility of this cable type makes it quick and easy to install.

CEE= The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

Part no.	No.cores x cross-sec. mm <sup>2</sup>	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
22100	2 x 0,5	4,8	9,6	45,0	20
22101	3 G 0,5	5,1	14,4	55,0	20
22102	4 G 0,5	5,5	19,0	65,0	20
22103	5 G 0,5	6,2	24,0	75,0	20
22104	7 G 0,5	6,7	33,6	90,0	20
22105	8 G 0,5	7,4	38,0	105,0	20
22106	10 G 0,5	8,3	48,0	120,0	20
22107	12 G 0,5	8,7	58,0	135,0	20
22108	14 G 0,5	9,5	67,0	170,0	20
22109	18 G 0,5	10,7	86,0	205,0	20
22110	21 G 0,5	11,3	96,0	225,0	20
22111	25 G 0,5	12,6	120,0	270,0	20
22112	30 G 0,5	13,5	144,0	315,0	20
22113	34 G 0,5	14,3	163,0	380,0	20
22114	42 G 0,5	15,8	202,0	415,0	20
22115	50 G 0,5	17,5	240,0	550,0	20
22116	2 x 0,75	5,3	14,4	44,0	19
22117	3 G 0,75	5,6	21,6	53,0	19
22118	4 G 0,75	6,3	29,0	64,0	19
22119	5 G 0,75	6,9	36,0	76,0	19
22120	7 G 0,75	7,5	50,0	96,0	19
22121	8 G 0,75	8,3	58,0	111,0	19
22122	10 G 0,75	9,2	72,0	140,0	19
22123	12 G 0,75	9,8	86,0	170,0	19
22124	14 G 0,75	10,6	101,0	202,0	19
22125	18 G 0,75	12,2	130,0	260,0	19
22126	21 G 0,75	12,7	151,0	269,0	19
22127	25 G 0,75	14,3	180,0	282,0	19
22128	30 G 0,75	15,3	216,0	400,0	19
22129	34 G 0,75	16,5	245,0	475,0	19
22130	42 G 0,75	18,1	302,0	600,0	19
22131	50 G 0,75	19,8	360,0	720,0	19

Part no.	No.cores x cross-sec. mm <sup>2</sup>	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
22132	2 x 1	5,6	19,0	53,0	18
22133	3 G 1	5,9	29,0	63,0	18
22134	4 G 1	6,6	38,0	75,0	18
22135	5 G 1	7,3	48,0	89,0	18
22136	7 G 1	8,1	67,0	115,0	18
22137	8 G 1	8,8	77,0	131,0	18
22138	10 G 1	9,8	96,0	166,0	18
22139	12 G 1	10,4	115,0	201,0	18
22140	14 G 1	11,4	134,0	230,0	18
22141	18 G 1	12,9	173,0	289,0	18
22142	21 G 1	13,8	196,0	306,0	18
22143	25 G 1	15,4	240,0	380,0	18
22144	32 G 1	17,1	308,0	620,0	18
22145	34 G 1	17,7	326,0	645,0	18
22146	42 G 1	19,5	403,0	730,0	18
22147	50 G 1	21,3	480,0	890,0	18
22148	2 x 1,5	6,4	29,0	68,0	16
22149	3 G 1,5	6,8	43,0	87,0	16
22150	4 G 1,5	7,4	58,0	106,0	16
22151	5 G 1,5	8,3	72,0	131,0	16
22152	7 G 1,5	9,2	101,0	173,0	16
22153	8 G 1,5	10,0	115,0	199,0	16
22154	10 G 1,5	10,9	144,0	245,0	16
22155	12 G 1,5	11,8	173,0	293,0	16
22156	14 G 1,5	13,0	202,0	347,0	16
22157	18 G 1,5	14,6	259,0	454,0	16
22158	21 G 1,5	15,6	302,0	534,0	16
22159	25 G 1,5	17,4	360,0	641,0	16
22160	30 G 1,5	18,6	410,0	800,0	16
22161	34 G 1,5	20,0	490,0	945,0	16
22162	42 G 1,5	21,8	605,0	1100,0	16
22163	50 G 1,5	24,2	720,0	1250,0	16

Continuation ▶

**PURö-JZ** tear and coolant resistant, increased oil resistant, meter marking

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
22164	2 x 2,5	7,8	48,0	110,0	14
22165	3 G 2,5	8,3	72,0	146,0	14
22166	4 G 2,5	9,2	96,0	183,0	14
22167	5 G 2,5	10,1	120,0	222,0	14
22168	7 G 2,5	11,2	168,0	293,0	14
22169	12 G 2,5	14,8	288,0	512,0	14
22170	18 G 2,5	18,2	432,0	740,0	14
22171	25 G 2,5	21,6	600,0	940,0	14
22172	2 x 4	9,2	77,0	147,0	12
22173	3 G 4	9,8	115,0	228,0	12
22174	4 G 4	10,9	154,0	291,0	12
22175	5 G 4	12,1	192,0	355,0	12
22176	7 G 4	13,2	269,0	503,0	12
22177	3 G 6	11,9	173,0	362,0	10
22178	4 G 6	13,0	230,0	468,0	10
22179	5 G 6	14,5	288,0	570,0	10
22180	7 G 6	16,2	403,0	808,0	10

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
22181	3 G 10	14,9	288,0	555,0	8
22182	4 G 10	16,5	384,0	720,0	8
22183	5 G 10	18,3	480,0	894,0	8
22184	7 G 10	20,2	672,0	1295,0	8
22185	4 G 16	20,1	614,0	1063,0	6
22186	5 G 16	22,6	768,0	1400,0	6
22187	7 G 16	24,8	1075,0	1800,0	6
22188	4 G 25	25,0	960,0	1590,0	4
22189	4 G 35	28,7	1344,0	2200,0	2
22190	4 G 50	34,1	1920,0	2400,0	1
22191	4 G 70	40,2	2688,0	4400,0	2/0
22192	4 G 95	46,0	3648,0	6000,0	3/0

Dimensions and specifications may be changed without prior notice. (RA02)



Suitable accessories can be found in Chapter X.

- Cable Gland - HELUTOP® HT-PA
- Cable Gland - HELUTOP® HT-MS
- Cable Gland - HELUTOP® HT-E

**PUR-ORANGE** high abrasion, coolant resistant, meter marking**Technical data**

- Special-PVC/PUR control cable adapted to DIN VDE 0285-525-1 / DIN EN 50525-1
- **Temperature range**  
flexing -15°C to +80°C  
fixed installation -40°C to +80°C
- **Nominal voltage** U<sub>0</sub>/U 300/500 V
- **Test voltage** 3000 V
- **Breakdown voltage** min. 6000 V
- **Insulation resistance**  
min. 20 MOhm x km
- **Minimum bending radius**  
flexing 7,5x cable Ø  
fixed installation 4x cable Ø
- **Radiation resistance**  
up to 100x10<sup>6</sup> cJ/kg (up to 100 Mrad)

**Cable structure**

- Bare copper-conductor, to DIN VDE 0295 cl.5, fine-wire, BS 6360 cl.5, IEC 60228 cl.5
- Core insulation of special PVC compound type T12 adapted to DIN VDE 0207-363-3 / DIN EN 50363-3
- Core identification to DIN VDE 0293-308  
JZ/OZ-version: black cores with continuous white numbering  
JB/OB-version: coloured cores
- GN-YE conductor, 3 cores and above
- Cores stranded in layers with optimal lay-length
- Inner sheath of PVC guarantees easy cable stripping
- Outer sheath of PUR compound type TMPU to DIN EN 50363-10-2
- Sheath colour orange (RAL 2003)
- with meter marking

**Properties**

- High flexibility at low temperature
- High abrasion resistance
- **Resistant to**  
Oils and fats  
Non-alcoholic fuels and kerosene  
Atmospheric influences  
UV-radiation  
Oxygene and ozone  
Microbes and rotting  
Sea and waste water  
Vibrations
- The materials used in manufacture are cadmium-free and contain no silicone and free from substances harmful to the wetting properties of lacquers

**Note**

- G = with green-yellow conductor  
x = without green-yellow conductor (OZ/OB).
- AWG sizes are approximate equivalent values. The actual cross-section is in mm<sup>2</sup>.

**Application**

Robust control cable with an outstanding resistance to oil and abrasion. Suitable for use in tool making and machine industries, steel works, on building sites and in the oil and coal industries. The cable can also be used for portable tools etc. To be recommended if the cable comes into contact with chemical agents.

CE= The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

**JZ/OZ-version: cores numbered**

Part no.	No.cores x cross-sec. mm <sup>2</sup>	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
22001	2 x 0,75	6,4	14,4	50,0	19
22002	3 G 0,75	6,8	21,6	70,0	19
22003	4 G 0,75	7,3	28,8	80,0	19
22004	5 G 0,75	8,2	36,0	100,0	19
22005	7 G 0,75	9,2	50,0	140,0	19
22006	2 x 1	7,2	19,2	63,0	18
22007	3 G 1	7,6	29,0	76,0	18
22008	4 G 1	8,0	38,0	95,0	18
22009	5 G 1	8,8	48,0	120,0	18
22010	7 G 1	10,0	67,0	170,0	18
22015	2 x 1,5	7,8	29,0	80,0	16
22016	3 G 1,5	8,3	43,0	105,0	16
22017	4 G 1,5	9,0	58,0	135,0	16
22018	5 G 1,5	9,7	72,0	158,0	16
22019	7 G 1,5	11,2	101,0	221,0	16
22025	2 x 2,5	9,2	48,0	150,0	14
22026	3 G 2,5	9,6	72,0	173,0	14
22027	4 G 2,5	11,0	96,0	203,0	14
22028	5 G 2,5	12,0	120,0	253,0	14
22029	7 G 2,5	13,7	168,0	356,0	14
22033	3 G 4	11,8	115,0	250,0	12
22034	4 G 4	13,2	154,0	300,0	12
22035	5 G 4	14,8	192,0	370,0	12
22036	7 G 4	16,4	269,0	500,0	12
22037	4 G 6	15,4	230,0	480,0	10
22038	5 G 6	17,0	288,0	583,0	10
22039	7 G 6	20,8	403,0	780,0	10
22040	4 G 10	20,8	384,0	740,0	8
22041	5 G 10	22,6	480,0	920,0	8
22042	4 G 16	23,0	614,0	1100,0	6
22043	5 G 16	27,4	768,0	1400,0	6

**JB/OB-version: cores colour coded**

Part no.	No.cores x cross-sec. mm <sup>2</sup>	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
22250	2 x 0,75	6,4	14,4	50,0	19
22251	3 G 0,75	6,8	21,6	70,0	19
22252	4 G 0,75	7,3	28,8	80,0	19
22253	5 G 0,75	8,2	36,0	100,0	19
22254	2 x 1	7,2	19,2	63,0	18
22255	3 G 1	7,6	29,0	76,0	18
22256	4 G 1	8,0	38,0	95,0	18
22257	5 G 1	8,8	48,0	120,0	18
22258	2 x 1,5	7,8	29,0	80,0	16
22259	3 G 1,5	8,3	43,0	105,0	16
22260	4 G 1,5	9,0	58,0	135,0	16
22261	5 G 1,5	9,7	72,0	158,0	16
22262	2 x 2,5	9,2	48,0	150,0	14
22263	3 G 2,5	9,6	72,0	173,0	14
22264	4 G 2,5	11,0	96,0	203,0	14
22265	5 G 2,5	12,0	120,0	253,0	14
22266	4 G 4	13,2	154,0	300,0	12
22267	5 G 4	14,8	192,0	370,0	12
22268	4 G 6	15,4	230,0	480,0	10
22269	5 G 6	17,0	288,0	583,0	10
22270	4 G 10	20,8	384,0	740,0	8
22271	5 G 10	22,6	480,0	920,0	8
22272	4 G 16	23,0	614,0	1100,0	6
22273	5 G 16	27,4	768,0	1400,0	6
22044	4 G 25	30,0	960,0	1600,0	4
22045	5 G 25	32,2	1200,0	2000,0	4
22046	4 G 35	33,0	1344,0	2100,0	2

Dimensions and specifications may be changed without prior notice. (RA02)



# PUR-YELLOW PVC-inner sheath, high abrasion, coolant resistant, meter marking



A



## Technical data

- Special-PVC/PUR control cable adapted to DIN VDE 0285-525-1 / DIN EN 50525-1
- **Temperature range**  
flexing -15°C to +80°C  
fixed installation -40°C to +80°C
- **Nominal voltage** U<sub>0</sub>/U 300/500 V
- **Test voltage** 3000 V
- **Breakdown voltage** min. 6000 V
- **Insulation resistance**  
min. 20 MOhm x km
- **Minimum bending radius**  
flexing 7,5x cable Ø  
fixed installation 4x cable Ø
- **Radiation resistance**  
up to 100x10<sup>6</sup> cJ/kg (up to 100 Mrad)

## Cable structure

- Bare copper-conductor, to DIN VDE 0295 cl.5, fine-wire, BS 6360 cl.5, IEC 60228 cl.5
- Core insulation of special PVC compound type T12 adapted to DIN VDE 0207-363-3 / DIN EN 50363-3
- Core identification to DIN VDE 0293-308  
- up to 5 cores coloured  
- from 6 cores, black with continuous white numbering
- GN-YE conductor, 3 cores and above
- Cores stranded in layers with optimal lay-length
- Inner sheath of PVC guarantees easy cable stripping
- Outer sheath of PUR compound type TPU to DIN EN 50363-10-2
- Sheath colour yellow (RAL 1021) also available in other colours on request
- with meter marking

## Properties

- High flexibility at low temperature
- High abrasion resistance
- **Resistant to**  
Oils and fats  
Non-alcoholic fuels and kerosene  
Atmospheric influences  
UV-radiation  
Oxygene and ozone  
Microbes and rotting  
Sea and waste water  
Vibrations
- The materials used in manufacture are cadmium-free and contain no silicone and free from substances harmful to the wetting properties of lacquers

## Note

- G = with green-yellow conductor  
x = without green-yellow conductor (OB).
- Art.no. 22212 = JB-version.
- Art.no. 22220 = JZ-version.
- AWG sizes are approximate equivalent values. The actual cross-section is in mm<sup>2</sup>.

## Application

Robust control cable with an outstanding resistance to oil and abrasion. Suitable for use in tool making and machine industries, steel works, on building sites and in the oil and coal industries. The cable can also be used for portable tools. etc. To be recommended if the cable comes into contact with chemical agents.

CE= The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
22200	2 x 0,75	6,4	14,4	50,0	19
22201	3 G 0,75	6,8	21,6	70,0	19
22202	4 G 0,75	7,3	28,8	80,0	19
22203	5 G 0,75	8,2	36,0	100,0	19
22204	7 G 0,75	9,2	50,0	140,0	19
22205	2 x 1	7,2	19,2	63,0	18
22206	3 G 1	7,6	29,0	76,0	18
22207	4 G 1	8,0	38,0	95,0	18
22208	5 G 1	8,8	48,0	120,0	18
22209	7 G 1	10,0	67,0	170,0	18
22210	2 x 1,5	7,8	29,0	80,0	16
22211	3 G 1,5	8,3	43,0	105,0	16

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
22212	4 G 1,5	9,0	58,0	135,0	16
22220	4 G 1,5	9,7	58,0	135,0	16
22213	5 G 1,5	11,2	72,0	158,0	16
22214	7 G 1,5	9,2	101,0	221,0	16
22215	2 x 2,5	9,6	48,0	150,0	14
22216	3 G 2,5	11,0	72,0	173,0	14
22217	4 G 2,5	12,0	96,0	203,0	14
22218	5 G 2,5	13,7	120,0	253,0	14
22219	7 G 2,5	9,0	168,0	356,0	14
22221	4 G 4	14,6	153,6	310,0	12
22222	5 G 4	14,8	192,0	370,0	12
22233	4 G 35	33,0	1344,0	2100,0	2

Dimensions and specifications may be changed without prior notice. (RA02)



Suitable accessories can be found in Chapter X.

- Cable Gland - HELUTOP® HT-PA
- Cable Gland - HELUTOP® HT-MS
- Cable Gland - HELUTOP® HT-E

# H05BQ-F / H07BQ-F (NGMH11YÖ)



## Technical data

- EPR/PUR-insulated power cable acc. to DIN VDE 0285-525-2-21 / DIN EN 50525-2-21
- **Temperature range**  
flexing -40°C to +80°C  
fixed installation -50°C to +90°C
- Permissible **operating temperature** at conductor +90°C
- **Nominal voltage**  
H05BQ-F U<sub>0</sub>/U 300/500 V  
H07BQ-F U<sub>0</sub>/U 450/750 V
- **Test voltage**  
H05BQ-F 2000 V  
H07BQ-F 2500 V
- **Minimum bending radius**  
flexing 5x cable Ø  
fixed installation 3x cable Ø
- **Radiation resistance**  
up to 100x10<sup>6</sup> cJ/kg (up to 100 Mrad)

## Cable structure

- Bare copper-conductor, to DIN VDE 0295 cl.5, fine-wire, BS 6360 cl.5, IEC 60228 cl.5
- Core insulation of rubber compound type EI6 to DIN VDE 0207-363-1 / DIN EN 50363-1
- Core identification to DIN VDE 0293-308
- GN-YE conductor, 3 cores and above in the outer layer
- Cores stranded in layers with optimal lay-length (inner fill compound permissible \*)
- Outer sheath of PUR compound type TMPU to DIN EN 50363-10-2
- Sheath colour orange (RAL 2003)

## Properties

- Abrasion resistant
- Notch resistant
- Resistant to tearing and cutting
- **Resistant to**  
Oils, fats, Petrol  
Water and weathering effects  
Oxygen and ozone  
UV-radiation, Hydrolysis and Microbial attack
- The materials used in manufacture are cadmium-free and contain no silicone and free from substances harmful to the wetting properties of lacquers

## Note

- G = with green-yellow conductor  
x = without green-yellow conductor
- adapted to VDE  
7G1,5 mm<sup>2</sup>, 12G1,5 mm<sup>2</sup> and cross-section > 16 mm<sup>2</sup> designation 07BQ-F
- AWG sizes are approximate equivalent values. The actual cross-section is in mm<sup>2</sup>.
- \*) Version with filler compound

## Application

These cables can be used for medium mechanical loads in dry, damp or wet environments, e. g. for connecting agricultural and commercial equipment and heaters provided there is no danger of contact with the hot parts or by radiation of heat. These robust and flexible cables are used for electrical tools such as drills and hand-held circular saws, as well as for portable motors and machinery in agriculture, at building sites, docks and refrigeration plants.

CE= The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

### H05BQ-F

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer Ø min. - max. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
22050	2 x 0,75	5,7 - 7,4	14,4	52,0	19
22051	3 G 0,75	6,2 - 8,1	21,6	63,0	19
22052	4 G 0,75	6,8 - 8,8	29,0	80,0	19
22053	5 G 0,75	7,6 - 9,9	36,0	96,0	19
22054	2 x 1	6,1 - 8,0	19,2	59,0	18
22055	3 G 1	6,5 - 8,5	29,0	71,0	18
22056	4 G 1	7,1 - 9,3	38,4	89,0	18
22057	5 G 1	8,0 - 10,3	48,0	112,0	18

### H07BQ-F

Part no. *)	No. cores x cross-sec. mm <sup>2</sup>	Outer Ø min. - max. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
22074	220974 2 x 10	15,6 - 19,9	192,0	428,0	8
22076	220976 3 G 10	16,8 - 21,4	288,0	640,0	8
22078	220978 4 G 10	18,6 - 23,6	384,0	738,0	8
22082	220982 5 G 10	20,4 - 25,9	480,0	968,0	8
22075	220975 2 x 16	17,9 - 22,8	307,0	600,0	6
22077	220977 3 G 16	19,5 - 24,7	461,0	758,0	6
22079	220979 4 G 16	21,3 - 27,0	614,0	1187,0	6
22083	220983 5 G 16	23,7 - 30,0	768,0	1475,0	6
22828	228928 4 G 25	26,7 - 32,6	960,0	1550,0	4
22829	228929 5 G 25	29,6 - 36,1	1220,0	1920,0	4
22830	228930 4 G 35	31,3 - 38,2	1344,0	2120,0	2
22831	228931 5 G 35	34,5 - 42,0	1680,0	2600,0	2
22832	228932 4 G 50	34,9 - 42,6	1920,0	2920,0	1
22833	228933 5 G 50	38,6 - 47,0	2400,0	3700,0	1
22835	228935 4 G 70	38,9 - 47,3	2688,0	3900,0	2/0
22836	228936 5 G 70	43,0 - 52,3	3368,0	5020,0	2/0
22837	228937 4 G 95	44,9 - 54,6	3648,0	5150,0	3/0
22838	228938 5 G 95	49,7 - 60,4	4560,0	6520,0	3/0
22839	228939 4 G 120	47,9 - 58,2	4608,0	6550,0	4/0
22840	228940 5 G 120	53,1 - 64,5	5760,0	8050,0	4/0
22841	228941 4 G 150	53,5 - 65,0	5760,0	7950,0	300 kcmil
22842	228942 5 G 185	65,6 - 79,6	7104,0	9350,0	350 kcmil
22843	228943 4 G 240	68,1 - 82,6	9216,0	12200,0	500 kcmil

### H07BQ-F

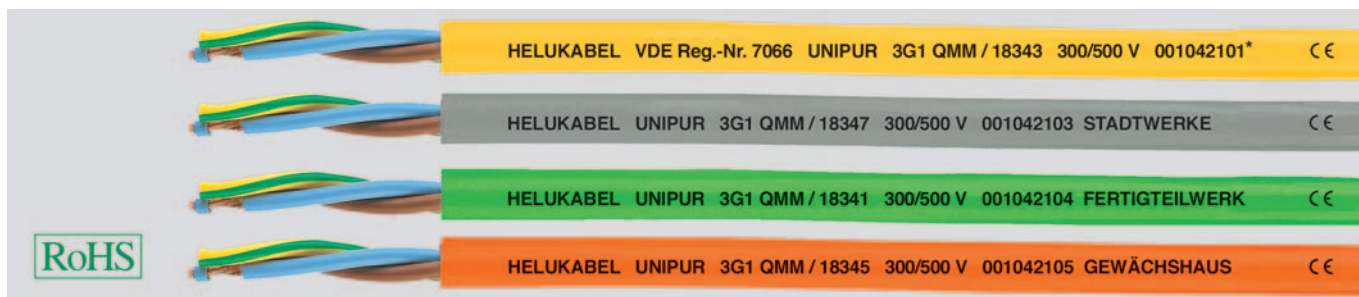
Part no. *)	No. cores x cross-sec. mm <sup>2</sup>	Outer Ø min. - max. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
22058	220958 2 x 1,5	7,6 - 9,8	29,0	92,0	16
22059	220959 3 G 1,5	8,0 - 10,4	43,0	109,0	16
22060	220960 4 G 1,5	9,0 - 11,6	58,0	145,0	16
22061	220961 5 G 1,5	9,8 - 12,7	72,0	169,0	16
22062	220962 7 G 1,5	12,2 - 15,1	101,0	230,0	16
22063	220963 12 G 1,5	15,0 - 18,4	173,0	398,0	16
22064	220964 2 x 2,5	9,0 - 11,6	48,0	121,0	14
22065	220965 3 G 2,5	9,6 - 12,4	72,0	164,0	14
22066	220966 4 G 2,5	10,7 - 13,8	96,0	207,0	14
22067	220967 5 G 2,5	11,9 - 16,3	120,0	262,0	14
22072	220972 2 x 4	10,6 - 13,7	77,0	194,0	12
22068	220968 3 G 4	11,3 - 14,5	115,0	224,0	12
22069	220969 4 G 4	12,7 - 16,2	154,0	327,0	12
22080	220980 5 G 4	14,1 - 17,9	192,0	415,0	12
22073	220973 2 x 6	11,8 - 15,1	115,0	311,0	10
22070	220970 3 G 6	12,8 - 16,3	173,0	310,0	10
22071	220971 4 G 6	14,2 - 18,1	230,0	496,0	10
22081	220981 5 G 6	15,7 - 20,0	288,0	586,0	10

Dimensions and specifications may be changed without prior notice. (RA02)

# UNIPUR® flexible at low temperature, with customer markings, halogen-free, wear resistant, robust, meter marking



A



## Technical data

- Spezial TPE/PUR connecting cable adapted to DIN VDE 0285-525-2-21/ DIN EN 50525-2-21
- **Temperature range** flexing -40°C to +90°C
- **Nominal voltage** up to 1 mm<sup>2</sup> U<sub>0</sub>/U 300/500 V from 1,5 mm<sup>2</sup> U<sub>0</sub>/U 450/750 V
- **Test voltage** 3000 V
- **Minimum bending radius** flexing 10x cable Ø fixed installation 5x cable Ø
- **Radiation resistance** up to 100x10<sup>6</sup> cJ/kg (up to 100 Mrad)

## Cable structure

- Bare copper-conductor, to DIN VDE 0295 cl.5, fine-wire, BS 6360 cl.5, IEC 60228 cl.5
- Core insulation of thermoplastic elastomere (TPE)
- Core identification to DIN VDE 0293-308 - up to 5 cores coloured - from 6 cores, black with continuous white numbering
- GN-YE conductor, 3 cores and above
- Cores stranded in layers with optimal lay-length
- Outer sheath of PUR compound type TPU adapted to DIN EN 50363-10-2
- Sheath colour by request
- with meter marking

## Properties

- Abrasion resistant, Notch resistant
- Resistant to tearing and cutting
- Good flexibility at low temperatures down to -40°C
- **Resistant to** Oils and fats Water and weathering effects Ozone and oxygen UV-radiation Hydrolysis Microbial attack
- The materials used in manufacture are cadmium-free and contain no silicone and free from substances harmful to the wetting properties of lacquers

## Note

- G = with green-yellow conductor x = without green-yellow conductor (OB).
- Please add the individual part no. for order with the identification colour code:  
0 = approx.RAL 5015 blue  
1 = approx.RAL 6018 green  
2 = approx.RAL 8003 brown  
3 = approx.RAL 1021 yellow\*  
4 = approx.RAL 3000 red  
5 = approx.RAL 2003 orange  
6 = approx.RAL 4005 violet  
7 = approx.RAL 7001/7032 grey  
Further colours on request.  
\*with yellow outer sheath as storage types
- VDE-Reg.No. cable with 2-7 cores
- AWG sizes are approximate equivalent values. The actual cross-section is in mm<sup>2</sup>.
- screened analogue type: **UNIPUR®-CP**, confer page 82

## Application

These robust and flexible cables are used for electrical tools such as drills, hand-held circular saws, and garden equipment as well as for portable motors and machinery in agriculture, at building sites, for hobbies, docks and refrigeration plants.

Extremely good mechanical characteristics e. g. compressive load, good abrasion and near-resistant.

CE= The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
1812x	2 x 0,5	5,8	9,6	40,0	20
1813x	3 G 0,5	6,1	14,4	47,0	20
1814x	4 G 0,5	6,7	19,0	57,0	20
1815x	5 G 0,5	7,5	24,0	65,0	20
1816x	7 G 0,5	9,0	33,6	94,0	20
1817x	12 G 0,5	10,7	58,0	150,0	20
1818x	18 G 0,5	13,0	86,0	208,0	20
1819x	25 G 0,5	15,6	120,0	276,0	20
1820x	34 G 0,5	17,9	163,0	393,0	20
1821x	41 G 0,5	19,6	197,0	460,0	20

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
1822x	2 x 0,75	6,3	14,0	52,0	19
1823x	3 G 0,75	6,9	21,6	62,0	19
1824x	4 G 0,75	7,5	28,8	80,0	19
1825x	5 G 0,75	8,3	36,0	94,0	19
1826x	6 G 0,75	9,0	43,0	111,0	19
1827x	7 G 0,75	9,8	50,0	160,0	19
1828x	12 G 0,75	11,6	86,0	191,0	19
1829x	18 G 0,75	14,1	130,0	267,0	19
1830x	25 G 0,75	17,0	180,0	376,0	19
1831x	34 G 0,75	19,5	245,0	506,0	19
1832x	41 G 0,75	21,2	296,0	596,0	19

Continuation ▶

# UNIPUR® flexible at low temperature, with customer markings, halogen-free, wear resistant, robust, meter marking



Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
1833x	2 x 1	6,8	19,2	59,0	18
1834x	3 G 1	7,2	29,0	70,0	18
1835x	4 G 1	7,8	38,0	87,0	18
1836x	5 G 1	8,8	48,0	100,0	18
1837x	6 G 1	9,7	58,0	131,0	18
1838x	7 G 1	10,6	67,0	182,0	18
1839x	12 G 1	12,6	115,0	230,0	18
1840x	18 G 1	15,3	173,0	325,0	18
1841x	25 G 1	18,3	240,0	476,0	18
1842x	34 G 1	21,0	326,0	616,0	18
1843x	41 G 1	22,9	394,0	724,0	18
1844x	2 x 1,5	8,3	29,0	92,0	16
1845x	3 G 1,5	8,8	43,0	108,0	16
1846x	4 G 1,5	9,7	58,0	144,0	16
1847x	5 G 1,5	10,7	72,0	168,0	16
1848x	6 G 1,5	11,8	86,0	201,0	16
1849x	7 G 1,5	12,9	101,0	230,0	16
1850x	12 G 1,5	15,5	173,0	306,0	16
1851x	18 G 1,5	18,7	259,0	464,0	16
1852x	25 G 1,5	22,9	360,0	641,0	16
1853x	34 G 1,5	25,9	490,0	857,0	16
1854x	41 G 1,5	28,3	590,0	1010,0	16

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
1855x	2 x 2,5	9,9	48,0	120,0	14
1856x	3 G 2,5	10,5	72,0	148,0	14
1857x	4 G 2,5	11,6	96,0	184,0	14
1858x	5 G 2,5	13,0	120,0	224,0	14
1859x	7 G 2,5	15,5	168,0	301,0	14
1860x	12 G 2,5	19,2	288,0	489,0	14
1861x	2 x 4	11,5	77,0	149,0	12
1862x	3 G 4	12,2	115,0	240,0	12
1863x	4 G 4	13,5	154,0	297,0	12
1864x	5 G 4	15,0	192,0	360,0	12
1865x	7 G 4	18,3	268,0	540,0	12
1866x	2 x 6	13,1	115,0	240,0	10
1867x	3 G 6	14,1	173,0	370,0	10
1868x	4 G 6	15,6	230,0	472,0	10
1869x	5 G 6	17,3	288,0	581,0	10
1870x	7 G 6	21,0	403,0	698,0	10
1871x	3 G 10	18,0	288,0	560,0	8
1872x	4 G 10	20,1	384,0	718,0	8
1873x	5 G 10	22,2	480,0	896,0	8
1874x	3 G 16	23,4	461,0	940,0	6
1875x	4 G 16	25,5	614,0	1068,0	6
1876x	5 G 16	28,3	768,0	1810,0	6

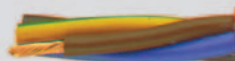
Dimensions and specifications may be changed without prior notice. (RA02)



Suitable accessories can be found in Chapter X.

- Cable Gland - HELUTOP® HT-PA
- Cable Gland - HELUTOP® HT-MS
- Cable Gland - HELUTOP® HT-E



**PUR-750** halogen-free, meter marking

HELUKABEL PUR-750 3G2,5 QMM / 49733 450/750 V 001041930

CE

**Technical data**

- Special-PUR control cable adapted to DIN VDE 0285-525-2-21 / DIN EN 50525-2-21
- **Temperature range**  
flexing -40°C to +80°C  
(up to +100°C for short periods)
- **Nominal voltage**  
up to 1 mm<sup>2</sup> U<sub>0</sub>/U 300/500 V  
from 1,5 mm<sup>2</sup> U<sub>0</sub>/U 450/750 V
- **Test voltage**  
up to 1 mm<sup>2</sup> 2000 V  
from 1,5 mm<sup>2</sup> 2500 V
- **Insulation resistance**  
min. 20 MOhm x km
- **Minimum bending radius**  
flexing 10x cable Ø  
fixed installation 5x cable Ø
- **Radiation resistance**  
up to 100x10<sup>6</sup> cJ/kg (up to 100 Mrad)

**Cable structure**

- Bare copper-conductor, to DIN VDE 0295 cl.5, fine-wire, BS 6360 cl.5, IEC 60228 cl.5
- Core insulation PUR
- Core identification to DIN VDE 0293-308
  - for 2 cores, BN, BU
  - up to 5 cores coloured
  - from 6 cores, black with continuous white numbering
- GN-YE conductor, 3 cores and above in the outer layer
- Cores stranded in layers with optimal lay-length
- Outer sheath of halogen-free PUR
- Sheath colour orange (RAL 2004)
- with meter marking

**Properties**

- High flexibility at low temperature
- Usable for foodstuffs
- High abrasion resistance
- **Resistant to**
  - Oils and fats
  - Non-alcoholic fuels and kerosene
  - Atmospheric influences, UV-radiation
  - Oxygene and ozone
  - Microbes and rotting
  - Sea and waste water vibrations
- The materials used in manufacture are cadmium-free and contain no silicone and free from substances harmful to the wetting properties of lacquers

**Note**

- G = with green-yellow conductor
- x = without green-yellow conductor (OZ)
- AWG sizes are approximate equivalent values. The actual cross-section is in mm<sup>2</sup>.

**Application**

Especially suited for installation in all areas demanding good performance under extreme conditions. These cable types have been successfully in use in areas such as steel works, heating and air-conditioning systems, in machinery and industrial plant equipment and on building sites etc.

CE= The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

Part no.	No.cores x cross-sec. mm <sup>2</sup>	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
49700	2 x 0,75	6,3	15,0	44,0	19
49701	3 G 0,75	6,8	22,0	55,0	19
49702	4 G 0,75	7,4	29,0	70,0	19
49703	5 G 0,75	8,3	36,0	91,0	19
49704	7 G 0,75	9,7	50,0	130,0	19
49705	12 G 0,75	12,1	86,0	192,0	19
49706	18 G 0,75	14,2	130,0	290,0	19
49707	25 G 0,75	17,6	180,0	405,0	19
49708	2 x 1	6,8	20,0	50,0	18
49709	3 G 1	7,2	29,0	65,0	18
49710	4 G 1	7,8	38,0	87,0	18
49711	5 G 1	8,8	48,0	106,0	18
49712	6 G 1	9,5	58,0	135,0	18
49713	7 G 1	10,4	67,0	160,0	18
49714	8 G 1	11,4	77,0	185,0	18
49715	10 G 1	12,8	96,0	210,0	18
49716	12 G 1	12,8	115,0	240,0	18
49717	16 G 1	14,4	154,0	310,0	18
49718	18 G 1	15,3	173,0	353,0	18
49719	20 G 1	16,4	192,0	390,0	18
49720	25 G 1	18,8	240,0	495,0	18
49721	2 x 1,5	8,2	29,0	70,0	16
49722	3 G 1,5	8,7	43,0	95,0	16
49723	4 G 1,5	9,7	58,0	120,0	16
49724	5 G 1,5	10,6	72,0	164,0	16
49725	7 G 1,5	12,8	101,0	210,0	16
49726	10 G 1,5	15,8	150,0	290,0	16
49727	12 G 1,5	15,8	172,0	340,0	16
49728	16 G 1,5	17,9	230,0	440,0	16
49729	18 G 1,5	18,8	259,0	508,0	16
49730	20 G 1,5	20,0	300,0	560,0	16
49731	25 G 1,5	23,5	360,0	722,0	16
49732	2 x 2,5	9,8	48,0	110,0	14
49733	3 G 2,5	10,5	72,0	150,0	14
49734	4 G 2,5	11,6	96,0	180,0	14
49735	5 G 2,5	13,0	120,0	240,0	14
49736	7 G 2,5	15,5	168,0	340,0	14
49737	12 G 2,5	19,3	288,0	520,0	14
49738	16 G 2,5	21,6	394,0	680,0	14

Part no.	No.cores x cross-sec. mm <sup>2</sup>	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
49739	18 G 2,5	23,0	432,0	778,0	14
49740	20 G 2,5	24,4	480,0	860,0	14
49741	25 G 2,5	28,5	600,0	1083,0	14
49742	3 G 4	12,2	115,0	220,0	12
49743	4 G 4	13,4	154,0	280,0	12
49744	5 G 4	15,1	192,0	350,0	12
49745	7 G 4	18,2	269,0	470,0	12
49746	4 G 6	15,8	230,0	400,0	10
49747	5 G 6	17,3	288,0	500,0	10
49748	7 G 6	21,0	403,0	700,0	10
49749	4 G 10	20,4	384,0	640,0	8
49750	5 G 10	22,5	480,0	800,0	8
49751	7 G 10	26,6	672,0	1180,0	8
49752	4 G 16	23,3	614,0	920,0	6
49753	5 G 16	25,9	768,0	1180,0	6
49754	4 G 25	27,3	960,0	1400,0	4
49755	5 G 25	30,4	1200,0	1740,0	4
49756	4 G 35	31,0	1344,0	1870,0	2
49757	5 G 35	34,8	1680,0	2320,0	2
49758	4 G 50	36,8	1920,0	2700,0	1
49759	5 G 50	41,2	2400,0	3300,0	1
49760	4 G 70	43,2	2688,0	3700,0	2/0
49761	5 G 70	48,2	3660,0	4900,0	2/0
49918	4 G 95	48,7	3648,0	4850,0	3/0
49762	5 G 95	54,5	4560,0	6000,0	3/0
49763	4 G 120	54,9	4610,0	6005,0	4/0

Dimensions and specifications may be changed without prior notice. (RA02)

# JZ-500-FC-PUR EMC-preferred type, tear and coolant resistant, screened, without inner sheath, meter marking



HELUKABEL JZ-500-FC-PUR 4G 2,5 QMM / 23475 300/500V 001051019



## Technical data

- Special-PUR control cable adapted to DIN VDE 0285-525-1 / DIN EN 50525-1
- **Temperature range**  
flexing -10°C to +80°C  
fixed installation -40°C to +80°C
- **Nominal voltage**  $U_0/U$  300/500 V
- **Test voltage** 3000 V
- **Breakdown voltage** min. 6000 V
- **Coupling resistance**  
max. 250 Ohm/km
- **Minimum bending radius**  
flexing 10x cable  $\varnothing$   
fixed installation 5x cable  $\varnothing$
- **Radiation resistance**  
up to  $100 \times 10^6$  cJ/kg (up to 100 Mrad)

## Cable structure

- Bare copper-conductor, to DIN VDE 0295 cl.5, fine-wire, BS 6360 cl.5, IEC 60228 cl.5
- Core insulation of special PVC compound type T12 to DIN VDE 0207-363-3 / DIN EN 50363-3
- Core identification to DIN VDE 0293 black cores with continuous white numbering
- GN-YE conductor, 3 cores and above in the outer layer
- Cores stranded in layers with optimal lay-length
- Separating foil
- Tinned copper braided screen, approx. 85% coverage
- Core wrapping of fleece guarantees easy cable stripping
- Outer sheath from special **full polyurethane** compound type TMPU to DIN EN 50363-10-2
- Sheath colour grey (RAL 7001) also available in other colours on request
- with meter marking

## Properties

- **Resistant to**  
UV-radiation, Oxygen, Ozone, Hydrolyse and Microbes
- Low adhesion, matt surface
- The materials used in manufacture are cadmium-free and contain no silicone and free from substances harmful to the wetting properties of lacquers

## Note

- G = with green-yellow conductor  
x = without green-yellow conductor (OZ)
- AWG sizes are approximate equivalent values. The actual cross-section is in  $\text{mm}^2$ .
- unscreened analogue type:  
**JZ-500-PUR**, confer page 67

## Application

Extremely robust cable noted for its good abrasion resistance and notch resistance. Due to its resistance to coolant emulsions, this cable is well suited for use in mechanical engineering, tool making, and systems engineering, and in steel mills and rolling mills in particularly critical areas. Good flexibility means that installation is quick and easy. Suitable for medium mechanical stresses with free movement without tensile stress or forced movements in dry, moist and wet rooms, and in open air (fixed installation). The dense screening assures interference-free transmission of all signals and impulses. An ideal interference-free control cable for the above applications.

**EMC** = Electromagnetic compatibility

To optimize the EMC features we recommend a large round contact of the copper braiding on both ends.

CE = The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

Part no.	No. cores x cross-sec. $\text{mm}^2$	Outer $\varnothing$ approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
23414	2 x 0,5	5,7	35,0	47,0	20
23415	3 G 0,5	5,9	42,0	57,0	20
23416	3 x 0,5	5,9	42,0	57,0	20
23417	4 G 0,5	6,4	47,0	60,0	20
23418	4 x 0,5	6,4	47,0	60,0	20
23419	5 G 0,5	6,9	56,0	75,0	20
23420	5 x 0,5	6,9	56,0	75,0	20
23421	7 G 0,5	7,6	69,0	97,0	20
23422	7 x 0,5	7,6	69,0	97,0	20
23423	10 G 0,5	9,6	94,0	133,0	20
23424	12 G 0,5	9,7	108,0	158,0	20
23425	18 G 0,5	11,5	145,0	218,0	20
23426	25 G 0,5	13,7	240,0	315,0	20
23427	34 G 0,5	15,5	312,0	420,0	20
23428	42 G 0,5	16,9	355,0	487,0	20

Part no.	No. cores x cross-sec. $\text{mm}^2$	Outer $\varnothing$ approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
23429	2 x 0,75	6,1	40,0	60,0	19
23430	3 G 0,75	6,3	52,0	67,0	19
23431	3 x 0,75	6,3	52,0	67,0	19
23432	4 G 0,75	6,8	60,0	76,0	19
23433	4 x 0,75	6,8	60,0	76,0	19
23435	5 x 0,75	7,4	71,0	92,0	19
23434	5 G 0,75	7,4	71,0	92,0	19
23437	7 x 0,75	8,2	91,0	131,0	19
23436	7 G 0,75	8,2	91,0	131,0	19
23438	10 G 0,75	10,3	137,0	180,0	19
23439	12 G 0,75	10,5	142,0	204,0	19
23440	18 G 0,75	12,7	212,0	290,0	19
23441	25 G 0,75	15,0	281,0	413,0	19
23442	34 G 0,75	17,2	345,0	492,0	19
23443	42 G 0,75	18,8	407,0	624,0	19

Continuation ►

# JZ-500-FC-PUR EMC-preferred type, tear and coolant resistant, screened, without inner sheath, meter marking

EAC

A

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
23444	2 x 1	6,4	50,0	66,0	18
23445	3 G 1	6,7	60,0	82,0	18
23446	3 x 1	6,7	60,0	82,0	18
23447	4 G 1	7,2	71,0	100,0	18
23448	4 x 1	7,2	71,0	100,0	18
23449	5 G 1	8,0	88,0	128,0	18
23450	5 x 1	8,0	88,0	128,0	18
23451	7 G 1	8,7	111,0	157,0	18
23452	7 x 1	8,7	111,0	157,0	18
23453	10 G 1	11,2	150,0	230,0	18
23454	12 G 1	11,4	184,0	262,0	18
23455	18 G 1	13,6	260,0	381,0	18
23456	25 G 1	16,2	349,0	535,0	18
23457	34 G 1	18,5	486,0	740,0	18
23458	42 G 1	20,2	545,0	867,0	18
23459	50 G 1	22,0	625,0	1027,0	18
23460	2 x 1,5	7,0	63,0	87,0	16
23461	3 G 1,5	7,4	80,0	102,0	16
23462	3 x 1,5	7,4	80,0	102,0	16
23463	4 G 1,5	8,1	97,0	127,0	16
23464	4 x 1,5	8,1	97,0	127,0	16
23465	5 G 1,5	9,0	119,0	159,0	16
23466	5 x 1,5	9,0	119,0	159,0	16
23467	7 G 1,5	9,8	147,0	207,0	16
23468	7 x 1,5	9,8	147,0	207,0	16
23469	12 G 1,5	12,8	267,0	340,0	16
23470	18 G 1,5	15,6	374,0	480,0	16
23471	25 G 1,5	18,4	526,0	704,0	16
23472	30 G 1,5	19,6	555,0	817,0	16

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
23473	2 x 2,5	8,4	96,0	131,0	14
23474	3 G 2,5	8,8	144,0	168,0	14
23475	4 G 2,5	9,8	148,0	194,0	14
23476	5 G 2,5	10,8	181,0	222,0	14
23477	7 G 2,5	11,9	255,0	345,0	14
23478	12 G 2,5	15,8	441,0	570,0	14
23479	4 G 4	11,6	230,0	310,0	12
23480	5 G 4	12,9	273,0	386,0	12
23481	7 G 4	14,2	316,0	498,0	12
23482	4 G 6	13,8	305,0	414,0	10
23483	5 G 6	15,4	439,0	510,0	10
23484	7 G 6	17,0	505,0	673,0	10
23485	4 G 10	17,2	535,0	591,0	8
23486	5 G 10	19,1	592,0	768,0	8
23487	7 G 10	21,2	810,0	976,0	8
23488	4 G 16	20,3	740,0	1196,0	6

Dimensions and specifications may be changed without prior notice. (RA02)

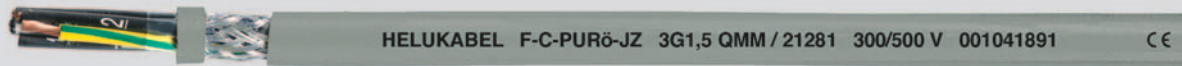


Suitable accessories can be found in Chapter X.

- Cable Gland - HELUTOP® HT-PA
- Cable Gland - HELUTOP® HT-MS
- Cable Gland - HELUTOP® HT-E

# F-C-PURö-JZ

tear and coolant resistant, Cu-screened, without inner sheath, increased oil resistant, EMC-preferred type, meter marking



## Technical data

- Special-PUR control cable adapted to DIN VDE 0285-525-1 / DIN EN 50525-1
- **Temperature range**  
flexing -20°C to +80°C  
fixed installation -40°C to +80°C
- **Nominal voltage**  $U_0/U$  300/500 V
- **Test voltage** 3000 V
- **Breakdown voltage** min. 6000 V
- **Coupling resistance**  
max. 250 Ohm/km
- **Minimum bending radius**  
flexing 10x cable Ø  
fixed installation 5x cable Ø
- **Radiation resistance**  
up to  $100 \times 10^6$  cJ/kg (up to 100 Mrad)

## Cable structure

- Bare copper-conductor, to DIN VDE 0295 cl.5, fine-wire, BS 6360 cl.5, IEC 60228 cl.5
- Core insulation of **oil resistant** PVC compound type T12 adapted to DIN VDE 0207-363-3 / DIN EN 50363-3 for better sliding abilities
- Core identification to DIN VDE 0293 black cores with continuous white numbering
- GN-YE conductor, 3 cores and above in the outer layer
- Cores stranded in layers with optimal lay-length
- Separating foil
- Tinned copper braided screen, approx. 85% coverage
- Core wrapping of fleece guarantees easy cable stripping
- Outer sheath of special **full-polyurethane** compound type TMPU to DIN EN 50363-10-2
- Sheath colour grey (RAL 7001) also available in other colours on request
- with meter marking

## Properties

- **Resistant to**  
UV-Radiation  
Oxygene  
Ozone  
Hydrolysis  
Microbes
- The materials used in manufacture are cadmium-free and contain no silicone and free from substances harmful to the wetting properties of lacquers

## Note

- G = with green-yellow conductor  
x = without green-yellow conductor (OZ)
- AWG sizes are approximate equivalent values. The actual cross-section is in  $\text{mm}^2$ .
- unscreened analogue type: **PURö-JZ**, confer page 68

## Application

Extremely robust control cable characterised by high abrasion and notch resistance properties. Used for critical areas in such applications as machinery, tooling and plant construction, in rolling mills and steel works because of the resistance to mineral oils and to coolant emulsions in particular. Rapid and safe installation assured by the good flexibility of the cable. Suitable for outdoor installation.

An interference-free transmission of signals and pulses is assured by the high screening density. The ideal interference-protected control cable for such applications as given above.

**EMC** = Electromagnetic compatibility

To optimize the EMC features we recommend a large round contact of the copper braiding on both ends.

**CE** = The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

Part no.	No. cores x cross-sec. $\text{mm}^2$	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
21200	2 x 0,5	5,7	35,0	44,0	20
21201	3 G 0,5	5,9	42,0	56,0	20
21202	4 G 0,5	6,4	47,0	60,0	20
21203	5 G 0,5	6,9	56,0	75,0	20
21205	7 G 0,5	7,6	69,0	97,0	20
21207	10 G 0,5	9,6	94,0	133,0	20
21208	12 G 0,5	9,7	108,0	158,0	20
21209	14 G 0,5	10,2	116,0	190,0	20
21211	18 G 0,5	11,5	145,0	218,0	20
21213	21 G 0,5	12,3	188,0	252,0	20
21215	25 G 0,5	13,7	240,0	315,0	20
21217	30 G 0,5	14,4	295,0	362,0	20
21220	36 G 0,5	15,6	318,0	447,0	20
21221	40 G 0,5	16,4	343,0	475,0	20
21224	50 G 0,5	18,5	406,0	572,0	20

Part no.	No. cores x cross-sec. $\text{mm}^2$	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
21227	2 x 0,75	6,1	40,0	60,0	19
21228	3 G 0,75	6,3	52,0	67,0	19
21229	4 G 0,75	6,8	60,0	76,0	19
21230	5 G 0,75	7,4	71,0	92,0	19
21232	7 G 0,75	8,2	91,0	131,0	19
21234	10 G 0,75	10,3	137,0	180,0	19
21235	12 G 0,75	10,5	142,0	204,0	19
21236	14 G 0,75	11,3	180,0	226,0	19
21238	18 G 0,75	12,7	212,0	290,0	19
21240	21 G 0,75	13,6	246,0	376,0	19
21242	25 G 0,75	15,0	281,0	413,0	19
21245	32 G 0,75	16,7	342,0	485,0	19
21249	41 G 0,75	18,2	400,0	611,0	19
21251	50 G 0,75	20,3	461,0	775,0	19

Continuation ▶



# F-C-PURÖ-JZ

tear and coolant resistant, Cu-screened, without inner sheath, increased oil resistant, EMC-preferred type, meter marking

EAC

A

Part no.	No.cores x cross-sec. mm <sup>2</sup>	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
21253	2 x 1	6,4	50,0	66,0	18
21254	3 G 1	6,7	60,0	82,0	18
21255	4 G 1	7,2	71,0	100,0	18
21256	5 G 1	8,0	88,0	128,0	18
21257	6 G 1	8,7	97,0	145,0	18
21258	7 G 1	8,7	111,0	157,0	18
21259	8 G 1	9,6	127,0	198,0	18
21261	10 G 1	11,2	150,0	230,0	18
21262	12 G 1	11,4	184,0	262,0	18
21263	14 G 1	12,0	196,0	302,0	18
21264	16 G 1	12,8	209,0	345,0	18
21265	18 G 1	13,6	260,0	381,0	18
21267	21 G 1	14,3	319,0	480,0	18
21268	25 G 1	16,2	349,0	535,0	18
21273	34 G 1	18,5	486,0	740,0	18
21276	41 G 1	19,5	531,0	855,0	18
21278	50 G 1	22,0	625,0	1027,0	18
21280	2 x 1,5	7,0	63,0	87,0	16
21281	3 G 1,5	7,4	80,0	102,0	16
21282	4 G 1,5	8,1	97,0	127,0	16
21283	5 G 1,5	9,0	119,0	159,0	16
21285	7 G 1,5	9,8	147,0	207,0	16
21286	8 G 1,5	10,8	170,0	245,0	16
21287	10 G 1,5	12,6	193,0	313,0	16
21288	12 G 1,5	12,8	267,0	340,0	16

Part no.	No.cores x cross-sec. mm <sup>2</sup>	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
21290	14 G 1,5	13,5	283,0	384,0	16
21291	16 G 1,5	14,6	315,0	425,0	16
21292	18 G 1,5	15,6	374,0	480,0	16
21295	21 G 1,5	16,6	425,0	563,0	16
21296	25 G 1,5	18,5	526,0	704,0	16
21297	34 G 1,5	21,2	629,0	870,0	16
21298	42 G 1,5	22,2	819,0	1040,0	16
21299	50 G 1,5	25,0	885,0	1292,0	16
21300	2 x 2,5	8,4	96,0	131,0	14
21301	3 G 2,5	8,8	144,0	168,0	14
21302	4 G 2,5	9,8	148,0	194,0	14
21303	5 G 2,5	10,8	181,0	222,0	14
21304	7 G 2,5	11,9	255,0	345,0	14
21305	10 G 2,5	15,5	340,0	462,0	14
21306	12 G 2,5	15,8	441,0	570,0	14
21313	2 x 4	10,0	120,0	187,0	12
21314	3 G 4	10,6	174,0	243,0	12
21315	4 G 4	11,6	230,0	310,0	12
21316	5 G 4	12,8	273,0	386,0	12
21317	7 G 4	14,2	316,0	498,0	12
21319	3 G 6	12,5	240,0	333,0	10
21320	4 G 6	13,8	305,0	414,0	10
21321	5 G 6	15,4	439,0	510,0	10
21322	7 G 6	17,0	505,0	673,0	10

Dimensions and specifications may be changed without prior notice. (RA02)

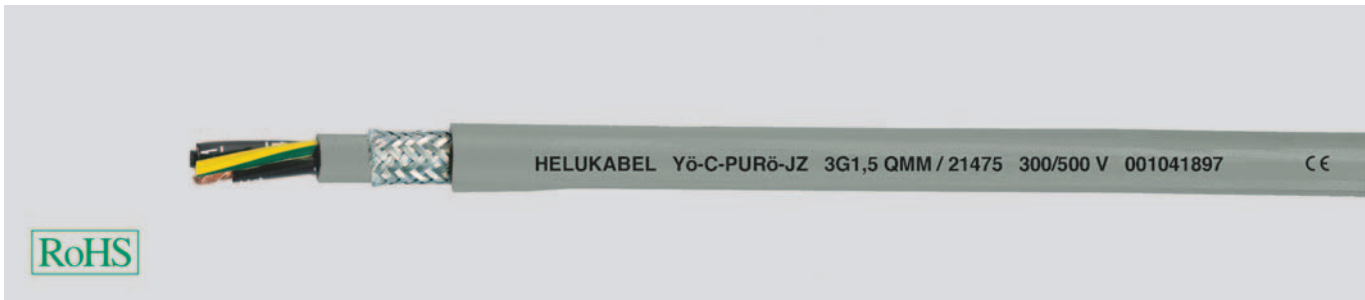


Suitable accessories can be found in Chapter X.

- Cable Gland - HELUTOP® HT-MS-EP4

# Yö-C-PURö-JZ

tear and coolant resistant, Cu-screened, with inner sheath, increased oil resistant, EMC-preferred type, meter marking



## Technical data

- Special-PUR sheathed multicore cable adapted to DIN VDE 0285-525-1 / DIN EN 50525-1
- **Temperature range**  
flexing -20°C to +80°C  
fixed installation -40°C to +80°C
- **Nominal voltage**  
up to 2,5 mm<sup>2</sup> U<sub>0</sub>/U 300/500 V  
from 4 mm<sup>2</sup> U<sub>0</sub>/U 450/750 V
- **Test voltage** 4000 V
- **Breakdown voltage** min. 8000 V
- **Coupling resistance**  
max. 250 Ohm/km
- **Minimum bending radius**  
flexing 10x cable Ø  
fixed installation 5x cable Ø
- **Radiation resistance**  
up to 100x10<sup>6</sup> cJ/kg (up to 100 Mrad)

## Cable structure

- Bare copper-conductor, to DIN VDE 0295 cl.5, fine-wire, BS 6360 cl.5, IEC 60228 cl.5
- Outer sheath of **oil resistant** PVC compound type T12 adapted to DIN VDE 0207-363-3 / DIN EN 50363-3 for better sliding abilities
- Core identification to DIN VDE 0293 black cores with continuous white numbering
- GN-YE conductor, 3 cores and above in the outer layer
- Cores stranded in layers with optimal lay-length
- Inner sheath of **oil resistant** PVC
- Tinned copper braided screen, approx. 85% coverage
- Core wrapping of fleece guarantees easy cable stripping
- Outer sheath of special **full-polyurethane** compound type TMPU to DIN EN 50363-10-2
- Sheath colour grey (RAL 7001)
- with meter marking

## Properties

- **Resistant to**  
UV-Radiation  
Oxygene  
Ozone  
Hydrolysis  
Microbes
- The materials used in manufacture are cadmium-free and contain no silicone and free from substances harmful to the wetting properties of lacquers

## Note

- G = with green-yellow conductor  
x = without green-yellow conductor (OZ)
- AWG sizes are approximate equivalent values. The actual cross-section is in mm<sup>2</sup>.
- unscreened analogue type: **PURö-JZ**, confer page 68

## Application

Extremely robust control cable characterised by high abrasion and notch resistance properties. Used for critical areas in such applications as machinery, tooling and plant construction, in rolling mills and steel works because of the resistance to mineral oils and to coolant emulsions in particular. The mechanical strength of the cable is increased by the additional oil-resistant inner sheath. The ideal interference-protected control cable for such applications as given above. Suitable for outdoor installation.

These screened cables are particularly suitable for the interference-free transmission in instrumentation and control engineering applications (electromagnetic compatibility).

**EMC** = Electromagnetic compatibility

To optimize the EMC features we recommend a large round contact of the copper braiding on both ends.

CE = The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
21400	2 x 0,5	7,0	41,0	68,0	20
21401	3 G 0,5	7,3	45,0	84,0	20
21402	4 G 0,5	7,9	54,0	95,0	20
21403	5 G 0,5	8,4	66,0	107,0	20
21405	7 G 0,5	9,1	79,0	135,0	20
21407	10 G 0,5	10,7	107,0	170,0	20
21408	12 G 0,5	11,5	137,0	195,0	20
21409	14 G 0,5	12,2	142,0	222,0	20
21411	18 G 0,5	13,5	156,0	278,0	20
21413	21 G 0,5	14,2	189,0	330,0	20
21415	25 G 0,5	15,7	250,0	406,0	20
21416	30 G 0,5	16,2	297,0	520,0	20
21419	36 G 0,5	17,7	320,0	587,0	20
21420	40 G 0,5	18,4	345,0	655,0	20
21421	50 G 0,5	20,7	407,0	742,0	20

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
21425	2 x 0,75	7,7	46,0	88,0	19
21426	3 G 0,75	8,0	57,0	98,0	19
21427	4 G 0,75	8,5	63,0	112,0	19
21428	5 G 0,75	9,3	76,0	130,0	19
21430	7 G 0,75	9,9	100,0	185,0	19
21432	10 G 0,75	11,8	140,0	270,0	19
21433	12 G 0,75	12,7	175,0	294,0	19
21434	14 G 0,75	13,3	190,0	317,0	19
21436	18 G 0,75	14,9	240,0	357,0	19
21438	21 G 0,75	15,4	274,0	455,0	19
21440	25 G 0,75	17,5	306,0	510,0	19
21443	32 G 0,75	18,9	349,0	688,0	19
21446	41 G 0,75	21,0	403,0	951,0	19
21447	50 G 0,75	23,1	470,0	1100,0	19

Continuation ▶

# YÖ-C-PURÖ-JZ

tear and coolant resistant, Cu-screened, with inner sheath, increased oil resistant, EMC-preferred type, meter marking

EAC

A

Part no.	No.cores x cross-sec. mm <sup>2</sup>	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
21451	2 x 1	8,0	54,0	98,0	18
21452	3 G 1	8,3	64,0	102,0	18
21453	4 G 1	9,0	76,0	145,0	18
21454	5 G 1	9,7	89,0	170,0	18
21456	7 G 1	10,3	114,0	220,0	18
21457	8 G 1	11,2	130,0	270,0	18
21458	10 G 1	12,6	156,0	330,0	18
21459	12 G 1	13,3	186,0	350,0	18
21460	14 G 1	14,1	198,0	402,0	18
21461	16 G 1	14,8	214,0	420,0	18
21462	18 G 1	15,6	284,0	515,0	18
21463	20 G 1	16,4	325,0	545,0	18
21465	25 G 1	18,5	387,0	690,0	18
21468	34 G 1	20,9	500,0	912,0	18
21469	41 G 1	21,5	578,0	1070,0	18
21470	50 G 1	24,8	681,0	1318,0	18
21474	2 x 1,5	8,6	64,0	130,0	16
21475	3 G 1,5	9,2	82,0	152,0	16
21476	4 G 1,5	9,8	99,0	167,0	16
21477	5 G 1,5	10,8	123,0	203,0	16
21479	7 G 1,5	11,7	148,0	305,0	16
21480	8 G 1,5	12,6	172,0	335,0	16
21481	10 G 1,5	14,2	198,0	422,0	16
21482	12 G 1,5	14,9	274,0	435,0	16
21483	14 G 1,5	15,8	294,0	480,0	16
21484	16 G 1,5	16,7	318,0	525,0	16
21485	18 G 1,5	17,4	386,0	642,0	16
21487	21 G 1,5	18,5	447,0	722,0	16
21489	25 G 1,5	20,8	531,0	803,0	16
21492	34 G 1,5	23,2	671,0	1068,0	16
21494	42 G 1,5	25,0	890,0	1370,0	16
21495	50 G 1,5	27,4	997,0	1677,0	16
21499	2 x 2,5	10,1	110,0	180,0	14
21500	3 G 2,5	10,8	148,0	215,0	14
21501	4 G 2,5	11,5	169,0	268,0	14
21502	5 G 2,5	12,8	220,0	349,0	14
21503	7 G 2,5	14,0	284,0	406,0	14
21504	12 G 2,5	17,9	470,0	720,0	14

Part no.	No.cores x cross-sec. mm <sup>2</sup>	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
21507	2 x 4	13,3	124,0	300,0	12
21508	3 G 4	14,0	178,0	340,0	12
21509	4 G 4	15,3	234,0	408,0	12
21510	5 G 4	16,7	284,0	504,0	12
21511	7 G 4	18,4	321,0	640,0	12
21512	3 G 6	15,6	245,0	453,0	10
21513	4 G 6	17,0	316,0	560,0	10
21514	5 G 6	18,6	442,0	700,0	10
21515	7 G 6	20,4	530,0	905,0	10
21516	3 G 10	19,0	367,0	750,0	8
21517	4 G 10	21,1	549,0	1023,0	8
21518	5 G 10	23,1	604,0	1114,0	8
21519	7 G 10	25,6	820,0	1505,0	8
21521	4 G 16	25,3	807,0	1385,0	6
21522	5 G 16	28,0	940,0	1550,0	6
21524	4 G 25	31,1	1169,0	1894,0	4
21525	5 G 25	34,3	1420,0	2272,0	4
21526	4 G 35	33,9	1680,0	2395,0	2
21527	5 G 35	37,8	2020,0	2890,0	2
21528	4 G 50	40,1	2370,0	3312,0	1
21529	5 G 50	45,0	2880,0	4100,0	1
21530	4 G 70	46,0	3257,0	4605,0	2/0
21531	5 G 70	50,6	4032,0	5710,0	2/0
21532	4 G 95	51,2	4060,0	6055,0	3/0
21533	5 G 95	56,5	5244,0	7520,0	3/0
21534	4 G 120	56,3	5231,0	7318,0	4/0

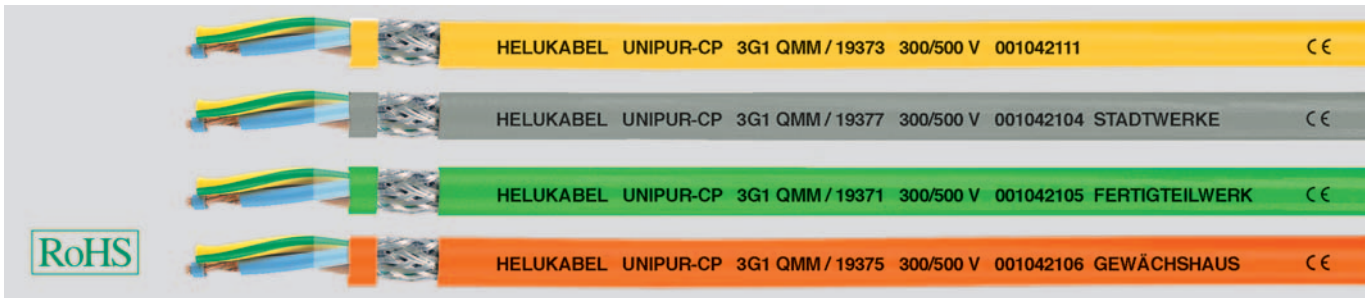
Dimensions and specifications may be changed without prior notice. (RA02)



Suitable accessories can be found in Chapter X.

- Cable Gland - HELUTOP® HT-MS-EP4

# UNIPUR®-CP flexible at low temperature, with customer markings, halogen-free, wear resistant, robust, screened, EMC-preferred type, meter marking



## Technical data

- Special TPE/PUR screened connecting cable adapted to DIN VDE 0285-525-2-21 / DIN EN 50525-2-21
- **Temperature range**  
flexing -40°C to +90°C
- **Nominal voltage**  
up to 1 mm<sup>2</sup> U<sub>0</sub>/U 300/500 V  
from 1,5 mm<sup>2</sup> U<sub>0</sub>/U 450/750 V
- **Test voltage** 3000 V
- **Coupling resistance**  
max. 250 Ohm/km
- **Minimum bending radius**  
flexing 12,5x cable Ø  
fixed installation 7,5x cable Ø
- **Radiation resistance**  
up to 100x10<sup>6</sup> cJ/kg (up to 100 Mrad)

## Cable structure

- Bare copper-conductor, to DIN VDE 0295 cl.5, fine-wire, BS 6360 cl.5, IEC 60228 cl.5
- Core insulation of thermoplastic elastomere (TPE)
- Core identification to DIN VDE 0293-308  
- up to 5 cores coloured  
- from 6 cores, black with continuous white numbering
- GN-YE conductor, 3 cores and above in the outer layer
- Cores stranded in layers with optimal lay-length
- Separating foil
- Tinned copper braided screen, approx. 85% coverage
- Outer sheath of PUR compound type TMPU adapted to DIN EN 50363-10-2
- Sheath colour by request
- with meter marking

## Properties

- Resistant to
  - Oils and fats
  - Water and weathering effects
  - Ozone and oxygen
  - UV-radiation
  - Hydrolysis
  - Microbial attack
- Abrasion resistant
- Notch resistant
- Resistant to tearing and cutting
- Good flexibility at low temperatures down to -40°C
- The materials used in manufacture are cadmium-free and contain no silicone and free from substances harmful to the wetting properties of lacquers

## Note

- G = with green-yellow conductor  
x = without green-yellow conductor (OB).
- Please complete the part number for these cables by adding the suffix for the colour required as per the list:  
0 = approx.RAL 5015, blue  
1 = approx.RAL 6018, green  
2 = approx.RAL 8003, brown  
3 = approx.RAL 1021, yellow  
4 = approx.RAL 3000, red  
5 = approx.RAL 2003, orange  
6 = approx.RAL 4005, violet  
7 = approx.RAL 7001/7032, grey  
Further colours on request.
- unscreened analogue type:  
**UNIPUR®**, confer page 73

## Application

These robust and flexible cables are used for electrical tools such as drills, hand-held circular saws, and garden equipment as well as for portable motors and machinery in agriculture, at building sites, for hobbies, docks and refrigeration plants.

Extremely good mechanical characteristics e. g. compressive load, good abrasion and near-resistant.

**EMC** = Electromagnetic compatibility

To optimize the EMC features we recommend a large round contact of the copper braiding on both ends.

CE = The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
1915x	2 x 0,5	6,4	35,0	46,0	20
1916x	3 G 0,5	6,8	42,0	56,0	20
1917x	4 G 0,5	7,3	47,0	62,0	20
1918x	5 G 0,5	7,9	56,0	75,0	20
1919x	7 G 0,5	9,4	69,0	98,0	20
1920x	12 G 0,5	11,3	108,0	158,0	20
1921x	18 G 0,5	13,7	145,0	216,0	20
1922x	25 G 0,5	16,3	240,0	315,0	20
1923x	34 G 0,5	18,6	312,0	371,0	20
1924x	41 G 0,5	20,4	348,0	442,0	20

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
1925x	2 x 0,75	6,8	40,0	60,0	19
1926x	3 G 0,75	7,1	52,0	68,0	19
1927x	4 G 0,75	7,7	60,0	78,0	19
1928x	5 G 0,75	8,6	71,0	95,0	19
1929x	6 G 0,75	9,3	80,0	112,0	19
1930x	7 G 0,75	10,3	91,0	138,0	19
1931x	12 G 0,75	12,5	142,0	207,0	19
1932x	18 G 0,75	14,8	212,0	293,0	19
1933x	25 G 0,75	17,9	281,0	413,0	19
1934x	34 G 0,75	20,3	345,0	523,0	19
1935x	41 G 0,75	22,1	400,0	609,0	19

Continuation ▶



# UNIPUR®-CP flexible at low temperature, with customer markings, halogen-free, wear resistant, robust, screened, EMC-preferred type, meter marking

EAC

A

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
1936x	2 x 1	7,2	50,0	65,0	18
1937x	3 G 1	7,6	60,0	76,0	18
1938x	4 G 1	8,4	71,0	89,0	18
1939x	5 G 1	9,2	88,0	108,0	18
1940x	6 G 1	10,1	97,0	141,0	18
1941x	7 G 1	11,2	111,0	187,0	18
1942x	12 G 1	13,5	184,0	240,0	18
1943x	18 G 1	16,1	260,0	335,0	18
1944x	25 G 1	19,4	349,0	484,0	18
1945x	34 G 1	22,2	486,0	627,0	18
1946x	41 G 1	24,0	531,0	738,0	18
1947x	2 x 1,5	8,6	63,0	97,0	16
1948x	3 G 1,5	9,1	80,0	119,0	16
1949x	4 G 1,5	10,1	97,0	152,0	16
1950x	5 G 1,5	11,2	119,0	168,0	16
1951x	6 G 1,5	12,1	121,0	218,0	16
1952x	7 G 1,5	13,6	147,0	243,0	16
1953x	12 G 1,5	16,3	267,0	317,0	16
1954x	18 G 1,5	19,6	374,0	481,0	16
1955x	25 G 1,5	23,8	526,0	674,0	16
1956x	34 G 1,5	27,0	629,0	881,0	16
1957x	41 G 1,5	29,3	801,0	1027,0	16

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
1958x	2 x 2,5	10,2	96,0	129,0	14
1959x	3 G 2,5	10,9	144,0	158,0	14
1960x	4 G 2,5	11,9	148,0	196,0	14
1961x	5 G 2,5	13,2	181,0	241,0	14
1962x	7 G 2,5	16,3	255,0	317,0	14
1963x	12 G 2,5	20,0	441,0	496,0	14
1964x	2 x 4	11,8	120,0	158,0	12
1965x	3 G 4	12,7	174,0	261,0	12
1966x	4 G 4	14,2	230,0	316,0	12
1967x	5 G 4	15,7	273,0	384,0	12
1968x	7 G 4	19,3	316,0	592,0	12
1969x	2 x 6	13,6	173,0	259,0	10
1970x	3 G 6	14,6	240,0	394,0	10
1971x	4 G 6	16,1	305,0	483,0	10
1972x	5 G 6	18,0	439,0	592,0	10
1973x	7 G 6	21,8	505,0	714,0	10
1974x	3 G 10	18,0	350,0	576,0	8
1975x	4 G 10	19,9	535,0	729,0	8
1976x	5 G 10	22,2	592,0	914,0	8
1977x	3 G 16	20,8	585,0	960,0	6
1978x	4 G 16	23,1	740,0	1813,0	6
1979x	5 G 16	25,5	895,0	1827,0	6

Dimensions and specifications may be changed without prior notice. (RA02)



Suitable accessories can be found in Chapter X.

- Cable Gland - HELUTOP® HT-MS-EP4

# PUR-C-PUR

Cu-screened, extrem conditions, halogen-free, EMC-preferred type,  
meter marking



## Technical data

- Special PUR control cables, screened, adapted to DIN VDE 0250
- **Temperature range**  
-40°C to +80°C
- **Nominal voltage**  
up to 1 mm<sup>2</sup> U<sub>0</sub>/U 300/500 V  
from 1,5 mm<sup>2</sup> U<sub>0</sub>/U 450/750 V
- **Test voltage**  
to 1 mm<sup>2</sup> 2000 V  
from 1,5 mm<sup>2</sup> 2500 V
- **Insulation resistance**  
min. 20 MOhm x km
- **Mutual capacitance**(800 Hz)  
core/core approx. 150 pF/m  
core/screen approx. 320 pF/m
- **Coupling resistance**  
max. 250 Ohm/km
- **Minimum bending radius**  
flexing 10x cable Ø  
fixed installation 5x cable Ø
- **Radiation resistance**  
up to 100x10<sup>6</sup> cJ/kg (up to 100 Mrad)

## Cable structure

- Bare copper-conductor, to DIN VDE 0295 cl.5, fine-wire, BS 6360 cl.5, IEC 60228 cl.5
- Aderisolatio aus special PUR
- Core identification to DIN VDE 0293-308
- GN-YE conductor, 3 cores and above
- Cores stranded in layers with optimal lay-length
- Core wrapping with foil
- Tinned copper braided screen, approx. 85% coverage
- PUR outer sheath
- Sheath colour grey (RAL 7032)
- with meter marking

## Properties

- High flexibility at low temperatures
- High abrasion resistance
- Break and cut resistant
- Tear resistant
- Halogen-free
- **Resistant to**  
Oils and fats  
Coolant and chemicals  
Non-alcoholic fuels and kerosene  
Atmospheric influences  
UV-radiation  
Oxygene and ozone  
Microbes and rotting  
Sea and waste water  
Vibrations  
Acids and Lyes
- The materials used in manufacture are cadmium-free and contain no silicone and free from substances harmful to the wetting properties of lacquers

## Note

- G = with green-yellow conductor  
x = without green-yellow conductor (O).
- AWG sizes are approximate equivalent values. The actual cross-section is in mm<sup>2</sup>.

## Application

PUR-C-PUR screened cables are well suited as data transfer and connection cables for the machine and motor industries due to the good level of copper screening which blocks strong electrical disturbances.

This cable type has proven to be especially suited to use in extreme weather and environmental conditions due to its good thermal and chemical properties (Temperature range -40°C to +80°C). In addition to this it also possesses excellent mechanical properties, e. g. pressure resistance and good abrasive resistant qualities, all of which go to guarantee a long life.

**EMC** = Electromagnetic compatibility

To optimize the EMC features we recommend a large round contact of the copper braiding on both ends.

CE = The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
22315	2 x 0,75	6,8	40,0	65,0	19
22316	3 G 0,75	7,2	52,0	80,0	19
22317	4 G 0,75	8,0	60,0	95,0	19
22318	5 G 0,75	8,6	71,0	126,0	19
22319	6 G 0,75	9,5	80,0	150,0	19
22339	2 x 1	7,2	50,0	80,0	18
22340	3 G 1	7,8	60,0	95,0	18
22341	4 G 1	8,4	71,0	106,0	18
22342	5 G 1	9,5	88,0	149,0	18

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
22364	2 x 1,5	8,6	63,0	101,0	16
22365	3 G 1,5	9,3	80,0	125,0	16
22366	4 G 1,5	10,1	97,0	150,0	16
22367	5 G 1,5	11,2	119,0	210,0	16
22385	2 x 2,5	10,4	96,0	142,0	14
22386	3 G 2,5	11,0	144,0	169,0	14
22387	4 G 2,5	12,2	148,0	225,0	14
22388	5 G 2,5	13,6	181,0	275,0	14

Dimensions and specifications may be changed without prior notice. (RA02)



Suitable accessories can be found in Chapter X.

- Cable Gland - HELUTOP® HT-MS-EP4

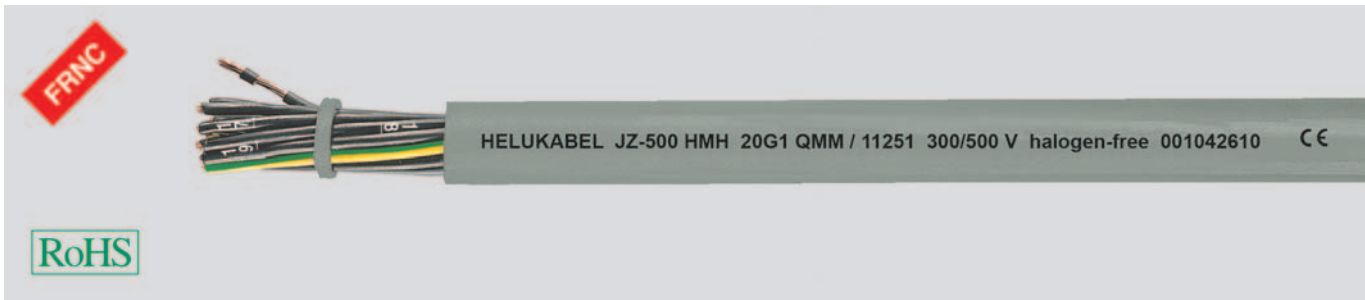


# HALOGEN-FREE CONTROL CABLES





# JZ-500 HMH flexible control cable, halogen-free, extremely fire resistant, oil resistant<sup>1)</sup>, meter marking



## Technical data

- Halogen-free flexible control cable adapted to  
DIN VDE 0285-525-2-51 /  
DIN EN 50525-2-51 and  
DIN VDE 0285-525-3-11 /  
DIN EN 50525-3-11
- **Temperature range**  
flexing -15°C to +70°C  
fixed installation -40°C to +70°C
- **Nominal voltage**  $U_0/U$  300/500 V
- **Test voltage** 2000 V
- **Minimum bending radius**  
flexing 12,5x cable Ø  
fixed installation 4x cable Ø
- **Radiation resistance**  
up to  $100 \times 10^6$  cJ/kg (up to 100 Mrad)

## Cable structure

- Bare copper-conductor, to  
DIN VDE 0295 cl.5, fine-wire,  
BS 6360 cl.5, IEC 60228 cl.5
- Core insulation of halogen-free polymer compound type T16 to  
DIN VDE 0207-363-7 / DIN EN 50363-7
- Core identification to DIN VDE 0293  
black cores with continuous white numbering
- GN-YE conductor, 3 cores and above  
in the outer layer
- Cores stranded in layers with  
optimal lay-length
- Outer sheath of halogen-free polymer compound type TM7 to  
DIN VDE 0207-363-8 / DIN EN 50363-8
- Outer Sheath colour grey (RAL 7001)
- with meter marking
- **LSOH**= Low Smoke Zero Halogen

## Properties

- <sup>1)</sup> For the critical applications we advise for consultation
  - The materials used in manufacture are cadmium-free and contain no silicone and free from substances harmful to the wetting properties of lacquers
- ### Tests
- Flame test acc. to  
DIN VDE 0482-332-3, BS 4066 part 3,  
DIN EN 60332-3, IEC 60332-3 (previously  
DIN VDE 0472 part 804 test method C)
  - self-extinguishing and flame retardant  
acc. to DIN VDE 0482-332-1-2,  
DIN EN 60332-1-2, IEC 60332-1 (equivalent  
DIN VDE 0472 part 804 test method B)
  - Corrosiveness of combustion gases  
acc. to DIN VDE 0482 part 267,  
DIN EN 50267-2-2, IEC 60754-2  
(equivalent DIN VDE 0472 part 813)
  - Halogen-free acc. to DIN VDE 0482  
part 267, DIN EN 50267-2-1, IEC 60754-1  
(equivalent DIN VDE 0472 part 815)
  - Smoke density acc. to DIN VDE 0482  
part 1034-1+2, DIN EN 61034-1+2,  
IEC 61034-1+2, BS 7622 part 1+2  
(previously DIN VDE 0472 part 816)

## Note

- G = with green-yellow conductor  
x = without green-yellow conductor (OZ)
- AWG sizes are approximate equivalent values. The actual cross-section is in mm<sup>2</sup>.
- Please note the cleanroom qualification when ordering.
- screened analogue type:  
**JZ-500 HMH-C**, confer page 96

## Application

Used as measuring, monitoring and control cables in tool machinery, conveyor belts, production lines, in plant, in air-conditioning, in foundries and steel mills. For fixed installation or flexible application, casual, not constantly recurring free movement without forced motion and without tensile stress, for medium mechanical stress. The cable is suitable for use in dry, damp and wet locations and on plaster.

CE= The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
11201	2 x 0,5	4,8	9,6	43,0	20
11202	3 G 0,5	5,1	14,4	50,0	20
11332	3 x 0,5	5,1	14,4	50,0	20
11203	4 G 0,5	5,6	19,0	60,0	20
11333	4 x 0,5	5,5	19,0	60,0	20
11204	5 G 0,5	6,2	24,0	71,0	20
11334	5 x 0,5	6,2	24,0	71,0	20
11205	7 G 0,5	6,7	33,6	84,0	20
11206	8 G 0,5	7,4	38,0	101,0	20
11207	10 G 0,5	8,3	48,0	121,0	20
11208	12 G 0,5	8,7	58,0	142,0	20
11209	16 G 0,5	10,0	76,0	183,0	20

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
11210	18 G 0,5	10,7	86,0	204,0	20
11211	20 G 0,5	11,3	96,0	227,0	20
11212	25 G 0,5	12,6	120,0	283,0	20
11213	30 G 0,5	13,5	144,0	324,0	20
11214	34 G 0,5	14,3	163,0	367,0	20
11215	37 G 0,5	14,5	178,0	381,0	20
11216	41 G 0,5	15,8	197,0	417,0	20
11217	42 G 0,5	15,8	202,0	454,0	20
11218	50 G 0,5	17,5	240,0	519,0	20
11219	61 G 0,5	18,5	293,0	635,0	20
11220	65 G 0,5	19,4	312,0	694,0	20

Continuation ▶



# JZ-500 HMH flexible control cable, halogen-free, extremely fire resistant, oil resistant<sup>1)</sup>, meter marking



A

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
11221	2 x 0,75	5,3	14,4	47,0	19
11222	3 G 0,75	5,6	21,6	56,0	19
11223	3 x 0,75	5,6	21,6	56,0	19
11223	4 G 0,75	6,3	29,0	69,0	19
11224	4 x 0,75	6,3	29,0	69,0	19
11224	5 G 0,75	6,9	36,0	83,0	19
11224	5 G 0,75	6,9	36,0	83,0	19
11225	7 G 0,75	7,5	50,0	114,0	19
11225	7 G 0,75	7,5	50,0	114,0	19
11226	8 G 0,75	8,3	58,0	136,0	19
11226	8 G 0,75	8,3	58,0	136,0	19
11227	10 G 0,75	9,2	72,0	172,0	19
11227	10 G 0,75	9,2	72,0	172,0	19
11228	12 G 0,75	9,8	86,0	183,0	19
11228	12 G 0,75	9,8	86,0	183,0	19
11229	16 G 0,75	11,4	115,0	241,0	19
11229	16 G 0,75	11,4	115,0	241,0	19
11230	18 G 0,75	12,2	130,0	266,0	19
11230	18 G 0,75	12,2	130,0	266,0	19
11231	20 G 0,75	12,7	144,0	291,0	19
11231	20 G 0,75	12,7	144,0	291,0	19
11232	25 G 0,75	14,3	180,0	374,0	19
11232	25 G 0,75	14,3	180,0	374,0	19
11233	30 G 0,75	15,3	216,0	450,0	19
11233	30 G 0,75	15,3	216,0	450,0	19
11234	34 G 0,75	16,5	245,0	517,0	19
11234	34 G 0,75	16,5	245,0	517,0	19
11235	37 G 0,75	16,7	260,0	541,0	19
11235	37 G 0,75	16,7	260,0	541,0	19
11236	41 G 0,75	18,1	296,0	611,0	19
11236	41 G 0,75	18,1	296,0	611,0	19
11237	42 G 0,75	18,1	302,0	621,0	19
11237	42 G 0,75	18,1	302,0	621,0	19
11238	50 G 0,75	19,8	360,0	742,0	19
11238	50 G 0,75	19,8	360,0	742,0	19
11239	61 G 0,75	21,2	439,0	853,0	19
11239	61 G 0,75	21,2	439,0	853,0	19
11240	65 G 0,75	21,8	468,0	909,0	19
11240	65 G 0,75	21,8	468,0	909,0	19
11241	2 x 1	5,6	19,2	63,0	18
11241	2 x 1	5,6	19,2	63,0	18
11242	3 G 1	5,9	29,0	74,0	18
11242	3 G 1	5,9	29,0	74,0	18
11243	3 x 1	5,9	29,0	74,0	18
11243	4 G 1	6,6	38,4	90,0	18
11243	4 G 1	6,6	38,4	90,0	18
11244	4 x 1	6,6	38,4	90,0	18
11244	5 G 1	7,3	48,0	109,0	18
11244	5 G 1	7,3	48,0	109,0	18
11245	7 G 1	8,1	67,0	151,0	18
11245	7 G 1	8,1	67,0	151,0	18
11246	8 G 1	8,8	77,0	184,0	18
11246	8 G 1	8,8	77,0	184,0	18
11247	10 G 1	9,8	96,0	224,0	18
11247	10 G 1	9,8	96,0	224,0	18
11248	12 G 1	10,4	115,0	243,0	18
11248	12 G 1	10,4	115,0	243,0	18
11249	16 G 1	12,3	154,0	314,0	18
11249	16 G 1	12,3	154,0	314,0	18
11250	18 G 1	12,9	173,0	361,0	18
11250	18 G 1	12,9	173,0	361,0	18
11251	20 G 1	13,8	192,0	387,0	18
11251	20 G 1	13,8	192,0	387,0	18
11252	25 G 1	15,4	240,0	496,0	18
11252	25 G 1	15,4	240,0	496,0	18
11253	34 G 1	17,7	326,0	670,0	18
11253	34 G 1	17,7	326,0	670,0	18
11254	37 G 1	17,9	355,0	713,0	18
11254	37 G 1	17,9	355,0	713,0	18
11255	41 G 1	19,5	394,0	784,0	18
11255	41 G 1	19,5	394,0	784,0	18
11256	42 G 1	19,5	403,0	824,0	18
11256	42 G 1	19,5	403,0	824,0	18
11257	50 G 1	21,3	480,0	952,0	18
11257	50 G 1	21,3	480,0	952,0	18
11258	61 G 1	22,5	586,0	1140,0	18
11258	61 G 1	22,5	586,0	1140,0	18
11259	65 G 1	23,6	628,0	1201,0	18
11259	65 G 1	23,6	628,0	1201,0	18
11260	2 x 1,5	6,4	29,0	70,0	16
11260	2 x 1,5	6,4	29,0	70,0	16
11261	3 G 1,5	6,8	43,0	94,0	16
11261	3 G 1,5	6,8	43,0	94,0	16
11262	3 x 1,5	6,8	43,0	94,0	16
11262	4 G 1,5	7,4	58,0	112,0	16
11262	4 G 1,5	7,4	58,0	112,0	16
11263	5 G 1,5	8,3	72,0	141,0	16
11263	5 G 1,5	8,3	72,0	141,0	16
11264	7 G 1,5	9,2	101,0	191,0	16
11264	7 G 1,5	9,2	101,0	191,0	16
11265	8 G 1,5	10,0	115,0	224,0	16
11265	8 G 1,5	10,0	115,0	224,0	16
11266	10 G 1,5	10,9	144,0	282,0	16
11266	10 G 1,5	10,9	144,0	282,0	16
11267	12 G 1,5	11,8	173,0	311,0	16
11267	12 G 1,5	11,8	173,0	311,0	16
11268	16 G 1,5	13,9	230,0	392,0	16
11268	16 G 1,5	13,9	230,0	392,0	16
11269	18 G 1,5	14,6	259,0	450,0	16
11269	18 G 1,5	14,6	259,0	450,0	16
11270	20 G 1,5	15,6	288,0	497,0	16
11270	20 G 1,5	15,6	288,0	497,0	16
11271	25 G 1,5	17,4	360,0	630,0	16
11271	25 G 1,5	17,4	360,0	630,0	16
11272	34 G 1,5	20,2	490,0	842,0	16
11272	34 G 1,5	20,2	490,0	842,0	16
11273	37 G 1,5	20,2	533,0	897,0	16
11273	37 G 1,5	20,2	533,0	897,0	16
11274	50 G 1,5	24,2	720,0	1277,0	16
11274	50 G 1,5	24,2	720,0	1277,0	16
11275	61 G 1,5	25,8	878,0	1460,0	16
11275	61 G 1,5	25,8	878,0	1460,0	16
11276	65 G 1,5	26,8	936,0	1612,0	16
11276	65 G 1,5	26,8	936,0	1612,0	16

Dimensions and specifications may be changed without prior notice. (RA03)

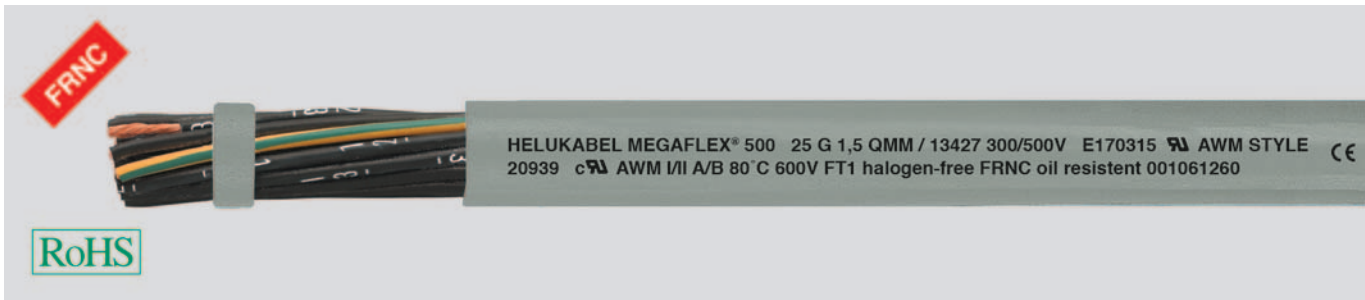


Suitable accessories can be found in Chapter X.

- Cable Gland - HELUTOP® HT-MS-EP4

# MEGAFLEX® 500

halogen-free, flame retardant, oil-resistant,  
UV-resistant, flexible, meter marking



## Technical data

- Halogen-free flexible control cable adapted to  
DIN VDE 0285-525-3-11/  
DIN EN 50525-3-11,  
to UL-Style 20939, UL-Std.758
- **Temperature range**  
flexing -30°C to +80°C  
fixed installation -40°C to +80°C
- **Nominal voltage**  
U<sub>0</sub>/U 300/500 V  
UL/CSA 600 V
- **Test voltage** 3000 V
- **Minimum bending radius**  
flexing 10x cable Ø  
fixed installation 4x cable Ø
- **Flexible**  
Alternate bending test acc. to  
DIN VDE 0473-396 / DIN EN 50396

## Cable structure

- Bare copper-conductor, to  
DIN VDE 0295 cl.5, fine-wire,  
BS 6360 cl.5, IEC 60228 cl.5
- Core insulation of halogen-free  
special polymer
- Core identification to DIN VDE 0293  
black cores with continuous white  
numbering
- GN-YE conductor, 3 cores and above  
in the outer layer
- Cores stranded in layers with  
optimal lay-length
- Outer sheath of halogen-free  
special polymer
- Sheath colour grey (RAL 7001)
- with meter marking
- **LSOH**= Low Smoke Zero Halogen

## Note

- G = with green-yellow conductor  
x = without green-yellow conductor (OZ)
- Also available as a 0,6/1 kV cable  
MEGAFLEX® 600
- AWG sizes are approximate equivalent  
values. The actual cross-section is in mm<sup>2</sup>.
- screened analogue type:  
**MEGAFLEX® 500-C**, confer page 98

## Properties

- Highly flame-retardant
- Resistant to oils and greases
- Resistant to UV and weathering
- Hydrolysis resistant
- Flexible, abrasion- and wear-resistant
- Ozone-resistant, recyclable
- The materials used in manufacture are  
cadmium-free and contain no silicone  
and free from substances harmful to  
the wetting properties of lacquers

## Tests

- Flame test acc. to DIN VDE 0482-332-3-24,  
BS 4066 part 3, DIN EN 60332-3-24,  
IEC 60332-3-24 (previously DIN VDE 0472  
part 804 test method C)
- Self-extinguishing and flame retardant  
acc. to DIN VDE 0482-332-1-2,  
DIN EN 60332-1-2 / IEC 60332-1 (previously  
DIN VDE 0472 part 804 test method B),  
CSA FT 1
- Corrosiveness of combustion gases  
acc. to NF X 10-702
- Halogen-free acc. to DIN VDE 0482  
part 267 / DIN EN 50267-2-1 / IEC 60754-1  
(equivalent DIN VDE 0472 part 815)
- Smoke density acc. to DIN VDE 0482  
part 1034-1+2, DIN EN 61034-1+2,  
IEC 61034-1+2, BS 7622 part 1+2  
(previously DIN VDE 0472 part 816)
- Oil-resistant to DIN VDE 0473-811-404/  
DIN EN 60811-404
- Hydrolysis-resistant to DIN EN 61234-1
- Ozone-resistant to  
DIN VDE 0473-811-403/DIN EN 60811-403



Approved to UL/CSA  
see section N, page 394

## Application

For fixed installation or flexible application, with free movements without forcing which do not constantly recur and without tensile stress, for high mechanical strain. As a measuring and control cable primarily in machinery and plant construction, in air-conditioning systems, at the warehouse and conveyor systems, in ship-building and in the renewable energies such as in the construction of wind power stations.

CE= The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

Part no.	No. cores x cross-sec. mm <sup>2</sup>	AWG-No.	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km
13344	2 x 0,5	20	5,0	9,6	43,0
13345	3 G 0,5	20	5,3	14,4	50,0
13346	3 x 0,5	20	5,3	14,4	50,0
13347	4 G 0,5	20	5,7	19,0	60,0
13348	4 x 0,5	20	5,7	19,0	60,0
13349	5 G 0,5	20	6,2	24,0	71,0
13350	5 x 0,5	20	6,2	24,0	71,0
13351	7 G 0,5	20	7,4	33,6	84,0
13352	8 G 0,5	20	8,0	38,0	101,0

Part no.	No. cores x cross-sec. mm <sup>2</sup>	AWG-No.	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km
13353	10 G 0,5	20	8,8	48,0	121,0
13354	12 G 0,5	20	9,1	58,0	142,0
13355	16 G 0,5	20	10,0	76,0	183,0
13356	18 G 0,5	20	10,7	86,0	204,0
13357	20 G 0,5	20	11,2	96,0	227,0
13359	25 G 0,5	20	12,7	120,0	283,0
13360	30 G 0,5	20	13,5	144,0	324,0
13361	34 G 0,5	20	14,5	163,0	367,0
13362	37 G 0,5	20	14,5	178,0	381,0

Continuation ►

# MEGAFLEX® 500 halogen-free, flame retardant, oil-resistant, UV-resistant, flexible, meter marking



A

Part no.	No. cores x cross-sec. mm <sup>2</sup>	AWG-No.	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km
13363	41 G 0,5	20	15,8	197,0	417,0
13364	42 G 0,5	20	15,8	202,0	454,0
13365	50 G 0,5	20	17,3	240,0	519,0
13366	61 G 0,5	20	18,5	293,0	635,0
13367	65 G 0,5	20	19,4	312,0	694,0
13368	2 x 0,75	19	5,4	14,4	47,0
13369	3 G 0,75	19	5,7	21,6	56,0
13370	3 x 0,75	19	5,7	21,6	56,0
13371	4 G 0,75	19	6,2	29,0	69,0
13372	4 x 0,75	19	6,2	29,0	69,0
13373	5 G 0,75	19	6,8	36,0	83,0
13374	5 x 0,75	19	6,8	36,0	83,0
13375	7 G 0,75	19	8,1	50,0	114,0
13376	7 x 0,75	19	8,1	50,0	114,0
13377	8 G 0,75	19	8,9	58,0	136,0
13378	10 G 0,75	19	9,6	72,0	172,0
13379	12 G 0,75	19	9,9	86,0	183,0
13380	16 G 0,75	19	11,2	115,0	241,0
13381	18 G 0,75	19	11,9	130,0	266,0
13382	20 G 0,75	19	12,6	144,0	291,0
13383	25 G 0,75	19	14,1	180,0	374,0
13384	30 G 0,75	19	15,4	216,0	450,0
13385	34 G 0,75	19	16,4	245,0	517,0
13386	37 G 0,75	19	16,4	260,0	541,0
13387	41 G 0,75	19	17,6	296,0	611,0
13388	42 G 0,75	19	17,6	302,0	621,0
13389	50 G 0,75	19	19,8	360,0	742,0
13390	61 G 0,75	19	20,9	439,0	853,0
13392	65 G 0,75	19	21,8	468,0	909,0
13393	2 x 1	18	5,7	19,2	63,0
13394	3 G 1	18	6,0	29,0	74,0
13395	3 x 1	18	6,0	29,0	74,0
13396	4 G 1	18	6,6	38,4	90,0
13397	4 x 1	18	6,6	38,4	90,0
13398	5 G 1	18	7,2	48,0	109,0
13399	7 G 1	18	8,6	67,0	151,0
13400	8 G 1	18	9,4	77,0	184,0
13401	10 G 1	18	10,4	96,0	224,0
13402	12 G 1	18	10,7	115,0	243,0
13403	16 G 1	18	12,0	154,0	314,0
13404	18 G 1	18	12,7	173,0	361,0
13405	20 G 1	18	13,5	192,0	387,0
13406	25 G 1	18	15,2	240,0	496,0
13407	34 G 1	18	17,4	326,0	670,0
13408	37 G 1	18	17,4	355,0	713,0
13409	41 G 1	18	18,9	394,0	784,0
13410	42 G 1	18	18,9	403,0	824,0
13411	50 G 1	18	21,0	480,0	952,0
13412	61 G 1	18	22,2	586,0	1140,0
13413	65 G 1	18	23,2	628,0	1201,0
13414	2 x 1,5	16	6,3	29,0	70,0
13415	3 G 1,5	16	6,6	43,0	94,0
13416	3 x 1,5	16	6,6	43,0	94,0
13417	4 G 1,5	16	7,2	58,0	112,0
13418	5 G 1,5	16	7,9	72,0	141,0
13419	7 G 1,5	16	9,5	101,0	191,0
13420	8 G 1,5	16	10,4	115,0	224,0
13421	10 G 1,5	16	11,3	144,0	282,0
13422	12 G 1,5	16	11,7	173,0	311,0
13423	16 G 1,5	16	13,3	230,0	392,0

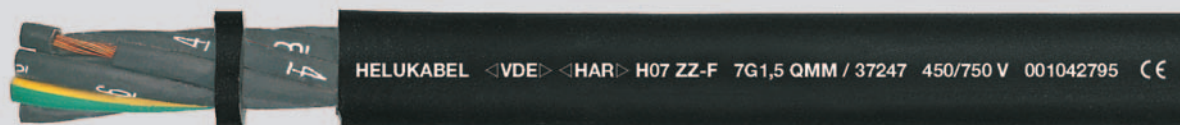
Part no.	No. cores x cross-sec. mm <sup>2</sup>	AWG-No.	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km
13425	18 G 1,5	16	14,0	259,0	450,0
13426	20 G 1,5	16	14,9	288,0	497,0
13427	25 G 1,5	16	16,8	360,0	630,0
13428	34 G 1,5	16	19,4	490,0	842,0
13429	37 G 1,5	16	19,4	533,0	897,0
13430	50 G 1,5	16	23,4	720,0	1277,0
13431	61 G 1,5	16	24,8	878,0	1460,0
13432	65 G 1,5	16	25,8	936,0	1612,0
13433	2 x 2,5	14	7,6	48,0	118,0
13434	3 G 2,5	14	8,3	72,0	151,0
13435	4 G 2,5	14	9,1	96,0	181,0
13436	5 G 2,5	14	10,2	120,0	224,0
13437	7 G 2,5	14	12,1	168,0	316,0
13438	8 G 2,5	14	13,2	192,0	370,0
13439	10 G 2,5	14	14,6	240,0	451,0
13440	12 G 2,5	14	15,2	288,0	499,0
13441	16 G 2,5	14	16,8	384,0	720,0
13442	18 G 2,5	14	18,1	432,0	769,0
13443	20 G 2,5	14	19,0	480,0	911,0
13444	25 G 2,5	14	22,2	600,0	1047,0
13445	30 G 2,5	14	22,9	720,0	1280,0
13446	2 x 4	12	9,2	77,0	199,0
13447	3 G 4	12	9,9	115,0	247,0
13448	4 G 4	12	11,0	154,0	299,0
13449	5 G 4	12	12,1	192,0	369,0
13450	7 G 4	12	13,3	269,0	463,0
13451	8 G 4	12	15,9	307,0	601,0
13452	10 G 4	12	17,3	384,0	698,0
13453	12 G 4	12	18,3	461,0	790,0
13454	16 G 4	12	20,2	614,0	1130,0
13455	18 G 4	12	21,8	691,0	1280,0
13456	2 x 6	10	10,8	115,0	266,0
13457	3 G 6	10	11,7	173,0	360,0
13458	4 G 6	10	13,0	230,0	429,0
13459	5 G 6	10	14,5	288,0	529,0
13460	7 G 6	10	16,0	403,0	631,0
13461	2 x 10	8	14,0	192,0	440,0
13462	3 G 10	8	15,0	288,0	550,0
13463	4 G 10	8	16,8	384,0	708,0
13464	5 G 10	8	18,7	480,0	862,0
13465	7 G 10	8	20,6	672,0	1124,0
13466	2 x 16	6	16,5	307,0	642,0
13467	3 G 16	6	17,6	461,0	830,0
13468	4 G 16	6	19,7	641,0	1060,0
13469	5 G 16	6	21,9	768,0	1270,0
13470	7 G 16	6	24,4	1075,0	1794,0
13471	3 G 25	4	22,5	720,0	1190,0
13472	4 G 25	4	25,2	960,0	1594,0
13473	5 G 25	4	27,9	1200,0	2014,0
13474	3 G 35	2	26,3	1008,0	1590,0
13475	4 G 35	2	28,5	1344,0	2200,0
13476	5 G 35	2	31,2	1680,0	2693,0
13477	3 G 50	1	30,2	1440,0	2571,0
13478	4 G 50	1	34,0	1920,0	3087,0
13479	5 G 50	1	37,8	2400,0	3980,0
13480	3 G 70	2/0	37,0	2016,0	3207,0
13481	4 G 70	2/0	41,5	2688,0	4077,0
13482	5 G 70	2/0	46,2	3360,0	5501,0
13483	3 G 95	3/0	41,4	2736,0	4708,0
13484	4 G 95	3/0	46,2	3648,0	5590,0
13485	5 G 95	3/0	51,5	4560,0	6972,0
13486	3 G 120	4/0	45,7	3456,0	5515,0
13487	4 G 120	4/0	51,2	4608,0	7100,0
13488	3 G 150	300 kcmil	52,8	4320,0	6279,0
13489	4 G 150	300 kcmil	58,3	5760,0	7781,0

Dimensions and specifications may be changed without prior notice. (RA03)



Suitable accessories can be found in Chapter X.

- Cable Gland - HELUTOP® HT-PA
- Cable Gland - HELUTOP® HT-MS

**H07ZZ-F** control cable, cross linked, halogen-free**Technical data**

- halogen-free cross-linked control cable to DIN VDE 0285-525-3-21 / DIN EN 50525-3-21
- **Temperature range**  
flexing -5°C to +70°C  
fixed installation -20°C to +70°C
- Permissible **operating temperature** at conductor +90°C
- **Nominal voltage**  
flexing  $U_0/U$  450/750 V  
fixed installation  $U_0/U$  0,6/1 kV
- **Test voltage**  $U_0/U$
- **Permanent tensile load**  
max. 15 N/mm<sup>2</sup>  
under consideration of total copper cross-sections
- **Minimum bending radius**  
flexing 10x cable  $\varnothing$   
for fixed installation 4x cable  $\varnothing$

**Cable structure**

- Bare copper-conductor, to DIN VDE 0295 cl.5, fine-wire, BS 6360 cl.5, IEC 60228 cl.5, HD 383
- Core insulation of halogen-free, cross-linked EI8 to DIN VDE 0207-363-5/DIN EN 50363-5
- Core identification to DIN VDE 0293-308
- Cores stranded in layers with optimal lay-length
- Outer sheath of halogen-free, cross-linked EM8 to DIN VDE 0207-363-6/DIN EN 50363-6
- Sheath colour black

**Properties****Test****Behaviour in fire**

- to DIN VDE 0482-332-1-2, DIN EN 60332-1-2, IEC 60332-1 and IEC 60332-3-24
- Corrosiveness of combustion gases acc. to EN 50267-2-2
- Smoke density to DIN VDE 0482 part 1034-1+2, DIN EN 61034-1+2, IEC 61034-1+2
- **Ozone resistant** of single core the insulation to DIN VDE 0473-811-403 / DIN EN 60811-403

**Note**

- G = with green-yellow conductor  
x = without green-yellow conductor
- AWG sizes are approximate equivalent values. The actual cross-section is in mm<sup>2</sup>.

**Application**

Single and multicore sheathed cable, with low smoke and corrosive gas production in case of fire for interior use. Not suitable for continuous outside use. In this case, cable with a special tested covering should be used. Skin contact should be avoided when the cable is used in high temperatures.

CE= The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer $\varnothing$ min. - max. approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
37176	1 x 1,5	5,7 - 7,1	14,4	58,0	16
37177	1 x 2,5	6,3 - 7,9	24,0	71,0	14
37178	1 x 4	7,2 - 9,0	38,0	100,0	12
37179	1 x 6	7,9 - 9,8	58,0	130,0	10
37180	1 x 10	9,5 - 11,9	96,0	230,0	8
37181	1 x 16	10,8 - 13,4	154,0	290,0	6
37182	1 x 25	12,7 - 15,8	240,0	420,0	4
37183	1 x 35	14,3 - 17,9	336,0	530,0	2
37184	1 x 50	16,5 - 20,6	480,0	750,0	1
37185	1 x 70	18,6 - 23,3	672,0	960,0	2/0
37186	1 x 95	20,8 - 26,0	912,0	1250,0	3/0
37187	1 x 120	22,8 - 28,6	1152,0	1560,0	4/0
37188	1 x 150	25,2 - 31,4	1440,0	1900,0	300 kcmil
37189	1 x 185	27,6 - 34,4	1776,0	2300,0	350 kcmil
37190	1 x 240	30,6 - 38,3	2304,0	2950,0	500 kcmil
37191	1 x 300	33,5 - 41,9	2880,0	3600,0	600 kcmil
37192	1 x 400	37,4 - 46,8	3840,0	4600,0	750 kcmil
37193	1 x 500	41,3 - 52,0	4800,0	6000,0	1000 kcmil
37194	2 x 1	7,7 - 10,0	19,0	95,0	18
37195	2 x 1,5	8,5 - 11,0	29,0	119,0	16
37196	2 x 2,5	10,2 - 13,1	48,0	172,0	14
37197	2 x 4	11,8 - 15,1	77,0	239,0	12
37198	2 x 6	13,1 - 16,8	115,0	319,0	10
37199	2 x 10	17,7 - 22,6	192,0	572,0	8
37200	2 x 16	20,2 - 25,7	307,0	767,0	6
37201	2 x 25	24,3 - 30,7	480,0	1154,0	4
37202	3 G 1	8,3 - 10,7	29,0	115,0	18
37203	3 G 1,5	9,2 - 11,9	43,0	144,0	16
37204	3 G 2,5	10,9 - 14,0	72,0	211,0	14
37205	3 G 4	12,7 - 16,2	115,0	290,0	12
37206	3 G 6	14,1 - 18,0	173,0	391,0	10
37207	3 G 10	19,1 - 24,2	288,0	706,0	8
37208	3 G 16	21,8 - 27,6	461,0	961,0	6
37209	3 G 25	26,1 - 33,0	720,0	1438,0	4
37210	3 G 35	29,3 - 37,1	1008,0	1814,0	2
37211	3 G 50	34,1 - 42,9	1440,0	2550,0	1
37212	3 G 70	38,4 - 48,3	2016,0	3210,0	2/0
37213	3 G 95	43,3 - 54,0	2736,0	4423,0	3/0
37214	3 G 120	47,4 - 60,0	3456,0	5405,0	4/0
37215	3 G 150	52,0 - 66,0	4320,0	6725,0	300 kcmil
37216	3 G 185	57,0 - 72,0	5328,0	8222,0	350 kcmil
37217	3 G 240	65,0 - 82,0	6192,0	10224,0	500 kcmil

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer $\varnothing$ min. - max. approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
37218	3 G 300	72,0 - 90,0	8640,0	12620,0	600 kcmil
37219	4 G 1	9,2 - 11,9	38,0	141,0	18
37220	4 G 1,5	10,2 - 13,1	58,0	176,0	16
37221	4 G 2,5	12,1 - 15,5	96,0	235,0	14
37222	4 G 4	14,0 - 17,9	154,0	365,0	12
37223	4 G 6	15,7 - 20,0	230,0	501,0	10
37224	4 G 10	20,9 - 26,5	384,0	872,0	8
37225	4 G 16	23,8 - 30,1	614,0	1194,0	6
37226	4 G 25	28,9 - 36,6	960,0	1822,0	4
37227	4 G 35	32,5 - 41,1	1344,0	2307,0	2
37228	4 G 50	37,7 - 47,5	1920,0	3253,0	1
37229	4 G 70	42,7 - 54,0	2688,0	4130,0	2/0
37230	4 G 95	48,4 - 61,0	3648,0	5720,0	3/0
37231	4 G 120	53,0 - 66,0	4608,0	6965,0	4/0
37232	4 G 150	58,0 - 73,0	5760,0	8644,0	300 kcmil
37233	4 G 185	64,0 - 80,0	7104,0	10598,0	350 kcmil
37234	4 G 240	72,0 - 91,0	9216,0	12100,0	500 kcmil
37235	4 G 300	80,0 - 101,0	11520,0	15200,0	600 kcmil
37236	5 G 1	10,2 - 13,1	48,0	170,0	18
37237	5 G 1,5	11,2 - 14,4	72,0	214,0	16
37238	5 G 2,5	13,3 - 17,0	120,0	316,0	14
37239	5 G 4	15,6 - 19,9	192,0	448,0	12
37240	5 G 6	17,5 - 22,2	288,0	607,0	10
37241	5 G 10	22,9 - 29,1	480,0	1075,0	8
37242	5 G 16	26,4 - 33,3	768,0	1480,0	6
37243	5 G 25	32,0 - 40,4	1200,0	2255,0	4
37244	6 G 1,5	13,4 - 17,2	84,0	287,0	16
37245	6 G 2,5	15,7 - 20,0	144,0	420,0	14
37246	6 G 4	18,2 - 23,2	230,0	583,0	12
37247	7 G 1,5	11,4 - 14,4	101,0	303,0	16
37248	7 G 2,5	13,4 - 17,0	168,0	448,0	14
37249	12 G 1,5	17,6 - 22,4	173,0	496,0	16
37250	12 G 2,5	20,6 - 26,2	288,0	724,0	14
37251	12 G 4	24,4 - 30,9	461,0	1042,0	12
37252	18 G 1,5	20,7 - 26,3	259,0	702,0	16
37253	18 G 2,5	24,4 - 30,9	432,0	1045,0	14
37254	18 G 4	28,8 - 36,4	691,0	1430,0	12
37255	24 G 1,5	24,3 - 30,7	346,0	935,0	16
37256	24 G 2,5	28,8 - 36,4	576,0	1325,0	14
37257	36 G 1,5	27,8 - 35,2	518,0	1297,0	16
37258	36 G 2,5	33,2 - 41,8	864,0	1949,0	14

Dimensions and specifications may be changed without prior notice. (RF01)



# JZ-600 HMH flexible control cable, halogen-free, extremely fire resistant, oil resistant<sup>1)</sup>, 0,6/1kV, meter marking

EAC

A



## Technical data

- Halogen-free, flexible control cable, adapted to DIN VDE 0285-525-2-51/ DIN EN 50525-2-51 and DIN VDE 0285-525-3-11/ DIN EN 50525-3-11
- **Temperature range**  
flexing -15°C to +70°C  
fixed -40°C to +70°C
- **Nominal voltage** U<sub>0</sub>/U 0,6/1 kV
- **Test voltage** 4000 V
- **Minimum bending radius**  
flexing 15x cable Ø  
fixed installation 7,5x cable Ø
- **Radiation resistance**  
up to 100x10<sup>6</sup> cJ/kg (up to 100 Mrad)

## Cable structure

- Bare copper-conductor, to DIN VDE 0295 cl.5, fine-wire, BS 6360 cl.5, IEC 60228 cl.5
- Core insulation of halogen-free polymer compound type TI6 to DIN VDE 0207-363-7 / DIN EN 50363-7
- Core identification to DIN VDE 0293 black cores with continuous white numbering
- GN-YE conductor, 3 cores and above in the outer layer
- Cores stranded in layers with optimal lay-length
- Outer sheath of halogen-free polymer compound type TM7 to DIN VDE 0207-363-8 / DIN EN 50363-8
- Sheath colour black (RAL 9005)
- with meter marking
- **LSOH**= Low Smoke Zero Halogen

## Properties

- <sup>1)</sup> For critical applications, we recommend that you consult
  - The materials used in manufacture are cadmium-free and contain no silicone and free from substances harmful to the wetting properties of lacquers
- ### Tests
- Flame test acc. to DIN VDE 0482-332-3, BS 4066 part 3, DIN EN 60332-3, IEC 60332-3 (previously DIN VDE 0472 part 804 test method C)
  - self-extinguishing and flame retardant acc. to DIN VDE 0482-332-1-2, DIN EN 60332-1-2/IEC 60332-1 (equivalent DIN VDE 0472 part 804 test method B)
  - Corrosiveness of combustion gases acc. to DIN VDE 0482 part 267, DIN EN 50267-2-2, IEC 60754-2 (equivalent DIN VDE 0472 part 813)
  - Halogen-free acc. to DIN VDE 0482 Part 267/ DIN EN 50267-2-1 / IEC 60754-1 (as per DIN VDE 0472, Part 815)
  - Smoke density acc. to DIN VDE 0482 part 1034-1+2, DIN EN 61034-1+2, IEC 61034-1+2, BS 7622 part 1+2 (previously DIN VDE 0472 part 816)

## Note

- G = with green-yellow conductor  
x = without green-yellow conductor (OZ)
- AWG sizes are approximate equivalent values. The actual cross-section is in mm<sup>2</sup>.
- screened analogue type:  
**JZ-600 HMH-C**, confer page 100

## Application

Halogen-free, flame retardant cables are used as measuring and control cable in machine tools, conveyor belts, production lines as well as in plant installations, in heating and air-conditioning systems and steel production works. For fixed installation or flexible application, directed without forcing by casual, constantly recurring free movements and without tensile stress, for medium mechanical strain. This cable is suitable for the application in dry, damp and wet environments, outdoors (fixed installation) and for laying on plaster.

**EMC** = Electromagnetic compatibility

To optimize the EMC features we recommend a large round contact of the copper braiding on both ends.

CE = The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
12723	2 x 0,5	6,3	9,6	57,0	20
12724	3 G 0,5	6,6	14,4	69,0	20
12725	3 x 0,5	6,6	14,4	69,0	20
12726	4 G 0,5	7,2	19,0	104,0	20
12727	4 x 0,5	7,2	19,0	104,0	20
12728	5 G 0,5	8,0	24,0	121,0	20
12729	5 x 0,5	8,0	24,0	121,0	20
12730	7 G 0,5	8,7	33,6	145,0	20
12731	10 G 0,5	10,3	48,0	186,0	20
12732	12 G 0,5	11,2	58,0	224,0	20
12733	18 G 0,5	13,8	86,0	292,0	20
12734	25 G 0,5	16,1	120,0	357,0	20

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
12735	2 x 0,75	6,6	14,4	68,0	19
12736	3 G 0,75	6,9	21,6	77,0	19
12737	3 x 0,75	6,9	21,6	77,0	19
12738	4 G 0,75	7,5	29,0	136,0	19
12739	4 x 0,75	7,5	29,0	136,0	19
12740	5 G 0,75	8,4	36,0	152,0	19
12741	5 x 0,75	8,4	36,0	152,0	19
12742	7 G 0,75	9,3	50,0	208,0	19
12743	10 G 0,75	11,4	72,0	250,0	19
12744	12 G 0,75	12,2	86,0	271,0	19
12745	18 G 0,75	14,5	130,0	387,0	19
12746	25 G 0,75	17,2	180,0	498,0	19

Continuation ▶

# JZ-600 HMH flexible control cable, halogen-free, extremely fire resistant, oil resistant<sup>1)</sup>, 0,6/1kV, meter marking



Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
12747	2 x 1	7,0	19,2	82,0	18
12748	3 G 1	7,4	29,0	99,0	18
12749	3 x 1	7,4	29,0	99,0	18
12750	4 G 1	8,2	38,4	140,0	18
12751	4 x 1	8,2	38,4	140,0	18
12752	5 G 1	9,2	48,0	160,0	18
12753	5 x 1	9,2	48,0	160,0	18
12754	7 G 1	9,9	67,0	217,0	18
12755	10 G 1	11,9	96,0	271,0	18
12756	12 G 1	12,8	115,0	301,0	18
12757	18 G 1	15,7	173,0	417,0	18
12758	25 G 1	18,6	240,0	576,0	18
12759	2 x 1,5	8,2	29,0	97,0	16
12760	3 G 1,5	8,6	43,0	119,0	16
12761	3 x 1,5	8,6	43,0	119,0	16
12762	4 G 1,5	9,6	58,0	148,0	16
12763	4 x 1,5	9,6	58,0	148,0	16
12764	5 G 1,5	10,7	72,0	172,0	16
12765	5 x 1,5	10,7	72,0	172,0	16
12766	7 G 1,5	11,6	101,0	243,0	16
12767	10 G 1,5	15,2	144,0	311,0	16
12768	12 G 1,5	15,5	173,0	392,0	16
12769	18 G 1,5	18,6	259,0	529,0	16
12770	25 G 1,5	22,5	360,0	741,0	16
12771	2 x 2,5	9,6	48,0	160,0	14
12772	3 G 2,5	10,1	72,0	177,0	14
12773	3 x 2,5	10,1	72,0	177,0	14
12774	4 G 2,5	11,2	96,0	209,0	14
12775	4 x 2,5	11,2	96,0	209,0	14
12776	5 G 2,5	12,5	120,0	272,0	14
12777	5 x 2,5	12,5	120,0	272,0	14
12778	7 G 2,5	13,8	168,0	340,0	14
12779	10 G 2,5	16,6	288,0	561,0	14
12780	12 G 2,5	18,3	432,0	799,0	14
12781	18 G 2,5	22,0	480,0	940,0	14
12782	25 G 2,5	26,2	600,0	1121,0	14

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
12783	3 G 4	11,7	115,0	255,0	12
12784	4 G 4	12,9	154,0	319,0	12
12785	5 G 4	14,4	192,0	423,0	12
12786	3 G 6	13,1	173,0	380,0	10
12787	4 G 6	14,5	230,0	441,0	10
12788	5 G 6	16,2	288,0	657,0	10
12789	3 G 10	16,8	288,0	668,0	8
12790	4 G 10	18,5	384,0	796,0	8
12791	5 G 10	20,5	480,0	972,0	8
12792	3 G 16	20,2	461,0	832,0	6
12793	4 G 16	22,4	614,0	1122,0	6
12794	5 G 16	25,0	768,0	1604,0	6
12795	3 G 25	24,8	720,0	1457,0	4
12796	4 G 25	27,4	960,0	1611,0	4
12797	5 G 25	30,5	1200,0	2070,0	4
12798	3 G 35	27,4	1008,0	1914,0	2
12799	4 G 35	30,3	1344,0	2424,0	2
12800	5 G 35	33,6	1680,0	2970,0	2
12801	4 G 50	35,8	1920,0	3467,0	1
12802	4 G 70	40,8	2688,0	4491,0	2/0
12803	4 G 95	46,2	3648,0	6170,0	3/0
12804	4 G 120	51,6	4608,0	7618,0	4/0

Dimensions and specifications may be changed without prior notice. (RA03)



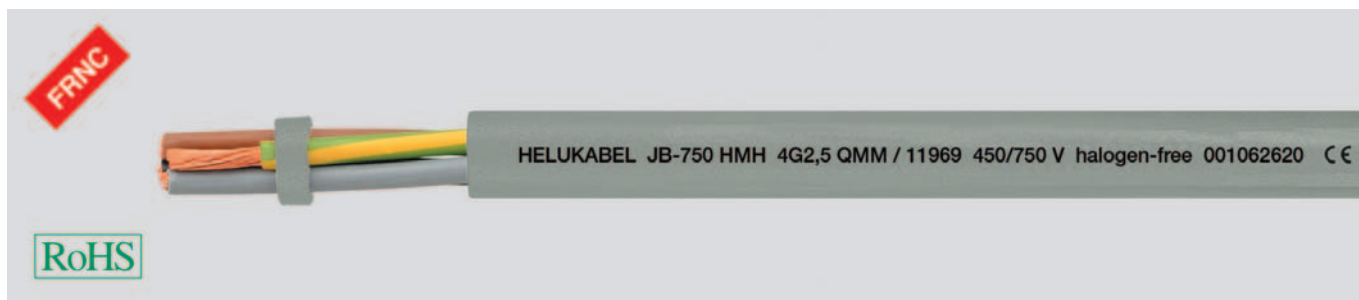
Suitable accessories can be found in Chapter X.

- Cable Gland - HELUTOP® HT-PA
- Cable Gland - HELUTOP® HT-MS

# JB-750 HMH flexible control cable, coloured core, halogen-free, extremely fire resistant, oil resistant<sup>1)</sup>, meter marking



A



## Technical data

- Halogen-free flexible control cable, adapted to  
DIN VDE 0285-525-2-51 /  
DIN EN 50525-2-51 and  
DIN VDE 0285-525-3-11 /  
DIN EN 50525-3-11
- **Temperature range**  
flexing -15°C to +70°C  
fixed installation -40°C to +70°C
- **Nominal voltage**  $U_0/U$  450/750 V
- **Test voltage** 3000 V
- **Minimum bending radius**  
flexing 12,5x cable Ø  
fixed installation 4x cable Ø
- **Radiation resistance**  
up to  $100 \times 10^6$  cJ/kg (up to 100 Mrad)

## Cable structure

- Bare copper-conductor, to  
DIN VDE 0295 cl.5, fine-wire,  
BS 6360 cl.5, IEC 60228 cl.5
- Core insulation of halogen-free polymer compound type TI6 to  
DIN VDE 0207-363-7 / DIN EN 50363-7
- Core identification to DIN VDE 0293-308
- GN-YE conductor
- Cores stranded in layers with optimal lay-length
- Outer sheath of halogen-free polymer compound type TM7 to  
DIN VDE 0207-363-8 / DIN EN 50363-8
- Sheath colour grey (RAL 7001)
- with meter marking
- **LSOH**= Low Smoke Zero Halogen

## Properties

- <sup>1)</sup> We recommend you for critical applications a consultation
  - The materials used in manufacture are cadmium-free and contain no silicone and free from substances harmful to the wetting properties of lacquers
- ### Tests
- Flame test acc. to  
DIN VDE 0482-332-3, BS 4066 part 3,  
DIN EN 60332-3, IEC 60332-3 (previously  
DIN VDE 0472 part 804 test method C)
  - self-extinguishing and flame retardant  
acc. to DIN VDE 0482-332-1-2,  
DIN EN 60332-1-2, IEC 60332-1 (equivalent  
DIN VDE 0472 part 804 test method B)
  - Corrosiveness of combustion gases  
acc. to DIN VDE 0482 part 267,  
DIN EN 50267-2-2, IEC 60754-2  
(equivalent DIN VDE 0472 part 813)
  - Halogen-free acc. to DIN VDE 0482  
part 267 / DIN EN 50267-2-1 / IEC 60754-1  
(equivalent DIN VDE 0472 part 815)
  - Smoke density acc. to DIN VDE 0482  
part 1034-1+2, DIN EN 61034-1+2,  
IEC 61034-1+2, BS 7622 part 1+2  
(previously DIN VDE 0472 part 816)

## Note

- G = with green-yellow conductor  
x = without green-yellow conductor (OZ)
- Please note the cleanroom qualification when ordering.
- AWG sizes are approximate equivalent values.  
The actual cross-section is in mm<sup>2</sup>.
- screened analogue type:  
**JB-750 HMH-C**, confer page 102

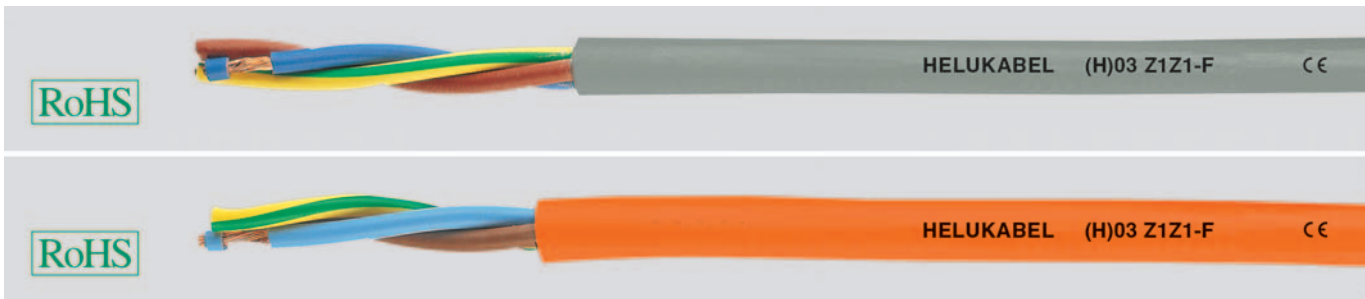
## Application

Halogen-free, flame retardant cables are used as measuring and control cable in machine tools, conveyor belts, production lines as well as in plant installations, in air-conditioning and steel production works. For fixed installation or flexible application, directed without forcing by casual, not constantly recurring free movements and without tensile stress, for medium mechanical strain. This cable is suitable for the application in dry, damp and wet environments and also for laying on plaster.

CE= The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.	Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
11965	3 G 1,5	7,8	43,0	110,0	16	11976	4 G 10	18,1	384,0	750,0	8
11966	4 G 1,5	8,5	58,0	140,0	16	11977	5 G 10	20,1	480,0	916,0	8
11967	5 G 1,5	9,6	72,0	181,0	16	11978	4 G 16	22,0	614,0	1037,0	6
11968	3 G 2,5	9,3	72,0	181,0	14	11979	5 G 16	24,4	768,0	1280,0	6
11969	4 G 2,5	10,2	96,0	223,0	14	11980	4 G 25	27,1	960,0	1504,0	4
11970	5 G 2,5	11,4	120,0	269,0	14	11981	5 G 25	30,1	1200,0	1883,0	4
11971	3 G 4	11,3	115,0	238,0	12	11982	4 G 35	29,9	1344,0	2057,0	2
11972	4 G 4	12,5	154,0	292,0	12	11983	5 G 35	33,4	1680,0	2575,0	2
11973	5 G 4	13,9	192,0	357,0	12	11984	4 G 50	35,5	1920,0	2808,0	1
11974	4 G 6	14,2	230,0	392,0	10	11985	4 G 70	40,2	2688,0	3964,0	2/0
11975	5 G 6	15,8	288,0	501,0	10	11986	4 G 95	46,0	3648,0	4951,0	3/0
						11987	4 G 120	51,3	4608,0	6387,0	4/0

Dimensions and specifications may be changed without prior notice. (RA03)

**(H)03Z1Z1-F** halogen-free, meter marking**Technical data**

- flexible halogen-free control cable adapted to DIN VDE 0285-525-3-11 / DIN EN 50525-3-11
- Temperature range**  
flexing -5°C to +70°C  
fixed installation -40°C to +70°C
- Nominal voltage**  $U_0/U$  300/300 V
- Test voltage** 2000 V
- Breakdown voltage** min. 4000 V
- Minimum bending radius**  
7,5x cable  $\varnothing$
- Radiation resistance**  
up to  $20 \times 10^6$  cJ/kg (up to 20 Mrad)

**Cable structure**

- Bare copper-conductor, to DIN VDE 0295 cl.5, fine-wire, BS 6360 cl.5, IEC 60228 cl.5
- Core insulation of thermoplastic compound
- Core identification to DIN VDE 0293-308
- GN-YE conductor, 3 cores and above
- Outer sheath of thermoplastic compound
- Sheath colour by request
- with meter marking

**Properties**

- The materials used in manufacture are cadmium-free and contain no silicone and free from substances harmful to the wetting properties of lacquers

**Tests**

- Tested for flame retardation acc. to DIN VDE 0482-332-1-2, DIN EN 60332-1-2, IEC 60332-1 (equivalent DIN VDE 0472 part 804 test method B)
- Smoke density acc. to DIN VDE 0482-1034-1+2, DIN EN 61034-1+2, IEC 61034-1+2
- Halogen-free acc. to DIN VDE 0285-525-1, DIN EN 50525-1

**Note**

- G = with green-yellow conductor  
x = without green-yellow conductor
- Please complete the part number for these cables by adding the suffix for the colour required as per the list:  
0 = ca.RAL 9005 black  
1 = ca.RAL 9003 white  
2 = ca.RAL 5015 blue  
3 = ca.RAL 6018 green  
4 = ca.RAL 8003 brown  
5 = ca.RAL 1021 yellow  
6 = ca.RAL 3000 red  
7 = ca.RAL 2003 orange  
8 = ca.RAL 4005 violet  
9 = ca.RAL 7001/7032 grey  
Further colours on request.
- AWG sizes are approximate equivalent values. The actual cross-section is in  $\text{mm}^2$ .

**Application**

These cables may be used when halogen-free, low smoke and corrosive gas properties are required in case of fire. For low mechanical demands in the house, kitchen and office, for small equipment such as, for example, office machines, radios, table and stranded lamps.

Not suitable for:

Cooking and heating equipment, use in high temperature areas (for example, in lighting equipment), outside use, industrial use or industrial electrical tools, cables with a nominal cross-section of  $0,75 \text{ mm}^2$  comply with the same recommendations as for cable (H)05Z1Z1-F.

CE = The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

Part no.	No. cores x cross-sec. $\text{mm}^2$	Outer $\varnothing$ approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
3233x	2 x 0,5	5,1	9,6	39,0	20
3234x	3 G 0,5	5,4	14,4	46,0	20
3235x	4 G 0,5	5,9	19,2	56,0	20

Part no.	No. cores x cross-sec. $\text{mm}^2$	Outer $\varnothing$ approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
3236x	2 x 0,75	5,4	14,4	47,0	19
3237x	3 G 0,75	5,7	21,6	55,0	19
3238x	4 G 0,75	6,3	29,0	69,0	19

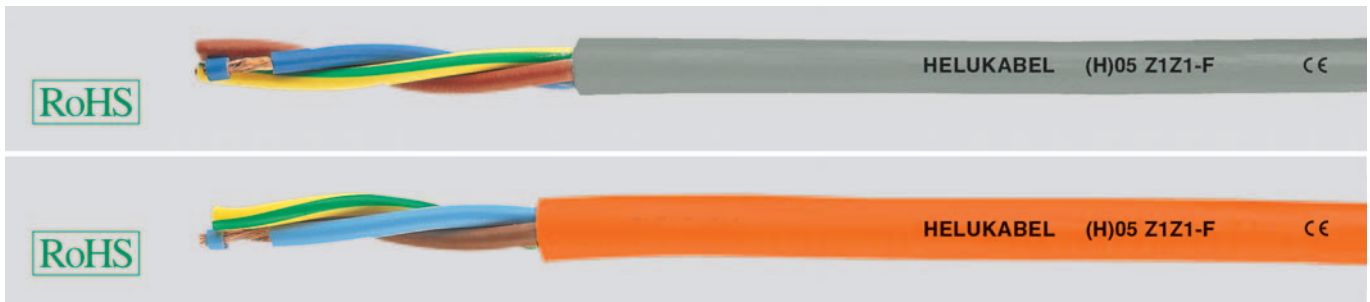
Dimensions and specifications may be changed without prior notice. (RA03)



Suitable accessories can be found in Chapter X.

- Cable Gland - HELUTOP® HT-PA
- Cable Gland - HELUTOP® HT-MS



**(H)05Z1Z1-F** halogen-free, meter marking**Technical data**

- flexible halogen-free control cable adapted to DIN VDE 0285-525-3-11/ DIN EN 50525-3-11
- Temperature range**  
flexing -5°C to +70°C  
fixed installation -40°C to +70°C
- Nominal voltage** U<sub>0</sub>/U 300/500 V
- Test voltage** 2000 V
- Breakdown voltage** min. 4000 V
- Minimum bending radius**  
7,5x cable Ø
- Radiation resistance**  
up to 20x10<sup>6</sup> Cj/kg (up to 20 Mrad)

**Cable structure**

- Bare copper-conductor, to DIN VDE 0295 cl.5, fine-wire, BS 6360 cl.5, IEC 60228 cl.5
- Core insulation thermoplastic compound
- Core identification to DIN VDE 0293-308
- GN-YE conductor, 3 cores and above
- Cores stranded with optimal lay-length
- Outer sheath of thermoplastic compound
- Sheath colour by request
- with meter marking

**Properties**

- The materials used in manufacture are cadmium-free and contain no silicone and free from substances harmful to the wetting properties of lacquers

**Tests**

- Tested for flame retardation acc. to DIN VDE 0482-332-1-2, DIN EN 60332-1-2, IEC 60332-1 (equivalent DIN VDE 0472 part 804 test method B)
- Smoke density acc. to DIN VDE 0482-1034-1+2, DIN EN 61034-1+2, IEC 61034-1+2
- Halogen-free acc. to DIN VDE 0285-525-1, DIN EN 50525-1

**Note**

- G = with green-yellow conductor  
x = without green-yellow conductor
- Please complete the part number for these cables by adding the suffix for the colour required as per the list:  
0 = ca. RAL 9005 black  
1 = ca. RAL 9003 white  
2 = ca. RAL 5015 blue  
3 = ca. RAL 6018 green  
4 = ca. RAL 8003 brown  
5 = ca. RAL 1021 yellow  
6 = ca. RAL 3000 red  
7 = ca. RAL 2003 orange  
8 = ca. RAL 4005 violet  
9 = ca. RAL 7001/7032 grey  
Further colours on request.
- AWG sizes are approximate equivalent values. The actual cross-section is in mm<sup>2</sup>.

**Application**

These cables may be used when halogen-free, low smoke and corrosive gas properties are required in case of fire. For moderate mechanical demands in the house, kitchen and office, for house equipment in damp rooms (for example: washing machines, spin-dryers and refrigerators). Suitable for cooking and heating equipment, providing the cable is not in contact with hot components or heat radiation.

**Not suitable for:**

in high temperature areas (for example, in lighting equipment), outside buildings, in industrial or agricultural buildings, connection of electrical power tools.

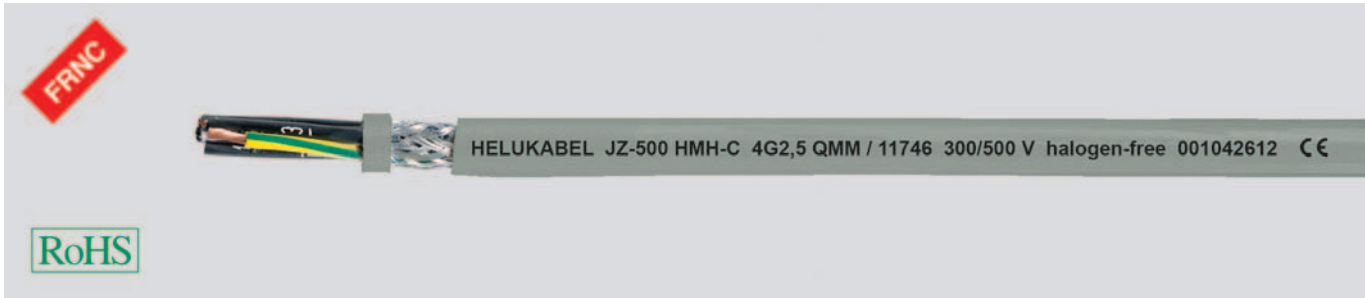
CE= The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
3027x	2 x 0,75	6,3	14,4	58,0	19
3028x	3 G 0,75	6,6	21,6	68,0	19
3029x	4 G 0,75	7,2	29,0	81,0	19
3030x	5 G 0,75	8,0	36,0	102,0	19
3031x	2 x 1	6,5	19,0	67,0	18
3032x	3 G 1	6,9	29,0	81,0	18
3034x	4 G 1	7,7	38,0	101,0	18
3035x	5 G 1	8,4	48,0	107,0	18
3036x	2 x 1,5	7,4	29,0	87,0	16
3037x	3 G 1,5	8,0	43,0	109,0	16
3038x	4 G 1,5	9,1	58,0	117,0	16
3039x	5 G 1,5	10,0	72,0	169,0	16
3040x	2 x 2,5	9,1	48,0	138,0	14
3041x	3 G 2,5	9,9	72,0	172,0	14
3042x	4 G 2,5	10,8	96,0	210,0	14

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
3043x	5 G 2,5	12,0	120,0	260,0	14
3044x	2 x 4	10,4	76,8	190,0	12
3045x	3 G 4	11,3	115,2	242,0	12
3046x	4 G 4	12,3	153,6	298,0	12
3047x	5 G 4	13,9	192,0	371,0	12

Dimensions and specifications may be changed without prior notice. (RA03)

# JZ-500 HMH-C flexible control cable, halogen-free, extremely fire resistant, oil resistant<sup>1)</sup>, Cu-screened, EMC-preferred type, meter marking



## Technical data

- Halogen-free core flexible control cable adapted to DIN VDE 0285-525-2-51 / DIN EN 50525-2-51 and DIN VDE 0285-525-3-11 / DIN EN 50525-3-11
- **Temperature range**  
flexing -15°C to +70°C  
fixed installation -40°C to +70°C
- **Nominal voltage**  $U_0/U$  300/500 V
- **Test voltage** 2000 V
- **Coupling resistance**  
max. 250 Ohm/km
- **Minimum bending radius**  
flexing 12,5x cable Ø  
fixed installation 4x cable Ø
- **Radiation resistance**  
up to  $100 \times 10^6$  cJ/kg (up to 100 Mrad)

## Cable structure

- Bare copper-conductor, to DIN VDE 0295 cl.5, fine-wire, BS 6360 cl.5, IEC 60228 cl.5
- Core insulation of halogen-free polymer compound type T16 to DIN VDE 0207-363-7 / DIN EN 50363-7
- Core identification to DIN VDE 0293 black cores with continuous white numbering
- GN-YE conductor, 3 cores and above in the outer layer
- Cores stranded in layers with optimal lay-length
- Separating foil
- Tinned copper braided screen, approx. 85% coverage
- Outer sheath of halogen-free spolymer compound type TM7 to DIN VDE 0207-363-8 / DIN EN 50363-8
- Sheath colour grey (RAL 7001)
- with meter marking
- **LSOH**= Low Smoke Zero Halogen

## Properties

- <sup>1)</sup> We recommend you for critical applications a consultation
  - The materials used in manufacture are cadmium-free and contain no silicone and free from substances harmful to the wetting properties of lacquers
- ### Tests
- Flame test acc. to DIN VDE 0482-332-3, BS 4066 part 3, DIN EN 60332-3, IEC 60332-3 (previously DIN VDE 0472 part 804 test method C)
  - self-extinguishing and flame retardant acc. to DIN VDE 0482-332-1-2, DIN EN 60332-1-2/IEC 60332-1 (equivalent DIN VDE 0472 part 804 test method B)
  - Corrosiveness of combustion gases acc. to DIN VDE 0482 part 267, DIN EN 50267-2-2, IEC 60754-2 (equivalent DIN VDE 0472 part 813)
  - Halogen-free acc. to DIN VDE 0482 part 267, DIN EN 50267-2-1, IEC 60754-1 (equivalent DIN VDE 0472 part 815)
  - Smoke density acc. to DIN VDE 0482 part 1034-1+2, DIN EN 61034-1+2, IEC 61034-1+2, BS 7622 part 1+2 (previously DIN VDE 0472 part 816)

## Note

- G = with green-yellow conductor  
x = without green-yellow conductor (OZ)
- Cleanroom qualification tested with analog type. Please note "cleanroom qualified" when ordering.
- AWG sizes are approximate equivalent values. The actual cross-section is in mm<sup>2</sup>.
- unscreened analogue type:  
**JZ-500 HMH**, confer page 86

## Application

Halogen-free, flame retardant control cables are used for instrumentation and control cables in tooling machinery, conveyor and transportation belts, production lines, in plant construction, air-conditioning systems as well as in iron and steel works. For fixed installation or for flexing applications, for casual, not constantly recurring free movement without forced motion and without tensile stress for medium mechanical loads. The cable is suitable for use in dry, damp and wet environments and on plaster. An interference-free transmission of signals and pulse is assured by the high degree of screening.

**EMC** = Electromagnetic compatibility

To optimize the EMC features we recommend a large round contact of the copper braiding on both ends.

= The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
11656	2 x 0,5	5,7	35,0	46,0	20
11657	3 G 0,5	5,9	42,0	56,0	20
11342	3 x 0,5	5,9	42,0	56,0	20
11658	4 G 0,5	6,4	47,0	62,0	20
11343	4 x 0,5	6,4	47,0	62,0	20
11659	5 G 0,5	6,9	56,0	75,0	20
11660	7 G 0,5	7,6	69,0	98,0	20
11663	12 G 0,5	9,7	108,0	158,0	20
11665	18 G 0,5	11,5	145,0	216,0	20
11667	25 G 0,5	13,7	240,0	315,0	20

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
11678	2 x 0,75	6,1	40,0	60,0	19
11679	3 G 0,75	6,3	52,0	68,0	19
11344	3 x 0,75	6,3	52,0	68,0	19
11680	4 G 0,75	6,8	60,0	78,0	19
11345	4 x 0,75	6,8	60,0	78,0	19
11681	5 G 0,75	7,4	71,0	95,0	19
11346	5 x 0,75	7,4	71,0	95,0	19
11682	7 G 0,75	8,2	91,0	130,0	19
11347	7 x 0,75	8,2	91,0	130,0	19
11685	12 G 0,75	10,5	142,0	203,0	19

Continuation ►

# JZ-500 HMH-C flexible control cable, halogen-free, extremely fire resistant, oil resistant<sup>1)</sup>, Cu-screened, EMC-preferred type, meter marking



A

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
11687	18 G 0,75	12,7	212,0	290,0	19
11689	25 G 0,75	15,0	281,0	413,0	19
11700	2 x 1	6,4	50,0	66,0	18
11701	3 G 1	6,7	60,0	80,0	18
11348	3 x 1	6,7	60,0	80,0	18
11702	4 G 1	7,2	71,0	100,0	18
11349	4 x 1	7,2	71,0	100,0	18
11703	5 G 1	8,0	88,0	130,0	18
11704	7 G 1	8,7	111,0	160,0	18
11707	12 G 1	11,4	184,0	260,0	18
11709	18 G 1	13,6	260,0	382,0	18
11711	25 G 1	16,2	349,0	540,0	18
11722	2 x 1,5	7,0	63,0	88,0	16
11723	3 G 1,5	7,4	80,0	100,0	16
11350	3 x 1,5	7,4	80,0	100,0	16
11724	4 G 1,5	8,1	97,0	125,0	16
11725	5 G 1,5	9,0	119,0	158,0	16
11726	7 G 1,5	9,8	147,0	210,0	16
11729	12 G 1,5	12,8	267,0	340,0	16
11731	18 G 1,5	15,6	374,0	480,0	16
11733	25 G 1,5	18,4	526,0	702,0	16
11744	2 x 2,5	8,4	96,0	132,0	14
11745	3 G 2,5	8,8	144,0	168,0	14
11746	4 G 2,5	9,8	148,0	195,0	14
11747	5 G 2,5	10,8	181,0	222,0	14
11748	7 G 2,5	11,9	255,0	345,0	14
11751	12 G 2,5	15,8	441,0	572,0	14
11766	2 x 4	10,0	120,0	184,0	12
11768	3 G 4	10,6	174,0	238,0	12
11769	4 G 4	11,6	230,0	305,0	12
11770	5 G 4	12,8	273,0	388,0	12
11771	7 G 4	14,2	316,0	504,0	12

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
11781	2 G 6	11,7	173,0	270,0	10
11782	3 G 6	12,5	240,0	328,0	10
11783	4 G 6	13,8	305,0	416,0	10
11784	5 G 6	15,4	439,0	510,0	10
11785	7 G 6	17,0	505,0	670,0	10
11786	2 x 10	14,5	255,0	420,0	8
11787	3 G 10	15,6	350,0	495,0	8
11788	4 G 10	17,2	535,0	785,0	8
11789	5 G 10	19,1	592,0	855,0	8
11790	7 G 10	21,2	810,0	1308,0	8
11793	4 G 16	20,3	740,0	882,0	6
11794	5 G 16	22,2	895,0	1293,0	6
11812	7 G 16	24,8	1282,0	2149,0	6
11795	3 G 25	22,5	1070,0	1432,0	4
11796	4 G 25	25,0	1140,0	1911,0	4
11797	5 G 25	27,5	1380,0	2414,0	4
11798	3 G 35	25,7	1240,0	1914,0	2
11799	4 G 35	28,5	1576,0	2542,0	2
11800	5 G 35	31,7	1930,0	3180,0	2
11801	3 G 50	30,8	1675,0	3080,0	1
11802	4 G 50	34,1	2155,0	3550,0	1
11803	5 G 50	38,1	2794,0	4753,0	1
11804	3 G 70	36,0	2288,0	3840,0	2/0
11805	4 G 70	40,0	3120,0	4939,0	2/0
11806	5 G 70	44,5	3705,0	6572,0	2/0
11807	3 G 95	41,1	3010,0	5651,0	3/0
11808	4 G 95	45,6	4043,0	6690,0	3/0
11809	5 G 95	50,7	5026,0	8370,0	3/0
11810	3 G 120	45,2	3812,0	6342,0	4/0
11811	4 G 120	50,1	5069,0	8453,0	4/0
11813	4 G 185	63,0	8040,0	10800,0	350 kcmil

Dimensions and specifications may be changed without prior notice. (RA03)



Suitable accessories can be found in Chapter X.

- Cable Gland - HELUTOP® HT-MS-EP4

# MEGAFLEX® 500-C halogen-free, flame retardant, oil-resistant, UV-resistant, flexible, screened, EMC-preferred types, meter marking



## Technical data

- Halogen-free flexible control cable adapted to DIN VDE 0285-525-3-11 / DIN EN 50525-3-11, to UL-Style 20939, UL-Std.758
- **Temperature range**  
flexing -30°C to +80°C  
fixed installation -40°C to +80°C
- **Nominal voltage**  
U<sub>0</sub>/U 300/500 V  
UL/CSA 600 V
- **Test voltage** 3000 V
- **Coupling resistance**  
max. 250 Ohm/km
- **Minimum bending radius**  
flexing 10x cable Ø  
fixed installation 4x cable Ø
- **Flexible**  
Alternate bending test acc. to DIN VDE 0473-396 / DIN EN 50396

## Cable structure

- Bare copper, fine wire conductors, to DIN VDE 0295 cl.5, BS 6360 cl.5 and IEC 60228 cl.5
- Core insulation of halogen-free special polymer
- Core identification to DIN VDE 0293 black cores with continuous white numbering
- GN-YE conductor, 3 cores and above in the outer layer
- Cores stranded in layers with optimal lay-length
- Separating foil
- Tinned copper braided screen, approx. 85% coverage
- Outer sheath of halogen-free special polymer
- Sheath colour grey (RAL 7001)
- with meter marking
- **LSOH**= Low Smoke Zero Halogen

## Note

- G = with green-yellow conductor  
x = without green-yellow conductor (OZ)
- AWG sizes are approximate equivalent values. The actual cross-section is in mm<sup>2</sup>.
- unscreened analogue type:  
**MEGAFLEX® 500**, confer page 88

## Properties

- Halogen-free
- Highly flame-retardant
- Resistant to oils and greases
- Resistant to UV and weathering
- Flexible, abrasion- and wear-resistant
- Ozone-resistant
- Recyclable
- The materials used in manufacture are cadmium-free and contain no silicone and free from substances harmful to the wetting properties of lacquers

## Tests

- Flame test acc. to DIN VDE 0482-332-3-24, BS 4066 part 3, DIN EN 60332-3-24, IEC 60332-3-24 (previously DIN VDE 0472 part 804 test method C)
- Self-extinguishing and flame retardant acc. to DIN VDE 0482-332-1-2, DIN EN 60332-1-2, IEC 60332-1 (previously DIN VDE 0472 part 804 test method B) CSA FT1
- Corrosiveness of combustion gases acc. to NF X 10-702
- Halogen-free acc. to DIN VDE 0482 part 267, DIN EN 50267-2-1, IEC 60754-1 (equivalent DIN VDE 0472 part 815)
- Smoke density acc. to DIN VDE 0482 part 1034-1+2, DIN EN 61034-1+2, IEC 61034-1+2, BS 7622 part 1+2 (previously DIN VDE 0472 part 816)
- Oil-resistant to DIN VDE 0473-811-404 / DIN EN 60811-404
- Hydrolysis resistant to DIN EN 61234-1
- Ozone-resistant to DIN VDE 0473-811-403 / DIN EN 60811-403



Approved to UL/CSA  
see section N, page 398

## Application

For fixed installation or flexible application that does not permanently recurring free movement without forced motion and without tensile stress, for high mechanical strain. As a measuring and control cable e. g. in machine and plant engineering, air conditioning in the warehouse and materials handling, shipbuilding and in the newable energies such as wind power stations.

**EMC** = Electromagnetic compatibility

To optimize the EMC features we recommend a large round contact of the copper braiding on both ends.

CE = The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

Part no.	No. cores x cross-sec. mm <sup>2</sup>	AWG-No.	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km
13500	2 x 0,5	20	5,7	35,0	46,0
13501	3 G 0,5	20	6,0	42,0	56,0
13502	3 x 0,5	20	6,0	42,0	56,0
13504	4 x 0,5	20	6,5	47,0	62,0
13503	4 G 0,5	20	6,5	47,0	62,0
13505	5 G 0,5	20	7,0	56,0	75,0
13506	5 x 0,5	20	7,0	56,0	75,0
13507	7 G 0,5	20	7,9	69,0	98,0

Part no.	No. cores x cross-sec. mm <sup>2</sup>	AWG-No.	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km
13508	8 G 0,5	20	8,5	80,0	116,0
13509	10 G 0,5	20	9,3	94,0	135,0
13510	12 G 0,5	20	9,6	108,0	158,0
13511	16 G 0,5	20	10,7	129,0	210,0
13512	18 G 0,5	20	11,2	145,0	216,0
13514	20 G 0,5	20	11,9	172,0	240,0
13515	25 G 0,5	20	13,4	240,0	315,0

Continuation ▶



# MEGAFLEX® 500-C halogen-free, flame retardant, oil-resistant, UV-resistant, flexible, screened, EMC-preferred types, meter marking



A

Part no.	No. cores x cross-sec. mm²	AWG-No.	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km
13516	2 x 0,75	19	6,1	40,0	60,0
13517	3 G 0,75	19	6,4	52,0	68,0
13518	3 x 0,75	19	6,4	52,0	68,0
13519	4 G 0,75	19	6,9	60,0	78,0
13520	4 x 0,75	19	6,9	60,0	78,0
13521	5 G 0,75	19	7,4	71,0	95,0
13522	5 x 0,75	19	7,4	71,0	95,0
13523	7 G 0,75	19	8,6	91,0	130,0
13524	7 x 0,75	19	8,6	91,0	130,0
13525	8 G 0,75	19	9,4	110,0	145,0
13526	10 G 0,75	19	10,2	137,0	180,0
13527	12 G 0,75	19	10,4	142,0	203,0
13528	16 G 0,75	19	11,6	200,0	275,0
13529	18 G 0,75	19	12,4	212,0	290,0
13530	20 G 0,75	19	12,9	238,0	320,0
13531	25 G 0,75	19	14,8	281,0	413,0
13532	2 x 1	18	6,4	50,0	66,0
13533	3 G 1	18	6,7	60,0	80,0
13534	3 x 1	18	6,7	60,0	80,0
13535	4 G 1	18	7,3	71,0	100,0
13536	4 x 1	18	7,3	71,0	100,0
13537	5 G 1	18	7,8	88,0	130,0
13538	7 G 1	18	9,1	111,0	160,0
13539	8 G 1	18	9,9	127,0	197,0
13540	10 G 1	18	10,8	150,0	232,0
13541	12 G 1	18	11,2	184,0	260,0
13542	16 G 1	18	12,3	209,0	346,0
13543	18 G 1	18	13,2	260,0	382,0
13544	20 G 1	18	13,8	317,0	440,0
13545	25 G 1	18	15,8	349,0	540,0
13546	2 x 1,5	16	7,0	63,0	88,0
13547	3 G 1,5	16	7,3	80,0	100,0
13548	3 x 1,5	16	7,3	80,0	100,0
13549	4 G 1,5	16	7,9	97,0	125,0
13550	5 G 1,5	16	8,6	119,0	158,0
13552	7 G 1,5	16	10,2	147,0	210,0
13554	8 G 1,5	16	11,1	170,0	244,0
13556	10 G 1,5	16	12,0	193,0	315,0
13557	12 G 1,5	16	12,5	267,0	340,0
13558	16 G 1,5	16	13,8	315,0	424,0
13559	18 G 1,5	16	15,0	374,0	480,0
13560	20 G 1,5	16	15,7	396,0	545,0
13561	25 G 1,5	16	18,0	526,0	702,0

Part no.	No. cores x cross-sec. mm²	AWG-No.	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km
13562	2 x 2,5	14	8,3	96,0	132,0
13563	3 G 2,5	14	9,0	144,0	168,0
13565	4 G 2,5	14	9,8	148,0	195,0
13566	5 G 2,5	14	10,9	181,0	256,0
13567	7 G 2,5	14	12,9	255,0	345,0
13568	8 G 2,5	17	13,8	285,0	390,0
13569	10 G 2,5	14	15,8	340,0	482,0
13570	12 G 2,5	14	15,9	441,0	572,0
13571	2 x 4	12	9,8	120,0	220,0
13572	3 G 4	12	10,6	174,0	251,0
13573	4 G 4	12	11,5	230,0	305,0
13574	5 G 4	12	12,7	273,0	388,0
13575	7 G 4	12	13,9	316,0	504,0
13576	2 x 6	10	11,5	173,0	270,0
13577	3 G 6	10	12,4	240,0	351,0
13578	4 G 6	10	13,8	305,0	464,0
13579	5 G 6	10	15,7	439,0	546,0
13580	7 G 6	10	16,6	505,0	670,0
13581	2 x 10	8	14,9	255,0	461,0
13582	3 G 10	8	15,9	350,0	574,0
13583	4 G 10	8	17,8	535,0	785,0
13584	5 G 10	8	19,6	592,0	914,0
13585	7 G 10	8	21,6	810,0	1308,0
13586	2 x 16	6	17,3	422,0	670,0
13587	3 G 16	6	18,5	585,0	911,0
13588	4 G 16	6	20,8	740,0	1105,0
13589	5 G 16	6	22,9	895,0	1293,0
13590	7 G 16	6	25,0	1282,0	2149,0
13591	4 G 25	4	26,2	1140,0	1911,0
13592	4 x 35	2	30,4	1576,0	2542,0
13593	4 G 50	1	34,6	2155,0	3550,0
13594	4 G 70	2/0	41,3	3120,0	4939,0
13595	4 G 95	3/0	46,2	4043,0	6690,0
13596	4 G 120	4/0	51,0	5069,0	8453,0
13597	4 G 150	300 kcmil	59,0	5792,0	9104,0

Dimensions and specifications may be changed without prior notice. (RA03)



Suitable accessories can be found in Chapter X.

- Cable Gland - HELUTOP® HT-MS-EP4

# JZ-600 HMH-C flexible control cable, halogen-free, extremely fire resistant, oil resistant<sup>1)</sup>, 0,6/1kV, screened, EMC-preferred type, meter marking



## Technical data

- Halogen-free, flexible control cable, core construction adapted to DIN VDE 0285-525-2-51 / DIN EN 50525-2-51 and DIN VDE 0285-525-3-11 / DIN EN 50525-3-11
- **Temperature range** flexing -15°C to +70°C fixed -40°C to +70°C
- **Nominal voltage**  $U_0/U$  0,6/1 kV
- **Test voltage** 4000 V
- **Coupling resistance** max. 250 Ohm/km
- **Minimum bending radius** flexing 15x cable Ø fixed installation 7,5x cable Ø
- **Radiation resistance** up to  $100 \times 10^6$  cJ/kg (up to 100 Mrad)

## Cable structure

- Bare copper-conductor, to DIN VDE 0295 cl.5, fine-wire, BS 6360 cl.5, IEC 60228 cl.5
- Core insulation of halogen-free polymer compound type T16 to DIN VDE 0207-363-7 / DIN EN 50363-7
- Core identification to DIN VDE 0293 black cores with continuous white numbering
- GN-YE conductor, 3 cores and above in the outer layer
- Cores stranded in layers with optimal lay-length
- Inner sheath
- Tinned copper braided screen, approx. 85% coverage
- Outer sheath of halogen-free polymer compound type, TM7 to DIN VDE 0207-363-8 / DIN EN 50363-8
- Sheath colour black (RAL 9005)
- with meter marking

## Properties

- <sup>1)</sup> For critical applications recommend you request a consultation
  - The materials used in manufacture are cadmium-free and contain no silicone and free from substances harmful to the wetting properties of lacquers
- ### Tests
- Flame test acc. to DIN VDE 0482-332-3, BS 4066 part 3, DIN EN 60332-3, IEC 60332-3 (previously DIN VDE 0472 part 804 test method C)
  - Self-extinguishing and flame-resistant acc. to DIN VDE 0482 Part 265-2-1 / EN 50265-2-1 / IEC 60332-1 (equivalent DIN VDE 0472 Part 804 test method B)
  - Corrosiveness of corrosive gases acc. to DIN VDE 0482 part 267, DIN EN 50267-2-2, IEC 607542 (equivalent DIN VDE 0472 part 813)
  - Halogen-free acc. to DIN VDE 0482, Part 267, DIN EN 50267-2-1, IEC 60754-1 (equivalent DIN VDE 0472 part 815)
  - Smoke density acc. to DIN VDE 0482 part 1034-1+2, DIN EN 61034-1+2, IEC 61034-1+2, BS 7622 part 1+2 (previously DIN VDE 0472 part 816)

## Note

- G = with green-yellow conductor
- AWG sizes are approximate equivalent values. The actual cross-section is in mm<sup>2</sup>.
- unscreened analogue type: **JZ-600 HMH**, confer page 91

## Application

Halogen-free, flame retardant cables are used as measuring and control cable in machine tools, conveyor belts, production lines as well as in plant installations, in heating and air-conditioning systems and steel production works. For fixed installation or flexible application, directed without forcing by casual, constantly recurring free movements and without tensile stress, for medium mechanical strain. This cable is suitable for the application in dry, damp and wet environments, outdoors (fixed installation) and for laying on plaster. The dense screening assures interference-free transmission of all signals and impulses.

**EMC** = Electromagnetic compatibility

To optimize the EMC features we recommend a large round contact of the copper braiding on both ends.

CE = The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
12850	3 G 0,5	8,8	45,0	150,0	20
12851	4 G 0,5	9,4	54,0	170,0	20
12852	5 G 0,5	10,2	66,0	199,0	20
12853	7 G 0,5	10,8	79,0	235,0	20
12854	12 G 0,5	14,3	137,0	320,0	20
12855	18 G 0,5	16,4	156,0	428,0	20
12856	25 G 0,5	19,3	250,0	503,0	20
12857	3 G 0,75	9,1	57,0	155,0	19
12858	4 G 0,75	9,9	63,0	190,0	19
12859	5 G 0,75	10,6	76,0	228,0	19
12860	7 G 0,75	11,5	100,0	323,0	19
12861	12 G 0,75	14,9	175,0	410,0	19
12862	18 G 0,75	17,2	240,0	560,0	19
12863	25 G 0,75	20,6	306,0	730,0	19

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
12864	3 G 1	9,8	64,0	163,0	18
12865	4 G 1	10,4	76,0	200,0	18
12866	5 G 1	11,4	89,0	239,0	18
12867	7 G 1	12,3	114,0	289,0	18
12868	12 G 1	15,9	186,0	464,0	18
12869	18 G 1	18,2	284,0	628,0	18
12870	25 G 1	22,0	387,0	855,0	18
12871	3 G 1,5	10,8	82,0	187,0	16
12872	4 G 1,5	11,5	99,0	240,0	16
12873	5 G 1,5	13,0	123,0	289,0	16
12874	7 G 1,5	14,2	148,0	383,0	16
12875	12 G 1,5	18,4	274,0	592,0	16
12876	18 G 1,5	21,3	386,0	806,0	16
12877	25 G 1,5	25,4	531,0	1241,0	16

Continuation ▶

# JZ-600 HMH-C flexible control cable, halogen-free, extremely fire resistant, oil resistant<sup>1)</sup>, 0,6/1kV, screened, EMC-preferred type, meter marking

EAC

A

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
12878	3 G 2,5	12,8	148,0	298,0	14
12879	4 G 2,5	13,8	169,0	345,0	14
12880	5 G 2,5	15,0	220,0	427,0	14
12881	7 G 2,5	16,3	284,0	561,0	14
12882	12 G 2,5	21,6	470,0	857,0	14
12883	18 G 2,5	25,2	572,0	1355,0	14
12884	25 G 2,5	30,0	740,0	1995,0	14
12885	3 G 4	14,6	178,0	391,0	12
12886	4 G 4	15,7	234,0	527,0	12
12887	5 G 4	17,2	284,0	700,0	12
12888	3 G 6	15,9	245,0	629,0	10
12889	4 G 6	17,4	316,0	731,0	10
12890	5 G 6	19,2	442,0	1105,0	10
12891	3 G 10	19,8	367,0	1125,0	8
12892	4 G 10	21,5	549,0	1345,0	8
12893	5 G 10	23,5	604,0	1635,0	8

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
12894	4 G 16	25,7	807,0	1395,0	6
12895	5 G 16	28,5	940,0	1870,0	6
12896	7 G 16	31,4	1345,0	2720,0	6
12897	3 G 25	28,2	920,0	2465,0	4
12898	4 G 25	31,3	1169,0	2750,0	4
12899	5 G 25	34,5	1420,0	3490,0	4
12900	3 G 35	31,2	1250,0	3230,0	2
12901	4 G 35	34,5	1680,0	4100,0	2
12902	5 G 35	38,0	2020,0	4950,0	2
12903	4 G 50	40,5	2370,0	5780,0	1
12904	4 G 70	46,0	3257,0	7480,0	2/0
12905	4 G 95	51,3	4060,0	10220,0	3/0
12906	4 G 120	56,4	5231,0	13750,0	4/0
12907	4 G 150	64,4	6794,0	15900,0	4/0

Dimensions and specifications may be changed without prior notice. (RA03)



Suitable accessories can be found in Chapter X.

- Cable Gland - HELUTOP® HT-MS-EP4

# JB-750 HMH-C flexible control cable, coloured core, halogen-free, screened, extremely fire resistant<sup>1)</sup>, oil resistant<sup>1)</sup>, EMC-preferred type, meter marking



## Technical data

- Halogen-free core flexible control cable, adapted to DIN VDE 0285-525-2-51 / DIN EN 50525-2-51 and DIN VDE 0285-525-3-11 / DIN EN 50525-3-11
- **Temperature range**  
flexing -15°C to +70°C  
fixed installation -40°C to +70°C
- **Nominal voltage**  $U_0/U$  450/750 V
- **Test voltage** 3000 V
- **Coupling resistance**  
max. 250 Ohm/km
- **Minimum bending radius**  
flexing 12,5x cable  $\emptyset$   
fixed installation 4x cable  $\emptyset$
- **Radiation resistance**  
up to  $100 \times 10^6$  cJ/kg (up to 100 Mrad)

## Cable structure

- Bare copper-conductor, to DIN VDE 0295 cl.5, fine-wire, BS 6360 cl.5, IEC 60228 cl.5
- Core insulation of halogen-free polymer compound type T16 to DIN VDE 0207-363-7 / DIN EN 50363-7
- Core identification to DIN VDE 0293-308
- GN-YE conductor
- Cores stranded in layers with optimal lay-length
- Separating foil
- Tinned copper braided screen, approx. 85% coverage
- Outer sheath of halogen-free polymer compound type TM7 to DIN VDE 0207-363-8 / DIN EN 50363-8
- Sheath colour grey (RAL 7001)
- with meter marking
- **LS0H**= Low Smoke Zero Halogen

## Properties

- <sup>1)</sup> For the critical applications we advise for consultation
- The materials used in manufacture are cadmium-free and contain no silicone and free from substances harmful to the wetting properties of lacquers

## Tests

- Flame test acc. to DIN VDE 0482-332-3, BS 4066 part 3, DIN EN 60332-3, IEC 60332-3 (previously DIN VDE 0472 part 804 test method C)
- Self-extinguishing and flame retardant acc. to DIN VDE 0482-332-1-2, DIN EN 60332-1-2 / IEC 60332-1 (equivalent DIN VDE 0472 part 804 test method B)
- Corrosiveness of combustion gases acc. to DIN VDE 0482 part 267 / DIN EN 50267-2-2 / IEC 60754-2 (equivalent DIN VDE 0472 part 813)
- Halogen-free acc. to DIN VDE 0482 part 267 / DIN EN 50267-2-1 / IEC 60754-1 (equivalent DIN VDE 0472 part 815)
- Smoke density acc. to DIN VDE 0482 part 1034-1+2, DIN EN 61034-1+2, IEC 61034-1+2, BS 7622 part 1+2 (previously DIN VDE 0472 part 816)

## Note

- G = with green-yellow conductor
- Cleanroom qualification tested with analog type. Please note "cleanroom qualified" when ordering.
- AWG sizes are approximate equivalent values. The actual cross-section is in mm<sup>2</sup>.
- unscreened analogue type:  
**JB-750 HMH**, confer page 93

## Application

Halogen-free, flame retardant control cables are used for instrumentation and control cables in tooling machinery, conveyor and transportation belts, production lines, in plant construction, air-conditioning systems as well as in iron and steel works. For fixed installation or for flexing applications, for casual, not constantly recurring free movement without forced motion and without tensile stress for medium mechanical loads. The cable is suitable for use in dry, damp and wet environments and for installation on plaster. An interference-free transmission of signals and pulse is assured by the high degree of screening.

**EMC** = Electromagnetic compatibility

To optimize the EMC features we recommend a large round contact of the copper braiding on both ends.

**CE** = The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer $\emptyset$ approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
11942	3 G 1,5	8,4	80,0	125,0	16
11943	4 G 1,5	9,3	97,0	160,0	16
11944	5 G 1,5	10,2	119,0	193,0	16
11945	3 G 2,5	9,9	144,0	198,0	14
11946	4 G 2,5	11,0	148,0	240,0	14
11947	5 G 2,5	12,2	181,0	280,0	14

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer $\emptyset$ approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
11948	3 G 4	12,1	174,0	251,0	12
11949	4 G 4	13,3	230,0	315,0	12
11950	5 G 4	14,7	273,0	396,0	12
11951	4 G 6	15,0	305,0	430,0	10
11952	5 G 6	16,6	439,0	524,0	10

Continuation ▶



# JB-750 HMMH-C flexible control cable, coloured core, halogen-free, screened, extremely fire resistant, oil resistant<sup>1)</sup>, EMC-preferred type, meter marking



A

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
11953	4 G 10	18,9	535,0	804,0	8
11954	5 G 10	21,1	592,0	942,0	8
11955	4 G 16	21,9	740,0	1190,0	6
11956	5 G 16	24,3	895,0	1370,0	6
11957	4 G 25	27,0	1140,0	1968,0	4
11958	5 G 25	30,0	1380,0	2514,0	4

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
11959	4 G 35	29,6	1576,0	2540,0	2
11960	5 G 35	32,9	1930,0	3260,0	2
11961	4 G 50	35,3	2155,0	3668,0	1
11962	4 G 70	39,0	3120,0	5076,0	2/0
11963	4 G 95	45,6	4043,0	6807,0	3/0
11964	4 G 120	50,8	5069,0	8612,0	4/0

Dimensions and specifications may be changed without prior notice. (RA03)



Suitable accessories can be found in Chapter X.

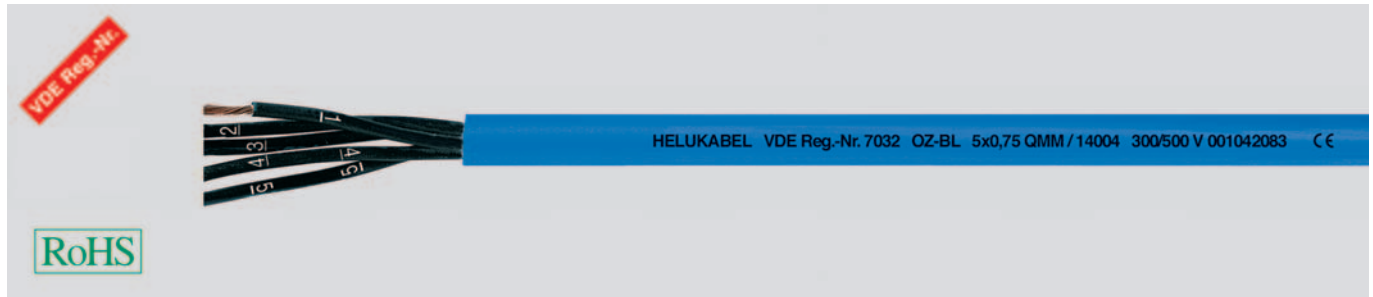
- Cable Gland - HELUTOP® HT-MS-EP4

# INHERENTLY SAFE PVC CONTROL CABLES



# OZ-BL outer sheath blue, intrinsic safety, flexible, meter marking

A



## Technical data

- Control cable, special PVC with blue outer sheath for hazardous areas to hazard type -i- (= intrinsically safe)
- For intrinsically safe installation acc. to DIN EN 60079-14 and IEC 60079-14 section 12.2.2 (VDE 0165 part 1)
- **Temperature range**  
flexing -15°C to +80°C  
fixed installation -40°C to +80°C
- **Nominal voltage**  $U_0/U$  300/500 V
- **Test voltage** 3000 V
- **Breakdown voltage** min. 6000 V
- **Insulation resistance**  
min. 20 MOhm x km
- **Mutual capacitance**  
core/core approx. 120 nF/km
- **Inductance**  
approx. 0,68 mH/km
- **Minimum bending radius**  
flexing 7,5x cable  $\varnothing$   
fixed installation 4x cable  $\varnothing$
- **Radiation resistance**  
up to  $80 \times 10^6$  cJ/kg (up to 80 Mrad)

## Cable structure

- Bare copper-conductor, to DIN VDE 0295 cl.5, fine-wire, BS 6360 cl.5, IEC 60228 cl.5
- Core insulation of special PVC compound type Z 7225
- Core identification to DIN VDE 0293 black cores with continuous white numbering
- without GN-YE conductor
- Cores stranded in layers with optimal lay-length
- Outer sheath of special PVC compound type TM2 to DIN VDE 0207-363-4-1/DIN EN 50363-4-1
- Sheath colour blue (RAL 5015)
- with meter marking

## Properties

- Extensively oil resistant, oil-/chemical resistance see table Technical Informations
  - The materials used in manufacture are cadmium-free and contain no silicone and free from substances harmful to the wetting properties of lacquers
- ### Tests
- PVC self-extinguishing and flame retardant acc. to DIN VDE 0482-332-1-2, DIN EN 60332-1-2/IEC 60332-1 (equivalent DIN VDE 0472 part 804 test method B)

## Note

- For underground laying use NYY with blue outer sheath.
- AWG sizes are approximate equivalent values. The actual cross-section is in mm<sup>2</sup>.
- Instrumentation cable RE-2Y(St)Yv with blue outer sheath see Data and Computer Cables

## Application

For hazardous areas the cables with special marking (blue) (hazard type-i-) used as flexible control and measuring cables to meet the requirements for the installation of electrical apparatus. These installations are not earthed and require a separate power circuit. Those cables are not suitable for underground laying.

CE The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer $\varnothing$ approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
14001	2 x 0,75	5,3	14,4	46,0	19
14002	3 x 0,75	5,6	21,6	54,0	19
14003	4 x 0,75	6,3	29,0	66,0	19
14004	5 x 0,75	6,9	36,0	80,0	19
14075	7 x 0,75	7,5	52,0	110,0	19
14005	8 x 0,75	8,3	58,0	130,0	19
14076	12 x 0,75	9,8	88,0	179,0	19
14006	18 x 0,75	12,2	130,0	257,0	19
14007	25 x 0,75	14,3	180,0	365,0	19
14008	30 x 0,75	15,3	215,0	448,0	19
14009	34 x 0,75	16,5	245,0	510,0	19
14010	41 x 0,75	18,1	298,0	607,0	19
14011	2 x 1	5,6	19,0	60,0	18
14012	3 x 1	5,9	29,0	72,0	18
14013	4 x 1	6,6	38,0	86,0	18
14014	5 x 1	7,3	48,0	104,0	18
14015	7 x 1	8,1	67,0	141,0	18
14016	12 x 1	10,4	115,0	230,0	18
14017	18 x 1	12,9	173,0	343,0	18
14018	25 x 1	15,4	240,0	485,0	18
14019	2 x 1,5	6,4	29,0	70,0	16
14020	3 x 1,5	6,8	43,0	90,0	16
14021	4 x 1,5	7,4	58,0	109,0	16
14022	5 x 1,5	8,3	72,0	131,0	16
14023	7 x 1,5	9,2	101,0	184,0	16
14024	12 x 1,5	11,8	173,0	309,0	16
14025	18 x 1,5	14,6	259,0	440,0	16
14026	25 x 1,5	17,4	360,0	620,0	16
14027	30 x 1,5	18,6	440,0	842,0	16
14100	3 x 2,5	8,3	72,0	148,0	14
14101	4 x 2,5	9,2	96,0	178,0	14
14102	5 x 2,5	10,1	120,0	221,0	14

Dimensions and specifications may be changed without prior notice. (RA04)



Suitable accessories can be found in Chapter X.

- Cable Gland - HELUTOP® HT-PA-EX
- Cable Gland - HELUTOP® HT-MS-EX-d

**OZ-BL-CY** outer sheath blue, intrinsic safety, flexible, meter marking**Technical data**

- Control cable, special PVC with blue outer sheath for hazardous areas to hazard type -i- (=intrinsically safe)
- For intrinsically safe installation acc. to DIN EN 60079-14 and IEC 60079-14 section 12.2.2. (VDE 0165 part 1)
- **Temperature range**  
flexing -10°C to +80°C  
fixed installation -40°C to +80°C
- **Nominal voltage**  $U_0/U$  300/500 V
- **Test voltage** 3000 V
- **Breakdown voltage** min. 6000 V
- **Insulation resistance**  
min. 20 MOhm x km
- **Mutual capacitance**  
core/core approx. 140 nF/km  
core/screen approx. 187 nF/km
- **Inductance**  
approx. 0,68 mH/km
- **Coupling resistance**  
max. 250 Ohm/km
- **Minimum bending radius**  
flexing 10x cable  $\varnothing$   
fixed installation 5x cable  $\varnothing$
- **Radiation resistance**  
up to  $80 \times 10^6$  cJ/kg (up to 80 Mrad)

**Cable structure**

- Bare copper-conductor, to DIN VDE 0295 cl.5, fine-wire, BS 6360 cl.5, IEC 60228 cl.5
- Core insulation of special PVC compound type Z 7225
- Core identification to DIN VDE 0293 black cores with continuous white numbering
- without GN-YE conductor
- Cores stranded in layers with optimal lay-length
- Separating foil
- Tinned copper braided screen, approx. 85% coverage
- Outer sheath of special PVC compound type TM2 to DIN VDE 0207-363-4-1/DIN EN 50363-4-1
- Sheath colour blue (RAL 5015)
- with meter marking

**Properties**

- Extensively oil resistant, oil-/chemical resistance see table Technical Informations
- The materials used in manufacture are cadmium-free and contain no silicone and free from substances harmful to the wetting properties of lacquers

**Tests**

- PVC self-extinguishing and flame retardant acc. to DIN VDE 0482-332-1-2, DIN EN 60332-1-2 / IEC 60332-1 (equivalent DIN VDE 0472 part 804 test method B)

**Note**

- For underground laying use NYY with blue outer sheath.
- AWG sizes are approximate equivalent values. The actual cross-section is in mm<sup>2</sup>.
- Instrumentation cable RE-2Y(St)Yv with blue outer sheath see Data and Computer cables

**Application**

For hazardous areas the cables with special marking (blue) (hazard type-i-) used as flexible control and measuring cables to meet the requirements for the installation of electrical apparatus. These installations are not earthed and require a separate power circuit. Those cables are not suitable for underground laying. The copper braided screening ensures the transmission of data signals and free from interference.

**EMC** = Electromagnetic compatibility

To optimize the EMC features we recommend a large round contact of the copper braiding on both ends.

**CE** = The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer $\varnothing$ approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
14028	2 x 0,75	6,1	40,0	59,0	19
14029	3 x 0,75	6,3	52,0	66,0	19
14030	4 x 0,75	6,8	60,0	77,0	19
14031	5 x 0,75	7,4	71,0	93,0	19
14088	7 x 0,75	8,2	91,0	130,0	19
14032	8 x 0,75	9,0	110,0	145,0	19
14033	10 x 0,75	10,3	137,0	180,0	19
14034	12 x 0,75	10,5	142,0	202,0	19
14035	18 x 0,75	12,7	212,0	292,0	19
14036	20 x 0,75	13,6	238,0	362,0	19
14037	25 x 0,75	15,0	281,0	415,0	19
14038	30 x 0,75	16,0	320,0	486,0	19
14039	34 x 0,75	17,2	345,0	523,0	19
14040	41 x 0,75	18,1	400,0	680,0	19
14041	2 x 1	6,4	50,0	65,0	18
14042	3 x 1	6,7	60,0	81,0	18
14043	4 x 1	7,2	71,0	98,0	18
14044	5 x 1	8,0	88,0	127,0	18
14045	7 x 1	8,7	111,0	158,0	18
14046	12 x 1	11,4	184,0	260,0	18
14047	18 x 1	13,6	260,0	380,0	18
14048	25 x 1	16,2	349,0	534,0	18
14049	34 x 1	18,5	486,0	741,0	18

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer $\varnothing$ approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
14050	2 x 1,5	7,0	63,0	88,0	16
14051	3 x 1,5	7,4	80,0	100,0	16
14052	4 x 1,5	8,1	97,0	126,0	16
14053	5 x 1,5	9,0	119,0	160,0	16
14054	7 x 1,5	9,8	147,0	208,0	16
14055	12 x 1,5	12,8	267,0	338,0	16
14056	18 x 1,5	15,6	374,0	479,0	16
14057	25 x 1,5	18,4	526,0	705,0	16
14058	30 x 1,5	19,6	555,0	830,0	16
14059	34 x 1,5	21,2	629,0	900,0	16

Dimensions and specifications may be changed without prior notice. (RA04)



# OB-BL-PAAR-CY outer sheath blue, intrinsic safety, EMC-preferred type, meter marking

EAC

A



HELUKABEL OB-BL-PAAR-CY 4x2x0.5 QMM / 14079 900 V 001042085 CE



## Technical data

- Special PVC control cable with blue outer sheath for hazardous areas to hazard type -i- for intrinsically safe installation acc. to DIN EN 60079-14 and IEC 60079-14 section 12.2.2. (VDE 0165 part 1)
- **Conductor resistance**  
at 0,5 mm<sup>2</sup> 37,8 Ohm/km  
at 0,75 mm<sup>2</sup> 25,3 Ohm/km
- **Temperature range**  
flexing -10°C to +80°C  
fixed installation -30°C to +80°C
- **Operating peak voltage**  
(not for heavy current installation purposes)  
900 V
- **Test voltage**  
core/core 2000 V  
core/screen 1000 V
- **Breakdown voltage** min. 4000 V
- **Insulation resistance**  
min. 20 MOhm x km
- **Mutual capacitance**  
core/core approx. 105 nF/km  
core/screen approx. 145 nF/km
- **Inductance**  
approx. 0,68 mH/km
- **Characteristic impedance**  
approx. 80 Ohm
- **Coupling resistance**  
max. 250 Ohm/km
- **Minimum bending radius**  
flexing 10x cable Ø  
fixed installation 5x cable Ø
- **Radiation resistance**  
up to 80x10<sup>6</sup> cJ/kg (up to 80 Mrad)

## Cable structure

- Bare copper-conductor, to DIN VDE 0295 cl.5, fine-wire, BS 6360 cl.5, IEC 60228 cl.5
- Core insulation special PVC compound type T12 to DIN VDE 0207-363-3 / DIN EN 50363-3
- Core identification (pair) to DIN 47100
- Cores twisted in pairs
- Pairs stranded in layers with optimal lay-length
- Separating foil
- Tinned copper braided screen, approx. 85% coverage
- Outer sheath of special PVC compound type TM2 to DIN VDE 0207-363-4-1/DIN EN 50363-4-1
- Sheath colour blue (RAL 5015)
- with meter marking

## Properties

- Extensively oil resistant, oil-/chemical resistance see table Technical Informations
- The materials used in manufacture are cadmium-free and contain no silicone and free from substances harmful to the wetting properties of lacquers

## Tests

- PVC self-extinguishing and flame retardant acc. to DIN VDE 0482-332-1-2, DIN EN 60332-1-2, IEC 60332-1 (equivalent DIN VDE 0472 part 804 test method B)

## Note

- AWG sizes are approximate equivalent values. The actual cross-section is in mm<sup>2</sup>.
- Instrumentation cable RE-2Y(St)Yv with blue outer sheath see Data and Computer Cables

## Application

For hazardous areas this flexible control cable has been constructed for closed circuit systems in accordance with VDE 0165 part 1, part 12. 2. 2. 6, which covers the requirements for the special marking (blue) of this type (hazard type -i-). The paired construction and the copper screening afford a good protection against electrical interference and ensure the transmission of data signals.

EMC = Electromagnetic compatibility

To optimize the EMC features we recommend a large round contact of the copper braiding on both ends.

CE = The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

Part no.	No.pairs x cross-sec. mm <sup>2</sup>	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.	Part no.	No.pairs x cross-sec. mm <sup>2</sup>	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
14077	2 x 2 x 0,5	7,6	47,0	89,0	20	14089	2 x 2 x 0,75	8,6	60,0	105,0	19
14078	3 x 2 x 0,5	8,2	67,0	104,0	20	14090	3 x 2 x 0,75	9,1	80,0	128,0	19
14079	4 x 2 x 0,5	9,0	80,0	126,0	20	14091	4 x 2 x 0,75	10,1	110,0	156,0	19
14080	6 x 2 x 0,5	10,9	108,0	171,0	20	14092	6 x 2 x 0,75	12,4	142,0	216,0	19
14081	8 x 2 x 0,5	12,3	129,0	251,0	20	14093	8 x 2 x 0,75	14,2	200,0	309,0	19
14082	10 x 2 x 0,5	14,2	172,0	282,0	20	14094	10 x 2 x 0,75	16,0	238,0	355,0	19
14083	12 x 2 x 0,5	14,7	235,0	261,0	20	14095	12 x 2 x 0,75	16,8	270,0	405,0	19
14084	16 x 2 x 0,5	16,3	301,0	445,0	20	14096	16 x 2 x 0,75	18,6	342,0	560,0	19
14085	20 x 2 x 0,5	17,7	343,0	525,0	20	14097	20 x 2 x 0,75	21,2	369,0	671,0	19
14086	24 x 2 x 0,5	20,2	394,0	590,0	20	14098	24 x 2 x 0,75	22,8	451,0	795,0	19
14087	25 x 2 x 0,5	20,6	406,0	622,0	20	14099	25 x 2 x 0,75	23,2	461,0	803,0	19

Dimensions and specifications may be changed without prior notice. (RA04)



# BIO-OIL & MICROBE-RESISTANT CABLES





# BIOFLEX-500®-JZ Bio-fuel resistant, abrasion resistant, recyclable environment friendly, bio-oil resistant<sup>1)</sup>, meter marking



## Technical data

- Bio-oil resistant, abrasion resistant special control cable in adapted to DIN VDE 0285-525-1 / DIN EN 50525-1
- **Temperature range**  
flexing -20°C to +80°C  
fixed installation -40°C to +80°C
- **Nominal voltage** U<sub>0</sub>/U 300/500 V
- **Test voltage** 3000 V
- **Insulation resistance**  
min. 20 MOhm x km
- **Minimum bending radius**  
flexing 15x cable Ø  
fixed installation 4x cable Ø
- **Radiation resistance**  
up to 100x10<sup>6</sup> cJ/kg (up to 100 Mrad)

## Cable structure

- Bare copper-conductor, to DIN VDE 0295 cl.5, fine-wire, BS 6360 cl.5, IEC 60228 cl.5
- Core insulation of special polymer
- Core identification to DIN VDE 0293 black cores with continuous white numbering
- GN-YE conductor, 3 cores and above in the outer layer
- Cores stranded in layers with optimal lay-length
- Outer sheath of special polymer compound
- Sheath colour dark green
- with meter marking

## Properties

- **Resistant to**  
Bio-fuel (diesel and petrol), highly resistant to biologically decomposable oils, Oxygene, Ozone, Hydrolysis and Microbes
- Low adhesion

## Note

- G = with green-yellow conductor  
x = without green-yellow conductor (OZ)
- <sup>1)</sup> For the critical applications we advise for consultation.
- AWG sizes are approximate equivalent values. The actual cross-section is in mm<sup>2</sup>.
- screened analogue type:  
**BIOFLEX-500®-JZ-C**, confer page 110

## Application

HELUKABEL® BIOFLEX-500®-JZ is an extremely robust control cable with high abrasion and tear resistant properties. Due to its high resistance to Bio-fuel, Bio-oil and coolant emulsions. It is especially suited for use in the machine, tool making and plant industries as well as in the steel industry for difficult and problem areas. The high flexibility of this cable type makes it quick and easy to install. Suitable for outdoor lying.

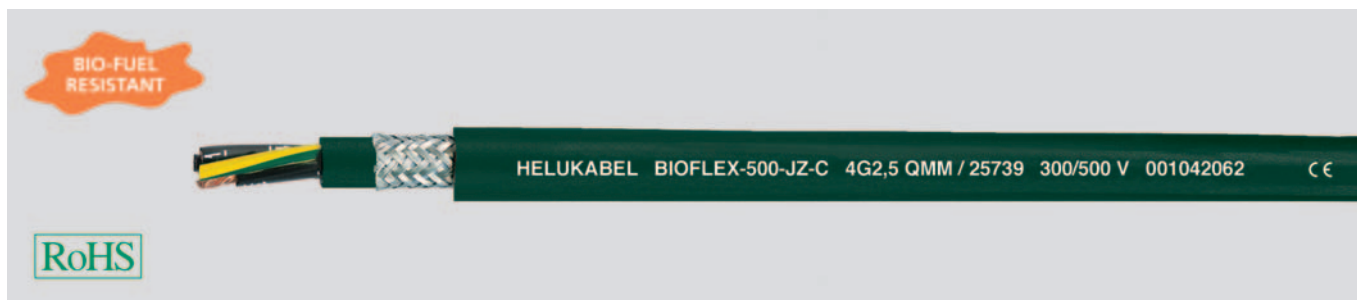
CE= The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

Part no.	No.cores x cross-sec. mm <sup>2</sup>	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
25620	2 x 0,5	5,4	9,6	45,0	20
25621	3 G 0,5	5,9	14,4	55,0	20
25622	4 G 0,5	6,3	19,0	65,0	20
25623	5 G 0,5	6,9	24,0	75,0	20
25624	7 G 0,5	7,8	33,6	90,0	20
25625	10 G 0,5	9,6	48,0	120,0	20
25626	12 G 0,5	10,0	58,0	135,0	20
25627	14 G 0,5	10,3	67,0	170,0	20
25628	18 G 0,5	11,5	86,0	205,0	20
25629	25 G 0,5	13,6	120,0	270,0	20
25630	2 x 0,75	5,4	14,4	44,0	19
25631	3 G 0,75	6,2	21,6	53,0	19
25632	4 G 0,75	6,7	29,0	64,0	19
25633	5 G 0,75	7,3	36,0	76,0	19
25634	7 G 0,75	8,8	50,0	96,0	19
25635	10 G 0,75	10,5	72,0	140,0	19
25636	12 G 0,75	11,0	86,0	170,0	19
25637	14 G 0,75	11,4	101,0	202,0	19
25638	18 G 0,75	12,6	130,0	260,0	19
25639	25 G 0,75	15,2	180,0	282,0	19
25640	41 G 0,75	18,0	296,0	600,0	19
25641	42 G 0,75	18,5	310,0	620,0	19
25642	2 x 1	6,6	19,0	53,0	18
25643	3 G 1	7,0	29,0	63,0	18
25644	4 G 1	7,6	38,0	75,0	18
25645	5 G 1	8,2	48,0	89,0	18
25646	7 G 1	9,6	67,0	115,0	18
25647	10 G 1	11,6	96,0	166,0	18
25648	12 G 1	12,0	115,0	201,0	18
25649	14 G 1	13,2	134,0	230,0	18
25650	18 G 1	14,5	173,0	289,0	18
25651	25 G 1	17,6	240,0	380,0	18
25652	41 G 1	21,1	394,0	720,0	18
25653	42 G 1	21,5	403,0	740,0	18

Part no.	No.cores x cross-sec. mm <sup>2</sup>	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
25654	2 x 1,5	7,2	29,0	68,0	16
25655	3 G 1,5	7,6	43,0	87,0	16
25656	4 G 1,5	8,2	58,0	106,0	16
25657	5 G 1,5	9,0	72,0	131,0	16
25658	7 G 1,5	10,7	101,0	173,0	16
25659	10 G 1,5	13,0	144,0	245,0	16
25660	12 G 1,5	13,4	173,0	293,0	16
25661	14 G 1,5	14,5	202,0	347,0	16
25662	18 G 1,5	16,0	259,0	454,0	16
25663	25 G 1,5	19,5	360,0	641,0	16
25664	42 G 1,5	23,8	605,0	1100,0	16
25665	2 x 2,5	8,6	48,0	110,0	14
25666	3 G 2,5	9,3	72,0	146,0	14
25667	4 G 2,5	10,3	96,0	183,0	14
25668	5 G 2,5	11,5	120,0	222,0	14
25669	7 G 2,5	13,4	168,0	293,0	14
25670	12 G 2,5	17,0	288,0	512,0	14
25671	18 G 2,5	20,0	432,0	740,0	14
25672	25 G 2,5	24,1	600,0	940,0	14
25673	2 x 4	10,4	77,0	147,0	12
25674	3 G 4	11,2	115,0	228,0	12
25675	4 G 4	12,5	154,0	291,0	12
25676	5 G 4	13,8	192,0	355,0	12
25677	3 G 6	13,0	173,0	362,0	10
25678	4 G 6	14,7	230,0	468,0	10
25679	5 G 6	16,0	288,0	570,0	10
25680	3 G 10	16,7	288,0	555,0	8
25681	4 G 10	18,3	384,0	720,0	8
25682	5 G 10	20,5	480,0	894,0	8
25683	4 G 16	21,1	614,0	1063,0	6
25684	5 G 16	23,6	768,0	1400,0	6
25685	4 G 25	29,4	960,0	1590,0	4
25686	4 G 35	32,8	1344,0	2200,0	2
25687	4 G 50	38,9	1920,0	2400,0	1
25688	4 G 70	44,7	2688,0	4400,0	2/0
25689	4 G 95	59,6	3648,0	6000,0	3/0
25690	4 G 120	64,5	4608,0	7400,0	4/0

Dimensions and specifications may be changed without prior notice. (RA05)

# BIOFLEX-500®-JZ-C Bio-fuel resistant, abrasion resistant, recyclable environment friendly, bio-oil resistant<sup>1)</sup>, Cu-screened, EMC-preferred type, meter marking



## Technical data

- Bio-oil resistant, abrasion resistant special control cable in adapted to DIN VDE 0285-525-1 / DIN EN 50525-1
- **Temperature range**  
flexing -20°C to +80°C  
fixed installation -40°C to +80°C
- **Nominal voltage** U<sub>0</sub>/U 300/500 V
- **Test voltage** 3000 V
- **Insulation resistance**  
min. 20 MOhm x km
- **Coupling resistance**  
max. 250 Ohm/km
- **Minimum bending radius**  
flexing 20x cable Ø  
fixed installation 6x cable Ø
- **Radiation resistance**  
up to 100x10<sup>6</sup>cJ/kg (up to 100 Mrad)

## Cable structure

- Bare copper-conductor, to DIN VDE 0295 cl.5, fine-wire, BS 6360 cl.5, IEC 60228 cl.5
- Core insulation of special polymer
- Core identification to DIN VDE 0293 black cores with continuous white numbering
- GN-YE conductor, 3 cores and above in the outer layer
- Cores stranded in layers with optimal lay-length
- Special inner sheath
- Tinned copper braided screen, approx. 85% coverage
- Core wrapping of fleece guarantees easy cable stripping
- Outer sheath of special polymer compound
- Sheath colour dark green
- with meter marking

## Properties

- **Resistant to**  
Bio-fuel (diesel and petrol), highly resistant to biologically decomposable oils, Oxygene, Ozone, Hydrolysis and Microbes
- Low adhesion

## Note

- G = with green-yellow conductor  
x = without green-yellow conductor (OZ)
- <sup>1)</sup> For the critical applications we advise for consultation.
- AWG sizes are approximate equivalent values. The actual cross-section is in mm<sup>2</sup>.
- unscreened analogue type: **BIOFLEX-500®-JZ**, confer page 109

## Application

HELUKABEL® BIOFLEX-500®-JZ-C is an extremely robust control cable with high abrasion and tear resistant properties. Due to its high resistance to Bio-fuel, Bio-oil and coolant emulsions. It is especially suited for use in the machine, tool making and plant industries as well as in the steel industry for difficult and problem areas. The inner sheaths of those cables raise the mechanical stress. The high flexibility of this cable type makes it quick and easy to install. Suitable for outdoor lying. These screened cables are particularly suitable for the interference-free transmission in instrumentation and control engineering applications (electromagnetic compatibility). <sup>1)</sup> For the critical applications we advise for consultation.

**EMC** = Electromagnetic compatibility

To optimize the EMC features we recommend a large round contact of the copper braiding on both ends.

CE = The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
25691	2 x 0,5	6,6	41,0	68,0	20
25692	3 G 0,5	7,1	45,0	84,0	20
25693	4 G 0,5	7,6	54,0	95,0	20
25694	5 G 0,5	8,2	66,0	107,0	20
25695	7 G 0,5	9,4	79,0	135,0	20
25696	10 G 0,5	11,2	107,0	170,0	20
25697	12 G 0,5	11,3	137,0	195,0	20
25698	14 G 0,5	11,9	142,0	222,0	20
25699	18 G 0,5	12,9	156,0	278,0	20
25700	25 G 0,5	15,9	250,0	406,0	20
25701	2 x 0,75	7,2	46,0	88,0	19
25702	3 G 0,75	7,7	57,0	98,0	19
25703	4 G 0,75	8,2	63,0	112,0	19
25704	5 G 0,75	8,8	76,0	130,0	19
25705	7 G 0,75	10,1	100,0	185,0	19
25706	10 G 0,75	12,2	140,0	270,0	19
25707	12 G 0,75	12,3	175,0	294,0	19
25708	14 G 0,75	13,0	190,0	317,0	19
25709	18 G 0,75	14,6	240,0	357,0	19
25710	25 G 0,75	17,8	306,0	510,0	19
25711	41 G 0,75	21,5	403,0	951,0	19
25712	42 G 0,75	22,0	410,0	975,0	19

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
25713	2 x 1	8,1	54,0	98,0	18
25714	3 G 1	8,5	64,0	102,0	18
25715	4 G 1	9,0	76,0	145,0	18
25716	5 G 1	9,9	89,0	170,0	18
25717	7 G 1	11,6	114,0	220,0	18
25718	10 G 1	14,0	156,0	330,0	18
25719	12 G 1	14,4	186,0	350,0	18
25720	14 G 1	15,0	198,0	402,0	18
25721	18 G 1	17,0	284,0	515,0	18
25722	25 G 1	20,6	387,0	690,0	18
25723	41 G 1	25,0	578,0	1070,0	18
25724	42 G 1	25,5	590,0	1096,0	18
25725	2 x 1,5	8,5	64,0	130,0	16
25726	3 G 1,5	8,9	82,0	152,0	16
25727	4 G 1,5	9,7	99,0	167,0	16
25728	5 G 1,5	10,8	123,0	203,0	16
25729	7 G 1,5	12,5	148,0	305,0	16
25730	10 G 1,5	15,1	198,0	422,0	16
25731	12 G 1,5	15,5	274,0	435,0	16
25732	14 G 1,5	16,1	294,0	480,0	16
25733	18 G 1,5	18,6	386,0	642,0	16
25734	25 G 1,5	22,1	531,0	803,0	16

Continuation ▶



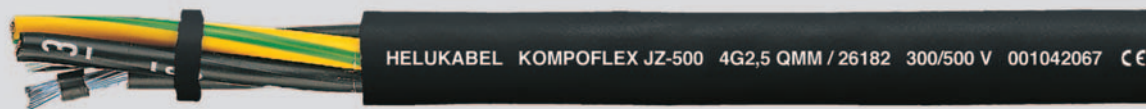
# BIOFLEX-500®-JZ-C Bio-fuel resistant, abrasion resistant, recyclable environment friendly, bio-oil resistant<sup>1)</sup>, Cu-screened, EMC-preferred type, meter marking

A

Part no.	No.cores x cross-sec. mm <sup>2</sup>	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.	Part no.	No.cores x cross-sec. mm <sup>2</sup>	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
25735	41 G 1,5	27,2	840,0	1360,0	16	25748	4 G 6	17,0	316,0	560,0	10
25736	42 G 1,5	27,5	890,0	1375,0	16	25749	5 G 6	18,6	442,0	700,0	10
25737	2 x 2,5	10,6	110,0	180,0	14	25750	3 G 10	19,5	367,0	750,0	8
25738	3 G 2,5	11,1	148,0	215,0	14	25751	4 G 10	21,5	549,0	1023,0	8
25739	4 G 2,5	12,1	169,0	268,0	14	25752	5 G 10	23,9	604,0	1114,0	8
25740	5 G 2,5	13,2	220,0	349,0	14	25753	4 G 16	24,6	807,0	1385,0	6
25741	7 G 2,5	15,9	284,0	406,0	14	25754	5 G 16	27,3	940,0	1550,0	6
25742	12 G 2,5	19,5	470,0	720,0	14	25755	4 G 25	30,6	1169,0	1894,0	4
25743	2 x 4	12,6	124,0	300,0	12	25756	4 G 35	36,9	1680,0	2395,0	2
25744	3 G 4	13,4	178,0	340,0	12	25757	4 G 50	41,3	2370,0	3312,0	1
25745	4 G 4	15,0	234,0	408,0	12	25758	4 G 70	48,8	3257,0	4605,0	2/0
25746	5 G 4	16,4	284,0	504,0	12	25759	4 G 95	61,8	4060,0	6055,0	3/0
25747	3 G 6	15,2	245,0	453,0	10	25760	4 G 120	65,7	5231,0	7318,0	4/0

Dimensions and specifications may be changed without prior notice. (RA05)

# KOMPOFLEX® JZ-500 halogen-free, microbes resistant, low adhesion, meter marking



## Technical data

- Microbes resistant, halogen-free special control cable in adapted to DIN VDE 0285-525-2-51 /
- DIN EN 50525-2-51
- **Temperature range**  
flexing -30°C to +90°C  
fixed installation -40°C to +100°C
- **Nominal voltage**  $U_0/U$  300/500 V
- **Test voltage** 3000 V
- **Insulation resistance**  
min. 20 MOhm x km
- **Minimum bending radius**  
flexing 7,5x cable Ø  
fixed installation 4x cable Ø
- **Radiation resistance**  
up to  $100 \times 10^6$  cJ/kg (up to 100 Mrad)

## Cable structure

- Tinned copper-conductor, to DIN VDE 0295 cl.5, fine-wire, BS 6360 cl.5, IEC 60228 cl.5
- Core insulation of special thermoplastic polymer
- Core identification to DIN VDE 0293 black cores with continuous white numbering
- GN-YE conductor, 3 cores and above in the outer layer
- Cores stranded in layers with optimal lay-length
- Outer sheath of special thermoplastic polymer
- Sheath colour black (RAL 9005)
- with meter marking

## Properties

- **Resistant to**  
UV-radiation, Oxygene, Ozone, Microbes,
- Hydrofluoric acid, Hydrochloric acid and diluted sulfuric acid
- The materials used in manufacture are cadmium-free and contain no silicone and free from substances harmful to the wetting properties of lacquers
- Low adhesion

## Note

- G = with green-yellow conductor  
x = without green-yellow conductor (OZ)
- AWG sizes are approximate equivalent values. The actual cross-section is in mm<sup>2</sup>.
- screened analogue type:  
**KOMPOLEX® JZ-500-C**, confer page 113

## Application

Extremely robust universal cable. This cable is specially installed in rubbish, sewage-treatment plants, composting works, animal stalls and greenhouses. Suitable for installation for flexible use for medium mechanical, stresses with free movement without tensile stress or forced movements in dry, moist and wet rooms as well as outside.

CE= The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

Part no.	No.cores x cross-sec. mm <sup>2</sup>	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
26125	2 x 0,5	4,8	9,6	41,0	20
26126	3 G 0,5	5,1	14,4	50,0	20
26127	4 G 0,5	5,7	19,0	61,0	20
26128	5 G 0,5	6,2	24,0	72,0	20
26129	7 G 0,5	7,4	33,6	86,0	20
26130	12 G 0,5	9,1	58,0	130,0	20
26131	18 G 0,5	10,7	86,0	198,0	20
26132	20 G 0,5	11,2	96,0	211,0	20
26133	25 G 0,5	13,0	120,0	260,0	20
26135	34 G 0,5	14,5	163,0	361,0	20
26136	42 G 0,5	15,8	202,0	405,0	20
26137	50 G 0,5	17,3	240,0	541,0	20
26138	61 G 0,5	19,4	293,0	670,0	20
26139	2 x 0,75	5,2	14,4	42,0	19
26140	3 G 0,75	5,5	21,6	49,0	19
26141	4 G 0,75	6,2	29,0	60,0	19
26142	5 G 0,75	6,8	36,0	71,0	19
26143	7 G 0,75	8,1	50,0	88,0	19
26144	12 G 0,75	9,9	86,0	161,0	19
26145	18 G 0,75	11,9	130,0	250,0	19
26146	20 G 0,75	12,6	144,0	266,0	19
26147	25 G 0,75	14,5	180,0	273,0	19
26149	34 G 0,75	16,4	245,0	501,0	19
26150	42 G 0,75	17,6	302,0	591,0	19
26151	50 G 0,75	19,8	360,0	712,0	19
26152	61 G 0,75	20,9	439,0	820,0	19
26153	2 x 1	5,5	19,0	48,0	18
26154	3 G 1	6,0	29,0	56,0	18
26155	4 G 1	6,6	38,0	70,0	18
26156	5 G 1	7,2	48,0	81,0	18
26157	7 G 1	8,6	67,0	109,0	18
26158	12 G 1	10,7	115,0	191,0	18
26159	18 G 1	12,7	173,0	274,0	18
26160	20 G 1	13,5	192,0	314,0	18
26162	30 G 1	16,0	288,0	492,0	18
26163	34 G 1	17,4	326,0	640,0	18
26164	42 G 1	18,9	403,0	804,0	18
26165	50 G 1	21,0	480,0	932,0	18
26166	61 G 1	22,2	586,0	1102,0	18
26167	2 x 1,5	6,3	29,0	60,0	16

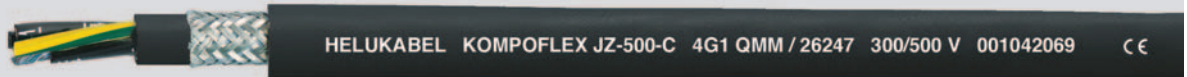
Part no.	No.cores x cross-sec. mm <sup>2</sup>	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
26168	3 G 1,5	6,7	43,0	79,0	16
26169	4 G 1,5	7,3	58,0	98,0	16
26170	5 G 1,5	8,2	72,0	112,0	16
26171	7 G 1,5	9,8	101,0	159,0	16
26172	12 G 1,5	12,1	173,0	280,0	16
26173	18 G 1,5	14,5	259,0	420,0	16
26174	20 G 1,5	15,2	288,0	480,0	16
26175	25 G 1,5	17,8	360,0	604,0	16
26176	34 G 1,5	19,8	490,0	812,0	16
26177	42 G 1,5	21,4	605,0	1002,0	16
26178	50 G 1,5	23,7	720,0	1240,0	16
26179	61 G 1,5	25,3	878,0	1421,0	16
26180	2 x 2,5	7,6	48,0	99,0	14
26181	3 G 2,5	8,3	72,0	136,0	14
26182	4 G 2,5	9,1	96,0	170,0	14
26183	5 G 2,5	10,2	120,0	204,0	14
26184	7 G 2,5	12,1	168,0	281,0	14
26185	12 G 2,5	15,2	288,0	487,0	14
26186	18 G 2,5	18,1	432,0	704,0	14
26187	25 G 2,5	22,2	600,0	909,0	14
26189	3 G 4	9,9	115,0	224,0	12
26190	4 G 4	11,0	154,0	289,0	12
26191	5 G 4	12,1	192,0	357,0	12
26192	7 G 4	13,3	269,0	451,0	12
26193	12 G 4	18,3	461,0	782,0	12
26195	3 G 6	11,7	173,0	345,0	10
26196	4 G 6	13,0	230,0	417,0	10
26197	5 G 6	14,5	288,0	521,0	10
26198	7 G 6	16,0	403,0	622,0	10
26199	3 G 10	15,0	288,0	537,0	8
26200	4 G 10	16,8	384,0	699,0	8
26201	5 G 10	18,7	480,0	851,0	8
26202	7 G 10	20,6	672,0	1102,0	8
26204	4 G 16	19,7	614,0	1028,0	6
26206	7 G 16	24,4	1075,0	1772,0	6
26208	4 G 25	25,2	960,0	1577,0	4
26212	4 G 35	29,0	1344,0	2097,0	2
26215	4 G 50	33,4	1920,0	2914,0	1
26216	5 G 50	37,2	2400,0	3919,0	1

Dimensions and specifications may be changed without prior notice. (RA05)

# KOMPOFLEX® JZ-500-C halogen-free, microbes resistant, Cu-screened, EMC-preferred type, meter marking

EAC

A



## Technical data

- Screened microbes resistant, halogen-free special control cable in adapted to DIN VDE 0285-525-2-51 / DIN EN 50525-2-51
- **Temperature range**  
flexing -30°C to +90°C  
fixed installation -40°C to +100°C
- **Nominal voltage**  $U_0/U$  300/500 V
- **Test voltage**  
core/core 4000 V  
core/screen 2000 V
- **Insulation resistance**  
min. 20 MOhm x km
- **Coupling resistance**  
max. 250 Ohm/km
- **Minimum bending radius**  
flexing 7,5x cable  $\varnothing$   
fixed installation 4x cable  $\varnothing$
- **Radiation resistance**  
up to  $100 \times 10^6$  cJ/kg (up to 100 Mrad)

## Cable structure

- Tinned copper-conductor, to DIN VDE 0295 cl.5, fine-wire, BS 6360 cl.5, IEC 60228 cl.5
- Core insulation of special thermoplastic polymer
- Core identification to DIN VDE 0293 black cores with continuous white numbering
- GN-YE conductor, 3 cores and above in the outer layer
- Cores stranded in layers with optimal lay-length
- Inner sheath of special thermoplastic polymer
- Tinned copper braided screen, approx. 85% coverage
- Core wrapping of fleece guarantees easy cable stripping
- Outer sheath of special thermoplastic polymer
- Sheath colour black (RAL 9005)
- with meter marking

## Properties

- **Resistant to**  
UV-radiation, Oxygene, Ozone, Microbes, Hydrofluoric acid, Hydrochloric acid and diluted sulfuric acid
- Low adhesion
- The materials used in manufacture are cadmium-free and contain no silicone and free from substances harmful to the wetting properties of lacquers

## Note

- G = with green-yellow conductor  
x = without green-yellow conductor (OZ)
- AWG sizes are approximate equivalent values. The actual cross-section is in mm<sup>2</sup>.
- unscreened analogue type:  
**KOMPOFLEX® JZ-500**, confer page 112

## Application

Extremely robust universal cable. This cable is specially installed in rubbish, sewage-treatment plants, composting works, animal stalls and greenhouses. The inner sheaths of those cables raise the mechanical stress. Suitable for installation for flexible use for medium mechanical, stresses with free movement without tensile stress or forced movements in dry, moist and wet rooms as well as outside. The high flexibility of this cable type makes it quick and easy to install. This screened cable is ideal for use in data signal transmission free from interferences for measurement and control engineering technology.

**EMC** = Electromagnetic compatibility

To optimize the EMC features we recommend a large round contact of the copper braiding on both ends.

**CE** = The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer $\varnothing$ approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.	Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer $\varnothing$ approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
26217	2 x 0,5	6,9	41,0	68,0	20	26245	2 x 1,5	7,9	54,0	98,0	18
26218	3 G 0,5	7,2	45,0	84,0	20	26246	3 G 1	8,2	64,0	102,0	18
26219	4 G 0,5	7,8	54,0	95,0	20	26247	4 G 1	8,9	76,0	145,0	18
26220	5 G 0,5	8,3	66,0	107,0	20	26248	5 G 1	9,5	89,0	171,0	18
26221	7 G 0,5	9,5	79,0	135,0	20	26249	7 G 1	11,0	114,0	210,0	18
26222	12 G 0,5	11,3	137,0	195,0	20	26250	12 G 1	13,1	186,0	330,0	18
26223	18 G 0,5	13,1	156,0	278,0	20	26251	18 G 1	15,4	284,0	488,0	18
26224	20 G 0,5	13,8	173,0	310,0	20	26252	20 G 1	16,0	325,0	545,0	18
26225	25 G 0,5	15,7	250,0	406,0	20	26253	25 G 1	18,3	387,0	690,0	18
26226	30 G 0,5	16,0	297,0	520,0	20	26254	30 G 1	18,8	457,0	770,0	18
26227	34 G 0,5	17,4	316,0	571,0	20	26255	34 G 1	20,3	500,0	811,0	18
26228	42 G 0,5	18,9	360,0	651,0	20	26256	42 G 1	21,8	590,0	996,0	18
26229	50 G 0,5	20,9	407,0	760,0	20	26257	50 G 1	24,0	681,0	1320,0	18
26230	61 G 0,5	22,9	520,0	911,0	20	26258	61 G 1	26,2	710,0	1480,0	18
26231	2 x 0,75	7,6	46,0	88,0	19	26259	2 x 1,5	8,4	64,0	130,0	16
26232	3 G 0,75	7,8	57,0	98,0	19	26260	3 G 1,5	9,0	82,0	154,0	16
26233	4 G 0,75	8,3	63,0	112,0	19	26261	4 G 1,5	9,6	99,0	165,0	16
26234	5 G 0,75	9,1	76,0	130,0	19	26262	5 G 1,5	10,5	123,0	197,0	16
26235	7 G 0,75	10,4	100,0	185,0	19	26263	7 G 1,5	12,1	148,0	305,0	16
26236	12 G 0,75	12,5	175,0	294,0	19	26264	12 G 1,5	14,9	274,0	435,0	16
26237	18 G 0,75	14,3	240,0	357,0	19	26265	18 G 1,5	17,1	386,0	642,0	16
26238	20 G 0,75	15,2	262,0	404,0	19	26266	20 G 1,5	18,0	401,0	718,0	16
26239	25 G 0,75	17,6	306,0	510,0	19	26267	25 G 1,5	20,7	531,0	803,0	16
26240	30 G 0,75	18,1	340,0	561,0	19	26268	30 G 1,5	21,1	598,0	961,0	16
26241	34 G 0,75	19,5	346,0	670,0	19	26269	34 G 1,5	22,7	671,0	1060,0	16
26242	42 G 0,75	20,9	410,0	960,0	19	26270	42 G 1,5	24,4	890,0	1300,0	16
26243	50 G 0,75	23,2	470,0	1104,0	19	26271	50 G 1,5	26,8	997,0	1677,0	16
26244	61 G 0,75	25,0	550,0	1270,0	19	26272	61 G 1,5	29,6	1120,0	1971,0	16

Continuation ▶

# KOMPOFLEX® JZ-500-C halogen-free, microbes resistant, Cu-screened, EMC-preferred type, meter marking



Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
26273	2 x 2,5	10,0	110,0	180,0	14
26274	3 G 2,5	10,7	148,0	215,0	14
26275	4 G 2,5	11,4	169,0	268,0	14
26276	5 G 2,5	12,5	220,0	349,0	14
26277	7 G 2,5	15,0	284,0	404,0	14
26278	12 G 2,5	18,0	470,0	710,0	14
26279	18 G 2,5	21,2	572,0	891,0	14
26280	25 G 2,5	25,5	740,0	1104,0	14
26281	2 x 4	11,6	124,0	300,0	12
26282	3 G 4	12,3	178,0	340,0	12
26283	4 G 4	13,4	234,0	408,0	12
26284	5 G 4	14,8	284,0	504,0	12
26285	7 G 4	16,2	321,0	640,0	12
26286	12 G 4	21,8	581,0	894,0	12
26287	2 x 6	13,5	176,0	391,0	10
26288	3 G 6	14,2	245,0	453,0	10
26289	4 G 6	15,6	316,0	560,0	10
26290	5 G 6	17,0	442,0	680,0	10
26291	7 G 6	18,7	530,0	891,0	10

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
26292	3 G 10	17,8	367,0	730,0	8
26293	4 G 10	19,7	549,0	1004,0	8
26294	5 G 10	21,6	604,0	1170,0	8
26295	7 G 10	24,0	820,0	1405,0	8
26296	3 G 16	20,7	653,0	894,0	6
26297	4 G 16	22,6	807,0	1311,0	6
26298	5 G 16	25,2	940,0	1550,0	6
26299	7 G 16	27,6	1345,0	1820,0	6
26300	3 G 25	26,0	920,0	1430,0	4
26301	4 G 25	28,9	1169,0	1894,0	4
26302	5 G 25	31,8	1420,0	2272,0	4
26303	4 G 35	33,4	1680,0	2310,0	2
26304	5 G 35	37,2	2020,0	2740,0	2
26305	4 G 50	38,2	2370,0	3270,0	1
26306	5 G 50	43,0	2880,0	4080,0	1

Dimensions and specifications may be changed without prior notice. (RA05)



# HYGIENIC CABLE



**NANOFLEX® HC\* 500** cut-resistant, meter marking

HELUKABEL NANOFLEX® HC 500 3G1,5QMM/27071 300/500V 001091204 CE

**Technical data**

- Special PUR sheathed cable acc. to DIN VDE 0285-525-1 / DIN EN 50525-1
- **Temperature range**  
flexing -5°C to +80°C  
fixed installation -40°C to +80°C
- **Nominal voltage** U<sub>0</sub>/U 300/500 V
- **Test voltage** 4000 V
- **Breakdown voltage** min. 8000 V
- **Insulation resistance**  
min. 20 MOhm x km
- **Minimum bending radius**  
flexing 7,5x cable Ø  
fixed installation 4x cable Ø
- **Radiation resistance**  
up to 100x10<sup>6</sup> cJ/kg (up to 100 Mrad)

**Cable structure**

- Bare copper-conductor, to DIN VDE 0295 cl.5, fine-wire, BS 6360 cl.5, IEC 60228 cl.5
- Core insulation of special PVC compound type T12 to DIN VDE 0207-363-3 / DIN EN 50363-3
- Core identification to DIN VDE 0293 black cores with continuous white numbering
- GN-YE conductor, 3 cores and above in the outer layer
- Cores stranded in layers with optimal lay-length
- Outer sheath of special **full-polyurethane** compound type TMPU to DIN EN 50363-10-2
- Sheath colour light grey (RAL 7035)
- with meter marking

**Properties**

- Resistant to UV radiation, Oxygen, Ozone, Hydrolysis, Microbes
- The materials used in manufacture are cadmium-free and contain no silicone and free from substances harmful to the wetting properties of lacquers
- Good cleaning properties
- Resistant to all standard detergents

**Note**

- G = with green-yellow conductor  
x = without green-yellow conductor (OZ)
- AWG sizes are approximate equivalent values. The actual cross-section is in mm<sup>2</sup>.
- screened analogue type: **NANOFLEX®HC 500-C**, confer page 117
- \*Hygienic Cable

**Application**

Special PUR cable for the food and beverage industry; outer sheath with antimicrobial properties increases process reliability in all applications in which food and beverages are processed unpacked and unsealed, e. g. processing of dairy products, meat, fish; production of convenience foods, brewery and beverage industry.

CE= The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

Part no.	No.cores x cross-sec. mm <sup>2</sup>	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
27031	2 x 0,5	4,8	10,0	45,0	20
27032	3 G 0,5	5,1	14,0	55,0	20
27033	3 x 0,5	5,1	14,0	55,0	20
27034	4 G 0,5	5,5	19,0	65,0	20
27035	4 x 0,5	5,5	19,0	65,0	20
27036	5 G 0,5	6,2	24,0	75,0	20
27037	5 x 0,5	6,2	24,0	75,0	20
27038	7 G 0,5	7,2	34,0	90,0	20
27039	7 x 0,5	7,2	34,0	90,0	20
27040	10 G 0,5	8,3	48,0	120,0	20
27041	12 G 0,5	8,7	58,0	135,0	20
27042	18 G 0,5	10,7	86,0	205,0	20
27043	25 G 0,5	12,6	120,0	270,0	20
27044	2 G 0,75	5,3	14,0	44,0	19
27045	3 G 0,75	5,6	22,0	53,0	19
27046	3 G 0,75	5,6	22,0	53,0	19
27047	4 G 0,75	6,3	29,0	64,0	19
27048	4 x 0,75	6,3	29,0	64,0	19
27049	5 G 0,75	6,9	36,0	76,0	19
27050	5 x 0,75	6,9	36,0	76,0	19
27051	7 G 0,75	7,5	50,0	96,0	19
27052	7 x 0,75	7,5	50,0	96,0	19
27053	10 G 0,75	9,2	72,0	140,0	19
27054	12 G 0,75	9,8	86,0	170,0	19
27055	18 G 0,75	12,2	130,0	260,0	19
27056	25 G 0,75	14,3	180,0	282,0	19
27057	2 x 1	5,6	19,0	53,0	18
27058	3 G 1	5,9	29,0	63,0	18
27059	3 x 1	5,9	29,0	63,0	18
27060	4 G 1	6,6	38,0	75,0	18

Part no.	No.cores x cross-sec. mm <sup>2</sup>	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
27061	4 x 1	6,6	38,0	75,0	18
27062	5 G 1	7,3	48,0	89,0	18
27063	5 x 1	7,3	48,0	89,0	18
27064	7 G 1	8,1	67,0	115,0	18
27065	7 x 1	8,1	67,0	115,0	18
27066	10 G 1	9,8	96,0	166,0	18
27067	12 G 1	10,4	115,0	201,0	18
27068	18 G 1	12,9	173,0	289,0	18
27069	25 G 1	15,4	240,0	380,0	18
27070	2 x 1,5	6,4	29,0	68,0	16
27071	3 G 1,5	6,8	43,0	87,0	16
27072	3 x 1,5	6,8	43,0	87,0	16
27073	4 G 1,5	7,4	58,0	106,0	16
27074	4 x 1,5	7,4	58,0	106,0	16
27075	5 G 1,5	8,3	72,0	131,0	16
27076	5 x 1,5	8,3	72,0	131,0	16
27077	7 G 1,5	10,9	101,0	173,0	16
27078	7 x 1,5	10,9	101,0	173,0	16
27079	12 G 1,5	11,8	173,0	293,0	16
27080	18 G 1,5	14,6	259,0	454,0	16
27081	25 G 1,5	17,4	360,0	641,0	16
27082	2 x 2,5	7,8	48,0	110,0	14
27083	3 G 2,5	8,3	72,0	146,0	14
27084	4 G 2,5	9,2	96,0	183,0	14
27085	5 G 2,5	10,1	120,0	222,0	14
27086	7 G 2,5	11,2	168,0	293,0	14
27087	12 G 2,5	14,8	288,0	512,0	14
27088	4 G 4	10,9	154,0	291,0	12
27089	5 G 4	12,1	192,0	355,0	12

Dimensions and specifications may be changed without prior notice. (RA02)



Suitable accessories can be found in Chapter X.

- Cable Gland - HELUTOP® HT-Clean

# NANOFLEX® HC\* 500-C EMC preferred type, cut-resistant, screened, no inner sheath, meter marking

EAC

A



HELUKABEL NANOFLEX® HC 500-C 3G,075QMM/27120 300/500V 001091104 C€



## Technical data

- Special PUR sheathed cable adapted to DIN VDE 0285-525-1 / DIN EN 50525-1
- **Temperature range**  
flexing -5°C to +80°C  
fixed installation -40°C to +80°C
- **Nominal voltage** U<sub>0</sub>/U 300/500 V
- **Test voltage** 3000 V
- **Breakdown voltage** min. 6000 V
- **Insulation resistance**  
Min. 20 MOhm x km
- **Coupling resistance**  
max. 250 Ohm/km
- **Minimum bending radius**  
flexing 10x cable Ø  
fixed installation 5x cable Ø
- **Radiation resistance**  
up to 100x10<sup>6</sup> cJ/kg (up to 100 Mrad)

## Cable structure

- Bare copper-conductor, to DIN VDE 0295 cl.5, fine-wire, BS 6360 cl.5, IEC 60228 cl.5
- Core insulation special PVC compound type TI2 to DIN VDE 0207-363-3 / DIN EN 50363-3
- Core identification to DIN VDE 0293 black cores with continuous white numbering
- GN-YE conductor, 3 cores and above in the outer layer
- Cores stranded in layers with optimal lay-length
- Separating foil
- Tinned copper braided screen, approx. 85% coverage
- Outer sheath of special **full-polyurethane** compound type TMPU to DIN EN 50363-10-2
- Sheath colour light grey (RAL 7035)
- With meter marking

## Properties

- Resistant to UV radiation, Oxygen, Ozone, Hydrolysis, Microbes
- The materials used in manufacture are cadmium-free and contain no silicone and free from substances harmful to the wetting properties of lacquers
- Good cleaning properties
- Resistant to all standard detergents

## Note

- G = with green-yellow conductor  
x = without green-yellow conductor (OZ)
- AWG sizes are approximate equivalent values. The actual cross-section is in mm<sup>2</sup>.
- Unscreened analogue type: **NANOFLEX® HC 500**, confer page 116
- \*Hygienic Cable

## Application

Screened special PUR cable for the food and beverage industry; outer sheath with antimicrobial properties increases process reliability in all applications in which food and beverages are processed unpacked and unsealed, e. g. processing of dairy products, meat, fish; production of convenience foods, brewery and beverage industry.

EMC = Electromagnetic compatibility

To optimize the EMC features we recommend a large round contact of the copper braiding on both ends.

C€ = The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

Part no.	No.cores x cross-sec. mm <sup>2</sup>	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.	Part no.	No.cores x cross-sec. mm <sup>2</sup>	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
27105	2 x 0,5	5,7	35,0	47,0	20	27135	4 G 1	7,2	71,0	100,0	18
27107	3 G 0,5	5,9	42,0	57,0	20	27136	5 x 1	8,0	88,0	128,0	18
27106	3 x 0,5	5,9	42,0	57,0	20	27137	5 G 1	8,0	88,0	128,0	18
27108	4 G 0,5	6,4	47,0	60,0	20	27138	7 x 1	8,7	111,0	157,0	18
27109	4 x 0,5	6,4	47,0	60,0	20	27139	7 G 1	8,7	111,0	157,0	18
27110	5 x 0,5	6,9	56,0	75,0	20	27140	10 G 1	11,2	150,0	230,0	18
27111	5 G 0,5	6,9	56,0	75,0	20	27141	12 G 1	11,4	184,0	262,0	18
27112	7 G 0,5	7,6	69,0	97,0	20	27142	18 G 1	13,6	260,0	381,0	18
27113	7 x 0,5	7,6	69,0	97,0	20	27143	25 G 1	16,2	349,0	535,0	18
27114	10 G 0,5	9,6	94,0	133,0	20	27144	2 x 1,5	7,0	63,0	87,0	16
27115	12 G 0,5	9,7	108,0	158,0	20	27145	3 x 1,5	7,4	80,0	102,0	16
27116	18 G 0,5	11,5	145,0	218,0	20	27146	3 G 1,5	7,4	80,0	102,0	16
27117	25 G 0,5	13,7	240,0	315,0	20	27147	4 x 1,5	8,1	97,0	127,0	16
27118	2 x 0,75	6,1	40,0	60,0	19	27148	4 G 1,5	8,1	97,0	127,0	16
27119	3 x 0,75	6,3	52,0	67,0	19	27149	5 x 1,5	9,0	119,0	159,0	16
27120	3 G 0,75	6,3	52,0	67,0	19	27150	5 G 1,5	9,0	119,0	159,0	16
27121	4 G 0,75	6,8	60,0	76,0	19	27151	7 x 1,5	9,8	147,0	207,0	16
27122	4 x 0,75	6,8	60,0	76,0	19	27152	7 G 1,5	9,8	147,0	207,0	16
27123	5 x 0,75	7,4	71,0	92,0	19	27153	12 G 1,5	12,8	267,0	340,0	16
27124	5 G 0,75	7,4	71,0	92,0	19	27154	18 G 1,5	15,6	374,0	480,0	16
27125	7 G 0,75	8,2	91,0	131,0	19	27155	25 G 1,5	18,4	526,0	704,0	16
27126	7 x 0,75	8,2	91,0	131,0	19	27156	2 x 2,5	8,4	96,0	131,0	14
27127	10 G 0,75	10,3	137,0	180,0	19	27157	3 G 2,5	8,8	144,0	168,0	14
27128	12 G 0,75	10,5	142,0	204,0	19	27158	4 G 2,5	9,8	148,0	194,0	14
27129	18 G 0,75	12,7	212,0	290,0	19	27159	5 G 2,5	10,8	181,0	222,0	14
27130	25 G 0,75	15,0	281,0	413,0	19	27160	7 G 2,5	11,9	255,0	345,0	14
27131	2 x 1	6,4	50,0	66,0	18	27161	12 G 2,5	15,8	441,0	570,0	14
27132	3 G 1	6,7	60,0	82,0	18	27162	4 G 4	11,6	230,0	310,0	12
27133	3 x 1	6,7	60,0	82,0	18	27163	5 G 4	12,8	273,0	386,0	12
27134	4 x 1	7,2	71,0	100,0	18						

Dimensions and specifications may be changed without prior notice. (RA02)

# NANOFLEX® HC\*TRONIC flexible, colour code to DIN 47100, meter marking



HELUKABEL NANOFLEX® HC TRONIC 7x0,34QMMM/27202 001091147 CE



## Technical data

- Special-PUR data cable adapted to DIN VDE 0812
- **Temperature range**  
flexing -5°C to +80°C  
fixed installation -40°C to +80°C
- **Peak operating voltage**  
(not for purposes of high current and power installation)  
0,14 mm<sup>2</sup> = 350 V  
≥ 0,25 mm<sup>2</sup> = 500 V
- **Test voltage**  
up to 0,25 mm<sup>2</sup> 1200 V  
from 0,34 mm<sup>2</sup> 2000 V
- **Breakdown voltage**  
up to 0,25 mm<sup>2</sup> 2400 V  
from 0,34 mm<sup>2</sup> 4000 V
- **Insulation resistance**  
min. 20 MOhm x km
- **Operating capacity**  
(approx. value) at 800 Hz  
0,14 mm<sup>2</sup> 120 pF/m  
≥ 0,25 mm<sup>2</sup> 150 pF/m
- **Inductance**  
approx. 0,65 mH/km
- **Impedance**  
approx. 78 Ohm
- **Minimum bending radius**  
flexing 7,5x cable Ø  
fixed installation 4x cable Ø
- **Radiation resistance**  
up to 100x10<sup>6</sup> cJ/kg (up to 100 Mrad)

## Cable structure

- Bare copper-conductor, from 0,5 mm<sup>2</sup> to DIN VDE 0295 cl.5, fine-wire, BS 6360 cl.5, IEC 60228 cl.5
- Conductor construction:  
0,14 mm<sup>2</sup> = 18x0,1 mm  
0,25 mm<sup>2</sup> = 14x0,15 mm  
0,34 mm<sup>2</sup> = 7x0,25 mm
- Core insulation of special PVC compound type T12 to DIN VDE 0207-363-3 / DIN EN 50363-3
- Core identification to DIN 47100, without colour repetition
- Cores stranded in layers with optimal lay-lengths
- Outer sheath of special **full polyurethane** compound type TMPU to DIN EN 50363-10-2
- Sheath colour light grey (RAL 7035)
- with meter marking

## Properties

- Resistant to UV radiation, oxygen, ozone, hydrolysis, microbes
- The materials used in manufacture are cadmium-free and contain no silicone and free from substances harmful to the wetting properties of lacquers
- Good cleaning properties
- Resistant to all standard detergents

## Note

- Screened analogue type: **NANOFLEX®HC TRONIC-C**, confer page 120
- \*Hygienic Cable

## Application

Special PUR data cable for the food and beverage industry; outer sheath with antimicrobial properties increases process reliability in all applications in which food and beverages are processed unpacked and unsealed, e. g. processing of dairy products, meat, fish; production of convenience foods, brewery and beverage industry.

CE= The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
27164	2 x 0,14	3,5	3,0	13,0	26
27165	3 x 0,14	3,7	4,0	16,0	26
27166	4 x 0,14	3,9	5,0	19,0	26
27167	5 x 0,14	4,3	7,0	22,0	26
27168	6 x 0,14	4,6	8,0	25,0	26
27169	7 x 0,14	4,6	9,0	28,0	26
27170	8 x 0,14	5,5	11,0	35,0	26
27171	10 x 0,14	5,9	13,0	41,0	26
27172	12 x 0,14	6,1	16,0	48,0	26
27173	14 x 0,14	6,3	19,0	53,0	26
27174	16 x 0,14	6,9	22,0	59,0	26
27175	18 x 0,14	7,2	24,0	65,0	26
27176	20 x 0,14	7,5	27,0	70,0	26
27177	21 x 0,14	7,6	28,0	77,0	26
27178	24 x 0,14	8,5	32,0	87,0	26
27179	25 x 0,14	8,6	34,0	91,0	26

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
27180	2 x 0,25	3,8	5,0	18,0	24
27181	3 x 0,25	4,0	7,0	22,0	24
27182	4 x 0,25	4,3	10,0	26,0	24
27183	5 x 0,25	4,7	12,0	30,0	24
27184	6 x 0,25	5,3	14,0	36,0	24
27185	7 x 0,25	5,3	17,0	42,0	24
27186	8 x 0,25	6,1	19,0	49,0	24
27187	10 x 0,25	6,8	24,0	57,0	24
27188	12 x 0,25	7,0	29,0	66,0	24
27189	14 x 0,25	7,3	34,0	75,0	24
27190	16 x 0,25	7,7	38,0	84,0	24
27191	18 x 0,25	8,3	43,0	92,0	24
27192	19 x 0,25	8,3	46,0	98,0	24
27193	20 x 0,25	8,7	48,0	101,0	24
27194	21 x 0,25	8,8	50,0	107,0	24
27195	24 x 0,25	9,8	60,0	120,0	24
27196	25 x 0,25	10,0	61,0	132,0	24

Continuation ▶



# NANOFLEX® HC\*TRONIC flexible, colour code to DIN 47100, meter marking

EAC

A

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
27197	2 x 0,34	4,2	7,0	22,0	22
27198	3 x 0,34	4,4	10,0	30,0	22
27199	4 x 0,34	4,8	13,0	43,0	22
27200	5 x 0,34	5,4	16,0	54,0	22
27201	6 x 0,34	5,9	20,0	58,0	22
27202	7 x 0,34	5,9	23,0	61,0	22
27203	8 x 0,34	7,1	26,0	73,0	22
27204	10 x 0,34	7,6	33,0	82,0	22
27205	12 x 0,34	7,8	39,0	102,0	22
27206	14 x 0,34	8,4	46,0	108,0	22
27207	16 x 0,34	8,8	52,0	126,0	22
27208	18 x 0,34	9,3	59,0	143,0	22
27209	20 x 0,34	1,0	65,0	160,0	22
27210	21 x 0,34	10,1	69,0	166,0	22
27211	24 x 0,34	11,2	78,0	186,0	22
27212	25 x 0,34	11,4	82,0	192,0	22
27213	2 x 0,5	4,6	10,0	40,0	20
27214	3 x 0,5	4,9	14,0	46,0	20
27215	4 x 0,5	5,5	19,0	55,0	20
27216	5 x 0,5	6,0	24,0	64,0	20
27217	6 x 0,5	6,8	29,0	73,0	20

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
27218	7 x 0,5	6,8	34,0	81,0	20
27219	8 x 0,5	7,8	38,0	97,0	20
27220	10 x 0,5	8,7	48,0	116,0	20
27221	12 x 0,5	8,9	58,0	135,0	20
27222	16 x 0,5	10,0	77,0	168,0	20
27223	20 x 0,5	11,2	96,0	213,0	20
27224	24 x 0,5	12,7	116,0	241,0	20
27225	2 x 0,75	5,2	14,0	47,0	19
27226	3 x 0,75	5,5	22,0	54,0	19
27227	4 x 0,75	6,0	29,0	66,0	19
27228	5 x 0,75	6,7	36,0	80,0	19
27229	7 x 0,75	7,4	50,0	110,0	18
27230	8 x 0,75	8,7	58,0	125,0	19
27231	10 x 0,75	9,6	72,0	148,0	19
27232	12 x 0,75	9,9	86,0	176,0	19
27233	16 x 0,75	11,1	115,0	220,0	19
27234	20 x 0,75	12,5	144,0	276,0	19

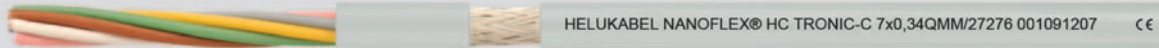
Dimensions and specifications may be changed without prior notice. (RA02)



Suitable accessories can be found in Chapter X.

- Cable Gland - HELUTOP® HT-Clean

# NANOFLEX® HC\*TRONIC-C EMC preferred type, flexible, colour code to DIN 47100, screened, meter marking



## Technical data

- Special-PUR data cable for electronic control adapted to DIN VDE 0812
- **Temperature range**  
flexing -5°C to +80°C  
fixed installation -40°C to +80°C
- **Peak operating voltage**  
(not for purposes of high current and power installation)  
0,14 mm<sup>2</sup> = 350 V  
≥ 0,25 mm<sup>2</sup> = 500 V
- **Test voltage**  
core/core 1200 V  
core/screen 800 V
- **Breakdown voltage**  
min. 2400 V
- **Insulation resistance**  
min. 200 MOhm x km
- **Operating capacity**  
(approx.-value) at 800 Hz  
core/core at 0,14 mm<sup>2</sup> = 120 pF/m  
core/core ≥ 0,25 mm<sup>2</sup> = 150 pF/m  
core/screen at 0,14 mm<sup>2</sup> = 240 pF/m  
core/screen ≥ 0,25 mm<sup>2</sup> = 270 pF/m
- **Inductance**  
approx. 0,65 mH/km
- **Impedance**  
approx. 78 Ohm
- **Coupling resistance**  
max. 250 Ohm/km
- **Minimum bending radius**  
flexing 10x cable Ø  
fixed installation 5x cable Ø
- **Radiation resistance**  
up to 100x10<sup>6</sup> cJ/kg (up to 100 Mrad)

## Cable structure

- Bare copper-conductor, from 0,5 mm<sup>2</sup> to DIN VDE 0295 cl.5, fine-wire, BS 6360 cl.5, IEC 60228 cl.5
- Conductor construction:  
0,14 mm<sup>2</sup> = 18x0,1 mm  
0,25 mm<sup>2</sup> = 14x0,15 mm  
0,34 mm<sup>2</sup> = 7x0,25 mm
- Core insulation of special PVC compound type T12 to DIN VDE 0207-363-3 / DIN EN 50363-3
- Core identification to DIN 47100, without colour repetition
- Cores stranded in layers with optimal lay-length
- Separating foil
- Drain stranded wire, tinned copper
- Tinned copper braided screen, approx. 85% coverage
- Outer sheath of special **full polyurethane** compound type TMPU to DIN EN 50363-10-2
- Sheath colour light grey (RAL 7035)
- with meter marking

## Properties

- Resistant to UV radiation, oxygen, ozone, hydrolysis, microbes
- The materials used in manufacture are cadmium-free and contain no silicone and free from substances harmful to the wetting properties of lacquers
- Good cleaning properties
- Resistant to all standard detergents

## Note

- AWG sizes are approximate equivalent values. The actual cross-section is in mm<sup>2</sup>.
- unscreened analogue type: **NANOFLEX®HC TRONIC**, confer page 118
- \*Hygienic Cable

## Application

Special PUR cable for the food and beverage industry; outer sheath with antimicrobial properties increases process reliability in all applications in which food and beverages are processed unpacked and unsealed, e. g. processing of dairy products, meat, fish; production of convenience foods, brewery and beverage industry.

**EMC** = Electromagnetic compatibility

To optimize the EMC features we recommend a large round contact of the copper braiding on both ends.

CE= The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

Part no.	No.cores x cross-sec. mm <sup>2</sup>	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
27235	1 x 0,14	2,6	6,0	16,0	26
27236	2 x 0,14	3,9	12,0	20,0	26
27237	3 x 0,14	4,0	13,0	27,0	26
27238	4 x 0,14	4,3	15,0	32,0	26
27239	5 x 0,14	4,7	16,0	37,0	26
27240	6 x 0,14	5,2	18,0	42,0	26
27241	7 x 0,14	5,2	19,0	48,0	26
27242	8 x 0,14	5,9	21,0	55,0	26
27243	10 x 0,14	6,5	29,0	65,0	26
27244	12 x 0,14	6,7	31,0	77,0	26
27245	14 x 0,14	6,9	32,0	79,0	26
27246	16 x 0,14	7,3	43,0	89,0	26
27247	18 x 0,14	7,6	51,0	103,0	26
27248	20 x 0,14	8,3	55,0	116,0	26
27249	21 x 0,14	8,4	56,0	120,0	26
27250	24 x 0,14	8,9	62,0	131,0	26
27251	25 x 0,14	9,1	61,0	136,0	26

Part no.	No.cores x cross-sec. mm <sup>2</sup>	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
27252	1 x 0,25	3,0	7,0	27,0	24
27253	2 x 0,25	4,3	16,0	31,0	24
27254	3 x 0,25	4,5	19,0	36,0	24
27255	4 x 0,25	4,8	22,0	40,0	24
27256	5 x 0,25	5,4	27,0	51,0	24
27257	6 x 0,25	5,8	32,0	58,0	24
27258	7 x 0,25	5,8	35,0	64,0	24
27259	8 x 0,25	7,0	42,0	82,0	24
27260	10 x 0,25	7,3	50,0	85,0	24
27261	12 x 0,25	7,5	58,0	90,0	24
27262	14 x 0,25	8,1	62,0	144,0	24
27263	16 x 0,25	8,5	67,0	110,0	24
27264	18 x 0,25	9,1	78,0	142,0	24
27265	19 x 0,25	9,1	79,0	146,0	24
27266	20 x 0,25	9,5	152,0	88,0	24
27267	21 x 0,25	9,6	91,0	150,0	24
27268	24 x 0,25	10,4	96,0	163,0	24

Continuation ▶

# NANOFLEX® HC\*TRONIC-C EMC preferred type, flexible, colour code

to DIN 47100, screened, meter marking

EAC

A

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
27269	25 x 0,25	10,6	99,0	169,0	24
27270	1 x 0,34	3,2	13,0	24,0	22
27271	2 x 0,34	4,9	18,0	30,0	22
27272	3 x 0,34	5,1	22,0	37,0	22
27273	4 x 0,34	5,5	28,0	48,0	22
27274	5 x 0,34	6,0	31,0	54,0	22
27275	6 x 0,34	6,6	45,0	61,0	22
27276	7 x 0,34	6,6	51,0	67,0	22
27277	8 x 0,34	7,7	54,0	81,0	22
27278	10 x 0,34	8,4	65,0	103,0	22
27279	12 x 0,34	8,6	70,0	110,0	22
27280	14 x 0,34	9,0	81,0	153,0	22
27281	16 x 0,34	9,6	88,0	159,0	22
27282	18 x 0,34	10,1	103,0	172,0	22
27283	19 x 0,34	10,1	106,0	181,0	22
27284	20 x 0,34	10,8	112,0	191,0	22
27285	21 x 0,34	10,9	116,0	199,0	22
27286	24 x 0,34	11,7	129,0	229,0	22
27287	25 x 0,34	12,0	120,0	241,0	22
27288	1 x 0,5	3,5	15,0	40,0	20
27289	2 x 0,5	5,3	29,0	45,0	20
27290	3 x 0,5	5,6	39,0	55,0	20
27291	4 x 0,5	6,3	46,0	61,0	20
27292	5 x 0,5	6,8	52,0	76,0	20
27293	6 x 0,5	7,3	66,0	89,0	20

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
27294	7 x 0,5	7,3	68,0	98,0	20
27295	8 x 0,5	8,6	80,0	117,0	20
27296	10 x 0,5	9,4	93,0	135,0	20
27297	12 x 0,5	9,6	117,0	157,0	20
27298	14 x 0,5	10,1	122,0	190,0	20
27299	16 x 0,5	10,6	129,0	210,0	20
27300	18 x 0,5	11,3	152,0	217,0	20
27301	19 x 0,5	11,3	156,0	246,0	20
27302	20 x 0,5	12,0	173,0	275,0	20
27303	24 x 0,5	13,2	256,0	337,0	20
27304	25 x 0,5	13,7	250,0	351,0	20
27305	1 x 0,75	4,0	19,0	41,0	19
27306	2 x 0,75	5,8	38,0	59,0	19
27307	3 x 0,75	6,3	50,0	66,0	19
27308	4 x 0,75	6,8	57,0	77,0	19
27309	5 x 0,75	7,4	70,0	93,0	19
27310	6 x 0,75	8,2	87,0	113,0	19
27311	7 x 0,75	8,2	96,0	130,0	19
27312	8 x 0,75	9,7	110,0	145,0	19
27313	10 x 0,75	10,3	140,0	180,0	19
27314	12 x 0,75	10,5	151,0	202,0	19
27315	14 x 0,75	11,3	167,0	225,0	19
27316	16 x 0,75	11,9	183,0	275,0	19
27317	18 x 0,75	12,7	207,0	292,0	19
27318	19 x 0,75	12,7	221,0	322,0	19
27319	20 x 0,75	13,6	238,0	362,0	19
27320	24 x 0,75	14,9	270,0	435,0	19
27321	25 x 0,75	15,0	278,0	415,0	19

Dimensions and specifications may be changed without prior notice. (RA02)



Suitable accessories can be found in Chapter X.

- Cable Gland - HELUTOP® HT-Clean

VERTEILERFLEX

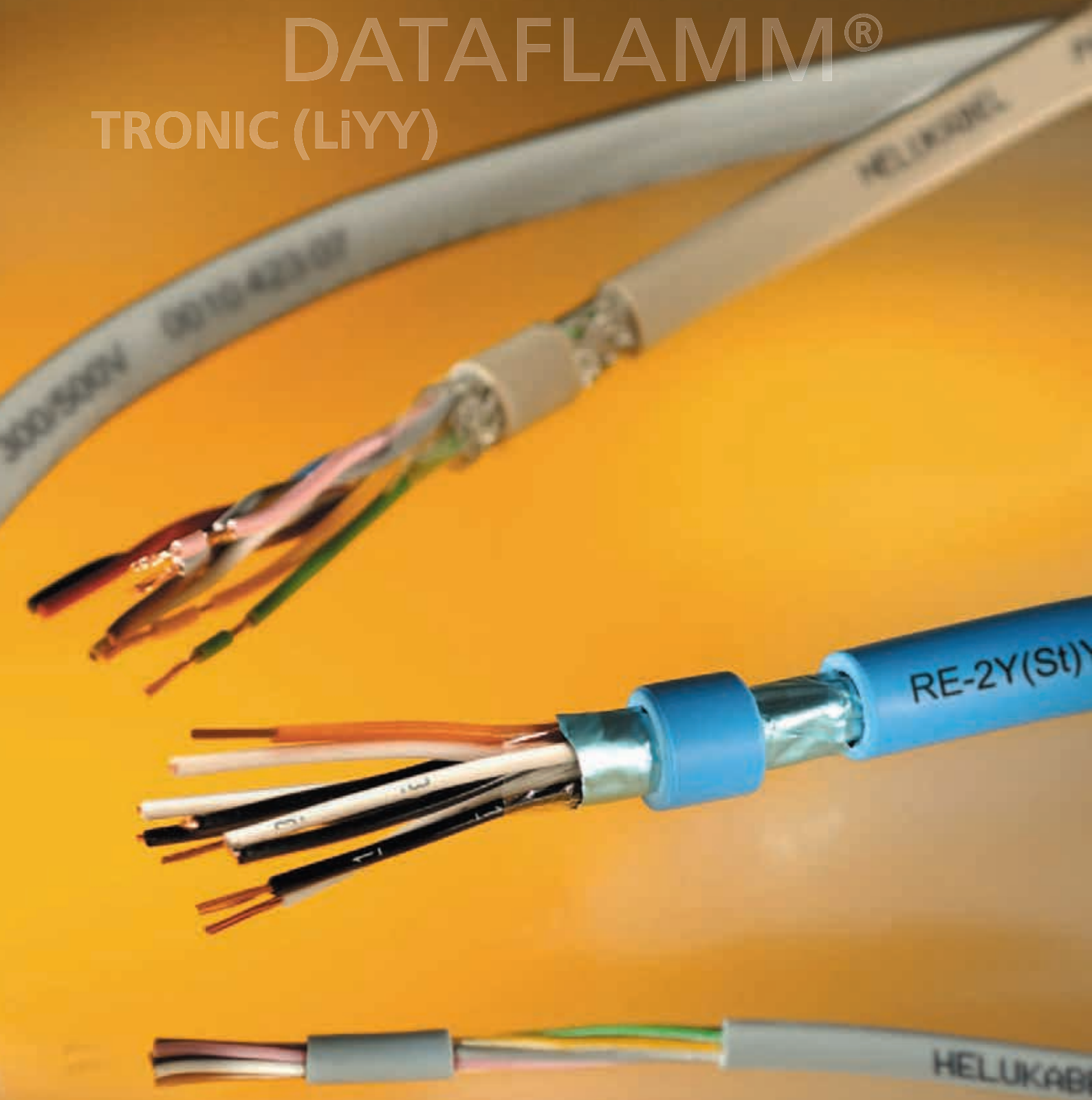
PAAR-TRONIC

PAAR-TRONIC-Li-2YCYv

**SENSORFLEX®**

DATAFLAMM®

TRONIC (LiYY)





# DATA & COMPUTER CABLES

Temperature (°C) - flexing  
 Temperature (°C) - fixed  
 Nominal voltage U<sub>0</sub>/U  
 Operating top level voltage  
 Bending radius - flexing x Ø  
 Bending radius - fixed x Ø  
 Halogen-free  
 UV-resistant  
 Outdoor use  
 Drag chain  
 Colored cores/VDE 0293  
 Screened/shielded  
 HAR/VDE REG no./VDE  
 UL/CSA  
 Page

Data & computer cables													
TRONIC (LiYY)	-5 to +80	-40 to +80	350	7.5x	4x						X	124	
PAAR-TRONIC	-5 to +80	-30 to +80	350	7.5x	4x						X	126	
SENSORFLEX®	-5 to +80	-30 to +80	350	7.5/15x						(X)	X	128	
VERTEILERFLEX	-5 to +80	-30 to +80	300/500	7.5/15x						(X)	X	129	
DATAFLAMM®	+5 to +70	-40 to +70	350	7.5x	7.5x	X					X	130	
TRONIC-CY (LiY-CY)	-5 to +80	-40 to +80	350	10x	5x						X	X	131
PAAR-TRONIC-CY	-5 to +80	-30 to +80	350	10x	5x						X	X	133
PAAR-CY-OZ	-5 to +80	-40 to +80	300/500	10x	5x							X	135
PAAR-TRONIC-CY-CY (LiYCY-CY)	-5 to +80	-40 to +80	350	12x	6x						X	X	136
PAAR-TRONIC-Li-2YCV	-5 to +70	-30 to +80	250	12x	7.5x			X			X	X	138
PAAR-TRONIC-Li-2YCY	-5 to +70	-30 to +80	250	12x	7.5x						X	X	139
LiYCY	-5 to +70	-40 to +70	350	10x	5x						X	X	140
TRONIC 1-CY	-5 to +80	-40 to +80	250	10x	5x						X	X	141
TRONIC 2-CY	-5 to +80	-40 to +80	350	10x	5x						X	X	142
LiY-TPC-Y	-5 to +70	-30 to +70	500	12x	7.5x						X	X	143
DATAPUR®-C	-5 to +80	-40 to +80	350	10x	5x		X	X			X	X	144
DATAFLAMM®-C	+5 to +70	-40 to +70	350	7.5x	7.5x	X					X	X	145
DATAFLAMM®-C-PAAR	+5 to +70	-40 to +70	350	7.5x	7.5x	X					X	X	146
EDV-PIMF-CY	-5 to +80	-20 to +80	300	10x	5x						X	X	147
RD-Y(St)Y	-5 to +50	-40 to +70	600	7.5x	7.5x						X	X	148
RD-Y(St)Yv / RD-Y(St)YY	-5 to +50	-40 to +70	600	7.5x	7.5x			X			X	X	149
RE-2Y(St)YV	-5 to +50	-40 to +70	300	7.5x	7.5x			X			X	X	150
RE-2Y(St)YV PIMF	-5 to +50	-40 to +70	300	7.5x	7.5x			X			X	X	151
JE-Y(St)Y	-5 to +50	-30 to +70	225		6x						X	X	152
JE-LiYCY	-5 to +50	-30 to +70	225		6x						X	X	153
JE-LiHCH	-5 to +50	-30 to +70	225	7.5x	7.5x	X					X	X	154
RD-H(St)H	-5 to +50	-30 to +70	225	7.5x	7.5x	X		(X)			X	X	155

The selection table is intended as an initial orientation.  
 Please see the relevant page of the catalogue for detailed information on the product properties.

**TRONIC (LiYY)** flexible, colour coded to DIN 47100, meter marking

HELUKABEL TRONIC (LiYY) 10x0,25 QMM / 18036 001042209

**Technical data**

- Special-PVC data cables adapted to DIN VDE 0812
- **Temperature range**  
flexing -5°C to +80°C  
fixed installation -40°C to +80°C
- **Operating peak voltage**  
(not for purposes of high current and power installation)  
0,14 mm<sup>2</sup> = 350 V  
≥ 0,25 mm<sup>2</sup> = 500 V
- **Test voltage**  
up to 0,25 mm<sup>2</sup> 1200 V  
from 0,34 mm<sup>2</sup> 2000 V
- **Breakdown voltage**  
up to 0,25 mm<sup>2</sup> 2400 V  
from 0,34 mm<sup>2</sup> 4000 V
- **Insulation resistance**  
min. 20 MOhm x km
- **Capacitance** (approx.-value) at 800 Hz  
0,14 mm<sup>2</sup> 120 pF/m  
0,25 mm<sup>2</sup> 150 pF/m
- **Inductance** approx. 0,65 mH/km
- **Impedance** approx. 78 Ohm
- **Minimum bending radius**  
flexing 7,5x cable Ø  
fixed installation 4x cable Ø
- **Radiation resistance**  
up to 80x10<sup>6</sup> cJ/kg (up to 80 Mrad)

**Cable structure**

- Bare copper-conductor, from 0,5 mm<sup>2</sup> to DIN VDE 0295 cl.5, fine-wire, BS 6360 cl.5, IEC 60228 cl.5
- Conductor construction:  
0,14 mm<sup>2</sup> = 18x0,1 mm  
0,25 mm<sup>2</sup> = 14x0,15 mm  
0,34 mm<sup>2</sup> = 7x0,25 mm
- Core insulation of special PVC compound type T12 to DIN VDE 0207-363-3 / DIN EN 50363-3
- Core identification to DIN 47100, without colour repetition
- Cores stranded in layers with optimal lay-length
- Outer sheath of special PVC compound type TM2 to DIN VDE 0207-363-4-1 / DIN EN 50363-4-1
- Sheath colour grey (RAL 7001)
- with meter marking

**Properties**

- Extensively oil resistant, oil-/ chemical Resistance - see table Technical Informations
  - The materials used in manufacture are cadmium-free and contain no silicone and free from substances harmful to the wetting properties of lacquers
- Tests**
- PVC self-extinguishing and flame retardant acc. to DIN VDE 0482-332-1-2, DIN EN 60332-1-2, IEC 60332-1 (equivalent DIN VDE 0472 part 804 test method B)

**Note**

- Also available in paired version, see HELUKABEL®-PAAR-TRONIC
- AWG sizes are approximate equivalent values. The actual cross-section is in mm<sup>2</sup>.
- screened analogue type:  
**TRONIC-CY (LiY-CY)**, confer page 131

**Application**

These cables are used for flexible use with free movement without tensile stress or forced movements in dry, moist and wet rooms but not suitable for open air, wherever the construction requirements call for a minimum outer diameter, TRONIC is the suitable cable to use. This applies especially to such areas as tool making and machine industries as well as electronic, computer, measurement and control sectors.

CE= The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
18001	2 x 0,14	3,5	2,7	13,0	26
18002	3 x 0,14	3,7	4,0	16,0	26
18003	4 x 0,14	3,9	5,4	19,0	26
18004	5 x 0,14	4,3	6,7	22,0	26
18005	6 x 0,14	4,6	8,1	25,0	26
18006	7 x 0,14	4,6	9,4	28,0	26
18007	8 x 0,14	5,5	10,7	35,0	26
18008	10 x 0,14	5,9	13,4	41,0	26
18009	12 x 0,14	6,1	16,1	48,0	26
18010	14 x 0,14	6,3	18,8	53,0	26
18011	16 x 0,14	6,9	21,5	59,0	26
18012	18 x 0,14	7,2	24,2	65,0	26
18013	20 x 0,14	7,5	26,9	70,0	26
18014	21 x 0,14	7,6	28,2	77,0	26
18015	24 x 0,14	8,5	32,3	87,0	26
18117	25 x 0,14	8,6	33,6	91,0	26
18016	27 x 0,14	8,7	36,3	97,0	26
18017	30 x 0,14	8,9	40,3	108,0	26
18018	32 x 0,14	9,3	43,0	114,0	26
18019	36 x 0,14	9,8	48,4	126,0	26
18020	40 x 0,14	10,4	54,0	139,0	26
18021	42 x 0,14	10,5	56,0	146,0	26
18022	44 x 0,14	11,1	59,0	153,0	26
18023	48 x 0,14	11,2	65,0	164,0	26
18024	52 x 0,14	11,5	70,0	173,0	26
18025	56 x 0,14	11,8	75,0	187,0	26
18026	61 x 0,14	12,1	82,0	204,0	26
18027	80 x 0,14	14,1	108,0	280,0	26
18028	100 x 0,14	15,6	135,0	370,0	26

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
18029	2 x 0,25	3,8	4,8	18,0	24
18030	3 x 0,25	4,0	7,2	22,0	24
18031	4 x 0,25	4,3	9,6	26,0	24
18032	5 x 0,25	4,7	12,0	30,0	24
18033	6 x 0,25	5,3	14,4	36,0	24
18034	7 x 0,25	5,3	16,8	42,0	24
18035	8 x 0,25	6,1	19,2	49,0	24
18036	10 x 0,25	6,8	24,0	57,0	24
18037	12 x 0,25	7,0	28,8	66,0	24
18038	14 x 0,25	7,3	33,6	75,0	24
18039	16 x 0,25	7,7	38,4	84,0	24
18040	18 x 0,25	8,3	43,2	72,0	24
18114	19 x 0,25	8,3	46,0	84,0	24
18041	20 x 0,25	8,7	48,0	101,0	24
18042	21 x 0,25	8,8	50,0	107,0	24
18043	24 x 0,25	9,8	60,0	120,0	24
18118	25 x 0,25	10,0	61,0	132,0	24
18044	27 x 0,25	10,1	65,0	140,0	24
18045	30 x 0,25	10,3	72,0	156,0	24
18046	32 x 0,25	10,7	77,0	164,0	24
18047	36 x 0,25	11,3	86,0	182,0	24
18115	37 x 0,25	11,3	89,0	190,0	24
18048	40 x 0,25	12,1	96,0	200,0	24
18049	42 x 0,25	12,2	101,0	211,0	24
18050	44 x 0,25	12,8	106,0	225,0	24
18051	48 x 0,25	13,0	115,0	245,0	24
18052	52 x 0,25	13,3	125,0	263,0	24
18053	56 x 0,25	13,9	134,0	280,0	24
18054	61 x 0,25	14,3	146,0	305,0	24

Continuation ▶

**TRONIC (LiYY)** flexible, colour coded to DIN 47100, meter marking

Part no.	No.cores x cross-sec. mm <sup>2</sup>	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
18055	80 x 0,25	16,5	192,0	450,0	24
18056	100 x 0,25	18,3	240,0	590,0	24
18057	2 x 0,34	4,2	6,5	22,0	22
18058	3 x 0,34	4,4	9,8	30,0	22
18059	4 x 0,34	4,8	13,1	43,0	22
18060	5 x 0,34	5,4	16,3	54,0	22
18061	6 x 0,34	5,9	19,6	58,0	22
18062	7 x 0,34	5,9	22,8	61,0	22
18063	8 x 0,34	7,1	26,1	73,0	22
18064	10 x 0,34	7,6	32,6	82,0	22
18065	12 x 0,34	7,8	39,2	102,0	22
18066	14 x 0,34	8,4	45,7	108,0	22
18067	16 x 0,34	8,8	52,0	126,0	22
18068	18 x 0,34	9,3	59,0	143,0	22
18069	20 x 0,34	10,0	65,0	160,0	22
18070	21 x 0,34	10,1	69,0	166,0	22
18071	24 x 0,34	11,2	78,0	186,0	22
18096	25 x 0,34	11,4	82,0	192,0	22
18072	27 x 0,34	11,5	88,0	206,0	22
18073	30 x 0,34	11,8	98,0	226,0	22
18074	32 x 0,34	12,3	104,0	245,0	22
18075	36 x 0,34	12,9	118,0	285,0	22
18116	37 x 0,34	12,9	121,0	292,0	22
18076	40 x 0,34	14,0	131,0	318,0	22
18077	42 x 0,34	14,1	137,0	330,0	22
18078	44 x 0,34	14,6	144,0	370,0	22
18079	48 x 0,34	14,7	157,0	405,0	22
18080	52 x 0,34	15,4	170,0	430,0	22
18081	53 x 0,34	15,8	183,0	440,0	22
18082	61 x 0,34	16,3	199,0	610,0	22
18083	80 x 0,34	18,8	264,0	880,0	22
18084	100 x 0,34	21,0	327,0	1050,0	22

Part no.	No.cores x cross-sec. mm <sup>2</sup>	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
18085	2 x 0,5	4,6	9,6	40,0	20
18086	3 x 0,5	4,9	14,4	46,0	20
18087	4 x 0,5	5,5	19,2	55,0	20
18088	5 x 0,5	6,0	24,0	64,0	20
18089	6 x 0,5	6,7	28,8	73,0	20
18090	7 x 0,5	6,7	33,6	81,0	20
18091	8 x 0,5	7,8	38,4	97,0	20
18092	10 x 0,5	8,6	48,0	116,0	20
18093	12 x 0,5	8,7	58,0	135,0	20
18103	16 x 0,5	10,0	77,0	168,0	20
18101	20 x 0,5	11,3	96,0	213,0	20
18094	24 x 0,5	12,7	116,0	241,0	20
18102	30 x 0,5	13,4	144,0	303,0	20
18095	40 x 0,5	15,8	192,0	391,0	20
18104	2 x 0,75	5,3	14,4	47,0	19
18097	3 x 0,75	5,6	21,6	54,0	19
18098	4 x 0,75	6,1	29,0	66,0	19
18099	5 x 0,75	6,9	36,0	80,0	19
18100	7 x 0,75	7,5	50,0	110,0	19
18105	8 x 0,75	8,9	58,0	125,0	19
18106	10 x 0,75	9,2	72,0	148,0	19
18107	12 x 0,75	9,8	86,0	176,0	19
18108	16 x 0,75	11,4	115,0	220,0	19
18109	20 x 0,75	12,7	144,0	276,0	19
18110	2 x 1	5,6	19,2	56,0	18
18111	3 x 1	5,9	29,0	71,0	18
18112	2 x 1,5	6,3	29,0	75,0	16
18113	3 x 1,5	6,8	43,0	90,0	16

Dimensions and specifications may be changed without prior notice. (RB01)



Suitable accessories can be found in Chapter X.

- Cable tie

# PAAR-TRONIC flexible, colour coded to DIN 47100, meter marking



HELUKABEL PAAR-TRONIC 5x2x0,25 QMM / 19038 001042302

CE



## Technical data

- Special-PVC data cable for electronic control adapted to DIN VDE 0812 and 0814
- **Temperature range**  
flexing -5°C to +80°C  
fixed installation -30°C to +80°C
- **Operating peak voltage** 350 V  
(not for heavy current installation purposes)
- **Test voltage** 1200 V
- **Breakdown voltage** min. 2400 V
- **Insulation resistance**  
min. 20 MOhm x km
- **Capacitance** (approx. -value) at 800 Hz  
core/core 0,14 mm<sup>2</sup> = 120 pF/m  
core/core 0,25 mm<sup>2</sup> = 150 pF/m
- **Inductance** approx. 0,65 mH/km
- **Impedance** approx. 78 Ohm
- **K<sub>1</sub>-coupling** approx. 300 pF/100 m
- **Minimum bending radius**  
flexing 7,5x cable Ø  
fixed installation 4x cable Ø
- **Radiation resistance**  
up to 80x10<sup>6</sup> cJ/kg (up to 80 Mrad)

## Cable structure

- Bare copper-conductor, from 0,5 mm<sup>2</sup> to DIN VDE 0295 cl.5, fine-wire, BS 6360 cl.5, IEC 60228 cl.5
- Core insulation of special PVC compound type T12 to DIN VDE 0207-363-3 / DIN EN 50363-3
- Core identification (pair) to DIN 47100
- Cores stranded in pairs with optimal lay-length
- Pairs stranded in layers with optimal lay-length
- Foil wrapping
- Outer sheath of special PVC compound type TM2 to DIN VDE 0207-363-4-1 / DIN EN 50363-4-1
- Sheath colour grey (RAL 7032)
- with meter marking

## Properties

- Extensively oil resistant, oil-/ chemical Resistance - see table Technical Informations
  - The materials used in manufacture are cadmium-free and contain no silicone and free from substances harmful to the wetting properties of lacquers
- Tests**
- PVC self-extinguishing and flame retardant acc. to DIN VDE 0482-332-1-2, DIN EN 60332-1-2, IEC 60332-1 (equivalent DIN VDE 0472 part 804 test method B)

## Note

- AWG sizes are approximate equivalent values. The actual cross-section is in mm<sup>2</sup>.
- screened analogue type:  
**PAAR-TRONIC-CY**, confer page 133

## Application

These data control cables are used for flexible use with free movement without tensile stress or forced movements in dry, moist and wet rooms but not suitable for open air. PAAR-TRONIC is the perfect cable for use in areas where a small diameter is essential to complete wiring. E. g. as a control and signal cable in measuring instruments, computers, signal transfer etc. This cable is suitable only for low load application.

CE= The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

Part no.	No.pairs x cross-sec. mm <sup>2</sup>	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
19001	1 x 2 x 0,14	3,6	2,7	20,0	26
19002	2 x 2 x 0,14	4,6	5,4	25,0	26
19003	3 x 2 x 0,14	5,1	8,0	31,0	26
19004	4 x 2 x 0,14	5,5	10,7	38,0	26
19005	5 x 2 x 0,14	6,3	13,4	45,0	26
19006	6 x 2 x 0,14	6,7	16,1	50,0	26
19007	7 x 2 x 0,14	6,7	18,8	57,0	26
19008	8 x 2 x 0,14	7,6	21,5	64,0	26
19009	10 x 2 x 0,14	8,5	26,9	78,0	26
19010	11 x 2 x 0,14	9,0	29,5	86,0	26
19011	12 x 2 x 0,14	9,1	32,3	94,0	26
19012	14 x 2 x 0,14	9,8	37,6	105,0	26
19013	15 x 2 x 0,14	10,1	40,3	108,0	26
19014	16 x 2 x 0,14	10,2	43,0	110,0	26
19015	18 x 2 x 0,14	10,6	48,4	119,0	26
19016	20 x 2 x 0,14	10,8	54,0	130,0	26
19017	22 x 2 x 0,14	11,7	59,0	150,0	26

Part no.	No.pairs x cross-sec. mm <sup>2</sup>	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
19018	24 x 2 x 0,14	12,2	65,0	170,0	26
19019	25 x 2 x 0,14	12,3	67,0	180,0	26
19020	26 x 2 x 0,14	12,4	70,0	184,0	26
19021	27 x 2 x 0,14	12,5	73,0	188,0	26
19022	28 x 2 x 0,14	13,5	75,0	192,0	26
19023	30 x 2 x 0,14	13,6	81,0	200,0	26
19024	32 x 2 x 0,14	14,0	86,0	224,0	26
19025	34 x 2 x 0,14	14,1	91,0	247,0	26
19026	36 x 2 x 0,14	14,9	97,0	260,0	26
19027	38 x 2 x 0,14	15,6	102,0	272,0	26
19028	40 x 2 x 0,14	15,9	108,0	294,0	26
19029	44 x 2 x 0,14	16,2	118,0	334,0	26
19030	45 x 2 x 0,14	16,4	121,0	342,0	26
19031	50 x 2 x 0,14	17,4	134,0	387,0	26
19032	52 x 2 x 0,14	17,4	140,0	403,0	26
19033	55 x 2 x 0,14	18,0	148,0	427,0	26

Continuation ▶



**PAAR-TRONIC** flexible, colour coded to DIN 47100, meter marking

Part no.	No.pairs x cross-sec. mm <sup>2</sup>	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
19034	1 x 2 x 0,25	4,0	5,0	32,0	24
19035	2 x 2 x 0,25	5,4	10,0	37,0	24
19036	3 x 2 x 0,25	5,9	15,0	47,0	24
19037	4 x 2 x 0,25	6,8	20,0	58,0	24
19038	5 x 2 x 0,25	7,7	25,0	70,0	24
19039	6 x 2 x 0,25	8,4	30,0	80,0	24
19040	7 x 2 x 0,25	8,4	35,0	89,0	24
19041	8 x 2 x 0,25	8,7	40,0	99,0	24
19042	10 x 2 x 0,25	10,3	50,0	114,0	24
19043	11 x 2 x 0,25	10,4	55,0	126,0	24
19044	12 x 2 x 0,25	10,5	60,0	137,0	24
19045	14 x 2 x 0,25	11,4	70,0	161,0	24
19046	15 x 2 x 0,25	11,7	75,0	174,0	24
19047	16 x 2 x 0,25	12,0	80,0	187,0	24
19048	18 x 2 x 0,25	12,6	90,0	212,0	24
19049	20 x 2 x 0,25	13,4	100,0	234,0	24
19050	22 x 2 x 0,25	14,2	110,0	250,0	24
19051	24 x 2 x 0,25	14,9	120,0	280,0	24
19052	25 x 2 x 0,25	15,0	125,0	300,0	24
19053	26 x 2 x 0,25	15,1	130,0	320,0	24
19054	27 x 2 x 0,25	15,2	135,0	330,0	24
19055	28 x 2 x 0,25	16,0	140,0	345,0	24
19056	30 x 2 x 0,25	16,2	150,0	370,0	24

Part no.	No.pairs x cross-sec. mm <sup>2</sup>	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
19057	32 x 2 x 0,25	17,1	160,0	410,0	24
19058	34 x 2 x 0,25	17,5	170,0	425,0	24
19059	36 x 2 x 0,25	17,8	180,0	440,0	24
19060	38 x 2 x 0,25	18,3	190,0	480,0	24
19061	40 x 2 x 0,25	19,0	200,0	530,0	24
19062	44 x 2 x 0,25	19,7	220,0	580,0	24
19063	45 x 2 x 0,25	20,0	225,0	600,0	24
19064	50 x 2 x 0,25	21,0	250,0	650,0	24
19065	52 x 2 x 0,25	21,0	260,0	670,0	24
19066	55 x 2 x 0,25	21,5	275,0	790,0	24
19067	1 x 2 x 0,34	4,6	6,5	36,0	22
19068	2 x 2 x 0,34	6,3	13,1	42,0	22
19069	3 x 2 x 0,34	6,7	19,6	50,0	22
19070	4 x 2 x 0,34	7,6	26,1	61,0	22
19071	1 x 2 x 0,5	4,9	9,6	42,0	20
19072	2 x 2 x 0,5	7,2	19,2	51,0	20
19073	3 x 2 x 0,5	7,8	28,8	62,0	20
19074	4 x 2 x 0,5	8,6	38,4	73,0	20
19075	1 x 2 x 0,75	5,8	14,4	47,0	19
19076	2 x 2 x 0,75	8,7	28,8	59,0	19
19077	3 x 2 x 0,75	8,9	43,2	74,0	19
19078	4 x 2 x 0,75	10,2	57,6	93,0	19

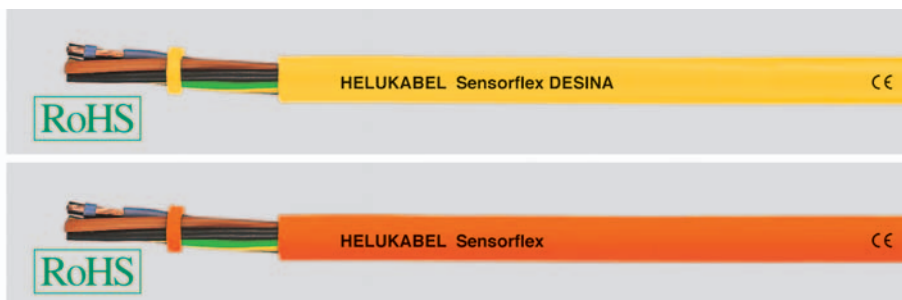
Dimensions and specifications may be changed without prior notice. (RB01)



Suitable accessories can be found in Chapter X.

- Cable tie

# SENSORFLEX® sensor actuator cable, PVC, PUR, PVC/PUR



## Technical data

- **Temperature range**  
flexing -5°C to +80°C  
fixed installation -30°C to +80°C
- **Peak operating voltage**  
up to 0,25 mm<sup>2</sup> 350 V  
from 0,34 mm<sup>2</sup> 500 V
- **A.c. test voltage**, 50 Hz  
up to 0,25 mm<sup>2</sup> 1200 V  
from 0,34 mm<sup>2</sup> 2000 V
- **Minimum bending radius**  
SENSORFLEX® PUR 7,5x cable Ø  
SENSORFLEX® PVC/PUR 7,5x cable Ø  
SENSORFLEX® PVC 15x cable Ø

## Cable structure

### SENSORFLEX®PVC

- Bare copper-conductor, to DIN VDE 0295 cl.5 or cl.6, fine-wire or extra-fine-wire, BS 6360 cl.5 or cl.6, IEC 60228 cl.5 or cl.6
- Core insulation of PVC
- Core identification see table below
- Outer sheath of special PVC

### SENSORFLEX®PUR

- Bare copper-conductor, to DIN VDE 0295 cl.6, extra-fine-wire, BS 6360 cl.6, IEC 60228 cl.6
- Core insulation of PVC
- Core identification see table below
- Outer sheath of PUR

### SENSORFLEX®PVC/PUR

- Construction as per SENSORFLEX® PVC
- PVC inner sheath, with PUR sheath applied over it by means of coextrusion

## Properties

### SENSORFLEX®PVC

- Extensively oil resistant; Chemical Resistance (see table Technical Informations)
- PVC self-extinguishing and flame retardant acc. to DIN VDE 0482-332-1-2, DIN EN 60332-1-2, IEC 60332-1 (equivalent DIN VDE 0472 part 804 test method B)

### SENSORFLEX®PUR

- low adhesion, extremely abrasion resistant, resistant to hydrolysis and microbial attack

### Special feature

- The cables with the highly flexible stranded conductor, cl. 6, are **suitable for drag chain applications**
- These cables are produced to high quality specifications and conform with a yellow sheath to the DESINA®-standard

**Sheath colour yellow (RAL 1021) acc. to DESINA®**

## Note

- All cables can be delivered with UL/CSA approval and Cu shield.
- DESINA®: Explanation: see introduction.

## Application

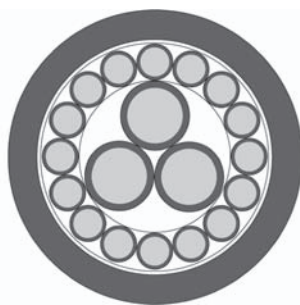
For decentralised installation and control technology. These cables are used in connector systems for sensors and actuators. In combination with injected circular connectors and installed actuator-sensor boxes, they constitute an important connecting element between the periphery and the PLC in production systems. The assembled cables offer attractive opportunities for reducing costs, not only in the field of automation technology, but also in the entire manufacturing industry. While previously it was necessary to carry out time-consuming wiring of switchgear cabinets and machines, now field bus technology has made it possible to move the periphery interfaces from the switchgear cabinets to the machines and systems. Moving the I/O points to the system periphery enables significant reductions in installation costs.

☑= The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

Part no. yellow	orange	grey	Cable structure No. cores x cross-sec. mm <sup>2</sup>	Sheath material	Core colours	Fine wire	High flex **	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
76061	76076	73473	3 x 0,25	PVC	BN, BU, BK		X	4,4	7,2	22,0	24
76062	76077	73466	3 x 0,25	PUR	BN, BU, BK		X	4,4	7,2	22,0	24
76063	76078	73474	4 x 0,25	PVC	BN, BU, BK, WH		X	4,7	9,6	26,0	24
76064	76079	73471	4 x 0,25	PUR	BN, BU, BK, WH		X	4,7	9,6	26,0	24
76065	76080	76094	5 G 0,25	PVC	BN, BU, BK, WH, GN-YE		X	4,8	12,0	30,0	24
76066	76081	76095	5 G 0,25	PVC/PUR	BN, BU, BK, WH, GN-YE		X	4,8	12,0	30,0	24
76071	76086	73472	3 G 0,34	PVC/PUR	BN, BU, GN-YE		X	4,9	9,8	30,0	22
76070	76085	76099	3 x 0,34	PVC	BN, BU, BK		X	4,9	9,8	30,0	22
73485	76087	73368	4 x 0,34	PVC	BN, BU, BK, WH	X		5,2	13,1	43,0	22
73484	76088	72973	4 x 0,34	PVC/PUR	BN, BU, BK, WH		X	5,2	13,1	43,0	22
78240	78241	73728	5 x 0,34	PVC	BN, BU, BK, WH, GY	X		5,9	16,4	54,0	22
76072	76089	73657	5 G 0,34	PVC	BN, BU, BK, WH, GN-YE	X		5,9	16,4	54,0	22
73870	76090	73548	5 G 0,34	PVC/PUR	BN, BU, BK, WH, GN-YE		X	5,9	16,4	54,0	22

Dimensions and specifications may be changed without prior notice.

# VERTEILERFLEX for sensor actuator distributor boxes, PVC, PUR or PVC/PUR



B

## Technical data

- **Temperature range**  
flexing -5°C to +80°C  
fixed installation -30°C to +80°C
- **Operating voltage**  
U<sub>0</sub>/U 300/500 V
- **A.c. test voltage**, 50 Hz  
2000 V
- **Minimum bending radius**  
flexibel 15x cable Ø  
highly flexible 7,5x cable Ø

## Cable structure

### PVC cables

- Bare copper-conductor, acc. to DIN VDE 0295 cl.5, fine-wire, BS 6360 cl.5, IEC 60228 cl.5
- Core insulation of PVC
- Core identification see table below
- Outer sheath of special PVC

### PUR cables

- Bare copper-conductor, to DIN VDE 0295 cl.6, extra fine-wire, BS 6360 cl.6, IEC 60228 cl.6
- Core insulation of PVC
- Core identification see table below
- Outer sheath of PUR

## Note

- All cables can be delivered with UL/CSA approbation and Cu shield.
- Further core numbers, cross-sections and sheath colours available on request.

## Properties

### PVC cables

- Extensively oil resistant.
- Chemical Resistance - see table Technical Informations
- PVC self-extinguishing and flame retardant acc. to DIN VDE 0482-332-1-2, DIN EN 60332-1-2, IEC 60332-1 (equivalent DIN VDE 0472 part 804 test method B)

### PUR cables

- Low adhesion, extremely abrasion resistant, resistant to hydrolysis and microbial attack

### Special feature

- The cables with the highly flexible stranded conductor, cl. 6, are **suitable for drag chain applications**
- The types with PVC/PUR sheath material have a PVC inner sheath, with a PUR sheath applied over it by means of coextrusion

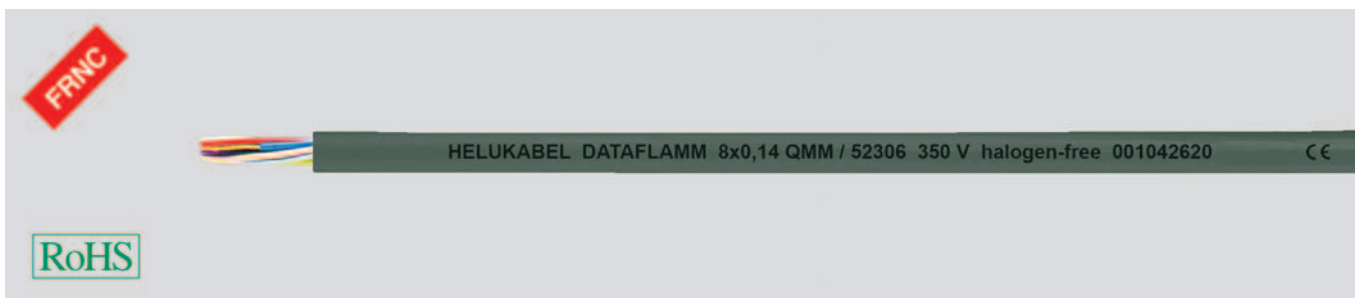
## Application

These cables are used in connector systems for sensors and actuators. In combination with injected circular connectors and installed actuator-sensor boxes, they constitute an important connecting element between the periphery and the PLC in production systems. The assembled cables offer attractive opportunities for reducing costs, not only in the field of automation technology, but also in the entire manufacturing industry.

CE= The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

Part no. black	grey	Cable structure No. cores x cross-sec. mm <sup>2</sup>	Sheath material	Core colours	Fine wire	High flex **	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
76105	76115	4 G 0,34	PVC	BN, BU, BK, WH, GN-YE	X		5,8	18,0	58,0	22
76639		4 G 0,34	PVC/PUR	YE, WH, GN, GY, GN-YE, BN, BU		X	8,7	36,0	82,0	22
76107	73574	6 G 0,34	PVC/PUR	WH, GN, YE, GY, PK, RD, BN, BU, GN-YE		X	9,1	42,0	106,0	22
72961	73993	8 G 0,34	PVC/PUR	GY, PK, RD, BK, VT, WH, GN, YE, BN, BU, GN-GE		X	9,1	48,0	110,0	22
76109	74729	8 x 0,34	PVC	WH, GN, YE, GY, PK, RD, BK, VT, BU, BN	X		9,1	41,0	107,0	22
76110	72951	8 x 0,34	PUR	WH, GN, YE, GY, PK, RD, BK, VT, BU, BN		X	9,1	41,0	107,0	22
76108	76117	8 x 0,34	PVC/PUR	WH, GN, YE, GY, PK, RD, BK, VT, BU, BN		X	8,8	36,0	102,0	22
71254	76118	11 x 0,34	PVC	BK with number 1-2, DIN 47100	X		10,0	65,0	143,0	22
76111	76119	12 x 0,34	PVC/PUR	PK, YE/BN, RD, GY/PK, WH, RD/BU, GN, WH/GN, YE, BN/GN, GY, WH/YE		X	10,3	61,0	138,0	22
	77642	16 G 0,34	PVC/PUR	BU with number 1-2, GN-YE, GY/PK, WH, RD/BU, GN, WH/GY, YE, BN/GY, WH/YE, PK, YE/BN, RD, WH/GY, BK, GY/BN, VT		X	12,5	89,0	193,0	22
76112	76120	16 G 0,34	PVC/PUR	BN, GY/PK, RD/BU, WH/GN, BN/GN, WH/YE, YE/BN, WH/GY, GY/BN, BU, WH, GN, YE, GY, PK, RD, BK, VT, GN-GE		X	10,5	74,0	170,0	22
76113	76121	8 G 0,5	PUR	BN, BU, GN-GE, GY/PK, RD/BU, WH/GN, BN/GN, WH, GN, YE, GY		X	9,9	68,0	136,0	20
76114	76122	12 G 0,5	PUR	GY/PK, RD/BU, WH/GN, BN/GN, WH/YE, YE/BN, WH, GN, YE, GY, PK, RD, BN, BU, GN-YE		X	10,4	87,0	160,0	20
	79921	14 x 0,5	PVC	BK with number 1-14, BN with number 1-2, BU with number 1-2	X		12,3	125,0	201,0	20
76640		16 G 0,5	PVC/PUR	GY, BN/GN, GN, RD/BU, GY/PK, WH, WH/GN, WH/GY, BK, WH/YE, PK, YE, RD, YE/BN, VT, GY/BN, GN-GE, BN, BU		X	11,6	106,0	183,0	20
74034	76123	16 G 0,5	PUR	GY/PK, WH, RD/BU, GN, WH/GN, YE, BN/GN, GY, WH/YE, PK, YE/BN, RD, WH/GN, BK, VT, BN, BU, GN-YE		X	11,6	106,0	183,0	20

Dimensions and specifications may be changed without prior notice.

**Technical data**

- Special data cable, halogen-free
- **Temperature range**  
flexing +5°C to +70°C  
fixed installation -40°C to +70°C
- **Operating peak voltage**  
(not for heavy current installation purposes)  
0,14 mm<sup>2</sup> = 350 V  
≥ 0,25 mm<sup>2</sup> = 500 V
- **Test voltage**  
0,14 mm<sup>2</sup> = 800 V  
≥ 0,25 mm<sup>2</sup> = 1200 V
- **Insulation resistance**  
min. 2 GOhm x km
- **Capacitance**  
core/core < 70 nF/km
- **Minimum bending radius**  
7,5x cable Ø
- **Radiation resistance**  
up to 100x10<sup>6</sup> cJ/kg (up to 100 Mrad)

**Cable structure**

- Bare copper-conductor, fine-wire to DIN VDE 0812
- Conductor construction:  
0,34 mm<sup>2</sup> = 7x0,25 mm
- Core insulation of PE compound type L/MD to DIN VDE 0819-103 / DIN EN 50290-2-23
- Core identification to DIN 47100, without colour repetition
- Cores twisted in layers with optimal lay-length
- Outer sheath compound type HM2 to DIN VDE 0207 part 24
- Sheath colour grey (RAL 7005)
- with meter marking

**Properties****Tests**

- Halogen-free to DIN VDE 0482 part 267, DIN EN 50267-2-1, IEC 60754-1 (equivalent DIN VDE 0472 part 815)
- Corrosiveness of combustion gases acc.to DIN VDE 0482 part 267, DIN EN 50267-2-2, IEC 60754-2 (equivalent DIN VDE 0472 part 813)
- Halogen-free sheath compound, self-extinguishing and flame retardant acc.to DIN VDE 0482-332-1-2, DIN EN 60332-1-2, IEC 60332-1 (equivalent DIN VDE 0472 part 804 test method B)

**Note**

- AWG sizes are approximate equivalent values. The actual cross-section is in mm<sup>2</sup>.
- screened analogue type:  
**DATAFLAMM®-C**, confer page 145

**Application**

DATAFLAMM® halogen-free data cables are used as connecting cable for signal, measuring, control, call-announcing and two-way intercom speaking systems, clock installations, electronic weighing equipment and electrical apparatus for office requirements. The cables are suitable for installation in dry, damp and wet environments. PE-insulated-cores, compared with the conventional PVC-insulated cores, assure a remarkable and more favourable capacitance values. These cables are generally installed in telecommunication apparatus and data transmission systems in public buildings, laboratories, trading centres where the freedom from halogen in case of fire and the flame propagation must be avoided. The halogen-free thermoplastic sheath produce neither corrosive nor toxic gases.

CE= The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

Part no.	No.cores x cross-sec. mm <sup>2</sup>	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
52300	2 x 0,14	3,3	2,6	14,0	26
52301	3 x 0,14	3,5	4,0	17,0	26
52302	4 x 0,14	3,7	5,3	19,0	26
52303	5 x 0,14	4,0	6,6	23,0	26
52304	6 x 0,14	4,3	7,9	25,0	26
52305	7 x 0,14	4,3	9,2	27,0	26
52306	8 x 0,14	4,6	10,3	30,0	26
52307	10 x 0,14	5,4	13,2	38,0	26
52308	12 x 0,14	5,7	16,0	45,0	26
52309	15 x 0,14	6,1	20,1	57,0	26
52310	18 x 0,14	6,7	23,7	65,0	26
52311	21 x 0,14	7,0	27,9	76,0	26
52312	25 x 0,14	7,8	33,4	88,0	26
52313	30 x 0,14	8,2	39,3	98,0	26
52314	34 x 0,14	8,8	45,5	111,0	26
52315	40 x 0,14	9,5	53,6	139,0	26
52316	50 x 0,14	10,5	64,9	176,0	26
52317	2 x 0,25	3,8	4,7	18,0	24
52318	3 x 0,25	4,0	7,1	21,0	24
52319	4 x 0,25	4,3	9,5	26,0	24
52320	5 x 0,25	4,7	12,0	31,0	24
52321	7 x 0,25	5,1	16,6	40,0	24
52322	10 x 0,25	6,4	24,0	56,0	24
52323	12 x 0,25	6,6	28,6	64,0	24
52324	15 x 0,25	7,4	36,0	80,0	24
52430	18 x 0,25	7,9	43,2	90,0	24
52431	21 x 0,25	8,6	50,4	105,0	24
52325	25 x 0,25	9,4	59,8	121,0	24
52326	34 x 0,25	11,0	81,3	168,0	24
52327	40 x 0,25	12,0	96,0	196,0	24
52328	2 x 0,34	4,4	6,4	25,0	22
52329	3 x 0,34	4,7	9,7	30,0	22

Part no.	No.cores x cross-sec. mm <sup>2</sup>	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
52330	4 x 0,34	5,0	13,0	35,0	22
52331	5 x 0,34	5,5	16,4	43,0	22
52332	7 x 0,34	6,0	22,7	58,0	22
52333	10 x 0,34	7,8	32,4	80,0	22
52334	12 x 0,34	8,0	39,1	91,0	22
52335	15 x 0,34	9,0	49,1	115,0	22
52336	18 x 0,34	9,8	59,1	135,0	22
52337	21 x 0,34	10,4	68,3	154,0	22
52338	25 x 0,34	12,0	81,4	180,0	22
52339	34 x 0,34	13,6	111,1	233,0	22
52340	40 x 0,34	14,8	130,5	272,0	22
52341	2 x 0,5	4,6	9,5	30,0	20
52342	3 x 0,5	4,9	14,2	36,0	20
52343	4 x 0,5	5,3	19,2	43,0	20
52344	5 x 0,5	5,9	24,0	56,0	20
52345	7 x 0,5	6,4	33,7	70,0	20
52346	10 x 0,5	8,3	48,0	101,0	20
52347	12 x 0,5	8,6	57,4	117,0	20
52348	15 x 0,5	9,8	72,0	145,0	20
52349	18 x 0,5	10,5	86,4	171,0	20
52350	21 x 0,5	11,1	101,0	197,0	20
52351	25 x 0,5	12,6	120,0	230,0	20
52352	30 x 0,5	13,3	142,6	269,0	20
52353	34 x 0,5	14,5	163,1	301,0	20
52354	40 x 0,5	15,8	192,0	365,0	20
52355	2 x 0,75	5,2	14,3	40,0	19
52356	3 x 0,75	5,5	21,5	51,0	19
52357	4 x 0,75	6,0	28,6	61,0	19
52358	5 x 0,75	6,7	36,1	76,0	19
52359	7 x 0,75	7,3	50,3	97,0	19
52360	10 x 0,75	9,8	72,0	137,0	19
52361	12 x 0,75	10,0	86,2	167,0	19

Dimensions and specifications may be changed without prior notice. (RB01)



# TRONIC-CY (LiY-CY) flexible, Cu-screened, colour coded to DIN 47100, EMC-preferred type, meter marking

EAC

B



## Technical data

- Special-PVC data cable for electronic control adapted to DIN VDE 0812
- **Temperature range**  
flexing -5°C to +80°C  
fixed installation -40°C to +80°C
- **Operating peak voltage**  
(not for heavy current installation purposes)  
0,14 mm<sup>2</sup> = 350 V  
≥ 0,25 mm<sup>2</sup> = 500 V
- **Test voltage**  
core/core 1200 V  
core/screen 800 V
- **Breakdown voltage** min. 2400 V
- **Insulation resistance**  
min. 20 MOhm x km
- **Capacitance** (approx.-value) at 800 Hz  
core/core at 0,14 mm<sup>2</sup> = 120 pF/m  
core/core 0,25 mm<sup>2</sup> = 150 pF/m  
core/screen at 0,14 mm<sup>2</sup> = 240 pF/m  
core/screen 0,25 mm<sup>2</sup> = 270 pF/m
- **Inductance** approx. 0,65 mH/km
- **Impedance** approx. 78 Ohm
- **Coupling resistance**  
max. 250 Ohm/km
- **Minimum bending radius**  
flexing 10x cable Ø  
fixed installation 5x cable Ø
- **Radiation resistance**  
up to 80x10<sup>6</sup> cJ/kg (up to 80 Mrad)

## Cable structure

- Bare copper-conductor, from 0,5 mm<sup>2</sup> to DIN VDE 0295 cl.5, fine-wire, BS 6360 cl.5, IEC 60228 cl.5
- Conductor construction:  
0,14 mm<sup>2</sup> = 18x0,1 mm  
0,25 mm<sup>2</sup> = 14x0,15 mm  
0,34 mm<sup>2</sup> = 7x0,25 mm
- Core insulation of special PVC compound type TI2 to DIN VDE 0207-363-3 / DIN EN 50363-3
- Core identification to DIN 47100, without colour repetition
- Cores stranded in layers with optimal lay-length
- Foil wrapping
- Drain-wire, tinned
- Tinned, copper braided screen, approx. 85% coverage
- Outer sheath of special PVC compound type TM2 to DIN VDE 0207-363-4-1/DIN EN 50363-4-1
- Sheath colour grey (RAL 7001)
- with meter marking

## Properties

- Extensively oil resistant, oil- / chemical Resistance - see table Technical Informations
- The materials used in manufacture are cadmium-free and contain no silicone and free from substances harmful to the wetting properties of lacquers

## Tests

- PVC self-extinguishing and flame retardant acc. to DIN VDE 0482-332-1-2, DIN EN 60332-1-2, IEC 60332-1 (equivalent DIN VDE 0472 part 804 test method B)

## Note

- Also available in paired version, see HELUKABEL®-PAAR-TRONIC-CY
- For 1 core cable screen of helically wound.
- AWG sizes are approximate equivalent values. The actual cross-section is in mm<sup>2</sup>.
- unscreened analogue type: **TRONIC (LiYY)**, confer page 124

## Application

These screened cables are used for flexible use with free movement without tensile stress or forced movements in dry, moist and wet rooms but not suitable for open air, wherever the construction requirements call for a minimum outer diameter, TRONIC is the suitable cable to use. This applies especially to such areas as tool making and machine industries as well as electronic, computer, measurement and control sectors. The extremely small outer diameter make suitable for miniature plugs etc.

**EMC** = Electromagnetic compatibility

To optimize the EMC features we recommend a large round contact of the copper braiding on both ends.

CE = The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.	Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
20139	1 x 0,14	2,6	6,1	16,0	26	20015	24 x 0,14	8,9	62,0	131,0	26
20001	2 x 0,14	3,9	12,0	20,0	26	20091	25 x 0,14	9,1	61,0	136,0	26
20002	3 x 0,14	4,0	13,0	27,0	26	20016	27 x 0,14	9,2	65,0	142,0	26
20003	4 x 0,14	4,3	14,5	32,0	26	20017	30 x 0,14	9,5	69,0	157,0	26
20004	5 x 0,14	4,7	15,5	37,0	26	20018	32 x 0,14	9,9	76,0	163,0	26
20005	6 x 0,14	5,2	18,2	42,0	26	20019	36 x 0,14	10,2	83,0	182,0	26
20006	7 x 0,14	5,2	19,0	48,0	26	20020	40 x 0,14	11,1	88,0	209,0	26
20007	8 x 0,14	5,9	21,3	55,0	26	20021	42 x 0,14	11,2	94,0	217,0	26
20008	10 x 0,14	6,5	28,7	65,0	26	20022	44 x 0,14	11,5	110,0	226,0	26
20009	12 x 0,14	6,7	30,5	77,0	26	20023	48 x 0,14	11,7	115,0	240,0	26
20010	14 x 0,14	6,9	32,0	79,0	26	20024	52 x 0,14	12,3	124,0	270,0	26
20011	16 x 0,14	7,3	43,2	89,0	26	20025	56 x 0,14	12,5	132,0	320,0	26
20012	18 x 0,14	7,6	51,0	103,0	26	20026	61 x 0,14	12,8	146,0	370,0	26
20013	20 x 0,14	8,3	55,0	116,0	26	20027	80 x 0,14	14,7	226,0	510,0	26
20014	21 x 0,14	8,4	56,0	120,0	26	20028	100 x 0,14	16,3	267,0	580,0	26

Continuation ▶

# TRONIC-CY (LiY-CY) flexible, Cu-screened, colour coded to DIN 47100,

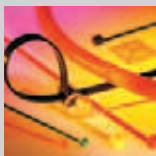
## EMC-preferred type, meter marking



Part no.	No.cores x cross-sec. mm <sup>2</sup>	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
20084	1 x 0,25	3,0	7,2	27,0	24
20029	2 x 0,25	4,3	15,8	31,0	24
20030	3 x 0,25	4,5	18,6	36,0	24
20031	4 x 0,25	4,8	22,0	40,0	24
20032	5 x 0,25	5,4	26,5	51,0	24
20083	6 x 0,25	5,8	32,4	58,0	24
20033	7 x 0,25	5,8	35,0	64,0	24
20034	8 x 0,25	7,0	42,1	82,0	24
20035	10 x 0,25	7,3	49,9	85,0	24
20036	12 x 0,25	7,5	58,0	90,0	24
20037	14 x 0,25	8,1	62,0	144,0	24
20038	16 x 0,25	8,5	67,0	110,0	24
20039	18 x 0,25	9,1	78,0	142,0	24
20086	19 x 0,25	9,1	79,0	146,0	24
20040	20 x 0,25	9,5	88,0	152,0	24
20041	21 x 0,25	9,6	91,0	150,0	24
20042	24 x 0,25	10,4	96,0	163,0	24
20092	25 x 0,25	10,6	99,0	169,0	24
20043	27 x 0,25	10,7	122,0	176,0	24
20044	30 x 0,25	11,1	132,0	189,0	24
20045	32 x 0,25	11,5	138,0	204,0	24
20046	36 x 0,25	11,9	146,0	219,0	24
20087	37 x 0,25	11,9	152,0	230,0	24
20047	40 x 0,25	12,9	157,0	247,0	24
20048	42 x 0,25	13,0	160,0	269,0	24
20049	44 x 0,25	13,7	164,0	292,0	24
20050	48 x 0,25	13,9	164,0	317,0	24
20051	52 x 0,25	14,3	175,0	330,0	24
20052	56 x 0,25	14,7	189,0	343,0	24
20053	61 x 0,25	15,2	204,0	365,0	24
20054	80 x 0,25	17,2	387,0	480,0	24
20055	100 x 0,25	19,4	505,0	605,0	24
20088	1 x 0,34	3,2	13,5	24,0	22
20056	2 x 0,34	4,9	18,0	30,0	22
20057	3 x 0,34	5,1	22,0	37,0	22
20058	4 x 0,34	5,5	28,0	48,0	22
20059	5 x 0,34	6,0	31,0	54,0	22
20085	6 x 0,34	6,6	45,0	61,0	22
20060	7 x 0,34	6,6	51,0	67,0	22
20061	8 x 0,34	7,7	54,0	81,0	22
20062	10 x 0,34	8,4	65,0	103,0	22
20063	12 x 0,34	8,6	70,0	110,0	22
20064	14 x 0,34	9,0	81,0	153,0	22
20065	16 x 0,34	9,6	88,0	159,0	22
20066	18 x 0,34	10,1	103,0	172,0	22
20089	19 x 0,34	10,1	106,0	181,0	22
20067	20 x 0,34	10,8	112,0	191,0	22
20068	21 x 0,34	10,9	116,0	199,0	22
20069	24 x 0,34	11,7	129,0	229,0	22
20093	25 x 0,34	12,0	120,0	241,0	22
20070	27 x 0,34	12,1	138,0	258,0	22
20071	30 x 0,34	12,6	158,0	290,0	22
20072	32 x 0,34	13,0	163,0	305,0	22
20073	36 x 0,34	13,8	178,0	330,0	22
20090	37 x 0,34	13,8	192,0	348,0	22
20074	40 x 0,34	14,8	198,0	364,0	22
20075	42 x 0,34	14,9	203,0	389,0	22
20076	44 x 0,34	15,6	214,0	414,0	22
20077	48 x 0,34	15,8	227,0	420,0	22
20078	52 x 0,34	16,3	242,0	450,0	22
20079	56 x 0,34	16,8	267,0	480,0	22
20080	61 x 0,34	17,2	295,0	520,0	22
20081	80 x 0,34	19,6	524,0	580,0	22
20082	100 x 0,34	21,9	620,0	694,0	22
16001	1 x 0,5	3,5	15,0	40,0	20
16002	2 x 0,5	5,3	29,0	45,0	20
16003	3 x 0,5	5,6	39,0	55,0	20
16004	4 x 0,5	6,3	46,0	61,0	20
16005	5 x 0,5	6,8	52,0	76,0	20
16006	6 x 0,5	7,3	66,0	89,0	20
16007	7 x 0,5	7,3	68,0	98,0	20
16008	8 x 0,5	8,6	80,0	117,0	20
16009	10 x 0,5	9,4	93,0	135,0	20
16010	12 x 0,5	9,6	117,0	157,0	20
16011	14 x 0,5	10,1	122,0	190,0	20

Part no.	No.cores x cross-sec. mm <sup>2</sup>	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
16012	16 x 0,5	10,6	129,0	210,0	20
16013	18 x 0,5	11,3	152,0	217,0	20
16526	19 x 0,5	11,3	156,0	246,0	20
16014	20 x 0,5	12,0	173,0	275,0	20
16015	24 x 0,5	13,2	236,0	337,0	20
16016	25 x 0,5	13,7	250,0	351,0	20
16527	27 x 0,5	13,8	265,0	373,0	20
16017	30 x 0,5	14,2	297,0	396,0	20
16018	32 x 0,5	14,7	301,0	431,0	20
16164	34 x 0,5	15,4	312,0	440,0	20
16019	36 x 0,5	15,5	320,0	445,0	20
16528	37 x 0,5	15,5	325,0	458,0	20
16020	40 x 0,5	16,4	345,0	470,0	20
16021	50 x 0,5	18,2	407,0	570,0	20
16022	61 x 0,5	19,2	508,0	650,0	20
16023	80 x 0,5	22,1	690,0	780,0	20
16024	100 x 0,5	24,6	814,0	990,0	20
16025	1 x 0,75	4,0	19,0	41,0	19
16026	2 x 0,75	5,8	38,0	59,0	19
16027	3 x 0,75	6,3	50,0	66,0	19
16028	4 x 0,75	6,8	57,0	77,0	19
16029	5 x 0,75	7,4	70,0	93,0	19
16030	6 x 0,75	8,2	87,0	113,0	19
16031	7 x 0,75	8,2	96,0	130,0	19
16032	8 x 0,75	9,7	110,0	145,0	19
16033	10 x 0,75	10,3	140,0	180,0	19
16034	12 x 0,75	10,5	151,0	202,0	19
16035	14 x 0,75	11,3	167,0	225,0	19
16036	16 x 0,75	11,9	183,0	275,0	19
16037	18 x 0,75	12,7	207,0	292,0	19
16529	19 x 0,75	12,7	221,0	322,0	19
16038	20 x 0,75	13,6	238,0	362,0	19
16039	24 x 0,75	14,9	270,0	435,0	19
16040	25 x 0,75	15,0	278,0	415,0	19
16041	27 x 0,75	15,1	287,0	467,0	19
16042	30 x 0,75	16,0	315,0	486,0	19
16043	32 x 0,75	16,5	330,0	530,0	19
16163	34 x 0,75	17,7	350,0	570,0	19
16044	36 x 0,75	17,4	370,0	600,0	19
16530	37 x 0,75	17,4	386,0	640,0	19
16045	40 x 0,75	18,7	395,0	680,0	19
16120	42 x 0,75	18,9	408,0	714,0	19
16047	61 x 0,75	22,0	555,0	900,0	19
16048	80 x 0,75	25,3	715,0	1200,0	19
16049	100 x 0,75	28,0	910,0	1440,0	19
16475	2 x 1	6,4	46,0	65,0	18
16476	3 x 1	6,7	56,0	80,0	18
16477	4 x 1	7,2	69,0	98,0	18
16478	5 x 1	8,0	89,0	127,0	18
16479	6 x 1	8,7	105,0	144,0	18
16480	7 x 1	8,7	111,0	158,0	18
16481	8 x 1	10,3	130,0	197,0	18
16482	10 x 1	11,2	140,0	232,0	18
16483	12 x 1	11,4	168,0	260,0	18
16484	14 x 1	12,0	198,0	302,0	18
16485	16 x 1	12,8	218,0	346,0	18
16486	19 x 1	13,6	268,0	412,0	18
16487	24 x 1	16,0	320,0	493,0	18
16488	27 x 1	16,4	360,0	562,0	18
16489	37 x 1	18,6	485,0	790,0	18
16500	2 x 1,5	7,0	63,0	88,0	16
16501	3 x 1,5	7,4	76,0	100,0	16
16502	4 x 1,5	8,1	98,0	126,0	16
16503	5 x 1,5	9,0	116,0	160,0	16
16504	6 x 1,5	9,8	140,0	192,0	16
16505	7 x 1,5	9,8	152,0	208,0	16
16506	8 x 1,5	11,0	172,0	244,0	16
16507	10 x 1,5	12,6	193,0	315,0	16
16508	12 x 1,5	12,8	254,0	338,0	16
16509	14 x 1,5	13,5	272,0	383,0	16
16510	16 x 1,5	14,6	285,0	424,0	16
16511	19 x 1,5	15,6	387,0	506,0	16
16512	24 x 1,5	18,1	448,0	690,0	16
16513	27 x 1,5	18,7	506,0	781,0	16
16514	37 x 1,5	21,4	682,0	941,0	16

Dimensions and specifications may be changed without prior notice. (RB01)



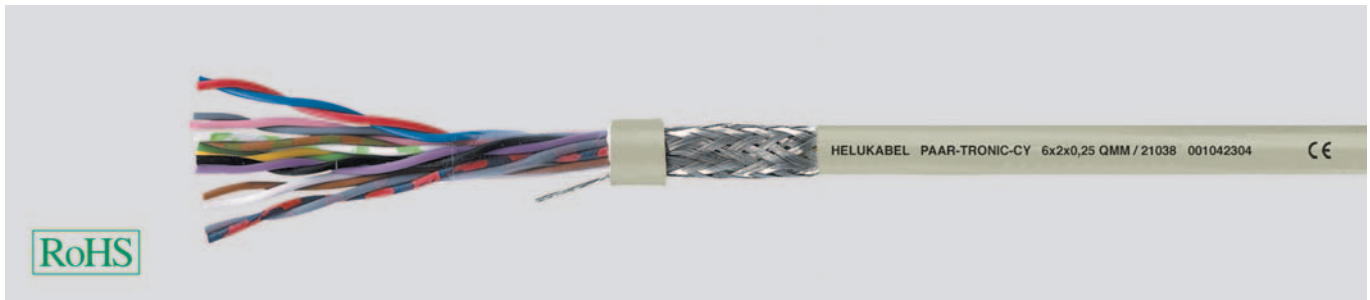
Suitable accessories can be found in Chapter X.

- Cable tie

# PAAR-TRONIC-CY EMC-preferred type, flexible, Cu-screened, colour coded to DIN 47100, meter marking

EAC

B



## Technical data

- Special PVC data cables for electronic control adapted to DIN VDE 0812 and 0814
- **Temperature range**  
flexing -5°C to +80°C  
fixed installation -30°C to +80°C
- **Operating peak voltage** 350 V (not for heavy current installation purposes)
- **Test voltage**  
core/core 1200 V  
core/screen 800 V
- **Breakdown voltage** min. 2400 V
- **Insulation resistance**  
min. 20 MOhm x km
- **Plant capacity** (approx. -value) at 800 Hz  
core/core 0,14 mm<sup>2</sup> = 120 pF/m  
core/core 0,25 mm<sup>2</sup> = 150 pF/m  
core/screen 0,14 mm<sup>2</sup> = 240 pF/m  
core/screen 0,25 mm<sup>2</sup> = 270 pF/m
- **Inductance** approx. 0,65 mH/km
- **Impedance** approx. 78 Ohm
- **K<sub>1</sub>-coupling** approx. 300 pF/100 m
- **Coupling resistance**  
max. 250 Ohm/km
- **Minimum bending radius**  
flexing 10x cable Ø  
fixed installation 5x cable Ø
- **Radiation resistance**  
up to 80x10<sup>6</sup> cJ/kg (up to 80 Mrad)

## Application

These data control cables are used for flexible use with free movement without tensile stress or forced movements in dry, moist and wet rooms but not suitable for open air. PAAR-TRONIC-CY is well suited for use in areas subject to signal interference. The high level of screening reduces substantially the effects of electrical disturbances from parallel running wiring etc. The copper screening is also often used as an "earth". The twisted pairs conform favourable cross-talk attenuation values.

**EMC** = Electromagnetic compatibility

To optimize the EMC features we recommend a large round contact of the copper braiding on both ends.

CE = The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

## Cable structure

- Bare copper-conductor, from 0,5 mm<sup>2</sup> to DIN VDE 0295 cl.5, fine-wire, BS 6360 cl.5, IEC 60228 cl.5
- Conductor construction:  
0,14 mm<sup>2</sup> = 18x0,1 mm  
0,25 mm<sup>2</sup> = 14x0,15 mm  
0,34 mm<sup>2</sup> = 7x0,25 mm
- Core insulation of special PVC compound type TI2 to DIN VDE 0207-363-3 / DIN EN 50363-3
- Core identification (pair) to DIN 47100
- Cores stranded in pairs with optimal lay-length
- Pairs stranded in layers with optimal lay-length
- Foil wrapping
- Drain wire, tinned
- Tinned copper braided screen, approx. 85% coverage
- Outer sheath of special PVC compound type TM2 to DIN VDE 0207-363-4-1/DIN EN 50363-4-1
- Sheath colour grey (RAL 7032) also available in other colours on request
- with meter marking

## Properties

- Extensively oil resistant, oil- / chemical Resistance - see table Technical Informations
- The materials used in manufacture are cadmium-free and contain no silicone and free from substances harmful to the wetting properties of lacquers

## Tests

- PVC self-extinguishing and flame retardant acc. to DIN VDE 0482-332-1-2, DIN EN 60332-1-2, IEC 60332-1 (equivalent DIN VDE 0472 part 804 test method B)

## Note

- AWG sizes are approximate equivalent values. The actual cross-section is in mm<sup>2</sup>.
- unshielded analogue type: **PAAR-TRONIC**, confer page 126

Part no.	No.pairs x cross-sec. mm <sup>2</sup>	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.	Part no.	No.pairs x cross-sec. mm <sup>2</sup>	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
21001	1 x 2 x 0,14	4,0	15,6	34,0	26	21006	6 x 2 x 0,14	7,2	48,5	86,0	26
21002	2 x 2 x 0,14	5,0	18,5	40,0	26	21007	7 x 2 x 0,14	7,2	51,1	91,0	26
21003	3 x 2 x 0,14	5,7	23,0	49,0	26	21008	8 x 2 x 0,14	8,2	53,7	97,0	26
21004	4 x 2 x 0,14	6,1	26,6	55,0	26	21009	10 x 2 x 0,14	9,1	59,0	109,0	26
21005	5 x 2 x 0,14	6,8	30,7	66,0	26	21010	12 x 2 x 0,14	9,6	66,0	141,0	26

Continuation ▶

# PAAR-TRONIC-CY EMC-preferred type, flexible, Cu-screened, colour coded

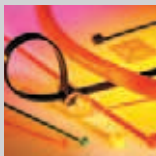
to DIN 47100, meter marking



Part no.	No.pairs x cross-sec. mm <sup>2</sup>	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
21011	14 x 2 x 0,14	10,4	74,0	148,0	26
21012	15 x 2 x 0,14	10,6	76,0	152,0	26
21013	16 x 2 x 0,14	10,7	79,0	155,0	26
21014	18 x 2 x 0,14	11,2	83,0	171,0	26
21015	20 x 2 x 0,14	11,4	97,0	183,0	26
21016	22 x 2 x 0,14	12,3	103,0	205,0	26
21017	24 x 2 x 0,14	12,8	111,0	228,0	26
21018	25 x 2 x 0,14	12,9	113,0	239,0	26
21019	26 x 2 x 0,14	13,0	122,0	245,0	26
21020	27 x 2 x 0,14	13,1	125,0	251,0	26
21021	28 x 2 x 0,14	14,0	128,0	258,0	26
21022	30 x 2 x 0,14	14,1	140,0	270,0	26
21023	32 x 2 x 0,14	14,8	145,0	284,0	26
21024	34 x 2 x 0,14	14,9	150,0	300,0	26
21025	36 x 2 x 0,14	15,6	156,0	316,0	26
21026	38 x 2 x 0,14	16,4	162,0	350,0	26
21027	40 x 2 x 0,14	16,8	177,0	370,0	26
21028	44 x 2 x 0,14	17,0	181,0	390,0	26
21029	46 x 2 x 0,14	17,2	195,0	430,0	26
21030	50 x 2 x 0,14	18,0	202,0	440,0	26
21031	52 x 2 x 0,14	18,2	206,0	460,0	26
21032	55 x 2 x 0,14	18,7	210,0	480,0	26
21033	1 x 2 x 0,25	4,4	15,0	45,0	24
21034	2 x 2 x 0,25	5,8	28,0	53,0	24
21035	3 x 2 x 0,25	6,4	32,0	65,0	24
21036	4 x 2 x 0,25	7,2	38,0	80,0	24
21037	5 x 2 x 0,25	8,1	55,0	98,0	24
21038	6 x 2 x 0,25	8,8	65,0	114,0	24
21039	7 x 2 x 0,25	8,8	70,0	121,0	24
21040	8 x 2 x 0,25	9,4	75,0	129,0	24
21041	10 x 2 x 0,25	10,8	110,0	157,0	24
21042	12 x 2 x 0,25	11,4	117,0	189,0	24
21043	14 x 2 x 0,25	12,0	122,0	213,0	24
21044	15 x 2 x 0,25	12,5	134,0	225,0	24
21045	16 x 2 x 0,25	12,6	143,0	237,0	24
21046	18 x 2 x 0,25	13,3	148,0	248,0	24
21047	20 x 2 x 0,25	14,0	162,0	275,0	24
21048	22 x 2 x 0,25	15,0	172,0	303,0	24
21049	24 x 2 x 0,25	15,7	223,0	330,0	24
21050	25 x 2 x 0,25	15,8	233,0	343,0	24
21051	26 x 2 x 0,25	15,9	238,0	345,0	24
21052	27 x 2 x 0,25	16,0	244,0	350,0	24
21053	28 x 2 x 0,25	16,6	249,0	360,0	24
21054	30 x 2 x 0,25	17,0	254,0	375,0	24
21055	32 x 2 x 0,25	17,6	290,0	400,0	24
21056	34 x 2 x 0,25	17,9	312,0	410,0	24
21057	36 x 2 x 0,25	18,6	322,0	420,0	24
21058	38 x 2 x 0,25	19,0	339,0	450,0	24
21059	40 x 2 x 0,25	19,7	349,0	485,0	24
21060	44 x 2 x 0,25	20,7	359,0	500,0	24
21061	46 x 2 x 0,25	21,2	398,0	540,0	24
21062	50 x 2 x 0,25	22,0	403,0	550,0	24
21063	52 x 2 x 0,25	22,0	435,0	580,0	24
21064	55 x 2 x 0,25	22,5	464,0	630,0	24
19970	1 x 2 x 0,34	5,0	16,0	58,0	22
19971	2 x 2 x 0,34	6,7	36,9	65,0	22

Part no.	No.pairs x cross-sec. mm <sup>2</sup>	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
19972	3 x 2 x 0,34	7,2	44,9	78,0	22
19973	4 x 2 x 0,34	8,1	54,2	90,0	22
19974	5 x 2 x 0,34	9,0	63,5	110,0	22
19975	6 x 2 x 0,34	10,0	73,1	130,0	22
19976	7 x 2 x 0,34	10,0	79,5	145,0	22
19977	8 x 2 x 0,34	10,8	88,4	150,0	22
19978	9 x 2 x 0,34	11,1	99,3	170,0	22
19979	10 x 2 x 0,34	12,2	106,9	190,0	22
19980	12 x 2 x 0,34	12,9	122,1	220,0	22
19981	14 x 2 x 0,34	13,9	138,2	245,0	22
19982	16 x 2 x 0,34	14,5	154,2	250,0	22
19983	18 x 2 x 0,34	15,3	197,9	275,0	22
19984	21 x 2 x 0,34	16,3	214,4	300,0	22
19985	25 x 2 x 0,34	17,6	238,5	400,0	22
19986	27 x 2 x 0,34	18,0	262,5	410,0	22
19987	30 x 2 x 0,34	19,5	286,6	440,0	22
19988	34 x 2 x 0,34	20,8	310,1	510,0	22
19989	37 x 2 x 0,34	21,4	368,7	550,0	22
19990	40 x 2 x 0,34	22,1	392,6	590,0	22
19991	44 x 2 x 0,34	23,0	424,3	600,0	22
19992	50 x 2 x 0,34	24,5	455,9	650,0	22
19993	52 x 2 x 0,34	24,7	487,6	680,0	22
19994	56 x 2 x 0,34	26,1	518,5	750,0	22
19995	61 x 2 x 0,34	27,5	557,2	840,0	22
17047	1 x 2 x 0,5	5,3	24,0	60,0	20
17001	2 x 2 x 0,5	7,6	54,0	89,0	20
17002	3 x 2 x 0,5	8,2	70,0	104,0	20
17003	4 x 2 x 0,5	9,0	91,0	126,0	20
17004	5 x 2 x 0,5	9,9	105,0	148,0	20
17005	6 x 2 x 0,5	10,9	120,0	171,0	20
17006	8 x 2 x 0,5	12,0	144,0	290,0	20
17007	10 x 2 x 0,5	13,8	178,0	320,0	20
17008	12 x 2 x 0,5	14,5	199,0	361,0	20
17009	16 x 2 x 0,5	16,1	254,0	421,0	20
17010	20 x 2 x 0,5	18,4	302,0	580,0	20
17011	25 x 2 x 0,5	21,0	344,0	740,0	20
17048	1 x 2 x 0,75	6,0	28,0	71,0	19
17012	2 x 2 x 0,75	8,7	58,0	105,0	19
17013	3 x 2 x 0,75	9,3	84,0	128,0	19
17014	4 x 2 x 0,75	10,6	108,0	156,0	19
17015	5 x 2 x 0,75	11,7	126,0	189,0	19
17016	6 x 2 x 0,75	12,7	146,0	216,0	19
17017	8 x 2 x 0,75	14,4	180,0	309,0	19
17018	10 x 2 x 0,75	15,6	220,0	355,0	19
17019	12 x 2 x 0,75	16,8	261,0	405,0	19
17020	16 x 2 x 0,75	18,7	328,0	565,0	19
17021	20 x 2 x 0,75	20,9	392,0	700,0	19
17022	25 x 2 x 0,75	23,2	470,0	950,0	19
17049	1 x 2 x 1	6,3	46,0	75,0	18
17050	2 x 2 x 1	9,1	82,0	116,0	18
17051	3 x 2 x 1	9,8	103,0	140,0	18
17052	4 x 2 x 1	10,9	132,0	191,0	18
17053	1 x 2 x 1,5	7,2	63,0	84,0	16
17054	2 x 2 x 1,5	10,7	111,0	122,0	16
17055	3 x 2 x 1,5	11,4	136,0	194,0	16
17056	4 x 2 x 1,5	12,8	172,0	240,0	16

Dimensions and specifications may be changed without prior notice. (RB01)



Suitable accessories can be found in Chapter X.

- Cable tie



# PAAR-CY-OZ flexible, Cu-screened, EMC-preferred type, meter marking



## Technical data

- Special-PUR control cable adapted to DIN VDE 0812, 0814
- **Temperature range**  
flexing -5°C to +80°C  
fixed installation -40°C to +80°C
- **Nominal voltage**  $U_0/U$  300/500 V
- **Test voltage**  
core/core 1200 V  
core/screen 800 V
- **Breakdown voltage** min. 2400 V
- **Insulation resistance**  
min. 20 MOhm x km
- **Mutual capacitance**  
core/core approx. 150 nF/km  
core/screen approx. 270 nF/km
- **Inductance** approx. 0,67 mH/km
- **Coupling resistance**  
max. 250 Ohm/km
- **Minimum bending radius**  
flexing 10x cable  $\emptyset$   
fixed installation 5x cable  $\emptyset$
- **Radiation resistance**  
up to  $80 \times 10^6$  cJ/kg (up to 80 Mrad)

## Cable structure

- Bare copper-conductor, to DIN VDE 0295 cl.5, fine-wire, BS 6360 cl.5, IEC 60228 cl.5
- Core insulation of special PVC compound type T12 to DIN VDE 0207-363-3 / DIN EN 50363-3
- Core identification to DIN VDE 0293 black cores with continuous white numbering
- Cores stranded in pairs with optimal lay-length
- Pairs stranded in layers with optimal lay-length
- Foil wrapping
- Tinned copper braided screen, approx. 85% coverage
- Outer sheath of special PVC compound type TM2 to DIN VDE 0207-363-4-1 / DIN EN 50363-4-1
- Sheath colour grey (RAL 7032)
- with meter marking

## Properties

- Extensively oil resistant, oil- / chemical Resistance - see table Technical Informations
- The materials used in manufacture are cadmium-free and contain no silicone and free from substances harmful to the wetting properties of lacquers

## Tests

- PVC self-extinguishing and flame retardant acc. to DIN VDE 0482-332-1-2, DIN EN 60332-1-2/IEC 60332-1 (equivalent DIN VDE 0472 part 804 test method B)

## Note

- x = without green-yellow conductor (OZ)
- Also available in other dimensions and in other sheath colours.
- AWG sizes are approximate equivalent values. The actual cross-section is in mm<sup>2</sup>.

## Application

PAAR-CY is ideal for use as a connecting cable for all areas involving measuring, control, regulation and signal transfer as well as for use in all fields of data and impulse transmission. Especially suited for all areas of high electromagnetic activity, e. g. disturbances through parallel circuits.

**EMC** = Electromagnetic compatibility

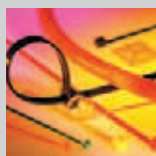
To optimize the EMC features we recommend a large round contact of the copper braiding on both ends.

CE = The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

Part no.	No.pairs x cross-sec. mm <sup>2</sup>	Outer $\emptyset$ approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
17023	2 x 2 x 1	9,5	82,0	135,0	18
17024	3 x 2 x 1	10,0	103,0	160,0	18
17025	4 x 2 x 1	11,0	132,0	197,0	18
17026	5 x 2 x 1	12,3	161,0	253,0	18
17027	6 x 2 x 1	13,4	188,0	295,0	18
17028	8 x 2 x 1	14,7	240,0	410,0	18
17029	10 x 2 x 1	16,4	282,0	518,0	18
17030	12 x 2 x 1	18,2	324,0	601,0	18
17031	16 x 2 x 1	19,0	412,0	990,0	18
17032	20 x 2 x 1	19,8	505,0	1400,0	18
17033	25 x 2 x 1	23,5	610,0	1600,0	18

Part no.	No.pairs x cross-sec. mm <sup>2</sup>	Outer $\emptyset$ approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
17034	2 x 2 x 1,5	11,3	112,0	168,0	16
17035	3 x 2 x 1,5	12,2	139,0	221,0	16
17036	4 x 2 x 1,5	13,5	176,0	269,0	16
17037	5 x 2 x 1,5	14,5	212,0	314,0	16
17038	6 x 2 x 1,5	17,2	255,0	550,0	16
17039	8 x 2 x 1,5	17,5	322,0	650,0	16
17040	10 x 2 x 1,5	20,1	380,0	900,0	16
17041	12 x 2 x 1,5	21,8	442,0	950,0	16
17042	16 x 2 x 1,5	25,0	572,0	1100,0	16
17043	20 x 2 x 1,5	27,0	705,0	1700,0	16
17044	25 x 2 x 1,5	29,5	862,0	1900,0	16

Dimensions and specifications may be changed without prior notice. (RB01)



Suitable accessories can be found in Chapter X.

- Cable tie

**PAAR-TRONIC-CY-CY (LiYCY-CY) EMC-preferred type,****meter marking**

HELUKABEL PAAR-TRONIC-CY-CY 6x2x0,34 QMM / 21094 001042319 CE

**Technical data**

- Special PVC data transmission cable adapted to DIN VDE 0812 and 0814
- **Temperature range**  
flexing -5°C to +80°C  
fixed installation -40°C to +80°C
- **Operating peak voltage**  
(not for heavy current installation purposes)  
0,14 mm<sup>2</sup> = max. 350 V  
≥ 0,25 mm<sup>2</sup> = max. 500 V
- **Test voltage**  
0,14 mm<sup>2</sup> = 1200 V  
≥ 0,25 mm<sup>2</sup> = 2000 V
- **Breakdown voltage**  
0,14 mm<sup>2</sup> = 2400 V  
≥ 0,25 mm<sup>2</sup> = 4000 V
- **Mutual capacitance**  
core/core  
0,14 mm<sup>2</sup> = 147 pF/m  
0,25 mm<sup>2</sup> = 152,5 pF/m  
core/screen  
0,14 mm<sup>2</sup> = 147 pF/m  
0,25 mm<sup>2</sup> = 263 pF/m
- **Impedance**  
0,14 mm<sup>2</sup> = 536 Ohm/1 kHz/20°C  
0,25 mm<sup>2</sup> = 396 Ohm/1 kHz/20°C
- **Coupling** 250 pF/100 m/1 kHz
- **Screen resistance**  
0,14 mm<sup>2</sup> = 36 Ohm/km  
0,25 mm<sup>2</sup> = 18 Ohm/km
- **Attenuation**  
0,14 mm<sup>2</sup> = 3,6 dB/1 kHz/km  
0,25 mm<sup>2</sup> = 2,2 dB/1 kHz/km
- **Coupling resistance**  
max. 250 Ohm/km
- **Minimum bending radius**  
flexing 12x cable Ø  
fixed installation 6x cable Ø
- **Radiation resistance**  
up to 80x10<sup>6</sup> cJ/kg (up to 80 Mrad)

**Cable structure**

- Bare copper, fine wire conductors, to DIN VDE 0295 cl.5
- Conductor construction:  
0,14 mm<sup>2</sup> = 18x0,1 mm  
0,25 mm<sup>2</sup> = 14x0,15 mm  
0,34 mm<sup>2</sup> = 7x0,25 mm
- Core insulation of special PVC compound type T12 to DIN VDE 0207-363-3 / DIN EN 50363-3
- Core identification (pair) to DIN 47100
- Cores stranded in pairs with optimal lay-length
- Pairs screened individually, tinned copper, coverage approx. 85%
- Special PVC coating over individual screened pairs all pairs-CY stranded together
- Foil wrapping
- Overall braid-screening, tinned copper coverage approx. 85%
- Outer sheath of special PVC compound type TM2 to DIN VDE 0207-363-4-1/DIN EN 50363-4-1
- Sheath colour grey (RAL 7001)
- with meter marking

**Properties**

- Extensively oil resistant, oil-/ chemical Resistance - see table Technical Informations
- The materials used in manufacture are cadmium-free and contain no silicone and free from substances harmful to the wetting properties of lacquers

**Tests**

- PVC self-extinguishing and flame retardant acc. to DIN VDE 0482-332-1-2, DIN EN 60332-1-2, IEC 60332-1 (equivalent DIN VDE 0472 part 804 test method B)

**Note**

- As of 0,75 mm<sup>2</sup> cross-sec. see type EDV-PiMF-CY.
- AWG sizes are approximate equivalent values. The actual cross-section is in mm<sup>2</sup>.

**Application**

As a control and signal cable in electronics, instrumentation and control technology. Interference free transmission of data signals from peripheral devices to information storage. Excellent connecting cable for mixing console, studio equipment, measuring and control technology. Reliable in process control, in machining centers and safety engineering systems. These cables with copper screening are suitable for interference free data and signal transmission in the measurement, control and regulation technology.

**EMC** = Electromagnetic compatibility

To optimize the EMC features we recommend a large round contact of the copper braiding on both ends.

The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

Part no.	No.pairs x cross-sec. mm <sup>2</sup>	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
21065	2 x 2 x 0,14	7,6	31,0	95,0	26
21066	3 x 2 x 0,14	8,4	34,0	105,0	26
21067	4 x 2 x 0,14	9,9	45,0	140,0	26
21068	5 x 2 x 0,14	10,4	58,0	160,0	26
21069	6 x 2 x 0,14	11,0	67,0	185,0	26
21070	7 x 2 x 0,14	11,0	78,0	230,0	26

Part no.	No.pairs x cross-sec. mm <sup>2</sup>	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
21071	8 x 2 x 0,14	12,0	97,0	245,0	26
21072	9 x 2 x 0,14	13,0	101,0	280,0	26
21073	10 x 2 x 0,14	14,1	108,0	325,0	26
21074	12 x 2 x 0,14	15,2	134,0	380,0	26
21075	16 x 2 x 0,14	16,7	179,0	440,0	26
21076	20 x 2 x 0,14	18,4	225,0	520,0	26

Continuation ▶

# PAAR-TRONIC-CY-CY (LiYCY-CY) EMC-preferred type, meter marking



Part no.	No.pairs x cross-sec. mm <sup>2</sup>	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
21077	2 x 2 x 0,25	8,6	62,0	125,0	24
21078	3 x 2 x 0,25	9,3	78,2	140,0	24
21079	4 x 2 x 0,25	10,4	124,1	205,0	24
21080	5 x 2 x 0,25	12,1	137,6	230,0	24
21081	6 x 2 x 0,25	13,9	148,1	275,0	24
21082	7 x 2 x 0,25	13,9	159,1	295,0	24
21083	8 x 2 x 0,25	14,2	178,7	330,0	24
21084	10 x 2 x 0,25	15,9	213,9	420,0	24
21085	12 x 2 x 0,25	17,0	238,3	465,0	24
21086	16 x 2 x 0,25	19,8	291,4	590,0	24
21087	20 x 2 x 0,25	21,2	325,0	620,0	24
21088	24 x 2 x 0,25	24,0	367,5	690,0	24
21089	32 x 2 x 0,25	26,5	588,0	785,0	24
21090	48 x 2 x 0,25	31,6	840,5	970,0	24
21091	2 x 2 x 0,34	9,5	73,1	139,0	22
21092	3 x 2 x 0,34	10,5	88,1	157,0	22
21093	4 x 2 x 0,34	11,3	137,2	213,0	22
21094	6 x 2 x 0,34	13,9	174,8	308,0	22
21095	8 x 2 x 0,34	15,4	247,2	385,0	22
21096	10 x 2 x 0,34	17,6	288,7	433,0	22
21097	12 x 2 x 0,34	18,3	321,0	495,0	22
21098	14 x 2 x 0,34	19,6	388,4	600,0	22
21099	16 x 2 x 0,34	20,9	425,5	637,0	22
21100	24 x 2 x 0,34	26,1	577,1	781,0	22

Part no.	No.pairs x cross-sec. mm <sup>2</sup>	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
21101	2 x 2 x 0,5	10,4	83,1	143,0	20
21102	3 x 2 x 0,5	11,7	106,4	179,0	20
21103	4 x 2 x 0,5	13,1	158,0	241,0	20
21104	6 x 2 x 0,5	15,6	201,4	319,0	20
21105	8 x 2 x 0,5	16,4	311,5	441,0	20
21106	10 x 2 x 0,5	20,6	334,5	464,0	20
21107	12 x 2 x 0,5	21,5	394,1	529,0	20
21108	14 x 2 x 0,5	21,6	446,0	641,0	20
21109	16 x 2 x 0,5	23,8	501,2	694,0	20
21110	24 x 2 x 0,5	28,4	712,4	930,0	20

B

Dimensions and specifications may be changed without prior notice. (RB01)



Suitable accessories can be found in Chapter X.

- Cable tie

# PAAR-TRONIC-LI-2YCYv PE-insulated, low capacitance, Termi-Point®, EMC-preferred type, meter marking



## Technical data

- PE-insulated data cable
- **Temperature range**  
flexing -5°C to +70°C  
fixed installation -30°C to +80°C
- **Conductor resistance** (loop) at 20°C  
0,22 mm<sup>2</sup> max. 186 Ohm/km  
0,34 mm<sup>2</sup> max. 115 Ohm/km  
0,5 mm<sup>2</sup> max. 78,5 Ohm/km  
1,0 mm<sup>2</sup> max. 39,2 Ohm/km
- **Operating peak voltage** max. 250 V  
(not for heavy current installation purposes)
- **Test voltage**  
core/core 2000 V  
core/screen 1000 V
- **Insulation resistance** min. 5 GOhm x km
- **Mutual capacitance** at 800 Hz  
> 4 pairs max. 60 nF/km  
≤ 4 pairs values extended by 20%
- **Inductance** approx. 0,66 mH/km
- **Line attenuation** (approx. value)  
0,22 mm<sup>2</sup> at 100 kHz 9,0 dB/km  
0,34 mm<sup>2</sup> at 100 kHz 6,6 dB/km  
0,50 mm<sup>2</sup> at 100 kHz 6,0 dB/km  
0,22 mm<sup>2</sup> at 1 MHz 25,0 dB/km  
0,34 mm<sup>2</sup> at 1 MHz 20,0 dB/km  
0,50 mm<sup>2</sup> at 1 MHz 18,0 dB/km
- **Cross-talk attenuation**  
up to 1 MHz min. 50 dB  
up to 10 MHz min. 40 dB
- **Minimum bending radius**  
flexing 12x cable Ø  
fixed installation 7,5x cable Ø

## Cable structure

- Bare copper-conductor, 7-wires, adapted to DIN VDE 0881, suitable for Termi-Point® and solder-free connection technique
- Conductor construction:  
0,22 mm<sup>2</sup> = 7x0,2 mm  
0,34 mm<sup>2</sup> = 7x0,25 mm  
0,5 mm<sup>2</sup> = 7x0,3 mm  
1 mm<sup>2</sup> = 7 x 0,42 mm
- Core insulation of PE compound type L/MD to DIN VDE 0819-103 /DIN EN 50290-2-23
- Core identification (pair) to DIN 47100
- Cores stranded in pairs with optimal lay-length
- Pairs stranded in layers with optimal lay-length
- Foil wrapping
- Tinned copper braided screening, coverage approx. 85%
- Outer sheath of special PVC compound type TM2 to DIN VDE 0207-363-4-1/DIN EN 50363-4-1
- Type . . . Yv with reinforced outer sheath
- Sheath colour black
- with meter marking

## Properties

- The line offers enormous advantages through fast and cheap contacting possibility in Termi-Point® connection technology. With this solder-free connection technique, the stranded conductor is crimped together with a sleeve onto a contact pin without prior stripping of the insulation material
- The twisted-pair lay-up prevents electrical unbalances within the cable and this thus effectively suppresses cross-talking effects
- The materials used in manufacture are cadmium-free and contain no silicone and free from substances harmful to the wetting properties of lacquers

## Tests

- PVC outer sheath self-extinguishing and flame retardant acc. to DIN VDE 0482-332-1-2,  
DIN EN 60332-1-2, IEC 60332-1 (equivalent DIN VDE 0472 part 804 test method B)

## Note

- At 0,22 mm<sup>2</sup> is designed for applications with Sub-D connectors.
- Termi-Point® registered trade mark AMP.
- AWG sizes are approximate equivalent values. The actual cross-section is in mm<sup>2</sup>.

## Application

These PE-insulated data cables with twisted pairs are used in particular for the interference-free transmission of data and signals over longer distances. The high transmission rates are particularly suitable for RS 422 and RS 485 interfaces. These cables are suitable for fixed installations as well as for flexing applications, for free movement without forced motion and without tensile stress, in dry and moist environments. Yv black with reinforced outer sheath, is suitable for installation in the ground and in open air.

**EMC** = Electromagnetic compatibility

To optimize the EMC features we recommend a large round contact of the copper braiding on both ends.

CE= The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

Part no.	No.pairs x cross-sec. mm <sup>2</sup>	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
21129	2 x 2 x 0,22	7,8	26,0	60,0	24
21130	3 x 2 x 0,22	8,1	31,0	79,0	24
21131	4 x 2 x 0,22	8,5	38,0	96,0	24
21132	8 x 2 x 0,22	10,6	62,0	140,0	24
21133	10 x 2 x 0,22	11,6	79,0	184,0	24
21135	2 x 2 x 0,34	8,7	35,0	83,0	22
21136	3 x 2 x 0,34	9,4	44,0	92,0	22
21137	4 x 2 x 0,34	10,0	53,0	112,0	22
21138	8 x 2 x 0,34	12,4	86,0	179,0	22
21139	10 x 2 x 0,34	13,8	104,0	219,0	22

Part no.	No.pairs x cross-sec. mm <sup>2</sup>	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
21141	2 x 2 x 0,5	9,8	49,0	90,0	20
21142	3 x 2 x 0,5	10,4	60,0	126,0	20
21143	4 x 2 x 0,5	11,2	73,0	146,0	20
21144	8 x 2 x 0,5	13,9	124,0	246,0	20
21145	10 x 2 x 0,5	16,0	155,0	292,0	20
21146	2 x 2 x 1	10,8	81,0	141,0	18
21147	3 x 2 x 1	11,5	102,0	170,0	18
21148	4 x 2 x 1	12,0	130,0	203,0	18
21149	8 x 2 x 1	16,1	240,0	261,0	18
21150	10 x 2 x 1	17,2	282,0	287,0	18

Dimensions and specifications may be changed without prior notice. (RB01)



# PAAR-TRONIC-LI-2YCY PE-insulated, low capacitance, Termi-Point®, EMC-preferred type, meter marking

EAC

B



## Technical data

- PE-insulated data cable
- **Temperature range**  
flexing -5°C to +70°C  
fixed installation -30°C to +80°C
- **Conductor resistance** (loop) at 20°C  
0,22 mm<sup>2</sup> max. 186 Ohm/km  
0,34 mm<sup>2</sup> max. 115 Ohm/km  
0,5 mm<sup>2</sup> max. 78,5 Ohm/km
- **Operating peak voltage** max. 250 V  
(not for heavy current installation purposes)
- **Test voltage**  
core/core 2000 V  
core/screen 1000 V
- **Insulation resistance** min. 5 GOhm x km
- **Mutual capacitance** at 800 Hz  
> 4 pairs max. 60 nF/km  
≤ 4 pairs values extended by 20%
- **Inductance** approx. 0,66 mH/km
- **Line attenuation** (approx. value)  
0,22 mm<sup>2</sup> at 100 kHz 9,0 dB/km  
0,34 mm<sup>2</sup> at 100 kHz 6,6 dB/km  
0,50 mm<sup>2</sup> at 100 kHz 6,0 dB/km  
0,22 mm<sup>2</sup> at 1 MHz 25,0 dB/km  
0,34 mm<sup>2</sup> at 1 MHz 20,0 dB/km  
0,50 mm<sup>2</sup> at 1 MHz 18,0 dB/km
- **Cross-talk attenuation**  
up to 1 MHz min. 50 dB  
up to 10 MHz min. 40 dB
- **Minimum bending radius**  
flexing 12x cable Ø  
fixed installation 7,5x cable Ø

## Application

These PE-insulated data cables with twisted pairs are used in particular for the interference-free transmission of data and signals over longer distances. The high transmission rates are particularly suitable for RS 422 and RS 485 interfaces. These cables are suitable for fixed installations as well as for flexing applications, for free movement without forced motion and without tensile stress, in dry and moist environments but not in open air (Type grey).

**EMC** = Electromagnetic compatibility

To optimize the EMC features we recommend a large round contact of the copper braiding on both ends.

CE = The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

## Cable structure

- Bare copper-conductor, 7-wires, adapted to DIN VDE 0881, suitable for Termi-Point® and solder-free connection technique
- Conductor construction:  
0,22 mm<sup>2</sup> = 7x0,2 mm  
0,34 mm<sup>2</sup> = 7x0,25 mm  
0,5 mm<sup>2</sup> = 7x0,3 mm
- Core insulation of PE compound type L/MD to DIN VDE 0819-103/DIN EN 50290-2-23
- Core identification (pair) to DIN 47100
- Cores stranded in pairs with optimal lay-length
- Pairs stranded in layers with optimal lay-length
- Foil wrapping
- Tinned copper braided screen, approx. 85% coverage
- Outer sheath of special PVC compound type TM2 to DIN VDE 0207-363-4-1/DIN EN 50363-4-1
- Sheath colour grey
- with meter marking

## Properties

- These cables make enormous advantages possible for fast and cost-effective contact-making using the Termi-Point® connection technique. With this solder-free connection technique, the stranded conductor is crimped together with a sleeve onto a contact pin without prior stripping of the insulation material
- The twisted-pair lay-up prevents electrical unbalances within the cable and this thus effectively suppresses cross-talking effects
- The materials used in manufacture are cadmium-free and contain no silicone and free from substances harmful to the wetting properties of lacquers

## Tests

- PVC outer sheath self-extinguishing and flame retardant acc. to DIN VDE 0482-332-1-2, DIN EN 60332-1-2, IEC 60332-1 (equivalent DIN VDE 0472 part 804 test method B)

## Note

- At 0,22 mm<sup>2</sup> is designed for applications with Sub-D connectors.
- Termi-Point® registered trade mark AMP.
- AWG sizes are approximate equivalent values. The actual cross-section is in mm<sup>2</sup>.

Part no.	No.pairs x cross-sec. mm <sup>2</sup>	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
21111	2 x 2 x 0,22	5,5	26,0	48,0	24
21112	3 x 2 x 0,22	6,2	31,0	66,0	24
21113	4 x 2 x 0,22	6,5	38,0	82,0	24
21114	8 x 2 x 0,22	8,6	62,0	123,0	24
21115	10 x 2 x 0,22	9,9	79,0	165,0	24
21117	2 x 2 x 0,34	6,7	35,0	68,0	22
21118	3 x 2 x 0,34	7,2	44,0	77,0	22
21119	4 x 2 x 0,34	8,0	53,0	95,0	22
21120	8 x 2 x 0,34	10,9	86,0	158,0	22
21121	10 x 2 x 0,34	12,5	104,0	195,0	22
21123	2 x 2 x 0,5	7,9	49,0	74,0	20
21124	3 x 2 x 0,5	8,6	60,0	109,0	20
21125	4 x 2 x 0,5	9,6	73,0	128,0	20
21126	8 x 2 x 0,5	12,8	124,0	223,0	20
21127	10 x 2 x 0,5	14,8	155,0	265,0	20

Dimensions and specifications may be changed without prior notice. (RB01)

# LifYCY high flexible, paired, screened, EMC-preferred type, meter marking



## Technical data

- Special PVC connecting cable, adapted to DIN VDE 0812 and 0814
- **Temperature range**  
flexing -5°C to +70°C  
fixed installation -40°C to +70°C
- **Operating peak voltage** 350 V  
(not for heavy current installation purposes)
- **Test voltage** 1200 V
- **Breakdown voltage** min. 2400 V
- **Insulation resistance**  
min. 10 MOhm x km
- **Minimum bending radius**  
flexing 10x cable Ø  
fixed installation 5x cable Ø
- **Radiation resistance**  
up to 80x10<sup>6</sup> cJ/kg (up to 80 Mrad)
- **Coupling resistance**  
max. 250 Ohm/km

## Cable structure

- Bare copper, extra fine conductors (single wire diameter 0,05 mm)
- Core insulation of special PVC compound type T12 to DIN VDE 0207-363-3 / DIN EN 50363-3
- Core identification (pair) to DIN 47100
- Cores stranded in pairs
- Pairs stranded in layers
- Foil wrapping
- Tinned copper braided screen, approx. 85% coverage
- Outer sheath of special PVC compound type TM2 to DIN VDE 0207-363-4-1 / DIN EN 50363-4-1
- Sheath colour grey (RAL 7032)
- with meter marking

## Properties

- Extensively oil resistant, oil-/ chemical Resistance - see table Technical Informations
  - The materials used in manufacture are cadmium-free and contain no silicone and free from substances harmful to the wetting properties of lacquers
- Tests**
- PVC self-extinguishing and flame retardant acc. to DIN VDE 0482-332-1-2, DIN EN 60332-1-2, IEC 60332-1 (equivalent DIN VDE 0472 part 804 test method B)

## Application

These screened cables are used as connecting cable for signal, measuring, control and speaking purposes for example in Intercom systems, weighing instruments, equipment for office works, computers and telecommunication equipment etc. The cable offers a flexible handling and installation. Due to pair-twisting, the electrical unbalances of the cable itself can be reduced and cross-talk effects are avoided. The tinned copper screened braiding serves as protection against outer high frequency influences (capacitance unbalance). The drain wire ensure an exact connection to the earth clamp. The cables are suitable for fixed installation and flexible application, free-moving without tensile stress and without forced guiding operation in dry, damp and wet places for medium mechanical stress.

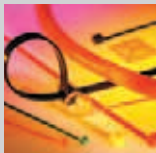
**EMC** = Electromagnetic compatibility

To optimize the EMC features we recommend a large round contact of the copper braiding on both ends.

CE = The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

Part no.	No.pairs x cross-sec. mm <sup>2</sup>	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.	Part no.	No.pairs x cross-sec. mm <sup>2</sup>	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
15987	2 x 2 x 0,2	5,7	24,0	60,0	-	15994	10 x 2 x 0,2	10,2	108,0	150,0	-
15988	3 x 2 x 0,2	6,1	35,0	70,0	-	15995	12 x 2 x 0,2	10,9	125,0	180,0	-
15989	4 x 2 x 0,2	6,6	45,0	80,0	-	15996	16 x 2 x 0,2	12,3	144,0	210,0	-
15990	5 x 2 x 0,2	7,9	54,0	90,0	-	15997	18 x 2 x 0,2	13,1	155,0	230,0	-
15991	6 x 2 x 0,2	8,3	56,0	100,0	-	15998	20 x 2 x 0,2	13,2	216,0	250,0	-
15992	7 x 2 x 0,2	8,3	68,0	120,0	-	15999	24 x 2 x 0,2	15,0	228,0	330,0	-
15993	8 x 2 x 0,2	9,4	72,0	130,0	-	16000	32 x 2 x 0,2	16,6	269,0	400,0	-

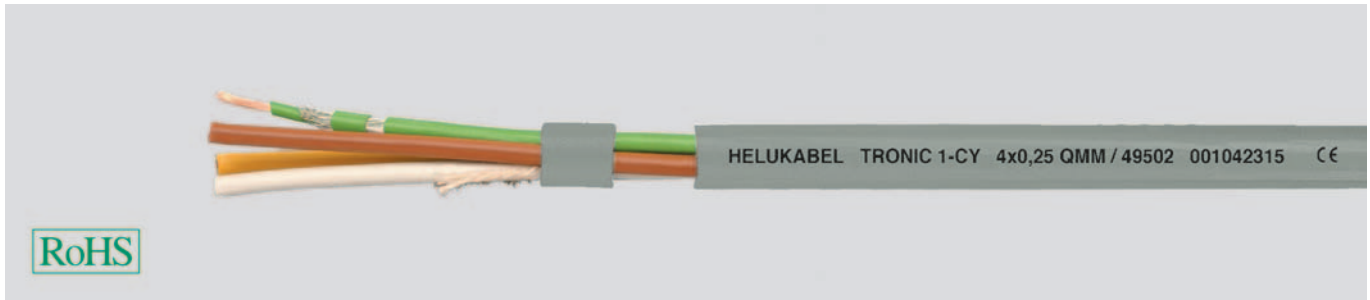
Dimensions and specifications may be changed without prior notice. (RB01)



Suitable accessories can be found in Chapter X.

- Cable tie

# TRONIC 1-CY each core individually screened, EMC-preferred type, meter marking



B

## Technical data

- Special-PVC core insulation adapted to DIN VDE 0812
- **Temperature range**  
flexing -5°C to +80°C  
fixed installation -40°C to +80°C
- **Operating peak voltage**  
(not for heavy current installation purposes)  
0,25 mm<sup>2</sup> 250 V  
0,50 mm<sup>2</sup> 350 V
- **Test voltage** (core/screen)  
0,25 mm<sup>2</sup> 800 V  
0,50 mm<sup>2</sup> 1200 V
- **Insulation resistance**  
min. 20 MOhm x km
- **Minimum bending radius**  
flexing 10x cable Ø  
fixed installation 5x cable Ø
- **Radiation resistance**  
up to 80x10<sup>6</sup> cJ/kg (up to 80 Mrad)

## Cable structure

- Bare copper-conductor, from 0,5 mm<sup>2</sup> to DIN VDE 0295 cl.5, fine-wire, BS 6360 cl.5, IEC 60228 cl.5
- Conductor construction:  
0,25 mm<sup>2</sup> = 14x0,15 mm  
0,50 mm<sup>2</sup> = 16x0,2 mm
- Core insulation of special PVC compound type T12 to DIN VDE 0207-363-3 / DIN EN 50363-3
- Core identification to DIN 47100
- Each core individually with copper spiral shield, approx. 85% coverage
- Contact protection, PVC sheath
- Cores stranded in layers with optimal lay-length
- Outer sheath of special PVC compound type TM2 to DIN VDE 0207-363-4-1 / DIN EN 50363-4-1
- Sheath colour grey (RAL 7001)
- with meter marking

## Properties

- Extensively oil resistant, oil- / chemical Resistance - see table Technical Informations
  - The materials used in manufacture are cadmium-free and contain no silicone and free from substances harmful to the wetting properties of lacquers
- ### Tests
- PVC self-extinguishing and flame retardant acc. to DIN VDE 0482-332-1-2, DIN EN 60332-1-2, IEC 60332-1 (equivalent DIN VDE 0472 part 804 test method B)

## Note

- AWG sizes are approximate equivalent values. The actual cross-section is in mm<sup>2</sup>.

## Application

The individually screened, flexible cable is ideal for use in data and impulse transfer in computers, communication systems and external units and offers interference-free data flow for all measuring and command functions. This cable type is widely used in the machine and steel producing industries as well as for traffic signals and data processing areas.

**EMC** = Electromagnetic compatibility

To optimize the EMC features we recommend a large round contact of the copper braiding on both ends.

**CE** = The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
49501	3 x 0,25	6,5	18,0	40,0	24
49502	4 x 0,25	7,2	24,0	45,0	24
49503	5 x 0,25	8,0	30,0	56,0	24
49504	7 x 0,25	8,8	42,0	70,0	24
49505	8 x 0,25	10,0	48,0	87,0	24
49506	10 x 0,25	11,3	60,0	90,0	24
49507	12 x 0,25	12,0	72,0	95,0	24
49508	16 x 0,25	13,1	96,0	115,0	24
49509	24 x 0,25	16,0	144,0	170,0	24
49510	32 x 0,25	18,5	192,0	210,0	24
49511	48 x 0,25	23,5	288,0	320,0	24

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
49512	3 x 0,5	7,3	28,8	71,0	20
49513	4 x 0,5	8,2	38,5	81,0	20
49514	5 x 0,5	9,2	48,0	95,0	20
49515	7 x 0,5	10,0	67,0	115,0	20
49516	8 x 0,5	11,0	77,0	145,0	20
49517	10 x 0,5	13,2	96,0	169,0	20
49518	12 x 0,5	14,0	114,6	185,0	20
49519	16 x 0,5	15,5	154,0	225,0	20
49520	32 x 0,5	21,5	308,0	440,0	20

Dimensions and specifications may be changed without prior notice. (RB01)



Suitable accessories can be found in Chapter X.

- Cable tie

# TRONIC 2-CY 2 cores screened, meter marking



HELUKABEL TRONIC 2-CY 4x0,25 QMM / 49526 001042316



## Technical data

- Special-PVC core insulation adapted to DIN VDE 0812
- **Temperature range**  
flexing -5°C to +80°C  
fixed installation -40°C to +80°C
- **Conductor resistance**  
0,14 mm<sup>2</sup> = max. 138 Ohm/km  
0,25 mm<sup>2</sup> = max. 77,8 Ohm/km  
0,50 mm<sup>2</sup> = max. 37,8 Ohm/km
- **Operating peak voltage**  
(not for heavy current installation purposes)  
0,14 mm<sup>2</sup> = max. 350 V  
0,25 mm<sup>2</sup> = max. 500 V  
0,50 mm<sup>2</sup> = max. 500 V
- **Test voltage** (50 Hz eff)  
0,14 mm<sup>2</sup> = 800 V  
0,25 mm<sup>2</sup> = 800 V  
0,50 mm<sup>2</sup> = 1200 V
- **Breakdown voltage**  
0,14 mm<sup>2</sup> = 1600 V  
0,25 mm<sup>2</sup> = 1600 V  
0,50 mm<sup>2</sup> = 2400 V
- **Insulation resistance**  
min. 200 MOhm x km
- **Mutual capacitance** (approx.-value)  
core/core  
0,14 mm<sup>2</sup> = 70 pF/m  
0,25 mm<sup>2</sup> = 80 pF/m  
0,50 mm<sup>2</sup> = 80 pF/m  
core/screen  
0,14 mm<sup>2</sup> = 270 pF/m  
0,25 mm<sup>2</sup> = 350 pF/m  
0,50 mm<sup>2</sup> = 400 pF/m
- **Minimum bending radius**  
flexing 10x cable Ø  
fixed installation 5x cable Ø
- **Radiation resistance**  
up to 80x10<sup>6</sup> cJ/kg (up to 80 Mrad)

## Cable structure

- Bare copper-conductor, from 0,5 mm<sup>2</sup> to DIN VDE 0295 cl.5, fine-wire, BS 6360 cl.5, IEC 60228 cl.5  
0,14 and 0,25 mm<sup>2</sup> to DIN VDE 0812
- Conductor construction:  
0,14 mm<sup>2</sup> = 18x0,1 mm  
0,25 mm<sup>2</sup> = 14x0,15 mm  
0,50 mm<sup>2</sup> = 16x0,2 mm
- Core insulation of special PVC compound type T12 to DIN VDE 0207-363-3 / DIN EN 50363-3
- Core identification to DIN 47100
- White and brown cores each individually screened
- Copper braided screen, approx. 85% coverage
- Cores stranded in layers with optimal lay-length
- Contact protection, PVC sheath
- Outer sheath of special PVC compound type TM2 to DIN VDE 0207-363-4-1 / DIN EN 50363-4-1
- Sheath colour grey (RAL 7001)
- with meter marking

## Properties

- Extensively oil resistant, oil-/ chemical Resistance - see table Technical Informations
- The materials used in manufacture are cadmium-free and contain no silicone and free from substances harmful to the wetting properties of lacquers

## Tests

- PVC self-extinguishing and flame retardant acc. to DIN VDE 0482-332-1-2, DIN EN 60332-1-2, IEC 60332-1 (equivalent DIN VDE 0472 part 804 test method B)

## Note

- AWG sizes are approximate equivalent values. The actual cross-section is in mm<sup>2</sup>.

## Application

TRONIC 2-CY is used in all areas of measuring and control technology requiring only 2 impulse transfer cores. This cable type is used mainly in the machinery and industrial equipment fields as well as in the steel industry and in electronics.

CE= The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
49521	4 x 0,14	6,2	14,6	40,0	26
49522	8 x 0,14	7,2	20,3	50,0	26
49523	12 x 0,14	8,4	26,8	70,0	26
49524	16 x 0,14	8,6	32,0	80,0	26
49525	24 x 0,14	9,0	43,4	110,0	26
49526	4 x 0,25	6,5	21,3	60,0	24
49527	8 x 0,25	8,0	31,0	90,0	24
49528	12 x 0,25	9,2	40,5	120,0	24
49529	16 x 0,25	9,6	50,1	140,0	24
49530	24 x 0,25	12,0	69,3	200,0	24

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
49531	4 x 0,5	7,6	34,0	100,0	20
49532	8 x 0,5	11,6	53,2	150,0	20
49533	12 x 0,5	11,9	72,4	190,0	20
49534	16 x 0,5	12,5	91,6	240,0	20
49535	24 x 0,5	15,3	130,0	310,0	20

Dimensions and specifications may be changed without prior notice. (RB01)



# LiY-TPC-Y pairs screened, EMC-preferred type, meter marking



## Technical data

- Pair screened special PVC data transmission cable adapted to DIN VDE 0812 and 0814
- **Temperature range**  
flexing -5°C to +70°C  
fixed installation -30°C to +70°C
- **Operating peak voltage** 500 V  
(not for heavy current installation purposes)
- **Test voltage** 1200 V
- **Breakdown voltage** min. 2400 V
- **Insulation resistance**  
min. 20 MOhm x km
- **Radiation resistance**  
up to 80x10<sup>6</sup> cJ/kg (up to 80 Mrad)
- **Coupling resistance**  
max. 250 Ohm/km
- **Minimum bending radius**  
flexing 12x cable Ø  
fixed installation 7,5x cable Ø

## Cable structure

- Bare copper-conductor, from 0,5 mm<sup>2</sup> to DIN VDE 0295 cl.5, fine-wire, BS 6360 cl.5, IEC 60228 cl.5 0,25 mm<sup>2</sup> and 0,34 mm<sup>2</sup> to DIN VDE 0812
- Conductor construction:  
0,25 mm<sup>2</sup> = 14x0,15 mm  
0,34 mm<sup>2</sup> = 7x0,25 mm
- Core insulation of special PVC compound type TI2 to DIN VDE 0207-363-3 / DIN EN 50363-3
- Core identification (pair) to DIN 47100
- Cores stranded in pairs with optimal lay-length
- Each pair with foil wrapping
- Pairs individually screened, tinned copper coverage approx. 85%
- All pairs-C stranded in layers with optimal lay-length
- Foil wrapping
- Outer sheath of special PVC compound type TM2 to DIN VDE 0207-363-4-1/DIN EN 50363-4-1
- Sheath colour grey (RAL 7032)
- with meter marking

## Properties

- Extensively oil resistant, oil- / chemical Resistance - see table Technical Informations
  - The materials used in manufacture are cadmium-free and contain no silicone and free from substances harmful to the wetting properties of lacquers
- ### Tests
- PVC self-extinguishing and flame retardant acc. to DIN VDE 0482-332-1-2, DIN EN 60332-1-2/IEC 60332-1 (equivalent DIN VDE 0472 part 804 test method B)

## Note

- AWG sizes are approximate equivalent values. The actual cross-section is in mm<sup>2</sup>.

## Application

This pair screened table type offers total interference-free data transfer and is ideal for use as a signal and control cable in combination with computers and external units. The screening properties also make this cable type well suited for use as a connecting cable in sound studio equipment, measuring and control sectors as well as proving a highly reliable cable for process-control and security systems. The copper screening assures a disturbance-free data and signal transmission for measuring and control systems.

**EMC** = Electromagnetic compatibility

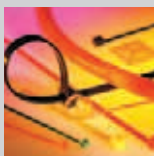
To optimize the EMC features we recommend a large round contact of the copper braiding on both ends.

**CE** = The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

Part no.	No.pairs x cross-sec. mm <sup>2</sup>	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
21323	2 x 2 x 0,25	6,2	32,0	60,0	24
21324	3 x 2 x 0,25	6,8	48,0	80,0	24
21325	4 x 2 x 0,25	7,4	64,0	112,0	24
21326	5 x 2 x 0,25	8,7	80,0	142,0	24
21327	6 x 2 x 0,25	9,1	96,0	159,0	24
21328	7 x 2 x 0,25	9,6	112,0	177,0	24
21329	10 x 2 x 0,25	11,7	160,0	250,0	24
21340	2 x 2 x 0,34	6,7	42,0	78,0	22
21341	3 x 2 x 0,34	7,5	63,0	104,0	22
21342	4 x 2 x 0,34	8,1	84,0	153,0	22
21343	5 x 2 x 0,34	9,5	105,0	189,0	22
21344	7 x 2 x 0,34	10,1	147,0	238,0	22
21345	10 x 2 x 0,34	13,4	210,0	322,0	22

Part no.	No.pairs x cross-sec. mm <sup>2</sup>	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
21355	2 x 2 x 0,5	8,3	58,0	96,0	20
21356	3 x 2 x 0,5	9,2	87,0	136,0	20
21357	4 x 2 x 0,5	10,2	116,0	187,0	20
21370	2 x 2 x 0,75	9,2	76,0	132,0	19
21371	3 x 2 x 0,75	10,1	114,0	178,0	19
21372	4 x 2 x 0,75	11,2	152,0	243,0	19
21373	5 x 2 x 0,75	12,7	190,0	312,0	19
21385	2 x 2 x 1	9,6	86,0	142,0	18
21386	3 x 2 x 1	10,8	130,0	189,0	18
21387	4 x 2 x 1	11,9	149,0	275,0	18

Dimensions and specifications may be changed without prior notice. (RB01)



Suitable accessories can be found in Chapter X.

- Cable tie

# DATAPUR-C<sup>®</sup> EMC-preferred type, Cu-screened, PUR-outer sheath, meter marking



HELUKABEL DATAPUR-C 7x0,34 QMM / 52516 500 V 001042057

CE



## Technical data

- Special -PVC/PUR control cable adapted to DIN VDE 0285-525-1 / DIN EN 50525-1
- **Temperature range**  
flexing -5°C to +80°C  
fixed installation -40°C to +80°C
- **Operating peak voltage**  
(not for heavy current installation purposes)  
0,14 mm<sup>2</sup> 350 V  
as of 0,25 mm<sup>2</sup> 500 V
- **Test voltage**  
0,14 mm<sup>2</sup> 800 V  
as of 0,25 mm<sup>2</sup> 1200 V
- **Insulation resistance**  
min. 20 MOhm x km
- **Mutual capacitance** core/core:  
up to 0,34 mm<sup>2</sup> approx. 120 nF/km  
as of 0,5 mm<sup>2</sup> approx. 160 nF/km
- **Minimum bending radius**  
flexing 10x cable Ø  
fixed installation 5x cable Ø
- **Radiation resistance**  
up to 100x10<sup>6</sup> cJ/kg (up to 100 Mrad)
- **Coupling resistance**  
max. 250 Ohm/km

## Cable structure

- Bare copper-conductor, from 0,5 mm<sup>2</sup> to DIN VDE 0295 cl.5, fine-wire, BS 6360 cl.5, IEC 60228 cl.5
- Conductor construction:  
0,34 mm<sup>2</sup> = 7 x 0,25 mm
- Core insulation of special PVC compound type T12 to DIN VDE 0207-363-3 / DIN EN 50363-3
- Core identification to DIN 471000
- Cores stranded in layers with optimal lay-length
- Foil wrapping
- Tinned copper braided screen, approx. 85% coverage
- Outer sheath of PUR compound type TMPU to DIN VDE 0207-363-10-2 / DIN EN 50363-10-2
- Sheath colour grey (RAL 7032)
- with meter marking

## Properties

- Chemical resistance: good against acids, lyes, hydraulic liquids
- High flexibility at low temperature
- High abrasion resistance
- **Resistant to**  
Oils and fats  
Non-alcoholic fuels and kerosene  
Atmospheric influences  
UV-radiation  
Oxygene and ozone  
Microbes and rotting  
Sea and waste water  
Vibrations
- The materials used in manufacture are cadmium-free and contain no silicone and free from substances harmful to the wetting properties of lacquers

## Note

- AWG sizes are approximate equivalent values. The actual cross-section is in mm<sup>2</sup>.

## Application

The specific construction of DATAPUR-C<sup>®</sup> makes this cable type ideal for use in all types of computer systems, office machinery, signal and control units. DATAPUR-C<sup>®</sup> proves its efficiency but also in the acoustic field in telecommunications, paging and intercom systems but also in the cradle of technology and in the measuring and control technology.

**EMC** = Electromagnetic compatibility

To optimize the EMC features we recommend a large round contact of the copper braiding on both ends.

CE = The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
52490	2 x 0,14	3,9	12,3	21,0	26
52491	3 x 0,14	4,0	14,0	25,0	26
52492	4 x 0,14	4,3	15,7	29,0	26
52493	5 x 0,14	4,7	19,5	35,0	26
52494	7 x 0,14	5,2	23,4	41,0	26
52495	10 x 0,14	6,5	28,5	54,0	26
52496	12 x 0,14	6,7	34,3	64,0	26
52497	14 x 0,14	6,9	39,9	74,0	26
52498	18 x 0,14	7,6	51,5	93,0	26
52499	21 x 0,14	8,4	60,1	108,0	26
52500	25 x 0,14	9,1	71,9	128,0	26
52501	2 x 0,25	4,3	14,7	26,0	24
52502	3 x 0,25	4,5	17,1	33,0	24
52503	4 x 0,25	4,8	20,6	38,0	24
52504	5 x 0,25	5,4	24,8	44,0	24
52505	7 x 0,25	5,8	31,1	53,0	24
52506	10 x 0,25	7,3	42,0	79,0	24
52507	12 x 0,25	7,5	51,0	92,0	24
52508	14 x 0,25	8,1	60,1	105,0	24
52509	18 x 0,25	9,1	77,9	128,0	24
52510	21 x 0,25	9,6	91,4	148,0	24
52511	25 x 0,25	10,6	110,8	175,0	24

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
52512	2 x 0,34	4,9	17,0	33,0	22
52513	3 x 0,34	5,1	20,7	42,0	22
52514	4 x 0,34	5,5	24,7	48,0	22
52515	5 x 0,34	6,0	30,1	57,0	22
52516	7 x 0,34	6,6	38,2	77,0	22
52517	10 x 0,34	8,4	63,1	111,0	22
52518	12 x 0,34	8,6	74,2	128,0	22
52519	14 x 0,34	9,0	85,3	144,0	22
52520	18 x 0,34	10,1	107,4	175,0	22
52521	21 x 0,34	10,9	124,1	200,0	22
52522	25 x 0,34	12,0	147,0	233,0	22
52523	2 x 0,5	5,3	23,2	38,0	20
52524	3 x 0,5	5,6	30,1	51,0	20
52525	4 x 0,5	6,4	35,4	58,0	20
52526	5 x 0,5	6,9	52,6	77,0	20
52527	7 x 0,5	7,3	65,3	93,0	20
52528	10 x 0,5	9,6	88,8	134,0	20
52529	12 x 0,5	9,7	101,9	155,0	20
52530	14 x 0,5	10,2	115,1	175,0	20
52531	18 x 0,5	11,5	141,2	214,0	20
52532	21 x 0,5	12,1	161,1	245,0	20
52533	25 x 0,5	13,7	187,9	285,0	20

Dimensions and specifications may be changed without prior notice. (RB01)

# DATAFLAMM®-C EMC-preferred type, halogen-free, screened, meter marking



## Technical data

- Special data cable, halogen-free
- **Temperature range**  
flexing +5°C to +70°C  
fixed installation -40°C to +70°C
- **Operating peak voltage**  
(not for heavy current installation purposes)  
0,14 mm<sup>2</sup> = 350 V  
≥ 0,25 mm<sup>2</sup> = 500 V
- **Test voltage**  
0,14 mm<sup>2</sup> = 800 V  
≥ 0,25 mm<sup>2</sup> = 1200 V
- **Insulation resistance**  
min. 2 GOhm x km
- **Capacitance**  
core/core <70 nF/km
- **Minimum bending radius**  
7,5x cable Ø
- **Coupling resistance**  
max. 250 Ohm/km
- **Radiation resistance**  
up to 100x10<sup>6</sup> cJ/kg (up to 100 Mrad)

## Cable structure

- Bare copper-conductor, to DIN VDE 0812, fine-wire
- Conductor construction:  
0,34 mm<sup>2</sup> = 7x0,25 mm
- Core insulation of PE compound type L/MD to DIN VDE 0819-103 / DIN EN 50290-2-23
- Core identification to DIN 47100
- Cores twisted in layers with optimal lay-length
- Foil wrapping
- Tinned copper braided screen, approx. 85% coverage
- Outer sheath compound type HM2 to DIN VDE 0207 part 24
- Sheath colour grey (RAL 7005)
- with meter marking

## Properties

- PE-insulated cores, compared with PVC-insulated cores, assure a remarkable and more favourable capacitance values
- ### Tests
- Halogen-free to DIN VDE 0482 part 267, DIN EN 50267-2-1, IEC 60754-1 (equivalent DIN VDE 0472 part 815)
  - Corrosiveness of combustion gases acc. to DIN VDE 0482 part 267, DIN EN 50267-2-2, IEC 60754-2 (equivalent DIN VDE 0472 part 813)
  - Halogen-free sheath compound, self-extinguishing and flame retardant acc. to DIN VDE 0482-332-1-2, DIN EN 60332-1-2, IEC 60332-1 (equivalent DIN VDE 0472 part 804 test method B)

## Note

- AWG sizes are approximate equivalent values. The actual cross-section is in mm<sup>2</sup>.
- unscreened analogue type: **DATAFLAMM®**, confer page 130

## Application

As a connecting and interconnecting cable for signaling, measuring, control and intercom purposes for the use in paging and intercom systems, clock systems, weighing equipment and office machines. The cables can be laid on or under plaster, in dry, damp and wet rooms as well as masonry and concrete. Areas of use are telecommunications and information processing systems in public buildings, laboratories, warehouses and other buildings in which the release of halogens in the event of fire must be avoided. Due to the shielding without interference against foreign encoder or high-frequency signals.

**EMC** = Electromagnetic compatibility

To optimize the EMC features we recommend a large round contact of the copper braiding on both ends.

**CE** = The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.	Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
52365	2 x 0,14	3,7	12,4	21,0	26	52398	4 x 0,34	5,5	24,5	47,0	22
52366	3 x 0,14	3,9	14,0	25,0	26	52399	5 x 0,34	6,0	30,0	58,0	22
52367	4 x 0,14	4,1	15,8	26,0	26	52400	7 x 0,34	6,4	38,2	76,0	22
52368	5 x 0,14	4,4	19,5	32,0	26	52401	10 x 0,34	8,0	62,2	110,0	22
52369	7 x 0,14	4,7	23,4	39,0	26	52402	12 x 0,34	8,5	69,4	123,0	22
52370	10 x 0,14	5,9	28,4	54,0	26	52403	14 x 0,34	9,0	82,1	140,0	22
52371	12 x 0,14	6,0	31,4	69,0	26	52404	16 x 0,34	9,5	95,0	157,0	22
52372	14 x 0,14	6,4	37,5	76,0	26	52405	18 x 0,34	10,2	107,3	172,0	22
52373	16 x 0,14	6,7	43,4	82,0	26	52406	21 x 0,34	10,8	122,4	195,0	22
52374	18 x 0,14	7,0	51,4	90,0	26	52407	25 x 0,34	12,2	142,2	226,0	22
52375	21 x 0,14	7,4	61,8	102,0	26	52408	30 x 0,34	12,7	162,6	261,0	22
52376	25 x 0,14	8,3	76,0	121,0	26	52409	34 x 0,34	13,7	178,9	285,0	22
52377	30 x 0,14	8,6	92,7	146,0	26	52410	40 x 0,34	14,9	203,3	330,0	22
52378	34 x 0,14	9,4	121,0	167,0	26	52411	2 x 0,5	5,1	23,0	37,0	20
52379	40 x 0,14	10,2	126,1	170,0	26	52412	3 x 0,5	5,5	30,0	46,0	20
52380	2 x 0,25	4,3	14,6	23,0	24	52413	4 x 0,5	5,9	35,3	57,0	20
52381	3 x 0,25	4,5	17,0	28,0	24	52414	5 x 0,5	6,6	52,5	77,0	20
52382	4 x 0,25	4,8	20,6	34,0	24	52415	7 x 0,5	7,1	65,3	92,0	20
52384	5 x 0,25	5,2	24,7	42,0	24	52416	10 x 0,5	9,3	88,7	135,0	20
52385	7 x 0,25	5,6	31,2	49,0	24	52417	12 x 0,5	9,4	98,7	148,0	20
52386	10 x 0,25	7,2	42,1	81,0	24	52418	18 x 0,5	11,1	141,2	210,0	20
52387	12 x 0,25	7,3	47,5	88,0	24	52419	21 x 0,5	12,0	161,0	242,0	20
52388	14 x 0,25	7,9	52,7	100,0	24	52420	25 x 0,5	13,5	187,2	285,0	20
52389	16 x 0,25	8,3	58,1	113,0	24	52421	30 x 0,5	14,2	223,2	340,0	20
52390	18 x 0,25	9,1	78,0	126,0	24	52422	40 x 0,5	16,5	294,9	445,0	20
52391	21 x 0,25	9,5	94,3	144,0	24	52423	2 x 0,75	5,9	30,6	45,0	19
52392	25 x 0,25	10,6	116,5	164,0	24	52424	3 x 0,75	6,2	38,1	60,0	19
52393	30 x 0,25	11,1	132,2	191,0	24	52425	4 x 0,75	6,9	58,0	80,0	19
52394	34 x 0,25	11,9	144,6	214,0	24	52426	5 x 0,75	7,5	68,4	97,0	19
52395	40 x 0,25	13,0	163,3	245,0	24	52427	7 x 0,75	8,1	88,4	127,0	19
52396	2 x 0,34	4,8	16,9	31,0	22	52428	10 x 0,75	10,4	122,5	175,0	19
52397	3 x 0,34	5,1	20,6	38,0	22	52429	12 x 0,75	10,9	137,2	196,0	19

Dimensions and specifications may be changed without prior notice. (RB01)

# DATAFLAMM®-C-PAAR EMC-preferred type, halogen-free, screened, meter marking



## Technical data

- Special data cable, halogen-free
- **Temperature range**  
flexing +5°C to +70°C  
fixed installation -40°C to +70°C
- **Operating peak voltage**  
(not for heavy current installation purposes)  
0,14 mm<sup>2</sup> = 350 V  
≥ 0,25 mm<sup>2</sup> = 500 V
- **Test voltage**  
0,14 mm<sup>2</sup> = 800 V  
≥ 0,25 mm<sup>2</sup> = 1200 V
- **Insulation resistance**  
min. 2 GOhm x km
- **Capacitance**  
core/core < 70 nF/km
- **Minimum bending radius**  
7,5x cable Ø
- **Coupling resistance**  
max. 250 Ohm/km
- **Radiation resistance**  
up to 100x10<sup>6</sup> cJ/kg (up to 100 Mrad)

## Cable structure

- Bare copper-conductor, fine-wire to DIN VDE 0812
- Conductor construction:  
0,34 mm<sup>2</sup> = 7x0,25 mm
- Core insulation of PE compound type L/MD to DIN VDE 0819-103 / DIN EN 50290-2-23
- Core identification to DIN 47100
- Cores stranded in pairs with optimal lay-length
- Pairs stranded in layers with optimal lay-length
- Foil wrapping
- Tinned copper braided screen, approx. 85% coverage
- Outer sheath compound type HM2 to DIN VDE 0207 part 24
- Sheath colour grey (RAL 7005)
- with meter marking

## Properties

### Tests

- Halogen-free to DIN VDE 0482 part 267, DIN EN 50267-2-1, IEC 60754-1 (equivalent DIN VDE 0472 part 815)
- Corrosiveness of combustion gases acc. to DIN VDE 0482 part 267, DIN EN 50267-2-2, IEC 60754-2 (equivalent DIN VDE 0472 part 813)
- Halogen-free sheath compound, self-extinguishing and flame retardant acc. to DIN VDE 0482-332-1-2, DIN EN 60332-1-2, IEC 60332-1 (equivalent DIN VDE 0472 part 804 test method B)

### Note

- AWG sizes are approximate equivalent values. The actual cross-section is in mm<sup>2</sup>.

## Application

Are used as connecting cable for signal, measuring, control, call-announcing and two-way intercom speaking systems, clock installations, electronic weighing equipment and electrical apparatus for office requirements. The cables are suitable for installation in dry, damp and wet environments as well as in masonry and concrete. PE-insulated cores, compared with the conventional PVC-insulated cores, assure a remarkable and more favourable capacitance values. These cables are generally installed in telecommunication apparatus and data transmission systems in public buildings, laboratories, trading centres where the freedom from halogen in case of fire and the flame propagation must be avoided. With screened braiding offers interference-free signal transfer. The halogen-free thermoplastic sheath produce neither corrosive nor toxic gases.

**EMC** = Electromagnetic compatibility

To optimize the EMC features we recommend a large round contact of the copper braiding on both ends.

CE = The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

Part no.	No.pairs x cross-sec. mm <sup>2</sup>	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
52435	2 x 2 x 0,14	4,7	22,5	37,0	26
52436	3 x 2 x 0,14	5,1	25,6	47,0	26
52437	4 x 2 x 0,14	5,8	39,1	66,0	26
52438	5 x 2 x 0,14	6,3	45,3	76,0	26
52439	6 x 2 x 0,14	6,8	51,4	87,0	26
52440	7 x 2 x 0,14	6,8	54,2	94,0	26
52441	10 x 2 x 0,14	8,9	68,7	119,0	26
52442	12 x 2 x 0,14	9,2	78,3	135,0	26
52443	15 x 2 x 0,14	10,0	79,9	157,0	26
52444	18 x 2 x 0,14	11,0	99,2	190,0	26
52445	2 x 2 x 0,25	5,7	27,1	44,0	24
52446	3 x 2 x 0,25	6,2	42,4	66,0	24
52447	4 x 2 x 0,25	7,0	54,5	81,0	24
52448	5 x 2 x 0,25	7,9	59,8	98,0	24
52449	6 x 2 x 0,25	8,6	64,6	116,0	24
52450	7 x 2 x 0,25	8,6	71,3	120,0	24
52451	10 x 2 x 0,25	10,6	93,3	153,0	24
52452	12 x 2 x 0,25	11,4	108,0	175,0	24
52453	15 x 2 x 0,25	12,5	123,4	213,0	24
52454	18 x 2 x 0,25	13,1	139,7	248,0	24
52455	2 x 2 x 0,34	6,5	43,3	68,0	22
52456	3 x 2 x 0,34	7,2	55,0	92,0	22
52457	4 x 2 x 0,34	7,9	64,0	110,0	22
52458	5 x 2 x 0,34	8,8	74,5	128,0	22
52459	6 x 2 x 0,34	9,8	85,0	147,0	22

Part no.	No.pairs x cross-sec. mm <sup>2</sup>	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
52460	7 x 2 x 0,34	9,8	89,8	154,0	22
52461	10 x 2 x 0,34	12,2	119,8	209,0	22
52462	12 x 2 x 0,34	12,9	139,4	245,0	22
52463	15 x 2 x 0,34	14,4	160,0	279,0	22
52464	18 x 2 x 0,34	15,3	207,2	363,0	22
52465	2 x 2 x 0,5	7,4	50,2	76,0	20
52466	3 x 2 x 0,5	8,0	64,5	107,0	20
52467	4 x 2 x 0,5	9,0	77,2	134,0	20
52468	5 x 2 x 0,5	9,9	96,2	150,0	20
52469	6 x 2 x 0,5	10,9	107,4	176,0	20
52470	7 x 2 x 0,5	10,9	117,3	185,0	20
52471	10 x 2 x 0,5	13,8	158,2	275,0	20
52472	12 x 2 x 0,5	14,5	177,8	330,0	20
52473	15 x 2 x 0,5	15,8	236,4	380,0	20
52474	18 x 2 x 0,5	17,1	265,4	450,0	20
52475	2 x 2 x 0,75	8,5	64,6	105,0	19
52476	3 x 2 x 0,75	9,3	81,7	137,0	19
52477	4 x 2 x 0,75	10,6	107,6	166,0	19
52478	5 x 2 x 0,75	11,7	126,1	200,0	19
52479	6 x 2 x 0,75	12,7	138,6	236,0	19
52480	7 x 2 x 0,75	12,7	153,7	255,0	19
52481	10 x 2 x 0,75	15,6	220,0	363,0	19
52482	12 x 2 x 0,75	16,8	265,5	434,0	19
52483	15 x 2 x 0,75	18,6	327,6	500,0	19
52484	18 x 2 x 0,75	20,5	374,6	580,0	19

Dimensions and specifications may be changed without prior notice. (RB01)



# EDV-PiMF-CY PE-insulated, low capacitance, EMC-preferred type, meter marking



## Technical data

- PE data cable
- **Temperature range**  
flexing -5°C to +80°C  
fixed installation -20°C to +80°C
- **Operating peak voltage** max. 300 V  
(not for heavy current installation purposes)
- **Test voltage**  
core/core 2000 V  
core/screen 1000 V
- **Insulation resistance**  
approx. 5 GOhm x km
- **Mutual capacitance** (approx. value)  
core/core approx. 75pF/m
- **Inductance** approx. 0,4 mH/km
- **Cross-talk attenuation**  
min. 60 dB at 100 kHz
- **Impedance** (approx. value)  
at 1 kHz approx. 360 Ohm  
at 10 kHz approx. 125 Ohm  
at 100 kHz approx. 87 Ohm  
at 1000 kHz approx. 70 Ohm
- **Line attenuation** (approx. value)  
at 1 kHz approx. 1,1 dB  
at 10 kHz approx. 2,7 dB  
at 100 kHz approx. 6,8 dB  
at 1000 kHz approx. 35 dB
- **Minimum bending radius**  
flexing 10x cable Ø  
fixed installation 5x cable Ø
- **Radiation resistance**  
up to 80x10<sup>6</sup> cJ/kg (up to 80 Mrad)
- **Coupling resistance**  
max. 250 Ohm/km

## Application

Absolute disturbance-free data transfer both for installed terminals in all areas of medicine and data technology. Also suitable for use in machine tool and steel producing industries, traffic signal systems, assembly lines and food processing.

**EMC** = Electromagnetic compatibility

To optimize the EMC features we recommend a large round contact of the copper braiding on both ends.

 = The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

## Cable structure

- Bare copper-conductor, to DIN VDE 0295 cl.5, fine-wire, BS 6360 cl.5, IEC 60228 cl.5
- Core insulation of PE
- Core identification to DIN 47100
- PiMF: (pair in metal foil) cores twisted in pairs; foil wrapped, plastic coated aluminium foil and copper drain-wire tinned, 100% coverage
- PiMFs are stranded in layer
- Foil wrapping
- Overall copper screened braiding, 85% coverage
- Outer sheath of PVC compound type TM2 adapted to DIN VDE 0207-363-4-1/DIN EN 50363-4-1
- Sheath colour grey (RAL 7032)
- with meter marking

## Properties

- The materials used in manufacture are cadmium-free and contain no silicone and free from substances harmful to the wetting properties of lacquers

## Tests

- PVC outer sheath self-extinguishing and flame retardant acc. to DIN VDE 0482-332-1-2, DIN EN 60332-1-2, IEC 60332-1 (equivalent DIN VDE 0472 part 804 test method B)

## Note

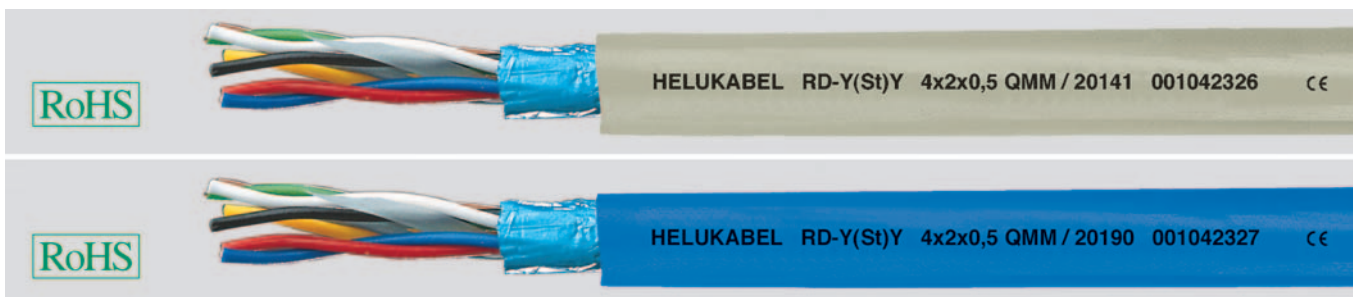
- AWG sizes are approximate equivalent values. The actual cross-section is in mm<sup>2</sup>.

Part no.	No.pairs x cross-sec. mm <sup>2</sup>	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
43553	2 x 2 x 0,5	8,7	50,0	101,0	20
43554	3 x 2 x 0,5	9,8	66,0	120,0	20
43524	4 x 2 x 0,5	10,8	108,0	196,0	20
43555	5 x 2 x 0,5	12,0	120,0	201,0	20
43525	6 x 2 x 0,5	13,1	148,0	260,0	20
43526	8 x 2 x 0,5	14,4	180,0	310,0	20
43527	10 x 2 x 0,5	17,3	236,0	398,0	20
43528	16 x 2 x 0,5	20,2	338,0	515,0	20
43529	20 x 2 x 0,5	21,6	394,0	688,0	20
43530	30 x 2 x 0,5	27,3	577,0	980,0	20
43531	40 x 2 x 0,5	28,9	684,0	1390,0	20
43532	50 x 2 x 0,5	31,4	834,0	1860,0	20
43556	2 x 2 x 0,75	10,1	61,0	117,0	19
43557	3 x 2 x 0,75	11,3	97,0	142,0	19
43533	4 x 2 x 0,75	12,2	141,0	240,0	19
43558	5 x 2 x 0,75	13,6	163,0	304,0	19
43534	6 x 2 x 0,75	15,1	198,0	352,0	19
43535	8 x 2 x 0,75	16,6	246,0	415,0	19
43536	10 x 2 x 0,75	19,7	305,0	505,0	19
43537	16 x 2 x 0,75	23,0	446,0	732,0	19
43538	20 x 2 x 0,75	24,7	530,0	860,0	19

Part no.	No.pairs x cross-sec. mm <sup>2</sup>	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
43539	30 x 2 x 0,75	30,3	765,0	1210,0	19
43559	2 x 2 x 1	12,3	72,0	130,0	18
43560	3 x 2 x 1	13,4	104,0	161,0	18
43540	4 x 2 x 1	14,8	186,0	360,0	18
43561	5 x 2 x 1	16,6	231,0	412,0	18
43541	6 x 2 x 1	18,4	260,0	472,0	18
43542	8 x 2 x 1	20,1	322,0	540,0	18
43543	10 x 2 x 1	23,9	382,0	670,0	18
43544	16 x 2 x 1	27,8	578,0	982,0	18
43545	20 x 2 x 1	30,3	710,0	1240,0	18
43546	30 x 2 x 1	36,0	1050,0	1720,0	18
43562	2 x 2 x 1,5	13,4	81,0	164,0	16
43563	3 x 2 x 1,5	14,9	141,0	197,0	16
43547	4 x 2 x 1,5	16,6	261,0	480,0	16
43564	5 x 2 x 1,5	18,4	284,0	516,0	16
43548	6 x 2 x 1,5	20,4	355,0	590,0	16
43549	8 x 2 x 1,5	22,4	448,0	696,0	16
43550	10 x 2 x 1,5	27,0	551,0	874,0	16
43551	16 x 2 x 1,5	31,0	838,0	1340,0	16
43552	20 x 2 x 1,5	32,1	1030,0	1620,0	16

Dimensions and specifications may be changed without prior notice. (RB01)

# RD-Y(St)Y Instrumentation Cable suitable for Maxi-Termi-Point®-connection, meter marking



## Technical data

- Special -PVC data transmission cable adapted to DIN VDE 0815
- **Conductor resistance** (loop) max. 73,6 Ohm/km
- **Temperature range** flexing -5°C to +50°C fixed installation -40°C to +70°C
- **Operating peak voltage** max. 600 V (not for heavy current installation purposes)
- **Test voltage** core/core 2000 V core/screen 2000 V
- **Insulation resistance** core/core min. 100 MOhm x km core/screen min. 100 MOhm x km
- **Mutual capacitance** at 800 Hz max. 100 nF/km (this value may be exceeded by 20% with a make-up to 4 pairs)
- **Impedance** at 1 kHz approx. 370 Ohm at 10 kHz approx. 130 Ohm
- **Capacity unbalance** at 800 Hz max. 200 pF/100 m (20% of the values, but one value up to 400 pF is allowed)
- **Line attenuation** at 1 kHz approx. 1,2 dB/km at 10 kHz approx. 3,0 dB/km
- **Cross-talk attenuation** at 10 kHz and cable length of 500 m min. 60 dB
- **Minimum bending radius** 7,5x cable Ø

## Cable structure

- Bare copper-conductor, multi-wire
- Conductor construction: 0,5 mm<sup>2</sup> = 7x0,3 mm
- Core insulation of PVC (Semi-Rigid-PVC)
- Core identification coloured pair-no.1: a-core = BU; b-core = RD pair-no.2: a-core = GY; b-core = YE pair-no.3: a-core = GN; b-core = BN pair-no.4: a-core = WH; b-core = BK
- Cores stranded in pairs (approx. 20 pitch/m ± 50 mm)
- 4 pairs stranded to a unit (unit labelled with numbers printed plastic helix)
- Units stranded in concentric layers
- Electrostatic screen of plastic coated aluminium foil and drain-wire tinned, 0,5 mm<sup>2</sup> = 7x0,3 mm
- Outer sheath of PVC
- Sheath colour grey (RAL 7032) or blue (RAL 5015)
- with meter marking

## Properties

- Twisted pairs with short different lay-lengths within a bundle results to good crosstalk attenuation values
- The static screen protects the transmission circuits against outer electrical interferences
- The materials used in manufacture are cadmium-free and contain no silicone and free from substances harmful to the wetting properties of lacquers

## Tests

- PVC self-extinguishing and flame retardant acc. to DIN VDE 0482-332-1-2, DIN EN 60332-1-2, IEC 60332-1 (equivalent DIN VDE 0472 part 804 test method B)

## Note

- Cop.weight including drain-wire.
- Also available halogen-free type RD-H(St)H on request.
- Maxi-Termi-Point® = registered trade mark AMP.
- AWG sizes are approximate equivalent values. The actual cross-section is in mm<sup>2</sup>.

## Application

The data transmission cables RD-Y(St)Y are used in measurement and control technology such as in control rooms of industrial plants and power stations. The cables serves for transmission of analog and digital signals up to frequencies of approx. 10 kHz. These cables offer considerable advantages by using the quick and economical connecting possibilities in Maxi-Termi-Point® technique. This solderless connecting technique is defined by a compression termination that employs a spring-clip for the connection of the cable to a square rigid post without pre-stripping. For this technique it is necessary to have an exact 7-core stranded conductor and a Semi-Rigid-PVC. Suitable for fixed installation only inside of buildings. With blue outer sheath suitable for intrinsic safe systems.

CE = The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

Part no.	No.pairs x cross-sec. mm <sup>2</sup>	Sheath colour	No. units	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.	Part no.	No.pairs x cross-sec. mm <sup>2</sup>	Sheath colour	No. units	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
20140	2 x 2 x 0,5	GY	-	6,8	25,0	61,0	20	20189	2 x 2 x 0,5	BU	-	6,8	25,0	61,0	20
20141	4 x 2 x 0,5	GY	1	8,7	45,0	96,0	20	20190	4 x 2 x 0,5	BU	1	8,7	45,0	96,0	20
20142	8 x 2 x 0,5	GY	2	11,0	85,0	160,0	20	20191	8 x 2 x 0,5	BU	2	11,0	85,0	160,0	20
20143	12 x 2 x 0,5	GY	3	12,5	125,0	210,0	20	20192	12 x 2 x 0,5	BU	3	12,5	125,0	210,0	20
20144	16 x 2 x 0,5	GY	4	14,0	165,0	282,0	20	20193	16 x 2 x 0,5	BU	4	14,0	165,0	282,0	20
20145	24 x 2 x 0,5	GY	6	17,0	245,0	330,0	20	20194	24 x 2 x 0,5	BU	6	17,0	245,0	330,0	20
20146	32 x 2 x 0,5	GY	8	20,0	325,0	530,0	20	20195	32 x 2 x 0,5	BU	8	20,0	325,0	530,0	20
20147	48 x 2 x 0,5	GY	12	23,5	485,0	730,0	20	20196	48 x 2 x 0,5	BU	12	23,5	485,0	730,0	20
20148	96 x 2 x 0,5	GY	24	32,5	965,0	1400,0	20	20197	96 x 2 x 0,5	BU	24	32,5	965,0	1400,0	20

Dimensions and specifications may be changed without prior notice. (RB01)

# RD-Y(St)Yv / RD-Y(St)YY reinforced (double) outer sheath, instrumentation cable, Maxi-Termi-Point®, meter marking



## Technical data

- Special -PVC data transmission cable adapted to DIN VDE 0815 and 0816
- **Conductor resistance** (loop) max. 73,6 Ohm/km
- **Temperature range** flexing -5°C to +50°C fixed installation -40°C to +70°C
- **Operating peak voltage** max. 600 V (not for heavy current installation purposes)
- **Test voltage** core/core 2000 V core/screen 2000 V
- **Insulation resistance** core/core min. 100 MOhm x km core/screen min. 100 MOhm x km
- **Mutual capacitance** at 800 Hz max. 100 nF/km (this value may be exceeded by 20% with a make-up to 4 pairs)
- **Impedance** at 1 kHz approx. 370 Ohm at 10 kHz approx. 130 Ohm
- **Capacity unbalance** at 800 Hz max. 200 pF/100 m (20% of the values, but one value up to 400 pF is allowed)
- **Line attenuation** at 1 kHz approx. 1,2 dB/km at 10 kHz approx. 3,0 dB/km
- **Cross-talk attenuation** at 10 kHz and cable length of 500 m min. 60 dB
- **Minimum bending radius** 7,5x cable Ø

## Application

The data transmission cables RD-Y(St)Yv are used in measurement and control technology such as in control rooms of industrial plants and power stations. The pairs are twisted with short pitches and different lay-lengths which lead to good crosstalk attenuation values in a unit. The cables serve for transmission of analog and digital signals up to frequencies of approx. 10 kHz. These cables offer considerable advantages by using the quick and economical connecting possibilities in Maxi-Termi-Point® technique. This solderless connecting technique is defined by a compression termination that employs a spring-clip for the connection of the cable to a square rigid post without pre-stripping. For this technique it is necessary to have an exact 7-core stranded conductor and a Semi-Rigid-PVC. Suitable for fixed installation only inside of buildings. With the reinforced PVC(-Yv) outer sheath these cables are suitable for fixed installation in inside buildings and also in open air and in underground.

CE= The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

## Cable structure

- Bare copper-conductor, multi-wires
- Conductor construction: 0,5 mm<sup>2</sup> = 7x0,3 mm
- Core insulation of PVC (Semi-Rigid-PVC)
- Cores colour coded pair-no.1: a-core = BU; b-core = RD pair-no.2: a-core = GY; b-core = YE pair-no.3: a-core = GN; b-core = BN pair-no.4: a-core = WH; b-core = BK
- Cores twisted in pairs (approx. 20 pitch/m ± 50 mm)
- 4 pairs stranded to a unit (unit labelled with numbers printed plastic helix)
- units stranded in concentric layers
- Static screen (St) of plastic coated metal foil with stranded tinned drain wire, 0,5 mm<sup>2</sup> = 7x0,3 mm
- Outer sheath of PVC
- Sheath colour grey (RAL 7032)
- with meter marking

## Properties

- The static screen protects the transmission circuits against outer electrical interferences
- The materials used in manufacture are cadmium-free and contain no silicone and free from substances harmful to the wetting properties of lacquers

## Tests

- PVC self-extinguishing and flame retardant acc. to DIN VDE 0482-332-1-2, DIN EN 60332-1-2, IEC 60332-1 (equivalent DIN VDE 0472 part 804 test method B)

## Note

- Cop.Weight including drain-wire.
- Maxi-Termi-Point® = registered trade mark AMP.
- AWG sizes are approximate equivalent values. The actual cross-section is in mm<sup>2</sup>.

## RD-Y(St)Yv

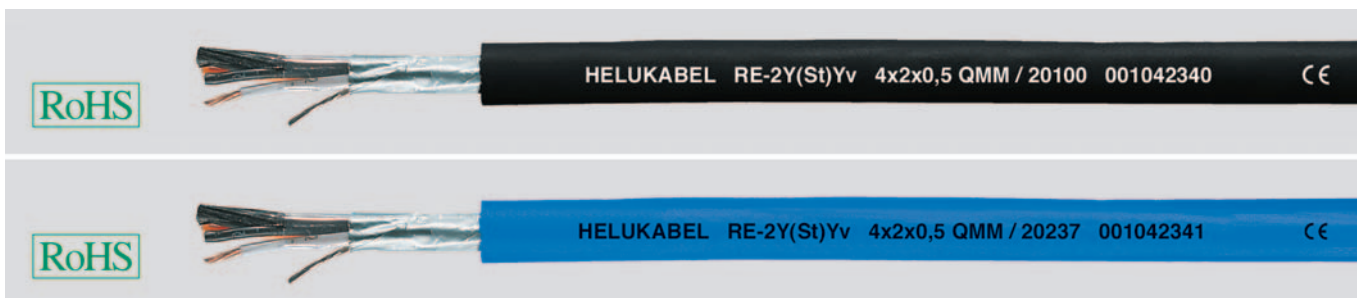
Part no.	No.pairs x cross-sec. mm <sup>2</sup>	No. units	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
20160	2 x 2 x 0,5	-	8,5	25,0	80,0	20
20161	4 x 2 x 0,5	1	10,0	45,0	125,0	20
20162	8 x 2 x 0,5	2	13,0	85,0	200,0	20
20163	12 x 2 x 0,5	3	14,0	125,0	255,0	20
20164	16 x 2 x 0,5	4	15,5	165,0	315,0	20
20165	24 x 2 x 0,5	6	18,5	245,0	370,0	20
20166	32 x 2 x 0,5	8	20,5	325,0	555,0	20
20167	48 x 2 x 0,5	12	24,0	485,0	1045,0	20
20168	96 x 2 x 0,5	24	35,5	965,0	1300,0	20

## RD-Y(St)YY

Part no.	No.pairs x cross-sec. mm <sup>2</sup>	No. units	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
20180	2 x 2 x 0,5	-	8,5	25,0	90,0	20
20181	4 x 2 x 0,5	1	10,6	45,0	140,0	20
20182	8 x 2 x 0,5	2	13,2	85,0	220,0	20
20183	12 x 2 x 0,5	3	14,8	125,0	275,0	20
20184	16 x 2 x 0,5	4	15,8	165,0	350,0	20
20185	24 x 2 x 0,5	6	18,2	245,0	470,0	20
20186	32 x 2 x 0,5	8	22,8	325,0	620,0	20
20187	48 x 2 x 0,5	12	24,0	485,0	850,0	20
20188	96 x 2 x 0,5	24	36,5	965,0	1450,0	20

Dimensions and specifications may be changed without prior notice. (RB01)

# RE-2Y(St)Yv instrumentation cable, reinforced outer sheath, meter marking



## Technical data

- Special core insulation of PE
- **Conductor resistance**  
0,5 mm<sup>2</sup>: max. 39,2 Ohm/km  
0,75 mm<sup>2</sup>: max. 24,6 Ohm/km  
1,3 mm<sup>2</sup>: max. 14,2 Ohm/km
- **Temperature range**  
flexing -5°C to +50°C  
fixed installation -40°C to +70°C
- **Operating peak voltage** max. 300 V  
(not for heavy current installation purposes)
- **Test voltage**  
core/core 2000 V  
core/screen 1000 V
- **Insulation resistance**  
min. 5 GOhm x km
- **Mutual capacitance** at 800 Hz  
core/core 0,5 mm<sup>2</sup>: 60 nF/km  
for 1 and 2 pairs: 75 nF/km  
core/core 0,75 mm<sup>2</sup>: 65 nF/km  
for 1 and 2 pairs: 110 nF/km  
core/core 1,3 mm<sup>2</sup>: 75 nF/km  
for 1 and 2 pairs: 100 nF/km
- **Inductance** max. 0,75 mH/km
- **Cross-talk attenuation**  
min. 0,88 dB/km at 60 kHz
- **Minimum bending radius**  
7,5x cable Ø

## Cable structure

- Bare copper-conductor, multi-wires
- Conductor construction:  
0,5 mm<sup>2</sup> = 7x0,3 mm  
0,75 mm<sup>2</sup> = 7x0,37 mm  
1,3 mm<sup>2</sup> = 7x0,49 mm
- Core insulation of PE
- Cores coloured  
with number print 1/1, 2/2 etc.  
pair: a-core = BK; b-core = WH  
triple: a-core = BK; b-core = WH;  
c-core = RD
- Cores twisted to pairs with optimum pitch
- Pairs stranded in layer
- 1 communication core 0,5 mm<sup>2</sup>, PE-insulated, orange (for multicore version)
- Foil wrapping
- Electrostatic screen (St) of plastics-coated metal foil
- Tinned drain-wire, 0,5 mm<sup>2</sup> = 7x0,3 mm
- Outer sheath of PVC, reinforced, black (RAL 9005) or blue (RAL 5015)
- with meter marking
- Wall-thickness to DIN VDE 0816 part 1, table 7, col. 1

## Properties

- The electrostatic screen protect the screened pairs against outer electrostatic interference fields
- Low level of line attenuations and low mutual capacitances enable long transmission distances and fast pulse acceleration
- The materials used in manufacture are cadmium-free and contain no silicone and free from substances harmful to the wetting properties of lacquers

## Tests

- self-extinguishing and flame retardant acc. to DIN VDE 0482-332-1-2, DIN EN 60332-1-2, IEC 60332-1 (equivalent DIN VDE 0472 part 804 test method B)

## Note

- Cop.Weight including communication core and drain-wire.
- Control cable with blue outer sheath, see Flexible Control Cables
- with blue outer sheath for hazardous areas to hazard type -i- for intrinsically safe installation acc. to DIN EN 60079-14 section 12.2.2 (VDE 0165 part 1)
- AWG sizes are approximate equivalent values. The actual cross-section is in mm<sup>2</sup>.

## Application

Instrumentation cables are used in data processing and process control. Instrumentation cables are suitable for fixed installations in damp locations, in open spaces and for underground laying.

CE= The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

Part no.	No.pairs x cross-sec. mm <sup>2</sup>	Sheath colour	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
20099	1 x 2 x 0,5	BK	7,5	15,0	74,0	20
20100	2 x 2 x 0,5	BK	9,8	30,0	117,0	20
20101	4 x 2 x 0,5	BK	11,3	50,0	140,0	20
20233	6 x 2 x 0,5	BK	13,1	70,0	190,0	20
20102	8 x 2 x 0,5	BK	14,6	90,0	215,0	20
20103	10 x 2 x 0,5	BK	16,1	110,0	220,0	20
20104	12 x 2 x 0,5	BK	16,4	130,0	280,0	20
20105	16 x 2 x 0,5	BK	18,3	170,0	352,0	20
20106	20 x 2 x 0,5	BK	19,2	210,0	385,0	20
20107	24 x 2 x 0,5	BK	22,3	250,0	468,0	20
20108	36 x 2 x 0,5	BK	24,5	370,0	656,0	20
20109	48 x 2 x 0,5	BK	27,7	490,0	854,0	20
20149	1 x 2 x 0,75	BK	7,9	20,0	74,0	19
20150	2 x 2 x 0,75	BK	10,4	35,0	123,0	19
20151	4 x 2 x 0,75	BK	11,9	65,0	164,0	19
20152	8 x 2 x 0,75	BK	15,0	125,0	258,0	19
20153	10 x 2 x 0,75	BK	17,0	154,0	305,0	19
20154	12 x 2 x 0,75	BK	17,6	185,0	350,0	19
20155	16 x 2 x 0,75	BK	19,5	245,0	445,0	19
20156	20 x 2 x 0,75	BK	21,5	298,0	520,0	19
20157	24 x 2 x 0,75	BK	24,0	365,0	620,0	19
20158	36 x 2 x 0,75	BK	26,5	532,0	940,0	19
20159	48 x 2 x 0,75	BK	30,3	708,0	1250,0	19
20125	1 x 2 x 1,3	BK	8,7	31,0	102,0	-
20132	1 x 3 x 1,3	BK	9,0	44,0	116,0	-
20126	2 x 2 x 1,3	BK	11,5	62,0	161,0	-
20127	4 x 2 x 1,3	BK	14,3	114,0	230,0	-
20234	6 x 2 x 1,3	BK	16,0	168,0	310,0	-
20128	8 x 2 x 1,3	BK	17,3	218,0	377,0	-
20129	12 x 2 x 1,3	BK	20,5	322,0	515,0	-
20130	16 x 2 x 1,3	BK	23,0	426,0	656,0	-
20131	24 x 2 x 1,3	BK	27,9	684,0	952,0	-

Part no.	No.pairs x cross-sec. mm <sup>2</sup>	Sheath colour	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
20235	1 x 2 x 0,5	BU	7,5	15,0	74,0	20
20236	2 x 2 x 0,5	BU	9,8	30,0	117,0	20
20237	4 x 2 x 0,5	BU	11,3	50,0	140,0	20
20238	6 x 2 x 0,5	BU	13,1	70,0	190,0	20
20239	8 x 2 x 0,5	BU	14,6	90,0	215,0	20
20240	10 x 2 x 0,5	BU	16,1	110,0	220,0	20
20241	12 x 2 x 0,5	BU	16,4	130,0	280,0	20
20242	16 x 2 x 0,5	BU	18,3	170,0	352,0	20
20243	20 x 2 x 0,5	BU	19,2	210,0	385,0	20
20244	24 x 2 x 0,5	BU	22,3	250,0	468,0	20
20245	36 x 2 x 0,5	BU	24,5	370,0	656,0	20
20246	48 x 2 x 0,5	BU	27,7	490,0	854,0	20
20169	1 x 2 x 0,75	BU	7,9	20,0	74,0	19
20170	2 x 2 x 0,75	BU	10,4	35,0	123,0	19
20171	4 x 2 x 0,75	BU	11,9	65,0	164,0	19
20172	8 x 2 x 0,75	BU	15,0	125,0	258,0	19
20173	10 x 2 x 0,75	BU	17,0	154,0	305,0	19
20174	12 x 2 x 0,75	BU	17,6	185,0	350,0	19
20175	16 x 2 x 0,75	BU	19,5	245,0	445,0	19
20176	20 x 2 x 0,75	BU	21,5	298,0	520,0	19
20177	24 x 2 x 0,75	BU	24,0	365,0	620,0	19
20178	36 x 2 x 0,75	BU	26,5	532,0	940,0	19
20179	48 x 2 x 0,75	BU	30,3	708,0	1250,0	19
20247	1 x 2 x 1,3	BU	8,7	31,0	102,0	-
20255	1 x 3 x 1,3	BU	9,0	44,0	116,0	-
20248	2 x 2 x 1,3	BU	11,5	62,0	161,0	-
20249	4 x 2 x 1,3	BU	14,3	114,0	230,0	-
20250	6 x 2 x 1,3	BU	15,8	168,0	310,0	-
20251	8 x 2 x 1,3	BU	17,3	218,0	377,0	-
20252	12 x 2 x 1,3	BU	20,5	322,0	515,0	-
20253	16 x 2 x 1,3	BU	23,0	426,0	656,0	-
20254	24 x 2 x 1,3	BU	27,9	684,0	952,0	-

Dimensions and specifications may be changed without prior notice. (RB01)

# RE-2Y(St)Yv PiMF Instrumentation cable, pairs screened, reinforced outer sheath, meter marking



## Technical data

- Special core insulation of PE
- **Conductor resistance**  
0,5 mm<sup>2</sup> = max. 39,2 Ohm/km  
1,3 mm<sup>2</sup> = max. 14,2 Ohm/km
- **Temperature range**  
flexing -5°C to +50°C  
fixed installation -40°C to +70°C
- **Operating peak voltage** max. 300 V  
(not for heavy current installation purposes)
- **Test voltage**  
core/core 2000 V  
core/screen 1000 V
- **Insulation resistance**  
min. 5 GOhm x km
- **Mutual capacitance** (approx. value)  
at 800 Hz  
core/core 0,5 mm<sup>2</sup> = 75 nF/km  
core/core 1,3 mm<sup>2</sup> = 100 nF/km
- **Inductance** max. 0,75 mH/km
- **Cross-talk attenuation**  
min. 1,02 dB/km at 60 kHz
- **Minimum bending radius**  
7,5x cable Ø

## Cable structure

- Bare copper stranded wires  
0,5 mm<sup>2</sup> = 7x0,3 mm  
1,3 mm<sup>2</sup> = 7x0,49 mm
- Core insulation of PE
- Cores coloured  
with number print 1/1, 2/2 etc.  
a-core = BK; b-core = WH
- Cores twisted in pairs with optimum pitch
- PiMF (pair in metal foil),  
PiMF structure: foil taping,  
Cu-tinned drain-wire 0,6 mm Ø,  
plastic coated alu-foil  
and foil wrapping
- PiMFe stranded in layer,  
1 communication core 0,5 mm<sup>2</sup>,  
PE-insulated orange (communication core  
for multicore version)
- Electrostatic screen (St) of plastics-coated  
metal foil and tinned drain-wire 0,5 mm<sup>2</sup>  
(7x0,3 mm)
- Outer sheath of PVC, reinforced,  
black (RAL 9005) or blue (RAL 5015)
- with meter marking
- Wall-thickness to DIN VDE 0816 part 1,  
table 7, col. 1

## Properties

- The materials used in manufacture are cadmium-free and contain no silicone and free from substances harmful to the wetting properties of lacquers

## Tests

- self-extinguishing and flame retardant acc. to DIN VDE 0482-332-1-2, DIN EN 60332-1-2/IEC 60332-1 (equivalent DIN VDE 0472 part 804 test method B)

## Note

- Cop.weight including communication core and drain-wire.
- Control cable with blue outer sheath, see Flexible Control Cables
- with blue outer sheath for hazardous areas to hazard type -i- for intrinsically safe installation acc. to DIN EN 60079-14 section 12.2.2 (VDE 0165 part 1)
- AWG sizes are approximate equivalent values. The actual cross-section is in mm<sup>2</sup>.

## Application

Instrumentation cables are used in data processing and process control. The individual screening of the pairs guarantee high cross-talk attenuation. The electrostatic screen protect the screened pairs against outer electrostatic interference fields. Low level of line attenuations and low mutual capacitances enable long transmission distances and fast pulse acceleration. Instrumentation cables are suitable for fixed installations in damp locations, in open spaces and for underground laying.

CE= The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

Part no.	No.pairs x cross-sec. mm <sup>2</sup>	Sheath colour	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.	Part no.	No.pairs x cross-sec. mm <sup>2</sup>	Sheath colour	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
20115	2 x 2 x 0,5	BK	11,0	35,0	128,0	20	21537	2 x 2 x 0,5	BU	11,0	35,0	128,0	20
20116	4 x 2 x 0,5	BK	12,6	60,0	170,0	20	21538	4 x 2 x 0,5	BU	12,6	60,0	170,0	20
21535	6 x 2 x 0,5	BK	14,6	82,0	215,0	20	21539	6 x 2 x 0,5	BU	14,6	82,0	215,0	20
20117	8 x 2 x 0,5	BK	15,5	121,0	246,0	20	21540	8 x 2 x 0,5	BU	15,5	121,0	246,0	20
20118	10 x 2 x 0,5	BK	16,8	136,0	261,0	20	21541	10 x 2 x 0,5	BU	16,8	136,0	261,0	20
20119	12 x 2 x 0,5	BK	17,9	161,0	351,0	20	21542	12 x 2 x 0,5	BU	17,9	161,0	351,0	20
20120	16 x 2 x 0,5	BK	19,8	212,0	430,0	20	21543	16 x 2 x 0,5	BU	19,8	212,0	430,0	20
20121	20 x 2 x 0,5	BK	21,0	262,0	496,0	20	21544	20 x 2 x 0,5	BU	21,0	262,0	496,0	20
20122	24 x 2 x 0,5	BK	23,4	313,0	604,0	20	21545	24 x 2 x 0,5	BU	23,4	313,0	604,0	20
20123	36 x 2 x 0,5	BK	26,5	465,0	850,0	20	21546	36 x 2 x 0,5	BU	26,5	465,0	850,0	20
20124	48 x 2 x 0,5	BK	29,5	616,0	1115,0	20	21547	48 x 2 x 0,5	BU	29,5	616,0	1115,0	20
20133	2 x 2 x 1,3	BK	12,8	68,0	184,0	-	21548	2 x 2 x 1,3	BU	12,8	68,0	184,0	-
20134	4 x 2 x 1,3	BK	14,8	124,0	269,0	-	21549	4 x 2 x 1,3	BU	14,8	124,0	269,0	-
21536	6 x 2 x 1,3	BK	17,3	178,0	370,0	-	21550	6 x 2 x 1,3	BU	17,3	178,0	370,0	-
20135	8 x 2 x 1,3	BK	18,5	239,0	442,0	-	21551	8 x 2 x 1,3	BU	18,5	239,0	442,0	-
20136	12 x 2 x 1,3	BK	21,6	353,0	593,0	-	21552	12 x 2 x 1,3	BU	21,6	353,0	593,0	-
20137	16 x 2 x 1,3	BK	24,7	468,0	789,0	-	21553	16 x 2 x 1,3	BU	24,7	468,0	789,0	-
20138	24 x 2 x 1,3	BK	29,8	697,0	1104,0	-	21554	24 x 2 x 1,3	BU	29,8	697,0	1104,0	-

Dimensions and specifications may be changed without prior notice. (RB01)



# JE-Y(St)Y Bd Si industry-elektronik cable according to DIN VDE 0815



## Technical data

- Special industrial electronic cable to DIN VDE 0815
- **Conductor resistance** at 20°C  
36,6 Ohm/km
- **Temperature range**  
flexing -5°C to +50°C  
fixed installation -30°C to +70°C
- **Operating peak voltage** 225 V  
(not for purposes of high current and power installation)
- **Test voltage**  
core/core 500 V  
core/screen 2000 V
- **Insulation resistance**  
min. 100 MOhm x km
- **Mutual capacitance**  
max. 100 pF/m (the value can exceed of 20% by cables up to 4 pairs)
- **Capacitance unbalance**  
max. 200 pF/100 m
- **Inductance** approx. 0,70 mH/km
- **Attenuation**  
at 800 Hz approx. 1,1 dB/km
- **Radiation resistance**  
up to  $80 \times 10^6$  cJ/kg (up to 80 Mrad)
- **Minimum bending radius**  
fixed installation 6x cable Ø
- **Caloric load values**  
see table Technical Informations

## Cable structure

- Solid bare copper conductor wire 0,8 mm Ø
- Core insulation of PVC Y13, to DIN VDE 0207 part 4
- Core identification (pair) to DIN VDE 0815 (Simatic colour code)
- Cores stranded in pairs with optimal lay-length
- 4 pairs stranded to a unit
- Unit stranded with optimal lay-length
- Foil wrapping
- Shielding of plastic laminated foil
- Copper drain-wire
- Outer sheath of PVC compound type YM1 to DIN VDE 0207 part 5
- Sheath colour grey (RAL 7032) or blue (RAL 5015)

## Properties

- The materials used in manufacture are cadmium-free and contain no silicone and free from substances harmful to the wetting properties of lacquers

## Tests

- PVC self-extinguishing and flame retardant acc. to DIN VDE 0482-332-1-2, DIN EN 60332-1-2, IEC 60332-1 (equivalent DIN VDE 0472 part 804 test method B)

## Note

- Also available in a halogen-free version. (see also content "Halogen-free Security Cables and Wires".)
- Control cable with blue outer sheath, see Flexible Control Cables
- with blue outer sheath for hazardous areas to hazard type -i- for intrinsically safe installation acc. to DIN EN 60079-14 section 12.2.2 (VDE 0165 part 1)
- 2-paired cables:  
cores stranded to a star quad

## Application

These cable types are suitable for transmission of signals and measurements in the symmetric circuits of the control and regulation technology, and for the transmission of data and process information in computer systems. Used in dry and damp premises, and in or under plaster in the open air for fixed installation. Installation cables are not allowed for purposes of high current and power or burial installation.

CE= The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

Part no.	No.pairs x cross-sec. mm	Sheath colour	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km
48500	1 x 2 x 0,8	GY	5,0	20,0	43,0
48501	2 x 2 x 0,8	GY	6,6	25,0	60,0
48502	4 x 2 x 0,8	GY	8,3	45,0	95,0
48503	8 x 2 x 0,8	GY	10,5	85,0	157,0
48504	12 x 2 x 0,8	GY	11,8	126,0	224,0
48505	16 x 2 x 0,8	GY	13,5	166,0	290,0
48506	20 x 2 x 0,8	GY	14,7	206,0	350,0
48507	32 x 2 x 0,8	GY	19,0	327,0	545,0
48508	40 x 2 x 0,8	GY	20,7	407,0	660,0
48509	80 x 2 x 0,8	GY	29,5	809,0	1160,0

Part no.	No.pairs x cross-sec. mm	Sheath colour	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km
48519	1 x 2 x 0,8	BU	5,0	20,0	43,0
48520	2 x 2 x 0,8	BU	6,6	25,0	60,0
48521	4 x 2 x 0,8	BU	8,3	45,0	95,0
48522	8 x 2 x 0,8	BU	10,5	85,0	157,0
48523	12 x 2 x 0,8	BU	11,8	126,0	224,0
48524	16 x 2 x 0,8	BU	13,5	166,0	290,0
48525	20 x 2 x 0,8	BU	14,7	206,0	350,0
48526	32 x 2 x 0,8	BU	19,0	327,0	545,0
48527	40 x 2 x 0,8	BU	20,7	407,0	660,0
48528	80 x 2 x 0,8	BU	29,5	809,0	1160,0

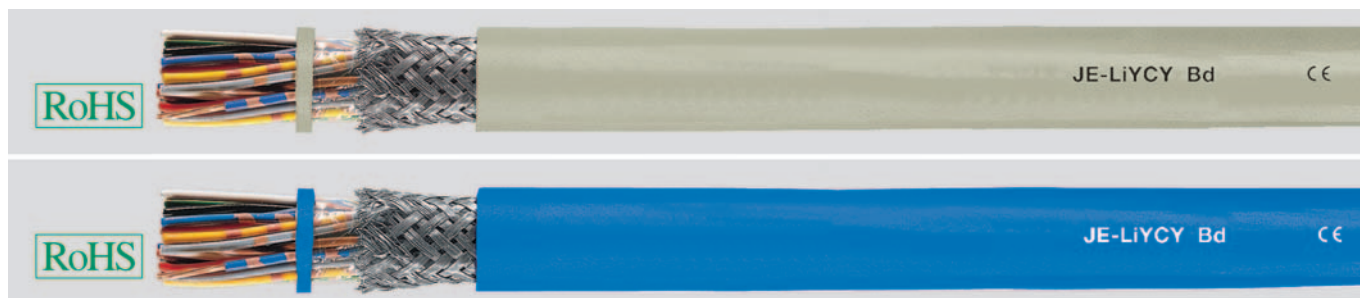
Dimensions and specifications may be changed without prior notice. (RB01)



Suitable accessories can be found in Chapter X.

- Tool - Multistrip 10

# JE-LiYCY Bd Si industry electronic cable



## Technical data

- Special industry electronic cable adapted to DIN VDE 0815
- **Conductor resistance** at 20°C 39,2 Ohm/km
- **Temperature range** flexing -5°C to +50°C fixed installation -30°C to +70°C
- **Operating peak voltage** 225 V (not for heavy current installation purposes)
- **Test voltage** core/core 500 V core/screen 2000 V
- **Insulation resistance** min. 100 MOhm x km
- **Mutual capacitance** max. 100 pF/m (the value can exceed of 20% by cables up to 4 pairs)
- **Capacitance unbalance** max. 200 pF/100 m
- **Inductance** approx. 0,70 mH/km
- **Attenuation** at 800 Hz approx. 1,1 dB/km
- **Radiation resistance** up to 80x10<sup>6</sup> cJ/kg (up to 80 Mrad)
- **Minimum bending radius** fixed installation 6x cable Ø

## Cable structure

- Bare copper strands 7x0,3 mm
- Core insulation of PVC (Semi-Rigid-PVC)
- Core identification (pair) to DIN VDE 0815 (Simatic colour code)
- Cores stranded in pairs with optimal lay-length
- 4 pairs stranded to a unit
- Unit stranded with optimal lay-length
- Foil wrapping
- Bare or tinned copper wire braided, 0,2 mm Ø screening, approx. 85% coverage
- Outer sheath of PVC compound type YM1 to DIN VDE 0207 part 5
- Sheath colour grey (RAL 7032) or blue (RAL 5015)

## Properties

- Suitable for cut clamp technology
- The materials used in manufacture are cadmium-free and contain no silicone and free from substances harmful to the wetting properties of lacquers

## Tests

- PVC self-extinguishing and flame retardant acc. to DIN VDE 0482-332-1-2, DIN EN 60332-1-2, IEC 60332-1 (equivalent DIN VDE 0472 part 804 test method B)

## Note

- Also available in a halogen-free version. (see also content "Halogen-free Security Cables and Wires")
- Control cable with blue outer sheath, see Flexible Control Cables
- with blue outer sheath for hazardous areas to hazard type -i- for intrinsically safe installation acc. to DIN EN 60079-14 section 12.2.2 (VDE 0165 part 1)
- 2-paired cables: cores stranded to a star quad
- For Maxi-Termi-Point® technique (Maxi-Termi-Point® = registered trade mark AMP)
- AWG sizes are approximate equivalent values. The actual cross-section is in mm<sup>2</sup>.

## Application

These cable types are suitable for transmission of signals and measurements in the symmetric circuits of the control and regulation technology, and for the transmission of data and process information in computer systems. Used in dry and damp premises, and in or under plaster in the open air for fixed installation. Installation cables are not allowed for purposes of high current and power or burial installation.

**EMC** = Electromagnetic compatibility

To optimize the EMC features we recommend a large round contact of the copper braiding on both ends.

**CE** = The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

Part no.	No.pairs x cross-sec. mm <sup>2</sup>	Sheath colour	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
48510	2 x 2 x 0,5	GY	7,0	51,0	94,0	20
48511	4 x 2 x 0,5	GY	8,6	87,0	154,0	20
48512	8 x 2 x 0,5	GY	12,0	144,0	259,0	20
48513	12 x 2 x 0,5	GY	13,1	196,0	340,0	20
48514	16 x 2 x 0,5	GY	14,3	249,0	431,0	20
48515	20 x 2 x 0,5	GY	15,5	299,0	494,0	20
48516	24 x 2 x 0,5	GY	19,4	348,0	604,0	20
48517	32 x 2 x 0,5	GY	20,5	444,0	737,0	20
48518	40 x 2 x 0,5	GY	22,5	537,0	844,0	20

Part no.	No.pairs x cross-sec. mm <sup>2</sup>	Sheath colour	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
48529	2 x 2 x 0,5	BU	7,0	51,0	94,0	20
48530	4 x 2 x 0,5	BU	8,6	87,0	154,0	20
48531	8 x 2 x 0,5	BU	12,0	144,0	259,0	20
48532	12 x 2 x 0,5	BU	13,1	196,0	340,0	20
48533	16 x 2 x 0,5	BU	14,3	249,0	431,0	20
48534	20 x 2 x 0,5	BU	15,5	299,0	494,0	20
48535	24 x 2 x 0,5	BU	19,4	348,0	604,0	20
48536	32 x 2 x 0,5	BU	20,5	444,0	737,0	20
48537	40 x 2 x 0,5	BU	22,5	537,0	844,0	20

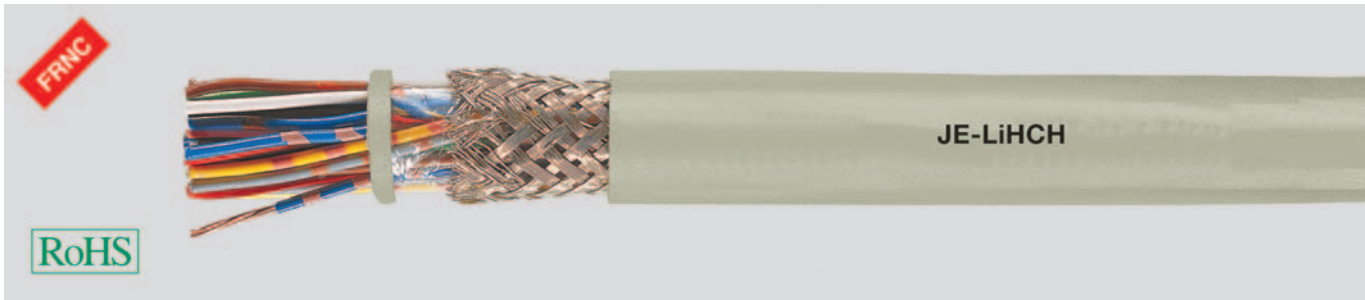
Dimensions and specifications may be changed without prior notice. (RB01)



Suitable accessories can be found in Chapter X.

- Tool - Multistrip 10

# JE-LiHCH Bd industry electronic cable, halogen-free



## Technical data

- Industry electronic cable adapted to DIN VDE 0815
- **Conductor resistance** at 20°C  
39,2 Ohm/km
- **Temperature range**  
flexing -5°C to +50°C  
fixed installation -30°C to +70°C
- **Operating peak voltage** 225 V  
(not for heavy current installation purposes)
- **Test voltage**  
core/core 500 V  
core/screen 2000 V
- **Insulation resistance**  
min. 100 MOhm x km
- **Mutual capacitance**  
max. 120 nF/km at 800 Hz (this values may be extended at 20% with a make-up up to 4 pairs)
- **Capacitance unbalance** at 800 Hz  
max. 200 pF/100 m (20% of the values, but one value up to 400 pF is allowed)
- **Minimum bending radius**  
7,5x cabel Ø
- **Radiation resistance**  
up to 100x10<sup>6</sup> cJ/kg (up to 100 Mrad)
- **Caloric load values**  
see Technical Informations

## Cable structure

- Bare copper, 7x0,3 mm
- Core insulation of polymer compound type HI1 or HI2 to DIN VDE 0207 part 23
- Insulation wall thickness 0,3 mm
- Core identification to DIN VDE 0815 (with ring colours and ring groups)
- 2 cores twisted in pair, 4 pairs to a unit and several units stranded in layers (for 2 pairs cable, 4 cores stranded to a quad)
- Foil wrapping
- Copper braided screening, wire 0,2 mm, approx. 85% coverage
- Outer sheath halogen-free compound type HM1 or HM2 to DIN VDE 0207 part 24
- Sheath colour grey RAL (7032)

## Properties

- Installation cables are not allowed for purposes of high current and power or burial installation.

## Tests

- Flame test acc. to  
DIN VDE 0482-332-3, BS 4066 part 3, DIN EN 60332-3, IEC 60332-3 (previously DIN VDE 0472 part 804 test method C)
- Corrosiveness of combustion gases acc. to DIN VDE 0482 part 267, DIN EN 50267-2-2, IEC 60754-2 (equivalent DIN VDE 0472 part 813)
- Smoke density acc. to DIN VDE 0482 part 1034-1+2, DIN EN 61034-1+2, IEC 61034-1+2, BS 7622 part 1+2 (previously DIN VDE 0472 part 816)

## Note

- 2-paired cables:  
cores stranded to a star quad
- AWG sizes are approximate equivalent values. The actual cross-section is in mm<sup>2</sup>.
- **LS0H** = Low Smoke Zero Halogen

## Application

Halogen-free installation cables with improved characteristics in the case of fire are used for telephone transmission, measuring and signal purposes. The copper screened design (C) protects the transmission circuits against electrical interferences. A fire propagation is prevented through high oxygen index of the insulation material and produce no corrosive gases in case of fire. They are preferably used for telecommunication installations inside buildings. These cables are suitable for fixed installation in areas with danger of fire, in dry and damp environments as well as in and under plaster.

**EMC** = Electromagnetic compatibility

To optimize the EMC features we recommend a large round contact of the copper braiding on both ends.

☑ = The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

Part no.	No.pairs x cross-sec. mm <sup>2</sup>	Core Ø approx. mm	No. units	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
34350	2 x 2 x 0,5	1,6	-	6,8	44,0	102,0	20
34351	4 x 2 x 0,5	1,6	1	9,1	80,0	168,0	20
34352	8 x 2 x 0,5	1,6	2	11,4	152,0	297,0	20
34353	12 x 2 x 0,5	1,6	3	13,3	192,0	357,0	20

Part no.	No.pairs x cross-sec. mm <sup>2</sup>	Core Ø approx. mm	No. units	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
34354	20 x 2 x 0,5	1,6	5	16,4	288,0	555,0	20
34355	32 x 2 x 0,5	1,6	8	19,6	439,0	852,0	20
34356	40 x 2 x 0,5	1,6	10	21,7	531,0	1005,0	20

Dimensions and specifications may be changed without prior notice. (RB01)



Suitable accessories can be found in Chapter X.

- Tool - Multistrip 10

# RD-H(St)H Bd instrumentation cable, halogen-free



## Technical data

- Halogen-free data transmission cable adapted to DIN VDE 0815
- **Conductor resistance** (loop)  
max. 73,6 Ohm/km (0,5 mm<sup>2</sup>)  
max. 36,8 Ohm/km (1,0 mm<sup>2</sup>)
- **Temperature range**  
flexing -5°C to +50°C  
fixed installation -30°C to +70°C
- **Operating peak voltage** max. 225 V  
(not for purposes of high current and power installation)
- **Test voltage**  
core/core 500 V  
core/screen 2000 V
- **Insulation resistance**  
min. 100 MOhm x km
- **Mutual capacitance**  
at 800 Hz max. 100 nF/km  
(this value may be exceeded by 20% with a make-up up to 4 pairs)
- **Impedance**  
at 1 kHz (nominal values)  
450 Ohm (0,5 mm<sup>2</sup>)  
320 Ohm (1,0 mm<sup>2</sup>)
- **Capacity unbalance**  
at 800 Hz max. 200 pF/100 m  
(20% of the values, but one value up to 200 pF is allowed)
- **Cross-talk attenuation**  
at min. 10 kHz, 60 dB/500 m
- **Line attenuation**  
at 1 kHz (nominal values)  
1,2 dB/km (0,5 mm<sup>2</sup>)  
0,9 dB/km (1,0 mm<sup>2</sup>)
- **Minimum bending radius**  
7,5x cable Ø
- **Radiation resistance**  
up to 100x10<sup>6</sup> cJ/kg (up to 100 Mrad)

## Cable structure

- Bare copper-conductor, multi-wires
- Conductor construction:  
0,5 mm<sup>2</sup> = 7x0,3 mm  
1 mm<sup>2</sup> = 7x0,43 mm
- Core insulation of halogen-free polymer compound
- Core identification coloured  
pair-no.1: a-core = BU; b-core = RD  
pair-no.2: a-core = GY; b-core = YE  
pair-no.3: a-core = GN; b-core = BN  
pair-no.4: a-core = WH; b-core = BK
- Cores twisted in pairs, with short lay-length (approx. 20 pitch/m ± 50 mm)
- 4 pairs stranded to a unit (unit labelled with numbers printed plastic helix)
- Units stranded in concentric layers
- Foil wrapping
- Electrostatic screen of plastic coated aluminium foil and drain wire tinned, 0,5 mm<sup>2</sup>
- Outer sheath of halogen-free, polymer compound, flame resistant
- Sheath colour grey (RAL 7032)

## Properties

- The static screen protects the transmission circuits against outer electrical interferences
- The halogen-free cables prevent the fire propagation and compared to PVC cables exist only a low smoke density under flame influence
- This results no decomposition products which destroy equipments, machines and buildings by corrosion

## Tests

- Flame test acc. to  
DIN VDE 0482-332-3, BS 4066 part 3,  
DIN EN 60332-3, IEC 60332-3 (previously  
DIN VDE 0472 part 804 test method C)
- Corrosiveness of combustion gases  
acc. to DIN VDE 0482 part 267,  
DIN EN 50267-2-2, IEC 60754-2  
(equivalent DIN VDE 0472 part 813)
- Smoke density acc. to DIN VDE 0482  
part 1034-1+2, IEC 61034-1+2,  
DIN EN 61034-1+2, BS 7622 part 1+2  
(equivalent DIN VDE 0472 part 816)

## Note

- AWG sizes are approximate equivalent values. The actual cross-section is in mm<sup>2</sup>.

## Application

The halogen-free data transmission cable RD-H(St)H are used for measurement and control technology for transmission of analog and digital signals up to frequencies of approx. 10 kHz. The twisted pairs with short pitches (<50 mm for 0,5 mm<sup>2</sup>) and different lay-lengths which lead good cross-talk attenuation values in a unit. These cables are used in inside buildings (in special cases in open air, but with sufficient protection against sunlight is necessary).

CE= The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

Part no.	No.pairs x cross-sec. mm <sup>2</sup>	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.	Part no.	No.pairs x cross-sec. mm <sup>2</sup>	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
20200	2 x 2 x 0,5	7,0	26,0	70,0	20	20216	2 x 2 x 1	9,0	47,0	110,0	18
20201	4 x 2 x 0,5	9,0	46,0	110,0	20	20217	4 x 2 x 1	12,0	89,0	190,0	18
20202	8 x 2 x 0,5	11,6	86,0	190,0	20	20218	8 x 2 x 1	16,5	172,0	320,0	18
20203	12 x 2 x 0,5	13,5	127,0	240,0	20	20219	12 x 2 x 1	17,5	255,0	435,0	18
20204	16 x 2 x 0,5	14,0	167,0	300,0	20	20220	16 x 2 x 1	19,5	338,0	560,0	18
20205	20 x 2 x 0,5	16,0	209,0	360,0	20	20221	20 x 2 x 1	21,0	423,0	680,0	18
20206	24 x 2 x 0,5	17,5	250,0	420,0	20	20222	24 x 2 x 1	23,0	507,0	800,0	18
20207	28 x 2 x 0,5	19,0	290,0	480,0	20	20223	28 x 2 x 1	27,0	590,0	905,0	18
20208	32 x 2 x 0,5	21,0	331,0	570,0	20	20225	32 x 2 x 1	29,0	674,0	1080,0	18
20209	36 x 2 x 0,5	21,5	372,0	614,0	20	20226	36 x 2 x 1	30,0	757,0	1260,0	18
20210	40 x 2 x 0,5	22,5	412,0	680,0	20	20227	40 x 2 x 1	31,0	841,0	1330,0	18
20211	44 x 2 x 0,5	23,5	453,0	700,0	20	20228	44 x 2 x 1	34,0	924,0	1410,0	18
20212	48 x 2 x 0,5	24,0	494,0	790,0	20	20229	48 x 2 x 1	32,5	1008,0	1550,0	18
20213	64 x 2 x 0,5	30,0	658,0	1040,0	20	20230	64 x 2 x 1	39,0	1342,0	2000,0	18
20214	80 x 2 x 0,5	33,0	821,0	1300,0	20	20231	80 x 2 x 1	43,0	1676,0	2470,0	18
20215	96 x 2 x 0,5	36,0	986,0	1510,0	20	20232	96 x 2 x 1	47,0	2016,0	2970,0	18

Dimensions and specifications may be changed without prior notice. (RB01)





**JZ-HF**

BIOFLEX-500®-JZ-HF

SUPERTRONIC®-PVC

**KOMPOSPED®-JZ-HF-500-C PURÖ-JZ-HF**

SUPER-PAAR-TRONIC-C-PUR®

**MULTISPEED 500-TPE**

MULTIFLEX 512®-PUR



# DRAG CHAIN CABLES

Temperature (°C) - flexing

Temperature (°C) - fixed

Nominal voltage U<sub>0</sub>/U

Bending radius - flexing x Ø

Bending radius - fixed x Ø

Halogen-free

UV-resistant

Outdoor use

Drag Chain

Colored cores/VDE 0293

Screened/shielded

HAR/VDE REG no./VDE

UL/CSA

Page

C

PVC drag chain cables															
		Temperature (°C) - flexing	Temperature (°C) - fixed	Nominal voltage U <sub>0</sub> /U	Bending radius - flexing x Ø	Bending radius - fixed x Ø	Halogen-free	UV-resistant	Outdoor use	Drag Chain	Colored cores/VDE 0293	Screened/shielded	HAR/VDE REG no./VDE	UL/CSA	Page
	JZ-HF	-10 to +80	-40 to +80	300/500	7.5x	4x			X			X			160
	MULTISPEED® 500-PVC	-15 to +80	-30 to +80	300/500	7.5x	4x	X	X	X						162
	JZ-HF-CY	-10 to +80	-40 to +80	300/500	10x	5x			X		X	X			163
	MULTISPEED® 500-C-PVC	-15 to +80	-30 to +80	300/500	7.5x	4x	X	X	X		X				165
PUR drag chain cables															
	PURö-JZ-HF	-20 to +80	-40 to +80	300/500	7.5x	4x	X	X	X						167
	MULTIFLEX 512®-PUR	-30 to +80	-40 to +80	300/500	5x	3x	X	X	X	X					169
	MULTISPEED® 500-PUR	-30 to +80	-40 to +80	300/500	7.5x	4x	X	X	X	X					171
	PURö-JZ-HF-YCP	-20 to +80	-40 to +80	300/500	10x	5x	X	X	X		X				172
	MULTIFLEX 512®-C-PUR	-30 to +80	-40 to +80	300/500	7.5x	4x	X	X	X	X		X			174
	MULTISPEED® 500-C-PUR	-30 to +80	-40 to +80	300/500	7.5x	4x	X	X	X	X		X			176
	MULTISPEED® 500-TPE	-30 to +80	-40 to +80	300/500	5x	3x	X	X	X	X					177
	MULTISPEED® 500-C-TPE	-30 to +80	-40 to +80	300/500	5x	3x	X	X	X	X		X			179
Bio-oil resistant and microbe-resistant drag chain cables															
	BIOFLEX-500®-JZ-HF	-20 to +80	-40 to +80	300/500	10x	4x			X	X					181
	BIOFLEX-500®-JZ-HF-C	-20 to +80	-40 to +80	300/500	15x	4x			X	X		X			182
	KOMPOSPEED® JZ-HF-500	-30 to +90	-40 to +100	300/500	7.5x		X	X	X	X					184
	KOMPOSPEED® JZ-HF-500-C	-30 to +90	-40 to +100	300/500	7.5x		X	X	X	X		X			185
Data drag chain cables															
	SUPERTRONIC®-PVC	-5 to +70	-40 to +70	350	5x	3x			X	X					187
	SUPERTRONIC®-C-PVC	-5 to +70	-40 to +70	350	7.5x	4x			X	X	X				188
	SUPERTRONIC®-PURö	-5 to +70	-40 to +70	350	5x	3x	X	X	X	X					189
	SUPERTRONIC®-C-PURö	-30 to +70	-40 to +70	350	7.5x	4x	X	X	X	X	X	X			190
	SUPER-PAAR-TRONIC-C-PUR®	-30 to +70	-40 to +70	350	10x	5x	X	X	X	X	X	X			191
	SENSORFLEX-H	-30 to +80	-40 to +80	350	5x/7,5x		X		X	X	X				192

The selection table is intended as an initial orientation.  
Please see the relevant page of the catalogue for detailed information on the product properties.

# SELECTION TABLE - DRAG CHAIN CABLES

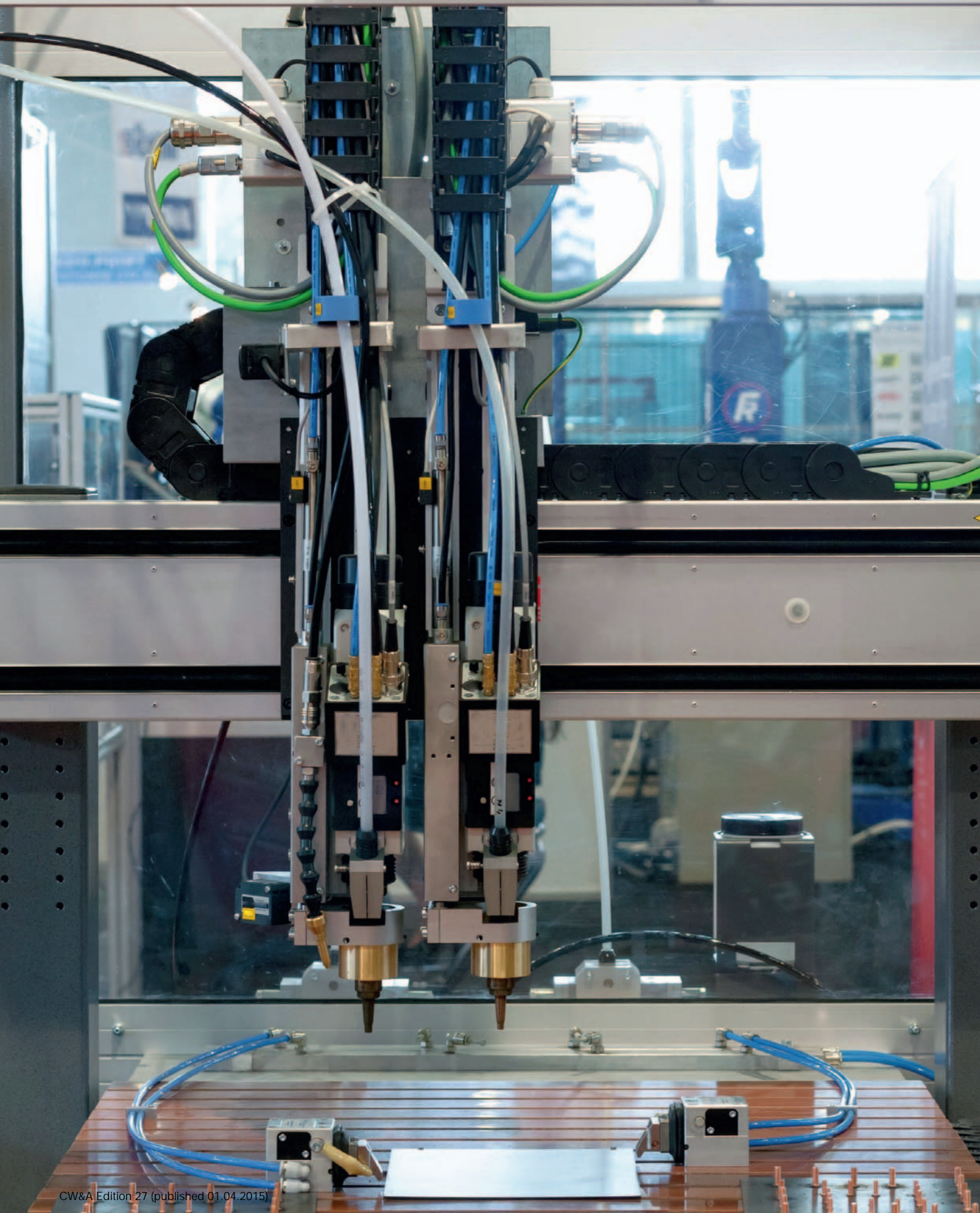
			Max. movement distance in m (10 m up to 25-cores)	Min. bending radius - flexing (D=outerØ)	Max. speed (m/s)	Max. acceleration (m/s <sup>2</sup> )	Max. cycles	Material	Nominal voltage U <sub>n</sub> / Operating voltage	Temperature (°C) - flexing	Approvals	Page	UL / CSA equivalent
<b>PVC drag chain cables</b>													
JZ-HF	10	7.5 x D	2	10	9 Mio	PVC/PVC	300/500V	-10° to +80°	VDE			160	423
JZ-HF CY	10	10 x D	2	10	9 Mio	PVC/CU/PVC	300/500V	-10° to +80°	VDE			163	427
MULTISPEED® 500-PVC	100	7.5 x D	5	50	9 Mio	PP/PVC	300/500V	-15° to +80°				162	425
MULTISPEED® 500-C-PVC	100	7.5 x D	5	50	9 Mio	PP/CU/PVC	300/500V	-15° to +80°				165	429
<b>PUR &amp; TPE drag chain cables</b>													
PURÖ-JZ-HF	15	7.5 x D	3	10	10 Mio	PVC/PUR	300/500V	-20° to +80°				167	430
PURÖ-JZ-HF-YCP	15	10 x D	3	10	10 Mio	PVC/CU/PUR	300/500V	-20° to +80°				172	436
MULTIFLEX 512®-PUR	100	5 x D	4	10	11 Mio	PP/PUR	300/500V	-30° to +80°				169	431
MULTIFLEX 512®-C-PUR	100	7.5 x D	4	10	11 Mio	PP/CU/PUR	300/500V	-30° to +80°				174	437
MULTISPEED® 500-PUR	450	7.5 x D	5	50	11 Mio	PP/PUR	300/500V	-30° to +80°				171	433
MULTISPEED® 500-C-PUR	450	7.5 x D	5	50	11 Mio	PP/CU/PUR	300/500V	-30° to +80°				176	439
MULTISPEED® 500-TPE	450	5 x D	5	50	11 Mio	PP/TPE	300/500V	-30° to +80°				177	441
MULTISPEED® 500-C-TPE	450	5 x D	5	50	11 Mio	PP/CU/TPE	300/500V	-30° to +80°				179	443
<b>Bio-oil resistant and microbe-resistant drag chain cables</b>													
BIOFLEX 500® JZ-HF	100	10 x D	4	10	11 Mio	Poly/Poly	300/500V	-20° to +80°				181	-
BIOFLEX 500® JZ-HF-C	100	15 x D	4	10	11 Mio	Poly/CU/Poly	300/500V	-20° to +80°				182	-
KOMPOSPEED® JZ-HF-500	100	7.5 x D	4	10	10 Mio	Poly/Poly	300/500V	-30° to +90°				184	-
KOMPOSPEED® JZ-HF-500-C	100	7.5 x D	4	10	10 Mio	Poly/CU/Poly	300/500V	-30° to +90°				185	-
<b>Sensor cables</b>													
SUPERTRONIC®-PVC	5	5 x D	2	10	9 Mio	PVC/PVC	350V	-5° to +70°				187	445
SUPERTRONIC®-C-PVC	5	7.5 x D	2	10	9 Mio	PVC/CU/PVC	350V	-5° to +70°				188	446
SUPERTRONIC®-PURö	5	5 x D	3	10	9 Mio	PVC/PUR	350V	-5° to +70°				189	447
SUPERTRONIC®-C-PURö	15	7.5 x D	4	10	9 Mio	PP/CU/PUR	350V	-30° to +70°				190	449
SUPER-PAAR-TRONIC-C-PUR®	30	10 x D	4	50	9 Mio	PP/CU/PUR	350V	-30° to +70°				191	451
SENSORFLEX®-H (Li12Y11Y)	30	5 x D	5	10	11 Mio	TPE/PUR	350V	-30° to +80°				192	-
SENSORFLEX®-H (Li9Y11Y)	30	7.5 x D	5	10	11 Mio	PP/PUR	350V	-30° to +80°				192	-

A cycle is a double lift: a representative sample has been tested and measured in our Test Workshop. The cycle count is only valid when appropriate and professionally installed (see the installation manual: cable installation in drag chains, see pages 1036 and 1037).

The selection table is intended as an initial orientation.

Please see the relevant page of the catalogue for detailed information on the product properties and the selection tables cables in drag chains, see pages 1030 and 1031.

# PVC DRAG CHAIN CABLES





# JZ-HF flexible, number coded, control cable for drag chains, oil resistant, meter marking



## Technical data

- Special PVC control cable, extreme flexibility due to special construction
- Requirements adapted to DIN VDE 0285-525-2-51 / DIN EN 50525-2-51
- **Temperature range** flexing -10°C to +80°C fixed installation -40°C to +80°C
- **Nominal voltage**  $U_0/U$  300/500 V
- **Test voltage** 4000 V
- **Breakdown voltage** min. 8000 V
- **Insulation resistance** min. 20 MΩm x km
- **Minimum bending radius** flexing 7,5x cable Ø fixed installation 4x cable Ø
- **Radiation resistance** up to  $80 \times 10^6$  cJ/kg (up to 80 Mrad)

## Cable structure

- Bare copper, extra fine wire conductors, to DIN VDE 0295 cl.6 col. 4, BS 6360 cl.6 and IEC 60228 cl.6
- Core insulation of special PVC compound type Z 7225
- Core identification to DIN VDE 0293 black cores with continuous white numbering
- Cores stranded in layers with optimal selected lay-length
- GN-YE conductor, 3 cores and above in the outer layer
- Core wrapping with fleece
- Outer sheath of special PVC compound type TM5 to DIN VDE 0207-363-4-1/DIN EN 50363-4-1
- Colour grey (RAL 7001)
- with meter marking

## Properties

- The materials used in manufacture are cadmium-free and contain no silicone and free from substances harmful to the wetting properties of lacquers

## Tests

- PVC self-extinguishing and flame retardant acc. to DIN VDE 0482-332-1-2, DIN EN 60332-1-2, IEC 60332-1 (equivalent DIN VDE 0472 part 804 test method B)
- Oil resistant to DIN VDE 0473-811-404/DIN EN 60811-404

## Note

- G = with green-yellow conductor  
x = without green-yellow conductor (OZ)
- AWG sizes are approximate equivalent values. The actual cross-section is in mm<sup>2</sup>.
- Cleanroom qualification tested with analog type. Please note "cleanroom qualified" when ordering.
- screened analogue type:  
**JZ-HF-CY**, confer page 163
- with UL-approval  
**MULTISPEED® 500-PVC UL/CSA**, confer page 424

## Application

JZ-HF cables are ideal for use in the machine tool industry, in robotics and machine production and anywhere where high flexibility is essential. These cables have shown excellent performance in combination with standard cable trays. These cables are suitable for flexible use for medium mechanical stresses with free movements. For applications which go beyond standard solutions (for example for composting appliances or high shelf conveyors with extremely high processing speeds etc.) we recommend for our especially developed enquiry sheet for energy guiding systems. Before installation in cable trays please read the instructions. Further technical details see selection table for drag chain cables, see lead text.

CE= The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
15001	2 x 0,5	5,0	9,6	46,0	20
15002	3 G 0,5	5,3	14,0	57,0	20
15003	4 G 0,5	5,7	19,0	70,0	20
15004	5 G 0,5	6,4	24,0	93,0	20
15005	7 G 0,5	7,5	34,0	127,0	20
15090	7 x 0,5	7,5	34,0	127,0	20
15006	10 G 0,5	9,1	48,0	161,0	20
15007	12 G 0,5	9,2	58,0	177,0	20
15008	14 G 0,5	9,8	67,0	213,0	20
15009	16 G 0,5	10,3	77,0	260,0	20
15010	18 G 0,5	11,1	86,0	284,0	20
15011	20 G 0,5	11,6	96,0	318,0	20
15012	25 G 0,5	13,4	120,0	363,0	20
15013	30 G 0,5	13,7	144,0	432,0	20
15014	34 G 0,5	15,0	163,0	487,0	20
15015	36 G 0,5	15,0	173,0	518,0	20
15016	42 G 0,5	16,1	202,0	575,0	20
15017	50 G 0,5	17,9	240,0	675,0	20
15018	61 G 0,5	19,6	290,0	829,0	20

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
15019	2 x 0,75	5,4	14,4	58,0	19
15020	3 G 0,75	5,7	22,0	73,0	19
15021	4 G 0,75	6,4	29,0	77,0	19
15022	5 G 0,75	7,0	36,0	119,0	19
15023	7 G 0,75	8,3	50,0	165,0	19
15024	10 G 0,75	10,1	72,0	216,0	19
15025	12 G 0,75	10,2	86,0	247,0	19
15026	14 G 0,75	10,9	101,0	284,0	19
15027	16 G 0,75	11,5	115,0	320,0	19
15028	18 G 0,75	12,1	130,0	356,0	19
15029	20 G 0,75	12,8	144,0	453,0	19
15030	25 G 0,75	14,9	180,0	498,0	19
15031	30 G 0,75	15,2	216,0	510,0	19
15032	34 G 0,75	16,6	245,0	550,0	19
15033	36 G 0,75	16,6	259,0	570,0	19
15034	42 G 0,75	18,1	302,0	600,0	19
15035	50 G 0,75	20,0	360,0	700,0	19
15036	61 G 0,75	22,1	432,0	820,0	19
15091	65 G 0,75	22,7	439,0	841,0	19

Continuation ▶

# JZ-HF flexible, number coded, control cable for drag chains, oil resistant, meter marking



Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
15037	2 x 1	5,7	19,0	65,0	18
15038	3 G 1	6,0	29,0	84,0	18
15039	4 G 1	6,8	38,0	113,0	18
15040	5 G 1	7,4	48,0	137,0	18
15041	7 G 1	8,8	67,0	192,0	18
15042	10 G 1	10,7	96,0	251,0	18
15043	12 G 1	10,8	115,0	295,0	18
15044	14 G 1	11,6	134,0	337,0	18
15045	16 G 1	12,2	154,0	379,0	18
15046	18 G 1	13,0	173,0	420,0	18
15047	20 G 1	13,6	192,0	480,0	18
15048	25 G 1	15,8	240,0	600,0	18
15049	30 G 1	16,4	288,0	695,0	18
15050	34 G 1	17,8	326,0	777,0	18
15051	36 G 1	17,8	346,0	825,0	18
15052	41 G 1	19,3	403,0	926,0	18
15214	42 G 1	19,3	403,0	948,0	18
15053	50 G 1	21,2	480,0	1092,0	18
15092	61 G 1	23,7	586,0	1204,0	18
15054	65 G 1	24,4	624,0	1400,0	18
15055	2 x 1,5	6,4	29,0	91,0	16
15056	3 G 1,5	6,8	43,0	117,0	16
15057	4 G 1,5	7,4	58,0	147,0	16
15058	5 G 1,5	8,3	72,0	181,0	16
15059	7 G 1,5	9,9	101,0	273,0	16
15060	10 G 1,5	11,9	144,0	344,0	16
15061	12 G 1,5	12,1	173,0	391,0	16
15062	14 G 1,5	12,9	202,0	457,0	16
15063	16 G 1,5	13,6	230,0	523,0	16
15064	18 G 1,5	14,5	259,0	590,0	16
15065	20 G 1,5	15,2	288,0	650,0	16
15066	25 G 1,5	17,8	360,0	801,0	16
15067	30 G 1,5	18,2	432,0	958,0	16
15068	34 G 1,5	19,7	490,0	1084,0	16
15069	36 G 1,5	19,7	518,0	1135,0	16
15070	42 G 1,5	21,5	605,0	1290,0	16
15071	50 G 1,5	23,7	720,0	1521,0	16
15072	60 G 1,5	25,3	864,0	1885,0	16
15215	61 G 1,5	26,2	878,0	1916,0	16
15216	65 G 1,5	27,2	936,0	1994,0	16

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
15073	2 x 2,5	7,7	48,0	130,0	14
15074	3 G 2,5	8,4	72,0	160,0	14
15075	4 G 2,5	9,1	96,0	200,0	14
15076	5 G 2,5	10,2	120,0	268,0	14
15077	7 G 2,5	12,2	168,0	357,0	14
15078	10 G 2,5	15,0	240,0	486,0	14
15079	12 G 2,5	15,2	288,0	572,0	14
15080	14 G 2,5	16,1	336,0	612,0	14
15081	16 G 2,5	17,2	384,0	702,0	14
15082	18 G 2,5	18,1	432,0	800,0	14
15083	20 G 2,5	19,2	480,0	920,0	14
15084	25 G 2,5	22,5	600,0	1100,0	14
15085	30 G 2,5	23,5	720,0	1400,0	14
15086	34 G 2,5	25,2	816,0	1500,0	14
15087	36 G 2,5	25,2	864,0	1600,0	14
15088	42 G 2,5	27,4	1008,0	1800,0	14
15089	50 G 2,5	30,0	1200,0	2100,0	14
15142	3 G 4	10,4	115,0	221,0	12
15143	4 G 4	11,4	154,0	260,0	12
15144	5 G 4	12,7	192,0	318,0	12
15145	4 G 6	13,3	230,0	392,0	10
15146	5 G 6	14,5	288,0	481,0	10
15147	4 G 10	17,7	384,0	642,0	8
15148	5 G 10	19,7	480,0	780,0	8
15149	4 G 16	20,8	614,0	926,0	6
15150	5 G 16	23,3	768,0	1135,0	6

Dimensions and specifications may be changed without prior notice. (RC01)

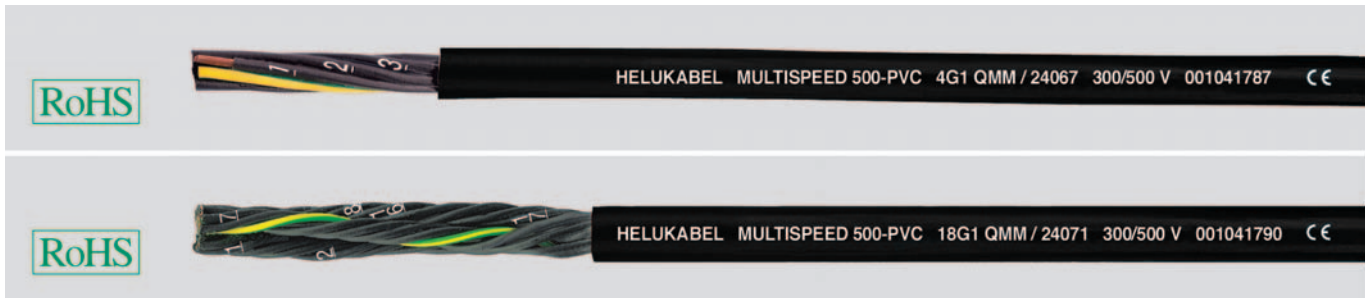


Suitable Cable drag chains can be found in our Cable Accessories catalogue.



# MULTISPEED® 500-PVC high flexible, safety against high bending

in drag chain systems, oil resistant, low torsion, meter marking



## Technical data

- Special drag chain cables for high mechanical stress adapted to DIN VDE 0285-525-2-51 / DIN EN 50525-2-51
- **Temperature range**  
flexing -15°C to +80°C  
fixed installation -30°C to +80°C
- **Nominal voltage**  $U_0/U$  300/500 V
- **Test voltage** 3000 V
- **Insulation resistance**  
min. 100 MOhm x km
- **Minimum bending radius**  
flexing 7,5x cable Ø  
fixed installation 4x cable Ø
- **Radiation resistance**  
up to  $80 \times 10^6$  cJ/kg (up to 80 Mrad)

## Cable structure

- Bare copper, fine wire conductors, Unilay with short pitch length
- Core insulation of special PP
- Core identification black cores with continuous white numbering
- GN-YE conductor, 3 cores and above
- Stranding:  
<7 cores: cores stranded in a layer with optimal lay-length around a filler as per construction  
≥7 cores: cores stranded with optimal lay-length to bunch-construction with low torsion strength, optimal selected short lay-length around a filler
- Outer sheath of special PVC, especially resistant against fatigue strength, extruded as filler with pressure
- Sheath colour black (RAL 9005)
- with meter marking

## Properties

- Low adhesion
- ozon- and uv-resistant
- High property of alternating bending strength
- High resistant to mechanical strain
- Long life durabilities due to low friction-resistancen
- Better chemical resistance
- High stability
- Higher economical solution
- Reduced Ø, results low weight of moving materials
- The materials used in manufacture are cadmium-free and contain no silicone and free from substances harmful to the wetting properties of lacquers

## Tests

- PVC self-extinguishing and flame retardant acc. to DIN VDE 0482-332-1-2, DIN EN 60332-1-2, IEC 60332-1 (equivalent DIN VDE 0472 part 804 test method B)
- Oil resistance to DIN VDE 0473-811-404 / DIN EN 60811-404

## Note

- G = with green-yellow conductor  
x = without green-yellow conductor (OZ)
- AWG sizes are approximate equivalent values. The actual cross-section is in mm<sup>2</sup>.
- screened analogue type:  
**MULTISPEED® 500-C-PVC**,  
confer page 165

## Application

HELUKABEL® MULTISPEED 500-PVC are installed there, where the extreme requirements for the cables are necessary. The selected materials and lay-up technique permit these high flexible cables for permanent application in drag chains for long distances, high and low speed of movements. These high flexible PVC control cables are suitable for shift- and bending stresses in machines and machine tool constructions. These are installed in dry, moist rooms and in open air with free movement without tensile stress or forced movements. For applications which go beyond standard solutions (for example for composting appliances or high shelf conveyors with extremely high processing speeds etc.) we recommend for our especially developed enquiry sheet for energy guiding systems. Before installation in cable trays please read the instructions. Further technical details see selection table for drag chain cables, see lead text.

CE= The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
24050	2 x 0,5	4,3	9,6	40,0	20
24051	3 G 0,5	4,6	14,4	45,0	20
24052	4 G 0,5	5,0	19,0	57,0	20
24053	5 G 0,5	5,4	24,0	66,0	20
24054	7 G 0,5	8,9	33,6	81,0	20
24055	12 G 0,5	9,7	58,0	133,0	20
24056	18 G 0,5	11,8	86,0	194,0	20
24057	25 G 0,5	13,9	120,0	274,0	20
24058	4 G 0,75	5,6	29,0	63,0	19
24059	5 G 0,75	6,3	36,0	79,0	19
24060	7 G 0,75	10,3	50,0	107,0	19
24061	12 G 0,75	11,0	86,0	169,0	19
24062	18 G 0,75	13,9	130,0	247,0	19
24063	25 G 0,75	15,9	180,0	366,0	19
24064	36 G 0,75	19,6	259,0	540,0	19
24065	42 G 0,75	21,5	302,0	630,0	19
24066	3 G 1	5,4	29,0	69,0	18
24067	4 G 1	5,9	38,4	86,0	18

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
24068	5 G 1	6,7	48,0	101,0	18
24069	7 G 1	11,1	67,0	140,0	18
24070	12 G 1	12,0	115,0	227,0	18
24071	18 G 1	14,8	173,0	351,0	18
24072	25 G 1	17,2	240,0	489,0	18
24073	3 G 1,5	6,4	43,0	88,0	16
24074	4 G 1,5	7,0	58,0	110,0	16
24075	5 G 1,5	7,8	72,0	130,0	16
24076	7 G 1,5	13,0	101,0	182,0	16
24077	12 G 1,5	14,2	173,0	319,0	16
24078	18 G 1,5	17,5	259,0	420,0	16
24079	25 G 1,5	20,1	360,0	604,0	16
24080	4 G 2,5	8,8	96,0	172,0	14
24081	5 G 2,5	9,8	120,0	219,0	14
24082	7 G 2,5	16,1	168,0	303,0	14
24083	12 G 2,5	17,8	288,0	504,0	14
24084	18 G 2,5	21,8	432,0	754,0	14
24085	25 G 2,5	24,4	600,0	940,0	14

Dimensions and specifications may be changed without prior notice. (RC01)

# JZ-HF-CY high flexible, screened control cable for drag chains, oil resistant, EMC-preferred type, meter marking



## Technical data

- Special PVC control cable, extreme flexibility due to special construction
- Requirements adapted to DIN VDE 0285-525-2-51 / DIN EN 50525-2-51
- **Temperature range**  
flexing -10°C to +80°C  
fixed installation -40°C to +80°C
- **Nominal voltage**  $U_0/U$  300/500 V
- **Test voltage** 4000 V
- **Breakdown voltage** min. 8000 V
- **Insulation resistance**  
min. 20 MOhm x km
- **Minimum bending radius**  
flexing 10x cable  $\emptyset$   
fixed installation 5x cable  $\emptyset$
- **Radiation resistance**  
up to  $80 \times 10^6$  Cj/kg (up to 80 Mrad)

## Cable structure

- Bare copper, extra fine wire conductors, to DIN VDE 0295 cl.6 col. 4, BS 6360 cl.6 and IEC 60228 cl.6
- Core insulation of special PVC Z 7225
- Core identification to DIN VDE 0293 black cores with continuous white numbering
- GN-YE conductor, 3 cores and above in the outer layer
- Cores stranded in layers with optimal selected lay-length
- Core wrapping with fleece PVC-inner sheath
- construction with Cu-screening, tinned, approx. 85%
- Minimum coverage 85%
- Outer sheath of special PVC compound type TM5 to DIN VDE 0207-363-4-1/DIN EN 50363-4-1
- Colour grey (RAL 7001)
- with meter marking

## Properties

- The materials used in manufacture are cadmium-free and contain no silicone and free from substances harmful to the wetting properties of lacquers

## Tests

- PVC self-extinguishing and flame retardant acc. to DIN VDE 0482-332-1-2, DIN EN 60332-1-2, IEC 60332-1 (equivalent DIN VDE 0472 part 804 test method B)
- oil resistant to DIN VDE 0473-811-404 / DIN EN 60811-404

## Note

- G = with green-yellow conductor  
x = without green-yellow conductor (OZ)
- AWG sizes are approximate equivalent values. The actual cross-section is in mm<sup>2</sup>.
- Please note the cleanroom qualification when ordering.
- unscreened analogue type:  
**JZ-HF**, confer page 160
- with UL-approval  
**JZ-HF-FCY**, confer page 425

## Application

JZ-HF cables are ideal for use in the machine tool industry, in robotics and machine production and anywhere where high flexibility is essential. These cables have shown excellent performance in combination with standard cable trays. These cables are suitable for flexible use for medium mechanical stresses with free movements. The dense screening assures disturbance-free transmission of all signals and impulses. An ideal disturbance-free control cable for the above application. For applications which go beyond standard solutions (for example for composting appliances or high shelf conveyors with extremely high processing speeds etc.) we recommend for our especially developed enquiry sheet for energy guiding systems. Before installation in cable trays please read the instructions. Further technical details see selection table for drag chain cables, see lead text.

EMC = Electromagnetic compatibility

To optimize the EMC features we recommend a large round contact of the copper braiding on both ends.

CE = The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer $\emptyset$ approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
15930	2 x 0,5	7,2	30,0	90,0	20
15931	3 G 0,5	7,5	38,0	115,0	20
15932	4 G 0,5	8,1	48,0	140,0	20
15933	5 G 0,5	8,6	64,0	168,0	20
15934	7 G 0,5	9,9	70,0	217,0	20
15935	12 G 0,5	11,6	100,0	274,0	20
15876	14 G 0,5	12,2	135,0	332,0	20
15877	16 G 0,5	13,0	145,0	388,0	20
15936	18 G 0,5	13,8	154,0	445,0	20
15937	20 G 0,5	14,3	160,0	497,0	20
15878	21 G 0,5	14,8	175,0	500,0	20
15938	25 G 0,5	16,1	240,0	505,0	20
15879	30 G 0,5	16,6	280,0	515,0	20
15880	34 G 0,5	17,7	290,0	530,0	20
15881	36 G 0,5	17,7	300,0	572,0	20
15882	42 G 0,5	19,2	330,0	605,0	20
15883	50 G 0,5	21,2	393,0	742,0	20

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer $\emptyset$ approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
15945	2 x 0,75	7,6	39,0	105,0	19
15946	3 G 0,75	8,1	49,0	128,0	19
15947	4 G 0,75	8,6	60,0	184,0	19
15948	5 G 0,75	9,4	70,0	200,0	19
15949	7 G 0,75	10,5	95,0	269,0	19
15885	10 G 0,75	12,6	110,0	327,0	19
15950	12 G 0,75	12,9	140,0	366,0	19
15886	14 G 0,75	13,4	163,0	426,0	19
15887	16 G 0,75	14,2	187,0	487,0	19
15951	18 G 0,75	14,8	211,0	547,0	19
15888	20 G 0,75	15,5	216,0	551,0	19
15889	21 G 0,75	16,2	272,0	590,0	19
15952	25 G 0,75	17,7	322,0	600,0	19
15890	30 G 0,75	18,2	414,0	650,0	19
15891	34 G 0,75	19,8	473,0	685,0	19
15892	36 G 0,75	19,8	500,0	720,0	19
15893	42 G 0,75	21,0	583,0	800,0	19
15894	50 G 0,75	23,1	695,0	954,0	19

Continuation ▶

# JZ-HF-CY high flexible, screened control cable for drag chains, oil resistant, EMC-preferred type, meter marking



Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
15961	2 x 1	8,1	50,0	115,0	18
15962	3 G 1	8,4	60,0	142,0	18
15963	4 G 1	9,0	73,0	196,0	18
15964	5 G 1	9,8	81,0	271,0	18
15965	7 G 1	11,2	114,0	307,0	18
15966	12 G 1	13,4	186,0	474,0	18
15967	18 G 1	15,7	254,0	622,0	18
15968	25 G 1	19,0	365,0	828,0	18
15969	34 G 1	21,0	500,0	1049,0	18
15970	41 G 1	22,7	576,0	1257,0	18
15971	50 G 1	24,5	681,0	1437,0	18
15972	65 G 1	27,7	932,0	1823,0	18
15976	2 x 1,5	8,6	64,0	170,0	16
15977	3 G 1,5	9,0	84,0	203,0	16
15978	4 G 1,5	9,8	99,0	243,0	16
15979	5 G 1,5	10,5	120,0	288,0	16
15980	7 G 1,5	12,5	148,0	403,0	16
15981	12 G 1,5	14,8	274,0	592,0	16
15982	18 G 1,5	17,3	386,0	844,0	16
15983	25 G 1,5	21,0	584,0	1155,0	16
15152	41 G 1,5	24,8	867,0	1227,0	16
15153	50 G 1,5	27,3	970,0	1445,0	16
15154	61 G 1,5	29,8	1028,0	1724,0	16

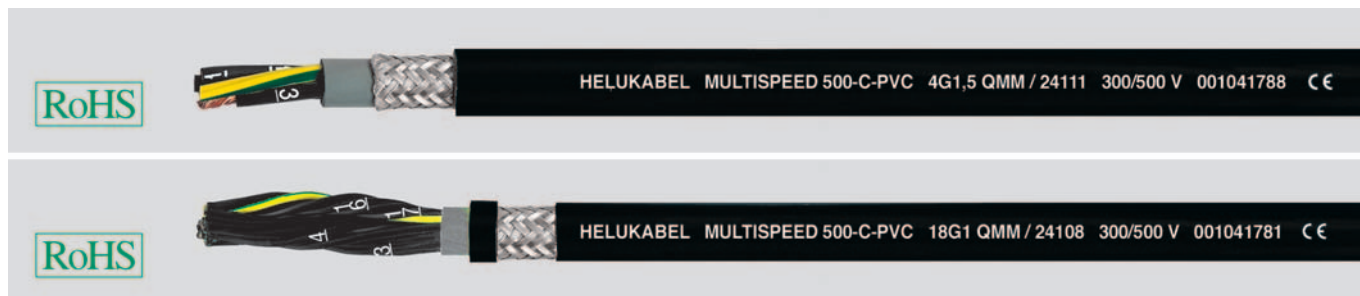
Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
15925	3 G 2,5	10,8	140,0	215,0	14
15926	4 G 2,5	11,5	159,0	264,0	14
15927	5 G 2,5	12,9	194,0	344,0	14
15928	7 G 2,5	15,1	234,0	410,0	14
15929	12 G 2,5	18,4	390,0	721,0	14
15155	3 G 4	13,0	178,0	292,0	12
15156	4 G 4	14,2	222,0	372,0	12
15157	5 G 4	15,6	328,0	448,0	12
15158	4 G 6	16,0	305,0	526,0	10
15159	5 G 6	17,5	441,0	632,0	10
15160	4 G 10	21,2	485,0	838,0	8
15161	5 G 10	23,2	610,0	998,0	8
15162	4 G 16	24,1	840,0	1225,0	6
15163	5 G 16	27,0	1050,0	1560,0	6

Dimensions and specifications may be changed without prior notice. (RC01)



Suitable Cable drag chains can be found in our Cable Accessories catalogue.

# MULTISPEED® 500-C-PVC high flexible, safety against high bending in drag chain systems, oil resistant, low torsion, screened, EMC-preferred type, meter marking



## Technical data

- Special drag chain cables for high mechanical stress adapted to DIN VDE 0285-525-2-51 / DIN EN 50525-2-51
- **Temperature range**  
flexing -15°C to +80°C  
fixed installation -30°C to +80°C
- **Nominal voltage**  $U_0/U$  300/500 V
- **Test voltage** 3000 V
- **Insulation resistance**  
min. 100 MOhm x km
- **Minimum bending radius**  
flexing 7,5x cable Ø  
fixed installation 4x cable Ø
- **Coupling resistance**  
max. 250 Ohm x km
- **Radiation resistance**  
up to  $80 \times 10^6$  Cj/kg (up to 80 Mrad)

## Cable structure

- Bare copper, fine wire conductors, Unilay with short pitch length
- Core insulation of special PP
- Core identification black cores with continuous white numbering
- GN-YE conductor, 3 cores and above
- Stranding:  
<7 cores: cores stranded in a layer with optimal lay-length around a filler as per construction  
≥7 cores: cores stranded with optimal lay-length to bunch-construction with low torsion strength, optimal selected short lay-length around a filler
- Special-PVC inner sheath YM2 extruded as filler with pressure grey (RAL 7001)
- Tinned copper braidet screen, coverage 85% max., with optimal bunch
- Fleece separator, ensure good dismantling ability
- Outer sheath of special PVC especially resistant against fatigue strength
- Sheath colour black (RAL 9005)
- with meter marking

## Properties

- Low adhesion
- ozon- and uv- resistant
- High property of alternating bending strength
- Long life durability due to low friction-resistance
- Better chemical resistance
- High stability
- Higher economical solution
- Reduced Ø, results low weight of moving materials
- The materials used in manufacture are cadmium-free and contain no silicone and free from substances harmful to the wetting properties of lacquers

## Tests

- PVC self-extinguishing and flame retardant acc. to DIN VDE 0482-332-1-2, DIN EN 60332-1-2/IEC 60332-1 (equivalent DIN VDE 0472 part 804 test method B)
- Oil resistance to DIN VDE 0473-811-404 / DIN EN 60811-404

## Note

- G = with green-yellow conductor  
x = without green-yellow conductor (OZ)
- AWG sizes are approximate equivalent values. The actual cross-section is in mm<sup>2</sup>.
- unscreened analogue type:  
**MULTISPEED® 500-PVC**, confer page 162

## Application

HELUKABEL® MULTISPEED 500-C-PVC are installed there, where the extreme requirements for the cables are necessary. The selected materials and lay-up technique permit these high flexible cables for permanent application in drag chains for long distances, high and low speed of movements. These high flexible PVC control cables are suitable for shift- and bending stresses in machines and machine tool constructions. These are installed in dry, moist rooms and in open air with free movement without tensile stress or forced movements. These screened cables are particularly suitable for the interference-free transmission in instrumentation and control engineering applications. For applications which go beyond standard solutions (for example for composting appliances or high shelf conveyors with extremely high processing speeds etc.) we recommend for our especially developed enquiry sheet for energy guiding systems. Before installation in cable trays please read the instructions. Further technical details see selection table for drag chain cables, see lead text.

**EMC** = Electromagnetic compatibility

To optimize the EMC features we recommend a large round contact of the copper braiding on both ends.

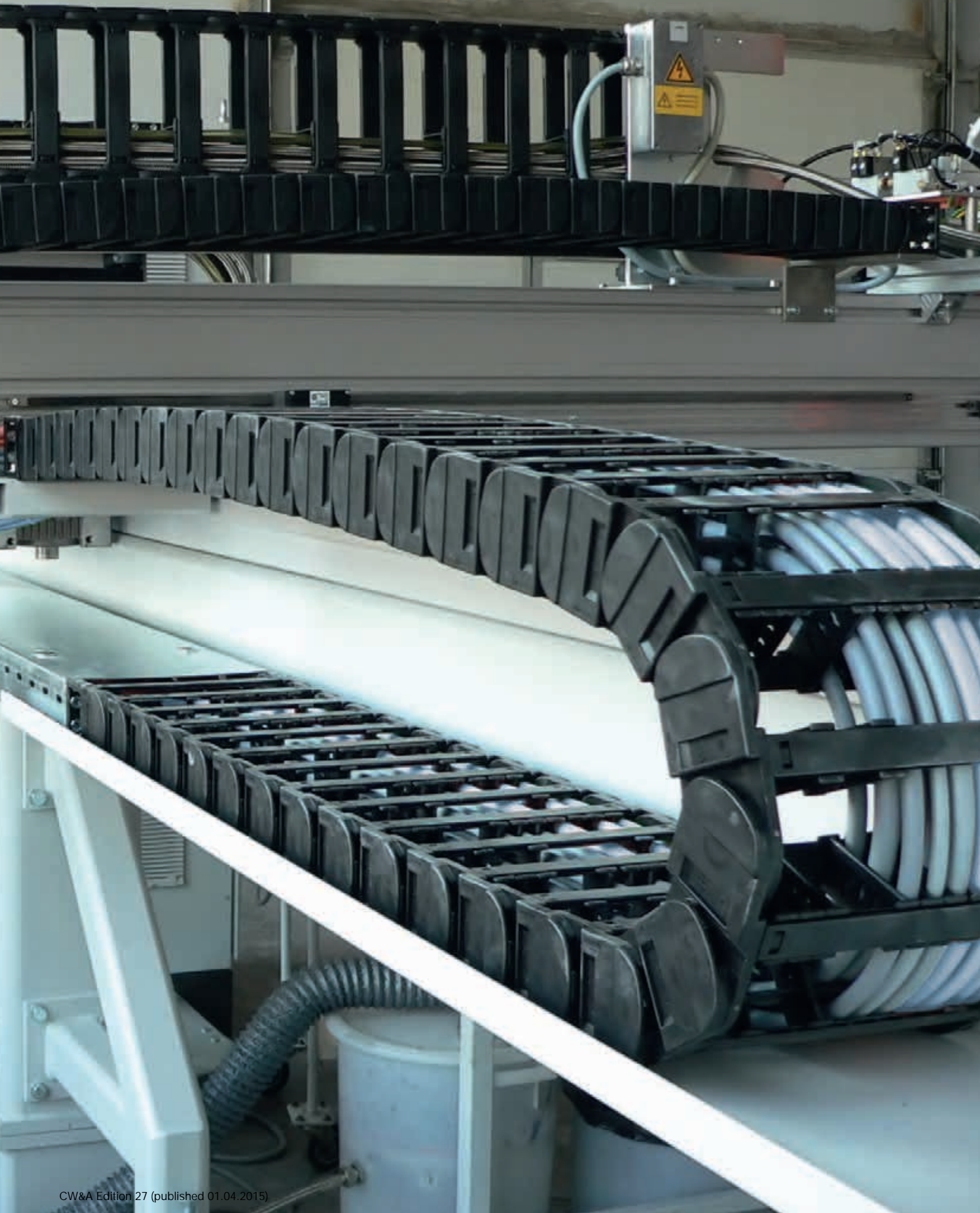
CE = The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.	Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
24086	2 x 0,5	6,2	30,0	88,0	20	24103	3 G 1	7,6	59,0	131,0	18
24087	3 G 0,5	6,7	36,0	101,0	20	24104	4 G 1	8,1	70,0	164,0	18
24088	4 G 0,5	7,2	42,0	116,0	20	24105	5 G 1	8,9	84,0	198,0	18
24089	5 G 0,5	7,6	48,0	146,0	20	24106	7 G 1	13,6	106,0	252,0	18
24090	7 G 0,5	11,4	64,0	181,0	20	24107	12 G 1	14,6	174,0	410,0	18
24091	9 G 0,5	11,4	80,0	219,0	20	24108	18 G 1	18,4	240,0	550,0	18
24092	12 G 0,5	12,4	105,0	271,0	20	24109	25 G 1	21,0	332,0	756,0	17
24093	18 G 0,5	14,7	137,0	374,0	20	24110	3 G 1,5	8,4	75,0	166,0	16
24094	25 G 0,5	17,1	210,0	542,0	20	24111	4 G 1,5	9,1	90,0	199,0	16
24095	2 x 0,75	6,8	40,0	96,0	19	24112	5 G 1,5	10,2	108,0	229,0	16
24096	3 G 0,75	7,3	48,0	111,0	19	24113	7 G 1,5	15,7	157,0	304,0	16
24097	4 G 0,75	7,8	55,0	140,0	19	24114	12 G 1,5	17,4	240,0	502,0	16
24098	5 G 0,75	8,3	66,0	161,0	19	24115	18 G 1,5	21,3	355,0	709,0	16
24099	7 G 0,75	12,7	85,0	227,0	19	24116	25 G 1,5	24,3	448,0	939,0	16
24100	12 G 0,75	13,7	135,0	317,0	19	24117	4 G 2,5	11,2	134,0	270,0	14
24101	18 G 0,75	17,1	190,0	486,0	19	24118	5 G 2,5	12,2	175,0	335,0	14
24102	25 G 0,75	19,5	275,0	651,0	19						

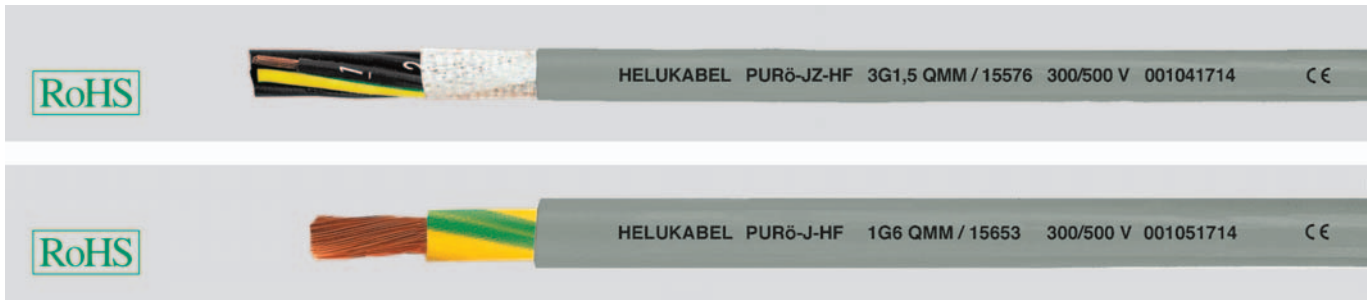
Dimensions and specifications may be changed without prior notice. (RC01)



# PUR DRAG CHAIN CABLES



# PURö-JZ-HF high flexible, cable for drag chains, abrasion and coolant resistant, meter marking



## Technical data

- Special polyurethane control cable adapted to DIN VDE 0285-525-1/ DIN EN 50525-1
- **Temperature range**  
flexing -20°C to +80°C  
fixed installation -40°C to +80°C
- **Nominal voltage** U<sub>0</sub>/U 300/500 V
- **Test voltage** 4000 V
- **Breakdown voltage** min. 8000 V
- **Insulation resistance**  
min. 20 MOhm x km
- **Minimum bending radius**  
flexing 7,5x cable Ø  
fixed installation 4x cable Ø
- **Radiation resistance**  
up to 100x10<sup>6</sup> cJ/kg (up to 100 Mrad)

## Cable structure

- Bare copper, extra fine wire conductors, bunch stranded to DIN VDE 0295 cl.6, BS 6360 cl.6 and IEC 60228 cl.6
- **Oil resistant** PVC core insulation, TI2 in adapted to DIN VDE 0207-363-3 / DIN EN 50363-3, for better sliding abilities
- Core identification to DIN VDE 0293 black cores with continuous white numbering
- GN-YE conductor, 3 cores and above in the outer layer
- Cores stranded in layers with optimal selected lay-length
- Core wrapping with fleece
- Outer sheath of special **full-polyurethane** TMPU, to DIN VDE 0207-363-10-2/ DIN EN 50363-10-2
- Colour grey (RAL 7001)
- with meter marking

## Properties

- Suitable for outdoor lying and resistant to UV-radiation, oxygen, ozone and hydrolysis. Conditionally resistant to microbes
- Adhesion-low
- The materials used in manufacture are cadmium-free and contain no silicone and free from substances harmful to the wetting properties of lacquers

## Note

- AWG sizes are approximate equivalent values. The actual cross-section is in mm<sup>2</sup>.
- G = with green-yellow conductor  
x = without green-yellow conductor (OZ)
- Cross-linked types also available on request.
- screened analogue type:  
**PURö-JZ-HF-YCP**, confer page 172

## Application

PURö-JZ-HF is an extremely robust cable noted for its good tear and abrasion resistance. Due to its good performance with mineral oils and especially in connection with coolants, this cable is well suited for use in the machinery, tool making and steel industries in critical areas. Its high abrasion resistance and good flexing ability make it quick and easy to install and, with its low bending radius, ideal for use with cable trays. For applications which go beyond standard solutions (for example for composting appliances or high shelf conveyors with extremely high processing speeds etc.) we recommend for our especially developed enquiry sheet for energy guiding systems. Before installation in cable trays please read the instructions. Further technical details see selection table for drag chain cables, see lead text.

CE = The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.	Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
15520	2 x 0,5	5,5	9,6	45,0	20	15556	2 x 1	6,3	19,2	64,0	18
15521	3 G 0,5	6,0	14,4	56,0	20	15557	3 G 1	6,6	29,0	83,0	18
15522	4 G 0,5	6,4	19,1	69,0	20	15558	4 G 1	7,1	38,5	113,0	18
15523	5 G 0,5	6,9	24,0	92,0	20	15559	5 G 1	7,8	48,0	137,0	18
15524	7 G 0,5	7,9	33,6	126,0	20	15560	7 G 1	9,0	67,0	191,0	18
16161	7 x 0,5	7,8	33,6	126,0	20	15561	8 G 1	9,9	77,0	218,0	18
15525	8 G 0,5	8,6	38,0	136,0	20	15562	10 G 1	11,1	96,0	251,0	18
15526	10 G 0,5	9,7	48,0	158,0	20	15563	12 G 1	11,1	115,0	294,0	18
15527	12 G 0,5	9,9	58,0	176,0	20	15564	14 G 1	12,1	134,0	337,0	18
15528	14 G 0,5	10,4	67,0	212,0	20	15565	18 G 1	13,6	173,0	420,0	18
15529	18 G 0,5	11,4	86,4	283,0	20	15566	21 G 1	14,2	196,0	504,0	18
15530	21 G 0,5	12,1	96,0	310,0	20	15567	25 G 1	16,1	240,0	600,0	18
15531	25 G 0,5	13,5	120,0	330,0	20	15568	32 G 1	17,6	308,0	732,0	18
15532	30 G 0,5	14,2	144,0	390,0	20	15569	34 G 1	18,4	326,0	776,0	18
15533	34 G 0,5	15,2	163,0	420,0	20	15570	41 G 1	19,7	394,0	925,0	18
15534	42 G 0,5	16,2	202,0	500,0	20	15571	42 G 1	19,7	403,0	949,0	18
15535	50 G 0,5	18,0	240,0	580,0	20	15572	50 G 1	21,7	480,0	1092,0	18
15538	2 x 0,75	6,0	14,4	57,0	19	15573	65 G 1	30,9	624,0	1400,0	18
15539	3 G 0,75	6,3	21,6	72,0	19	15575	2 x 1,5	6,8	29,0	90,0	16
15540	4 G 0,75	6,8	29,0	97,0	19	15576	3 G 1,5	7,2	43,0	117,0	16
15541	5 G 0,75	7,4	36,0	119,0	19	15577	4 G 1,5	7,7	58,0	147,0	16
15542	7 G 0,75	8,7	50,0	165,0	19	15578	5 G 1,5	8,6	72,0	181,0	16
15543	8 G 0,75	9,5	58,0	189,0	19	15579	7 G 1,5	10,3	101,0	274,0	16
15544	10 G 0,75	10,7	72,0	214,0	19	15580	8 G 1,5	11,0	115,0	313,0	16
15545	12 G 0,75	10,9	86,0	247,0	19	15581	10 G 1,5	12,7	144,0	344,0	16
15546	14 G 0,75	11,5	101,0	283,0	19	15582	12 G 1,5	12,7	173,0	391,0	16
15547	18 G 0,75	12,7	130,0	356,0	19	15583	14 G 1,5	13,4	202,0	457,0	16
15548	21 G 0,75	13,4	151,0	502,0	19	15584	18 G 1,5	15,1	259,0	589,0	16
15549	25 G 0,75	15,0	180,0	698,0	19	15585	21 G 1,5	16,2	302,0	680,0	16
15550	30 G 0,75	15,8	216,0	720,0	19	15586	25 G 1,5	18,0	360,0	801,0	16
15551	34 G 0,75	17,2	245,0	770,0	19	15587	30 G 1,5	18,7	410,0	938,0	16
15552	42 G 0,75	18,5	302,0	840,0	19	15588	34 G 1,5	20,6	490,0	1048,0	16
15553	50 G 0,75	20,1	360,0	990,0	19	15589	42 G 1,5	22,4	605,0	1290,0	16

Continuation ▶

# PURÖ-JZ-HF high flexible, cable for drag chains, abrasion and coolant resistant, meter marking



Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
15590	50 G 1,5	24,2	720,0	1520,0	16
15591	61 G 1,5	32,4	889,0	1850,0	16
15592	65 G 1,5	33,6	940,0	1970,0	16
15620	2 x 2,5	8,5	48,0	128,0	14
15621	3 G 2,5	9,0	72,0	160,0	14
15622	4 G 2,5	9,9	96,0	200,0	14
15623	5 G 2,5	11,0	120,0	268,0	14
15624	7 G 2,5	12,8	168,0	357,0	14
15625	12 G 2,5	16,2	288,0	571,0	14
15626	14 G 2,5	17,1	336,0	612,0	14
15627	18 G 2,5	19,1	432,0	800,0	14
15628	25 G 2,5	22,8	600,0	1100,0	14
15630	2 x 4	10,1	77,0	190,0	12
15631	3 G 4	10,9	115,0	250,0	12
15632	4 G 4	12,0	154,0	320,0	12
15633	5 G 4	13,4	192,0	400,0	12
15634	7 G 4	16,0	269,0	550,0	12
15653	1 G 6	7,3	58,0	81,0	10
15636	3 G 6	12,8	173,0	350,0	10

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
15637	4 G 6	13,9	230,0	500,0	10
15638	5 G 6	15,4	288,0	580,0	10
15639	7 G 6	18,0	403,0	800,0	10
15654	1 G 10	8,9	96,0	152,0	8
15641	3 G 10	16,2	288,0	660,0	8
15642	4 G 10	18,1	384,0	750,0	8
15643	5 G 10	20,3	480,0	990,0	8
15644	7 G 10	24,3	672,0	1300,0	8
15655	1 G 16	10,0	154,0	215,0	6
15645	4 G 16	21,1	614,0	1200,0	6
15646	5 G 16	23,5	768,0	1500,0	6
15647	7 G 16	28,7	1075,0	1900,0	6
15656	1 G 25	11,1	240,0	320,0	4
15648	4 G 25	34,0	960,0	1700,0	4
15649	4 G 35	37,0	1344,0	2300,0	2
15650	4 G 50	44,0	1920,0	2500,0	1
15651	4 G 70	53,0	2688,0	4600,0	2/0
15652	4 G 95	59,0	3648,0	6400,0	3/0

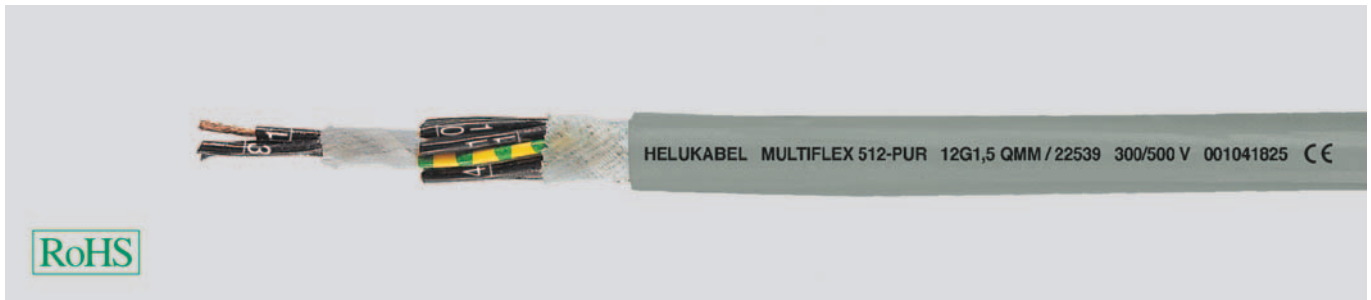
Dimensions and specifications may be changed without prior notice. (RC02)



Suitable Cable drag chains can be found in our Cable Accessories catalogue.

# MULTIFLEX 512<sup>®</sup>-PUR special cable for drag chains,

halogen-free, meter marking



## Technical data

- Special drag chain cables for high mechanical stress, adapted to DIN VDE 0285-525-2-21 / DIN EN 50525-2-21
- **Temperature range**  
flexing -30°C to +80°C  
fixed installation -40°C to +80°C
- **Nominal voltage** U<sub>0</sub>/U 300/500 V
- **Test voltage** 3000 V
- **Insulation resistance**  
min. 100 MOhm x km
- **Minimum bending radius**  
flexing 5x cable Ø  
fixed installation 3x cable Ø
- **Alternating bending cycles**  
approx. **10 million**
- **Radiation resistance**  
up to 50x10<sup>6</sup> cJ/kg (up to 50 Mrad)

## Cable structure

- Bare copper, extra fine wire conductors, bunch stranded to DIN VDE 0295 cl.6, col. 4, BS 6360 cl.6 and IEC 60228 cl.6
- Core insulation of special PP
- Core identification black cores with continuous white numbering
- GN-YE conductor, 3 cores and above in the outer layer
- Cores stranded in layers with optimal selected lay-length
- Special core wrapping over each layer (up to 4 mm<sup>2</sup> without core wrapping over the outer layer)
- Outer sheath of special **full-polyurethane** TMPU, to DIN VDE 0207-363-10-2 / DIN EN 50363-10-2
- Colour grey (RAL 7001) outer surface mat
- with meter marking

## Properties

- Very good oil resistant
- Guaranteed permanent application in multi-shift operation under extreme high bending stress
- Adhesion-low
- High resistant to mechanical strain
- High property of alternating bending strength
- Long life durabilities through low friction-resistance by using the PP-insulation
- High tensile strength-, abrasion- and impact resistant at low temperature
- **Resistant to weather, ozone and UV-radiation, solvents, acids and alkalis, hydraulic liquidity and hydrolysis**
- The materials used in manufacture are cadmium-free and contain no silicone and free from substances harmful to the wetting properties of lacquers

## Note

- AWG sizes are approximate equivalent values. The actual cross-section is in mm<sup>2</sup>.
- G = with green-yellow conductor  
x = without green-yellow conductor (OZ)
- Cleanroom qualification tested with analog type. Please note "cleanroom qualified" when ordering.
- screened analogue type:  
**MULTIFLEX 512<sup>®</sup>-C-PUR**,  
confer page 174

## Application

The special cables for drag chains are used for permanent flexible applications in machineries, machine tools, robot technics, for movable automated machinery parts and multi-shift operation. Those cables are developed according to the newest state of technology improvement. These high flexible control cables with sliding abilities guaranteed an optimum service life durabilities and also very economic by using the PP-core insulation and the PUR-outer sheath. The PUR material is adhesion-low and cut-resistant. For applications which go beyond standard solutions (for example for composting appliances or high shelf conveyors with extremely high processing speeds etc.) we recommend for our especially developed enquiry sheet for energy guiding systems. Before installation in cable trays please read the instructions. Further technical details see selection table for drag chain cables, see lead text.

CE The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.	Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
22501	2 x 0,5	5,5	9,6	38,0	20	22512	2 x 0,75	6,2	14,4	47,0	19
22502	3 G 0,5	5,8	14,4	46,0	20	22513	3 G 0,75	6,5	21,6	58,0	19
22503	4 G 0,5	6,4	19,0	59,0	20	22514	4 G 0,75	7,0	29,0	69,0	19
22504	5 G 0,5	7,0	24,0	68,0	20	22515	5 G 0,75	7,8	36,0	85,0	19
22505	7 G 0,5	8,1	33,6	88,0	20	22516	7 G 0,75	9,0	50,0	118,0	19
22506	12 G 0,5	9,9	58,0	131,0	20	22517	12 G 0,75	11,0	86,0	183,0	19
22507	18 G 0,5	11,5	86,0	197,0	20	22518	18 G 0,75	13,0	130,0	270,0	19
22508	20 G 0,5	12,0	96,0	260,0	20	22519	20 G 0,75	13,5	144,0	290,0	19
22509	25 G 0,5	13,7	120,0	282,0	20	22520	25 G 0,75	15,4	180,0	374,0	19
22510	30 G 0,5	14,3	144,0	315,0	20	22521	30 G 0,75	16,2	216,0	420,0	19
22511	36 G 0,5	15,3	172,0	374,0	20	22522	36 G 0,75	17,6	259,0	498,0	19

Continuation ▶



# MULTIFLEX 512<sup>®</sup>-PUR special cable for drag chains, halogen-free, meter marking



Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
22523	2 x 1	6,9	19,2	55,0	18
22524	3 G 1	7,4	29,0	70,0	18
22525	4 G 1	8,0	38,0	86,0	18
22526	5 G 1	8,7	48,0	102,0	18
22527	7 G 1	10,2	67,0	143,0	18
22528	12 G 1	12,6	115,0	225,0	18
22529	18 G 1	14,8	173,0	334,0	18
22530	20 G 1	15,8	192,0	370,0	18
22531	25 G 1	18,1	240,0	460,0	18
22532	30 G 1	18,5	288,0	530,0	18
22533	36 G 1	20,1	346,0	625,0	18
22878	41 G 1	22,0	410,0	779,0	18
22879	50 G 1	24,0	498,0	953,0	18
22880	65 G 1	27,2	650,0	1205,0	18
22534	2 x 1,5	7,6	29,0	70,0	16
22535	3 G 1,5	8,1	43,0	90,0	16
22536	4 G 1,5	8,7	58,0	106,0	16
22537	5 G 1,5	9,7	72,0	145,0	16
22538	7 G 1,5	11,3	101,0	205,0	16
22539	12 G 1,5	13,8	173,0	320,0	16
22540	18 G 1,5	16,3	259,0	465,0	16
22541	20 G 1,5	17,3	288,0	510,0	16
22542	25 G 1,5	19,8	360,0	650,0	16
22543	30 G 1,5	20,3	432,0	750,0	16
22544	36 G 1,5	22,2	518,0	880,0	16
22881	42 G 1,5	24,0	628,0	1209,0	16
22882	50 G 1,5	26,2	749,0	1449,0	16
22883	61 G 1,5	28,9	912,0	1712,0	16

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
22545	2 x 2,5	9,2	48,0	115,0	14
22546	3 G 2,5	9,7	72,0	162,0	14
22547	4 G 2,5	10,5	96,0	196,0	14
22548	5 G 2,5	11,6	120,0	230,0	14
22549	7 G 2,5	13,8	168,0	312,0	14
22550	12 G 2,5	16,9	288,0	532,0	14
22551	18 G 2,5	20,0	432,0	762,0	14
22552	20 G 2,5	21,2	480,0	858,0	14
22553	25 G 2,5	24,4	600,0	998,0	14
22554	4 G 4	13,2	154,0	283,0	12
22555	5 G 4	14,6	192,0	349,0	12
22556	7 G 4	17,6	269,0	498,0	12
22557	4 G 6	14,4	230,0	432,0	10
22558	5 G 6	15,9	288,0	529,0	10
22559	7 G 6	19,2	403,0	782,0	10
22560	4 G 10	18,4	384,0	685,0	8
22561	5 G 10	20,7	480,0	817,0	8
22562	7 G 10	24,7	672,0	1023,0	8
22563	4 G 16	21,3	614,0	1042,0	6
22564	5 G 16	23,8	768,0	1292,0	6
22565	7 G 16	28,6	1075,0	1709,0	6

Dimensions and specifications may be changed without prior notice. (RC02)



Suitable Cable drag chains can be found in our Cable Accessories catalogue.

# MULTISPEED® 500-PUR safety against high bending in drag chain systems, low torsion, halogen-free, meter marking



## Technical data

- Special drag chain cables for high mechanical stress adapted to  
DIN VDE 0285-525-2-51 /  
DIN EN 50525-2-51 and  
DIN VDE 0285-525-2-21 /  
DIN EN 50525-2-21
- **Temperature range**  
flexing -30°C to +80°C  
fixed installation -40°C to +80°C
- **Nominal voltage**  $U_0/U$  300/500 V
- **Test voltage** 3000 V
- **Insulation resistance**  
min. 100 MOhm x km
- **Minimum bending radius**  
flexing 7,5x cable  $\varnothing$   
fixed installation 4x cable  $\varnothing$
- **Radiation resistance**  
up to  $100 \times 10^6$  cJ/kg (up to 100 Mrad)

## Cable structure

- Bare copper, fine wire conductors, Unilay with short pitch length
- Core insulation of special PP
- Core identification black cores with continuous white numbering
- GN-YE conductor, 3 cores and above
- Stranding:  
<7 cores: cores stranded in a layer with optimal lay-length around a filler as per construction  
 $\geq 7$  cores: cores stranded with optimal lay-length to bunch-construction with low torsion strength, optimal selected short lay-length around a filler
- Special-PUR outer sheath, extruded as filler with pressure
- Sheath colour black (RAL 9005)
- with meter marking

## Properties

- Low adhesion
- Halogen-free
- Oil resistance
- Better chemical resistance
- UV and ozone resistance
- Higher economical solution
- Reduced  $\varnothing$ , results low weight of moving materials
- High property of alternating bending strength
- High resistant to mechanical strain
- Long life durability due to low friction-resistance
- High tensile strength, abrasion- and impact resistance at low temperature
- Tear resistance and high stability
- The materials used in manufacture are cadmium-free and contain no silicone and free from substances harmful to the wetting properties of lacquers

## Note

- AWG sizes are approximate equivalent values. The actual cross-section is in mm<sup>2</sup>.
- G = with green-yellow conductor  
x = without green-yellow conductor (OZ)
- screened analogue type:  
**MULTISPEED® 500-C-PUR**,  
confer page 176

## Application

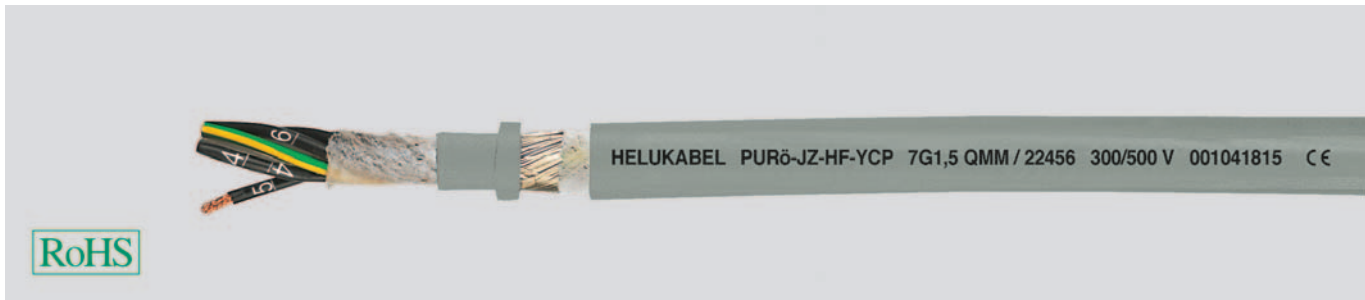
For permanent application in drag chains for long distances, high and low speed of movements. These cables are installed in dry, moist and wet rooms and in open air with free movement without tensile stress or forced movements. These robust and abrasion resistant special control cables are installed there, where the problems appear for the application in permanent stresses e. g. in energy drag chains, industry robotics, production lines, automatic control systems and permanent movable machinery parts for multi-shift operation. These cables are installed everywhere, where high requirements for the flexibility, abrasion, oxygen and chemical resistance are necessary. For applications which go beyond standard solutions we recommend for our especially developed enquiry sheet for energy guiding systems.

CE = The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer $\varnothing$ approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.	Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer $\varnothing$ approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
24119	2 x 0,5	4,3	9,6	41,0	20	24138	5 G 1	6,7	48,0	84,0	18
24120	3 G 0,5	4,6	14,4	48,0	20	24139	7 G 1	11,1	67,0	111,0	18
24121	4 G 0,5	5,0	19,0	62,0	20	24140	12 G 1	12,0	115,0	200,0	18
24122	5 G 0,5	5,4	24,0	70,0	20	24141	18 G 1	14,8	173,0	286,0	18
24123	7 G 0,5	8,9	33,6	88,0	20	24142	25 G 1	17,2	240,0	370,0	18
24124	12 G 0,5	9,7	58,0	131,0	20	24143	3 G 1,5	6,4	43,0	81,0	16
24125	18 G 0,5	11,8	86,0	204,0	20	24144	4 G 1,5	7,0	58,0	102,0	16
24126	25 G 0,5	13,9	120,0	266,0	20	24145	5 G 1,5	7,8	72,0	121,0	16
24127	3 G 0,75	5,2	21,6	51,0	19	24146	7 G 1,5	13,0	101,0	164,0	16
24128	4 G 0,75	5,6	29,0	68,0	19	24147	12 G 1,5	14,2	173,0	293,0	16
24129	5 G 0,75	6,3	36,0	73,0	19	24148	18 G 1,5	17,5	259,0	450,0	16
24130	7 G 0,75	10,3	50,0	92,0	19	24149	25 G 1,5	20,1	360,0	631,0	16
24131	12 G 0,75	11,0	86,0	170,0	19	24150	4 G 2,5	8,8	86,0	173,0	14
24132	18 G 0,75	13,9	130,0	257,0	19	24151	5 G 2,5	9,8	120,0	220,0	14
24133	25 G 0,75	15,9	180,0	280,0	19	24152	7 G 2,5	16,1	168,0	290,0	14
24134	36 G 0,75	19,6	260,0	411,0	19	24153	12 G 2,5	17,8	288,0	504,0	14
24135	42 G 0,75	21,5	302,0	608,0	19	24154	18 G 2,5	21,8	432,0	719,0	14
24136	3 G 1	5,4	29,0	59,0	18	24155	25 G 2,5	24,4	600,0	940,0	14
24137	4 G 1	5,9	38,0	71,0	18						

Dimensions and specifications may be changed without prior notice. (RC02)

# PURÖ-JZ-HF-YCP EMC-preferred type, cable for drag chains, screened, PUR-outer sheath, meter marking



## Technical data

- Special polyurethane control cable adapted to DIN VDE 0285-525-1 / DIN EN 50525-1
- **Temperature range**  
flexing -20°C to +80°C  
fixed installation -40°C to +80°C
- **Nominal voltage** U<sub>0</sub>/U 300/500 V
- **Test voltage** 4000 V
- **Breakdown voltage** min. 8000 V
- **Insulation resistance**  
min. 20 MOhm x km
- **Minimum bending radius**  
flexing 10x cable Ø  
fixed installation 5x cable Ø
- **Radiation resistance**  
up to 100x10<sup>6</sup> cJ/kg (up to 100 Mrad)

## Cable structure

- Bare copper, extra fine wire conductors, bunch stranded to DIN VDE 0295 cl.6, col. 4, BS 6360 cl.6 and IEC 60228 cl.6
- **Oil resistant** PVC core insulation TI2, in adapted to DIN VDE 0207-363-3/ DIN EN 50363-3, for better sliding abilities
- Core identification to DIN VDE 0293 black cores with continuous white numbering
- GN-YE conductor, 3 cores and above in the outer layer
- Cores stranded in layers with optimal selected lay-length
- Fleece separator
- **Oil resistant** PVC inner sheath
- One layer of tinned copper wire screening<sup>1)</sup>, approx. 85% coverage
- Outer sheath of special **full-polyurethane** to DIN VDE 0207-363-10-2/ DIN EN 50363-10-2
- Colour grey (RAL 7001)
- with meter marking

## Properties

- Suitable for outdoor lying and resistant to UV-radiation, oxygen, ozone and hydrolysis. Conditionally resistant to microbes
- Adhesion-low
- The materials used in manufacture are cadmium-free and contain no silicone and free from substances harmful to the wetting properties of lacquers

## Note

- G = with green-yellow conductor  
x = without green-yellow conductor (OZ)
- <sup>1)</sup>Change-over up to construction with Cu-screening, tinned, approx. 85% for coverage optimisation of the useful properties are in preparation
- AWG sizes are approximate equivalent values. The actual cross-section is in mm<sup>2</sup>.
- unscreened analogue type:  
**PURÖ-JZ-HF**, confer page 167

## Application

PURÖ-JZ-HF-YCP is a highly robust and tare and abrasion resistant cable with excellent resistance properties to mineral oils and cooling fluids, thus making it an ideal choice for installation in most types of industrial machinery as well as in steel works and rolling mills, etc. in fact, wherever you may need a cable to cope with especially critical situations. Easy to install, thanks to its high degree of flexibility. Its high abrasion resistance and good flexing ability make it quick and easy to install and, with its low bending radius, ideal for use with cable trays. This screened cable is ideal for use in data signal transmission free from interferences for measurement and control engineering technology. For applications which go beyond standard solutions (for example for composting appliances or high shelf conveyors with extremely high processing speeds etc.) we recommend for our especially developed enquiry sheet for energy guiding systems. Before installation in cable trays please read the instructions. Further technical details see selection table for drag chain cables, see lead text.

**EMC** = Electromagnetic compatibility

To optimize the EMC features we recommend a large round contact of the copper braiding on both ends.

**CE** = The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
22400	2 x 0,5	7,5	30,0	90,0	20
22401	3 G 0,5	7,8	38,0	104,0	20
22402	4 G 0,5	7,8	48,0	123,0	20
22403	5 G 0,5	8,5	65,0	131,0	20
22404	7 G 0,5	9,5	70,0	172,0	20
22405	8 G 0,5	10,4	81,0	195,0	20
22406	10 G 0,5	11,4	94,0	230,0	20
22407	12 G 0,5	11,6	110,0	250,0	20
22408	14 G 0,5	12,0	135,0	280,0	20
22409	18 G 0,5	13,4	157,0	321,0	20
22410	21 G 0,5	14,8	175,0	380,0	20
22411	25 G 0,5	16,1	240,0	445,0	20
22412	30 G 0,5	16,4	275,0	509,0	20
22413	34 G 0,5	17,8	305,0	560,0	20
22414	42 G 0,5	19,1	330,0	780,0	20
22415	50 G 0,5	20,6	393,0	960,0	20
22416	61 G 0,5	23,0	541,0	1050,0	20

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
22417	2 x 0,75	7,5	39,0	106,0	19
22418	3 G 0,75	7,8	49,0	120,0	19
22419	4 G 0,75	8,5	60,0	150,0	19
22420	5 G 0,75	9,1	70,0	158,0	19
22421	7 G 0,75	10,9	95,0	205,0	19
22422	8 G 0,75	11,5	104,0	272,0	19
22423	10 G 0,75	13,0	110,0	290,0	19
22424	12 G 0,75	13,2	141,0	304,0	19
22425	14 G 0,75	13,7	163,0	380,0	19
22426	18 G 0,75	15,2	211,0	418,0	19
22427	21 G 0,75	16,4	274,0	485,0	19
22428	25 G 0,75	18,2	322,0	578,0	19
22429	30 G 0,75	18,6	414,0	630,0	19
22430	34 G 0,75	20,0	473,0	720,0	19
22431	42 G 0,75	21,5	583,0	780,0	19
22432	50 G 0,75	23,7	626,0	954,0	19
22433	61 G 0,75	25,9	763,0	1085,0	19

Continuation ▶

# PURÖ-JZ-HF-YCP EMC-preferred type, cable for drag chains, screened, PUR-outer sheath, meter marking



Part no.	No.cores x cross-sec. mm <sup>2</sup>	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.	Part no.	No.cores x cross-sec. mm <sup>2</sup>	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
22434	2 x 1	8,5	50,0	116,0	18	22470	2 x 2,5	10,9	96,0	185,0	14
22435	3 G 1	8,8	60,0	135,0	18	22471	3 G 2,5	11,4	150,0	278,0	14
22436	4 G 1	9,4	73,0	178,0	18	22472	4 G 2,5	12,2	159,0	370,0	14
22437	5 G 1	10,7	81,0	188,0	18	22473	5 G 2,5	13,5	195,0	412,0	14
22438	7 G 1	12,1	114,0	235,0	18	22474	7 G 2,5	16,0	240,0	470,0	14
22439	8 G 1	13,2	130,0	270,0	18	22475	12 G 2,5	19,4	390,0	738,0	14
22440	10 G 1	14,6	178,0	340,0	18	22476	14 G 2,5	20,4	480,0	870,0	14
22441	12 G 1	14,8	186,0	358,0	18	22477	18 G 2,5	23,0	620,0	1100,0	14
22442	14 G 1	15,6	231,0	415,0	18	22478	25 G 2,5	27,7	821,0	1512,0	14
22443	18 G 1	17,0	254,0	500,0	18	22479	2 G 4	13,1	135,0	235,0	12
22444	21 G 1	19,0	328,0	525,0	18	22480	3 G 4	13,7	178,0	350,0	12
22445	25 G 1	20,9	378,0	678,0	18	22481	4 G 4	15,6	222,0	460,0	12
22446	32 G 1	22,6	450,0	777,0	18	22482	5 G 4	16,7	328,0	550,0	12
22447	34 G 1	23,3	478,0	825,0	18	22483	7 G 4	19,7	360,0	700,0	12
22448	41 G 1	25,1	576,0	980,0	18	22484	3 G 6	16,0	250,0	525,0	10
22449	42 G 1	25,3	590,0	998,0	18	22485	4 G 6	17,2	305,0	700,0	10
22450	50 G 1	27,6	702,0	1160,0	18	22486	5 G 6	19,3	441,0	800,0	10
22451	65 G 1	30,7	913,0	1670,0	18	22487	7 G 6	21,6	505,0	1100,0	10
22452	2 x 1,5	9,0	64,0	141,0	16	22488	3 G 10	20,4	370,0	855,0	8
22453	3 G 1,5	9,4	84,0	164,0	16	22489	4 G 10	23,0	485,0	1140,0	8
22454	4 G 1,5	10,6	99,0	220,0	16	22490	5 G 10	25,3	610,0	1310,0	8
22455	5 G 1,5	11,4	120,0	233,0	16	22491	7 G 10	28,0	820,0	1630,0	8
22456	7 G 1,5	13,3	148,0	323,0	16	22492	4 G 16	26,2	840,0	1391,0	6
22457	8 G 1,5	14,5	191,0	369,0	16	22493	5 G 16	28,6	1050,0	1810,0	6
22458	10 G 1,5	15,9	240,0	461,0	16	22494	7 G 16	31,5	1510,0	2166,0	6
22459	12 G 1,5	16,1	274,0	481,0	16						
22460	14 G 1,5	16,7	340,0	561,0	16						
22461	18 G 1,5	18,4	395,0	672,0	16						
22462	21 G 1,5	20,6	461,0	780,0	16						
22463	25 G 1,5	22,8	533,0	927,0	16						
22464	30 G 1,5	23,5	608,0	1030,0	16						
22465	34 G 1,5	26,1	702,0	1180,0	16						
22466	42 G 1,5	27,8	867,0	1458,0	16						
22467	50 G 1,5	30,3	1033,0	1857,0	16						
22468	61 G 1,5	32,7	1233,0	2250,0	16						
22469	65 G 1,5	33,5	1315,0	2401,0	16						

Dimensions and specifications may be changed without prior notice. (RC02)



Suitable Cable drag chains can be found in our Cable Accessories catalogue.



# MULTIFLEX 512<sup>®</sup>-C-PUR special cable for drag chains,

## halogen-free, screened, EMC-preferred type, meter marking



### Technical data

- Special drag chain cables for extreme mechanical stress in accordance to DIN VDE 0285-525-2-21 / DIN EN 50525-2-21
- **Temperature range**  
flexing -30°C to +80°C  
fixed installation -40°C to +80°C
- **Nominal voltage**  $U_0/U$  300/500 V
- **Test voltage**  
3000 V
- **Insulation resistance**  
min. 100 MOhm x km
- **Minimum bending radius**  
flexing 7,5x cable  $\varnothing$   
fixed installation 4x cable  $\varnothing$
- **Test of alternating bending cycles**  
approx. **10 million**
- **Radiation resistance**  
up to  $50 \times 10^6$  cJ/kg (up to 50 Mrad)
- **Coupling resistance**  
max. 250 Ohm/km

### Cable structure

- Bare copper, extra fine wire conductors, bunch stranded to DIN VDE 0295 cl.6, col. 4, BS 6360 cl.6 and IEC 60228 cl.6
- Core insulation special PP
- Core identification black cores with continuous white numbering
- GN-YE conductor, 3 cores and above in the outer layer
- Cores stranded in layers with optimal selected lay-length
- Special core wrapping over each layers and an additional fleece over outer layer
- **TPE-inner sheath**, halogen-free
- Wrapping with special tapes
- Tinned copper braided screening, approx. 85% coverage
- Special core wrapping of fleece (up to 4 mm<sup>2</sup> without core wrapping over the outer layer
- Outer sheath of special **full-polyurethane** TPU, to DIN VDE 0207-363-10-2 / DIN EN 50363-10-2
- Sheath colour grey, (RAL 7001), with a matte surface
- with meter marking

### Properties

- Very good oil resistant
- Guaranteed permanent application in multi-shift operation under extreme high bending stress
- Adhesion-low
- High resistant to mechanical strain
- High property of alternating bending strength
- Long life durabilities through low friction-resistance by using the PP insulation
- High tensile strength-, abrasion- and impact resistant at low temperature
- Resistant to weather, ozone and UV-radiation, solvents, acids and alkalis, hydraulic liquidity and hydrolysis
- The materials used in manufacture are cadmium-free and contain no silicone and free from substances harmful to the wetting properties of lacquers

### Note

- AWG sizes are approximate equivalent values. The actual cross-section is in mm<sup>2</sup>.
- G = with green-yellow conductor
- x = without green-yellow conductor (OZ)
- Please note the cleanroom qualification when ordering.  
For more information see introduction
- unscreened analogue type:  
**MULTIFLEX 512<sup>®</sup>-PUR**, confer page 169

### Application

The special screened cables for drag chains are mainly applied for impulse transmission to prevent external interference effects and used for permanent flexible applications in machineries, machine tools, robot technics, for movable automated machinery parts and multi-shift operation. Those cables are developed according to the newest state of technology improvement. These high flexible control cables with sliding abilities guaranteed an optimum service life durabilities and also very economic by using the PP-core insulation and the PUR-outer sheath which is adhesive-free and cut-resistant.

**EMC** = Electromagnetic compatibility

To optimize the EMC features we recommend a large round contact of the copper braiding on both ends.

CE = The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer $\varnothing$ approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
22571	2 x 0,5	8,3	30,0	90,0	20
22572	3 G 0,5	8,5	38,0	105,0	20
22573	4 G 0,5	9,0	50,0	124,0	20
22574	5 G 0,5	9,7	65,0	132,0	20
22575	7 G 0,5	11,1	70,0	175,0	20
22576	12 G 0,5	12,7	100,0	250,0	20

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer $\varnothing$ approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
22577	18 G 0,5	14,7	157,0	325,0	20
22578	20 G 0,5	15,4	167,0	350,0	20
22579	25 G 0,5	17,1	240,0	450,0	20
22580	30 G 0,5	17,9	273,0	510,0	20
22581	36 G 0,5	19,2	306,0	580,0	20

Continuation ►

# MULTIFLEX 512<sup>®</sup>-C-PUR special cable for drag chains,

halogen-free, screened, EMC-preferred type, meter marking



Part no.	No.cores x cross-sec. mm <sup>2</sup>	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.	Part no.	No.cores x cross-sec. mm <sup>2</sup>	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
22582	2 x 0,75	8,8	39,0	110,0	19	22609	12 G 1,5	17,4	279,0	481,0	16
22583	3 G 0,75	9,3	49,0	120,0	19	22610	18 G 1,5	19,9	393,0	675,0	16
22584	4 G 0,75	9,7	60,0	148,0	19	22611	25 G 1,5	23,7	584,0	927,0	16
22585	5 G 0,75	10,5	70,0	160,0	19	22612	30 G 1,5	24,6	607,0	1025,0	16
22586	7 G 0,75	11,9	95,0	205,0	19	22613	36 G 1,5	26,4	702,0	1210,0	16
22587	12 G 0,75	14,2	140,0	308,0	19	22887	42 G 1,5	28,4	829,0	1441,0	16
22588	18 G 0,75	16,3	220,0	420,0	19	22888	50 G 1,5	31,2	1025,0	1709,0	16
22589	20 G 0,75	16,9	249,0	450,0	19	22889	61 G 1,5	34,2	1190,0	2025,0	16
22590	25 G 0,75	19,2	313,0	579,0	19	22614	2 x 2,5	11,9	104,0	198,0	14
22591	30 G 0,75	19,7	470,0	630,0	19	22615	3 G 2,5	12,6	140,0	284,0	14
22592	36 G 0,75	21,2	500,0	745,0	19	22616	4 G 2,5	13,6	164,0	378,0	14
22593	2 x 1	9,7	50,0	120,0	18	22617	5 G 2,5	14,7	190,0	423,0	14
22594	3 G 1	10,0	60,0	135,0	18	22618	7 G 2,5	17,4	236,0	486,0	14
22595	4 G 1	10,8	73,0	173,0	18	22619	12 G 2,5	20,9	390,0	756,0	14
22596	5 G 1	11,7	81,0	187,0	18	22620	18 G 2,5	24,2	607,0	1127,0	14
22597	7 G 1	13,4	114,0	240,0	18	22621	20 G 2,5	25,6	661,0	1210,0	14
22598	12 G 1	16,0	186,0	360,0	18	22622	25 G 2,5	29,1	796,0	1530,0	14
22599	18 G 1	18,5	254,0	498,0	18	22623	4 G 4	16,8	222,0	448,0	12
22600	20 G 1	19,4	322,0	568,0	18	22624	5 G 4	18,4	328,0	533,0	12
22601	25 G 1	21,7	377,0	670,0	18	22625	7 G 4	21,6	360,0	678,0	12
22602	30 G 1	22,5	429,0	774,0	18	22626	4 G 6	18,1	305,0	636,0	10
22603	36 G 1	24,3	516,0	895,0	18	22627	5 G 6	19,6	441,0	772,0	10
22884	41 G 1	26,1	610,0	1032,0	18	22628	7 G 6	23,2	505,0	1028,0	10
22885	50 G 1	28,4	690,0	1160,0	18	22629	4 G 10	22,5	485,0	1052,0	8
22886	65 G 1	32,2	852,0	1660,0	18	22630	5 G 10	24,7	610,0	1096,0	8
22604	2 x 1,5	10,2	64,0	145,0	16	22631	7 G 10	29,3	820,0	1530,0	8
22605	3 G 1,5	11,0	84,0	168,0	16	22632	4 G 16	25,7	840,0	1386,0	6
22606	4 G 1,5	11,6	99,0	217,0	16	22633	5 G 16	28,2	1050,0	1759,0	6
22607	5 G 1,5	12,6	129,0	235,0	16	22634	7 G 16	33,6	1510,0	2087,0	6
22608	7 G 1,5	14,5	148,0	325,0	16						

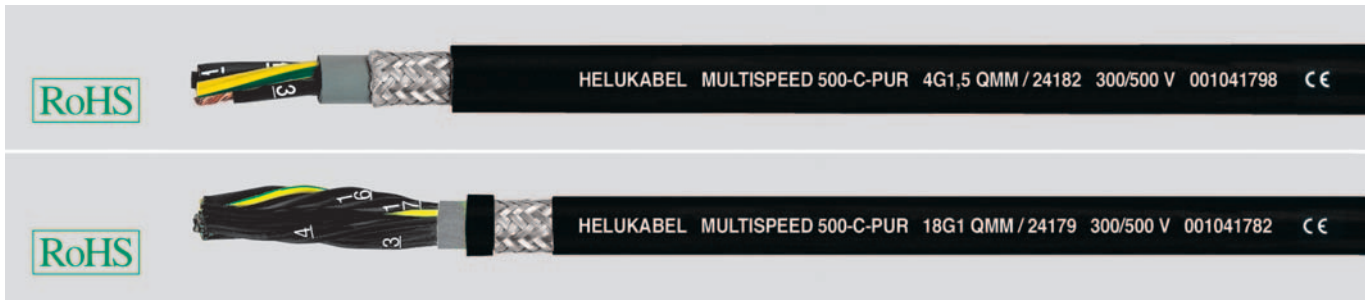
Dimensions and specifications may be changed without prior notice. (RC02)



Suitable Cable drag chains can be found in our Cable Accessories catalogue.

# MULTISPEED® 500-C-PUR

safety against high bending in drag chain systems, low torsion, halogen-free, EMC-preferred type, halogen-free, meter marking



## Technical data

- Special drag chain cables for high mechanical stress adapted to DIN VDE 0285-525-2-51 / DIN EN 50525-2-51 and DIN VDE 0285-525-2-21 / DIN EN 50525-2-21
- **Temperature range**  
flexing -30°C to +80°C  
fixed installation -40°C to +80°C
- **Nominal voltage**  $U_0/U$  300/500 V
- **Test voltage** 3000 V
- **Insulation resistance**  
min. 100 MOhm x km
- **Minimum bending radius**  
flexing 7,5x cable Ø  
fixed installation 4x cable Ø
- **Coupling resistant**  
max. 250 Ohm/km
- **Radiation resistance**  
up to 100x10<sup>6</sup> cJ/kg (up to 100 Mrad)

## Cable structure

- Bare copper, fine wire conductors, Unilay with short pitch length
- Core insulation of special PP
- Core identification black cores with continuous white numbering
- GN-YE conductor, 3 cores and above
- Stranding:  
<7 cores: cores stranded in a layer with optimal lay-length around a filler as per construction  
≥7 cores: cores stranded with optimal lay-length to bunch-construction with low torsion strength, optimal selected short lay-length around a filler
- Special-TPE inner sheath, extruded as filler with pressure, grey RAL 7001
- Tinned copper braided screen, coverage 85% max., with optimal pitch
- Fleece separator, ensure good dismantling ability
- Outer sheath of special PUR
- Sheath colour black (RAL 9005)
- with meter marking

## Properties

- Low adhesion
- High property of alternating bending strength
- High resistant to mechanical strain
- Long life durability due to low friction-resistance
- High tensile strength, abrasion- and impact resistance at low temperature
- Tear resistance
- High stability and oil resistance
- Better chemical resistance
- UV and ozone resistance
- Higher economical solution
- Reduced Ø, results low weight of moving materials
- The materials used in manufacture are cadmium-free and contain no silicone and free from substances harmful to the wetting properties of lacquers

## Note

- AWG sizes are approximate equivalent values. The actual cross-section is in mm<sup>2</sup>.
- G = with green-yellow conductor  
x = without green-yellow conductor (OZ)
- unscreened analogue type:  
**MULTISPEED® 500-PUR**, confer page 171

## Application

For permanent application in drag chains for long distances, high and low speed of movements. These cables are installed in dry, moist and wet rooms and in open air with free movement without tensile stress or forced movements. These robust and abrasion resistant special control cables are installed there, where the problems appear for the application in permanent stresses e. g. in energy drag chains. These cables are installed everywhere, where high requirements for the flexibility, abrasion, oxygen and chemical resistance are necessary. These screened cables are particularly suitable for the interference-free transmission in instrumentation and control engineering applications. For applications which go beyond standard solutions we recommend for our especially developed enquiry sheet for energy guiding systems.

**EMC** = Electromagnetic compatibility

To optimize the EMC features we recommend a large round contact of the copper braiding on both ends.

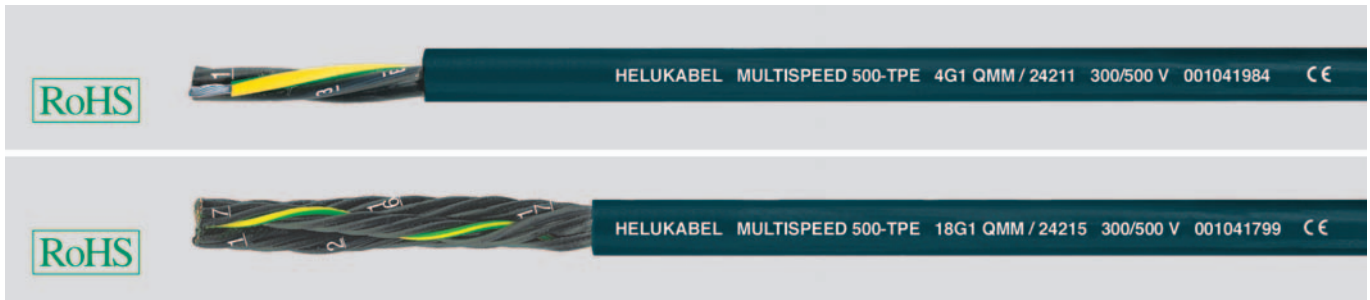
CE= The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
24156	2 x 0,5	6,4	30,0	90,0	20
24157	3 G 0,5	6,7	36,0	104,0	20
24158	4 G 0,5	7,2	42,0	118,0	20
24159	5 G 0,5	7,6	48,0	148,0	20
24160	7 G 0,5	11,4	64,0	184,0	20
24161	9 G 0,5	11,4	80,0	219,0	20
24162	12 G 0,5	12,4	105,0	276,0	20
24163	18 G 0,5	14,7	137,0	378,0	20
24164	25 G 0,5	17,1	210,0	547,0	20
24165	2 x 0,75	6,8	40,0	100,0	19
24166	3 G 0,75	7,3	48,0	117,0	19
24167	4 G 0,75	7,8	55,0	143,0	19
24168	5 G 0,75	8,3	66,0	167,0	19
24169	7 G 0,75	12,7	85,0	229,0	19
24170	12 G 0,75	13,7	135,0	319,0	19
24171	18 G 0,75	17,1	190,0	492,0	19
24172	25 G 0,75	19,5	275,0	659,0	19

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
24173	2 x 1	7,1	50,0	120,0	18
24174	3 G 1	7,6	59,0	140,0	18
24175	4 G 1	8,1	70,0	167,0	18
24176	5 G 1	8,9	84,0	201,0	18
24177	7 G 1	13,6	106,0	256,0	18
24178	12 G 1	14,6	174,0	417,0	18
24179	18 G 1	18,4	240,0	557,0	18
24180	25 G 1	21,0	332,0	766,0	18
24181	3 G 1,5	8,4	75,0	170,0	16
24182	4 G 1,5	9,1	90,0	204,0	16
24183	5 G 1,5	10,2	108,0	236,0	16
24184	7 G 1,5	15,7	157,0	309,0	16
24185	12 G 1,5	17,4	240,0	509,0	16
24186	18 G 1,5	21,3	355,0	718,0	16
24187	25 G 1,5	24,3	448,0	944,0	16
24188	4 G 2,5	11,2	134,0	280,0	14
24189	5 G 2,5	12,2	175,0	346,0	14
24190	7 G 2,5	19,7	229,0	410,0	14

Dimensions and specifications may be changed without prior notice. (RC02)

# MULTISPEED® 500-TPE high flexible, safety against high bending in drag chain systems, low torsion, halogen-free, meter marking



## Technical data

- Special drag chain cables for high mechanical stress adapted to DIN VDE 0285-525-2-51 / DIN EN 50525-2-51
- **Temperature range**  
flexing -30°C to +80°C  
fixed installation -40°C to +80°C
- **Nominal voltage**  $U_0/U$  300/500 V
- **Test voltage** 3000 V
- **Insulation resistance**  
min. 100 MΩ x km
- **Minimum bending radius**  
flexing 5x cable Ø  
fixed installation 3x cable Ø
- **Radiation resistance**  
up to 100x10<sup>6</sup> cJ/kg (up to 100 Mrad)

## Cable structure

- Tinned copper, fine wire conductors, Unilay with short pitch length
- Core insulation of special PP
- Core identification black cores with continuous white numbering
- GN-YE conductor, 3 cores and above
- Stranding:  
<7 cores: cores stranded in a layer with optimal lay-length around a filler as per construction  
≥7 cores: cores stranded with optimal lay-length to bunch-construction with low torsion strength, optimal selected short lay-length around a filler
- Outer sheath of special TPE-O extruded as filler with pressure
- Sheath colour ocean blue (RAL 5020)
- with meter marking
- **TPE:** The selected tinned copper wire conductor permits the installation in aggressive environments as well as hydrogen sulfide, ammonia and sulfur dioxide

## Properties

- Microbe-resistance - TPE
- Halogen-free
- Low adhesion
- High property of alternating bending strength
- High resistant to mechanical strain
- Long life durability due to low friction-resistance
- High tensile strength, abrasion- and impact resistance at low temperature
- Use in multi-shift operations under extremely high continuous bending loads
- Abrasion resistance
- Tear resistance
- High stability
- Oil resistance
- Better chemical resistance
- UV and ozone resistance
- Higher economical solution
- Reduced Ø, results low weight of moving materials
- The materials used in manufacture are cadmium-free and contain no silicone and free from substances harmful to the wetting properties of lacquers

## Note

- G = with green-yellow conductor  
x = without green-yellow conductor (OZ)
- Cleanroom qualification tested with analog type. Please note "cleanroom qualified" when ordering.
- screened analogue type:  
**MULTISPEED® 500-C-TPE**,  
confer page 179

## Application

For permanent application in drag chains for long distances, high and low speed of movements. These cables are installed in dry, moist and wet rooms and in open air with free movement without tensile stress or forced movements. These robust and abrasion resistant special control cables are installed there, where the problems appear for the application in permanent stresses e. g. in energy drag chains, industry robotics, production lines, automatic control systems and permanent movable machinery parts for multi-shift operation. For applications which go beyond standard solutions we recommend for our especially developed enquiry sheet for energy guiding systems. Before installation in cable trays please read the instructions. Further technical details see selection table for drag chain cables, see lead text.

CE = The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.	Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
24191	2 x 0,5	4,7	9,6	42,0	20	24199	2 x 0,75	5,0	14,4	47,0	19
24192	3 G 0,5	5,0	14,4	49,0	20	24200	3 G 0,75	5,2	21,6	55,0	19
24193	4 G 0,5	5,4	19,0	63,0	20	24201	4 G 0,75	6,0	29,0	70,0	19
24194	5 G 0,5	5,8	24,0	70,0	20	24202	5 G 0,75	6,5	36,0	74,0	19
24195	7 G 0,5	8,9	33,6	90,0	20	24203	7 G 0,75	10,3	50,0	95,0	19
24196	12 G 0,5	9,7	58,0	134,0	20	24204	12 G 0,75	11,0	86,0	174,0	19
24197	18 G 0,5	11,8	86,0	209,0	20	24205	18 G 0,75	13,9	130,0	261,0	19
24198	25 G 0,5	13,9	120,0	270,0	20	24206	25 G 0,75	15,9	180,0	290,0	19
						24207	36 G 0,75	19,6	260,0	419,0	19
						24208	42 G 0,75	21,5	302,0	614,0	19

Continuation ▶



# MULTISPEED® 500-TPE high flexible, safety against high bending in drag chain systems, low torsion, halogen-free, meter marking



Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
24209	2 x 1	5,2	19,2	50,0	18
24210	3 G 1	5,8	29,0	60,0	18
24211	4 G 1	6,3	38,0	74,0	18
24212	5 G 1	6,9	48,0	86,0	18
24213	7 G 1	11,1	67,0	114,0	18
24214	12 G 1	12,0	115,0	210,0	18
24215	18 G 1	14,8	173,0	291,0	18
24216	25 G 1	17,2	240,0	380,0	18
24043	41 G 1	22,0	394,0	510,0	18
24217	3 G 1,5	6,6	43,0	84,0	16
24218	4 G 1,5	7,2	58,0	108,0	16
24219	5 G 1,5	7,8	72,0	126,0	16
24220	7 G 1,5	13,0	101,0	169,0	16
24221	12 G 1,5	14,2	173,0	299,0	16
24222	18 G 1,5	17,5	259,0	460,0	16
24223	25 G 1,5	20,1	360,0	640,0	16

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
24224	4 G 2,5	8,8	96,0	179,0	14
24225	5 G 2,5	9,8	120,0	230,0	14
24226	7 G 2,5	16,1	168,0	294,0	14
24227	12 G 2,5	17,8	288,0	510,0	14
24228	18 G 2,5	21,8	432,0	722,0	14
24229	25 G 2,5	24,4	600,0	950,0	14
24230	4 G 4	10,3	154,0	197,0	12
24231	4 G 6	11,9	231,0	320,0	10
24232	5 G 6	13,4	289,0	394,0	10
24233	4 G 10	14,7	387,0	520,0	8
24234	4 G 16	20,0	517,0	784,0	6
24235	4 G 35	24,9	1344,0	1711,0	2

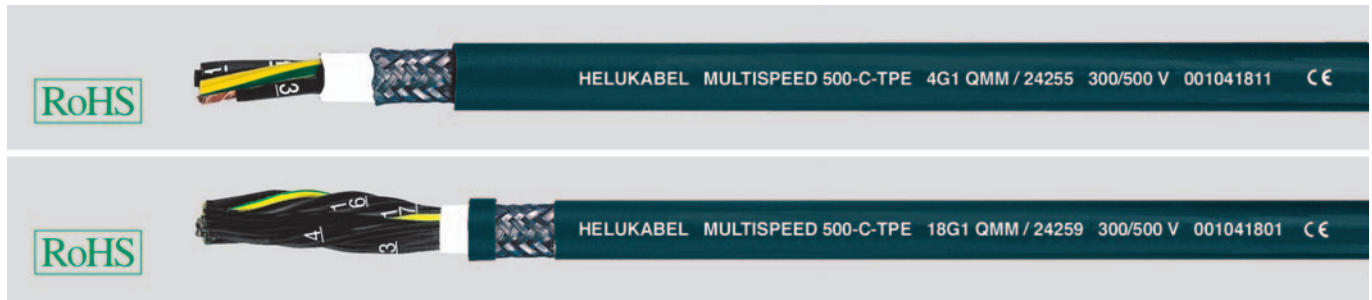
Dimensions and specifications may be changed without prior notice. (RC02)



Suitable Cable drag chains can be found in our Cable Accessories catalogue.

# MULTISPEED® 500-C-TPE

safety against high bending in drag chain systems, low torsion, halogen-free, EMC-preferred type, meter marking



## Technical data

- Special drag chain cables for high mechanical stress adapted to DIN VDE 0285-525-2-51 / DIN EN 50525-2-51
- **Temperature range**  
flexing -30°C to +80°C  
fixed installation -40°C to +80°C
- **Nominal voltage**  $U_0/U$  300/500 V
- **Test voltage** 3000 V
- **Insulation resistance**  
min. 100 MOhm x km
- **Minimum bending radius**  
flexing 5x cable Ø  
fixed installation 3x cable Ø
- **Coupling resistance**  
max. 250 Ohm x km
- **Radiation resistance**  
up to 100x10<sup>6</sup> cJ/kg (up to 100 Mrad)

## Cable structure

- Tinned copper, fine wire conductors, Unilay with short pitch length
- Core insulation of special PP
- Core identification black cores with continuous white numbering
- GN-YE conductor, 3 cores and above
- Stranding:  
<7 cores: cores stranded in a layer with optimal lay-length around a filler as per construction  
≥7 cores: cores stranded with optimal lay-length to bunch-construction with low torsion strength, optimal selected short lay-length around a filler
- Inner sheath of special-TPE, extruded as filler with pressure, natural colour
- Screen of Cu braid tinned, coverage 85% max., with optimal pitch
- Fleece separator, ensure good dismantling ability
- Outer sheath of special-TPE-O extruded as filler with pressure
- Sheath colour ocean blue (RAL 5020)
- with meter marking
- **TPE:** The selected tinned copper wire conductor permits the installation in aggressive environments as well as hydrogen sulfide, ammonia and sulfur dioxide

## Properties

- Microbe-resistance - TPE
- High property of alternating bending strength
- Long life durability due to low friction-resistance
- High tensile strength, abrasion- and impact resistance at low temperature
- Low adhesion, oil resistance
- Tear resistance
- Better chemical resistance
- UV and ozone resistance
- Reduced Ø, results low weight of moving materials
- The materials used in manufacture are cadmium-free and contain no silicone and free from substances harmful to the wetting properties of lacquers

## Note

- AWG sizes are approximate equivalent values. The actual cross-section is in mm<sup>2</sup>.
- G = with green-yellow conductor  
x = without green-yellow conductor (OZ)
- Please note the cleanroom qualification when ordering.  
For more information, see introduction
- unscreened analogue type:  
**MULTISPEED® 500-TPE**, confer page 177

## Application

For permanent application in drag chains for long distances, high and low speed of movements. These cables are installed in dry, moist and wet rooms and in open air with free movement without tensile stress or forced movements. These robust and abrasion resistant special control cables are installed there, where the problems appear for the application in permanent stresses e. g. in energy drag chains. These cables are installed everywhere, where high requirements for the flexibility, abrasion, oxygen and chemical resistance are necessary.

**EMC** = Electromagnetic compatibility

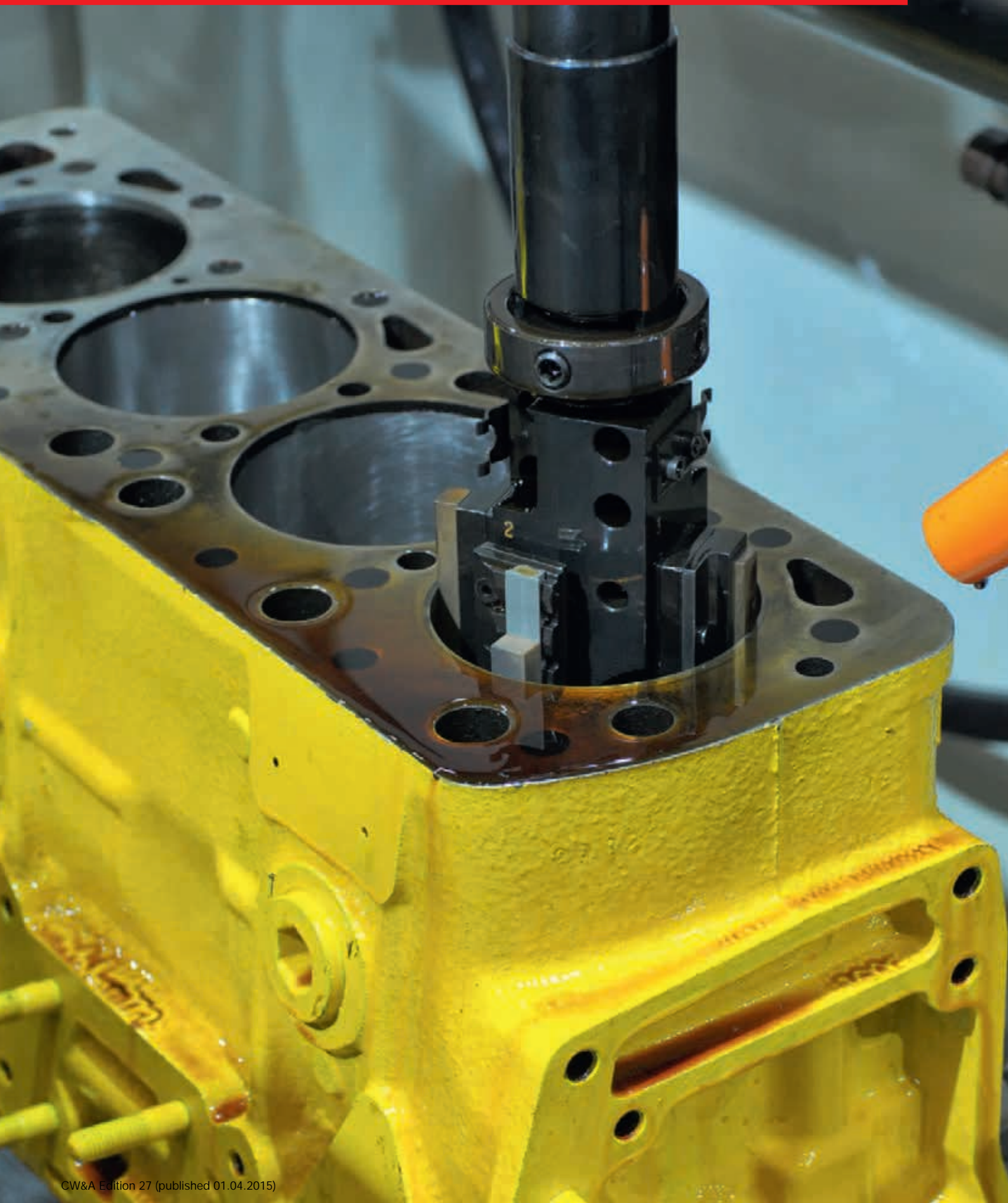
To optimize the EMC features we recommend a large round contact of the copper braiding on both ends.

CE = The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.	Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
24236	2 x 0,5	6,5	30,0	85,0	20	24255	4 G 1	8,1	70,0	160,0	18
24237	3 G 0,5	6,7	36,0	99,0	20	24256	5 G 1	8,9	84,0	195,0	18
24238	4 G 0,5	7,2	42,0	107,0	20	24257	7 G 1	13,6	106,0	247,0	18
24239	5 G 0,5	7,6	48,0	140,0	20	24258	12 G 1	14,8	174,0	411,0	18
24240	7 G 0,5	11,4	64,0	176,0	20	24259	18 G 1	18,4	240,0	547,0	18
24241	10 G 0,5	11,4	80,0	204,0	20	24260	25 G 1	21,0	332,0	754,0	18
24242	12 G 0,5	12,4	105,0	261,0	20	24261	3 G 1,5	8,4	75,0	160,0	16
24243	18 G 0,5	14,7	137,0	360,0	20	24262	4 G 1,5	9,2	90,0	194,0	16
24244	25 G 0,5	17,1	320,0	530,0	20	24263	5 G 1,5	10,2	108,0	220,0	16
24245	2 x 0,75	7,0	40,0	97,0	19	24264	7 G 1,5	15,7	157,0	294,0	16
24246	3 G 0,75	7,3	48,0	110,0	19	24265	12 G 1,5	17,4	240,0	490,0	16
24247	4 G 0,75	7,8	55,0	139,0	19	24266	18 G 1,5	21,3	355,0	704,0	16
24248	5 G 0,75	8,3	66,0	160,0	19	24267	25 G 1,5	24,3	448,0	930,0	16
24249	7 G 0,75	12,7	85,0	219,0	19	24268	4 G 2,5	11,2	134,0	260,0	14
24250	12 G 0,75	13,7	135,0	307,0	19	24269	5 G 2,5	12,2	175,0	330,0	14
24251	18 G 0,75	17,1	190,0	490,0	19	24270	7 G 2,5	19,5	229,0	406,0	14
24252	25 G 0,75	19,5	275,0	640,0	19	24271	12 G 2,5	21,7	390,0	990,0	14
24253	2 x 1	7,3	50,0	115,0	18	24272	4 G 4	13,6	194,0	355,0	12
24254	3 G 1	7,6	59,0	131,0	18						

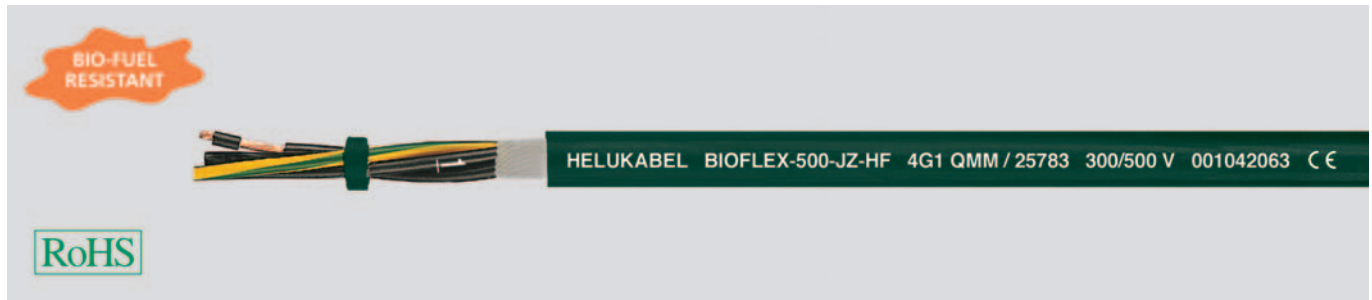
Dimensions and specifications may be changed without prior notice. (RC02)

BIO-OIL & MICROBE-RESISTANT CABLES  
DRAG CHAIN CABLES



# BIOFLEX-500®-JZ-HF

Bio-fuel resistant, abrasion resistant, recyclable  
environment friendly, bio-oil resistant<sup>1)</sup>, cable for drag chains, meter marking



## Technical data

- Bio-oil resistant, abrasion resistant special high flexible control cable adapted to DIN VDE 0285-525-1/DIN EN 50525-1
- **Temperature range**  
flexing -20°C to +80°C  
fixed installation -40°C to +80°C
- **Nominal voltage** U<sub>0</sub>/U 300/500 V
- **Test voltage** 3000 V
- **Insulation resistance**  
min. 20 MOhm x km
- **Minimum bending radius**  
flexing 10x cable Ø  
fixed installation 4x cable Ø
- **Radiation resistance**  
up to 100x10<sup>6</sup> cJ/kg (up to 100 Mrad)

## Cable structure

- Bare copper, extra fine wire conductors, bunch stranded to DIN VDE 0295 cl.6, BS 6360 cl.6 and IEC 60228 cl.6
- Core insulation of special polymer with improved sliding ability
- Core identification to DIN VDE 0293 black cores with continuous white numbering
- GN-YE conductor, 3 cores and above in the outer layer
- Cores stranded in layers with optimal selected lay-length
- Wrapping with fleece
- Outer sheath of special polymer compound
- Sheath colour dark green
- with meter marking

## Properties

- **Resistant to**  
Bio-fuel (diesel and petrol), highly resistant to biologically decomposable oils, Oxygene, Ozone, Hydrolysis and Microbes
- Low adhesion

## Note

- G = with green-yellow conductor  
x = without green-yellow conductor (OZ)
- AWG sizes are approximate equivalent values. The actual cross-section is in mm<sup>2</sup>.
- unscreened analogue type:  
**BIOFLEX-500®-JZ-HF-C**, confer page 182

## Application

HELUKABEL® BIOFLEX-500®-JZ-HF is an extremely robust and high flexible control cable with high abrasion and tear resistant properties. Due to its high resistance to Bio-fuel, Bio-oil and coolant emulsions. It is especially suited for use in the machine, tool making and plant industries as well as in the steel industry for difficult and problem areas. Suitable in combination with cable trays in dry, moist and wet rooms and outdoor installation. The high flexibility of this cable type makes it quick and easy to install. Suitable for outdoor lying. <sup>1)</sup> For the critical applications we advise for consultation. For applications which go beyond standard solutions we recommend for our especially developed enquiry sheet for energy guiding systems. Before installation in cable trays please read the instructions. Further technical details see selection table for drag chain cables, see lead text.

CE= The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

Part no.	No.cores x cross-sec. mm <sup>2</sup>	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
25761	2 x 0,5	5,4	9,6	45,0	20
25762	3 G 0,5	5,9	14,4	56,0	20
25763	4 G 0,5	6,3	19,1	69,0	20
25764	5 G 0,5	6,9	24,0	92,0	20
25765	7 G 0,5	7,8	33,6	126,0	20
25766	10 G 0,5	9,6	48,0	158,0	20
25767	12 G 0,5	10,3	58,0	176,0	20
25768	14 G 0,5	10,3	67,0	212,0	20
25769	18 G 0,5	11,5	86,4	283,0	20
25770	25 G 0,5	13,6	120,0	330,0	20
25771	2 x 0,75	5,9	14,4	57,0	19
25772	3 G 0,75	6,2	21,6	72,0	19
25773	4 G 0,75	6,7	29,0	97,0	19
25774	5 G 0,75	7,3	36,0	119,0	19
25775	7 G 0,75	8,7	50,0	165,0	19
25776	10 G 0,75	10,5	72,0	214,0	19
25777	12 G 0,75	11,0	86,0	247,0	19
25778	14 G 0,75	11,4	101,0	283,0	19
25779	18 G 0,75	12,6	130,0	356,0	19
25780	25 G 0,75	15,2	180,0	698,0	19
25781	2 x 1	6,6	19,0	64,0	18
25782	3 G 1	7,0	29,0	83,0	18
25783	4 G 1	7,6	38,5	113,0	18
25784	5 G 1	8,2	48,0	137,0	18
25785	7 G 1	9,6	67,0	191,0	18
25786	10 G 1	11,6	96,0	251,0	18
25787	12 G 1	12,0	115,0	294,0	18
25788	14 G 1	13,0	134,0	337,0	18
25789	18 G 1	14,5	173,0	420,0	18
25790	25 G 1	17,6	240,0	600,0	18
25791	2 x 1,5	7,1	29,0	90,0	16
25792	3 G 1,5	7,5	43,0	117,0	16
25793	4 G 1,5	8,2	58,0	147,0	16
25794	5 G 1,5	9,0	72,0	181,0	16
25795	7 G 1,5	10,8	101,0	274,0	16

Part no.	No.cores x cross-sec. mm <sup>2</sup>	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
25796	10 G 1,5	13,4	144,0	344,0	16
25797	12 G 1,5	13,4	173,0	391,0	16
25798	14 G 1,5	14,3	202,0	457,0	16
25799	18 G 1,5	16,0	259,0	589,0	16
25800	25 G 1,5	19,5	360,0	801,0	16
25801	2 x 2,5	8,6	48,0	128,0	14
25802	3 G 2,5	9,3	72,0	160,0	14
25803	4 G 2,5	10,3	96,0	200,0	14
25804	5 G 2,5	11,5	120,0	268,0	14
25805	7 G 2,5	13,4	168,0	357,0	14
25806	12 G 2,5	17,0	288,0	571,0	14
25807	14 G 2,5	18,5	336,0	612,0	14
25808	18 G 2,5	20,0	432,0	800,0	14
25809	25 G 2,5	29,6	600,0	1100,0	14
25810	2 x 4	10,4	77,0	190,0	12
25811	3 G 4	11,2	115,0	250,0	12
25812	4 G 4	12,5	154,0	320,0	12
25813	5 G 4	13,8	192,0	400,0	12
25814	3 G 6	13,0	173,0	350,0	10
25815	4 G 6	14,7	230,0	500,0	10
25816	5 G 6	16,0	288,0	580,0	10
25817	3 G 10	17,4	288,0	660,0	8
25819	5 G 10	21,3	480,0	990,0	8
25820	4 G 16	23,2	614,0	1200,0	6
25821	4 G 25	34,0	960,0	1700,0	4
25822	4 G 35	37,0	1344,0	2300,0	2
25823	4 G 50	44,0	1920,0	2500,0	1
25824	4 G 70	53,0	2688,0	4600,0	2/0
25825	4 G 95	59,0	3648,0	6400,0	3/0

Dimensions and specifications may be changed without prior notice. (RC03)



# BIOFLEX-500®-JZ-HF-C Biofuel-resistant, abrasion-resistant, recyclable, environmentally friendly, drag-chain cable, bio-oil resistant <sup>1)</sup>, meter marking



## Technical data

- Bio-oil resistant, abrasion resistant special high flexible control cable adapted to DIN VDE 0285-525-1 / DIN EN 50525-1
- **Temperature range**  
flexing -20°C to +80°C  
fixed installation -40°C to +80°C
- **Nominal voltage**  $U_0/U$  300/500 V
- **Test voltage** 3000 V
- **Insulation resistance**  
min. 20 MOhm x km
- **Minimum bending radius**  
flexing 15x cable  $\varnothing$   
fixed installation 4x cable  $\varnothing$
- **Coupling resistance**  
max. 250 Ohm/km
- **Radiation resistance**  
up to  $100 \times 10^6$  cJ/kg (up to 100 Mrad)

## Cable structure

- Bare copper, extra fine wire conductors, bunch stranded to DIN VDE 0295 cl.6, BS 6360 cl.6 and IEC 60228 cl.6
- Core insulation of special polymer with improved sliding ability
- Core identification to DIN VDE 0293 black cores with continuous white numbering
- GN-YE conductor, 3 cores and above in the outer layer
- Cores stranded in layers with optimal selected lay-length
- Wrapping with fleece
- Special inner sheath
- Copper braided screening approx. 85% coverage
- Wrapping with fleece guarantees a good dismantling
- Outer sheath of special polymer compound
- Sheath colour dark green
- with meter marking

## Properties

- **Resistant to**  
Bio-fuel (diesel and petrol), highly resistant to biologically decomposable oils, Oxygene, Ozone, Hydrolysis and Microbes
- Low adhesion

## Note

- G = with green-yellow conductor  
x = without green-yellow conductor (OZ)
- AWG sizes are approximate equivalent values. The actual cross-section is in mm<sup>2</sup>.
- unscreened analogue type:  
**BIOFLEX-500®-JZ-HF**, confer page 181

## Application

HELUKABEL® BIOFLEX-500®-JZ-HF-C is an extremely robust and high flexible control cable with high abrasion and tear resistant properties. Due to its high resistance to Bio-fuel, Bio-oil and coolant emulsions. It is especially suited for use in the machine, tool making and plant industries as well as in the steel industry for difficult and problem areas. Suitable in combination with cable trays in dry, moist and wet rooms and outdoor installation. The high flexibility of this cable type makes it quick and easy to install. Suitable for outdoor lying. These screened cables are particularly suitable for the interference-free transmission in instrumentation and control engineering applications (electromagnetic compatibility). For the critical applications we advise for consultation. For applications which go beyond standard solutions (for example for composting appliances or high shelf conveyors with extremely high processing speeds etc.) we recommend for our especially developed enquiry sheet for energy guiding systems. Before installation in cable trays please read the instructions. Further technical details see selection table for drag chain cables, see lead text.

**EMC** = Electromagnetic compatibility

To optimize the EMC features we recommend a large round contact of the copper braiding on both ends.

CE = The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer $\varnothing$ approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.	Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer $\varnothing$ approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
25826	2 x 0,5	7,5	47,0	90,0	20	25849	5 G 1	11,8	99,0	188,0	18
25827	3 G 0,5	7,8	52,0	104,0	20	25850	7 G 1	12,7	125,0	235,0	18
25828	4 G 0,5	8,2	55,0	123,0	20	25851	10 G 1	14,6	178,0	340,0	18
25829	5 G 0,5	9,9	65,0	131,0	20	25852	12 G 1	15,5	186,0	358,0	18
25830	7 G 0,5	10,0	84,0	172,0	20	25853	14 G 1	16,7	250,0	415,0	18
25831	10 G 0,5	11,3	115,0	230,0	20	25854	18 G 1	18,0	280,0	500,0	18
25832	12 G 0,5	12,5	117,0	250,0	20	25855	25 G 1	21,0	378,0	678,0	18
25833	14 G 0,5	13,2	148,0	280,0	20	25856	2 x 1,5	10,5	79,0	141,0	16
25834	18 G 0,5	14,5	157,0	321,0	20	25857	3 G 1,5	10,8	94,0	164,0	16
25835	25 G 0,5	16,8	227,0	445,0	20	25858	4 G 1,5	11,5	113,0	220,0	16
25836	2 x 0,75	8,3	53,0	106,0	19	25859	5 G 1,5	12,5	129,0	233,0	16
25837	3 G 0,75	8,5	62,0	120,0	19	25860	7 G 1,5	13,2	170,0	323,0	16
25838	4 G 0,75	9,5	77,0	150,0	19	25861	8 G 1,5	14,4	226,0	369,0	16
25839	5 G 0,75	10,8	86,0	158,0	19	25862	10 G 1,5	14,9	258,0	461,0	16
25840	7 G 0,75	11,5	107,0	205,0	19	25863	12 G 1,5	16,2	280,0	481,0	16
25841	10 G 0,75	13,1	148,0	290,0	19	25864	14 G 1,5	18,1	340,0	561,0	16
25842	12 G 0,75	14,0	156,0	304,0	19	25865	18 G 1,5	20,3	395,0	672,0	16
25843	14 G 0,75	15,3	214,0	380,0	19	25866	21 G 1,5	21,7	461,0	780,0	16
25844	18 G 0,75	17,3	235,0	418,0	19	25867	25 G 1,5	23,1	533,0	927,0	16
25845	25 G 0,75	18,7	313,0	578,0	19	25868	2 x 2,5	11,8	96,0	185,0	14
25846	2 x 1	10,0	60,0	116,0	18	25869	3 G 2,5	13,0	150,0	278,0	14
25847	3 G 1	10,2	70,0	135,0	18	25870	4 G 2,5	14,0	174,0	370,0	14
25848	4 G 1	11,0	86,0	178,0	18	25871	5 G 2,5	15,1	200,0	412,0	14

Continuation ▶

# BIOFLEX-500®-JZ-HF-C Biofuel-resistant, abrasion-resistant, recyclable, environmentally friendly, drag-chain cable, bio-oil resistant <sup>1)</sup>, meter marking



Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
25872	7 G 2,5	16,2	240,0	470,0	14
25873	12 G 2,5	21,0	410,0	738,0	14
25874	14 G 2,5	23,4	480,0	870,0	14
25875	18 G 2,5	25,7	620,0	1100,0	14
25876	25 G 2,5	31,0	821,0	1512,0	14
25877	2 x 4	13,4	135,0	235,0	12
25878	3 G 4	15,8	178,0	350,0	12
25879	4 G 4	17,3	222,0	460,0	12
25880	5 G 4	19,0	328,0	550,0	12

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
25881	3 G 6	19,5	250,0	525,0	10
25882	4 G 6	21,0	305,0	700,0	10
25883	5 G 6	23,0	441,0	800,0	10
25884	3 G 10	18,8	370,0	855,0	8
25885	4 G 10	25,0	485,0	1140,0	8
25886	5 G 10	26,4	610,0	1310,0	8
25887	4 G 16	28,0	840,0	1391,0	6

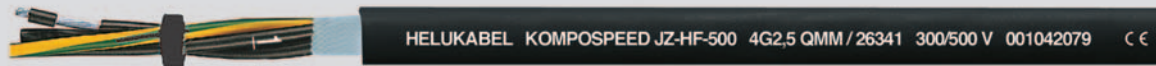
Dimensions and specifications may be changed without prior notice. (RC03)



Suitable Cable drag chains can be found in our Cable Accessories catalogue.

C

# KOMPOSPEED® JZ-HF-500 halogen-free, microbes resistant, cable for drag chains, meter marking



## Technical data

- Microbes resistant, halogen-free special control cable adapted to DIN VDE 0285-525-2-51 / DIN EN 50525-2-51
- **Temperature range**  
flexing -30°C to +90°C  
fixed installation -40°C to +100°C
- **Nominal voltage**  $U_0/U$  300/500 V
- **Test voltage** 3000 V
- **Insulation resistance**  
min. 20 MOhm x km
- **Minimum bending radius**  
flexing 7,5x cable Ø
- **Radiation resistance**  
up to  $100 \times 10^6$  cJ/kg (up to 100 Mrad)

## Cable structure

- Tinned copper, extra fine wire conductors, bunch stranded to DIN VDE 0295 cl.6, BS 6360 cl.6 and IEC 60228 cl.6
- Core insulation of special thermoplastic polymer with improved sliding ability
- Core identification to DIN VDE 0293 black cores with continuous white numbering
- GN-YE conductor, 3 cores and above in the outer layer
- Cores stranded in layers with optimal selected lay-length
- Wrapping with fleece over the stranded layers
- Outer sheath of special thermoplastic polymer
- Sheath colour black (RAL 9005)
- with meter marking

## Properties

- **Resistant to**  
UV-radiation  
Oxygene  
Ozone  
Microbes  
Hydrofluoric acid  
Hydrochloric acid  
and diluted sulfuric acid
- Low adhesion
- The materials used in manufacture are cadmium-free and contain no silicone and free from substances harmful to the wetting properties of lacquers

## Note

- G = with green-yellow conductor  
x = without green-yellow conductor (OZ)
- AWG sizes are approximate equivalent values. The actual cross-section is in mm<sup>2</sup>.

## Application

HELUKABEL® KOMPOSPEED® JZ-HF-500 control cable is significant due to its resistance against microbes. This cable is specially installed in rubbish, sewage-treatment plants, composting works, animal stalls and greenhouses. Suitable for installation for flexible use for medium mechanical, stresses with free movement without tensile stress or forced movements in dry, moist and wet rooms as well as outside. The high flexibility of this cable type makes it quick and easy to install. For applications which go beyond standard solutions (for example for composting appliances or high shelf conveyors with extremely high processing speeds etc.) we recommend for our especially developed enquiry sheet for energy guiding systems. Before installation in cable trays please read the instructions. Further technical details see selection table for drag chain cables, see lead text.

CE= The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

Part no.	No.cores x cross-sec. mm <sup>2</sup>	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
26307	2 x 0,5	5,0	9,6	42,0	20
26308	3 G 0,5	5,3	14,4	51,0	20
26309	4 G 0,5	5,7	19,1	62,0	20
26310	5 G 0,5	6,4	24,0	88,0	20
26311	7 G 0,5	7,5	33,6	119,0	20
26312	12 G 0,5	9,2	58,0	166,0	20
26313	18 G 0,5	11,1	86,4	273,0	20
26314	25 G 0,5	13,4	120,0	330,0	20
26315	2 x 0,75	5,4	14,4	53,0	19
26316	3 G 0,75	5,7	21,6	70,0	19
26317	4 G 0,75	6,4	29,0	92,0	19
26318	5 G 0,75	7,0	36,0	116,0	19
26319	7 G 0,75	8,3	50,0	159,0	19
26320	12 G 0,75	10,2	86,0	241,0	19
26321	18 G 0,75	12,1	130,0	346,0	19
26322	25 G 0,75	14,9	180,0	681,0	19
26323	2 x 1	5,7	19,2	60,0	18
26324	3 G 1	6,0	29,0	79,0	18
26325	4 G 1	6,8	38,5	107,0	18
26326	5 G 1	7,4	48,0	127,0	18
26327	7 G 1	8,8	67,0	181,0	18
26328	12 G 1	10,8	115,0	284,0	18
26329	18 G 1	13,0	173,0	397,0	18
26330	25 G 1	15,8	240,0	491,0	18

Part no.	No.cores x cross-sec. mm <sup>2</sup>	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
26331	2 x 1,5	6,4	29,0	88,0	16
26332	3 G 1,5	6,8	43,0	104,0	16
26333	4 G 1,5	7,4	58,0	137,0	16
26334	5 G 1,5	8,3	72,0	171,0	16
26335	7 G 1,5	9,9	101,0	264,0	16
26336	12 G 1,5	12,1	173,0	381,0	16
26337	18 G 1,5	14,5	259,0	579,0	16
26338	25 G 1,5	17,8	360,0	789,0	16
26339	2 x 2,5	7,7	48,0	118,0	14
26340	3 G 2,5	8,4	72,0	172,0	14
26341	4 G 2,5	9,1	96,0	197,0	14
26342	5 G 2,5	10,2	120,0	258,0	14
26343	7 G 2,5	12,2	168,0	347,0	14
26344	12 G 2,5	15,2	288,0	561,0	14
26345	18 G 2,5	18,1	432,0	791,0	14
26346	25 G 2,5	22,5	600,0	1090,0	14

Dimensions and specifications may be changed without prior notice. (RC03)



Suitable Cable drag chains can be found in our Cable Accessories catalogue.

# KOMPOSPEED® JZ-HF-500-C halogen-free, microbes resistant, Cu-screened, EMC-preferred type, cable for drag chains, meter marking



## Technical data

- Screened microbes resistant, halogen-free special control cable in adapted to DIN VDE 0285-525-2-51 / DIN EN 50525-2-51
- **Temperature range**  
flexing -30°C to +90°C  
fixed installation -40°C to +100°C
- **Nominal voltage**  $U_0/U$  300/500 V
- **Test voltage**  
core/core 4000 V  
core/screen 2000 V
- **Insulation resistance**  
min. 20 MOhm x km
- **Minimum bending radius**  
flexing 7,5x cable  $\varnothing$
- **Coupling resistance**  
max. 250 Ohm/km
- **Radiation resistance**  
up to  $100 \times 10^6$  cJ/kg (up to 100 Mrad)

## Cable structure

- Tinned copper, extra fine wire conductors, bunch stranded to DIN VDE 0295 cl.6, BS 6360 cl.6 and IEC 60228 cl.6
- Core insulation of Special thermoplastic polymer with improved sliding ability
- Core identification to DIN VDE 0293 black cores with continuous white numbering
- GN-YE conductor, 3 cores and above in the outer layer
- Cores stranded in layers with optimal selected lay-length
- Wrapping with fleece
- Inner-sheath with special thermoplastic polymer
- Screen of tinned copper braid, coverage approx. 85%
- Wrapping of fleece guarantees a good dismantling
- Outer sheath of special thermoplastic polymer
- Sheath colour black (RAL 9005)
- with meter marking

## Properties

- **Resistant to**  
UV-radiation  
Oxygene  
Ozone  
Microbes  
Hydrofluoric acid  
Hydrochloric acid  
and diluted sulfuric acid
- Low adhesion
- The materials used in manufacture are cadmium-free and contain no silicone and free from substances harmful to the wetting properties of lacquers

## Note

- G = with green-yellow conductor  
x = without green-yellow conductor (OZ)
- AWG sizes are approximate equivalent values. The actual cross-section is in mm<sup>2</sup>.

## Application

HELUKABEL® KOMPOSPEED® JZ-HF-500-C control cable is significant due to its resistance against microbes. This cable is specially installed in rubbish, sewage-treatment plants, composting works, animal stalls and greenhouses. The inner sheaths of those cables raise the mechanical stress. For medium mechanical, stresses with free movement without tensile stress or forced movements in dry, moist and wet rooms as well as outside. This screened cable is ideal for use in data signal transmission free from interferences for measurement and control engineering technology. For applications which go beyond standard solutions (for example for composting appliances or high shelf conveyors with extremely high processing speeds etc.) we recommend for our especially developed enquiry sheet for energy guiding systems. Before installation in cable trays please read the instructions. Further technical details see selection table for drag chain cables, see lead text.

**EMC** = Electromagnetic compatibility

To optimize the EMC features we recommend a large round contact of the copper braiding on both ends.

**CE** = The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer $\varnothing$ approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
26347	2 x 0,5	6,9	47,0	90,0	20
26348	3 G 0,5	7,2	52,0	101,0	20
26349	4 G 0,5	7,8	55,0	119,0	20
26350	5 G 0,5	8,3	65,0	121,0	20
26351	6 G 0,5	9,1	70,0	144,0	20
26352	7 G 0,5	9,6	84,0	169,0	20
26353	12 G 0,5	11,3	117,0	250,0	20
26354	18 G 0,5	13,5	157,0	321,0	20
26355	25 G 0,5	15,8	227,0	445,0	20
26356	2 x 0,75	7,3	53,0	106,0	19
26357	3 G 0,75	7,8	62,0	116,0	19
26358	4 G 0,75	8,3	77,0	140,0	19
26359	5 G 0,75	9,1	86,0	148,0	19
26360	7 G 0,75	10,2	107,0	198,0	19
26361	12 G 0,75	12,6	156,0	294,0	19
26362	18 G 0,75	14,5	235,0	391,0	19
26363	25 G 0,75	17,3	313,0	562,0	19
26364	2 x 1	7,8	60,0	110,0	18
26365	3 G 1	8,1	70,0	131,0	18
26366	4 G 1	8,7	86,0	171,0	18

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer $\varnothing$ approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
26367	5 G 1	9,5	99,0	179,0	18
26368	7 G 1	10,9	125,0	229,0	18
26369	12 G 1	13,1	186,0	348,0	18
26370	18 G 1	15,4	280,0	498,0	18
26371	25 G 1	18,6	378,0	669,0	18
26372	2 x 1,5	8,3	79,0	141,0	16
26373	3 G 1,5	8,7	94,0	162,0	16
26374	4 G 1,5	9,5	113,0	210,0	16
26375	5 G 1,5	10,2	129,0	233,0	16
26376	7 G 1,5	12,2	170,0	317,0	16
26377	12 G 1,5	14,5	280,0	471,0	16
26378	18 G 1,5	16,9	395,0	664,0	16
26379	25 G 1,5	20,6	533,0	914,0	16
26380	2 x 2,5	9,8	96,0	182,0	14
26381	3 G 2,5	10,5	150,0	264,0	14
26382	4 G 2,5	11,2	174,0	350,0	14
26383	5 G 2,5	12,6	200,0	394,0	14
26384	7 G 2,5	14,8	240,0	450,0	14
26385	12 G 2,5	18,0	410,0	712,0	14

Dimensions and specifications may be changed without prior notice. (RC03)



# DATA DRAG CHAIN CABLES



**SUPERTRONIC®-PVC** special cable for drag chains, meter marking

HELUKABEL SUPERTRONIC-PVC 4x0,25 QMM / 49563 350 V 001041714

CE

**Technical data**

- Special PVC cable for drag chains, adapted to DIN VDE 0285-525-1 / DIN EN 50525-1
- Very high flexible due to special construction
- **Temperature range**  
flexing -5°C to +70°C  
fixed installation -40°C to +70°C
- **Nominal voltage** 350 V
- **Test voltage** 1500 V
- **Breakdown voltage** min. 3000 V
- **Insulation resistance**  
min. 20 MOhm x km
- **Minimum bending radius**  
flexing 5x cable Ø  
fixed installation 3x cable Ø
- **Radiation resistance**  
up to 80x10<sup>6</sup> cJ/kg (up to 80 Mrad)

**Cable structure**

- Bare copper, extra fine wire conductors, to DIN VDE 0295 cl.6
- Core insulation of special PVC compound type TI2 to DIN VDE 0207-363-3 / DIN EN 50363-3
- Cores colour coded to DIN 47100, see Technical Informations
- Cores stranded in layers with optimal selected lay-length
- Core wrapping with textile tape
- Outer sheath of special PVC compound type TM2 to DIN VDE 0207-363-4-1 / DIN EN 50363-4-1
- Colour grey (RAL 7001)
- with meter marking

**Properties**

- Extensively oil resistant  
Chemical Resistance - see table Technical Informations
- Adhesion-low
- The materials used in manufacture are cadmium-free and contain no silicone and free from substances harmful to the wetting properties of lacquers

**Tests**

- PVC self-extinguishing and flame retardant acc. to DIN VDE 0482-332-1-2, DIN EN 60332-1-2, IEC 60332-1 (equivalent DIN VDE 0472 part 804 test method B)

**Note**

- AWG sizes are approximate equivalent values. The actual cross-section is in mm<sup>2</sup>.

**Application**

The ideal cable for use in cable trays. This high flexible cable is ideal for all areas requiring a high and fast flexing cable including the machine industries, robotics and all areas of highly mobile machine parts. The long working life offers a secure performance as well as economy. For applications which go beyond standard solutions (for example for composting appliances or high shelf conveyors with extremely high processing speeds etc.) we recommend for our especially developed enquiry sheet for energy guiding systems. Before installation in cable trays please read the instructions. Further technical details see selection table for drag chain cables, see lead text.

CE= The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
49550	2 x 0,14	3,5	2,8	23,0	26
49551	3 x 0,14	3,7	4,1	25,0	26
49552	4 x 0,14	3,9	5,6	30,0	26
49553	5 x 0,14	4,2	7,0	35,0	26
49554	7 x 0,14	4,8	9,8	49,0	26
49555	10 x 0,14	6,2	14,0	64,0	26
49556	12 x 0,14	6,3	16,8	71,0	26
49557	14 x 0,14	6,6	19,6	77,0	26
49558	18 x 0,14	7,2	25,2	90,0	26
49559	24 x 0,14	8,5	33,6	119,0	26
49560	25 x 0,14	8,6	35,0	124,0	26
49561	2 x 0,25	4,2	5,0	28,0	24
49562	3 x 0,25	4,4	7,5	33,0	24
49563	4 x 0,25	4,7	10,0	39,0	24
49564	5 x 0,25	5,6	12,5	50,0	24
49565	7 x 0,25	6,1	17,5	63,0	24
49566	10 x 0,25	7,2	25,0	83,0	24

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
49567	12 x 0,25	7,5	30,1	95,0	24
49568	14 x 0,25	7,9	35,0	107,0	24
49569	18 x 0,25	8,9	45,0	130,0	24
49570	24 x 0,25	10,4	60,0	170,0	24
49571	25 x 0,25	10,5	62,5	177,0	24
49572	2 x 0,34	4,6	6,8	33,0	22
49573	3 x 0,34	4,8	10,2	42,0	22
49574	4 x 0,34	5,2	13,6	56,0	22
49575	5 x 0,34	6,1	17,0	64,0	22
49576	7 x 0,34	7,0	23,8	84,0	22
49577	10 x 0,34	8,4	34,0	116,0	22
49578	12 x 0,34	8,5	40,8	133,0	22
49579	14 x 0,34	9,0	47,6	150,0	22
49580	18 x 0,34	10,1	61,2	182,0	22
49581	24 x 0,34	12,0	81,5	240,0	22
49582	25 x 0,34	12,2	85,0	250,0	22

Dimensions and specifications may be changed without prior notice. (RC03)



Suitable Cable drag chains can be found in our Cable Accessories catalogue.

**SUPERTRONIC®-C-PVC** special cable for drag chains, EMC-preferred

type, meter marking



HELUKABEL SUPERTRONIC-C-PVC 4x0,25 QMM / 49633 350 V 001041716

CE

**Technical data**

- Special PVC cable for drag chains, adapted to DIN VDE 0285-525-1 / DIN EN 50525-1
- Very high flexible due to special construction
- **Temperature range**  
flexing -5°C to +70°C  
fixed installation -40°C to +70°C
- **Nominal voltage** 350 V
- **Test voltage** 1500 V
- **Breakdown voltage** min. 3000 V
- **Insulation resistance**  
min. 20 MOhm x km
- **Minimum bending radius**  
flexing 7,5x cable Ø  
fixed installation 4x cable Ø
- **Radiation resistance**  
up to 80x10<sup>6</sup> cJ/kg (up to 80 Mrad)
- **Coupling resistance**  
max. 250 Ohm/km

**Cable structure**

- Bare copper, extra fine wire conductors, to DIN VDE 0295 cl.6
- Core insulation of special PVC compound type T12 to DIN VDE 0207-363-3 / DIN EN 50363-3
- Cores colour coded to DIN 47100, see Technical Informations
- Cores stranded in layers with optimal selected lay-length
- Core wrapping with textile tape
- Tinned copper braided screen, approx. 85% coverage
- Outer sheath of special PVC compound type TM2 to DIN VDE 0207-363-4-1 / DIN EN 50363-4-1
- Sheath colour grey (RAL 7001)
- with meter marking

**Properties**

- Extensively oil resistant
- Chemical Resistance - see table Technical Informations
- Adhesion-low
- The materials used in manufacture are cadmium-free and contain no silicone and free from substances harmful to the wetting properties of lacquers

**Tests**

- PVC self-extinguishing and flame retardant acc. to DIN VDE 0482-332-1-2, DIN EN 60332-1-2, IEC 60332-1 (equivalent DIN VDE 0472 part 804 test method B)

**Note**

- AWG sizes are approximate equivalent values. The actual cross-section is in mm<sup>2</sup>.

**Application**

The ideal cable for use in cable trays. This high flexible cable is ideal for all areas requiring a high and fast flexing cable including the machine industries, robotics and all areas of highly mobile machine parts. The long working life offers a secure performance as well as economy. For applications which go beyond standard solutions (for example for composting appliances or high shelf conveyors with extremely high processing speeds etc.) we recommend for our especially developed enquiry sheet for energy guiding systems. Before installation in cable trays please read the instructions. Further technical details see selection table for drag chain cables, see lead text.

**EMC** = Electromagnetic compatibility

To optimize the EMC features we recommend a large round contact of the copper braiding on both ends.

CE = The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
49620	2 x 0,14	4,0	11,2	33,0	26
49621	3 x 0,14	4,2	14,1	36,0	26
49622	4 x 0,14	4,4	15,5	41,0	26
49623	5 x 0,14	4,7	18,3	46,0	26
49624	7 x 0,14	5,3	27,6	70,0	26
49625	10 x 0,14	6,7	39,3	88,0	26
49626	12 x 0,14	6,8	41,1	97,0	26
49627	14 x 0,14	7,1	45,3	105,0	26
49628	18 x 0,14	7,7	54,1	122,0	26
49629	24 x 0,14	9,0	66,3	156,0	26
49630	25 x 0,14	9,1	68,4	162,0	26
49631	2 x 0,25	4,7	14,9	39,0	24
49632	3 x 0,25	4,9	18,8	45,0	24
49633	4 x 0,25	5,2	21,3	52,0	24
49634	5 x 0,25	5,6	31,0	70,0	24
49635	7 x 0,25	6,7	39,6	88,0	24
49636	10 x 0,25	7,8	53,9	114,0	24
49637	12 x 0,25	8,1	59,1	128,0	24

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
49638	14 x 0,25	8,5	64,2	140,0	24
49639	18 x 0,25	9,5	78,4	166,0	24
49640	24 x 0,25	11,0	89,9	210,0	24
49641	25 x 0,25	11,1	101,0	220,0	24
49642	2 x 0,34	5,2	16,1	46,0	22
49643	3 x 0,34	5,4	28,7	62,0	22
49644	4 x 0,34	5,8	35,7	80,0	22
49645	5 x 0,34	6,7	39,1	88,0	22
49646	7 x 0,34	7,6	52,7	116,0	22
49647	10 x 0,34	9,0	67,4	156,0	22
49648	12 x 0,34	9,1	76,4	167,0	22
49649	14 x 0,34	9,6	85,3	195,0	22
49650	18 x 0,34	10,7	99,7	225,0	22
49651	24 x 0,34	12,6	147,1	312,0	22
49652	25 x 0,34	12,8	155,0	325,0	22

Dimensions and specifications may be changed without prior notice. (RC03)



Suitable Cable drag chains can be found in our Cable Accessories catalogue.



**SUPERTRONIC®-PURö** special cable for drag chains, meter marking

HELUKABEL SUPERTRONIC-PURö 4x0,25 QMM / 49596 350 V 001042052

CE

**Technical data**

- Special PUR drag chain cables adapted to DIN VDE 0285-525-2-51 / DIN EN 50525-2-51
- Very high flexible due to special construction
- **Temperature range**  
flexing -5°C to +70°C  
fixed installation -40°C to +70°C
- **Nominal voltage** 350 V
- **Test voltage** 1500 V
- **Breakdown voltage** min. 3000 V
- **Insulation resistance**  
min. 20 MOhm x km
- **Minimum bending radius**  
flexing 5x cable Ø  
fixed installation 3x cable Ø
- **Radiation resistance**  
up to 100x10<sup>6</sup> cJ/kg (up to 100 Mrad)

**Cable structure**

- Bare copper, extra fine wire conductors, to DIN VDE 0295 cl.6, col. 4 and 5 and IEC 60228 cl.6
- **Oil resistant** PVC core insulation TI2, in adapted to DIN VDE 0207-363-3 / DIN EN 50363-3, for better sliding abilities
- Cores are stranded in layer with short lay-length
- Cores colour coded to DIN 47100
- Core wrapping with textile tape
- Outer sheath of special **full-polyurethane** TMPU to DIN VDE 0207-363-10-2 / DIN EN 50363-10-2
- Sheath colour grey (RAL 7001), surface mat
- with meter marking

**Properties**

- **Features**  
High flexibility at low temperature, high abrasion resistance, break and cut-resistant, tear resistant
- **Resistant to**  
UV-radiation, Oxygen, Ozone, Hydrolyse, Oil.
- **Conditional resistant to**  
Microbes, Hydraulic liquidity, Alkalis, Lye.
- The PUR outer sheath is extremely robust with high tear, abrasion and oil-resistance.
- Adhesion-low
- The materials used in manufacture are cadmium-free and contain no silicone and free from substances harmful to the wetting properties of lacquers

**Note**

- AWG sizes are approximate equivalent values. The actual cross-section is in mm<sup>2</sup>.

**Application**

Perfect for use with cable trays. This highly flexible PUR control cable is ideal for use wherever frequent high flexing motion is required, e. g. in robotics or all moving parts. The long working life of this cable makes it both efficient and economic. For applications which go beyond standard solutions (for example for composting appliances or high shelf conveyors with extremely high processing speeds etc.) we recommend for our especially developed enquiry sheet for energy guiding systems. Before installation in cable trays please read the instructions. Further technical details see selection table for drag chain cables, see lead text.

CE= The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

Part no.	No.cores x cross-sec. mm <sup>2</sup>	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.	Part no.	No.cores x cross-sec. mm <sup>2</sup>	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
49583	2 x 0,14	3,5	2,8	22,0	26	49600	12 x 0,25	7,6	30,1	91,0	24
49584	3 x 0,14	3,7	4,1	24,0	26	49601	14 x 0,25	7,9	35,0	102,0	24
49585	4 x 0,14	3,9	5,6	29,0	26	49602	18 x 0,25	8,9	45,0	125,0	24
49586	5 x 0,14	4,2	7,0	33,0	26	49603	24 x 0,25	10,0	60,0	163,0	24
49587	7 x 0,14	4,9	9,8	47,0	26	49604	25 x 0,25	10,6	62,5	170,0	24
49588	10 x 0,14	6,2	14,0	59,0	26	49605	2 x 0,34	4,5	6,8	32,0	22
49589	12 x 0,14	6,4	16,8	67,0	26	49606	3 x 0,34	4,9	10,2	40,0	22
49590	14 x 0,14	6,6	19,6	74,0	26	49607	4 x 0,34	5,3	13,6	55,0	22
49591	18 x 0,14	7,3	25,2	86,0	26	49608	5 x 0,34	5,8	17,0	60,0	22
49592	24 x 0,14	8,5	33,6	115,0	26	49609	7 x 0,34	6,9	23,8	80,0	22
49593	25 x 0,14	8,6	35,0	120,0	26	49610	10 x 0,34	8,4	34,0	112,0	22
49594	2 x 0,25	4,1	5,0	27,0	24	49611	12 x 0,34	8,6	40,8	127,0	22
49595	3 x 0,25	4,3	7,5	33,0	24	49612	14 x 0,34	9,0	47,6	142,0	22
49596	4 x 0,25	4,8	10,0	40,0	24	49613	18 x 0,34	10,1	61,2	175,0	22
49597	5 x 0,25	5,2	12,5	48,0	24	49614	24 x 0,34	12,0	81,5	229,0	22
49598	7 x 0,25	6,2	17,5	60,0	24	49615	25 x 0,34	12,2	85,0	238,0	22
49599	10 x 0,25	7,4	25,0	79,0	24						

Dimensions and specifications may be changed without prior notice. (RC03)



Suitable Cable drag chains can be found in our Cable Accessories catalogue.

# SUPERTRONIC®-C-PURÖ special cable for drag chains, halogen-free, EMC-preferred type, meter marking



HELUKABEL SUPERTRONIC-C-PURÖ 4x0,25 QMM / 49666 500 V 001042077

CE



## Technical data

- Special PUR drag chain cables, screened, adapted to DIN VDE 0285-525-2-51 / DIN EN 50525-2-51
- **Temperature range**  
flexing -30°C to +70°C  
fixed installation -40°C to +70°C
- **Nominal voltage**  
0,14 mm<sup>2</sup> 350 V  
0,25 and 0,34 mm<sup>2</sup> 500 V
- **Test voltage**  
0,14 mm<sup>2</sup> 800 V  
0,25 and 0,34 mm<sup>2</sup> 1200 V
- **Capacitance** core/core <80 nF/km
- **Minimum bending radius**  
flexing 7,5x cable Ø  
fixed installation 4x cable Ø
- **Radiation resistance**  
up to 100x10

## Cable structure

- Bare copper conductors extra fine wire stranded to DIN VDE 0295 cl.6, col. 4 and 5, IEC 60228 cl.6
- Core insulation of PP
- Cores are stranded in layer with short lay-length
- Cores colour coded to DIN 47100
- Core wrapping with textile tape
- Tinned copper braided screen, approx. 85% coverage.
- Outer sheath of special **full-polyurethane** TMPU to DIN VDE 0207-363-10-2 / DIN EN 50363-10-2
- Sheath colour grey (RAL 7001), surface mat
- with meter marking

## Properties

- **Features**  
High flexibility at low temperature, high abrasion resistance, break and cut-resistant, tear resistant
- **Resistant to**  
UV-radiation, Oxygen, Ozone, Hydrolyse, Oil
- **Conditional resistant to**  
Microbes, Hydraulic liquidity, Alkalis, Lye
- The PUR outer sheath is extremely robust with high tear, abrasion and oil-resistance
- Adhesion-low
- The materials used in manufacture are cadmium-free and contain no silicone and free from substances harmful to the wetting properties of lacquers

## Note

- AWG sizes are approximate equivalent values. The actual cross-section is in mm<sup>2</sup>.

## Application

Used for installation in dry, moist and wet environments as well as for outdoors, for free movement without forced motion and for flexible routing without forced motion, for proven use as drag-chain cables. Suitable as a highly flexible control cable for fast hoisting and bending stresses in machinery and tooling construction, in robotics engineering and for continuously moving machinery parts. The long working life of this cable makes it both efficient and economic. The copper braided screening offers effective protection from both internal and external interference. For applications which go beyond standard solutions (for example for composting appliances or high shelf conveyors with extremely high processing speeds etc.) we recommend for our especially developed enquiry sheet for energy guiding systems. Before installation in cable trays please read the instructions. Further technical details see selection table for drag chain cables, see lead text.

**EMC** = Electromagnetic compatibility

To optimize the EMC features we recommend a large round contact of the copper braiding on both ends.

**CE** = The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

Part no.	No.cores x cross-sec. mm <sup>2</sup>	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
49653	2 x 0,14	4,1	11,2	32,0	26
49654	3 x 0,14	4,3	14,1	35,0	26
49655	4 x 0,14	4,5	15,5	40,0	26
49656	5 x 0,14	4,8	18,3	45,0	26
49657	7 x 0,14	5,7	27,8	66,0	26
49658	10 x 0,14	6,7	39,3	86,0	26
49659	12 x 0,14	6,9	42,1	94,0	26
49660	14 x 0,14	7,1	45,3	102,0	26
49661	18 x 0,14	7,8	54,1	118,0	26
49662	24 x 0,14	9,0	66,3	149,0	26
49663	25 x 0,14	9,1	68,4	156,0	26
49664	2 x 0,25	4,6	14,9	38,0	24
49665	3 x 0,25	4,8	18,8	44,0	24
49666	4 x 0,25	5,3	21,3	51,0	24
49667	5 x 0,25	5,7	31,0	68,0	24
49668	7 x 0,25	6,7	39,6	82,0	24
49669	10 x 0,25	8,2	53,9	110,0	24

Part no.	No.cores x cross-sec. mm <sup>2</sup>	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
49670	12 x 0,25	8,4	59,1	124,0	24
49671	14 x 0,25	8,7	64,2	135,0	24
49672	18 x 0,25	9,5	78,4	160,0	24
49673	24 x 0,25	11,0	89,9	202,0	24
49674	25 x 0,25	11,1	101,0	211,0	24
49675	2 x 0,34	5,0	18,1	45,0	22
49676	3 x 0,34	5,4	28,7	60,0	22
49677	4 x 0,34	6,2	35,7	76,0	22
49678	5 x 0,34	6,7	39,1	82,0	22
49679	7 x 0,34	7,6	52,7	110,0	22
49680	10 x 0,34	9,2	67,4	148,0	22
49681	12 x 0,34	9,4	76,4	166,0	22
49682	14 x 0,34	10,0	85,5	185,0	22
49683	18 x 0,34	10,9	99,7	216,0	22
49684	24 x 0,34	12,6	147,1	300,0	22
49685	25 x 0,34	12,8	155,0	313,0	22

Dimensions and specifications may be changed without prior notice. (RC03)

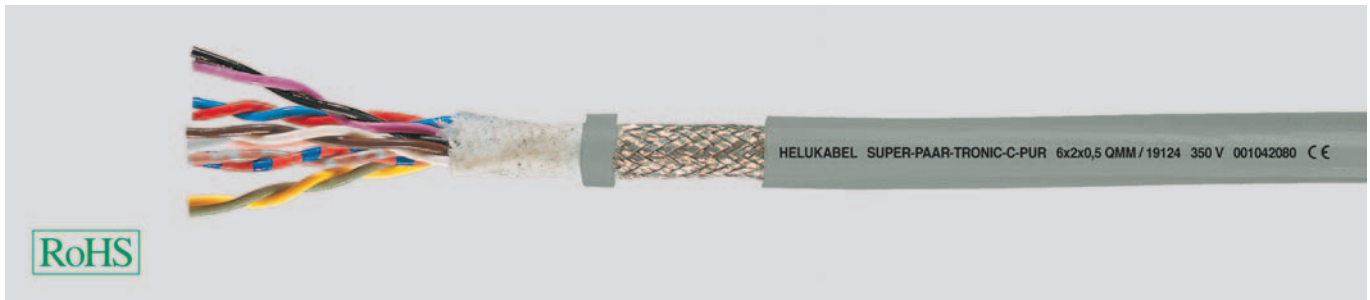


Suitable Cable drag chains can be found in our Cable Accessories catalogue.



# SUPER-PAAR-TRONIC-C-PUR® cable for drag chains,

halogen-free, EMC-preferred type, meter marking



## Technical data

- Special drag chain cable, twisted in pairs, adapted to DIN VDE 0812
- **Temperature range**  
flexing -30°C to +70°C  
fixed installation -40°C to +70°C
- **Nominal voltage** 350 V
- **Test voltage** 1500 V
- **Insulation resistance**  
min. 100 MOhm x km
- **Mutual capacitance**  
approx. 135 nF/km
- **Minimum bending radius**  
flexing at 0,25 mm<sup>2</sup>  
7,5 x cable Ø  
fixed installation at 0,25 mm<sup>2</sup>  
4 x cable Ø  
flexing at 0,5 - 1 mm<sup>2</sup>  
10 x cable Ø  
fixed installation at 0,5 - 1 mm<sup>2</sup>  
5 x cable Ø
- **Coupling resistance**  
max. 250 Ohm/km
- **Radiation resistance**  
up to 100x10<sup>6</sup> cJ/kg (up to 100 Mrad)

## Cable structure

- Bare copper conductors, extra fine wire stranded to DIN VDE 0295 cl.6, col. 4, BS 6360 cl.6 and IEC 60228 cl.6
- Core insulation of PP
- Core identification to DIN 47100
- Cores twisted in pairs, the pairs torsion-free stranded in layers
- Special fleece over outer layer
- Tinned copper screened braiding, approx. 85% coverage
- Outer sheath of **full-polyurethane** compound type TPU to DIN VDE 0207-363-10-2/ DN EN 50363-10-2
- Sheath colour grey (RAL 7001)
- with meter marking

## Properties

- Very good oil resistant
- Resistant to weather, ozone, hydrolysis- and UV-radiation
- Chemical resistant to solvents, acids, lyes and hydraulic liquidity
- Guaranteed permanent application in multi-shift operation under extreme high bending stress
- High resistant to mechanical strain
- High property of alternating bending strength
- Long life durabilities through low friction-resistance by using the PP-core insulation where the core are stranded in layers
- High tensile strength-, abrasion- and impact resistant at low temperature
- Adhesion-low
- The materials used in manufacture are cadmium-free and contain no silicone and free from substances harmful to the wetting properties of lacquers

## Note

- AWG sizes are approximate equivalent values. The actual cross-section is in mm<sup>2</sup>.

## Application

These pair stranded and overall screened special cables for drag chains offer the operational possibilities where the outer electrical influences at high frequency cause interference of impulse transmission, are applied for permanent flexible operations in machineries, machine tools, robot technics, for movable automated machinery parts and multi-shift-operation as a transmission-cable. These high flexible data cables are developed according to the newest state of technology improvement and with its sliding abilities by using the PP-core insulation and adhesion-low and cut-resistant PUR-outer sheath, guaranteed an optimum life durabilities and highly economic. For applications which go beyond standard solutions (for example for composting appliances or high shelf conveyors with extremely high processing speeds etc.) we recommend for our especially developed enquiry sheet for energy guiding systems. Before installation in cable trays please read the instructions. Further technical details see selection table for drag chain cables, see lead text.

**EMC** = Electromagnetic compatibility

To optimize the EMC features we recommend a large round contact of the copper braiding on both ends.

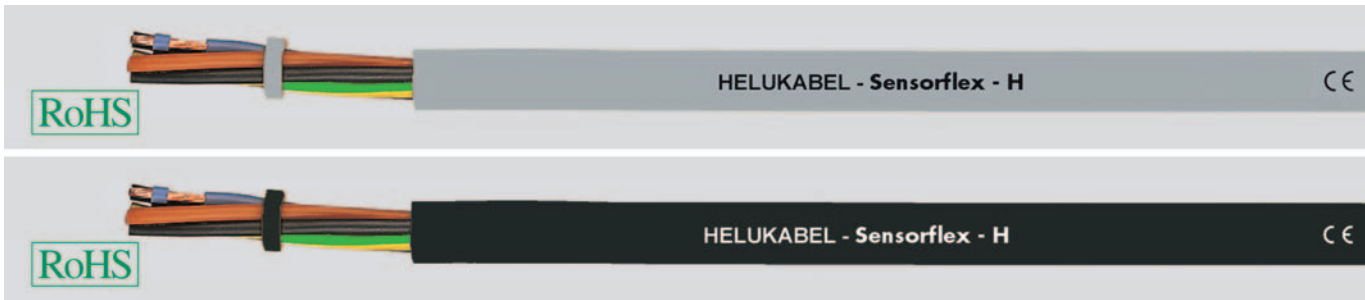
**CE** = The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

Part no.	No.pairs x cross-sec. mm <sup>2</sup>	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
19101	1 x 2 x 0,25	4,7	14,0	28,0	24
19102	2 x 2 x 0,25	6,5	32,0	61,0	24
19103	3 x 2 x 0,25	6,6	38,4	73,0	24
19104	4 x 2 x 0,25	7,1	43,2	90,0	24
19105	5 x 2 x 0,25	8,2	51,5	105,0	24
19106	6 x 2 x 0,25	8,5	71,8	133,0	24
19107	8 x 2 x 0,25	9,2	74,4	156,0	24
19108	10 x 2 x 0,25	10,7	90,0	188,0	24
19109	14 x 2 x 0,25	11,5	111,2	220,0	24
19119	1 x 2 x 0,5	5,5	22,0	47,0	20
19120	2 x 2 x 0,5	7,9	50,0	100,0	20
19121	3 x 2 x 0,5	8,2	71,8	131,0	20
19122	4 x 2 x 0,5	8,9	74,4	149,0	20
19123	5 x 2 x 0,5	10,3	84,5	169,0	20
19124	6 x 2 x 0,5	10,7	99,6	196,0	20
19125	8 x 2 x 0,5	11,8	144,3	285,0	20
19126	10 x 2 x 0,5	13,5	176,0	344,0	20
19127	14 x 2 x 0,5	14,8	215,4	401,0	20

Part no.	No.pairs x cross-sec. mm <sup>2</sup>	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
19128	1 x 2 x 0,75	6,3	34,0	61,0	19
19129	2 x 2 x 0,75	9,0	60,0	113,0	19
19130	3 x 2 x 0,75	9,1	85,7	158,0	19
19131	4 x 2 x 0,75	9,9	93,6	173,0	19
19132	5 x 2 x 0,75	11,5	113,0	203,0	19
19133	6 x 2 x 0,75	11,9	130,4	231,0	19
19134	8 x 2 x 0,75	13,1	192,2	343,0	19
19135	10 x 2 x 0,75	15,0	258,0	467,0	19
19136	14 x 2 x 0,75	16,4	316,6	546,0	19
19137	1 x 2 x 1	6,9	42,0	71,0	18
19138	2 x 2 x 1	10,0	73,0	130,0	18
19139	3 x 2 x 1	10,2	93,6	170,0	18
19140	4 x 2 x 1	11,3	117,8	204,0	18
19141	5 x 2 x 1	13,1	139,0	238,0	18

Dimensions and specifications may be changed without prior notice. (RC03)

# SENSORFLEX®-H sensor actuator cables, halogen-free, high flexible drag chain cable, PUR



## Technical data

- **Temperature range**  
flexing -30°C to +80°C  
fixed installation -40°C to +80°C
- **Operating voltage**  
up to 0,25 mm<sup>2</sup> 350 V  
from 0,34 mm<sup>2</sup> 500 V
- **A.c. test voltage, 50 Hz**  
up to 0,25 mm<sup>2</sup> 1200 V  
from 0,34 mm<sup>2</sup> 2000 V
- **Minimum bending radius**  
SENSORFLEX®-H (Li12Y11Y)  
5x cable Ø  
SENSORFLEX®-H (Li9Y11Y)  
7,5x cable Ø

## Cable structure

- **SENSORFLEX®-H (Li12Y11Y)**
  - Bare copper-conductor, to DIN VDE 0295 cl.6, extra fine-wire, BS 6360 cl.6, IEC 60228 cl.6
  - Core insulation of TPE
  - Core identification see table below
  - Outer sheath of PUR
  - Sheath colour see table below
- **SENSORFLEX®-H (Li9Y11Y)**
  - Bare copper-conductor, to DIN VDE 0295 cl.6, extra fine-wire, BS 6360 cl.6, IEC 60228 cl.6
  - Core insulation of PP
  - Core identification see table below
  - Outer sheath of PUR
  - Sheath colour see table below

## Properties

- low adhesion, extremely abrasion resistant, resistant to hydrolysis and microbial attack
- Highly flexible drag chain cable

## Application

For decentralised installation and control technology. These cables are used in connector systems for sensors and actuators. In combination with injected circular connectors and installed actuator-sensor boxes, they constitute an important connecting element between the periphery and the PLC in production systems. The assembled cables offer attractive opportunities for reducing costs, not only in the field of automation technology, but also in the entire manufacturing industry. While previously it was necessary to carry out time-consuming wiring of switchgear cabinets and machines, now field bus technology has made it possible to move the periphery interfaces from the switchgear cabinets to the machines and systems. Moving the I/O points to the system periphery enables significant reductions in installation costs.

CE= The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

## SENSORFLEX®-H (Li12Y11Y) sensor actuator cables, halogen-free, high flexible drag chain cable, PUR

Part no. black	grey	Cable structure No. cores x cross-sec. mm <sup>2</sup>	Sheath material	Core colours	Fine wire	High flex **	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
76283	76299	2 x 0,25	PUR	BN, BU		X	4,4	4,8	22,0	24
76284	76300	3 x 0,25	PUR	BN, BU, BK		X	4,4	7,2	22,0	24
76285	76301	4 x 0,25	PUR	BN, BU, BK, WH		X	4,7	9,6	26,0	24
76286	76302	5 x 0,25	PUR	BN, BU, BK, WH, GY		X	4,8	12,0	30,0	24
76287	76303	2 x 0,34	PUR	BN, BU		X	4,9	6,5	30,0	22
76288	76304	3 x 0,34	PUR	BN, BU, BK		X	4,9	9,8	30,0	22
76289	76305	4 x 0,34	PUR	BN, BU, BK, WH		X	5,2	13,1	43,0	22
76290	76306	5 x 0,34	PUR	BN, BU, BK, WH, GY		X	5,9	16,4	54,0	22
78265	78266	5 G 0,34	PUR	BN, BU, BK, WH, GN-YE		X	5,9	16,4	54,0	22
76291	76307	2 x 0,5	PUR	BN, BU		X	5,0	9,6	40,0	20
78267	78268	3 G 0,5	PUR	BK with number, GN-YE		X	5,7	14,4	43,0	20
76292	76308	3 x 0,5	PUR	BN, BU, BK		X	5,0	14,4	40,0	20
76293	76309	4 x 0,5	PUR	BN, BU, BK, WH		X	5,5	19,2	47,0	20
76294	76310	5 x 0,5	PUR	BN, BU, BK, WH, GY		X	6,0	24,0	55,0	20

Continuation ►

**SENSORFLEX®-H** sensor actuator cables, halogen-free, high flexible drag chain**cable, PUR****SENSORFLEX®-H (Li12Y11Y) sensor actuator cables, halogen-free, high flexible drag chain cable, PUR**

Part no.	black	grey	Cable structure No. cores x cross-sec. mm <sup>2</sup>	Sheath material	Core colours	Fine wire	High flex **	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
76295		76311	2 x 0,75	PUR	BN, BU		X	5,7	14,4	47,0	18
78269		78270	3 G 0,75	PUR	BN, BU, GN-YE		X	5,9	21,6	54,0	18
76296		76312	3 x 0,75	PUR	BN, BU, BK		X	5,9	21,6	54,0	18
78271		78272	4 G 0,75	PUR	BN, BU, BK, GN-YE		X	6,2	28,8	67,0	18
76297		76313	4 x 0,75	PUR	BN, BU, BK, WH		X	6,0	28,8	66,0	18
78273		78274	5 G 0,75	PUR	BK with number, GN-YE		X	7,0	36,0	80,0	18
76298		76314	5 x 0,75	PUR	BN, BU, BK, WH, GY		X	7,0	36,0	80,0	18

**SENSORFLEX®-H (Li9Y11Y) sensor actuator cables, halogen-free, high flexible drag chain cable, PUR**

Part no.	Sheath colour	Cable structure No. cores x cross-sec. mm <sup>2</sup>	Sheath material	Core colours	Fine wire	High flex **	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
75801	GY RAL 7001	3 x 0,25	PUR	BN, BU, BK		X	4,5	7,2	22,0	24
77468	GY RAL 7001	4 x 0,25	PUR	BN, BU, BK, WH		X	4,7	9,6	26,0	24
76705	GY RAL 7001	8 x 0,25	PUR	DIN 47100		X	6,0	19,2	49,0	24
77427	GY RAL 7001	4 x 0,34	PUR	BN, BU, BK, WH		X	4,9	13,1	43,0	22
77428	GY RAL 7001	3 G 0,75	PUR	BK with number, GN-YE		X	6,2	21,6	54,0	18
78275	GY RAL 7001	3 x 0,75	PUR	BK with number, GN-YE		X	6,2	21,6	54,0	18
77429	GY RAL 7001	4 G 0,75	PUR	BK with number, GN-YE		X	6,2	28,8	66,0	18

Dimensions and specifications may be changed without prior notice.

TOPFLEX®611-PUR

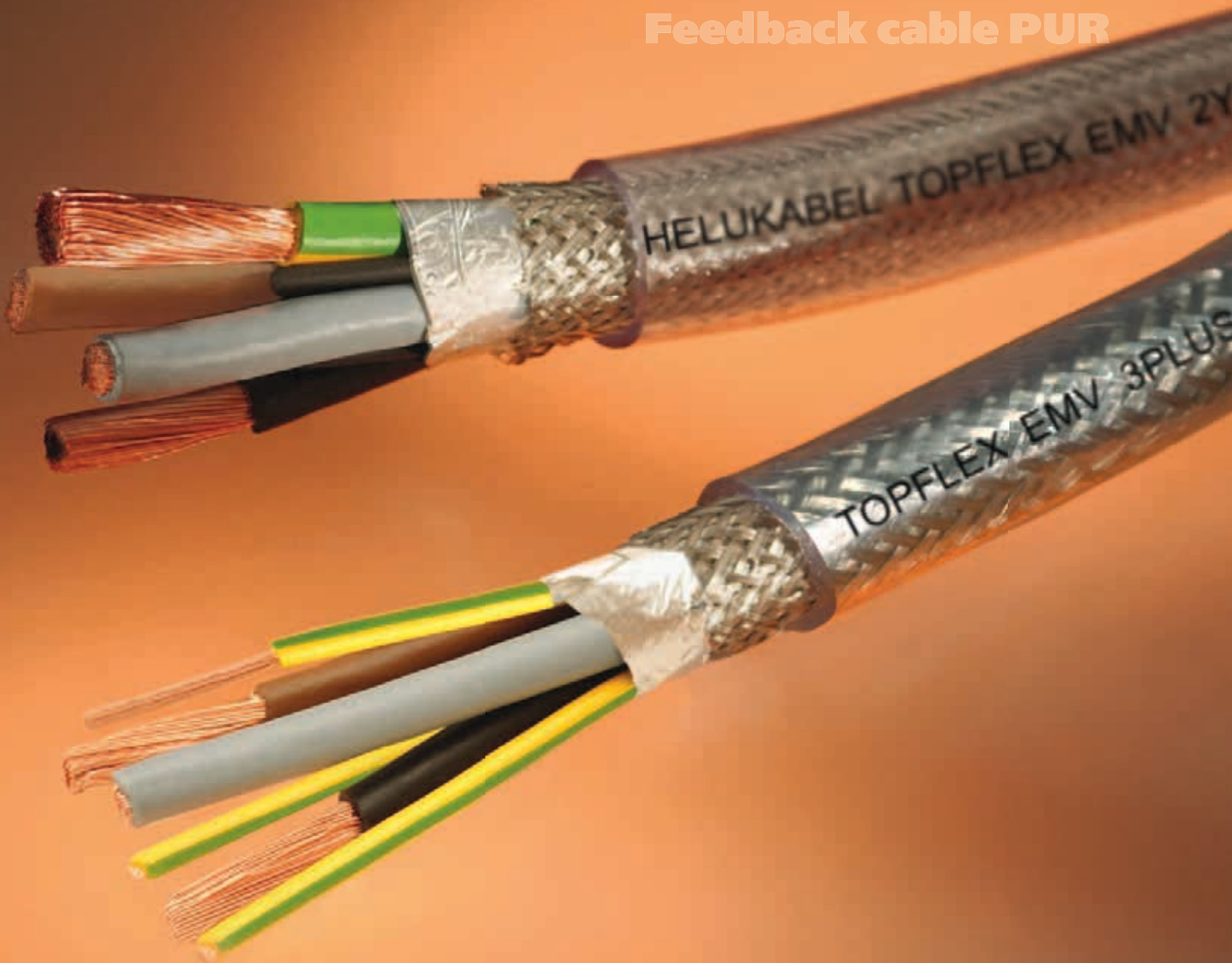
TOPFLEX® MOTOR 109

TOPFLEX® EMV-UV-2YSLCYK-J

TOPSERV® 110

TOPFLEX® 600-PVC

Feedback cable PUR





# MOTOR, SERVO, & FEEDBACK CABLES

Temperature (°C) - flexing

Temperature (°C) - fixed

Nominal voltage U<sub>0</sub>/U

Bending radius - flexing x Ø

Bending radius - fixed x Ø

Halogen-free

UV-resistant

Outdoor use

Drag Chain

Colored cores/VDE 0293

Screened/shielded

HAR/VDE REG no./VDE  
UL/CSA

Page

D

Motor, servo, and feedback cables														
	Temperature (°C) - flexing	Temperature (°C) - fixed	Nominal voltage U <sub>0</sub> /U	Bending radius - flexing x Ø	Bending radius - fixed x Ø	Halogen-free	UV-resistant	Outdoor use	Drag Chain	Colored cores/VDE 0293	Screened/shielded	HAR/VDE REG no./VDE	UL/CSA	Page
TOPFLEX® 600-PVC	-15 to +80	-40 to +80	0.6/1 kV	7.5x	4x									197
TOPFLEX® 600-C-PVC	-15 to +80	-40 to +80	0.6/1 kV	7.5x	4x					X				198
TOPFLEX® 611-PUR	-30 to +80	-40 to +80	0.6/1 kV	7.5x	4x	X	X	X	X					199
TOPFLEX® 611-C-PUR	-30 to +80	-40 to +80	0.6/1 kV	10x	5x	X	X	X	X		X			200
TOPSERV® 110 / 120	-30 to +80	-40 to +80	0.6/1 kV	7.5x	4x	X	X	X	X		X			201
Feedback cable	-5 to +70	-30 to +80	350	10x						X	X			202
Feedback cable PUR	-30 to +80	-40 to +80	250	10x	5x	X	X	X	X	X	X			203
TOPFLEX® - EMV-2YSLCYK-J	+5 to +70	-40 to +70	0.6/1 kV	20x	10x					X	X			204
TOPFLEX® - EMV-3 PLUS 2YSLCY-J	+5 to +70	-40 to +70	0.6/1 kV	20x	10x					X	X			205
TOPFLEX® - EMV-UV-2YSLCYK-J	-5 to +70	-40 to +70	0.6/1 kV	20x	10x		X	X		X	X			206
TOPFLEX® - EMV-UV-3 PLUS 2YSLCYK-J	-5 to +70	-40 to +70	0.6/1 kV	20x	10x		X	X		X	X			207
TOPFLEX® - EMV-UV-2XSLCYK-J	-5 to +90	-40 to +90	0.6/1 kV	20x	10x		X	X		X	X			209
TOPFLEX® - EMV-UV-3 PLUS 2XSLCYK-J	-5 to +90	-40 to +90	0.6/1 kV	20x	10x		X	X		X	X			211
TOPFLEX® - EMV-UV-2XSLCH-J	-5 to +90	-40 to +90	0.6/1 kV	20x	10x	X				X	X			213
TOPFLEX® - EMV-UV-3 PLUS 2XSLCH-J	-5 to +90	-40 to +90	0.6/1 kV	20x	10x	X				X	X			215
TOPFLEX® MOTOR 109	-5 to +70	-40 to +80	0.6/1 kV	20x	10x	X	X	X		X	X			217

The selection table is intended as an initial orientation.  
Please see the relevant page of the catalogue for detailed information on the product properties.

# SELECTION TABLE - DRAG CHAIN CABLES

Max. movement distance in m  
 (10 m up to 25-cores)  
 Min. bending radius - flexing  
 (D=outer Ø)  
 Max. speed (m/s)  
 Max. acceleration (m/s<sup>2</sup>)  
 Max. cycles  
 Material  
 Nominal voltage U<sub>N</sub> / U<sub>o</sub> /  
 Operating voltage  
 Temperature (°C) - flexing  
 Approvals  
 Page  
 UL / CSA  
 equivalent

PUR motor & servo cables for drag chains												
TOPFLEX® 611-PUR	30	7.5 x D	4	50	11 Mio	PP/PUR	600/1000V	-30° to +80°			199	431
TOPFLEX® 611 C-PUR	30	10 x D	4	50	11 Mio	PP/CU/PUR	600/1000V	-30° to +80°			200	437
TOPSERV® 110	30	7.5 x D	3	10	11 Mio	PP/CU/PUR	600/1000V	-30° to +80°			201	468
TOPSERV® 120	30	7.5 x D	3	10	11 Mio	PP/CU/PUR	600/1000V	-30° to +80°			201	468
PUR feedback cables for drag chain cables												
Tachofeedback-cable-C-PUR	30	10 x D	4	50	9 Mio	PP/CU/PUR	450V	-30° to +80°			203	470
Incremental encoder cable C-PUR	30	10 x D	4	50	9 Mio	PP/CU/PUR	250V	-30° to +80°			203	470
TOPFLEX®-PUR	30	10 x D	4	50	9 Mio	PP/CU/PUR	350V	-30° to +80°			203	470

A cycle is a double lift: a representative sample has been tested and measured in our Test Workshop. The cycle count is only valid when appropriately and professionally installed (see the installation manual: cable installation in drag chains, see pages 1036 and 1037).

The selection table is intended as an initial orientation.

Please see the relevant page of the catalogue for detailed information on the product properties and the selection tables cables in drag chains, see pages 1030 and 1031.

# TOPFLEX® 600-PVC motor power supply cable 0,6/1kV, meter marking



D

## Technical data

- Special PVC-insulated sheathed cable adapted to DIN VDE 0293, 0295
- **Temperature range**  
flexing -15°C to +80°C  
fixed installation -40°C to +80°C
- **Nominal voltage** U<sub>0</sub>/U 600/1000 V
- **Test voltage** 4000 V
- **Breakdown voltage**  
min. 8000 V
- **Insulation resistance**  
min. 20 MOhm x km
- **Minimum bending radius**  
flexing 7,5x cable Ø  
fixed installation 4x cable Ø
- **Radiation resistance**  
up to 80x10<sup>6</sup> cJ/kg (to 80 Mrad)

## Cable structure

- Bare copper-conductor, to DIN VDE 0295 cl.5, fine-wire, IEC 60228 cl.5
- Core insulation of PVC
- Core identification to DIN VDE 0293 black cores with continuous white numbering
- GN-YE conductor
- Cores stranded in layers with optimal lay-length
- Outer sheath of special PVC
- Sheath colour grey (RAL 7001)
- with meter marking

## Properties

- PVC outer sheath: extensively oil resistant  
Chemical Resistance - see table Technical Informations
- The materials used in manufacture are cadmium-free and contain no silicone and free from substances harmful to the wetting properties of lacquers

## Tests

- PVC self-extinguishing and flame retardant acc. to DIN VDE 0482-332-1-2, DIN EN 60332-1-2, IEC 60332-1 (equivalent DIN VDE 0472 part 804 test method B)

## Note

- For use in drag chains, we recommend our versions TOPFLEX® 611-PUR and TOPFLEX® 611-C-PUR
- screened analogue type:  
**TOPFLEX® 600-C-PVC**, confer page 198

## Application

As supply cable for electronically controlled servo-motors and connections to DNC motors. The cable is suitable for permanent and flexible installation for medium mechanical loads in dry, damp and wet environments.

CE= The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
22860	4 G 1,5	9,6	58,0	130,0	16
22861	4 G 2,5	11,2	95,0	220,0	14
22862	4 G 4	13,0	154,0	330,0	12
22863	4 G 6	14,5	231,0	445,0	10
22864	4 G 10	18,2	384,0	660,0	8
22865	4 G 16	22,3	615,0	1060,0	6

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
22866	4 G 25	27,4	960,0	1805,0	4
22867	4 G 35	30,0	1344,0	2060,0	2
22868	4 G 50	35,8	1920,0	2900,0	1
22869	4 G 70	40,9	2640,0	4050,0	2/0
22854	4 G 95	46,2	3648,0	5540,0	3/0
22855	4 G 120	51,6	4608,0	7000,0	4/0

Dimensions and specifications may be changed without prior notice. (RD01)



Suitable accessories can be found in Chapter X.

- Cable Gland - HELUTOP® HT-MS-EP4

# TOPFLEX® 600-C-PVC motor power supply cable 0,6/1kV, EMC preferred type, meter marking



## Technical data

- Special PVC-insulated sheathed cable adapted to DIN VDE 0293, 0295
- **Temperature range**  
flexing -15°C to +80°C  
fixed installation -40°C to +80°C
- **Nominal voltage** U<sub>0</sub>/U 600/1000 V
- **Test voltage** 4000 V
- **Breakdown voltage**  
min. 8000 V
- **Coupling resistance**  
max. 250 Ohm/km
- **Insulation resistance**  
min. 20 MOhm x km
- **Minimum bending radius**  
flexing 7,5x cable Ø  
fixed installation 4x cable Ø
- **Radiation resistance**  
up to 80x10<sup>6</sup> cJ/kg (to 80 Mrad)

## Cable structure

- Bare copper-conductor, to DIN VDE 0295 cl.5, fine-wire, IEC 60228 cl.5
- Core insulation of PVC
- Core identification to DIN VDE 0293 black cores with continuous white numbering
- GN-YE conductor
- Cores stranded in layers with optimal lay-length
- Inner sheath of
- Tinned copper braided screen, approx. 85% coverage
- Outer sheath of special PVC
- Colour grey (RAL 7001)
- with meter marking

## Properties

- PVC outer sheath largely oil resistant, for Chemical Resistance - see table Technical Informations
- The materials used in manufacture are cadmium-free and contain no silicone and free from substances harmful to the wetting properties of lacquers

## Tests

- PVC self-extinguishing and flame retardant acc. to DIN VDE 0482-332-1-2, DIN EN 60332-1-2, IEC 60332-1 (equivalent DIN VDE 0472 part 804 test method B)

## Note

- For use in drag chains, we recommend our versions TOPFLEX® 611-PUR and TOPFLEX® 611-C-PUR
- unscreened analogue type:  
**TOPFLEX® 600-PVC**, confer page 197

## Application

As supply cable for electronically controlled servo-motors and connections to DNC motors. The cable is suitable for permanent and flexible installation for medium mechanical loads in dry, damp and wet environments.

**EMC** = Electromagnetic compatibility

To optimize the EMC features we recommend a large round contact of the copper braiding on both ends.

CE = The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
22960	4 G 1,5	11,8	99,0	250,0	16
22961	4 G 2,5	13,8	169,0	360,0	14
22962	4 G 4	15,7	234,0	530,0	12
22963	4 G 6	17,3	316,0	620,0	10
22964	4 G 10	21,5	549,0	1050,0	8
22965	4 G 16	26,1	807,0	1465,0	6

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
22966	4 G 25	31,7	1169,0	1920,0	4
22967	4 G 35	34,5	1680,0	2515,0	2
22856	4 G 50	40,7	2370,0	3315,0	1
22857	4 G 70	46,0	3257,0	4600,0	2/0
22858	4 G 95	51,3	4060,0	6060,0	3/0
22859	4 G 120	56,4	5231,0	7315,0	4/0

Dimensions and specifications may be changed without prior notice. (RD01)



Suitable accessories can be found in Chapter X.

- Cable Gland - HELUTOP® HT-MS-EP4



# TOPFLEX® 611-PUR motor power supply cable 0,6/1kV, cable for drag chain, halogen-free, meter marking



D

## Technical data

- Special-PUR drag chain cable adapted to DIN VDE 0293, 0295, 0250, DIN VDE 0285-525-1 / DIN EN 50525-1
- **Temperature range**  
flexing -30°C to +80°C  
fixed installation -40°C to +80°C
- **Nominal voltage**  $U_0/U$  600/1000 V
- **Test voltage** 4000 V
- **Insulation resistance**  
min. 20 MOhm x km
- **Min. bending radius**  
flexing 7,5x cable  $\emptyset$   
fixed installation 4x cable  $\emptyset$

## Cable structure

- Bare copper-conductor, to DIN VDE 0295 cl.6, extra fine-wire, BS 6360 cl.6, IEC 60228 cl.6
- Core insulation of PP
- Core identification to DIN VDE 0293 black cores with continuous white numbering
- GN-YE conductor
- Cores stranded together with optimal lay-length and stabilising filler
- Fleece wrapping facilitates sliding
- Outer sheath of PUR
- Sheath colour grey (RAL 7001)
- with meter marking

## Properties

- Adhesion-free, extremely abrasion resistant, halogen-free, resistant to hydrolysis and microbial attack
- resistant to UV-radiation, oxygen and ozone
- The materials used in manufacture are cadmium-free and contain no silicone and free from substances harmful to the wetting properties of lacquers

## Note

- G = with green-yellow conductor
- For extreme applications extending beyond standard solutions we recommend that you request our questionnaire, which has been especially designed for energy supply systems.
- Please observe applicable installation regulations for use in energy supply chains.
- screened analogue type:  
**TOPFLEX® 611-C-PUR**, confer page 200

## Application

As optimized supply cable for the supply to motors, in particular to DNC motors, servo-motors. These cables are specially designed for use in power drag chains, handling equipment, robotics, tooling machinery, processing and manufacturing machinery. Optimised insulation materials ensure resistance to oils (including mineral oils), greases, coolants, hydraulic fluids as well as many alkalis and solvents. Favourable outer diameters, reduced weights and enhanced torsion characteristics assure the use in multi-layer operations with extremely high continuous bending loads. Suitable for outdoor use.

CE= The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer $\emptyset$ approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
22870	4 G 1,5	8,0	58,0	125,0	16
22871	4 G 2,5	10,8	95,0	215,0	14
22872	4 G 4	12,5	154,0	310,0	12
22873	4 G 6	14,8	231,0	470,0	10
22874	4 G 10	18,8	384,0	760,0	8
22875	4 G 16	22,8	615,0	1250,0	6

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer $\emptyset$ approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
22876	4 G 25	26,9	960,0	1510,0	4
22877	4 G 35	30,7	1344,0	2100,0	2
22978	4 G 50	36,5	1920,0	2950,0	1
22979	4 G 70	41,6	2640,0	4090,0	2/0
22980	4 G 95	48,2	3648,0	5580,0	3/0
22981	4 G 120	51,6	4608,0	7040,0	4/0

Dimensions and specifications may be changed without prior notice. (RD01)



Suitable accessories can be found in Chapter X.

- Cable Gland - HELUTOP® HT-MS-EP4

# TOPFLEX® 611-C-PUR Motor power supply cable for drag chains

0,6/1kV, EMC preferred type, halogen-free, meter marking



## Technical data

- Special-PUR drag chain cable adapted to DIN VDE 0293, 0295, 0250, DIN VDE 0285-525-1 / DIN EN 50525-1
- **Temperature range**  
flexing -30°C to +80°C  
fixed installation -40°C to +80°C
- **Nominal voltage** U<sub>0</sub>/U 600/1000 V
- **Test voltage** 4000 V
- **Coupling resistance**  
max. 250 Ohm/km
- **Insulation resistance**  
min. 20 MOhm x km
- **Min. bending radius**  
flexing 10x cable Ø  
fixed installation 5x cable Ø

## Cable structure

- Bare copper-conductor, to DIN VDE 0295 cl.6, extra fine-wire, BS 6360 cl.6, IEC 60228 cl.6
- Core insulation PP
- Core identification to DIN VDE 0293 black cores with continuous white numbering
- GN-YE conductor
- Cores stranded together with optimal lay-length and stabilising filler
- Fleece wrapping facilitates sliding
- Inner sheath of TPE
- Tinned copper braided screen, approx. 85% coverage
- Outer sheath of PUR
- Sheath colour grey (RAL 7001)
- with meter marking

## Properties

- Adhesion-free, extremely abrasion resistant, halogen-free, resistant to hydrolysis and microbial attack
- resistant to UV-radiation, oxygen and ozone
- The materials used in manufacture are cadmium-free and contain no silicone and free from substances harmful to the wetting properties of lacquers

## Note

- G = with green-yellow conductor
- For extreme applications extending beyond standard solutions we recommend that you request our questionnaire, which has been especially designed for energy supply systems.
- Please observe applicable installation regulations for use in energy supply chains.
- unscreened analogue type:  
**TOPFLEX® 611-PUR**, confer page 199

## Application

As optimized supply cable for the supply to motors, in particular to DNC motors, servo-motors. These cables are specially designed for use in power drag chains, handling equipment, robotics, tooling machinery, processing and manufacturing machinery. Optimised insulation materials ensure resistance to oils (including mineral oils), greases, coolants, hydraulic fluids as well as many alkalis and solvents. Favourable outer diameters, reduced weights and enhanced torsion characteristics assure the use in multi-layer operations with extremely high continuous bending loads. Suitable for outdoor use.

**EMC** = Electromagnetic compatibility

To optimize the EMC features we recommend a large round contact of the copper braiding on both ends.

**CE** = The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

Part no.	No. cores x cross-sec. mm²	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
22970	4 G 1,5	11,3	99,0	220,0	16
22971	4 G 2,5	13,5	169,0	340,0	14
22972	4 G 4	16,0	234,0	490,0	12
22973	4 G 6	17,8	316,0	680,0	10
22974	4 G 10	22,2	549,0	1035,0	8
22975	4 G 16	27,2	807,0	1460,0	6

Part no.	No. cores x cross-sec. mm²	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
22976	4 G 25	31,2	1169,0	1990,0	4
22977	4 G 35	35,2	1680,0	2535,0	2
22982	4 G 50	42,5	2370,0	3360,0	1
22983	4 G 70	48,8	3257,0	4650,0	2/0
22984	4 G 95	54,6	4060,0	6090,0	3/0
22985	4 G 120	58,5	5231,0	7380,0	4/0

Dimensions and specifications may be changed without prior notice. (RD01)



Suitable accessories can be found in Chapter X.

- Cable Gland - HELUTOP® HT-MS-EP4

# TOPSERV® 110 / 120 PUR servo cable with 1 or 2 signal pairs 0,6/1kV, high flexible, cable for drag chain, EMC preferred type



## Technical data

- Spezial-PUR drag chain cable adapted to DIN VDE 0295, 0250, DIN VDE 0285-525-1-1/DIN EN 50525-1
- **Temperature range**  
flexing -30°C to +80°C  
fixed installation -40°C to +80°C
- **Nominal voltage**  
power supply cores U<sub>0</sub>/U 600/1000 V  
control cores U<sub>0</sub>/U 300/500 V
- **Test voltage**  
power supply cores 4000 V  
control cores 1000 V
- **Power rating**  
to DIN VDE 0298 part 4
- **Insulation resistance**  
min. 20 MOhm x km
- **Minimum bending radius**  
flexing 7,5x cable Ø  
fixed installation 4x cable Ø
- **Coupling resistance**  
max. 250 Ohm/km

## Cable structure

- Bare copper-conductor, to DIN VDE 0295 cl.6, extra fine-wire
- Core insulation of halogen-free PP
- Core identification
- **power supply cores**  
core 1: black with imprint U/L1/C/L+  
core 2: black with imprint V/L2  
core 3: black with imprint W/L3/D/L-
- **control cores**  
**TOPSERV® 110**  
core 1 black with imprint BR1  
core 2 black with imprint BR2  
**TOPSERV® 120**  
pair 1: black with number no. 5+6  
pair 2: black with number no. 7+8
- GN-YE conductor
- Screening of the control cores in pairs, tinned drain wire and tinned Cu braid
- Control cores stranded in pairs and laid up in layers together with the power supply cores
- Foil wrapping
- Overall screening of tinned cu braid, visible coverage min. 80%
- Fleece wrapping
- Outer sheath of PUR
- Sheath colour petrol (RAL 5018)

## Properties

- low capacitance by using PP as core insulation
- PUR-outer sheath low adhesion, resistant to hydrolysis and microbial attack, halogen-free
- These highly flexible cables are fitted with an additional overall screen to assure EMC compatibility, i.e. the protection against electromagnetic interference
- The materials used in manufacture are cadmium-free and contain no silicone and free from substances harmful to the wetting properties of lacquers

## Note

- For extreme applications extending beyond standard solutions we recommend that you request our questionnaire, which has been especially designed for energy supply systems.
- Please observe applicable installation regulations for use in energy supply chains.
- AWG sizes are approximate equivalent values. The actual cross-section is in mm<sup>2</sup>.
- Servo-cable and Feedback-cable **with UL-approval** to e.g. Siemens, Bosch Rexroth, Lenze etc. can be found in chapter N ...

## Application

The combination of feeder cores with the control cores for the braking function and the thermal protection in these cables is ideal. Precision servomotors, as used today in many areas of highly-automated manufacturing processes, call for high-quality, reliable and long-lasting cables. These requirements are met to a high degree as is the electromagnetic compatibility (EMC). These cables can also be used as drag chain cables. Manufacturing is based on specifications from renowned manufacturers of servo-actuators and servo-controls as well as in accordance with diverse VDE standards. Application for system SIMODRIVE.

**EMC** = Electromagnetic compatibility

To optimize the EMC features we recommend a large round contact of the copper braiding on both ends.

CE = The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

### TOPSERV® 110 (1 pair screened and overall screening)

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
71491	(4 G 1,5 + (2 x 1,0))	11,5	139,0	211,0	16
71493	(4 G 2,5 + (2 x 1,0))	13,6	188,0	273,0	14
71705	(4 G 4 + (2 x 1,0))	14,6	260,0	352,0	12
71706	(4 G 6 + (2 x 1,0))	16,0	360,0	500,0	10
71707	(4 G 10 + (2 x 1,0))	20,2	590,0	753,0	8
71708	(4 G 16 + (2 x 1,0))	23,8	845,0	1061,0	6
71709	(4 G 25 + (2 x 1,0))	27,0	1320,0	1499,0	4
71710	(4 G 35 + (2 x 1,0))	31,9	1840,0	1992,0	2
71711	(4 G 50 + (2 x 1,0))	36,7	2530,0	2880,0	1

Dimensions and specifications may be changed without prior notice. (RD01)

### TOPSERV® 120 (2 pairs individually screened and overall screening)

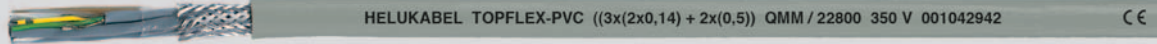
Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
71990	(4 G 1,5 + 2 x (2 x 1,0))	12,6	186,0	242,0	16
71991	(4 G 2,5 + 2 x (2 x 1,0))	15,0	231,0	316,0	14
71992	(4 G 4 + 2 x (2 x 1,0))	16,0	308,0	415,0	12
71993	(4 G 6 + 2 x (2 x 1,0))	18,2	420,0	574,0	10
71994	(4 G 10 + 2 x (2 x 1,0))	22,8	647,0	805,0	8
71995	(4 G 16 + 2 x (2 x 1,0))	25,0	918,0	1122,0	6
71996	(4 G 25 + 2 x (2 x 1,0))	27,7	1400,0	1584,0	4
72106	(4 G 35 + 2 x (2 x 1,0))	32,0	1882,0	2185,0	2
71997	(4 G 50 + 2 x (2 x 1,0))	37,0	2574,0	2977,0	1



Suitable accessories can be found in Chapter X.

- Cable Gland - HELUTOP® HT-MS-EP4

# Feedback cables PVC EMC-preferred type, meter marking



## Technical data

- Special core and sheath compound of PVC
- **Temperature range**  
flexing -5°C to +70°C  
fixed installation -30°C to +80°C
- **Nominal voltage** 350 V
- **Test voltage**  
core/core 2000 V  
core/screen 1000 V
- **Insulation resistance**  
min. 20 MOhm x km
- **Minimum bending radius**  
10x cable Ø
- **Coupling resistance**  
max. 250 Ohm/km

## Cable structure

- Bare copper, fine and/or ultra-fine wire conductors acc. to DIN VDE 0295 cl.5 and/or IEC 60228
- Core insulation of PVC
- Part No. 22800 Cu-screen of single pairs and PVC sheath
- Core identification see table below
- Single cores or pairs stranded in layer with optimal lay-length
- Core wrapping with film
- Tinned copper braided screen, approx. 85% coverage
- Outer sheath of special PVC
- Colour grey (RAL 7001)
- with meter marking

## Properties

- Largely oil-resistant, for oil-/ chemical Resistance see Technical Information table
- The materials used in manufacture are cadmium-free and contain no silicone and free from substances harmful to the wetting properties of lacquers

## Tests

- PVC self-extinguishing and flame retardant acc. to DIN VDE 0482-332-1-2, DIN EN 60332-1-2, IEC 60332-1 (equivalent DIN VDE 0472 part 804 test method B)

## Note

- AWG sizes are approximate equivalent values. The actual cross-section is in mm<sup>2</sup>.

## Application

These feedback cables are used in machinery and control construction as well as in plant engineering as these enable an excellent transmission of data and signals. Additional cores for the power supply to individual components are available.

**EMC** = Electromagnetic compatibility

To optimize the EMC features we recommend a large round contact of the copper braiding on both ends.

**C E** = The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

## TOPFLEX®-PVC

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Core marking 0,14 mm <sup>2</sup>	Core marking 0,5 mm <sup>2</sup>	Sheath colour	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
22800	( 3 x (2 x 0,14) + (2 x 0,5))	GN+YE, GY+PK, BU+RD	WH, BN	Grey	8,5	78,0	112,0	26
22806	( 4 x 2 x 0,14 + 4 x 0,5)	RD+BK, BN+GN, YE+VT, GN+PK	WH, BU, WH/GN, BN/GN	Grey	8,5	68,0	111,0	26
22845	( 10 x 0,14 + 2 x 0,5)	DIN 47100	WH, BN	Grey	8,0	46,2	70,0	26
22846	( 10 x 0,14 + 4 x 0,5)	DIN 47100	WH, BN, GN, YE	Grey	8,2	56,3	86,0	26

## Incremental feedback-cable

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Core marking 0,25 mm <sup>2</sup>	Core marking 1 mm <sup>2</sup>	Sheath colour	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
22825	( 4 x 2 x 0,25 + 2 x 1,0)	BN+GN, RD+BK, VT+BU, GY+PK	WH, BN	Grey	8,8	66,0	110,0	24

Dimensions and specifications may be changed without prior notice. (RD01)



Suitable accessories can be found in Chapter X.

- Cable Gland - HELUTOP® HT-MS-EP4

# Feedback cables PUR high flexible feedback cables for drag chain, EMC-preferred type, meter marking



## Technical data

- **Temperature range**  
flexing -30°C to +80°C  
fixed installation -40°C to +80°C
- **Nominal voltage**  
TOPFLEX®-PUR 350 V  
Tachofeedback-cable-C-PUR 450 V  
Incremental Feedback-cable-C-PUR 250 V
- **Test voltage**  
core/core 2000 V  
core/screen 1000 V
- **Insulation resistance**  
min. 20 MOhm x km
- **Minimum bending radius**  
flexing 10x cable Ø  
fixed installation 5x cable Ø
- **Coupling resistance**  
max. 250 Ohm/km
- **Radiation resistance**  
up to 100x10<sup>6</sup> cJ/kg (up to 100 Mrad)

## Cable structure

- Bare copper-conductor, to DIN VDE 0295 cl.6, extra fine-wire, BS 6360 cl.6, IEC 60228 cl.6
- Core insulation of PP
- Part No. 22847 Cu-screen of single pairs or single cores and PETP (polyethylene terephthalate) sheath
- Core identification see table below
- Single cores or pairs stranded in layer with optimal lay-length (pairs part no. 22818)
- Drain wire
- Tinned copper braided screen, approx. 85% coverage
- Outer sheath of special PUR, matt
- Sheath colour see table below

## Properties

- Special PUR outer sheath low adhesion
- **Resistant to**  
Oils and fats  
Acids and alkalis  
Hydraulic fluids  
Oxygen and ozone  
UV-radiation  
Hydrolysis  
Microbial attack  
Water and weathering effects
- The high abrasion resistance and notch resistance meet the highest requirements
- The materials used in manufacture are cadmium-free and contain no silicone and free from substances harmful to the wetting properties of lacquers

## Note

- For extreme applications extending beyond standard solutions we recommend that you request our questionnaire, which has been especially designed for energy supply systems.
- Please observe the assembly instruction for use in energy supply chains.
- AWG sizes are approximate equivalent values. The actual cross-section is in mm<sup>2</sup>.

## Application

Both cables fulfil different tasks for the control of servo-motors. The tachofeedback-cable or response cable serves the regulation of the motor speed and measurement of the actual values. The incremental feedback-cable or position response cable transfers the control signals for positioning and engineering characteristics and is used as the flexible connecting cable for tachometer, brakes and pulse transmitter in case of high mechanical stress in plant, machine and control engineering in dry, moist and wet rooms. Particularly suitable for continuous operating in drag chains, industrial robotics and handling equipment as these cables enable an excellent transmission of data and signals. Additional cores for the power supply to individual components are available. The braided screen guarantees reliable signal transmission. Optimum functionality, long service life and an excellent cost-performance ratio are given for the mentioned applications by the special compounds used for insulation and sheath.

**EMC** = Electromagnetic compatibility

To optimize the EMC features we recommend a large round contact of the copper braiding on both ends.

CE= The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

### TOPFLEX®-PUR

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Core marking 0,14 mm <sup>2</sup>	Core marking 0,5 mm <sup>2</sup>	Sheath colour	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
22847	(3 x (2 x 0,14) + (2 x 0,5))	DIN 47100	WH, BN	Grey	8,3	78,0	103,0	26
22852	4 x 2 x 0,14 + 4 x 0,5	BN+GN, YE+VT, GY+PK, RD+BU	WH, BN, WH/GN, BN/GN	Grey	8,4	73,0	105,0	26
22849	(10 x 0,14 + 2 x 0,5)	DIN 47100	WH, BN	Grey	7,2	39,0	83,0	26

### Tachofeedback-cable

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Core marking 0,5 mm <sup>2</sup>	Core marking -	Sheath colour	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
22823	(9 x 0,5)	WH, BN, GN, YE, GY, PK, BU, RD, BK	-	Orange	8,8	80,8	128,0	20

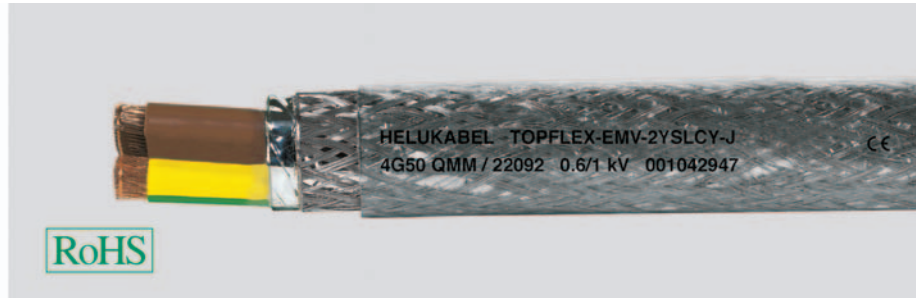
### Incremental feedback cable

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Core marking 0,14 mm <sup>2</sup>	Core marking 1 mm <sup>2</sup>	Sheath colour	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
22818	(4 x 2 x 0,25 + 2 x 1,0)	RD+BK, BN+GN, YE+VT, GN+PK	WH, BN	Orange	8,8	65,2	105,0	24

Dimensions and specifications may be changed without prior notice. (RD01)



# TOPFLEX® -EMV-2YSLCY-J for power supply connections to frequency converters, double screened, 0,6/1kV, meter marking



## Technical data

- Special motor power supply cable for frequency converters adapted to DIN VDE 0250
- **Temperature range**  
flexing +5°C to +70°C  
fixed installation -40°C to +70°C
- **Nominal voltage**  $U_0/U$  600/1000 V
- **Max. operating voltage**  
A.C. and 3-phase 700/1200 V  
DC operation 900/1800 V
- **Test voltage** 4000 V
- **Insulation resistance**  
min. 200 MOhm x km
- **Coupling resistance**  
acc. to different cross-sections  
max. 250 Ohm/km
- **Minimum bending radius**  
free-movement for outer Ø:  
up to 12 mm: 10x cable Ø  
> 12-20 mm: 15x cable Ø  
> 20 mm: 20x cable Ø  
fixed installation for outer Ø:  
up to 12 mm: 5x cable Ø  
> 12-20 mm: 7,5x cable Ø  
> 20 mm: 10x cable Ø
- **Radiation-resistance**  
up to  $80 \times 10^6$  cJ/kg (up to 80 Mrad)

## Application

This TOPFLEX®-EMV-2YSLCY-J motor power supply cable for the frequency converters assures electromagnetic compatibility in plants and buildings, facilities with units and operating equipment where the fields of electromagnetic interference might cause adverse effects on the surroundings. As a supply and connecting cable for medium mechanical stresses in fixed installations and forced movements in dry, moist and wet environments, not however for outdoor applications. Used in the automotive and food industries, environmental technology, packaging industry, machine tools. Handling equipment, for SIMOVERT drives, they are particularly suitable for use with industrial pumps, ventilators, conveyor belts and air-conditioning installations and similar applications. Installation in hazardous areas.

**EMC** = Electromagnetic compatibility

The screen must be connected at both ends and ensure large-area contact over the entire cable circumference for compliance with the functional interference requirements of EN 55011.

CE= The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

## Cable structure

- Bare copper-conductor, to DIN VDE 0295 cl.5, fine-wire, BS 6360 cl.5, IEC 60228 cl.5
- Core insulation of polyethylene (PE)
- Core identification BN, BK, GY
- GN-YE conductor
- Cores stranded in concentric layers
- 1. Screen with special aluminium film
- 2. Tinned copper braided screen, approx. 85% coverage
- Outer sheath of special PVC
- Sheath colour transparent
- with meter marking

## Note

- G = with GN-YE conductor
- \*\*) The current carrying capacity for permanent operation at ambient temperature of 30°C. For deviating ambient temperatures the conversion factors should be used and for further see the indication in DIN VDE 0298 part 4.
- AWG sizes are approximate equivalent values. The actual cross-section is in mm².

## Properties

- Low mutual capacitance
- Low coupling resistance for high electromagnetic compatibility
- This screened motor supply cable with low mutual capacitance of the single cores because of the special PE core insulation and low screen capacitance enable a low-loss transmission of the power compared to PVC-sheathed connecting cables
- Due to the optimal screening an interference-free operation of frequency converters is obtained
- The materials used in manufacture are cadmium-free and contain no silicone and free from substances harmful to the wetting properties of lacquers

## Tests

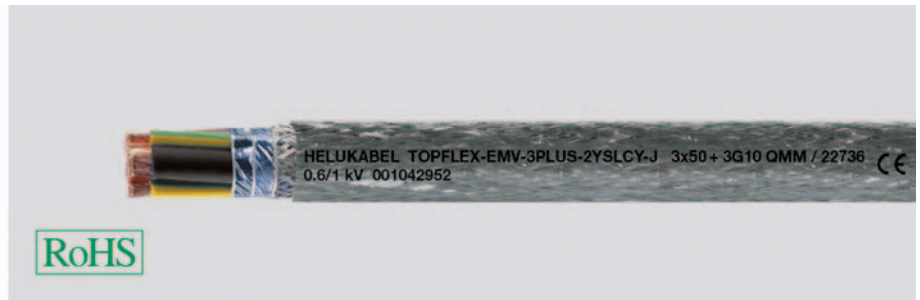
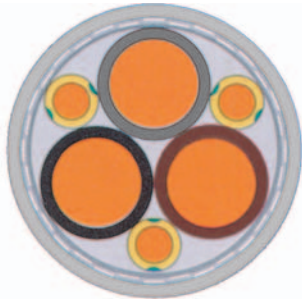
- PVC self-extinguishing and flame retardant acc. to DIN VDE 0482-332-1-2, DIN EN 60332-1-2, IEC 60332-1 (equivalent DIN VDE 0472 part 804 test method B)
- Meets EMC requirements acc. to EN 55011 and DIN VDE 0875 part 11

Part no.	No. cores x cross-sec. mm²	Outer Ø approx. mm	Mutual capacitance		Coupling resistance		Power ratings **) with 3 loaded cores in Amperes	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
			Core / Core approx.nF / km	Core / Screen approx.nF / km	at 1 MHz Ohm/km	at 30 MHz Ohm/km				
22084	4 G 1,5	10,1	70	110			18	95,0	230,0	16
22085	4 G 2,5	11,9	80	130	18	210	26	150,0	300,0	14
22086	4 G 4	13,6	90	150	11	210	34	235,0	485,0	12
22087	4 G 6	15,3	90	150	6	150	44	320,0	633,0	10
22088	4 G 10	19,4	120	200	7	180	61	533,0	863,0	8
22089	4 G 16	22,4	140	230	9	190	82	789,0	1291,0	6
22090	4 G 25	26,7	120	210	4	95	108	1236,0	1862,0	4
22091	4 G 35	29,3	150	260	3	85	135	1662,0	2611,0	2
22092	4 G 50	34,1	190	320	2	40	168	2345,0	2955,0	1
22093	4 G 70	39,0	190	320	2	45	207	3196,0	3953,0	2/0
22094	4 G 95	44,0	250	410	1	50	250	4316,0	5304,0	3/0
22095	4 G 120	48,7					292	5435,0	6604,0	4/0
22096	4 G 150	54,2					335	6394,0	7043,0	300 kcmil
22097	4 G 185	60,6					382	7639,0	8384,0	350 kcmil

Dimensions and specifications may be changed without prior notice. (RD01)

# TOPFLEX<sup>®</sup>-EMV-3 PLUS 2YSLCY-J for power supply connections

to frequency converters, double screened, 0,6/1kV, meter marking



D

## Technical data

- Special motor power supply cable for frequency converters adapted to DIN VDE 0250
- **Temperature range**  
flexing +5°C to +70°C  
fixed installation -40°C to +70°C
- **Nominal voltage**  $U_0/U$  600/1000 V
- **Max. operating voltage**  
A.C. and 3-phase 700/1200 V  
DC operation 900/1800 V
- **Test voltage** 4000 V
- **Insulation resistance**  
min. 200 MOhm x km
- **Coupling resistance**  
acc. to different cross-sections  
max. 250 Ohm/km
- **Minimum bending radius**  
free-movement for outer Ø:  
up to 12 mm: 10x cable Ø  
> 12-20 mm: 15x cable Ø  
> 20 mm: 20x cable Ø  
fixed installation for outer Ø:  
up to 12 mm: 5x cable Ø  
> 12-20 mm: 7,5x cable Ø  
> 20 mm: 10x cable Ø
- **Radiation-resistance**  
up to  $80 \times 10^6$  cJ/kg (up to 80 Mrad)

## Cable structure

- Bare copper-conductor, to DIN VDE 0295 cl.5, fine-wire, BS 6360 cl.5, IEC 60228 cl.5
- Core insulation of polyethylene (PE)
- Core identification BK, BN, GY
- GN-YE conductor (divided into 3)
- 3+3-core structure
- Cores stranded in concentric layers
- 1. Screen with special aluminium film
- 2. Tinned copper braided screen, approx. 85% coverage
- Outer sheath of special PVC
- Sheath colour transparent
- with meter marking

## Note

- <sup>\*)</sup>The current carrying capacity for permanent operation at ambient temperature of 30°C. For deviating ambient temperatures the conversion factors should be used and for further see the indication in DIN VDE 0298 part 4.
- AWG sizes are approximate equivalent values. The actual cross-section is in mm<sup>2</sup>.

## Properties

- Low mutual capacitance
- Low coupling resistance for high electromagnetic compatibility
- The minimum cross-section of 0,75<sup>2</sup> meets the requirements of DIN EN 60204 part 1.
- The 3 PLUS-construction of motor power supply cables features a symmetrical 3-core design, improved in terms of EMC characteristics comparing favorably with a 4-core version. The protective conductor PE, divided into 3 is uniformly stranded in the interstices. This enables an extremely concentric structure.
- Due to the optimal screening an interference-free operation of frequency converters is obtained
- The materials used in manufacture are cadmium-free and contain no silicone and free from substances harmful to the wetting properties of lacquers

## Tests

- PVC self-extinguishing and flame retardant acc. to DIN VDE 0482-332-1-2, DIN EN 60332-1-2, IEC 60332-1 (equivalent DIN VDE 0472 part 804 test method B)
- Meets EMC requirements acc. to EN 55011 and DIN VDE 0875 part 11

## Application

As a supply and connecting cable for medium mechanical stresses in fixed installations and forced movements in dry, moist and wet environments not however for outdoor applications. Used in the automotive and food industries, environmental technology, packaging industry, machine tools. Handling equipment, for SIMOVERT drives, they are particularly suitable for use with industrial pumps, ventilators, conveyor belts and air-conditioning installations and similar applications. Installation in hazardous areas. This screened motor supply cable with low mutual capacitance of the single cores because of the special PE core insulation and low screen capacitance enable a low-loss transmission of the power compared to PVC-sheathed connecting cables. Due to the optimal screening an interference-free operation of frequency converters is obtained. Installation in hazardous areas.

**EMC** = Electromagnetic compatibility

The screen must be connected at both ends and ensure large-area contact over the entire cable circumference for compliance with the functional interference requirements of EN 55011.

CE = The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer Ø approx. mm	Coupling resistance		Power ratings <sup>**) with 3 loaded cores in Amperes</sup>	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
			at 1 MHz Ohm/km	at 30 MHz Ohm/km				
22368	3 x 1,5 + 3 G 0,25	9,2			18	86,0	140,0	16
22369	3 x 2,5 + 3 G 0,5	10,8	18	210	26	144,0	220,0	14
22370	3 x 4 + 3 G 0,75	12,3	11	210	34	224,0	323,0	12
22371	3 x 6 + 3 G 1,0	14,0	6	150	44	298,0	420,0	10
22372	3 x 10 + 3 G 1,5	17,6	7	180	61	491,0	615,0	8
22373	3 x 16 + 3 G 2,5	21,2	9	190	82	723,0	819,0	6
22374	3 x 25 + 3 G 4,0	24,5	4	95	108	1138,0	1325,0	4
22375	3 x 35 + 3 G 6,0	26,9	3	85	135	1535,0	1718,0	2
22376	3 x 50 + 3 G 10,0	32,5	2	40	168	2208,0	2399,0	1
22377	3 x 70 + 3 G 10,0	35,5	2	45	207	2871,0	3056,0	2/0
22378	3 x 95 + 3 G 16,0	40,1	1	50	250	3953,0	4162,0	3/0
22379	3 x 120 + 3 G 16,0	44,4			292	4836,0	5074,0	4/0
22380	3 x 150 + 3 G 25,0	49,3			335	5412,0	6128,0	300 kcmil
22381	3 x 185 + 3 G 35,0	55,1			382	6969,0	7189,0	350 kcmil
22382	3 x 240 + 3 G 42,5	60,0			453	8540,0	9540,0	500 kcmil

Dimensions and specifications may be changed without prior notice. (RD01)

# TOPFLEX® -EMV-UV-2YSLCYK-J for power supply connections to frequency converters, double screened, 0,6/1kV, meter marking



## Technical data

- Special motor power supply cable for frequency converters adapted to DIN VDE 0250
- **Temperature range**  
flexing -5°C to +70°C  
fixed installation -40°C to +70°C
- **Nominal voltage** U<sub>0</sub>/U 600/1000 V
- **Max. operating voltage**  
A.C. and 3-phase 700/1200 V  
DC operation 900/1800 V
- **Test voltage** 4000 V
- **Insulation resistance**  
min. 200 MOhm x km
- **Coupling resistance**  
acc. to different cross-sections  
max. 250 Ohm/km
- **Minimum bending radius**  
free-movement for outer Ø:  
up to 12 mm: 10x cable Ø  
> 12-20 mm: 15x cable Ø  
> 20 mm: 20x cable Ø  
fixed installation for outer Ø:  
up to 12 mm: 5x cable Ø  
> 12-20 mm: 7,5x cable Ø  
> 20 mm: 10x cable Ø
- **Radiation-resistance**  
up to 80x10<sup>6</sup> cJ/kg (up to 80 Mrad)

## Cable structure

- Bare copper-conductor, to DIN VDE 0295 cl.5, fine-wire, BS 6360 cl.5, IEC 60228 cl.5
- Core insulation of polyethylene (PE)
- Core identification BN, BK, GY
- GN-YE conductor
- Cores stranded in concentric layers
- 1. Screen with special aluminium film
- 2. Tinned copper braided screen, approx. 85% coverage
- Outer sheath of special PVC
- Sheath colour black (RAL 9005)
- with meter marking

## Note

- \*\*\*)The current carrying capacity for permanent operation at ambient temperature of 30°C. For deviating ambient temperatures the conversion factors should be used and for further see the indication in DIN VDE 0298 part 4.

## Properties

- Low mutual capacitance
- Low coupling resistance for high electromagnetic compatibility
- UV-resistant
- Outdoor application, possible for installation in underground at 4G16 mm<sup>2</sup>
- This screened motor supply cable with low mutual capacitance of the single cores because of the special PE core insulation and low screen capacitance enable a low-loss transmission of the power compared to PVC-sheathed connecting cables
- Due to the optimal screening an interference-free operation of frequency converters is obtained
- The materials used in manufacture are cadmium-free and contain no silicone and free from substances harmful to the wetting properties of lacquers

## Tests

- PVC self-extinguishing and flame retardant acc. to DIN VDE 0482-332-1-2, DIN EN 60332-1-2, IEC 60332-1 (equivalent DIN VDE 0472 part 804 test method B)
- Meets EMC requirements acc. to EN 55011 and DIN VDE 0875 part 11
- AWG sizes are approximate equivalent values. The actual cross-section is in mm<sup>2</sup>.

## Application

This TOPFLEX®-EMV-2YSLCYK-J motor power supply cable for the frequency converters assures electromagnetic compatibility in plants and buildings, facilities with units and operating equipment where the fields of electromagnetic interference might cause adverse effects on the surroundings. As a supply and connecting cable for medium mechanical stresses in fixed installations and forced movements in dry, moist and wet environments and for outdoor applications, possible for installation in underground at 4G16 mm<sup>2</sup>. Used in the automotive and food industries, environmental technology, packaging industry, machine tools. Handling equipment, for SIMOVERT drives, they are particularly suitable for use with industrial pumps, ventilators, conveyor belts and air-conditioning installations and similar applications. Installation in hazardous areas.

**EMC** = Electromagnetic compatibility

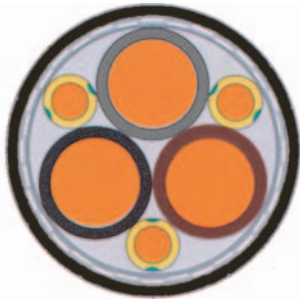
The screen must be connected at both ends and ensure large-area contact over the entire cable circumference for compliance with the functional interference requirements of EN 55011.

CE = The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer Ø approx. mm	Mutual capacitance		Coupling resistance		Power ratings **) with 3 loaded cores in Amperes	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
			Core / Core approx.nF / km	Core / Screen approx.nF / km	at 1 MHz Ohm/km	at 30 MHz Ohm/km				
22234	4 G 1,5	10,1	70	110			18	95,0	230,0	16
22235	4 G 2,5	11,9	80	130	18	210	26	150,0	300,0	14
22236	4 G 4	13,6	90	150	11	210	34	235,0	485,0	12
22237	4 G 6	15,3	90	150	6	150	44	320,0	630,0	10
22238	4 G 10	19,4	120	200	7	180	61	533,0	860,0	8
22239	4 G 16	22,4	140	230	9	190	82	789,0	1290,0	6
22240	4 G 25	26,7	120	210	4	95	108	1236,0	1860,0	4
22241	4 G 35	29,3	150	260	3	85	135	1662,0	2610,0	2
22242	4 G 50	34,1	190	320	2	40	168	2345,0	2950,0	1
22243	4 G 70	39,0	190	320	2	45	207	3196,0	3950,0	2/0
22244	4 G 95	44,0	250	410	1	50	250	4316,0	5300,0	3/0
22245	4 G 120	48,7					292	5435,0	6600,0	4/0
22246	4 G 150	54,2					335	6394,0	7040,0	300 kcmil
22247	4 G 185	60,6					382	7639,0	8380,0	350 kcmil

Dimensions and specifications may be changed without prior notice. (RD01)

# TOPFLEX<sup>®</sup>-EMV-UV-3 PLUS 2YSLCYK-J for power supply connections to frequency converters, double screened, 0,6/1kV, meter marking



D

## Technical data

- Special motor power supply cable for frequency converters adapted to DIN VDE 0250
- **Temperature range**  
flexing -5°C up to +70°C  
fixed installation -40°C up to +70°C
- **Nominal voltage**  $U_0/U$  600/1000 V
- **Max. operating voltage**  
A.C. and 3-phase 700/1200 V  
DC operation 900/1800 V
- **Test voltage** 4000 V
- **Insulation resistance**  
min. 200 MOhm x km
- **Coupling resistance**  
acc. to different cross-sections  
max. 250 Ohm/km
- **Minimum bending radius**  
free-movement for outer Ø:  
up to 12 mm: 10x cable Ø  
> 12-20 mm: 15x cable Ø  
> 20 mm: 20x cable Ø  
fixed installation for outer Ø:  
up to 12 mm: 5x cable Ø  
> 12-20 mm: 7,5x cable Ø  
> 20 mm: 10x cable Ø
- **Radiation resistance**  
up to  $80 \times 10^6$  cJ/kg (up to 80 Mrad)

## Cable structure

- Bare copper-conductor, to DIN VDE 0295 cl.5, fine-wire, BS 6360 cl.5, IEC 60228 cl.5
- Core insulation of polyethylene (PE)
- Core identification BK, BN, GY
- GN-YE conductor (divided into 3)
- 3+3 core design
- Cores stranded in concentric layers
- 1. Screen with special aluminium film  
2. Tinned copper braided screen, approx. 85% coverage
- Outer sheath of special PVC
- Sheath colour black (RAL 9005)
- with meter marking

## Note

- \*\*)The current carrying capacity for permanent operation at ambient temperature of 30°C. For deviating ambient temperatures the conversion factors should be used and for further see the indication in DIN VDE 0298 part 4.
- AWG sizes are approximate equivalent values. The actual cross-section is in mm<sup>2</sup>.

## Properties

- Low mutual capacitance
- Low coupling resistance for high electromagnetic compatibility
- Due to the optimal screening an interference-free operation of frequency converters is obtained
- The 3 PLUS-construction of motor power supply cables features a symmetrical 3-core design, improved in terms of EMC characteristics comparing favorably with a 4-core version. The protective conductor PE, divided into 3 is uniformly stranded in the interstices. This enables an extremely concentric structure
- The minimum cross-section of 0,75 mm<sup>2</sup> meets the requirements of DIN EN 60204 part 1
- UV-resistant
- Outdoor application
- This screened motor supply cable with low mutual capacitance of the single cores because of the special PE core insulation and low screen capacitance enable a low-loss transmission of the power compared to PVC-sheathed connecting cables
- The materials used in manufacture are cadmium-free and contain no silicone and free from substances harmful to the wetting properties of lacquers

## Tests

- PVC self-extinguishing and flame retardant acc. to DIN VDE 0482-332-1-2, DIN EN 60332-1-2, IEC 60332-1 (equivalent DIN VDE 0472 part 804 test method B)
- Meets EMC requirements acc. to EN 55011 and DIN VDE 0875 part 11

## Application

As a supply and connecting cable for medium mechanical stresses in fixed installations and forced movements in dry, moist and wet environments and for outdoor applications, possible for installation in underground at  $3 \times 16 + 3G2,5$  mm<sup>2</sup>. Used in the automobile industry, food industry, environmental engineering, packaging industry, toolmaking machinery, handling equipment, for SIMOVERT drivers, they are particularly suitable for use with industrial pumps, ventilators, conveyor belts and air-conditioning installations and similar applications. Installation in hazardous areas.

**EMC** = Electromagnetic compatibility

The screen must be connected at both ends and ensure large-area contact over the entire cable circumference for compliance with the functional interference requirements of EN 55011.

CE = The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

Continuation ▶

# TOPFLEX®-EMV-UV-3 PLUS 2YSLCYK-J for power supply connections to frequency converters, double screened, 0,6/1kV, meter marking



Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer Ø approx. mm	Coupling resistance		Power ratings **) with 3 loaded cores in Amperes	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
			at 1 MHz Ohm/km	at 30 MHz Ohm/km				
22673	3 x 1,5 + 3 G 0,25	9,2			18	86,0	140,0	16
22674	3 x 2,5 + 3 G 0,5	10,8	18	210	26	144,0	220,0	14
22675	3 x 4 + 3 G 0,75	12,3	11	210	34	224,0	323,0	12
22676	3 x 6 + 3 G 1,0	14,0	6	150	44	298,0	420,0	10
22677	3 x 10 + 3 G 1,5	17,6	7	180	61	491,0	615,0	8
22678	3 x 16 + 3 G 2,5	21,2	9	190	82	723,0	819,0	6
22679	3 x 25 + 3 G 4,0	24,5	4	95	108	1138,0	1325,0	4
22680	3 x 35 + 3 G 6,0	26,9	3	85	135	1535,0	1718,0	2
22681	3 x 50 + 3 G 10,0	32,5	2	40	168	2208,0	2399,0	1
22682	3 x 70 + 3 G 10,0	35,5	2	45	207	2871,0	3056,0	2/0
22683	3 x 95 + 3 G 16,0	40,1	1	50	250	3953,0	4162,0	3/0
22684	3 x 120 + 3 G 16,0	44,4			292	4836,0	5075,0	4/0
22685	3 x 150 + 3 G 25,0	49,3			335	5412,0	6128,0	300 kcmil
22686	3 x 185 + 3 G 35,0	55,1			382	6969,0	7189,0	350 kcmil
22687	3 x 240 + 3 G 42,5	60,0			453	8540,0	9540,0	500 kcmil

Dimensions and specifications may be changed without prior notice. (RD01)



Suitable accessories can be found in Chapter X.

- Cable Gland - HELUTOP® HT-MS-EP4



# TOPFLEX®-EMV-UV-2XSLCYK-J for power supply connections to frequency converters, double screened, higher current carrying capacity, 0,6/1kV, meter marking



NEW

D

## Technical data

- Special motor power supply cable for frequency converters adapted to DIN VDE 0250
- **Temperature range**  
flexing -5°C to +90°C  
fixed installation -40°C to +90°C
- Permissible **operating temperature** at conductor +90°C
- **Nominal voltage** U<sub>0</sub>/U 600/1000 V
- Max. **operating voltage**  
A.C. and 3-phase 700/1200 V  
DC operation 900/1800 V
- **Test voltage** 4000 V
- **Insulation resistance**  
min. 200 MOhm x km
- **Coupling resistance**  
acc. to different cross-sections  
max. 250 Ohm/km
- **Minimum bending radius**  
free-movement for outer Ø:  
> 12 mm: 10x cable Ø  
> 12-20 mm: 15x cable Ø  
> 20 mm: 20x cable Ø  
fixed installation for outer Ø:  
> 12 mm: 5x cable Ø  
> 12-20 mm: 7,5x cable Ø  
> 20 mm: 10x cable Ø
- **Radiation-resistance**  
up to 80x10<sup>6</sup> cJ/kg (up to 80 Mrad)

## Cable structure

- Bare copper-conductor, to DIN VDE 0295 cl.5, fine-wire, BS 6360 cl.5, IEC 60228 cl.5
- Core insulation of cross-linked polyethylene (XLPE)
- Core identification BN, BK, GY
- GN-YE conductor
- Cores stranded in concentric layers
- 1. Screen with special aluminium film
- 2. Tinned copper braided screen, approx. 85% coverage
- Outer sheath of special PVC
- Sheath colour black (RAL 9005)
- with meter marking

## Note

- \*\*)The current carrying capacity for permanent operation at ambient temperature of 30°C. For deviating ambient temperatures the conversion factors should be used and for further see the indication in DIN VDE 0298 part 4.
- AWG sizes are approximate equivalent values. The actual cross-section is in mm<sup>2</sup>.

## Properties

- Low mutual capacitance
- Low coupling resistance for high electromagnetic compatibility
- UV-resistant
- Outdoor application, possible for installation in underground at 4G16 mm<sup>2</sup>
- This screened motor supply cable with low mutual capacitance of the single cores because of the special XLPE core insulation and low screen capacitance enable a low-loss transmission of the power compared to PE-sheathed connecting cables
- Due to the optimal screening an interference-free operation of frequency converters is obtained
- The materials used in manufacture are cadmium-free and contain no silicone and free from substances harmful to the wetting properties of lacquers

## Tests

- self-extinguishing and flame retardant acc. to DIN VDE 0482-332-1-2, DIN EN 60332-1-2, IEC 60332-1 (equivalent DIN VDE 0472 part 804 test method B)
- Meets EMC requirements acc. to EN 55011 and DIN VDE 0875 part 11

## Application

This TOPFLEX®-EMV-UV-2XSLCYK-J motor power supply cable for the frequency converters assures electromagnetic compatibility in plants and buildings, facilities with units and operating equipment where the fields of electromagnetic interference might cause adverse effects on the surroundings. Respecting the permissible operating temperature at the conductor of +90 °C permits a higher current carrying capacity than PE insulated power distribution cables. As a supply and connecting cable for medium mechanical stresses in fixed installations and forced movements in dry, moist and wet environments and for outdoor applications, possible for installation in underground at 4G16 mm<sup>2</sup>. Used in the automotive and food industries, environmental technology, packaging industry, machine tools. Handling equipment, for SIMOVERT drives, they are particularly suitable for use with industrial pumps, ventilators, conveyor belts and air-conditioning installations and similar applications. Installation in hazardous areas.

**EMC** = Electromagnetic compatibility

The screen must be connected at both ends and ensure large-area contact over the entire cable circumference for compliance with the functional interference requirements of EN 55011.

CE= The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer Ø approx. mm	Mutual capacitance		Coupling resistance		Power ratings **) with 3 loaded cores in Amperes	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
			Core / Core approx.nF / km	Core / Screen approx.nF / km	at 1 MHz Ohm/km	at 30 MHz Ohm/km				
24489	4 G 1,5	10,1	70	110			23	95,0	230,0	16
24490	4 G 2,5	11,2	80	130	18	210	32	150,0	300,0	14
24491	4 G 4	12,8	90	150	11	210	42	235,0	485,0	12
24492	4 G 6	14,9	90	150	6	150	54	320,0	630,0	10
24493	4 G 10	17,7	120	200	7	180	75	533,0	860,0	8
24494	4 G 16	20,9	140	230	9	190	100	789,0	1290,0	6

Continuation ▶

# TOPFLEX®-EMV-UV-2XSLEYK-J for power supply connections to frequency converters, double screened, higher current carrying capacity, 0,6/1kV, meter marking

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer Ø approx. mm	Mutual capacitance		Coupling resistance		Power ratings **) with 3 loaded cores in Amperes	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
			Core / Core approx.nF / km	Core / Screen approx.nF / km	at 1 MHz Ohm/km	at 30 MHz Ohm/km				
24495	4 G 25	25,3	120	210	4	95	127	1236,0	1860,0	4
24496	4 G 35	28,0	150	260	3	85	158	1662,0	2610,0	2
24497	4 G 50	32,3	190	320	2	40	192	2345,0	2950,0	1
24498	4 G 70	37,6	190	320	2	45	246	3196,0	3950,0	2/0
24499	4 G 95	41,6	250	410	1	50	298	4316,0	5300,0	3/0
24500	4 G 120	44,8					346	5435,0	6600,0	4/0
24506	4 G 150	52,3					399	6394,0	7040,0	300 kcmil
24507	4 G 185	58,7					456	7639,0	8380,0	350 kcmil

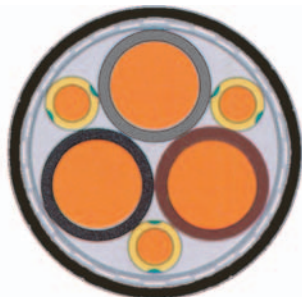
Dimensions and specifications may be changed without prior notice. (RD01)



Suitable accessories can be found in Chapter X.

- Cable Gland - HELUTOP® HT-MS-EP4

# TOPFLEX®-EMV-UV-3 PLUS 2XSLCYK-J for power supply connections to frequency converters, double screened, higher current carrying capacity, 0,6/1kV, meter marking



NEW

D

## Technical data

- Special motor power supply cable for frequency converters adapted to DIN VDE 0250
- **Temperature range**  
flexing -5°C to +90°C  
fixed installation -40°C to +90°C
- Permissible **operating temperature** at conductor +90°C
- **Nominal voltage**  $U_0/U$  600/1000 V
- Max. **operating voltage**  
A.C. and 3-phase 700/1200 V  
DC operation 900/1800 V
- **Test voltage** 4000 V
- **Insulation resistance**  
min. 200 MOhm x km
- **Coupling resistance**  
acc. to different cross-sections  
max. 250 Ohm/km
- **Minimum bending radius**  
free-movement for outer  $\varnothing$ :  
up to 12 mm: 10x cable  $\varnothing$   
> 12-20 mm: 15x cable  $\varnothing$   
> 20 mm: 20x cable  $\varnothing$   
fixed installation for outer  $\varnothing$ :  
up to 12 mm: 5x cable  $\varnothing$   
> 12-20 mm: 7,5x cable  $\varnothing$   
> 20 mm: 10x cable  $\varnothing$
- **Radiation resistance**  
up to  $80 \times 10^6$  cJ/kg (up to 80 Mrad)

## Cable structure

- Bare copper-conductor, to DIN VDE 0295 cl.5, fine-wire, BS 6360 cl.5, IEC 60228 cl.5
- Core insulation of cross-linked polyethylene (XLPE)
- Core identification BK, BN, GY
- GN-YE conductor (divided into 3)
- 3+3 core design
- Cores stranded in concentric layers
- 1. Screen with special aluminium film  
2. Tinned copper braided screen, approx. 85% coverage
- Outer sheath of special PVC
- Sheath colour black (RAL 9005)
- with meter marking

## Note

- \*)The current carrying capacity for permanent operation at ambient temperature of 30°C. For deviating ambient temperatures the conversion factors should be used and for further see the indication in DIN VDE 0298 part 4.
- AWG sizes are approximate equivalent values. The actual cross-section is in mm<sup>2</sup>.

## Properties

- Low mutual capacitance
- Low coupling resistance for high electromagnetic compatibility
- Due to the optimal screening an interference-free operation of frequency converters is obtained
- The 3 PLUS-construction of motor power supply cables features a symmetrical 3-core design, improved in terms of EMC characteristics comparing favorably with a 4-core version. The protective conductor PE, divided into 3 is uniformly stranded in the interstices. This enables an extremely concentric structure.
- The minimum cross-section of 0,75 mm<sup>2</sup> meets the requirements of DIN EN 60204 part 1
- UV-resistant
- Outdoor application, possible for installation in underground at  $3 \times 16 + 3G2,5$  mm<sup>2</sup>
- This screened motor supply cable with low mutual capacitance of the single cores because of the special XLPE core insulation and low screen capacitance enable a low-loss transmission of the power compared to PE-sheathed connecting cables
- The materials used in manufacture are cadmium-free and contain no silicone and free from substances harmful to the wetting properties of lacquers

## Tests

- self-extinguishing and flame retardant acc. to DIN VDE 0482-332-1-2, DIN EN 60332-1-2, IEC 60332-1 (equivalent DIN VDE 0472 part 804 test method B)
- Meets EMC requirements acc. to EN 55011 and DIN VDE 0875 part 11

## Application

As a supply and connecting cable for medium mechanical stresses in fixed installations and forced movements in dry, moist and wet environments and for outdoor applications, possible for installation in underground at  $3 \times 16 + 3G2,5$  mm<sup>2</sup>. Respecting the permissible operating temperature at the conductor of +90 °C permits a higher current carrying capacity than PE insulated power distribution cables. Used in the automobile industry, food industry, environmental engineering, packaging industry, toolmaking machinery, handling equipment, for SIMOVERT drivers, they are particularly suitable for use with industrial pumps, ventilators, conveyor belts and air-conditioning installations and similar applications. Installation in hazardous areas.

**EMC** = Electromagnetic compatibility

The screen must be connected at both ends and ensure large-area contact over the entire cable circumference for compliance with the functional interference requirements of EN 55011.

CE = The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

Continuation ►

# TOPFLEX®-EMV-UV-3 PLUS 2XSLCYK-J for power supply connections to frequency converters, double screened, higher current carrying capacity, 0,6/1kV, meter marking

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer Ø approx. mm	Coupling resistance		Power ratings **) with 3 loaded cores in Amperes	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
			at 1 MHz Ohm/km	at 30 MHz Ohm/km				
24508	3 x 1,5 + 3 G 0,25	9,2			23	86,0	140,0	16
24509	3 x 2,5 + 3 G 0,5	10,8	18	210	32	144,0	220,0	14
24510	3 x 4 + 3 G 0,75	12,3	11	210	42	224,0	323,0	12
24511	3 x 6 + 3 G 1,0	14,0	6	150	54	298,0	420,0	10
24512	3 x 10 + 3 G 1,5	17,6	7	180	75	491,0	615,0	8
24513	3 x 16 + 3 G 2,5	20,4	9	190	100	723,0	819,0	6
24514	3 x 25 + 3 G 4,0	23,2	4	95	127	1138,0	1325,0	4
24515	3 x 35 + 3 G 6,0	26,1	3	85	158	1535,0	1718,0	2
24516	3 x 50 + 3 G 10,0	30,8	2	40	192	2208,0	2399,0	2
24517	3 x 70 + 3 G 10,0	34,2	2	45	246	2871,0	3056,0	2/0
24518	3 x 95 + 3 G 16,0	37,8	1	50	298	3953,0	4162,0	3/0
24519	3 x 120 + 3 G 16,0	42,6			346	4836,0	5075,0	4/0
24520	3 x 150 + 3 G 25,0	47,5			399	5412,0	6128,0	300 kcmil
24521	3 x 185 + 3 G 35,0	53,4			456	6969,0	7189,0	350 kcmil
24587	3 x 240 + 3 G 42,5	58,7			538	8540,0	9540,0	350 kcmil

Dimensions and specifications may be changed without prior notice. (RD01)



Suitable accessories can be found in Chapter X.

- Cable Gland - HELUTOP® HT-MS-EP4

# TOPFLEX®-EMV-UV-2XSLCH-J for power supply connections to frequency converters, halogen-free, double screened, higher current carrying capacity, 0,6/1kV, meter marking



NEW

D

## Technical data

- Special motor power supply cable for frequency converters adapted to DIN VDE 0250
- **Temperature range**  
flexing -5°C to +90°C  
fixed installation -40°C to +90°C
- Permissible **operating temperature** at conductor +90°C
- **Nominal voltage**  $U_0/U$  600/1000 V
- Max. **operating voltage**  
A.C. and 3-phase 700/1200 V  
DC operation 900/1800 V
- **Test voltage** 4000 V
- **Insulation resistance**  
min. 200 MOhm x km
- **Coupling resistance**  
acc. to different cross-sections  
max. 250 Ohm/km
- **Minimum bending radius**  
free-movement for outer  $\varnothing$ :  
up to 12 mm: 10x cable  $\varnothing$   
> 12-20 mm: 15x cable  $\varnothing$   
> 20 mm: 20x cable  $\varnothing$   
fixed installation for outer  $\varnothing$ :  
up to 12 mm: 5x cable  $\varnothing$   
> 12-20 mm: 7,5x cable  $\varnothing$   
> 20 mm: 10x cable  $\varnothing$
- **Radiation-resistance**  
up to  $80 \times 10^6$  cJ/kg (up to 80 Mrad)

## Application

This TOPFLEX®-EMV-UV-2XSLCH-J motor power supply cable for the frequency converters assures electromagnetic compatibility in plants and buildings, facilities with units and operating equipment where the fields of electromagnetic interference might cause adverse effects on the surroundings. Respecting the permissible operating temperature at the conductor of +90 °C permits a higher current carrying capacity than PE insulated power distribution cables. As a supply and connecting cable for medium mechanical stresses in fixed installations and forced movements in dry, moist and wet environments. These cables are suitable for outdoor applications and in underground by using in conduits or tubes. For the installation in conduit all precautions must be taken that no accumulation of water can occur in the pipes. Used in the automotive and food industries, environmental technology, packaging industry, machine tools. Handling equipment, for SIMOVERT drives, they are particularly suitable for use with industrial pumps, ventilators, conveyor belts and air-conditioning installations and similar applications. Installation in hazardous areas.

**EMC** = Electromagnetic compatibility

The screen must be connected at both ends and ensure large-area contact over the entire cable circumference for compliance with the functional interference requirements of EN 55011.

CE= The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

## Cable structure

- Bare copper, fine wire conductor to DIN VDE 0295 cl.5, BS 6360 cl.5, IEC 60228 cl.5
- Core insulation of cross-linked polyethylene (XLPE)
- Core identification: BN, BL, GY
- GN-YE conductor
- Cores stranded in concentric layers
- 1. Screen with special aluminium film
- 2. Tinned copper braided screen, approx. 85% coverage
- Outer sheath of special polyolefin compound
- Sheath colour black (RAL 9005)
- with meter marking

## Note

- \*\*) The current carrying capacity for permanent operation at ambient temperature of 30°C. For deviating ambient temperatures the conversion factors should be used and for further see the indication in DIN VDE 0298 part 4.
- AWG sizes are approximate equivalent values. The actual cross-section is in mm<sup>2</sup>.

## Properties

- halogen-free
- Low mutual capacitance
- Low coupling resistance for high electromagnetic compatibility
- This screened motor supply cable with low mutual capacitance of the single cores because of the special XLPE core insulation and low screen capacitance enable a low-loss transmission of the power compared to PE-sheathed connecting cables
- Due to the optimal screening an interference-free operation of frequency converters is obtained
- The materials used in manufacture are cadmium-free and contain no silicone and free from substances harmful to the wetting properties of lacquers

## Tests

- self-extinguishing and flame retardant acc. to DIN VDE 0482-332-1-2, DIN EN 60332-1-2, IEC 60332-1 (equivalent DIN VDE 0472 part 804 test method B)
- Meets EMC requirements acc. to EN 55011 and DIN VDE 0875 part 11

Continuation ▶



# TOPFLEX®-EMV-UV-2XSLCH-J for power supply connections to frequency converters, halogen-free, double screened, higher current carrying capacity, 0,6/1kV, meter marking

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer Ø approx. mm	Mutual capacitance		Coupling resistance		Power ratings **) with 3 loaded cores in Amperes	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
			Core / Core approx.nF / km	Core / Screen approx.nF / km	at 1 MHz Ohm/km	at 30 MHz Ohm/km				
24522	4 G 1,5	10,1	70	110			23	95,0	230,0	16
24523	4 G 2,5	11,2	80	130	18	210	32	150,0	300,0	14
24524	4 G 4	12,8	90	150	11	210	42	235,0	485,0	12
24525	4 G 6	14,9	90	150	6	150	54	320,0	630,0	10
24526	4 G 10	17,7	120	200	7	180	75	533,0	860,0	8
24527	4 G 16	20,9	140	230	9	190	100	789,0	1290,0	6
24528	4 G 25	25,3	120	210	4	95	127	1236,0	1860,0	4
24529	4 G 35	28,0	150	260	3	85	168	1662,0	2610,0	2
24530	4 G 50	32,3	190	320	2	40	192	2345,0	2950,0	1
24531	4 G 70	37,6	190	320	2	45	246	3196,0	3950,0	2/0
24532	4 G 95	41,6	250	410	1	50	298	4316,0	5300,0	3/0
24533	4 G 120	44,8					346	5435,0	6600,0	4/0
24534	4 G 150	52,3					399	6394,0	7040,0	300 kcmil
24535	4 G 185	58,7					456	7639,0	8380,0	350 kcmil

Dimensions and specifications may be changed without prior notice. (RD01)



Suitable accessories can be found in Chapter X.

- Cable Gland - HELUTOP® HT-MS-EP4

# TOPFLEX®-EMV-UV-3 PLUS 2XSLCH-J for power supply connections to frequency converters, halogen-free, double screened, higher current carrying capacity, 0,6/1kV, meter marking



NEW

D

## Technical data

- Special motor power supply cable for frequency converters adapted to DIN VDE 0250
- **Temperature range**  
flexing -5°C to +90°C  
fixed installation -40°C to +90°C
- Permissible **operating temperature** at conductor +90°C
- **Nominal voltage**  $U_0/U$  600/1000 V
- Max. **operating voltage**  
A.C. and 3-phase 700/1200 V  
DC operation 900/1800 V
- **Test voltage** 4000 V
- **Insulation resistance**  
min. 200 MOhm x km
- **Coupling resistance**  
acc. to different cross-sections  
max. 250 Ohm/km
- **Minimum bending radius**  
free-movement for outer  $\varnothing$ :  
up to 12 mm: 10x cable  $\varnothing$   
> 12-20 mm: 15x cable  $\varnothing$   
> 20 mm: 20x cable  $\varnothing$   
fixed installation for outer  $\varnothing$ :  
up to 12 mm: 5x cable  $\varnothing$   
> 12-20 mm: 7,5x cable  $\varnothing$   
> 20 mm: 10x cable  $\varnothing$
- **Radiation resistance**  
up to  $80 \times 10^6$  cJ/kg (up to 80 Mrad)

## Cable structure

- Bare copper-conductor, to DIN VDE 0295 cl.5, fine-wire, BS 6360 cl.5, IEC 60228 cl.5
- Core insulation of cross-linked polyethylene (XLPE)
- Core identification BK, BN, GY
- GN-YE conductor (divided into 3)
- 3+3 core design
- Cores stranded in concentric layers
- 1. Screen with special aluminium film
- 2. Tinned copper braided screen, approx. 85% coverage
- Outer sheath special polyolefin compound
- Sheath colour black (RAL 9005)
- with meter marking

## Note

- \*)The current carrying capacity for permanent operation at ambient temperature of 30°C. For deviating ambient temperatures the conversion factors should be used and for further see the indication in DIN VDE 0298 part 4.
- AWG sizes are approximate equivalent values. The actual cross-section is in mm<sup>2</sup>.

## Properties

- halogen-free
- Low mutual capacitance
- Low coupling resistance for high electromagnetic compatibility
- Due to the optimal screening an interference-free operation of frequency converters is obtained
- The 3 PLUS-construction of motor power supply cables features a symmetrical 3-core design, improved in terms of EMC characteristics comparing favorably with a 4-core version. The protective conductor PE, divided into 3 is uniformly stranded in the interstices. This enables an extremely concentric structure
- The minimum cross-section of 0,75 mm<sup>2</sup> meets the requirements of DIN EN 60204 part 1
- This screened motor supply cable with low mutual capacitance of the single cores because of the special XLPE core insulation and low screen capacitance enable a low-loss transmission of the power compared to PE-sheathed connecting cables
- The materials used in manufacture are cadmium-free and contain no silicone and free from substances harmful to the wetting properties of lacquers

## Tests

- self-extinguishing and flame retardant acc. to DIN VDE 0482-332-1-2, DIN EN 60332-1-2, IEC 60332-1 (equivalent DIN VDE 0472 part 804 test method B)
- Meets EMC requirements acc. to EN 55011 and DIN VDE 0875 part 11

## Application

As a supply and connecting cable for medium mechanical stresses in fixed installations and forced movements in dry, moist and wet environments. These cables are suitable for outdoor applications and in underground by using in conduits or tubes. For the installation in conduit all precautions must be taken that no accumulation of water can occur in the pipes. Respecting the permissible operating temperature at the conductor of +90 °C permits a higher current carrying capacity than PE insulated power distribution cables. Used in the automobile industry, food industry, environmental engineering, packaging industry, toolmaking machinery, handling equipment, for SIMOVERT drivers, they are particularly suitable for use with industrial pumps, ventilators, conveyor belts and air-conditioning installations and similar applications. Installation in hazardous areas.

**EMC** = Electromagnetic compatibility

The screen must be connected at both ends and ensure large-area contact over the entire cable circumference for compliance with the functional interference requirements of EN 55011.

CE= The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

Continuation ▶

# TOPFLEX®-EMV-UV-3 PLUS 2XSLCH-J for power supply connections

to frequency converters, halogen-free, double screened, higher current carrying capacity, 0,6/1kV, meter marking

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer Ø approx. mm	Coupling resistance		Power ratings **) with 3 loaded cores in Amperes	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
			at 1 MHz Ohm/km	at 30 MHz Ohm/km				
24536	3 x 1,5 + 3 G 0,25	9,2			23	86,0	140,0	16
24537	3 x 2,5 + 3 G 0,5	10,8	18	210	32	144,0	220,0	14
24538	3 x 4 + 3 G 0,75	12,3	11	210	42	224,0	323,0	10
24539	3 x 6 + 3 G 1,0	14,0	6	150	54	298,0	420,0	10
24540	3 x 10 + 3 G 1,5	17,6	7	180	75	491,0	615,0	10
24541	3 x 16 + 3 G 2,5	20,4	9	190	100	723,0	819,0	6
24542	3 x 25 + 3 G 4,0	23,2	4	95	127	1138,0	1325,0	10
24543	3 x 35 + 3 G 6,0	26,1	3	85	158	1535,0	1718,0	2
24544	3 x 50 + 3 G 10,0	30,8	2	40	192	2208,0	2399,0	2
24545	3 x 70 + 3 G 10,0	34,2	2	45	246	2871,0	3056,0	2/0
24546	3 x 95 + 3 G 16,0	37,8	1	50	298	3953,0	4162,0	3/0
24583	3 x 120 + 3 G 16,0	42,6			346	4836,0	5075,0	4/0
24584	3 x 150 + 3 G 25,0	47,5			399	5412,0	6128,0	300 kcmil
24585	3 x 185 + 3 G 35,0	53,4			456	6969,0	7189,0	350 kcmil
24586	3 x 240 + 3 G 42,5	58,7			538	8540,0	9540,0	350 kcmil

Dimensions and specifications may be changed without prior notice. (RD01)



Suitable accessories can be found in Chapter X.

- Cable Gland - HELUTOP® HT-MS-EP4

# TOPFLEX® Motor 109 low capacitance power supply cable 0,6/1kV, increased ampacity, halogen-free, meter marking



## Technical data

- Special motor power supply cable for frequency converters
- **Temperature range**  
flexing -5°C to +70°C  
fixed installation -40°C to +80°C
- Permissible **operating temperature** at conductor +90°C
- **Nominal voltage**  $U_0/U$  600/1000 V
- Max. **operating voltage**  
A.C. and 3-phase 700/1200 V  
DC operation 900/1800 V
- **Test voltage** 2500 V
- **Insulation resistance**  
min. 200 MOhm x km
- **Coupling resistance**  
acc. to different cross-sections  
max. 250 Ohm/km
- **Mutual capacitance**  
acc. to different cross-sections  
core/core 70 to 250 nF/km  
core/screen 110 to 410 nF/km
- **Minimum bending radius**  
free-movement for outer Ø:  
up to 12 mm: 10x cable Ø  
> 12-20 mm: 15x cable Ø  
> 20 mm: 20x cable Ø  
fixed installation for outer Ø:  
up to 12 mm: 5x cable Ø  
> 12-20 mm: 7,5x cable Ø  
> 20 mm: 10x cable Ø
- **Radiation-resistance**  
up to  $80 \times 10^6$  cJ/kg (up to 80 Mrad)

## Cable structure

- Bare copper-conductor, to DIN VDE 0295 cl.5, fine-wire, BS 6360 cl.5, IEC 60228 cl.5
- Core insulation of special Polymer
- Core identification to DIN VDE 0293-308  
- up to 5 cores coloured  
- from 7 cores, black with continuous white numbering
- GN-YE conductor
- Cores stranded in concentric layers
- 1. Screen with special aluminium film
- 2. Tinned copper braided screen, approx. 80% coverage
- Outer sheath of special PUR
- Sheath colour orange (RAL 2003)
- with meter marking

## Properties

- Special polymerinsulation ensures low dielectric losses, a dual voltage resistance, longer service life and low - interference shield, and increased current carrying capacity
- Low coupling resistance for high electromagnetic compatibility
- UV-resistant
- Outdoor application
- This screened motor supply cable with low mutual capacitance of the single cores because of the special Polymer core insulation and low screen capacitance enable a low-loss transmission of the power compared to PVC-sheathed connecting cables
- Due to the optimal screening an interference-free operation of frequency converters is obtained
- Design acc. to the requirements of VdS 3501:2006-04
- The materials used in manufacture are cadmium-free and contain no silicone and free from substances harmful to the wetting properties of lacquers

## Tests

- Low mutual capacitance, test acc. to DIN VDE 0472 part 504, test method B
- Meets EMC requirements acc. to EN 55011 and DIN VDE 0875 part 11

## Note

- AWG sizes are approximate equivalent values. The actual cross-section is in mm<sup>2</sup>.

## Application

This motor power supply cable for the frequency converters assures electromagnetic compatibility in plants and buildings, facilities with units and operating equipment where the fields of electromagnetic interference might cause adverse effects on the surroundings. As a supply and connecting cable for medium mechanical stresses in fixed installations and forced movements in dry, moist and wet environments and for outdoor applications. Used in the automotive and food industries, environmental technology, packaging industry, machine tools. Handling equipment, for SIMOVERT drives, they are particularly suitable for use with industrial pumps, ventilators, conveyor belts and air-conditioning installations and similar applications.

**EMC** = Electromagnetic compatibility

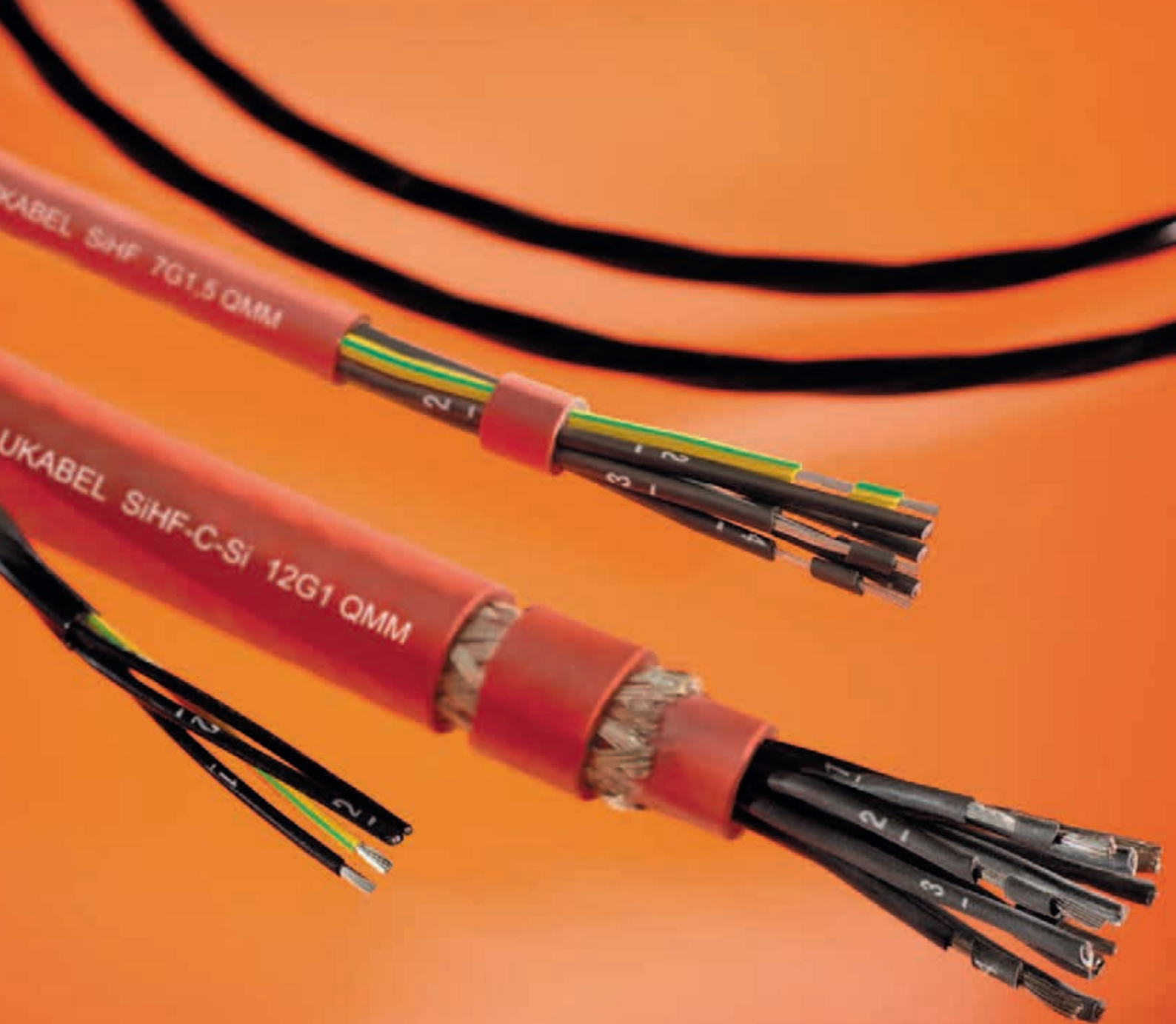
The screen must be connected at both ends and ensure large-area contact over the entire cable circumference for compliance with the functional interference requirements of EN 55011.

CE= The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

Part no.	No.cores x cross-sec. mm <sup>2</sup>	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
22724	3 G 1,5	9,4	72,0	200,0	16
22707	4 G 1,5	10,4	95,0	230,0	16
22708	5 G 1,5	11,2	117,0	258,0	16
22709	7 G 1,5	13,2	148,0	281,0	16
22710	3 G 2,5	11,2	137,0	270,0	14
22711	4 G 2,5	12,5	150,0	300,0	14
22712	5 G 2,5	13,5	200,0	352,0	14
22713	7 G 2,5	16,0	230,0	473,0	14
22714	4 G 4	14,2	235,0	485,0	12

Part no.	No.cores x cross-sec. mm <sup>2</sup>	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
22715	5 G 4	15,4	321,0	567,0	12
22716	7 G 4	18,2	352,0	603,0	12
22717	4 G 6	15,2	320,0	633,0	10
22718	5 G 6	16,8	439,0	679,0	10
22719	7 G 6	20,0	501,0	771,0	10
22720	4 G 10	19,5	533,0	860,0	8
22721	5 G 10	21,6	711,0	1029,0	8
22722	4 G 16	23,1	789,0	1290,0	6
22723	4 G 25	27,1	1236,0	1862,0	4

Dimensions and specifications may be changed without prior notice. (RD01)



HELUFLO<sup>®</sup> FEP-6Y

**THERMFLEX<sup>®</sup> 180 EWKF**

**MULTITHERM 400**

**H05SS-F/H05SST-F**

**HELUTHERM<sup>®</sup> 145 MULTI**

**SiHF-C-Si 500-TPE**

**SiHF/GL-P**

**HELUTHERM<sup>®</sup> 120**



# HEAT-RESISTANT CABLES

Temperature (°C) - flexing

Temperature (°C) - fixed

Nominal voltage U<sub>0</sub>/U

Bending radius - flexing x Ø

Bending radius - fixed x Ø

Halogen-free

UV-resistant

Outdoor use

Drag chain

Colored cores/VDE 0293

Screened/shielded

HAR/VDE REG no./VDE  
UL/CSA

Page

Heat-resistant cables														
	Temperature (°C) - flexing	Temperature (°C) - fixed	Nominal voltage U <sub>0</sub> /U	Bending radius - flexing x Ø	Bending radius - fixed x Ø	Halogen-free	UV-resistant	Outdoor use	Drag chain	Colored cores/VDE 0293	Screened/shielded	HAR/VDE REG no./VDE	UL/CSA	Page
HELUTHERM® 120	-5 to +105	-30 to +105	300/500	7.5x	4x			X		X				220
HELUTHERM® 145 MULTI	-35 to +120	-55 to +145	300/500	8x	4x	X	X	X		X				221
SiHF		-60 to +180	300/500	7.5x	4x	X		X		X				223
THERMFLEX® 180 EWKF	-25 to +180	-60 to +180	300/500	7.5x	4x	X		X		X				225
H05SS-F / H05SST-F		-60 to +180	300/500	7.5x	4x					X		X		226
HELUFロン®-FEP-6Y		-100 to +205	600	15x	4x		X	X						227
MULTITHERM 400		-60 to +400	500		5x	X				X				229
HELUTHERM® 145 MULTI-C	-35 to +120	-55 to +145	300/500	8x	4x	X	X	X			X			230
SiHF-C-Si		-60 to +180	300/500	10x	5x	X		X		X	X			232
THERMFLEX® 180 EWKF-C	-25 to +180	-60 to +180	300/500	10x	5x	X		X		X	X			234
SiHF/GL-P		-60 to +180	300/500	10x	5x	X		X		X	X			235
MULTITHERM 400-ES		-60 to +400	500		5x	X				X	X			236

The selection table is intended as an initial orientation.  
Please see the relevant page of the catalogue for detailed information on the product properties.

E

# HELUTHERM® 120 flexible, heat-resistant (+105°C), meter marking



## Technical data

- Special PVC cable with increased heat-resistance adapted to DIN VDE 0285-525-2-11 / DIN EN 50525-2-11  
0,5-0,75 mm<sup>2</sup> acc. to IEC 60227/56  
1,0-2,5 mm<sup>2</sup> acc. to IEC 60227/57
- **Temperature range**  
flexing -5°C to +105°C  
fixed installation -30°C to +105°C (for short time +120°C)
- **Nominal voltage**  
0,5-1 mm<sup>2</sup> U<sub>0</sub>/U 300/500 V  
from 1,5 mm<sup>2</sup> U<sub>0</sub>/U 450/750 V
- **Spark-test** 6000 V
- **Test voltage** 2000 V
- **Breakdown voltage** min. 4000 V
- **Insulation resistance**  
min. 20 MΩ x km
- **Minimum bending radius**  
flexing 7,5x cable Ø  
fixed installation 4x cable Ø
- **Radiation resistance**  
up to 80x10<sup>6</sup> cJ/kg (up to 80 Mrad)

## Cable structure

- Bare copper-conductor, to DIN VDE 0295 cl.5, fine-wire, BS 6360 cl.5, IEC 60228 cl.5
- Core insulation of special PVC compound type T13 to DIN VDE 0207-363-3 / DIN EN 50363-3
- Core identification to DIN VDE 0293-308  
- up to 5 cores coloured  
- from 6 cores, black with continuous white numbering
- GN-YE conductor, 3 cores and above in the outer layer
- Cores stranded in layers with optimal lay-length
- Outer sheath of special PVC, heat-resistant compound type TM3 to DIN VDE 0207-363-4-1 / DIN EN 50363-4-1
- Outer sheath black (RAL 9005), also available in other colours on request
- with meter marking

## Properties

- The materials used in manufacture are cadmium-free and contain no silicone and free from substances harmful to the wetting properties of lacquers

## Tests

- PVC self-extinguishing and flame retardant acc. to DIN VDE 0482-332-1-2, DIN EN 60332-1-2, IEC 60332-1 (equivalent DIN VDE 0472 part 804 test method B)

## Note

- G = with green-yellow conductor  
x = without green-yellow conductor
- AWG sizes are approximate equivalent values. The actual cross-section is in mm<sup>2</sup>.
- On request  
HELUTHERM® 120 H03V2V2-F  
HELUTHERM® 120 H05V2V2-F  
HELUTHERM® 120 (H)05V2V2-F

## Application

Therm cables are ideal for use in machines, appliances or motors which are subject to direct contact with high temperatures (e. g. varnishing machines and drying towers etc.). For application in dry, moist and wet rooms and in open air.

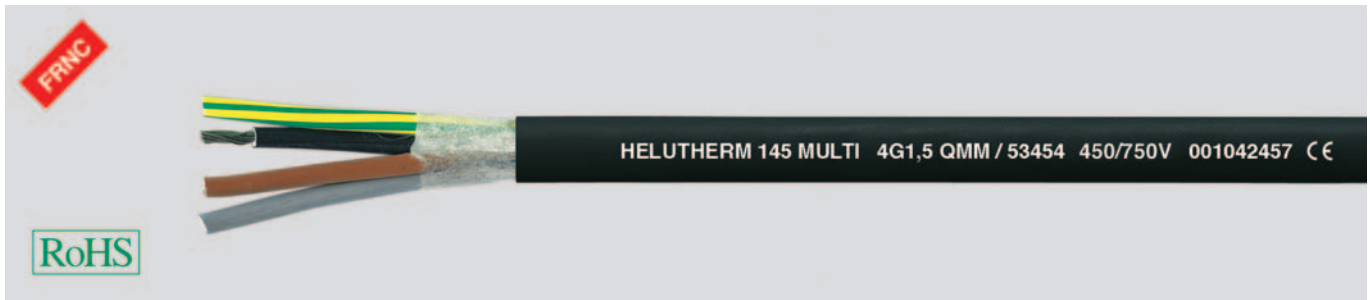
CE= The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
24002	2 x 0,5	5,0	9,6	40,0	20
24003	3 G 0,5	5,3	14,4	50,0	20
24004	4 G 0,5	5,8	19,2	60,0	20
24005	5 G 0,5	6,7	24,0	70,0	20
24006	7 G 0,5	8,8	33,6	90,0	20
24007	12 G 0,5	11,1	58,0	140,0	20
24008	18 G 0,5	12,9	86,0	170,0	20
24009	25 G 0,5	15,8	101,0	250,0	20
24011	2 x 0,75	6,2	14,4	52,0	19
24012	3 G 0,75	6,6	21,6	61,0	19
24013	4 G 0,75	7,1	29,0	75,0	19
24014	5 G 0,75	8,0	36,0	94,0	19
24015	7 G 0,75	9,5	50,0	112,0	19
24016	12 G 0,75	11,6	86,0	180,0	19
24017	18 G 0,75	13,9	130,0	270,0	19
24018	25 G 0,75	16,9	180,0	380,0	19
24019	1 x 1	6,0	9,6	50,0	18
24020	2 x 1	6,5	19,2	60,0	18
24021	3 G 1	6,9	29,0	73,0	18
24022	4 G 1	7,7	38,0	88,0	18
24023	5 G 1	8,4	48,0	110,0	18
24024	6 G 1	9,3	58,0	121,0	18
24025	7 G 1	10,0	67,0	130,0	18
24026	12 G 1	12,5	115,0	223,0	18
24027	18 G 1	14,7	173,0	350,0	18
24028	25 G 1	17,8	240,0	485,0	18

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
24030	2 x 1,5	7,4	29,0	77,0	16
24031	3 G 1,5	8,1	43,0	97,0	16
24032	4 G 1,5	9,0	58,0	122,0	16
24033	5 G 1,5	10,0	72,0	143,0	16
24034	7 G 1,5	11,9	101,0	179,0	16
24035	12 G 1,5	14,5	173,0	310,0	16
24036	18 G 1,5	17,4	259,0	460,0	16
24037	25 G 1,5	21,3	360,0	650,0	16
24039	2 x 2,5	9,3	48,0	120,0	14
24046	3 G 2,5	10,1	72,0	150,0	14
24040	4 G 2,5	11,0	96,0	200,0	14
24041	5 G 2,5	12,3	120,0	250,0	14
24042	7 G 2,5	14,6	168,0	310,0	14
24044	2 x 4	10,6	77,0	180,0	12
24291	3 G 4	11,5	115,0	220,0	12
24045	4 G 4	12,5	154,0	300,0	12
24292	5 G 4	15,1	192,0	360,0	12

Dimensions and specifications may be changed without prior notice. (RE01)

# HELUTHERM® 145 MULTI flexible, cross-linked, halogen-free, meter marking



## Technical data

- Halogen-free control and connecting cable with increased heat resistance
- **Temperature range**  
flexing -35°C to +120°C  
fixed installation -55°C to +145°C  
in short-circuit +250°C
- **Nominal voltage**  
up to 1,0 mm<sup>2</sup> U<sub>0</sub>/U 300/500 V  
from 1,5 mm<sup>2</sup> U<sub>0</sub>/U 450/750 V  
with protected fixed installation  
from 1,5 mm<sup>2</sup> U<sub>0</sub>/U 600/1000 V
- **Test voltage** 3000 V
- **Minimum bending radius**  
in operation 8x cable Ø  
fixed installation 4x cable Ø
- **Caloric load values**  
see Technical Informations
- **Power ratings table**  
see Technical Informations
- **Approval**  
Germanischer Lloyd

## Cable structure

- Tinned Cu wires, acc. to DIN VDE 0295 cl.5, BS 6360 cl.5 and IEC 60228 cl. 5
- Core insulation of halogen-free, cross-linked polyolefin-copolymer
- Core identification to DIN VDE 0293-308  
- for 2 cores BN, BU  
- up to 5 cores coloured  
- from 6 cores, black with continuous white numbering  
also available in other colours on request
- GN-YE conductor, 3 cores and above
- Cores stranded in layers with optimal lay-length
- Fleece wrapping
- Outer sheath of halogenfree, cross-linked Polyolefin-Copolymer
- Sheath colour black  
also available in other colours on request
- with meter marking

## Note

- G = with green-yellow conductor  
x = without green-yellow conductor
- AWG sizes are approximate equivalent values. The actual cross-section is in mm<sup>2</sup>.
- screened analogue type:  
**HELUTHERM® 145 MULTI-C**, confer page 230

## Properties

- Reduced flame propagation
- Good abrasion and notch resistance
- Good resistance to oils and weathering
- Resistant to UV radiation and ozone
- Resistant to soldering temperatures
- Thermal class B
- Are resistant to melting, even when in contact with a soldering iron at temperatures of between 300°C and 380°C, because of the cross-linking for the insulation material
- The materials used in manufacture are cadmium-free and contain no silicone and free from substances harmful to the wetting properties of lacquers

## Tests

- Flame test (unit flame test) acc. to DIN VDE 0482-332-3-22, BS 4066 part 3, DIN EN 60332-3-22, IEC 60332-3-22 (previously DIN VDE 0472 part 804 test method C)
- Flame test (cable) acc. to DIN VDE 0482-332-1-2, DIN EN 60332-1-2, IEC 60332-1-2 (equivalent DIN VDE 0472 part 804 test method B)
- Corrosiveness of combustion gases acc. to DIN VDE 0482 part 267, DIN EN 50267-2-2, IEC 60754-2 (equivalent DIN VDE 0472 part 813)
- Halogen-free acc. to DIN VDE 0482 part 267, DIN EN 50267-2-1, IEC 60754-1 (equivalent DIN VDE 0472 part 815)
- Smoke density acc. to DIN VDE 0482 part 1034-1+2, DIN EN 61034-1+2, IEC 61034-1+2, BS 7622 part 1+2 (previously DIN VDE 0472 part 816)

## Application

These halogen-free, cross-linked and temperature resistant wiring and control cables with enhanced fire-behaviour properties are used for wiring up the lighting fixtures, heaters, electric machines (temperature class B), switching systems and distribution switchboards. A very long service life is also given on account of their excellent high-temperature stability. These cables exhibit good resistance to weathering as well as being very stable to temperature, moisture, ozone and UV radiation. These cables are therefore mainly used for traffic control systems and diverse outdoor applications. The development of smoke is low and no corrosive gases are liberated during combustion of these halogen-free cables in case of fire. The risk of toxic fumes is considerably less in the event of fire because the caloric load values is lower. Precious time can thus be won for a disciplined evacuation, and unnecessary loss of life can be prevented. The extent of the damage to costly control and monitoring systems and the concrete and steel structures of buildings and plant due to fire is reduced by this. Injuries to persons and damage to materials can be prevented. A lower conductor cross-section is possible in certain circumstances because of the high thermal load and thus savings in the space and weight required can be made. These wiring and control cables provide a significant contribution in safety engineering and environmental protection.

CE= The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.	Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
53376	1 x 0,25	2,9	2,4	11,4	24	53381	6 G 0,25	6,5	14,4	58,0	24
52630	1 G 0,25	2,9	2,4	11,4	24	53382	7 G 0,25	6,9	16,8	64,0	24
53377	2 x 0,25	4,6	4,8	28,7	24	53383	8 G 0,25	7,3	19,2	71,0	24
53378	3 G 0,25	4,9	7,2	33,7	24	53384	10 G 0,25	8,1	24,0	84,0	24
53379	4 G 0,25	5,5	9,6	41,8	24	53385	12 G 0,25	8,1	28,8	90,0	24
53380	5 G 0,25	5,8	12,0	47,0	24	53386	14 G 0,25	8,6	33,6	102,0	24

Continuation ▶

**HELUTHERM® 145 MULTI** flexible, cross-linked, halogen-free,

## meter marking

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
53387	16 G 0,25	8,9	38,4	114,0	24
53388	19 G 0,25	10,1	45,6	132,0	24
53389	21 G 0,25	10,5	50,4	145,0	24
52631	1 G 0,5	3,2	4,8	15,7	20
53391	1 x 0,5	3,2	4,8	15,7	20
53392	2 x 0,5	5,1	9,6	39,6	20
53393	3 G 0,5	5,5	14,4	48,1	20
53394	4 G 0,5	5,9	19,2	51,0	20
53395	5 G 0,5	6,7	24,0	64,0	20
53396	6 G 0,5	7,1	28,8	74,0	20
53397	7 G 0,5	7,8	33,6	88,0	20
53398	8 G 0,5	8,6	38,4	102,0	20
53399	10 G 0,5	9,4	48,0	123,0	20
53400	12 G 0,5	9,4	57,6	135,0	20
53401	14 G 0,5	10,0	67,2	153,0	20
53402	16 G 0,5	10,7	76,8	176,0	20
53403	19 G 0,5	12,4	91,2	213,0	20
53404	21 G 0,5	13,0	100,8	234,0	20
53405	24 G 0,5	14,0	115,2	263,0	20
53406	25 G 0,5	14,0	120,0	269,0	20
53407	27 G 0,5	14,0	129,6	280,0	20
53408	30 G 0,5	15,0	144,0	311,0	20
53409	33 G 0,5	15,0	158,4	343,0	20
53410	37 G 0,5	17,0	177,6	392,0	20
52632	1 G 0,75	3,5	7,2	19,8	19
53411	1 x 0,75	3,5	7,2	19,8	19
53412	2 x 0,75	5,9	14,4	40,0	19
53413	3 G 0,75	6,2	21,6	53,0	19
53414	4 G 0,75	6,9	28,8	69,0	19
53415	5 G 0,75	7,7	36,0	86,0	19
53416	6 G 0,75	8,3	43,2	101,0	19
53417	7 G 0,75	9,1	50,4	117,0	19
53418	8 G 0,75	10,2	57,6	140,0	19
53419	10 G 0,75	11,1	72,0	167,0	19
53420	12 G 0,75	11,1	86,4	183,0	19
53421	14 G 0,75	11,7	100,8	212,0	19
53422	16 G 0,75	12,5	115,2	239,0	19
53423	19 G 0,75	14,0	136,8	290,0	19
53424	21 G 0,75	15,0	151,2	323,0	19
53425	24 G 0,75	16,0	172,8	364,0	19
53426	25 G 0,75	16,0	180,0	371,0	19
53427	27 G 0,75	16,0	194,4	387,0	19
53428	30 G 0,75	17,0	216,0	429,0	19
53429	33 G 0,75	18,0	237,6	468,0	19
53430	37 G 0,75	19,0	266,4	550,0	19
52633	1 G 1	3,9	9,6	25,2	18
53431	1 x 1	3,9	9,6	25,2	18
53432	2 x 1	6,3	19,2	50,0	18
53433	3 G 1	6,8	28,8	66,0	18
53434	4 G 1	7,4	38,4	86,0	18
53435	5 G 1	8,3	48,0	106,0	18
53436	6 G 1	8,9	57,6	127,0	18
53437	7 G 1	9,9	67,2	155,0	18
53438	8 G 1	11,0	76,8	187,0	18
53439	10 G 1	12,1	96,0	214,0	18
53440	12 G 1	12,1	115,2	230,0	18
53441	14 G 1	12,7	134,4	266,0	18
53442	16 G 1	13,6	153,6	301,0	18
53443	19 G 1	15,1	182,4	377,0	18
53444	21 G 1	16,0	201,6	419,0	18
53445	24 G 1	17,1	230,4	464,0	18
53446	25 G 1	17,1	240,0	472,0	18
53447	27 G 1	17,1	259,2	488,0	18
53448	30 G 1	17,7	288,0	536,0	18
53449	33 G 1	18,9	316,8	605,0	18
53450	37 G 1	20,3	355,2	690,0	18
52634	1 G 1,5	4,3	14,4	32,3	16
53451	1 x 1,5	4,3	14,4	32,3	16
53452	2 x 1,5	7,6	28,8	69,0	16
53453	3 G 1,5	8,1	43,2	93,0	16
53454	4 G 1,5	8,8	57,6	120,0	16
53455	5 G 1,5	9,8	72,0	152,0	16
53456	6 G 1,5	10,9	86,4	187,0	16
53457	7 G 1,5	12,0	100,8	222,0	16
53458	8 G 1,5	14,0	115,2	263,0	16
53459	10 G 1,5	14,6	144,0	308,0	16
53460	12 G 1,5	14,6	172,8	330,0	16
53461	14 G 1,5	15,4	201,6	383,0	16
53462	16 G 1,5	16,2	230,4	438,0	16
53463	19 G 1,5	18,3	273,6	554,0	16
53464	21 G 1,5	19,7	302,4	614,0	16
53465	24 G 1,5	21,1	345,6	791,0	16
53466	25 G 1,5	21,1	360,0	701,0	16
53467	27 G 1,5	21,1	388,8	723,0	16

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
53468	30 G 1,5	21,8	432,0	796,0	16
53469	33 G 1,5	22,6	475,2	880,0	16
53470	37 G 1,5	24,8	532,8	1026,0	16
52635	1 G 2,5	5,0	24,0	46,9	14
53471	1 x 2,5	5,0	24,0	46,9	14
53472	2 x 2,5	9,0	48,0	99,0	14
53473	3 G 2,5	9,8	72,0	140,0	14
53474	4 G 2,5	10,8	96,0	183,0	14
53475	5 G 2,5	12,0	120,0	231,0	14
53476	6 G 2,5	13,2	144,0	280,0	14
53477	7 G 2,5	14,6	168,0	336,0	14
53478	8 G 2,5	15,7	192,0	397,0	14
53479	10 G 2,5	17,7	240,0	460,0	14
53480	12 G 2,5	18,7	288,0	500,0	14
53481	14 G 2,5	19,0	336,0	593,0	14
53482	16 G 2,5	20,1	384,0	675,0	14
53483	19 G 2,5	20,7	456,0	835,0	14
53484	21 G 2,5	23,7	504,0	939,0	14
53485	24 G 2,5	25,8	576,0	1047,0	14
53486	25 G 2,5	25,8	600,0	1067,0	14
53487	27 G 2,5	25,8	648,0	1107,0	14
53488	30 G 2,5	26,7	720,0	1219,0	14
53489	33 G 2,5	28,0	792,0	1349,0	14
53490	37 G 2,5	30,6	888,0	1565,0	14
52636	1 G 4	5,6	38,4	96,0	12
53491	1 x 4	5,6	38,4	96,0	12
53492	2 x 4	10,2	76,8	159,0	12
53493	3 G 4	10,9	115,2	197,0	12
53494	4 G 4	12,2	153,6	260,0	12
53495	5 G 4	13,5	192,0	329,0	12
53496	6 G 4	14,9	230,4	398,0	12
53497	7 G 4	16,4	268,8	478,0	12
53498	8 G 4	17,6	307,2	553,0	12
53499	10 G 4	20,1	384,0	663,0	12
53500	12 G 4	20,1	460,8	725,0	12
53501	14 G 4	21,5	537,6	797,0	12
52637	1 G 6	6,1	57,6	108,0	10
53502	1 x 6	6,1	57,6	108,0	10
53503	2 x 6	11,6	115,2	216,0	10
53504	3 G 6	12,4	172,8	285,0	10
53505	4 G 6	13,8	230,4	375,0	10
53506	5 G 6	15,4	288,0	465,0	10
53507	6 G 6	16,7	345,6	544,0	10
53508	7 G 6	18,3	403,2	664,0	10
52638	1 G 10	7,7	96,0	144,0	8
53509	1 x 10	7,7	96,0	144,0	8
53510	2 x 10	14,7	192,0	351,0	8
53511	3 G 10	15,7	288,0	475,0	8
53512	4 G 10	17,5	384,0	630,0	8
53513	5 G 10	19,6	480,0	782,0	8
53514	6 G 10	21,7	576,0	914,0	8
53515	7 G 10	23,7	672,0	1092,0	8
52639	1 G 16	9,1	153,6	205,0	6
53516	1 x 16	9,1	153,6	205,0	6
53517	2 x 16	17,7	307,2	495,0	6
53518	3 G 16	19,3	460,8	691,0	6
53519	4 G 16	21,5	614,4	905,0	6
53520	5 G 16	23,9	768,0	1129,0	6
53521	6 G 16	26,2	921,6	1327,0	6
53522	7 G 16	28,9	1075,2	1590,0	6
52640	1 G 25	10,0	240,0	336,0	4
53523	1 x 25	10,9	240,0	336,0	4
53524	2 x 25	21,3	480,0	833,0	4
53525	3 G 25	22,7	720,0	1139,0	4
53526	4 G 25	25,4	960,0	1489,0	4
53527	5 G 25	28,1	1200,0	1863,0	4
53528	6 G 25	31,1	1440,0	2275,0	4
53529	7 G 25	34,5	1680,0	2633,0	4
52641	1 G 35	12,1	336,0	454,0	2
53530	1 x 35	12,1	336,0	454,0	2
53531	2 x 35	23,7	672,0	1104,0	2
53532	3 G 35	25,5	1008,0	1513,0	2
53533	4 G 35	28,4	1344,0	1992,0	2
53534	5 G 35	31,3	1680,0	2488,0	2
52642	1 G 50	14,9	480,0	638,0	1
53535	1 x 50	14,9	480,0	638,0	1
53536	2 x 50	29,3	960,0	1573,0	1
53537	3 G 50	31,5	1440,0	2154,0	1
53538	4 G 50	35,3	1920,0	2819,0	1
53539	5 G 50	39,1	2400,0	3505,0	1
52643	1 G 70	17,1	672,0	875,0	2/0
53540	1 x 70	17,1	672,0	875,0	2/0
53541	2 x 70	33,7	1344,0	2157,0	2/0
53542	3 G 70	36,4	2016,0	2946,0	2/0
53543	4 G 70	40,3	2688,0	3888,0	2/0
53544	5 G 70	44,5	3360,0	4864,0	2/0
52644	1 G 95	19,2	912,0	1149,0	3/0
53545	1 x 95	19,2	912,0	1149,0	3/0
53546	2 x 95	37,5	1824,0	2763,0	3/0
53547	3 G 95	40,0	2736,0	3835,0	3/0
53548	4 G 95	45,3	3648,0	5052,0	3/0
53549	5 G 95	50,7	4560,0	6307,0	3/0

Dimensions and specifications may be changed without prior notice. (RE01)

**Technical data**

- Special silicone multicore cable with higher heat-resistance range adapted to DIN VDE 0250 part 1 and DIN VDE 0285-525-2-83/ DIN EN 50525-2-83
- **Temperature range** -60°C to +180°C (for short time +220°C)
- **Temperature limit** at the conductor in operation +180°C
- **Nominal voltage**  $U_0/U$  300/500 V
- **Test voltage** 2000 V
- **Breakdown voltage** min. 5000 V
- **Insulation resistance** min. 200 MOhm x km
- **Power rating** ambient temperature up to +145°C to DIN VDE 0100 for higher temperatures valid:
  - 150°C - load value 100%
  - 155°C - load value 91%
  - 160°C - load value 82%
  - 165°C - load value 71%
  - 170°C - load value 58%
  - 175°C - load value 41%
- **Minimum bending radius** flexing 7,5x cable Ø fixed installation 4x cable Ø
- **Radiation resistance** up to  $20 \times 10^6$  cJ/kg (up to 20 Mrad)

**Cable structure**

- Tinned copper-conductor, to DIN VDE 0295 cl.5, fine-wire, BS 6360 cl.5, IEC 60228 cl.5
- Core insulation of silicone
- Core identification to DIN VDE 0293-308
  - up to 5 cores coloured
  - from 6 cores, black with continuous white numbering
- GN-YE conductor, 3 cores and above
- Cores stranded in layers with optimal lay-length
- Outer sheath of silicone
- Sheath colour preferably redbrown
- with meter marking

**Properties****Advantages**

- Hardly changes of dielectric strength and the insulation resistance also at high temperatures, high ignition or flash point, in case of fire, forms an insulating layer of  $\text{SiO}_2$
- **Resistant to** High molecular oils, fats from vegetables and animals, alcohols, plasticizers and clophenes, diluted acids, lyes and salt dissolution, oxidation substances, tropical influences and weather, lake water, oxygen, ozone
- For laying as a fixed installation only in open or ventilated pipe systems as well as in ducts. Otherwise the mechanical properties of the silicon are reduced by the enclosed air at temperatures exceeding 90°C.

**Tests**

- Halogen-free acc. to DIN VDE 0482 part 267, DIN EN 50267-2-2/ IEC 60754-2 (equivalent DIN VDE 0472 part 813)
- **Behaviour in fire** no flame propagation acc. to DIN VDE 0482-332-1-2, DIN EN 60332-1-2, IEC 60332-1 (equivalent DIN VDE 0472 part 804 test method B)

**Note**

- G = with green-yellow conductor
- x = without green-yellow conductor (OB)
- AWG sizes are approximate equivalent values. The actual cross-section is in  $\text{mm}^2$ .
- screened analogue type: **SiHF-C-Si**, confer page 232

**Application**

Silicone cables were evolved for use wherever insulation is subjected to extreme temperature changes. They are heat-resistant for permanent temperature up to +180°C, for short time operation up to +220°C. The good performance of the environmental resistant properties means that silicone cables can be used at temperatures down to -60°C. Silicone cables are halogen-free cables and are especially suited for installation in power stations. They have also found their uses in the steel producing industries, aviation industry, ship building as well as in ceramic, glass and cement factories. Due to elastical characteristic of core insulations, these are used as flexible connection cable.

CE The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

Part no.	No. cores x cross-sec. $\text{mm}^2$	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.	Part no.	No. cores x cross-sec. $\text{mm}^2$	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
22989	2 x 0,5	5,6	9,6	42,0	20	23002	3 G 0,75	6,8	21,6	63,0	19
22990	3 G 0,5	5,9	14,5	44,0	20	23104	3 x 0,75	6,8	21,6	63,0	19
22940	3 x 0,5	5,9	14,5	44,0	20	23003	4 G 0,75	7,6	29,0	83,0	19
22991	4 G 0,5	6,4	19,3	58,0	20	23105	4 x 0,75	7,6	29,0	83,0	19
22941	4 x 0,5	6,4	19,3	58,0	20	23004	5 G 0,75	8,5	36,0	101,0	19
22992	5 G 0,5	7,3	24,0	62,0	20	22943	5 x 0,75	8,5	36,0	101,0	19
22942	5 x 0,5	7,3	24,0	62,0	20	23005	6 G 0,75	9,2	43,0	115,0	19
22993	6 G 0,5	8,3	28,9	79,0	20	23006	7 G 0,75	9,2	50,0	124,0	19
22994	7 G 0,5	8,1	33,7	85,0	20	23127	8 G 0,75	9,9	57,7	138,0	19
22995	8 G 0,5	8,9	38,4	99,0	20	23128	10 G 0,75	11,1	72,1	156,0	19
22996	10 G 0,5	10,0	48,1	124,0	20	23129	12 G 0,75	12,2	86,5	185,0	19
22997	12 G 0,5	10,6	57,6	141,0	20	23130	16 G 0,75	13,7	115,2	218,0	19
22998	16 G 0,5	12,1	76,7	186,0	20	23131	18 G 0,75	14,6	129,7	260,0	19
22999	18 G 0,5	12,7	86,5	211,0	20	23132	25 G 0,75	17,2	180,0	370,0	19
23000	25 G 0,5	15,2	120,0	271,0	20	23007	2 x 1	6,6	19,0	59,0	18
23001	2 x 0,75	6,4	14,4	53,0	19	23008	3 G 1	7,0	29,0	77,0	18

Continuation ▶



**SiHF** silicon multicores cable, flexible, halogen-free, meter marking

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
22944	3 x 1	7,0	29,0	77,0	18
23009	4 G 1	7,8	38,0	94,0	18
22945	4 x 1	7,8	38,0	94,0	18
23010	5 G 1	8,8	48,0	115,0	18
22946	5 x 1	8,8	48,0	115,0	18
23011	6 G 1	9,5	58,0	134,0	18
23012	7 G 1	9,5	67,0	144,0	18
23133	8 G 1	10,3	76,7	175,0	18
24000	9 G 1	11,5	86,0	196,0	18
23134	10 G 1	11,5	96,1	216,0	18
23135	12 G 1	12,5	115,2	231,0	18
23136	16 G 1	14,2	153,5	302,0	18
23137	18 G 1	15,1	172,9	340,0	18
23138	25 G 1	18,0	240,0	431,0	18
23013	2 x 1,5	7,6	29,0	81,0	16
23014	3 G 1,5	8,0	43,0	98,0	16
22947	3 x 1,5	8,0	43,0	98,0	16
23015	4 G 1,5	8,7	58,0	122,0	16
22948	4 x 1,5	8,7	58,0	122,0	16
23016	5 G 1,5	9,6	72,0	147,0	16
22949	5 x 1,5	9,6	72,0	147,0	16
23017	6 G 1,5	10,4	86,0	173,0	16
23018	7 G 1,5	10,4	101,0	187,0	16
23019	8 G 1,5	11,2	114,0	213,0	16
23020	10 G 1,5	13,0	116,0	263,0	16
23021	12 G 1,5	13,9	173,0	314,0	16
23022	14 G 1,5	14,7	202,0	379,0	16
23023	16 G 1,5	16,2	231,0	445,0	16
23024	18 G 1,5	17,0	260,0	506,0	16
23025	20 G 1,5	17,5	288,0	566,0	16
23026	24 G 1,5	20,4	346,0	722,0	16
23027	2 x 2,5	8,8	48,0	134,0	14
23028	3 G 2,5	9,7	72,0	152,0	14
23029	4 G 2,5	10,6	96,0	188,0	14
23030	5 G 2,5	11,6	120,0	228,0	14
23139	6 G 2,5	12,6	144,0	304,0	14
23032	7 G 2,5	12,6	168,0	320,0	14
23140	8 G 2,5	13,6	192,2	373,0	14

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
23141	10 G 2,5	15,5	240,1	450,0	14
23033	12 G 2,5	17,1	288,0	502,0	14
23142	16 G 2,5	19,6	384,0	659,0	14
23143	18 G 2,5	20,6	432,2	761,0	14
23144	25 G 2,5	24,4	600,0	1007,0	14
23034	2 x 4	10,8	77,0	180,0	12
23035	3 G 4	11,4	115,0	224,0	12
23036	4 G 4	12,5	154,0	295,0	12
23037	5 G 4	13,9	192,0	359,0	12
23039	7 G 4	15,6	269,0	479,0	12
23040	2 x 6	12,4	115,0	210,0	10
23041	3 G 6	13,2	173,0	270,0	10
23042	4 G 6	14,8	230,0	341,0	10
23043	5 G 6	16,5	288,0	432,0	10
23045	7 G 6	18,0	403,0	552,0	10
23046	2 x 10	16,2	192,0	400,0	8
23047	3 G 10	17,2	288,0	507,0	8
23048	4 G 10	19,4	384,0	644,0	8
23049	5 G 10	21,4	480,0	788,0	8
23145	7 G 10	23,4	672,2	1151,0	8
23050	2 x 16	18,0	308,0	591,0	6
23051	3 G 16	19,3	462,0	749,0	6
23052	4 G 16	21,4	616,0	950,0	6
23053	5 G 16	24,0	770,0	1204,0	6
23146	7 G 16	26,4	1075,3	1682,0	6
23054	2 x 25	22,0	480,0	700,0	4
23055	3 G 25	23,4	720,0	1100,0	4
23056	4 G 25	26,3	960,0	1500,0	4
23057	2 x 35	24,6	672,0	1100,0	2
23058	3 G 35	26,3	1008,0	1500,0	2
23059	4 G 35	29,1	1344,0	2100,0	2

Dimensions and specifications may be changed without prior notice. (RE01)



Suitable accessories can be found in Chapter X.

- Cable protection tube - HTP

# THERMFLEX® 180 EWKF silicone multicore cable,

halogen-free, meter marking



## Technical data

- adapted to DIN VDE 0285-525-2-83/ DIN EN 50525-2-83
- **Temperature range**  
flexing -25°C to +180°C  
fixed installation -60°C to +180°C
- **Nominal voltage**  $U_0/U$  300/500 V
- **Test voltage** 2000 V
- **Insulation resistance**  
min. 200 MOhm x km
- **Minimum bending radius**  
flexing 7,5x cable  $\varnothing$   
fixed installation 4x cable  $\varnothing$
- **Radiation resistance**  
up to  $20 \times 10^6$  cJ/kg (up to 20 Mrad)

## Tests

- Insulation integrity  
testet acc. to DIN VDE 0472 part 814 and IEC 60331
- Halogen-free  
acc. to DIN VDE 0482 part 267, DIN EN 50267-2-1, IEC 60754-1 (equivalent DIN VDE 0472 part 815)
- Behaviour in fire  
no flame propagation acc. to DIN VDE 0482-332-1-2, DIN EN 60332-1-2, IEC 60332-1 (equivalent DIN VDE 0472 part 804 test method B)
- Corrosiveness of combustion gases  
acc. to DIN VDE 0482 part 267, DIN EN 50267-2-2, IEC 60754-2 (equivalent DIN VDE 0472 part 813)

## Cable structure

- Tinned copper-conductor, to DIN VDE 0295 cl.5, fine-wire, BS 6360 cl.5, IEC 60228 cl.5
- Core insulation of special silicone compound type EI2 to DIN VDE 0207-363-1 / DIN EN 50363-1
- Core identification to DIN VDE 0293-308 - up to 5 cores coloured - from 6 cores, black with continuous white numbering
- GN-YE conductor, 3 cores and above in the outer layer
- Cores stranded in layers with optimal lay-length
- Outer sheath of special silicone compound type 2GM1 to DIN VDE 0207-363-2-1/DIN EN 50363-2-1
- Sheath colour black (RAL 9005)
- with meter marking

## Properties

- Smoke density - low
- Due to the special abrasive and notch resistance outer sheath, these cables are suitable for heavy loading of mechanical stresses than the usual standard silicone cables
- Hardly changes of dielectric strength and the insulation resistance also at high temperatures
- High ignition or flash point
- leave in case of fire an insulating layer of SiO<sub>2</sub>, thereby ensuring a longer functional integrity
- **Resistant to**  
High molecular oils, fats from vegetables and animals, alcohols, plasticizers and clophenes, diluted acids, lyes and salt dissolution, oxidation substances, tropical influences and weather, lake water, oxygen, ozone

## Note

- G = with green-yellow conductor  
x = without green-yellow conductor
- AWG sizes are approximate equivalent values. The actual cross-section is in mm<sup>2</sup>.
- **EWKF** = Improved values to  
**E**=tearing resistance,  
**W**=breaking strength propagation,  
**K**=notch strength, **F**=flexibility
- screened analogue type:  
**THERMFLEX® 180 EWKF-C**, confer page 234

## Application

These cables are ideal for use everywhere, where they are exposed to high mechanical stresses, as well as wire insulation are subjected to high temperatures. For use in dry, damp and wet rooms, as well outdoor. Silicone cables are halogen free and are suitable for use in air conditioning and heating, for lighting, for the wiring of ovens, saunas and solariums, foundries, steel, cement and ceramic works and in the heating and cooling equipment.

### FRNC = Flame Retardant Non Corrosive

All silicon cables are available also in FRNC versions. The sheath designed with special-compound conform flame test method C to DIN VDE 0472 part 804 and IEC 60332-3 as well as HD 405.3. This special compound is self-extinguishing. Because of that these cables can be installed as security cable with functionality as for example in communal buildings, power stations, hotels, airports etc.

CE = The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer $\varnothing$ approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
74992	2 x 0,75	6,4	15,0	53,0	19
74993	3 G 0,75	7,0	22,0	64,0	19
74994	4 G 0,75	7,6	29,0	84,0	19
74995	5 G 0,75	8,5	36,0	101,0	19
74996	2 x 1	6,8	20,0	60,0	18
74997	3 G 1	7,2	29,0	78,0	18
74998	4 G 1	7,8	39,0	95,0	18
74999	5 G 1	8,8	48,0	116,0	18
75000	2 x 1,5	8,8	29,0	82,0	16
75001	3 G 1,5	8,9	43,0	98,0	16
75002	4 G 1,5	9,9	58,0	122,0	16
75003	5 G 1,5	10,8	72,0	148,0	16
75004	7 G 1,5	12,0	101,0	187,0	16
75005	12 G 1,5	16,1	173,0	315,0	16
75006	16 G 1,5	18,2	231,0	446,0	16
75007	20 G 1,5	19,4	288,0	566,0	16

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer $\varnothing$ approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
75008	2 G 2,5	9,8	48,0	135,0	14
75009	3 G 2,5	10,4	72,0	152,0	14
75010	4 G 2,5	11,5	96,0	189,0	14
75011	5 G 2,5	12,9	120,0	229,0	14
75012	2 x 4	11,6	77,0	180,0	12
75013	3 G 4	12,3	115,0	230,0	12
75014	4 G 4	13,6	154,0	300,0	12
75015	5 G 4	15,2	192,0	380,0	12
75016	2 x 6	13,2	115,0	321,0	10
75017	3 G 6	14,0	173,0	330,0	10
75018	4 G 6	15,5	230,0	430,0	10
75019	5 G 6	17,2	288,0	550,0	10

Dimensions and specifications may be changed without prior notice. (RE01)

# H05SS-F / H05SST-F heat-resistant multicore cable



## Technical data

- Heat-resistant multicore cable to DIN VDE 0285-525-2-83 / DIN EN 50525-2-83
- **Temperature range**  
fixed installation -60°C to +180°C (for short time +250°C)
- Permissible **operating temperature** at conductor +180°C
- **Nominal voltage**  $U_0/U$  300/500 V
- **Test voltage** 2000 V
- **Specific volume resistivity**  
min. 200 MOhm x km
- **Minimum bending radius**  
flexing 7,5x cable Ø  
fixed installation 4x cable Ø
- **Radiation resistance**  
up to  $20 \times 10^6$  cJ/kg (up to 20 Mrad)

## Cable structure

- Tinned copper-conductor, to DIN VDE 0295 cl.5, fine-wire, BS 6360 cl.5, IEC 60228 cl.5
- Core insulation of cross-linked rubber (SiR) compound type E12 to DIN VDE 0207-363-1 / DIN EN 50363-1
- Core identification to DIN VDE 0293-308
- GN-YE conductor, 3 cores and above
- Cores stranded in layers with optimal lay-length
- Outer sheath of cross-linked rubber compound type EM9 to DIN VDE 0207-363-2-1 / DIN EN 50363-2-1
- Sheath colour black (RAL 9005)  
also available in other colours on request

## H05SST-F

- Construction as per H05SS-F
- Polyester braiding

## Properties

- Advantages Hardly changes of dielectric strength and the insulation resistance also at high temperatures
- These cables may be damaged by pulling over sharp-edges or by abrasion during the installation and application. To avoid this, it should be treated with great care during the installation and application of the cable.

## Tests

- **Behavior in fire:**  
Test of vertical flame-propagation to VDE 0482-332-1-2, DIN EN 60332-1-2, not valid for the cables with outer polyesterbraiding (Type H05SST-F)

## Note

- G = with green-yellow conductor  
x = without green-yellow conductor
- AWG sizes are approximate equivalent values. The actual cross-section is in mm<sup>2</sup>.

## Application

Multicore cables insulated and sheathed with heat resistant silicone rubber without strain relieving elements are used in high temperatures or with contact to hot-surfaces. These cables are installed for fixed installation, mechanical protected, for internal wiring of lighting fixtures in industrial application. It is recommended for the application of the apparatus which are moving during the operation with less mechanical stress.

CE= The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

### H05SS-F

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer Ø min. - max. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
22290	2 x 0,75	5,7 - 7,4	14,4	59,0	19
22291	3 G 0,75	6,2 - 8,1	21,6	71,0	19
22292	4 G 0,75	6,8 - 8,8	28,8	93,0	19
22293	5 G 0,75	7,6 - 9,9	36,0	113,0	19
22294	2 x 1	6,1 - 8,0	19,2	67,0	18
22295	3 G 1	6,5 - 8,5	29,0	86,0	18
22296	4 G 1	7,1 - 9,3	38,4	105,0	18
22297	5 G 1	8,0 - 10,3	48,0	129,0	18
22298	2 x 1,5	7,6 - 9,8	29,0	91,0	16
22299	3 G 1,5	8,0 - 10,4	43,0	110,0	16
22300	4 G 1,5	9,0 - 11,6	58,0	137,0	16
22301	5 G 1,5	9,8 - 12,7	72,0	165,0	16
22302	2 x 2,5	9,0 - 11,6	48,0	150,0	14
22303	3 G 2,5	9,6 - 12,4	72,0	170,0	14
22304	4 G 2,5	10,7 - 13,8	96,0	211,0	14
22305	5 G 2,5	11,9 - 15,3	120,0	255,0	14
22306	3 G 4	11,3 - 14,5	115,0	251,0	12
22307	4 G 4	12,7 - 16,2	154,0	330,0	12
22308	3 G 6	12,8 - 16,3	173,0	379,0	10
22309	4 G 6	14,2 - 18,1	230,0	494,0	10

### H05SST-F

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer Ø min. - max. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
22343	2 x 0,75	6,7 - 8,4	14,4	63,0	19
22344	3 G 0,75	7,2 - 9,1	21,6	75,0	19
22345	4 G 0,75	7,8 - 9,8	28,8	99,0	19
22346	5 G 0,75	8,6 - 10,9	36,0	120,0	19
22347	2 x 1	7,1 - 9,0	19,2	71,0	18
22348	3 G 1	7,5 - 9,5	29,0	91,0	18
22349	4 G 1	8,1 - 10,3	38,4	111,0	18
22350	5 G 1	9,0 - 11,3	48,0	137,0	18
22351	2 x 1,5	8,6 - 10,8	29,0	97,0	16
22352	3 G 1,5	9,0 - 11,4	43,0	117,0	16
22353	4 G 1,5	10,0 - 12,6	58,0	145,0	16
22354	5 G 1,5	10,8 - 13,7	72,0	175,0	16
22355	2 x 2,5	10,0 - 12,6	48,0	159,0	14
22356	3 G 2,5	10,6 - 13,4	72,0	180,0	14
22357	4 G 2,5	11,7 - 14,8	96,0	224,0	14
22358	5 G 2,5	12,9 - 16,3	120,0	270,0	14
22359	3 G 4	12,3 - 15,5	115,0	266,0	12
22360	4 G 4	13,7 - 17,2	154,0	350,0	12
22361	3 G 6	13,8 - 17,3	173,0	402,0	10
22362	4 G 6	15,2 - 19,1	230,0	524,0	10

Dimensions and specifications may be changed without prior notice. (RE01)



Suitable accessories can be found in Chapter X.

- Cable protection tube - HTP

**HELUFLO<sup>®</sup>-FEP-6Y** multi core, fluorinated polymeric materials,**-100°C up to +205°C****Technical data**

- Fluorinated polymeric insulation FEP (Fluorethylenpropylene)
- **Temperature range**  
-100°C to +205°C  
(for short time +230°C)
- **Conductor temperature range**  
bare copper +130°C  
tinned copper +180°C  
silver pl. copper +200°C
- **Nominal voltage** 600 V
- **Test voltage** 2500 V
- **Insulation resistance**  
min. 2 GOhm x km
- **Minimum bending radius**  
flexing 15x cable Ø  
fixed installation 4x cable Ø
- **Radiation resistance**  
up to 1x10<sup>6</sup> cJ/kg (up to 1 Mrad)

**Cable structure**

- Copper-conductor, bare, tinned, silver to DIN VDE 0295 cl.5, fine-wire, BS 6360 cl.5, IEC 60228 cl.5
- Core insulation of FEP-HELUFLO<sup>®</sup>
- Core identification to DIN VDE 0293-308  
- up to 0,25 mm<sup>2</sup> cores coloured  
- from 0,5 mm<sup>2</sup> black cores with continuous white numbering
- GN-YE conductor, 3 cores and above
- Cores stranded in layers with optimal lay-length
- Outer sheath of FEP-HELUFLO<sup>®</sup>
- Sheath colour black (RAL 9005)

**Properties**

- Higher insulation resistance
- Low dielectric loss
- Not flammable
- Resistant to micro-cultures
- Do not permit any fungus-formation
- Absolute ozone resistant
- Absolute weather resistant
- Water absorption <0,01%
- Minimal water vapour permeability (approx. 0,18 mgr/cm<sup>2</sup> in 24 hours)
- The materials used in manufacture are cadmium-free and contain no silicone and free from substances harmful to the wetting properties of lacquers

**Tests**

- self-extinguishing and flame retardant acc. to DIN VDE 0482-332-1-2, DIN EN 60332-1-2, IEC 60332-1 (equivalent DIN VDE 0472 part 804 test method B)

**Note**

- G = with green-yellow conductor
- x = without green-yellow conductor (OZ)
- AWG sizes are approximate equivalent values. The actual cross-section is in mm<sup>2</sup>.

**Application**

This cables are predominantly used for installing in control cabinets subjected to high thermal effects as well as in brickworks, heaters, kitchen fitments and measuring appliances as well as in the chemical industry. These cables are non-flammable and resistant to acids, alkalis, solvents, oil and petrol.

☞ The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

**copper wire, tinned**

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
24547	2 x 0,25	2,7	5,0	17,0	24
24548	3 G 0,25	2,9	7,5	22,0	24
24549	4 G 0,25	3,2	10,0	27,0	24
24550	5 G 0,25	3,5	12,5	34,0	24
24551	7 G 0,25	3,9	17,5	46,0	24
24552	2 x 0,5	3,3	9,8	21,0	20
24553	3 G 0,5	3,5	14,7	32,0	20
24554	4 G 0,5	3,9	19,6	44,0	20
24555	5 G 0,5	4,3	24,5	55,0	20
24556	7 G 0,5	4,8	34,3	70,0	20
24557	2 x 0,75	3,6	14,4	31,0	19
24558	3 G 0,75	3,9	21,6	46,0	19
24559	4 G 0,75	4,3	29,0	58,0	19
24560	5 G 0,75	4,7	36,0	69,0	19
24561	7 G 0,75	4,8	50,0	92,0	19
24562	2 x 1	4,1	19,0	41,0	18
24563	3 G 1	4,4	29,0	55,0	18
24564	4 G 1	4,9	38,0	71,0	18
24565	5 G 1	5,5	48,0	88,0	18

**copper wire, tinned**

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
24566	7 G 1	6,0	67,0	113,0	18
24273	12 G 1	8,0	115,2	220,0	18
24274	18 G 1	9,5	173,0	321,0	18
24275	25 G 1	11,2	240,0	458,0	18
24501	2 x 1,5	4,9	29,0	45,0	16
24502	3 G 1,5	5,3	43,0	70,0	16
24503	4 G 1,5	5,8	58,0	98,0	16
24504	5 G 1,5	6,5	72,0	117,0	16
24505	7 G 1,5	7,2	101,0	184,0	16
24276	12 G 1,5	10,2	173,0	326,0	16
24277	18 G 1,5	12,3	260,0	504,0	16
24278	25 G 1,5	14,0	360,0	682,0	16
24279	3 G 2,5	6,4	72,0	121,0	14
24280	4 G 2,5	7,0	96,0	182,0	14
24281	5 G 2,5	7,9	120,0	240,0	14
24282	7 G 2,5	8,7	168,0	316,0	14
24283	3 G 4	7,5	115,0	212,0	12
24284	4 G 4	8,3	154,0	304,0	12
24285	5 G 4	9,2	192,0	386,0	12

Continuation ▶

**HELUFLO<sup>®</sup>-FEP-6Y** multi core, fluorinated polymeric materials,**-100°C up to +205°C****Copper wire, bare**

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
25914	2 x 0,25	2,7	5,0	17,0	24
25915	3 G 0,25	2,9	7,5	22,0	24
25916	4 G 0,25	3,2	10,0	27,0	24
25917	5 G 0,25	3,5	12,5	34,0	24
25918	7 G 0,25	3,9	17,5	46,0	24
25919	2 x 0,5	3,3	9,8	21,0	20
25920	3 G 0,5	3,5	14,7	32,0	20
25921	4 G 0,5	3,9	19,6	44,0	20
25922	5 G 0,5	4,3	24,5	55,0	20
25923	7 G 0,5	4,8	34,3	70,0	20
25924	2 x 0,75	3,6	14,4	31,0	19
25925	3 G 0,75	3,9	21,6	46,0	19
25926	4 G 0,75	4,3	29,0	58,0	19
25927	5 G 0,75	4,7	36,0	69,0	19
25928	7 G 0,75	5,4	50,0	92,0	19
25929	2 x 1	4,1	19,0	41,0	18
25930	3 G 1	4,4	29,0	55,0	18
25931	4 G 1	4,9	38,0	71,0	18
25932	5 G 1	5,5	48,0	88,0	18
25933	7 G 1	6,0	67,0	113,0	18
25934	12 G 1	8,0	115,2	220,0	18
25935	18 G 1	9,5	173,0	321,0	18
25936	25 G 1	11,2	240,0	458,0	18
25937	2 x 1,5	4,9	29,0	45,0	16
25938	3 G 1,5	5,3	43,0	70,0	16
25939	4 G 1,5	5,8	58,0	98,0	16
25940	5 G 1,5	6,5	72,0	117,0	16
25941	7 G 1,5	7,2	101,0	184,0	16
25942	12 G 1,5	10,2	173,0	326,0	16
25943	18 G 1,5	12,3	260,0	504,0	16
25944	25 G 1,5	14,0	360,0	682,0	16
25945	3 G 2,5	6,4	72,0	121,0	14
25946	4 G 2,5	7,0	96,0	182,0	14
25947	5 G 2,5	7,9	120,0	240,0	14
25948	7 G 2,5	8,7	168,0	316,0	14
25949	3 G 4	7,5	115,0	212,0	12
25950	4 G 4	8,3	154,0	304,0	12
25951	5 G 4	9,2	192,0	386,0	12

**copper wire, silvered**

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer Ø approx. mm	Cop. weight kg / km	AG weight kg / km	Weight approx. kg / km	AWG-No.
25952	2 x 0,25	2,7	5,0	0,26	17,0	24
25953	3 G 0,25	2,9	7,5	0,39	22,0	24
25954	4 G 0,25	3,2	10,0	0,52	27,0	24
25955	5 G 0,25	3,5	12,5	0,65	34,0	24
25956	7 G 0,25	3,9	17,5	0,91	46,0	24
25957	2 x 0,5	3,3	9,8	0,34	21,0	20
25958	3 G 0,5	3,5	14,7	0,51	32,0	20
25959	4 G 0,5	3,9	19,6	0,68	44,0	20
25960	5 G 0,5	4,3	24,5	0,85	55,0	20
25961	7 G 0,5	4,8	34,3	1,19	70,0	20
25962	2 x 0,75	3,6	14,4	0,40	31,0	19
25963	3 G 0,75	3,9	21,6	0,60	46,0	19
25964	4 G 0,75	4,3	29,0	0,80	58,0	19
25965	5 G 0,75	4,7	36,0	1,00	69,0	19
25966	7 G 0,75	5,4	50,0	1,40	92,0	19
25967	2 x 1	4,1	19,0	0,52	41,0	18
25968	3 G 1	4,4	29,0	0,78	55,0	18
25969	4 G 1	4,9	38,0	1,04	71,0	18
25970	5 G 1	5,5	48,0	1,30	88,0	18
25971	7 G 1	6,0	67,0	1,82	113,0	18
25972	12 G 1	8,0	115,2	3,12	220,0	18
25973	18 G 1	9,5	173,0	4,68	321,0	18
25974	25 G 1	11,2	240,0	6,50	458,0	18
25975	2 x 1,5	4,9	29,0	0,70	45,0	16
25976	3 G 1,5	5,3	43,0	1,05	70,0	16
25977	4 G 1,5	5,8	58,0	1,40	98,0	16
25978	5 G 1,5	6,5	72,0	1,75	117,0	16
25979	7 G 1,5	7,2	101,0	2,45	184,0	16
25980	12 G 1,5	10,2	173,0	4,20	326,0	16
25981	18 G 1,5	12,3	260,0	6,30	504,0	16
25982	25 G 1,5	14,0	360,0	8,75	682,0	16
25983	3 G 2,5	6,4	72,0	2,10	121,0	14
25984	4 G 2,5	7,0	96,0	2,80	182,0	14
25985	5 G 2,5	7,9	120,0	3,50	240,0	14
25986	7 G 2,5	8,7	168,0	4,90	316,0	14
25987	3 G 4	7,5	115,0	3,60	212,0	12
25989	4 G 4	8,3	154,0	4,80	304,0	12
25990	5 G 4	9,2	192,0	6,00	386,0	12

Dimensions and specifications may be changed without prior notice. (RE01)



Suitable accessories can be found in Chapter X.

- Cable protection tube - HTP



# MULTITHERM 400 halogen-free



## Technical data

- Special core insulation for high temperatures
- **Temperature range** -60°C to +400°C (for short time +500°C)
- **Nominal voltage** 500 V
- **Test voltage** 2500 V
- **Minimum bending radius** 5x cable Ø

## Cable structure

- Copper-conductor nickel plated, fine-wire (ASTM B 355)
- 1. Core insulation of braided glass-fibre impregnated with silicone
- 2. Core insulation of braided glass-fibre impregnated with silicone
- Core identification
  - No. of cores with GN-YE conductor
    - 3 = GN-YE, BU, BN
    - 4 = GN-YE, BK, BU, BN
    - 5 = GN-YE, BK, BU, BN, WH
    - 6 = GN-YE, BK, BU, BN, WH, RD
    - 7 = GN-YE, BK, BU, BN, WH, RD, GY
  - No. of cores without GN-YE conductor
    - 2 = BU, BN
    - 3 = BK, BU, BN
    - 4 = BK, BU, BN, WH
    - 5 = BK, BU, BN, WH, RD
    - 6 = BK, BU, BN, WH, RD, GY
    - 7 = BK, BU, BN, WH, RD, GY, GN
- Overall lay up of cores
- Outer sheath of braided glass-fibre impregnated with silicone

## Properties

- Asbestos and cadmium-free

## Note

- Further sizes are available on request.
- AWG sizes are approximate equivalent values. The actual cross-section is in mm<sup>2</sup>.
- screened analogue type: **MULTITHERM 400-ES**, confer page 236

## Application

MULTITHERM 400 cables are used for applications where extremely high connecting and ambient temperatures can arise, e. g. in iron and steel works, rolling mills, foundries, glass and ceramic factories, in furnace and power plant construction, during thermoplastic moulding processes etc. The special construction of the cable is designed for a recommended maximum temperature in damp environments of 220°C and for dry environments above this temperature.

CE= The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer Ø approx. mm	Cop. weight kg / km	Max. perm. current carrying capacity at +340°C (A)	Weight approx. kg / km	AWG-No.
51741	2 x 0,5	6,2	10,0	3,3	47,0	20
51742	3 x 0,5	6,4	15,0	3,1	50,0	20
51743	4 x 0,5	7,5	19,0	3,0	70,0	20
51744	5 x 0,5	8,0	25,0	2,9	81,0	20
51745	6 x 0,5	8,6	30,0	2,8	97,0	20
51746	7 x 0,5	8,7	34,0	2,7	105,0	20
51747	2 x 0,75	6,7	14,4	5,1	55,0	19
51748	3 x 0,75	7,0	21,6	5,1	66,0	19
51749	4 x 0,75	8,0	29,0	4,9	86,0	19
51750	5 x 0,75	8,8	36,0	4,7	103,0	19
51751	6 x 0,75	9,5	43,0	4,5	119,0	19
51752	7 x 0,75	9,7	50,0	4,4	130,0	19
51753	2 x 1	6,9	19,0	7,0	63,0	18
51754	3 x 1	7,8	29,0	6,7	82,0	18
51755	4 x 1	8,3	38,0	6,4	98,0	18
51756	5 x 1	9,1	48,0	6,2	119,0	18
51757	6 x 1	9,8	58,0	6,0	138,0	18
51758	7 x 1	10,0	67,0	5,8	150,0	18
51759	2 x 1,5	8,0	29,0	9,4	87,0	16
51760	3 x 1,5	8,3	43,0	9,0	103,0	16

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer Ø approx. mm	Cop. weight kg / km	Max. perm. current carrying capacity at +340°C (A)	Weight approx. kg / km	AWG-No.
51761	4 x 1,5	9,1	58,0	8,6	128,0	16
51762	5 x 1,5	10,0	72,0	8,3	150,0	16
51763	6 x 1,5	10,7	88,0	8,0	175,0	16
51764	7 x 1,5	11,0	101,0	7,8	190,0	16
51765	2 x 2,5	9,2	48,0	12,2	135,0	14
51766	3 x 2,5	9,7	72,0	11,6	153,0	14
51767	4 x 2,5	10,6	96,0	11,2	190,0	14
50060	5 x 2,5	11,8	120,0	10,8	230,0	14
50061	6 x 2,5	12,8	144,0	10,4	270,0	14
50062	7 x 2,5	13,0	168,0	10,1	295,0	14
50063	2 x 4	11,0	77,0	16,0	191,0	12
50064	3 x 4	11,4	115,0	15,3	224,0	12
50065	4 x 4	13,0	154,0	14,6	285,0	12
50066	5 x 4	14,5	192,0	14,1	360,0	12
50067	7 x 4	16,5	270,0	13,3	485,0	12
50068	3 x 6	14,2	173,0	20,0	340,0	10
50069	4 x 6	16,2	230,0	19,0	442,0	10
50070	5 x 6	17,7	288,0	18,0	535,0	10
50071	4 x 10	20,0	384,0	26,0	710,0	8
50072	4 x 16	24,5	615,0	34,0	990,0	6

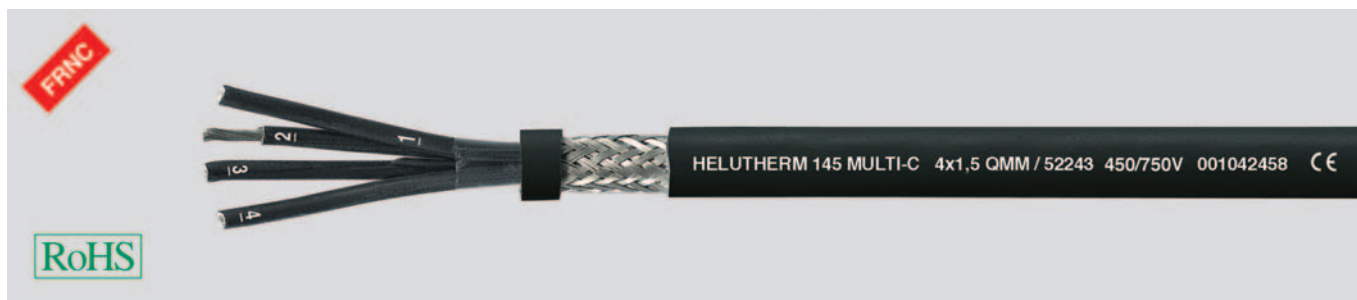
Dimensions and specifications may be changed without prior notice. (RE01)



Suitable accessories can be found in Chapter X.

- Cable protection tube - HTP

# HELUTHERM® 145 MULTI-C flexible, cross-linked, halogen-free, Cu-screened, EMC-preferred type



## Technical data

- Temperature-resistant and halogen-free connection and control cable
- **Temperature range**  
flexing -35°C to +120°C  
fixed installation -55°C to +145°C  
in short-circuit +250°C
- **Nominal voltage**  
up to 1,0 mm<sup>2</sup> U<sub>0</sub>/U 300/500 V  
from 1,5 mm<sup>2</sup> U<sub>0</sub>/U 450/750 V  
with protected fixed installation  
from 1,5 mm<sup>2</sup> U<sub>0</sub>/U 600/1000 V
- **Test voltage** 3000 V
- **Minimum bending radius**  
in operation 8x cable Ø  
fixed installation 4x cable Ø
- **Coupling resistance**  
max. 250 Ohm/km
- **Caloric load values**  
see Technical Informations
- **Power ratings table**  
see Technical Informations
- **Approval**  
Germanischer Lloyd

## Cable structure

- Tinned copper-conductor, to DIN VDE 0295 cl.5, fine-wire, BS 6360 cl.5, IEC 60228 cl.5
- Core insulation of cross-linked, halogen-free polyolefin-copolymer
- Core identification black cores with continuous white numbering
- Cores stranded in layers with optimal lay-length
- Tinned copper braided screen, approx. 85% coverage
- Outer sheath of cross-linked, halogen-free polyolefin-copolymer
- Sheath colour black
- with meter marking
- Different insulation- and outer sheath in other colours available on request

## Note

- AWG sizes are approximate equivalent values. The actual cross-section is in mm<sup>2</sup>.
- unscreened analogue type:  
**HELUTHERM® 145 MULTI**, confer page 221

## Properties

- Lower propagation of fire
- Low development of smoke and fumes
- Good abrasion and notch resistance
- Good resistance to oils and weathering
- Resistant to UV radiation and ozone
- Resistant to soldering temperatures
- Thermal class B
- These control cables are resistant to melting, even when in contact with a soldering iron at temperatures of between 300°C and 380°C, because of the cross-linking for the insulation material
- The materials used in manufacture are cadmium-free and contain no silicone and free from substances harmful to the wetting properties of lacquers

## Tests

- Flame test (unit flame test) acc. to DIN VDE 0482-332-3-22, BS 4066 Teil 3, DIN EN 60332-3-22, IEC 60332-3-22 (previously DIN VDE 0472 part 804 test method C)
- Flame test (cable) acc. to DIN VDE 0482-332-1-2, DIN EN 60332-1-2, IEC 60332-1-2 (equivalent DIN VDE 0472 part 804 test method B)
- Corrosiveness of combustion gases acc. to DIN VDE 0482 part 267, DIN EN 50267-2-2, IEC 60754-2 (equivalent DIN VDE 0472 part 813)
- Halogen-free acc. to DIN VDE 0482 part 267, DIN EN 50267-2-1, IEC 60754-1 (equivalent DIN VDE 0472 part 815)
- Smoke density acc. to DIN VDE 0482 part 1034-1+2, DIN EN 61034-1+2, IEC 61034-1+2, BS 7622 part 1+2 (previously DIN VDE 0472 part 816)

## Application

These halogen-free, cross-linked and temperature resistant wiring and control cables with enhanced fire-behaviour properties are used for wiring up the lighting fixtures, heaters, electric machines (temperature class B), switching systems and distribution switchboards. A very long service life is also given on account of their excellent high-temperature stability. These cables exhibit good resistance to weathering as well as being very stable to temperature, moisture, ozone and UV radiation. These cables are therefore mainly used for traffic control systems and diverse outdoor applications. The development of smoke is low and no corrosive gases are liberated during combustion of these halogen-free cables in case of fire. The risk of toxic fumes is considerably less in the event of fire because the caloric load values is lower. Precious time can thus be won for a disciplined evacuation, and unnecessary loss of life can be prevented. The extent of the damage to costly control and monitoring systems and the concrete and steel structures of buildings and plant due to fire is reduced by this. Injuries to persons and damage to materials can be prevented. A lower conductor cross-section is possible in certain circumstances because of the high thermal load and thus savings in the space and weight required can be made. These wiring and control cables provide a significant contribution in safety engineering and environmental protection.

**EMC** = Electromagnetic compatibility

To optimize the EMC features we recommend a large round contact of the copper braiding on both ends.

**CE** = The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
52194	2 x 0,25	5,0	16,0	36,0	24
52195	3 x 0,25	5,5	21,0	44,0	24

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
52196	5 x 0,25	6,4	29,0	68,0	24
52197	7 x 0,25	7,5	37,0	95,0	24

Continuation ►

# HELUTHERM® 145 MULTI-C flexible, cross-linked, halogen-free, Cu-screened, EMC-preferred type



Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
52198	1 x 0,5	3,7	15,0	24,0	20
52199	2 x 0,5	5,6	29,0	55,0	20
52200	3 x 0,5	6,1	38,0	64,0	20
52201	4 x 0,5	6,7	45,0	78,0	20
52202	5 x 0,5	7,3	51,0	95,0	20
52203	6 x 0,5	7,9	66,0	106,0	20
52204	7 x 0,5	8,4	68,0	122,0	20
52205	8 x 0,5	9,0	80,0	138,0	20
52206	10 x 0,5	10,0	93,0	161,0	20
52207	12 x 0,5	10,0	107,0	170,0	20
52208	14 x 0,5	11,0	122,0	193,0	20
52209	16 x 0,5	11,7	129,0	216,0	20
52210	19 x 0,5	12,8	158,0	253,0	20
52211	21 x 0,5	13,5	167,0	281,0	20
52212	1 x 0,75	4,0	18,0	29,0	19
52213	2 x 0,75	6,6	38,0	71,0	19
52214	3 x 0,75	6,9	50,0	82,0	19
52215	4 x 0,75	7,6	58,0	100,0	19
52216	5 x 0,75	8,3	70,0	117,0	19
52217	6 x 0,75	8,9	85,0	135,0	18
52218	7 x 0,75	9,9	90,0	158,0	19
52219	8 x 0,75	10,6	110,0	178,0	19
52220	10 x 0,75	11,5	140,0	207,0	19
52221	12 x 0,75	11,5	148,0	220,0	19
52222	14 x 0,75	12,2	167,0	250,0	19
52223	16 x 0,75	12,9	183,0	282,0	19
52224	19 x 0,75	14,5	212,0	335,0	19
52225	21 x 0,75	15,3	230,0	370,0	19
52226	1 x 1	4,2	20,0	33,0	18
52227	2 x 1	7,0	31,0	78,0	18
52228	3 x 1	7,4	56,0	92,0	18
52229	4 x 1	8,1	66,0	112,0	18
52230	5 x 1	8,9	95,0	134,0	18
52231	6 x 1	9,5	105,0	164,0	18
52232	7 x 1	10,5	109,0	192,0	18
52233	8 x 1	11,4	130,0	219,0	18
52234	10 x 1	12,5	138,0	254,0	18
52235	12 x 1	12,5	164,0	270,0	18
52236	14 x 1	13,5	198,0	308,0	18
52237	16 x 1	14,3	203,0	350,0	18
52238	19 x 1	16,2	235,0	447,0	18
52239	21 x 1	17,0	257,0	492,0	18
52240	1 x 1,5	4,8	22,0	42,0	16
52241	2 x 1,5	8,2	58,0	105,0	16
52242	3 x 1,5	8,7	71,0	121,0	16
52243	4 x 1,5	9,4	86,0	156,0	16
52244	5 x 1,5	10,5	104,0	188,0	16
52245	6 x 1,5	11,5	118,0	225,0	16
52246	7 x 1,5	12,6	136,0	264,0	16
52247	8 x 1,5	13,7	172,0	308,0	16
52248	10 x 1,5	15,0	193,0	361,0	16
52249	12 x 1,5	15,0	222,0	383,0	16
52250	14 x 1,5	16,0	272,0	458,0	16
52251	16 x 1,5	17,0	285,0	515,0	16
52252	19 x 1,5	19,3	331,0	639,0	16
52253	21 x 1,5	20,3	367,0	705,0	16
51000	25 x 1,5	21,7	526,0	841,0	16

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
52254	1 x 2,5	5,6	28,0	59,0	14
52255	2 x 2,5	9,8	96,0	148,0	14
52256	3 x 2,5	10,4	146,0	183,0	14
52257	4 x 2,5	11,5	150,0	221,0	14
52258	5 x 2,5	12,6	200,0	273,0	14
52259	6 x 2,5	13,8	227,0	326,0	14
52260	7 x 2,5	15,3	235,0	397,0	14
52261	8 x 2,5	16,5	265,0	475,0	14
52262	10 x 2,5	18,3	326,0	542,0	14
52263	12 x 2,5	18,3	376,0	582,0	14
52264	14 x 2,5	19,6	428,0	681,0	14
52265	16 x 2,5	20,7	480,0	778,0	14
52266	19 x 2,5	23,5	557,0	948,0	14
52267	21 x 2,5	24,4	606,0	1042,0	14
52268	1 x 4	6,3	56,0	86,0	12
52269	2 x 4	10,9	135,0	196,0	12
52270	3 x 4	11,5	178,0	248,0	12
52271	4 x 4	12,8	220,0	316,0	12
52272	5 x 4	14,3	259,0	376,0	12
52273	6 x 4	15,6	302,0	452,0	12
52274	7 x 4	17,0	355,0	555,0	12
52275	8 x 4	18,3	392,0	655,0	12
52276	10 x 4	20,7	480,0	767,0	12
52277	12 x 4	20,7	557,0	829,0	12
52278	14 x 4	22,1	636,0	948,0	12
52279	1 x 6	6,9	81,0	108,0	10
52280	2 x 6	12,1	175,0	255,0	10
52281	3 x 6	12,8	240,0	330,0	10
52282	4 x 6	14,3	305,0	429,0	10
52283	5 x 6	16,0	441,0	536,0	10
52284	6 x 6	17,4	473,0	624,0	10
52285	7 x 6	19,3	505,0	751,0	10
52286	1 x 10	8,4	124,0	170,0	8
52287	2 x 10	15,1	265,0	409,0	8
52288	3 x 10	16,4	370,0	550,0	8
52289	4 x 10	18,1	485,0	715,0	8
52290	5 x 10	20,2	610,0	882,0	8
52291	6 x 10	22,3	715,0	1026,0	8
52292	7 x 10	24,3	820,0	1195,0	8

Dimensions and specifications may be changed without prior notice. (RE01)



Suitable accessories can be found in Chapter X.

- Cable protection tube - HTP

E

# SiHF-C-Si silicon multicore cable, halogen-free, Cu-screened, EMC-preferred type, meter marking



## Technical data

- Special silicone-insulated cable with higher heat-resistance adapted to DIN VDE 0250 part 1 and DIN VDE 0285-525-2-83/ DIN EN 50525-2-83
- **Temperature range** -60°C to +180°C (for short time +220°C)
- **Temperature limit** at the conductor in operation +180°C
- **Nominal voltage**  $U_0/U$  300/500 V
- **Test voltage** 2000 V
- **Breakdown voltage** min. 5000 V
- **Insulation resistance** min. 200 MOhm x km
- **Power rating** at ambient temperatures up to +145°C acc. to DIN VDE 0100  
150°C - load value 100%  
155°C - load value 91%  
160°C - load value 82%  
165°C - load value 71%  
170°C - load value 58%  
175°C - load value 41%
- **Minimum bending radius** flexing 10x cable Ø  
fixed installation 5x cable Ø
- **Coupling resistance** max. 250 Ohm/km
- **Radiation resistance** up to  $20 \times 10^6$  cJ/kg (up to 20 Mrad)

## Application

Silicone-rubber-insulated cables are used for all applications where the cable insulation is subjected to high temperature fluctuations. These cables are heat-resistant for continuous use at temperatures up to +180°C, as well as for short periods of time at +220°C. Silicone-rubber-insulated cables can also be used at low temperatures down to -60°C because of the excellent weathering resistance of the material. These cables are halogen-free and hence are particularly suitable for applications in iron and steel works, rolling mills, foundries, in aircraft construction and ship building, as well as in cement, glass and ceramic plants. Silicone-rubber-insulated cables have demonstrated proven applications in projector and high-power lighting fixtures as well as all types of heating equipment. An interference-free transmission of signals and pulse is assured by the high screening density. The ideal interference-protected silicone multicore flexible cable for such applications as given above.

**EMC** = Electromagnetic compatibility

To optimize the EMC features we recommend a large round contact of the copper braiding on both ends.

CE = The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

## Cable structure

- Tinned copper-conductor, to DIN VDE 0295 cl.5, fine-wire, BS 6360 cl.5, IEC 60228 cl.5
- Core insulation of silicone
- Core identification to DIN VDE 0293-308 - up to 5 cores coloured - from 6 cores, black with continuous white numbering
- GN-YE conductor, 3 cores and above
- Cores stranded in layers with optimal lay-length
- Inner sheath of silicone
- Tinned copper braided screen, approx. 85% coverage
- Outer sheath of silicone
- Sheath colour preferentially redbrown
- with meter marking

## Properties

- **Resistant to** High molecular oils, fats from vegetables and animals, alcohols, plasticizers and clophenes, diluted acids, lyes and salt dissolution, oxidation substances, tropical influences and weather, lake water, oxygen, ozone
- For laying as a fixed installation only in open or ventilated pipe systems as well as in ducts. Otherwise the mechanical properties of the silicon are reduced by the enclosed air at temperatures exceeding 90°C.

## Tests

- Halogen-free acc. to DIN VDE 0482 part 267, DIN EN 50267-2-2, IEC 60754-2 (equivalent DIN VDE 0472 part 813)
- **Behaviour in fire** no flame propagation acc. to DIN VDE 0482-332-1-2, DIN EN 60332-1-2, IEC 60332-1 (equivalent DIN VDE 0472 part 804 test method B)

## Note

- G = with green-yellow conductor  
x = without green-yellow conductor
- AWG sizes are approximate equivalent values. The actual cross-section is in mm<sup>2</sup>.
- unscreened analogue type: **SiHF**, confer page 223

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
23151	2 x 0,5	8,0	55,5	101,0	20
23152	3 G 0,5	8,3	60,8	118,0	20
23153	4 G 0,5	9,1	66,5	131,0	20
23154	5 G 0,5	9,9	81,6	153,0	20
23155	7 G 0,5	10,9	92,2	173,0	20
23156	10 G 0,5	12,8	124,0	242,0	20
23157	12 G 0,5	13,5	134,4	263,0	20
23158	16 G 0,5	15,1	170,2	326,0	20
23159	18 G 0,5	15,9	181,0	351,0	20
23291	25 G 0,5	18,5	230,1	348,0	20

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
23160	2 x 0,75	9,0	61,4	124,0	19
23161	3 G 0,75	9,4	69,1	136,0	19
23162	4 G 0,75	10,4	86,7	159,0	19
23163	5 G 0,75	11,3	95,2	180,0	19
23164	7 G 0,75	12,0	113,3	212,0	19
23165	10 G 0,75	13,9	165,2	306,0	19
23166	12 G 0,75	15,2	180,3	333,0	19
23167	16 G 0,75	16,9	212,2	418,0	19
23168	18 G 0,75	18,0	282,1	453,0	19
23292	25 G 0,75	20,8	297,4	468,0	19

Continuation ▶

# SiHF-C-Si silicon multicore cable, halogen-free, Cu-screened, EMC-preferred type, meter marking



Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
23169	2 x 1	9,4	66,7	132,0	18
23170	3 G 1	9,8	86,2	153,0	18
23171	4 G 1	11,1	96,8	173,0	18
23172	5 G 1	12,0	108,3	202,0	18
23173	7 G 1	12,7	141,2	243,0	18
23174	10 G 1	14,7	190,0	238,0	18
23175	12 G 1	15,8	209,8	371,0	18
23176	16 G 1	17,4	251,8	468,0	18
23177	18 G 1	18,5	297,4	526,0	18
23293	25 G 1	21,8	329,0	559,0	18
23178	2 x 1,5	10,8	87,7	172,0	16
23179	3 G 1,5	11,2	103,5	198,0	16
23180	4 G 1,5	12,0	131,7	235,0	16
23181	5 G 1,5	12,8	148,5	281,0	16
23182	7 G 1,5	13,6	193,4	345,0	16
23183	10 G 1,5	14,7	268,5	482,0	16
23184	12 G 1,5	15,8	298,4	531,0	16
23185	16 G 1,5	17,4	362,3	662,0	16
23186	18 G 1,5	20,6	394,0	720,0	16
23294	25 G 1,5	24,2	488,2	791,0	16

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
23187	2 x 2,5	12,0	122,3	230,0	14
23188	3 G 2,5	12,9	147,7	275,0	14
23189	4 G 2,5	13,8	188,6	340,0	14
23190	5 G 2,5	14,8	214,9	394,0	14
23191	7 G 2,5	15,8	265,7	488,0	14
23192	4 G 4	16,0	294,0	520,0	12
23193	5 G 4	17,4	374,0	653,0	12
23150	2 x 6	15,8	171,0	350,0	20
23194	4 G 6	18,1	449,0	781,0	10
23195	5 G 6	20,0	563,0	982,0	10
23196	4 G 10	23,2	759,0	1294,0	8
23197	4 G 16	25,2	1180,0	1988,0	6
23198	4 G 25	31,0	1276,0	2995,0	4

Dimensions and specifications may be changed without prior notice. (RE01)



Suitable accessories can be found in Chapter X.

- Cable protection tube - HTP

E



# THERMFLEX® 180 EWKF-C silicone multicore cable,

halogen-free, screened, EMC-preferred type, meter marking



## Technical data

- adapted to DIN VDE 0285-525-2-83/ DIN EN 50525-2-83
- **Temperature range**  
flexing -25°C to +180°C  
fixed installation -60°C to +180°C
- **Nominal voltage** U<sub>0</sub>/U 300/500 V
- **Test voltage** 2000 V
- **Insulation resistance**  
min. 200 MOhm x km
- **Minimum bending radius**  
flexing 10x cable Ø  
fixed installation 5x cable Ø
- **Coupling resistance**  
max. 250 Ohm/km
- **Radiation resistance**  
up to 20x10<sup>6</sup> cJ/kg (up to 20 Mrad)

## Tests

- Insulation integrity  
testet acc. to DIN VDE 0472 part 814 and IEC 60331
- Halogen-free  
acc. to DIN VDE 0482 part 267, DIN EN 50267-2-1, IEC 60754-1 (equivalent DIN VDE 0472 part 815)
- Behaviour in fire  
no flame propagation acc. to DIN VDE 0482-332-1-2, DIN EN 60332-1-2, IEC 60332-1 (equivalent DIN VDE 0472 part 804 test method B)
- Corrosiveness of combustion gases  
acc. to DIN VDE 0482 part 267, DIN EN 50267-2-2, IEC 60754-2

## Cable structure

- Tinned copper-conductor, to DIN VDE 0295 cl.5, fine-wire, BS 6360 cl.5, IEC 60228 cl.5
- Core insulation of special silicone compound type E12 to DIN VDE 0207-363-1 / DIN EN 50363-1
- Core identification to DIN VDE 0293-308 - up to 5 cores coloured  
- from 6 cores, black with continuous white numbering
- GN-YE conductor, 3 cores and above in the outer layer
- Cores stranded in layers with optimal lay-length
- Inner sheath of special silicone
- Tinned copper braided screen, approx. 85% coverage
- Outer sheath of special silicone compound type 2GM1 to DIN VDE 0207-363-2-1/DIN EN 50363-2-1
- Sheath colour black (RAL 9005)
- with meter marking

## Properties

- Smoke density - low
- Due to the special abrasive and notch resistance outer sheath, these cables are suitable for heavy loading of mechanical stresses than the usual standard silicone cables
- Hardly changes of dielectric strength and the insulation resistance also at high temperatures
- High ignition or flash point
- In case of fire, forms an insulating layer of SiO<sub>2</sub>
- **Resistant to**  
High molecular oils, fats from vegetables and animals, alcohols, plasticizers and clophenes, diluted acids, lyes and salt dissolution, oxidation substances, tropical influences and weather, lake water, oxygen, ozone

## Note

- G = with green-yellow conductor  
x = without green-yellow conductor
- AWG sizes are approximate equivalent values. The actual cross-section is in mm<sup>2</sup>.
- **EWKF** = Improved values to **E**=tearing resistance, **W**=breaking strength propagation, **K**=notch strength, **F**=flexibility
- unscreened analogue type:  
**THERMFLEX® 180 EWKF**, confer page 225

## Application

These cables are ideal for use everywhere, where increased mechanical stresses for the installation and operation are required. Silicone-rubber-insulated cables are used for all applications where the cable insulation is subjected to high temperature fluctuations. For use in dry, damp and wet rooms as well outdoor. As flexible connecting cable for low mechanical stress i. e. sauna, solar installations, foundries and steel plants. This cable can be used for fixed installation only in open and ventilated cable tubes and cable ducts. An interference-free transmission of signals and pulse is assured by the high screening density.

**EMC** = Electromagnetic compatibility

To optimize the EMC features we recommend a large round contact of the copper braiding on both ends.

**FRNC** = Flame Retardant Non Corrosive

All silicon cables are available also in FRNC versions. The sheath designed with special-compound conform flame test method C to DIN VDE 0472 part 804 and IEC 60332-3 as well as HD 405.3. This special compound is self-extinguishing. Because of that these cables can be installed as security cable with functionality as for example in communal buildings, power stations, hotels, airports etc.

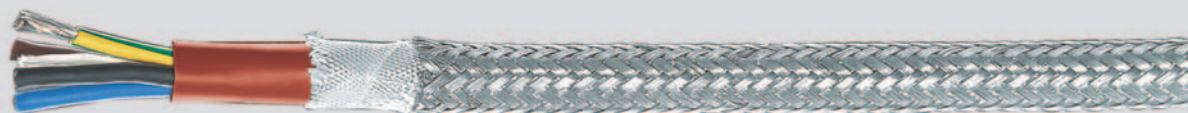
**CE** = The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
79804	2 x 0,75	9,0	61,4	124,0	19
79805	3 G 0,75	9,4	69,1	136,0	19
79806	4 G 0,75	10,4	86,7	160,0	19
79807	5 G 0,75	11,2	95,2	180,0	19
79808	2 x 1	9,4	66,7	132,0	18
79809	3 G 1	9,8	86,2	154,0	18
79810	4 G 1	10,7	96,8	176,0	18
79811	5 G 1	11,6	108,3	207,0	18
79812	2 x 1,5	10,8	87,7	170,0	16
79813	3 G 1,5	11,2	103,5	190,0	16
79814	4 G 1,5	12,0	131,7	231,0	16
79815	5 G 1,5	12,8	148,5	282,0	16
79816	7 G 1,5	13,6	193,4	342,0	16
701219	12 G 1,5	17,2	298,4	531,0	16

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
79817	16 G 1,5	20,0	362,3	660,0	16
79818	20 G 1,5	21,3	405,1	766,0	16
79819	2 x 2,5	12,0	122,3	230,0	14
79820	3 G 2,5	12,9	147,7	275,0	14
79821	4 G 2,5	13,9	188,6	340,0	14
79822	5 G 2,5	14,8	214,9	395,0	14
79823	2 x 4	14,2	137,0	308,0	12
79824	3 G 4	14,9	178,1	364,0	12
79825	4 G 4	16,0	294,0	511,0	12
79826	5 G 4	17,4	374,0	630,0	12
79827	2 x 6	15,8	185,0	418,0	10
79828	3 G 6	16,6	241,1	612,0	10
79829	4 G 6	18,1	449,0	781,0	10
79830	5 G 6	20,0	563,0	980,0	10

Dimensions and specifications may be changed without prior notice. (RE01)

# SiHF/GL-P silicon multicore cable, steel braiding, halogen-free



## Technical data

- Special silicone multicore cable with higher heat-resistance range adapted to DIN VDE 0250 part 1 and DIN VDE 0285-525-2-83/ DIN EN 50525-2-83
- **Temperature range** -60°C to +180°C (for short time +220°C)
- **Temperature limit** at the conductor in operation +180°C
- **Nominal voltage**  $U_0/U$  300/500 V
- **Test voltage** 2000 V
- **Breakdown voltage** min. 5000 V
- **Insulation resistance** min. 200 MOhm x km
- **Power rating** at ambient temperature up to +145°C to DIN VDE 0100 for higher temperatures valid:
  - 150°C - load value 100%
  - 155°C - load value 91%
  - 160°C - load value 82%
  - 165°C - load value 71%
  - 170°C - load value 58%
  - 175°C - load value 41%
- **Minimum bending radius** flexing 10x cable Ø fixed installation 5x cable Ø
- **Radiation resistance** up to 20x10<sup>6</sup> cJ/kg (up to 20 Mrad)

## Cable structure

- Tinned copper-conductor, to DIN VDE 0295 cl.5, fine-wire, BS 6360 cl.5, IEC 60228 cl.5
- Core insulation of silicone
- Core identification to DIN VDE 0293-308
  - up to 5 cores coloured
  - from 6 cores, black with continuous white numbering
- GN-YE conductor, 3 cores and above
- Cores stranded in layers with optimal lay-length
- Sheath of silicone
- Glass fibre tape over the sheath
- Galvanized steel wire outer braiding

## Properties

- **Advantages** Hardly changes of dielectric strength and the insulation resistance also at high temperatures, high ignition or flash point, in case of fire, forms an insulating layer of SiO<sub>2</sub>
- **Resistant to** High molecular oils, fats from vegetables and animals, alcohols, plasticizers and clophenes, diluted acids, lyes and salt dissolution, oxidation substances, tropical influences and weather, lake water, oxygen
- For laying as a fixed installation only in open or ventilated pipe systems as well as in ducts. Otherwise the mechanical properties of the silicon are reduced by the enclosed air at temperatures exceeding 90°C

## Tests

- Corrosiveness of combustion gases acc. to DIN VDE 0482 part 267, DIN EN 50267-2-2, IEC 60754-2 (equivalent DIN VDE 0472 part 813)
- **Behaviour in fire** no flame propagation acc. to DIN VDE 0482-332-1-2, DIN EN 60332-1-2, IEC 60332-1 (equivalent DIN VDE 0472 part 804 test method B)

## Note

- G = with green-yellow conductor  
x = without green-yellow conductor
- AWG sizes are approximate equivalent values. The actual cross-section is in mm<sup>2</sup>.

## Application

Silicone cables screened with steel braiding were evolved for use wherever insulation is subjected to extreme temperature changes. They are heat-resistant for permanent temperature up to +180°C, for short time operation up to +220°C. The good performance of the environmental resistant properties means that silicone cables can be used at temperatures down to -60°C. Silicone cables are halogen-free cables and are especially suited for installation in power stations. They have also found their uses in the steel producing industries, aviation industry, ship building as well as in ceramic, glass and cement factories. The screened steel braiding ensures a disturbance-free transmission of signals and impulses.

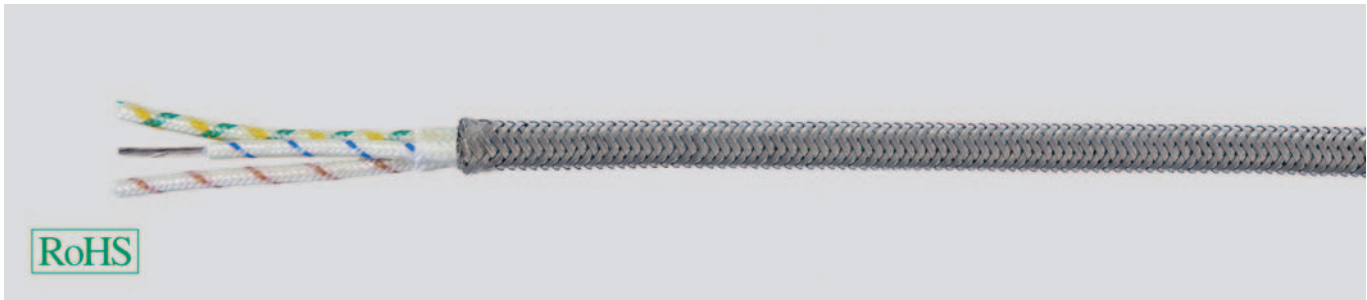
CE= The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
23062	2 x 0,75	7,9	14,4	90,0	19
23063	3 G 0,75	8,3	21,6	101,0	19
23064	4 G 0,75	9,3	29,0	129,0	19
23065	5 G 0,75	10,0	36,0	157,0	19
23067	7 G 0,75	10,7	50,0	177,0	19
23068	2 x 1	8,0	19,0	97,0	18
23069	3 G 1	8,9	29,0	122,0	18
23070	4 G 1	9,4	38,0	141,0	18
23071	5 G 1	10,4	48,0	166,0	18
23073	7 G 1	11,1	67,0	197,0	18
23074	2 x 1,5	9,0	29,0	127,0	16
23075	3 G 1,5	9,5	43,0	145,0	16
23076	4 G 1,5	10,3	58,0	173,0	16
23077	5 G 1,5	11,0	72,0	202,0	16
23078	6 G 1,5	12,0	86,0	240,0	16
23079	7 G 1,5	12,0	101,0	244,0	16
23080	8 G 1,5	13,0	115,0	261,0	16
23081	12 G 1,5	15,5	173,0	327,0	16
23082	14 G 1,5	16,2	202,0	382,0	16
23083	18 G 1,5	18,7	259,0	440,0	16

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
23084	24 G 1,5	21,5	346,0	600,0	16
23085	2 x 2,5	10,7	48,0	187,0	14
23086	3 G 2,5	11,2	72,0	205,0	14
23087	4 G 2,5	12,1	96,0	278,0	14
23088	5 G 2,5	13,3	120,0	322,0	14
23089	6 G 2,5	14,3	144,0	351,0	14
23090	7 G 2,5	14,4	168,0	380,0	14
23091	2 x 4	12,5	77,0	240,0	12
23092	3 G 4	13,0	115,0	311,0	12
23093	4 G 4	15,0	154,0	384,0	12
23094	5 G 4	16,0	192,0	454,0	12
23095	7 G 4	17,5	269,0	633,0	12
23096	2 x 6	15,1	115,0	321,0	10
23097	3 G 6	15,9	173,0	432,0	10
23098	4 G 6	18,0	230,0	544,0	10
23099	5 G 6	19,4	288,0	656,0	10
23100	7 G 6	20,7	403,0	768,0	10
23101	4 G 10	22,1	384,0	925,0	8
23102	4 G 16	26,1	614,0	1235,0	6
23103	4 G 25	30,4	960,0	1700,0	4

Dimensions and specifications may be changed without prior notice. (RE01)

# MULTITHERM 400-ES halogen-free, high-grade steel braiding



## Technical data

- Special core insulation for high temperatures
- **Temperature range** -60°C to +400°C (for short time +500°C)
- **Nominal voltage** 500 V
- **Test voltage** 2500 V
- **Minimum bending radius** 5x cable Ø

## Cable structure

- Copper-conductor nickel plated, fine-wire (ASTM B 355)
- 1. Core insulation of braided glass-fibre impregnated with silicone
- 2. Core insulation of braided glass-fibre impregnated with silicone
- Core identification
  - No. of cores with GN-YE conductor
  - 3 = GN-YE, BU, BN
  - 4 = GN-YE, BK, BU, BN
  - 5 = GN-YE, BK, BU, BN, WH
  - 6 = GN-YE, BK, BU, BN, WH, RD
  - 7 = GN-YE, BK, BU, BN, WH, RD, GY
  - No. of cores without GN-YE conductor
  - 2 = BU, BN
  - 3 = BK, BU, BN
  - 4 = BK, BU, BN, WH
  - 5 = BK, BU, BN, WH, RD
  - 6 = BK, BU, BN, WH, RD, GY
  - 7 = BK, BU, BN, WH, RD, GY, GN
- Overall lay up of cores
- Outer sheath of braided glass-fibre impregnated with silicone
- braided high-grade steel, coverage approx. 80%

## Properties

- Asbestos and cadmium-free

## Note

- Further sizes are available on request.
- AWG sizes are approximate equivalent values. The actual cross-section is in mm<sup>2</sup>.
- unshielded analogue type: **MULTITHERM 400**, confer page 229

## Application

Where extremely high connecting and ambient temperatures occur, e. g. in iron and steel works, rolling mills, foundries, glass and ceramic plants, in power plant construction, in the chemical industry, nuclear technology, crude oil engineering, in technical applications in medicine, as well as for wiring resistances in electrical heating equipment, furnaces and machinery in thermoplastic forming. Due to the special construction of the cable, a maximum temperature of approx. 220°C is recommended for use in damp environments. Applications at temperatures above this should be used in dry environments only. The robust braiding of high-grade steel protects the cable from aggressive atmospheres and mechanical stresses. The braided screen can also be used for earthing purposes.

☑= The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer Ø approx. mm	Cop. weight kg / km	Max. permitt. current carrying capacity at +340°C (A)	Weight approx. kg / km	AWG-No.
52018	2 x 0,5	7,1	10,0	3,3	84,0	20
52019	3 x 0,5	7,3	15,0	3,1	89,0	20
52020	4 x 0,5	8,4	19,0	3,0	111,0	20
52021	5 x 0,5	8,9	25,0	2,9	126,0	20
52022	6 x 0,5	9,5	30,0	2,8	146,0	20
52023	7 x 0,5	9,6	34,0	2,7	158,0	20
52024	2 x 0,75	7,6	14,4	5,1	95,0	19
52025	3 x 0,75	7,9	21,6	5,1	109,0	19
52026	4 x 0,75	8,9	29,0	4,9	131,0	19
52027	5 x 0,75	9,7	36,0	4,7	157,0	19
52028	6 x 0,75	10,4	43,0	4,5	177,0	19
52029	7 x 0,75	10,6	50,0	4,4	190,0	19
52030	2 x 1	7,8	19,0	7,0	105,0	18
52031	3 x 1	8,7	29,0	6,7	126,0	18
52032	4 x 1	9,2	38,0	6,4	148,0	18
52033	5 x 1	10,0	48,0	6,2	174,0	18
52034	6 x 1	10,7	58,0	6,0	198,0	18
52035	7 x 1	10,9	67,0	5,8	212,0	18
52036	2 x 1,5	8,9	29,0	9,4	132,0	16
52037	3 x 1,5	9,2	43,0	9,0	153,0	16

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer Ø approx. mm	Cop. weight kg / km	Max. permitt. current carrying capacity at +340°C (A)	Weight approx. kg / km	AWG-No.
52038	4 x 1,5	10,0	58,0	8,6	183,0	16
52039	5 x 1,5	10,9	72,0	8,3	212,0	16
52040	6 x 1,5	11,6	88,0	8,0	241,0	16
52041	7 x 1,5	11,9	101,0	7,8	259,0	16
52042	2 x 2,5	10,1	48,0	12,2	191,0	14
52043	3 x 2,5	10,6	72,0	11,6	213,0	14
52044	4 x 2,5	11,5	96,0	11,2	256,0	14
52045	5 x 2,5	12,7	120,0	10,8	307,0	14
52046	6 x 2,5	14,9	144,0	10,4	359,0	14
52047	7 x 2,5	15,1	168,0	10,1	388,0	14
52048	2 x 4	11,9	77,0	16,0	260,0	12
52049	3 x 4	12,3	115,0	15,3	303,0	12
52050	4 x 4	15,1	154,0	14,6	378,0	12
52051	5 x 4	15,6	192,0	14,1	458,0	12
52052	7 x 4	16,6	270,0	13,3	593,0	12
52053	3 x 6	16,3	173,0	20,0	442,0	10
52054	4 x 6	18,3	230,0	19,0	567,0	10
52055	5 x 6	19,8	288,0	18,0	671,0	10
52056	4 x 10	22,1	384,0	26,0	866,0	8
52057	4 x 16	26,6	615,0	34,0	1203,0	6

Dimensions and specifications may be changed without prior notice. (RE01)







NEOPREN Command Cable

LIFT-TRAGO®-30

H05 RR-F/H05 RN-F

**YELLOWFLEX**

HELUSPREADER NSSHÖU





# ■ ALLWEATHER & RUBBER CABLES

Temperature (°C) - flexing

Temperature (°C) - fixed

Nominal voltage U<sub>0</sub>/U

Bending radius - flexing x Ø

Bending radius - fixed x Ø

Halogen-free

UV-resistant

Outdoor use

Drag Chain

Colored cores/VDE 0293

Screened/shielded

HAR/VDE REG no./VDE  
UL/CSA

Page

Allweather & rubber cables													
	Temperature (°C) - flexing	Temperature (°C) - fixed	Nominal voltage U <sub>0</sub> /U	Bending radius - flexing x Ø	Bending radius - fixed x Ø	Halogen-free	UV-resistant	Outdoor use	Drag Chain	Colored cores/VDE 0293	Screened/shielded	HAR/VDE REG no./VDE UL/CSA	Page
YELLOWFLEX	-25 to +60	-30 to +60	450/750	7.5x	4x			X	X				240
H05RR-F / H05RN-F		-30 to +60	300/500	7.5x	7.5x			(X)	X		X		241
H07RN-F		-30 to +60	450/750	7.5x	4x			X	X		X		242
A07RN-F		-30 to +60	450/750	7.5x	4x			X	X		X		244
NEOPRENE control cable	-25 to +60	-40 to +80	300/500	12.5x	12.5x			X	X				245
NSSHÖU	-25 to +80	-40 to +80	0.6/1 kV	10x	4x			X	X		X		246
LIFT-TRAGO®-30 / -60	-5 to +50	-40 to +70	300/500	20x	20x								247
TRAGO / Lift-2S	-15 to +70	-40 to +70	300/500	20x	20x	X	X		X				248
BAULIFTKABEL B101 / B102 / B103	-10 to +80	-10 to +80	300/500	10x	10x	X	X						249
HELUSPREADER YSLTÖ-J	-20 to +60	-20 to +60	300/500	15x	15x	X	X						250

The selection table is intended as an initial orientation.  
Please see the relevant page of the catalogue for detailed information on the product properties.



# YELLOWFLEX cold flexible, robust, meter marking



## Technical data

- Rubber sheathed cable adapted to DIN VDE 0285-525-2-21 / DIN EN 50525-2-21
- **Temperature range**  
flexing -25°C to +60°C  
fixed installation -30°C to +60°C
- Permissible **operating temperature** at conductor +60°C
- **Nominal voltage**  $U_0/U$  450/750 V with protected fixed installation  $U_0/U$  600/1000 V
- Highest permissible **operating voltage** in three-phase and one-phase a.c. systems  $U_0/U$  476/825 V in d.c. systems  $U_0/U$  619/1238 V
- **Test voltage** 2500 V
- **Minimum bending radius**  
for fixed installation 4x cable Ø  
for guiding over roller 7,5x cable Ø  
during winding on drums 5x cable Ø

## Cable structure

- Bare copper-conductor, to DIN VDE 0295 cl.5, fine-wire, BS 6360 cl.5, IEC 60228 cl.5
- Core insulation of rubber, EI4 to DIN VDE 0207-363-1 / DIN EN 50363-1
- Core identification to DIN VDE 0293-308 - up to 5 cores coloured - from 6 cores, black with continuous white numbering
- GN-YE conductor, 3 cores and above
- Cores stranded in layers with optimal lay-length
- Outer sheath of special EM2 to DIN VDE 0207-363-2-1 / DIN EN 50363-2-1
- Sheath colour yellow (RAL 1021)
- with meter marking
- **Individual printing:**
  - **Article numbers** for individual printing:  
Part no. 37359 for 3G1,5 mm<sup>2</sup>  
Part no. 37360 for 3G2,5 mm<sup>2</sup>  
Part no. 37361 for 5G1,5 mm<sup>2</sup>  
Part no. 37362 for 5G2,5 mm<sup>2</sup>
- **Usual length:**  
500m or 1000m drum
- **Minimum quantity**  
500m drum
- price for 500m drum 102,25 Euro  
price for 1000m drum 153,40 Euro

## Properties

- Increased stability
- Tear-resistant
- **Resistant to**
  - Atmospheric influences
- **Largely resistant to**
  - Oils and fats
- **Tests**
  - **Behaviour in fire**  
to DIN VDE 0482-332-1-2  
DIN EN 60332-2-1, IEC 60332-1 (equivalent  
DIN VDE 0472 part 804 test method B)

## Note

- G = with green-yellow conductor  
x = without green-yellow conductor.
- AWG sizes are approximate equivalent values. The actual cross-section is in mm<sup>2</sup>.
- individual marking

## Application

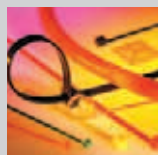
These robust rubber sheathed cables can be used where high demands are placed flexibility and mechanical stress. For application in dry, moist and wet rooms and in open air, in steel works and rolling mills in heating and air-conditioning systems, in the bottling industry, in machinery and plant construction, in the chemical industry as well as for the professional and the hobby enthusiast. The choice of yellow as the sheath colour ensures additional safety. Can be used in potentially explosive areas acc. to DIN VDE 0165.

CE = The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer Ø min. - max. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
37259	2 x 1	7,7 - 10,0	19,0	98,0	18
37260	3 G 1	8,3 - 10,7	29,0	131,0	18
37261	4 G 1	9,2 - 11,9	38,0	150,0	18
37262	5 G 1	10,2 - 13,1	48,0	220,0	18
37263	2 x 1,5	8,5 - 11,0	29,0	135,0	16
37264	3 G 1,5	9,2 - 11,9	43,0	165,0	16
37265	4 G 1,5	10,2 - 13,1	58,0	200,0	16
37266	5 G 1,5	11,2 - 14,4	72,0	241,0	16
37267	7 G 1,5	16,5 - 16,5	101,0	375,0	16
37268	12 G 1,5	17,6 - 22,4	175,0	460,0	16
37269	2 x 2,5	10,2 - 13,1	48,0	194,0	14
37270	3 G 2,5	10,9 - 14,0	72,0	235,0	14
37271	4 G 2,5	12,1 - 15,5	96,0	290,0	14
37272	5 G 2,5	13,3 - 17,0	120,0	347,0	14

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer Ø min. - max. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
37273	2 x 4	11,8 - 15,1	77,0	282,0	12
37274	3 G 4	12,7 - 16,2	115,0	322,0	12
37275	4 G 4	14,0 - 17,9	154,0	397,0	12
37276	5 G 4	15,6 - 19,9	192,0	486,0	12
37277	4 G 6	15,7 - 20,0	230,0	541,0	10
37278	5 G 6	17,5 - 22,2	288,0	652,0	10
37279	4 G 10	20,9 - 26,5	384,0	952,0	8
37280	5 G 10	22,9 - 29,1	480,0	1203,0	8
37281	4 G 16	23,8 - 30,1	614,0	1260,0	6
37282	5 G 16	26,4 - 33,3	768,0	1550,0	6
37283	4 G 25	28,9 - 36,6	960,0	1860,0	4
37284	5 G 25	32,0 - 40,4	1200,0	2250,0	4
37285	4 G 35	32,5 - 41,1	1344,0	2374,0	2
37286	5 G 35	40,6 - 40,6	1680,0	2752,0	2

Dimensions and specifications may be changed without prior notice. (RF01)

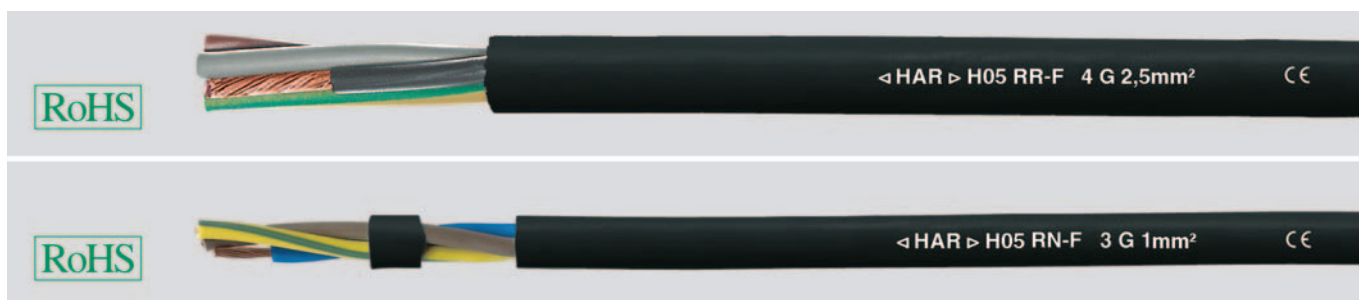


Suitable accessories can be found in Chapter X.

- Cable tie - T-WS



Also available as pre-assembled cable - see page 902.

**H05RR-F / H05RN-F** rubber-sheathed cable**Technical data**

- to DIN VDE 0285-525-2-21 / DIN EN 50525-2-21, IEC 60245-4
- H05RR-F additionally to BS 6500
- **Temperature range**  
-30°C to +60°C
- Permissible **operating temperature** at conductor +60°C
- **Nominal voltage**  $U_0/U$  300/500 V
- Max. **operating voltage** three-phase and one-phase a.c.  $U_0/U$  318/550 V for direct current  $U_0/U$  413/825 V
- **Test voltage** 2000 V
- **Minimum bending radius**  
7,5x cable Ø

**Cable structure**

- Bare copper-conductor, to DIN VDE 0295 cl.5, fine-wire, BS 6360 cl.5, IEC 60228 cl.5
- Core insulation of rubber EI4 to DIN VDE 0207-363-1 / DIN EN 50363-1
- Core identification to DIN VDE 0293-308
- Cores laid up
- Outer sheath black:  
RR-F = Rubber, EM3 to DIN VDE 0207-363-2-1/DIN EN 50363-2-1  
RN-F = EM2 to DIN VDE 0207-363-2-1/DIN EN 50363-2-1

**Properties**

- Oils and fats are allowed to come in touch

**Tests**

- **Behaviour in fire**  
to DIN VDE 0482-332-1-2  
DIN EN 60332-2-1, IEC 60332-1 (equivalent DIN VDE 0472 part 804 test method B)

**Note**

- G = with green-yellow conductor  
x = without green-yellow conductor
- AWG sizes are approximate equivalent values. The actual cross-section is in mm<sup>2</sup>.
- H05RR-F is replaced the former type NLH and NMH up to 2,5 mm<sup>2</sup>.
- H05RN-F is replaced to former type NMHÖ up to 1 mm<sup>2</sup>. at 1,5 mm<sup>2</sup> - not in VDE; adapted to VDE (H)05 RN-F Art.no. 36008 = national type: A05 RN-F Art.no. 36007 = (A)05 RN-F, outer sheath colour grey, for window shades manufacturer
- Further sizes are available on request.

**Application****H05RR-F**

These cables are suitable for connecting electrical appliances, for example vacuum cleaner, flat irons, soldering irons, kitchen appliances, toaster, stoves etc. They were also used for medium mechanical stress in households and offices. These cables are suitable for fixed installation in partition walls, furniture, decoration covering and in hollow spaces of prefabricated building parts. They are not suitable for use in open air, in industries (also permitted to tailor workshops and of that kind) or in agriculture plants and for connecting commercial electrical tools.

**H05RN-F**

These cables are suitable for connecting electrical equipment with low mechanical stress in dry, damp and wet places as well in open air, for example as connection cable for horticulture tools. These cables can be used in contact with fats and oils (for example deep fryer). They are also suitable for fixed installation, for example in furniture, decoration covering, partition walls and in hollow spaces of prefabricated building parts. The installation in hazardous areas is allowed.

CE = The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

**H05RR-F**

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer Ø min. - max. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
35001	2 x 0,75	5,7 - 7,4	14,4	60,0	19
35005	3 G 0,75	6,2 - 8,1	21,6	74,0	19
35009	4 G 0,75	6,8 - 8,8	29,0	78,0	19
35019	5 G 0,75	7,6 - 9,9	36,0	99,0	19
35002	2 x 1	6,1 - 8,0	19,0	72,0	18
35006	3 G 1	6,5 - 8,5	29,0	85,0	18
35010	4 G 1	7,1 - 9,3	38,0	98,0	18
35020	5 G 1	8,0 - 10,3	48,0	134,0	18
35003	2 x 1,5	7,6 - 9,8	29,0	98,0	16
35007	3 G 1,5	8,0 - 10,4	43,0	120,0	16
35011	4 G 1,5	9,0 - 11,6	58,0	150,0	16
35013	5 G 1,5	9,8 - 12,7	72,0	180,0	16
35004	2 x 2,5	9,0 - 11,6	48,0	145,0	14
35008	3 G 2,5	9,6 - 12,4	72,0	170,0	14
35012	4 G 2,5	10,7 - 13,8	96,0	220,0	14
35014	5 G 2,5	11,9 - 15,3	120,0	270,0	14
35015	3 G 4	11,3 - 14,5	115,0	260,0	12
35017	4 G 4	12,7 - 16,2	154,0	340,0	12
35016	3 G 6	12,8 - 16,3	173,0	361,0	10
35018	4 G 6	14,2 - 18,1	230,0	462,0	10

Dimensions and specifications may be changed without prior notice. (RF01)

**H05RN-F**

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer Ø min. - max. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
36001	2 x 0,75	5,7 - 7,4	14,4	78,0	19
36003	3 G 0,75	6,2 - 8,1	21,6	94,0	19
36007	4 G 0,75	6,8 - 8,8	29,0	90,0	19
36008	4 G 0,75	6,8 - 8,8	29,0	90,0	19
36002	2 x 1	6,1 - 8,0	19,0	94,0	18
36004	3 G 1	6,5 - 8,5	29,0	114,0	18
36005	3 G 1,5	8,6 - 11,0	43,0	157,0	16
36006	5 G 1,5	10,5 - 13,5	72,0	228,0	16

**H07RN-F** rubber-sheathed cable, harmonized type**Technical data**

- Rubber sheathed cable H07RN-F to DIN VDE 0285-525-2-21, BS 7919 DIN EN 50525-2-21, IEC 60245-4
- **Temperature range**  
-30°C to +60°C
- Permissible **operating temperature** at conductor +60°C
- **Nominal voltage**  
U<sub>0</sub>/U 450/750 V  
in case of protected and fixed installation  
U<sub>0</sub>/U 600/1000 V
- Max. permissible **operating voltage** in three phase and one phase a.c. system  
U<sub>0</sub>/U 476/825 V  
direct current-system  
U<sub>0</sub>/U 619/1238 V
- **Test voltage** 2500 V
- **Permanent tensile load**  
max. 15 N/mm<sup>2</sup>
- **Minimum bending radius**  
for fixed installation 4x cable Ø  
for guiding over roller 7,5x cable Ø  
during winding on drums 5x cable Ø

**Cable structure**

- Bare copper-conductor, to DIN VDE 0295 cl.5, fine-wire, BS 6360 cl.5, IEC 60228 cl.5
- Core insulation of rubber EI4 to DIN VDE 0207-363-1 / DIN EN 50363-1
- Core identification to DIN VDE 0293-308  
- up to 5 cores coloured  
- from 6 cores, black with continuous white numbering
- GN-YE conductor, 3 cores and above
- Cores stranded in layers with optimal lay-length
- Outer sheath of rubber EM2 to DIN VDE 0207-363-2-1/DIN EN 50363-2-1
- Sheath colour black

**Properties****Resistant to**

- Weather

**Tests**• **Behaviour in fire**

to DIN VDE 0482-332-1-2  
DIN EN 60332-2-1, IEC 60332-1 (equivalent DIN VDE 0472 part 804 test method B)

- **Ozone resistant** of the insulation to DIN VDE 0472 part 805, test method A or part 805 A1, test method C

- **Oil resistant** test according to DIN VDE 0473-811-404, DIN EN 60811-404

**Note**

- G = with green-yellow conductor  
x = without green-yellow conductor
- AWG sizes are approximate equivalent values. The actual cross-section is in mm<sup>2</sup>.
- The core identification of a single core sheathed, of an insulated wire is black.

**Application**

Heavy duty rubber-sheathed flexible cables are suited for use for medium mechanical stress in dry, damp and wet areas as well as in open air and in agriculture plants. They are used for equipment in industry works such as boilers, heating plates, hand lamps, electric tools such as drills, circular saws and homework tools as well as for transportable motors or machines at site. These cables are also suitable for fixed installation on plaster, in temporary buildings and residential barracks. They are suitable for direct laying on components and mechanical parts of machines, for example lifts and cranes. They can be used in case of protected and fixed installation in tubes or in equipment as well as rotor connecting cable of motors with a working voltage up to 1000 V alternating voltage or a direct voltage up to 750 V against ground. The operating direct voltage is permitted up to 900 V against ground when they are used in rail-coaches. Installation in hazardous areas according to DIN VDE 0165 is allowed.

CE= The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer Ø min. - max. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
37001	1 x 1,5	5,7 - 7,1	14,4	58,0	16
37002	1 x 2,5	6,3 - 7,9	24,0	71,0	14
37003	1 x 4	7,2 - 9,0	38,0	100,0	12
37004	1 x 6	7,9 - 9,8	58,0	130,0	10
37005	1 x 10	9,5 - 11,9	96,0	230,0	8
37006	1 x 16	10,8 - 13,4	154,0	290,0	6
37007	1 x 25	12,7 - 15,8	240,0	420,0	4
37008	1 x 35	14,3 - 17,9	336,0	530,0	2
37009	1 x 50	16,5 - 20,6	480,0	750,0	1
37010	1 x 70	18,6 - 23,3	672,0	960,0	2/0
37011	1 x 95	20,8 - 26,0	912,0	1250,0	3/0
37012	1 x 120	22,8 - 28,6	1152,0	1560,0	4/0
37013	1 x 150	25,2 - 31,4	1440,0	1900,0	300 kcmil
37014	1 x 185	27,6 - 34,4	1776,0	2300,0	350 kcmil
37015	1 x 240	30,6 - 38,3	2304,0	2950,0	500 kcmil
37016	1 x 300	33,5 - 41,9	2880,0	3600,0	600 kcmil
37017	1 x 400	37,4 - 46,8	3840,0	4600,0	750 kcmil
37018	1 x 500	41,3 - 52,0	4800,0	6000,0	1000 kcmil
37019	2 x 1	7,7 - 10,0	19,0	98,0	18
37020	2 x 1,5	8,5 - 11,0	29,0	135,0	16

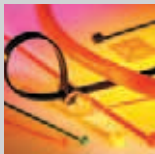
Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer Ø min. - max. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
37021	2 x 2,5	10,2 - 13,1	48,0	193,0	14
37022	2 x 4	11,8 - 15,1	77,0	280,0	12
37023	2 x 6	13,1 - 16,8	115,0	330,0	10
37024	2 x 10	17,7 - 22,6	192,0	586,0	8
37025	2 x 16	20,2 - 25,7	307,0	810,0	6
37026	2 x 25	24,3 - 30,7	480,0	1160,0	4
37027	3 G 1	8,3 - 10,7	29,0	130,0	18
37028	3 G 1,5	9,2 - 11,9	43,0	165,0	16

Continuation ►

**H07RN-F** rubber-sheathed cable, harmonized type

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer Ø min. - max. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.	Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer Ø min. - max. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
37029	3 G 2,5	10,9 - 14,0	72,0	235,0	14	37056	4 G 120	53,0 - 66,0	4608,0	6830,0	4/0
37030	3 G 4	12,7 - 16,2	115,0	320,0	12	37057	4 G 150	58,0 - 73,0	5760,0	8320,0	300 kcmil
37031	3 G 6	14,1 - 18,0	173,0	420,0	10	37058	4 G 185	64,0 - 80,0	7104,0	9800,0	350 kcmil
37032	3 G 10	19,1 - 24,2	288,0	810,0	8	37059	4 G 240	72,0 - 91,0	9216,0	12100,0	500 kcmil
37033	3 G 16	21,8 - 27,6	461,0	1050,0	6	37060	4 G 300	80,0 - 101,0	11520,0	15200,0	600 kcmil
37034	3 G 25	26,1 - 33,0	720,0	1250,0	4	37061	5 G 1,5	11,2 - 14,4	72,0	240,0	16
37035	3 G 35	29,3 - 37,1	1008,0	1900,0	2	37062	5 G 2,5	13,3 - 17,0	120,0	345,0	14
37036	3 G 50	34,1 - 42,9	1440,0	2600,0	1	37063	5 G 4	15,6 - 19,9	192,0	485,0	12
37037	3 G 70	38,4 - 48,3	2016,0	3400,0	2/0	37064	5 G 6	17,5 - 22,2	288,0	650,0	10
37038	3 G 95	43,3 - 54,0	2736,0	4450,0	3/0	37065	5 G 10	22,9 - 29,1	480,0	1200,0	8
37039	3 G 120	47,4 - 60,0	3456,0	5180,0	4/0	37066	5 G 16	26,4 - 33,3	768,0	1550,0	6
37040	3 G 150	52,0 - 66,0	4320,0	6500,0	300 kcmil	37067	5 G 25	32,0 - 40,4	1200,0	2250,0	4
37041	3 G 185	57,0 - 72,0	5328,0	7860,0	350 kcmil	37068	5 G 35	35,7 - 45,1	1680,0	2750,0	2
37042	3 G 240	65,0 - 82,0	6912,0	10224,0	500 kcmil	37091	5 G 50	41,8 - 53,0	2400,0	3950,0	1
37043	3 G 300	72,0 - 90,0	8640,0	12620,0	600 kcmil	37154	5 G 70	47,5 - 60,0	3360,0	4740,0	2/0
37044	4 G 1	9,2 - 11,9	38,0	150,0	18	34090	5 G 95	54,0 - 67,0	4560,0	6600,0	3/0
37045	4 G 1,5	10,2 - 13,1	58,0	200,0	16	34349	5 G 120	58,0 - 73,0	5760,0	8180,0	4/0
37046	4 G 2,5	12,1 - 15,5	96,0	290,0	14	34127	5 G 150	64,0 - 80,0	7200,0	10600,0	300 kcmil
37047	4 G 4	14,0 - 17,9	154,0	395,0	12	37092	7 G 1,5	14,7 - 18,7	101,0	375,0	16
37048	4 G 6	15,7 - 20,0	230,0	540,0	10	37079	7 G 2,5	17,1 - 21,8	168,0	520,0	14
37049	4 G 10	20,9 - 26,5	384,0	950,0	8	37093	12 G 1,5	17,6 - 22,4	175,0	460,0	16
37050	4 G 16	23,8 - 30,1	614,0	1260,0	6	37096	12 G 2,5	20,6 - 26,2	288,0	760,0	14
37051	4 G 25	28,9 - 36,6	960,0	1860,0	4	37097	18 G 2,5	24,4 - 30,9	432,0	850,0	14
37052	4 G 35	32,5 - 41,1	1344,0	2380,0	2	37094	19 G 1,5	20,7 - 26,3	274,0	810,0	16
37053	4 G 50	37,7 - 47,5	1920,0	3190,0	1	37098	19 G 2,5	25,5 - 31,0	456,0	1075,0	14
37054	4 G 70	42,7 - 54,0	2688,0	4260,0	2/0	37095	24 G 1,5	24,3 - 30,7	346,0	1015,0	16
37055	4 G 95	48,4 - 61,0	3648,0	5600,0	3/0	37099	24 G 2,5	28,8 - 36,4	576,0	1390,0	14

Dimensions and specifications may be changed without prior notice. (RF01)



Suitable accessories can be found in Chapter X.

- Cable tie - T-WS

**F**



**A07RN-F** rubber-sheathed cable, authorised national type**Technical data**

- Rubber sheathed cable A07RN-F to DIN VDE 0285-525-2-21 / DIN EN 50525-2-21
- **Temperature range** -30°C to +60°C
- Permissible **operating temperature** at conductor +60°C
- **Nominal voltage**  $U_0/U$  450/750 V in case of protected and fixed installation  $U_0/U$  600/1000 V
- max. permissible **operating voltage** in three phase and one phase a.c. system  $U_0/U$  476/825 V direct current-system  $U_0/U$  619/1238 V
- **Test voltage** 2500 V
- **Permanent tensile load** max. 15 N/mm<sup>2</sup> under consideration of total copper cross-sections
- **Minimum bending radius** for fixed installation 4x cable Ø for guiding over roller 7,5x cable Ø during winding on drums 5x cable Ø

**Cable structure**

- Bare copper-conductor, to DIN VDE 0295 cl.5, fine-wire, BS 6360 cl.5, IEC 60228 cl.5
- Core insulation of rubber EI4 to DIN VDE 0207-363-1 / DIN EN 50363-1
- Core identification to DIN VDE 0293-308 - up to 5 cores coloured - from 6 cores, black with continuous white numbering
- Cores stranded in layers in optimal lay-length
- Outer sheath of rubber EM2 to DIN VDE 0207-363-2-1 / DIN EN 50363-2-1
- Sheath colour black

**Properties****Resistant to**

- Weather

**Test**• **Behaviour in fire**

- to DIN VDE 0482-332-1-2
- DIN EN 60332-2-1, IEC 60332-1 (equivalent DIN VDE 0472 part 804 test method B)
- **Ozone resistant** of the insulation to DIN VDE 0472 part 805, test method A or part 805 A1, test method C

**Note**

- G = with green-yellow conductor
- x = without green-yellow conductor
- AWG sizes are approximate equivalent values. The actual cross-section is in mm<sup>2</sup>.
- A07RN-F = Authorized national rubber-sheathed cable
- Valid for design with central core + 7 cores.
- The core identification of a single core sheathed, of an insulated wire is black.

**Application**

Heavy duty rubber-sheathed flexible cables are suited for use for medium mechanical stress in dry, damp and wet areas as well as in open air and in agriculture plants. They are used for equipment in industry works such as boilers, heating plates, hand lamps, electric tools such as drills, circular saws and homework tools as well as for transportable motors or machines at site. These cables are also suitable for fixed installation on plaster, in temporary buildings and residential barracks. They are suitable for direct laying on components and mechanical parts of machines, for example lifts and cranes. They can be used in case of protected and fixed installation in tubes or in equipment as well as rotor connecting cable of motors with a working voltage up to 1000 V alternating voltage or a direct voltage up to 750 V against ground. The operating direct voltage is permitted up to 900 V against ground when they are used in rail-coaches. Installation in hazardous areas according to DIN VDE 0165 is allowed.

CE= The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

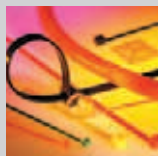
**A07 RN-F (with green-yellow protective conductor)**

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer Ø min. - max. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
37069	7 G 1,5	14,7 - 18,7	101,0	370,0	16
37070	7 G 2,5	17,1 - 21,8	168,0	500,0	14
37071	12 G 1,5	17,6 - 22,4	173,0	520,0	16
37072	12 G 2,5	20,6 - 26,2	288,0	720,0	14
37078	19 G 1,5	20,7 - 26,3	274,0	800,0	16
37073	19 G 2,5	25,5 - 31,0	456,0	1100,0	14
37074	24 G 2,5	28,8 - 36,4	576,0	1350,0	14
37075	27 G 1,5	25,5 - 31,5	385,0	1100,0	16
37076	27 G 2,5	30,0 - 37,0	640,0	1521,0	14
37077	37 G 2,5	34,0 - 37,5	720,0	1940,0	14

**A07 RN-F (without green-yellow protective conductor)**

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer Ø min. - max. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
37080	3 x 1,5	9,2 - 11,9	43,0	165,0	16
37081	3 x 2,5	10,9 - 14,0	72,0	235,0	14
37082	3 x 4	12,7 - 16,2	115,0	320,0	12
37083	3 x 6	14,1 - 18,0	173,0	495,0	10
37084	3 x 10	19,1 - 24,2	288,0	880,0	8
37085	3 x 16	21,8 - 27,6	461,0	1095,0	6
37086	3 x 25	26,1 - 33,0	720,0	1450,0	4
37087	3 x 35	29,3 - 37,1	1008,0	1900,0	2
37088	3 x 50	34,1 - 42,9	1440,0	2600,0	1
37089	4 x 10	20,9 - 26,5	384,0	1065,0	8
37090	4 x 25	28,9 - 36,6	960,0	1995,0	4

Dimensions and specifications may be changed without prior notice. (RF01)

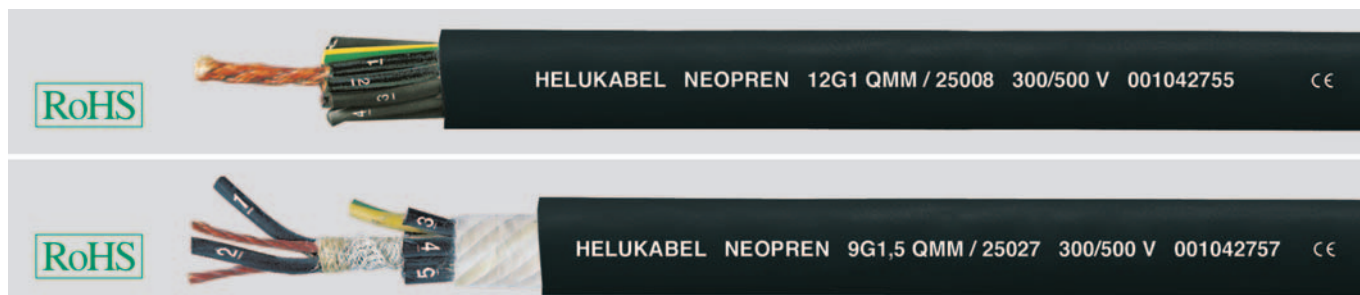


Suitable accessories can be found in Chapter X.

- Cable tie - T-W5

# NEOPREN Command Cable flexible, colour or

number coded with support organ



## Technical data

- Special neoprene cable adapted to DIN VDE 0250 with strain bearing support strand
- **Temperature range** flexing -25°C to +60°C fixed installation -40°C to +80°C
- **Nominal voltage** U<sub>0</sub>/U 300/500 V
- **Test voltage** 3000 V
- **Minimum bending radius** for continuous bending without forced guiding operation 12,5x cable Ø for flexing with forced guiding operation 20x cable Ø

## Cable structure

- Bare copper-conductor, to DIN VDE 0295 cl.6 col.4, extra fine-wire, BS 6360 cl.6, IEC 60228 cl.6
- Core insulation of rubber
- Core identification to DIN VDE 0293-308 - up to 5 cores coloured - from 6 cores, black with continuous white numbering
- GN-YE conductor, 3 cores and above
- Cores stranded in layers with optimal lay-length
- Support organ (hemp or sisal-string etc.), and/or taping with load carrying thread as construction permits
- Outer sheath of neoprene
- Sheath colour black
- The braking strength of the carrying element is depending on the number of cores, the cross section of cores and the construction of cable.

## Properties

- Generally oil, flat and alkali resistant

## Note

- G = with green-yellow conductor x = without green-yellow conductor
- AWG sizes are approximate equivalent values. The actual cross-section is in mm<sup>2</sup>.
- Not suitable for a winding up and an unwinding on spring or motor cable reels.
- Break resistance must be taken into consideration.
- By the assembly the cables must be installed without torsion.
- The mobility of the stranded core is not be affected by using of clamps.
- The occurring pulling forces are to be carried by the support organ.

## Application

As robust and weather resistant cable for machines, equipment and appliances, which are constantly exposed to the outdoor weather conditions (e.g. building machinery, conveyor and hoist systems, dry docks etc.). They are ideal for use as control cable in trailing cables. They are also suitable in dry, damp and wet areas for wall- and push-button panels and as power cable. The core insulation is ozone resistant and the outer sheath made of chloroprene is hardly flammable and abrasion resistant.

CE= The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer Ø approx. mm	Tensile strength of susp. strand in N	Cop. weight kg / km	Weight approx. kg / km	AWG-No.	Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer Ø approx. mm	Tensile strength of susp. strand in N	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
25001	2 x 1	7,5	300	19,0	90,0	18	25038	48 G 1,5	34,9	-	691,0	1510,0	16
25002	3 G 1	8,5	150	29,0	111,0	18	25039	50 G 1,5	36,7	-	720,0	1642,0	16
25003	4 G 1	9,7	300	38,0	141,0	18	25040	61 G 1,5	41,8	-	878,0	1950,0	16
25004	5 G 1	11,5	300	48,0	170,0	18	25041	2 x 2,5	10,0	300	48,0	142,0	14
25005	6 G 1	13,4	-	58,0	187,0	18	25042	3 G 2,5	10,5	300	72,0	172,0	14
25006	7 G 1	13,8	2290	67,0	204,0	18	25043	4 G 2,5	11,6	570	96,0	210,0	14
25007	9 G 1	15,8	2890	86,0	274,0	18	25044	5 G 2,5	12,9	380	120,0	255,0	14
25008	12 G 1	17,5	6740	115,0	389,0	18	25045	6 G 2,5	14,5	-	144,0	318,0	14
25009	16 G 1	19,2	570	154,0	432,0	18	25046	7 G 2,5	16,2	3460	168,0	383,0	14
25010	18 G 1	21,5	960	173,0	471,0	18	25075	8 G 2,5	16,8	3850	192,0	450,0	14
25011	19 G 1	22,0	-	182,0	565,0	18	25047	9 G 2,5	21,5	680	216,0	541,0	14
25012	20 G 1	22,4	600	192,0	590,0	18	25048	11 G 2,5	23,3	-	264,0	638,0	14
25013	24 G 1	23,6	2890	230,0	650,0	18	25049	12 G 2,5	25,4	6060	288,0	690,0	14
25074	30 G 1	24,6	-	290,0	785,0	18	25050	16 G 2,5	24,4	-	383,0	813,0	14
25014	36 G 1	29,0	960	346,0	910,0	18	25051	18 G 2,5	26,3	2290	432,0	891,0	14
25015	37 G 1	30,5	-	355,0	936,0	18	25052	19 G 2,5	27,5	-	456,0	946,0	14
25016	48 G 1	31,4	1440	461,0	1244,0	18	25053	24 G 2,5	30,5	6060	576,0	1221,0	14
25017	50 G 1	32,6	-	480,0	1296,0	18	25054	36 G 2,5	33,3	-	864,0	1737,0	14
25018	54 G 1	32,9	2500	518,0	1399,0	18	25055	37 G 2,5	40,8	2500	888,0	1784,0	14
25019	61 G 1	37,2	2290	586,0	1495,0	18	25056	48 G 2,5	41,9	-	1152,0	2500,0	14
25020	2 x 1,5	8,5	300	29,0	95,0	16	25057	50 G 2,5	43,3	-	1200,0	2630,0	14
25021	3 G 1,5	9,3	150	43,0	113,0	16	25058	61 G 2,5	49,3	-	1464,0	8100,0	14
25022	4 G 1,5	10,5	570	58,0	150,0	16	25059	3 G 4	13,6	-	115,0	372,0	12
25023	5 G 1,5	12,5	870	72,0	180,0	16	25060	4 G 4	15,0	1000	154,0	407,0	12
25024	6 G 1,5	14,3	-	86,0	245,0	16	25061	5 G 4	17,1	600	192,0	432,0	12
25025	7 G 1,5	14,8	2600	101,0	309,0	16	25062	7 G 4	21,5	-	269,0	495,0	12
25026	8 G 1,5	15,8	3460	115,0	333,0	16	25063	3 G 6	13,9	-	173,0	380,0	10
25027	9 G 1,5	17,7	3850	130,0	360,0	16	25064	4 G 6	15,2	1000	230,0	445,0	10
25028	10 G 1,5	18,5	450	144,0	405,0	16	25065	5 G 6	19,2	900	288,0	569,0	10
25029	11 G 1,5	20,1	-	158,0	458,0	16	25066	7 G 6	21,1	-	403,0	702,0	10
25030	12 G 1,5	21,6	7710	173,0	516,0	16	25067	3 G 10	18,1	-	288,0	530,0	8
25031	13 G 1,5	22,1	-	187,0	571,0	16	25068	4 G 10	20,6	1200	384,0	724,0	8
25032	15 G 1,5	22,8	680	216,0	590,0	16	25069	5 G 10	22,6	1500	480,0	923,0	8
25033	18 G 1,5	23,6	960	259,0	620,0	16	25070	7 G 10	27,4	-	672,0	1288,0	8
25034	19 G 1,5	24,1	860	274,0	670,0	16	25071	3 G 16	21,3	-	461,0	865,0	6
25035	24 G 1,5	27,0	3850	346,0	817,0	16	25072	4 G 16	25,2	1920	614,0	1028,0	6
25036	37 G 1,5	31,0	-	533,0	1220,0	16	25073	5 G 16	26,5	2400	768,0	1260,0	6
25037	42 G 1,5	33,0	3460	605,0	1380,0	16							

Dimensions and specifications may be changed without prior notice. (RF01)

# NSSHÖU heavy dusty rubber cable 0,6/ 1kV



## Technical data

- Rubber sheath cable to DIN VDE 0250 part 812
- **Temperature range** flexing -25°C to +80°C fixed installation -40°C to +80°C
- Permissible **operating temperature** at conductor +90°C
- **Nominal voltage**  $U_0/U$  0,6/1 kV
- **Operating voltage** in three-phase and one-phase a.c.  $U_0/U$  0,7/1,2 kV Direct current system  $U_0/U$  0,9/1,8 kV
- **Test voltage** 3000 V
- **Insulation resistance** min. 20 MOhm x km
- **Tensile strength** statical load: total cross-section x 15 N/mm<sup>2</sup>
- **Minimum bending radius** fixed installation 4x cable Ø flexing 10x cable Ø without forced operation 15x cable Ø

## Cable structure

- Tinned copper-conductor, to DIN VDE 0295 cl.5, fine-wire, BS 6360 cl.5, IEC 60228 cl.5
- Core insulation of rubber (EPR) compound type 3GI3 to DIN VDE 0207 part 20
- Core identification to DIN VDE 0293-308 - up to 5 cores coloured - from 6 cores, black with continuous white numbering
- GN-YE conductor, 3 cores and above
- Cores stranded in layers with optimal lay-length
- Inner sheath of rubber compound type GM1b to DIN VDE 0207 part 21
- Outer sheath of rubber compound type 5GM5 to DIN VDE 0207 part 21
- Sheath colour yellow

## Properties

- Ozone resistance
- High insulation resistance
- Resistant against hot penetration
- Low abrasion
- High notch resistant
- The code identification of a single core sheathed of an insulated wire is black.

## Resistant against

- oils
- fats and chemicals

## Tests

- **Behaviour in fire** to DIN VDE 0482-332-1-2 DIN EN 60332-2-1, IEC 60332-1 (equivalent DIN VDE 0472 part 804 test method B)
- **Oil resistant** to DIN EN 60811-404

## Note

- G = with green-yellow conductor
- x = without green-yellow conductor
- AWG sizes are approximate equivalent values. The actual cross-section is in mm<sup>2</sup>.

## Application

Are suited as a connecting cable for very high mechanical stress in underground mining and tools for use in industries and outdoor use. They are also used for mining industry, surface mining, stone-pits, on building sites, outdoors as well as indoors. Suitable for fixed installation on plaster in dry, damp and wet areas. A long duration of life is guaranteed under extreme operating conditions. Not suitable for drumming and use in all types of machinery, such as robots, handling units and energy transfer units, where constant mobility is essential. The insulation of a plastic-rubber compound on EPR basis improves the resistance to ozone in order to avoid the formation of cracks due to ozone and insulation damages in switch-boards.

CE= The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

Part no.	No.cores x cross-sec. mm <sup>2</sup>	Outer Ø max. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
38001	1 x 16	13,5	154,0	336,0	6
38002	1 x 25	16,5	240,0	473,0	4
38003	1 x 35	18,0	336,0	635,0	2
38004	1 x 50	20,0	480,0	866,0	1
38005	1 x 70	22,0	672,0	1145,0	2/0
38006	1 x 95	25,0	912,0	1475,0	3/0
38007	1 x 120	27,5	1152,0	1832,0	4/0
38008	1 x 150	30,0	1440,0	2000,0	300 kcmil
38009	1 x 185	34,0	1776,0	2450,0	350 kcmil
38010	1 x 240	37,0	2304,0	3190,0	500 kcmil
38011	2 x 2,5	16,0	48,0	205,0	14
38012	3 G 1,5	15,0	43,0	173,0	16
38013	3 G 2,5	16,5	72,0	247,0	14
38014	3 G 4	20,0	115,0	336,0	12
38015	3 G 6	22,0	173,0	520,0	10
38016	4 G 1,5	16,0	58,0	210,0	16
38017	4 G 2,5	19,0	96,0	305,0	14
38018	4 G 4	21,5	154,0	415,0	12
38019	4 G 6	23,0	230,0	641,0	10
38020	4 G 10	27,5	384,0	1113,0	8
38021	4 G 16	37,0	614,0	1412,0	6
38022	4 G 25	39,0	960,0	2095,0	4

Part no.	No.cores x cross-sec. mm <sup>2</sup>	Outer Ø max. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
38023	4 G 35	42,5	1344,0	2777,0	2
38024	4 G 50	49,0	1920,0	3817,0	1
38025	4 G 70	53,5	2688,0	5071,0	2/0
38026	4 G 95	61,5	3648,0	6636,0	3/0
38027	4 G 120	68,0	4608,0	7000,0	4/0
38028	5 G 1,5	17,0	72,0	252,0	16
38029	5 G 2,5	20,0	120,0	362,0	14
38030	5 G 4	23,0	192,0	509,0	12
38031	5 G 6	26,5	288,0	798,0	10
38035	5 G 10	30,0	480,0	1120,0	8
38036	5 G 16	34,0	768,0	1680,0	6
38037	5 G 25	42,0	1200,0	2430,0	4
38038	7 G 1,5	19,5	101,0	470,0	16
38032	7 G 2,5	21,5	168,0	546,0	14
38039	10 G 1,5	22,0	144,0	560,0	16
38033	12 G 2,5	28,0	288,0	851,0	14
38040	18 G 2,5	33,0	432,0	1230,0	14
38034	19 G 2,5	33,5	466,0	1260,0	14

Dimensions and specifications may be changed without prior notice. (RF01)

# LIFT-TRAGO®-30 / -60 lift hoist control cable, pendal length 30m resp. 60m



## Technical data

- Lift hoist control cables with strain bearing element to IEC 60227-6 edition 2001-06 and adapted to DIN VDE 0285-525-2-51 / DIN EN 50525-2-51
- **Temperature range**  
flexing -5°C to +50°C  
fixed installation -40°C to +70°C
- **Max. conductor temperature**  
under load +70°C  
circuit conditions +150°C
- **Nominal voltage**  
U<sub>0</sub>/U 300/500 V
- **Test voltage** 3000 V
- **Breakdown voltage**  
min. 6000 V
- **Minimum bending radius**  
20x cable Ø
- **Insulation resistance**  
min. 20 MOhm x km
- **Radiation resistance**  
up to 80x10<sup>6</sup> cJ/kg (up to 80 Mrad)

## Application

These cables are used as control or feeder cables in lifts and hoists.

- 30 m pendal length - LIFT-TRAGO®-30
- 60 m pendal length - LIFT-TRAGO®-60

Suspension height for medium mechanical stresses in dry and moist rooms.

CE= The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

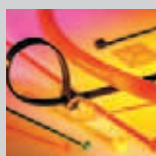
## LIFT-TRAGO®-30

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	Support core	Pendal length max. m	AWG-No.
25259	7 G 1	11,5	67,0	170,0	Textile	30	18
25260	12 G 1	15,7	115,0	325,0	Textile	30	18
25261	18 G 1	16,1	173,0	390,0	Textile	30	18
25262	24 G 1	19,2	230,0	530,0	Textile	30	18

## LIFT-TRAGO®-60

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	Support core	Pendal length max. m	AWG-No.
25263	7 G 1	12,3	67,0	185,0	Textile	60	18
25264	12 G 1	16,2	115,0	335,0	Textile	60	18
25265	18 G 1	16,7	173,0	400,0	Textile	60	18
25266	24 G 1	19,8	230,0	540,0	Textile	60	18
25267	30 G 1	22,5	288,0	690,0	Textile	60	18
25268	36 G 1	28,2	346,0	930,0	Steel	60	18

Dimensions and specifications may be changed without prior notice. (RF01)



Suitable accessories can be found in Chapter X.

- Cable tie - T-W5

## Cable structure

- Bare copper-conductor, to DIN VDE 0295 cl.5, fine-wire, BS 6360 cl.5, IEC 60228 cl.5
- Core insulation of special PVC compound type T12 to DIN VDE 0207-363-3 / DIN EN 50363-3
- Core identification to DIN VDE 0293 black cores with continuous white numbering
- GN-YE conductor in the outer layer
- Cores stranded with optimal lay-length acc. to the number of cores in one or two layers, over a central Suspension strand of textile.  
LIFT-TRAGO®-30 - Fleece wrapping  
LIFT-TRAGO®-60 - Support braiding of textile suspension strands
- Outer sheath of special PVC compound type TM2 to DIN VDE 0207-363-4-1 / DIN EN 50363-4-1
- Colour black (RAL 9005)

## Properties

- Extensively oil resistant  
Chemical Resistance - see table Technical Informations
- The materials used in manufacture are cadmium-free and contain no silicone and free from substances harmful to the wetting properties of lacquers

## Tests

- PVC self-extinguishing and flame retardant acc. to DIN VDE 0482-332-1-2, DIN EN 60332-1-2/IEC 60332-1 (equivalent DIN VDE 0472 part 804 test method B)

## Note

- G = with green-yellow conductor
- AWG sizes are approximate equivalent values. The actual cross-section is in mm<sup>2</sup>.
- Cable for pendal length 60 m and above available on request.

F

# TRAGO / Lift-2S Lift and Hoist Control Cables 300/500 V



## Technical data

- Lift hoist control cables with strain bearing element Special PVC-compound for core and sheath, adapted to DIN VDE 0250
- **Temperature range**  
flexing -15°C to +70°C  
fixed installation -40°C to +70°C
- **Max. conductor temperature**  
under load +70°C  
circuit conditions +150°C
- **Nominal voltage**  
U<sub>0</sub>/U 300/500 V
- **Test voltage** 3000 V
- **Breakdown voltage**  
min. 6000 V
- **Minimum bending radius**  
20x cable Ø

## Cable structure

- Bare copper-conductor, to DIN VDE 0295 cl.6, extra fine-wire, BS 6360 cl.6, IEC 60228 cl.6
- Core insulation of special PVC, T12 to DIN VDE 0207-363-3 / DIN EN 50363-3
- Core identification to DIN VDE 0293
- GN-YE conductor
- Special hemp support braid for **Trago** type with central support core of hemp for **Lift-2S** type with 2 outer steel support wires
- Cores stranded in layers with optimal lay-length
- Multi-layer wrapping functioning as a support braid
- Outer sheath of special PVC TM2 to DIN VDE 0207-363-4-1 / DIN EN 50363-4-1
- Sheath colour black (RAL 9005)

## Properties

- The materials used in manufacture are cadmium-free and contain no silicone and free from substances harmful to the wetting properties of lacquers
  - UV-resistant
- ### Tests
- PVC self-extinguishing and flame retardant acc. to DIN VDE 0482-332-1-2, DIN EN 60332-1-2, IEC 60332-1 (equivalent DIN VDE 0472 part 804 test method B)

## Note

- G = with green-yellow conductor
- AWG sizes are approximate equivalent values. The actual cross-section is in mm<sup>2</sup>.

## Application

These cables are used as control or feeder cables in lifts and hoists. The special attention given to both production and material quality for these cables has made them ideal even for use under extreme conditions. HELUKABEL®-Lift-2S has also proven itself to be ideally suited for installation in conveyor systems and manual control units. The external steel support wires can be dismantled without damaging the cable insulation.

CE= The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

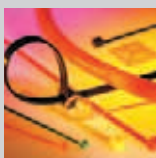
### TRAGO with central support

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	Support core	Pendal length max. m	AWG-No.
25080	7 G 0,75	15,4	50,0	290,0	Hemp	250	19
25081	12 G 0,75	19,2	86,0	360,0	Hemp	220	19
25082	18 G 0,75	21,0	130,0	455,0	Hemp	110	19
25083	24 G 0,75	23,0	173,0	535,0	Hemp	90	19
25084	7 G 1	14,9	67,0	222,0	Hemp	80	18
25085	12 G 1	20,0	115,0	415,0	Hemp	80	18
25086	18 G 1	21,4	173,0	450,0	Hemp	70	18
25087	20 G 1	21,6	192,0	490,0	Hemp	70	18
25088	24 G 1	23,2	230,0	605,0	Hemp	60	18
25089	36 G 1	26,1	346,0	950,0	Hemp	90	18

### Lift-2S with 2 external support cores

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	Support core	Pendal length max. m	AWG-No.
25091	12 G 1	13,5	115,2	446,0	Steel	50	18
25092	18 G 1	16,2	172,8	528,0	Steel	50	18
25093	25 G 1	19,0	240,0	660,0	Steel	50	18
25094	30 G 1	21,9	288,0	760,0	Steel	50	18
25095	8 G 1,5	14,7	115,0	425,0	Steel	50	16
25096	12 G 1,5	16,0	172,8	505,0	Steel	50	16
25097	15 G 1,5	19,5	230,0	575,0	Steel	50	16
25098	18 G 1,5	19,3	259,0	640,0	Steel	50	16
25099	20 G 1,5	19,5	288,0	715,0	Steel	50	16
25100	24 G 1,5	22,5	346,0	820,0	Steel	50	16

Dimensions and specifications may be changed without prior notice. (RF01)



Suitable accessories can be found in Chapter X.

- Cable tie - T-WS



# Bauliftkabel B101 / B102 / B103 to be used at plant elevators



## Technical data

- **Temperature range**  
flexing -10°C to +80°C
- **Nominal voltage**  
control cores 300/500 V  
power supply cores 0,6/1 kV
- **A.c. test voltage**, 50 Hz  
control cores 1500 V  
power supply cores 3000 V
- **Minimum bending radius**  
10x cable Ø

## Cable structure

- Bare copper-conductor, extra fine-wire, high flexible
- Core insulation of plastic, flexible at low temperatures
- Core identification black cores with continuous white numbering
- GN-YE conductor
- Outer sheath of special plastic, flexible at low temperatures
- Sheath colour black

## Properties

- Sheath UV-resistant
- In carriage version with special support braiding and with PUR sheath particularly resistant to wear, oil, hydrolysis and microbial attack

## Note

- Optional separate copper screening of the control cores

## Application

These hybrid cables are used for power supply and control of vertical lifts in the construction industry. There are 3 cable versions.

**Bauliftkabel B101:** Here the cable is drawn vertically from a drum as a drag cable via the load platform. The load platform pulls the cable along as it moves up. During the downwards motion the cable returns to the drum automatically. Our special versions are used at heights of up to about 150 m.

**Bauliftkabel B102:** For greater heights, a so-called carriage version is employed, in which the cable is fed at the centre of the tower, i. e. half the way up.

**Bauliftkabel B103:** Here the cable is guided via a spring-loaded drum. These vertical construction lifts are used during new construction and renovation work on high buildings. The rack lattice elements are fastened at intervals to the exterior facade.

CE= The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

### Bauliftkabel B101

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
73519	5 G 2,5 + 10 x 1,0	20,0	220,0	306,0	-
73913	5 G 2,5 + 11 x 1,0	20,0	225,6	320,0	14
70402	3 G 4 + 7 x 1,0	17,4	184,0	360,0	12
70931	4 G 6 + 9 x 1,0	20,5	330,0	555,0	10
70377	4 G 6 + 10 x 1,0	21,0	340,0	575,0	10
71901	4 G 6 + 15 x 1,0	22,0	388,0	625,0	10
71369	4 G 10 + 10 x 1,0	25,0	480,0	870,0	8
78123	4 G 16 + 6 x 1,0	26,1	700,0	1250,0	6
78124	4 G 16 + 10 x 1,0	29,0	710,0	1300,0	6
78125	4 G 16 + 15 x 1,0	31,5	760,0	1380,0	6
73726	4 G 16 + 1 x 2,5 + 4 x 1,0	28,5	830,0	1460,0	6

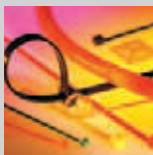
### Bauliftkabel B102

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
74293	4 G 16 + 1 x 2,5 + 2 x 2 x 1,0	28,5	830,0	1080,0	6
74670	4 G 16 + 1 x 2,5 + 2 x 2 x 1,0	28,5	787,0	1080,0	6
74297	4 G 25 + 1 x 2,5 + 2 x 2 x 1,0	33,4	1176,0	1500,0	4
78122	4 G 35 + 4 x 2,5 + 2 x 2 x 1,0 + 1 x 1,0	38,0	1500,0	1850,0	2

### Bauliftkabel B103

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
77532	4 G 2,5 + 3 x 1,0	13,0	125,0	230,0	14
77538	4 G 2,5 + 3 x 1,0	15,3	125,0	280,0	14

Dimensions and specifications may be changed without prior notice.



Suitable accessories can be found in Chapter X.

- Cable tie - T-WS

# HELUSPREADER YSLTÖ-J spreader cable for vertical basket enterprise



HELUSPREADER YSLTÖ-J



## Technical data

- Special cable adapted to DIN VDE 0250
- **Temperature range** flexing -20°C to +60°C fixed installation -20°C to +60°C
- max. **Operating temperature** at conductor +90°C
- max. **Short circuit temperature** at conductor +150°C
- **Nominal voltage**  $U_0/U$  300/500 V
- max. **Tensile load** 2000 N
- **Minimum bending radius** 15x cable Ø
- **Current carrying capacity** to DIN VDE 0298 part 4

## Cable structure

- Bare copper-conductor, to DIN VDE 0295 cl.5 or cl.6, fine-wire or extra-fine-wire, BS 6360 cl.5 or cl.6, IEC 60228 cl.5 or cl.6
- Core insulation of special EPR
- Core identification to DIN VDE 0293 black cores with continuous white numbering
- GN-YE conductor
- Cores laid-up in lay of length, stranding with optimal length of twists around a Kevlar element
- Outer sheath of special polychloropren
- Sheath colour black (RAL 9005)

## Properties

- weather resistant
- UV-resistant
- high abrasion resistance

## Note

- G = with green-yellow conductor
- Delivery on request:
- also as -K model, temperature range -40°C to +80°C
- further dimensions and special designs
- AWG sizes are approximate equivalent values. The actual cross-section is in mm<sup>2</sup>

## Application

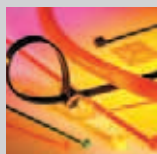
As Spreader cable with high mechanical stresses in vertical basket operation in dry, moist, wet environment and in open air. Please note that at the installation the cable must be placed counterwise and free of twist into the basket.

CE= The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer Ø min. - max. mm	Cop. weight kg / km	Weight approx. kg / km	Tensile strain max. N	AWG-No.
40160	36 G 2,5	38,1 - 41,0	864,0	2500,0	2000	14
40161	42 G 2,5	40,8 - 43,8	1008,0	3000,0	2000	14
40162	48 G 2,5	45,7 - 48,7	1152,0	3650,0	2000	14
40163	54 G 2,5	47,0 - 51,0	1296,0	4100,0	2000	14

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer Ø min. - max. mm	Cop. weight kg / km	Weight approx. kg / km	Tensile strain max. N	AWG-No.
40164	36 G 3,3	42,4 - 45,5	1140,0	3200,0	2000	12
40165	42 G 3,3	46,6 - 49,6	1330,0	3750,0	2000	12
40166	48 G 3,3	52,0 - 55,0	1521,0	4450,0	2000	12
40167	54 G 3,3	56,6 - 60,0	1711,0	5000,0	2000	12

Dimensions and specifications may be changed without prior notice. (RG01)



Suitable accessories can be found in Chapter X.

- Cable tie - T-WS





# NSHTÖU

(N)TSCGEWöu

# TROMMPUR®

# Flugzeugheber-T

NSHTÖU CE

NSHTÖU CE

NSHTÖU

# ■ TRAILING CABLES

Temperature (°C) - flexing

Temperature (°C) - fixed

Nominal voltage U<sub>0</sub>/U

Bending radius - flexing x Ø

Bending radius - fixed x Ø

Halogen-free

UV-resistant

Outdoor use

Drag Chain

Colored cores/VDE 0293

Screened/shielded

HAR/VDE REG no./VDE  
UL/CSA

Page

Trailing Cables														
	Temperature (°C) - flexing	Temperature (°C) - fixed	Nominal voltage U <sub>0</sub> /U	Bending radius - flexing x Ø	Bending radius - fixed x Ø	Halogen-free	UV-resistant	Outdoor use	Drag Chain	Colored cores/VDE 0293	Screened/shielded	HAR/VDE REG no./VDE	UL/CSA	Page
TROMMPUR®	-40 bis +80	-40 to +80	300/500	10x	10x	X	X	X		X				254
Flugzeugheber-T	-20 to +80	-20 to +80	300/500	15x	15x			X	X					255
NSHTÖU	-35 to +70	-40 to +70	0.6/1 kV	7.5x	7.5x			X	X	X		X		256
(N)SHTÖU-V	-25 to +80	-25 to +80	0.6/1 kV	7.5x	7.5x			X		X				257
(N)TSCGEWÖU	-20 to +60	-20 to +80	6-20 kV	15x	15x			X	X					258

The selection table is intended as an initial orientation.  
Please see the relevant page of the catalogue for detailed information on the product properties.







HELUKABEL TROMM-PUR 12G1 QMM / 26036 300/500 V 001042788 CE



### Technical data

- Special PUR insulation and sheath adapted to DIN VDE 0250
- Strain bearing support strand
- **Temperature range**  
-40°C to +80°C  
(up to +100°C for short periods)
- **Nominal voltage**  
up to 1 mm<sup>2</sup> U<sub>0</sub>/U 300/500 V  
from 1,5 mm<sup>2</sup> U<sub>0</sub>/U 450/750 V
- **Test voltage**  
up to 1 mm<sup>2</sup> = 2000 V  
from 1,5 mm<sup>2</sup> = 2500 V
- **Breakdown voltage**  
up to 1 mm<sup>2</sup> = 4000 V  
from 1,5 mm<sup>2</sup> = 5000 V
- **Insulation resistance**  
min. 20 MOhm x km
- **Minimum bending radius**  
10x cable Ø
- **Radiation resistance**  
up to 100x10<sup>6</sup> cJ/kg (up to 100 Mrad)

### Cable structure

- Bare copper-conductor, to DIN VDE 0295 cl.6 col.4, extra fine-wire, BS 6360 cl.6, IEC 60228 cl.6
- Core insulation of special PUR
- Support core
- Core identification to DIN VDE 0293 (flexible cables)
- Cores stranded in layers with optimal lay-length
- Core wrapping with fleece
- Support braiding of synthetic fibres
- Outer sheath of halogen-free PUR
- Sheath colour orange

### Properties

- High flexibility at low temperatures
- Usable for foodstuffs
- Abrasion and tear resistant
- Loadable under torsional stress

### Resistant to

- Oils and fats
- Non-alcoholic fuels and kerosene
- Atmospheric influences
- UV-radiation
- Oxygen and ozone
- Microbes and rotting
- Sea and waste water
- Vibrations

### Note

- G = with green-yellow conductor
- AWG sizes are approximate equivalent values. The actual cross-section is in mm<sup>2</sup>.

### Application

TROMMPUR® has taken the development of the neoprene type cables one step further. It is a robust, all-weather cable, halogen-free, tear and abrasion resistant and suitable for use in drag-chains, in ship docks, on building sites, for conveyor systems, in mining, for tunnels and roadbuilding. For the connecting the ski lift terminal positions to the control unit, surveillance of the joining rods in ski lift cables, as feeder cables for very high currents as for example in pump engineering, mining, locomotive and rail-carriage construction, for oil rig platforms, emergency power generators etc.

CE= The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer Ø app. mm	Cop. weight kg / km	Weight app. kg / km	Breaking strain ca. kp	AWG-No.
26035	14 G 0,75	16,5	154,0	320,0	250	19
26036	12 G 1	17,5	115,0	300,0	500	18
26037	18 G 1	23,0	173,0	480,0	500	18
26038	3 G 1,5	9,5	43,0	110,0	200	16
26039	5 G 1,5	12,5	72,0	220,0	200	16
26040	7 G 1,5	15,5	101,0	270,0	250	16
26041	12 G 1,5	21,0	173,0	450,0	750	16
26042	18 G 1,5	27,0	259,0	620,0	750	16
26043	24 G 1,5	30,0	346,0	850,0	750	16
26044	30 G 1,5	34,0	533,0	1100,0	750	16
26045	42 G 1,5	40,0	605,0	1600,0	750	16
26046	4 G 2,5	14,0	96,0	250,0	200	14
26047	5 G 2,5	15,0	120,0	280,0	250	14
26048	7 G 2,5	18,0	168,0	360,0	300	14
26049	12 G 2,5	25,0	288,0	740,0	750	14
26050	24 G 2,5	36,0	576,0	1400,0	750	14
26051	30 G 2,5	40,0	864,0	1740,0	750	14
26052	36 G 2,5	44,0	998,0	2050,0	750	14
26053	7 G 4	22,0	269,0	600,0	500	12
26054	4 G 10	22,0	384,0	650,0	500	8
26055	4 G 16	27,0	614,0	1100,0	500	6
26059	5 G 16	34,0	768,0	1600,0	750	6
26056	4 G 25	30,0	960,0	1600,0	500	4
26057	4 G 35	36,0	1344,0	2050,0	1000	2
26058	4 G 50	42,0	1920,0	2800,0	1000	1

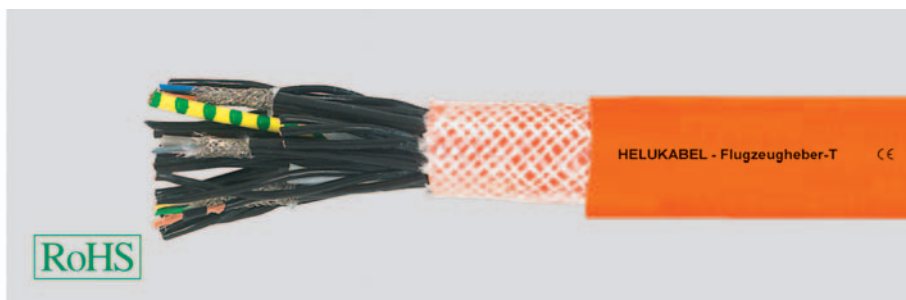
Dimensions and specifications may be changed without prior notice. (RG01)



Suitable accessories can be found in Chapter X.

- Tool - HAM 1

# Flugzeugheber-T trailing, PUR



## Technical data

- **Temperature range**  
flexing -20°C to +80°C
- **Nominal voltage**  
control cores 300/500 V  
power supply cores 600/1000 V
- **A.C. test voltage**, 50 Hz  
control cores 1500 V  
power supply cores 4000 V
- **Minimum bending radius**  
for flexible installation 15x cable Ø

## Cable structure

### Part no. 70736

- Bare copper-conductor, to DIN VDE 0295 cl.6, extra fine-wire, BS 6360 cl.6, IEC 60228 cl.6
- **Power supply cores** (4 mm<sup>2</sup>) and **control cores** (0,75 mm<sup>2</sup>)
  - Core insulation of cold flexible special PVC
  - Core identification black with numbering 4 mm<sup>2</sup> No.1-5 + 0,75 mm<sup>2</sup> No.6-20
- **Data pair** ( 0,34 mm<sup>2</sup>)
  - Core insulation data pair of polyethylene
  - Core identification to DIN 47100
  - Cores twisted in pairs
  - Foil wrapping
  - Tinned copper braided screen, approx. 85% coverage
  - Inner sheath of cold flexible special PVC
- Cores stranded with elements
- Inner sheath of cold flexible special PVC
- Outer sheath of PUR with integrated support braiding
- Sheath colour grey (RAL 7001)

### Part no. 77548

- Bare copper-conductor, to DIN VDE 0295 cl.6, extra fine-wire, BS 6360 cl.6, IEC 60228 cl.6
- **Power supply cores** (2,5 mm<sup>2</sup>) and **control cores** (1 mm<sup>2</sup>)
  - Core insulation of TPE-E
  - Core identification black with numbering
  - GN-YE conductor
- **Data pair** ( 0,34 mm<sup>2</sup>)
  - Core insulation of polyethylene
  - Core identification to DIN 47100
  - Cores twisted in pairs
  - Foil wrapping of aluminium-coated polyester
  - Tinned copper braided screen, approx. 85% coverage
- Cores stranded with elements
- Outer sheath of PUR with integrated support braiding
- Sheath colour orange (RAL 2003)

## Properties

- PUR outer sheath: low adhesion, extremely abrasion resistant, halogen-free, resistant to UV, oil, hydrolysis and microbial attack

## Application

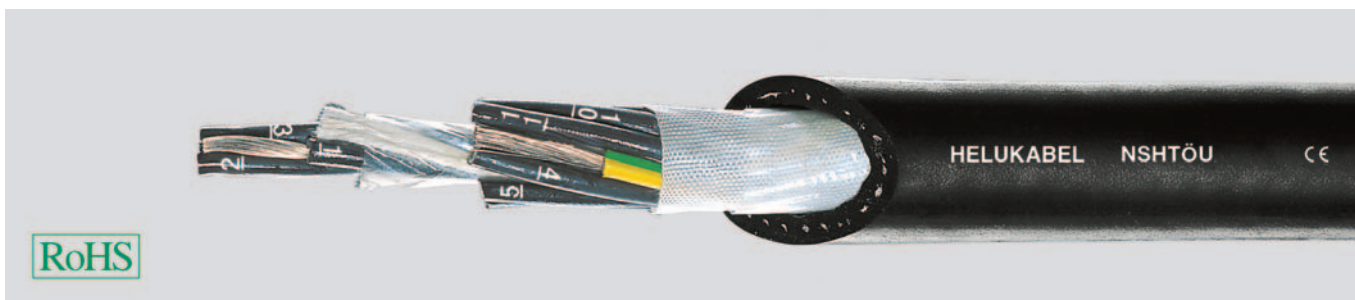
This hybrid cable is designed for the aircraft industry, and contains cores for power supply, control cores, and cores for a positioning laser. The cable is used to control and position a support robot, which absorbs loads at specific points when loading extremely heavy items, for example during loading of aircraft assemblies in large transport aircraft of the Airbus industry. The cable is trailing, UV and weather-resistant, and is provided with an extremely wear-resistant and petrol-resistant special sheath. Part no. 77548 is designed for similar applications, as a load-reducing lifter in aircraft assembly.

CE= The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer Ø app. mm	Cop. weight kg / km	Weight app. kg / km	AWG-No.	Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer Ø app. mm	Cop. weight kg / km	Weight app. kg / km	AWG-No.
70736	5 x 4 + 5 x 3 G 0,75 + 2 x 2 x 0,34	25,6	390,0	600,0	12	77548	5 x 2,5 + 18 G 1,0 + 4 x 2 x 0,34	27,0	461,0	750,0	14

Dimensions and specifications may be changed without prior notice.

# NSHTÖU drum cable, VDE approved



## Technical data

- Special-crane-drum cable to DIN VDE 0250 part 814
- **Temperature range**  
flexing -35°C to +70°C  
fixed installation -40°C to +70°C
- max. **Temperature at conductor**  
in operation +60°C  
in short-circuit +200°C
- **Nominal voltage**  $U_0/U 0,6/1$  kV
- max. **permissible operating voltages**  
in three-phase and one-phase a.c. system  $U_0/U 0,7/1,2$  kV  
in direct current system  $U_0/U 0,9/1,8$  kV
- **Test voltage** 2500 V
- **Insulation resistance**  
min. 10 MOhm x km
- **Minimum bending radius**  
7,5 x cable Ø
- **Radiation resistance**  
up to 20x10<sup>6</sup> cJ/kg (up to 20 Mrad)

## Cable structure

- Tinned copper-conductor, to DIN VDE 0295 cl.5, fine-wire, BS 6360 cl.5, IEC 60228 cl.5
- Core insulation of rubber compound type G11 to DIN VDE 0207 part 20
- Core identification to DIN VDE 0293  
- up to 5 cores coloured  
- from 6 cores, black with continuous white numbering
- Cores stranded (without elongated central core) with max. lay-length of 8x Ø over the stranding layers
- Textile tape
- Textile braiding as protection against torsion, embedded in inner filling sheath
- Outer sheath of neoprene compound type 5GM2 to DIN VDE 0207 part 21
- Sheath colour black

## Properties

- Designed and developed for horizontal drum-operation
- Permissible running speed up to max. 120 m/min
- Polychloroprene-rubber (neoprene)-sheath, extremely cold resistant
- Due to the neoprene outer sheath, the cables **is resistant** against ozone and radiation, oils, acids, fats, gasoline, solvents and chemicals
- During the installation and operation the tensile stress on conductor may not increase 15 N/mm<sup>2</sup>
- Acceleration not more than 0,4 m/s<sup>2</sup>
- During operation, 1-2 convolutions should remain on the operating drum
- In case of high mechanical stress, especially of high dynamic tensile stress result high acceleration, the permissible stress must be defined in each case

## Tests

- Behaviour in fire  
to DIN VDE 0482-332-1-2  
DIN EN 60332-2-1, IEC 60332-1 (equivalent DIN VDE 0472 part 804 test method B)
- Oil resistant acc. to  
DIN VDE 0473-811-404, DIN EN 60811-404

## Note

- G = with green-yellow conductor
- AWG sizes are approximate equivalent values. The actual cross-section is in mm<sup>2</sup>.

## Application

Trailing cables are used for high mechanical stress, especially for applications with frequent winding and unwinding with simultaneous tensile and torsional stress, for building machinery, conveyors, shifts and cranes. They are used as robust and all weather resistant cables of roughest operations in mining and in flexible handling equipment and railway motors. The cables are suitable for outdoor installation in dry, damp and wet places as well in open air. For applications which go beyond standard solutions we recommend that you fill out our especially developed questionnaire for reeling cables. Please read the installation instructions.

CE= The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer Ø app. mm	Cop. weight kg / km	Weight app. kg / km	AWG-No.
26001	3 G 1,5	13,6	47,0	236,0	16
26029	4 G 1,5	14,0	58,0	274,0	16
26002	5 G 1,5	14,5	81,0	316,0	16
26003	7 G 1,5	18,8	115,0	440,0	16
26004	12 G 1,5	21,0	196,0	606,0	16
26005	16 G 1,5	24,5	259,0	696,0	16
26006	18 G 1,5	25,5	271,0	750,0	16
26007	24 G 1,5	27,5	390,0	1150,0	16
26008	30 G 1,5	29,5	432,0	1325,0	16
26009	3 G 2,5	15,3	74,0	305,0	14
26010	4 G 2,5	16,5	98,0	350,0	14
26011	5 G 2,5	17,5	124,0	465,0	14
26012	7 G 2,5	20,0	168,0	576,0	14
26013	12 G 2,5	23,5	308,0	850,0	14
26014	18 G 2,5	28,0	451,0	1181,0	14
26015	24 G 2,5	32,5	615,0	1550,0	14
26016	30 G 2,5	34,0	770,0	1810,0	14
26017	40 G 2,5	42,5	1080,0	3110,0	14
26018	50 G 2,5	46,5	1200,0	3200,0	14

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer Ø app. mm	Cop. weight kg / km	Weight app. kg / km	AWG-No.
26019	4 G 4	18,5	158,0	510,0	12
26030	5 G 4	21,5	220,0	635,0	12
26020	4 G 6	21,0	241,0	650,0	10
26031	5 G 6	23,5	317,0	800,0	10
26021	4 G 10	26,0	404,0	1010,0	8
26022	5 G 10	28,0	508,0	1200,0	8
26023	4 G 16	29,0	642,0	1300,0	6
26032	5 G 16	31,5	768,0	1700,0	6
26024	4 G 25	35,0	1005,0	2000,0	4
26025	4 G 35	37,5	1344,0	2610,0	2
26026	4 G 50	44,5	2010,0	3500,0	1
26027	4 G 70	49,0	2688,0	4600,0	2/0
26028	4 G 95	56,0	3648,0	6100,0	3/0

Dimensions and specifications may be changed without prior notice. (RG01)

**(N)SHTÖU-V** Trailing-Cable**Technical data**

- Special trailing cable adapted to DIN VDE 0250, Part 814
- **Temperature range** flexing -25°C to +80°C
- max. **Temperature at conductor** in operation +90°C in short-circuit +250°C
- **Nominal voltage**  $U_0/U$  0,6/1 kV
- max. **permissible operating voltage** in three-phase and one-phase a.c. system  $U_0/U$  0,7/1,2 kV in direct current system  $U_0/U$  0,9/1,8 kV
- **Test voltage** 4 kV
- **Insulation resistance** min. 10 MOhm x km
- **Minimum bending radius** 7,5x cable  $\emptyset$

**Cable structure**

- Tinned copper-conductor, to DIN VDE 0295 cl.5, fine-wire, BS 6360 cl.5, IEC 60228 cl.5
- Core insulation of special rubber compound type 3GI3 to DIN VDE 207 part 20
- Core identification to DIN VDE 0293-308 (HD 308 S2)
- Cores stranded (without elongated central core) with max. lay-length of 8x  $\emptyset$  over the stranded layers)
- Depending on dimension/structure with Kevlar fillers
- Inner sheath of special rubber compound type 5GM5 to DIN VDE 0207 part 21
- Torsion protection between inner and outer sheath
- Outer sheath of special rubber compound type 5GM5 to DIN VDE 0207 part 21
- Sheath colour yellow

**Properties**

- Permitted running speed up 180 m/min
- Highly resistant to acids, fats, gasoline, solvents and chemicals
- During installation and operation, the tensile stress must not exceed 30 N/mm<sup>2</sup>

**Tests**

- Behaviour in fire to DIN VDE 0482-332-1-2 DIN EN 60332-2-1, IEC 60332-1 (equivalent DIN VDE 0472 part 804 test method B)
- Oil resistant to DIN VDE 0473-811-404, DIN EN 60811-404

**Note**

- AWG sizes are approximate equivalent values. The actual cross-section is in mm<sup>2</sup>.

**Application**

For vertical drum operation under extreme mechanical stress and on moving cable carriers. Used as a rugged feeder to construction machines, conveyor, transport and crane systems in dry, damp, wet environments and outdoors. For applications that go beyond standard solutions we recommend you to our specially developed questionnaire for reeling cables. Please note installation instructions.

CE = The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

**Power supply Cable**

Part no.	No.cores x cross-sec. mm <sup>2</sup>	Outer $\emptyset$ min. - max. mm	Cop. weight kg / km	Weight app. kg / km	Tensile strain max. N	AWG-No.
31040	3 G 1,5	10,9 - 13,6	45,0	191,0	130	16
31041	3 G 2,5	12,3 - 14,8	74,0	240,0	220	14
31042	3 G 4	14,9 - 17,6	115,0	362,0	360	12
31043	3 G 6	16,2 - 18,9	173,0	450,0	540	10
31044	3 G 10	19,6 - 22,6	288,0	682,0	900	8
31045	3 G 16	21,8 - 24,9	461,0	890,0	1440	6
31046	3 G 25	27,5 - 30,8	720,0	1200,0	2250	4
31047	3 x 50 + 3 G 25/3	36,9 - 40,6	1685,0	2810,0	4500	1
31048	3 x 70 + 3 G 35/3	40,4 - 44,4	2355,0	3760,0	6300	2/0
31049	3 x 95 + 3 G 50/3	46,6 - 50,8	3215,0	4700,0	8550	3/0
31050	3 x 120 + 3 G 70/3	50,8 - 55,2	4130,0	5950,0	10800	4/0
31051	3 x 150 + 3 G 70/3	55,4 - 60,0	4990,0	7050,0	13500	300 kcmil
31052	3 x 185 + 3 G 95/3	60,8 - 65,7	6250,0	8800,0	16650	350 kcmil
31053	3 x 240 + 3 G 120/3	68,8 - 74,0	8065,0	11700,0	21600	500 kcmil
31054	4 G 1,5	11,8 - 14,5	58,0	220,0	180	16
31055	4 G 2,5	14,4 - 17,1	99,0	330,0	300	14
31056	4 G 4	16,2 - 18,8	158,0	440,0	480	12
31057	4 G 6	17,4 - 20,2	241,0	530,0	720	10
31058	4 G 10	24,4 - 21,3	404,0	835,0	1200	8
31059	4 G 16	24,7 - 27,9	642,0	1175,0	1920	6
31060	4 G 25	31,4 - 34,9	1005,0	1850,0	3000	4
31061	4 G 35	37,5 - 33,9	1344,0	2250,0	4200	2
31062	4 G 50	40,3 - 44,2	2010,0	3210,0	6000	1
31063	4 G 70	44,5 - 48,6	2687,0	4210,0	8400	2/0
31064	4 G 95	51,1 - 55,5	3646,0	5550,0	11400	3/0
31065	4 G 120	57,4 - 62,0	4605,0	7010,0	14400	4/0
31066	4 G 150	62,6 - 67,6	5765,0	8450,0	18000	300 kcmil
31067	4 G 185	68,1 - 73,2	7110,0	10000,0	22200	350 kcmil
31068	5 G 1,5	12,8 - 15,5	73,0	258,0	220	16
31069	5 G 2,5	15,5 - 18,2	124,0	389,0	370	14
31070	5 G 4	17,4 - 20,2	220,0	511,0	600	12
31071	5 G 6	19,6 - 22,7	317,0	688,0	900	10
31072	5 G 10	23,2 - 26,3	508,0	1002,0	1500	8
31073	5 G 16	26,7 - 30,2	768,0	1395,0	2400	6
31074	5 G 25	34,1 - 37,7	1200,0	2205,0	3750	4
31075	5 G 35	38,3 - 42,2	1680,0	2960,0	5250	2
31076	5 G 50	43,8 - 47,8	2400,0	3950,0	7500	1
31077	5 G 70	50,2 - 54,6	3360,0	5455,0	10500	2/0

Dimensions and specifications may be changed without prior notice. (RG01)

**Control Cable (Kevlar fillers)**

Part no.	No.cores x cross-sec. mm <sup>2</sup>	Outer $\emptyset$ min. - max. mm	Cop. weight kg / km	Weight app. kg / km	Tensile strain max. N	AWG-No.
31078	49 G 1	31,0 - 34,5	470,0	1420,0	3450	18
31079	7 G 1,5	14,6 - 16,9	115,0	320,0	2318	16
31080	12 G 1,5	20,6 - 23,4	196,0	620,0	2540	16
31081	18 G 1,5	20,3 - 22,9	271,0	650,0	2810	16
31082	24 G 1,5	24,2 - 27,4	390,0	930,0	3080	16
31083	30 G 1,5	27,7 - 31,1	432,0	1190,0	3350	16
31084	36 G 1,5	27,9 - 31,3	518,0	1240,0	3620	16
31085	44 G 1,5	31,2 - 34,8	634,0	1530,0	3980	16
31086	48 G 1,5	31,8 - 35,4	691,0	1610,0	4160	16
31087	56 G 1,5	35,9 - 39,7	807,0	2020,0	4520	16
31088	7 G 2,5	17,5 - 19,8	168,0	480,0	2520	14
31089	12 G 2,5	23,8 - 26,7	308,0	915,0	2900	14
31090	18 G 2,5	23,4 - 26,2	451,0	945,0	3350	14
31091	24 G 2,5	28,2 - 31,1	615,0	1330,0	3800	14
31092	30 G 2,5	31,1 - 34,4	770,0	1615,0	4250	14
31093	36 G 2,5	31,3 - 34,7	866,0	1710,0	4680	14
31094	44 G 2,5	36,2 - 40,2	1057,0	2240,0	5250	14
31095	48 G 2,5	37,2 - 41,0	1153,0	2410,0	5550	14
31096	56 G 2,5	41,6 - 46,0	1344,0	2930,0	6150	14

**(N)TSCGEWÖU** extremely torsionally stiff**Technical data**

- Medium voltage power cable adapted to VDE 0250 part 813
- **Temperature range**  
flexing -20°C to +60°C  
fixed installation -20°C to +80°C
- **Nominal voltages**  
U<sub>0</sub>/U 3,6/6 kV  
U<sub>0</sub>/U 6/10 kV  
U<sub>0</sub>/U 8,7/15 kV  
U<sub>0</sub>/U 12/20 kV
- **Operating voltages max.**  
3,6/6 kV = 4,2/7,2 kV  
6/10 kV = 6,9/12 kV  
8,7/15 kV = 10,4/18 kV  
12/20 kV = 13,9/24 kV
- **Test voltages**  
3,6/6 kV = 11 kV  
6/10 kV = 17 kV  
8,7/15 kV = 24 kV  
12/20 kV = 29 kV
- **Minimum bending radius**  
15x outer Ø

**Cable structure**

- Tinned copper-conductor, to DIN VDE 0295 cl.5, fine-wire, BS 6360 cl.5, IEC 60228 cl.5
- Inner semi-conducting layer
- Core insulation of HEPR
- Outer semi-conducting layer
- Ground conductor with semi-conductive layer
- Cores concentrically stranded
- Inner sheath, sheath colour red
- Antitorsional protection
- Outer sheath of chloroprene rubber compound type 5GM3
- Sheath colour red

**Properties**

- maximum permissible speed 200 m/min is allowed when operating drums in one direction
- extremely torsion resistant
- resistant against oils and fats, atmospheric exposure and UV-radiation

**Note**

- Further dimensions and special designs on request

**Application**

Reeling medium voltage supply train for use in high mechanical stresses, such as in container cranes or large mobile equipment as well as excavators in the mining industry for days, in dry, damp, wet areas and outdoors.

**3,6/6kV**

Part no.	No.cores x cross-sec. mm <sup>2</sup>	Outer Ø min. - max. mm	Permanent load N	Tensile strain max. N	Cop. weight kg / km	Weight app. kg / km
38533	3 x 25 + 3 x 10	37,0 - 40,0	1500	2200	1008,0	2280,0
38534	3 x 35 + 3 x 10	40,0 - 43,0	2000	3100	1292,0	2750,0
38535	3 x 50 + 3 x 10	44,0 - 47,0	3000	4300	1728,0	3400,0
38536	3 x 70 + 3 x 16	47,0 - 50,0	4100	5100	2477,0	4100,0
38537	3 x 95 + 3 x 16	52,0 - 56,0	5600	7000	3197,0	5450,0
38538	3 x 120 + 3 x 25	56,0 - 60,0	7100	8500	4176,0	6650,0

**8,7/15kV**

Part no.	No.cores x cross-sec. mm <sup>2</sup>	Outer Ø min. - max. mm	Permanent load N	Tensile strain max. N	Cop. weight kg / km	Weight app. kg / km
38545	3 x 25 + 3 x 10	43,0 - 46,0	1500	2200	1008,0	2750,0
38546	3 x 35 + 3 x 10	46,0 - 48,0	2000	3100	1292,0	3210,0
38547	3 x 50 + 3 x 10	49,0 - 52,0	3000	4300	1728,0	3950,0
39040	3 x 70 + 3 x 16	53,0 - 57,0	4100	5100	2477,0	5000,0
39041	3 x 95 + 3 x 16	58,0 - 62,0	5600	7000	3197,0	6150,0
39042	3 x 120 + 3 x 25	63,0 - 67,0	7100	8500	4176,0	7700,0

**6/10kV**

Part no.	No.cores x cross-sec. mm <sup>2</sup>	Outer Ø min. - max. mm	Permanent load N	Tensile strain max. N	Cop. weight kg / km	Weight app. kg / km
38539	3 x 25 + 3 x 10	39,0 - 42,0	1500	2200	1008,0	2400,0
38540	3 x 35 + 3 x 10	42,0 - 45,0	2000	3100	1292,0	2900,0
38541	3 x 50 + 3 x 10	45,0 - 48,0	3000	4300	1728,0	3450,0
38542	3 x 70 + 3 x 16	50,0 - 54,0	4100	5100	2477,0	4600,0
38543	3 x 95 + 3 x 16	54,0 - 58,0	5600	7000	3197,0	5770,0
38544	3 x 120 + 3 x 25	58,0 - 62,0	7100	8500	4176,0	6900,0

**12/20kV**

Part no.	No.cores x cross-sec. mm <sup>2</sup>	Outer Ø min. - max. mm	Permanent load N	Tensile strain max. N	Cop. weight kg / km	Weight app. kg / km
39043	3 x 25 + 3 x 10	46,0 - 49,0	1500	2200	1008,0	3040,0
39044	3 x 35 + 3 x 10	49,0 - 52,0	2000	3100	1292,0	3510,0
39045	3 x 50 + 3 x 10	53,0 - 57,0	3000	4300	1728,0	4410,0
39046	3 x 70 + 3 x 16	57,0 - 61,0	4100	5100	2477,0	5420,0
39047	3 x 95 + 3 x 16	62,0 - 66,0	5600	7000	3197,0	6750,0
39048	3 x 120 + 3 x 25	67,0 - 70,0	7100	8500	4176,0	8050,0

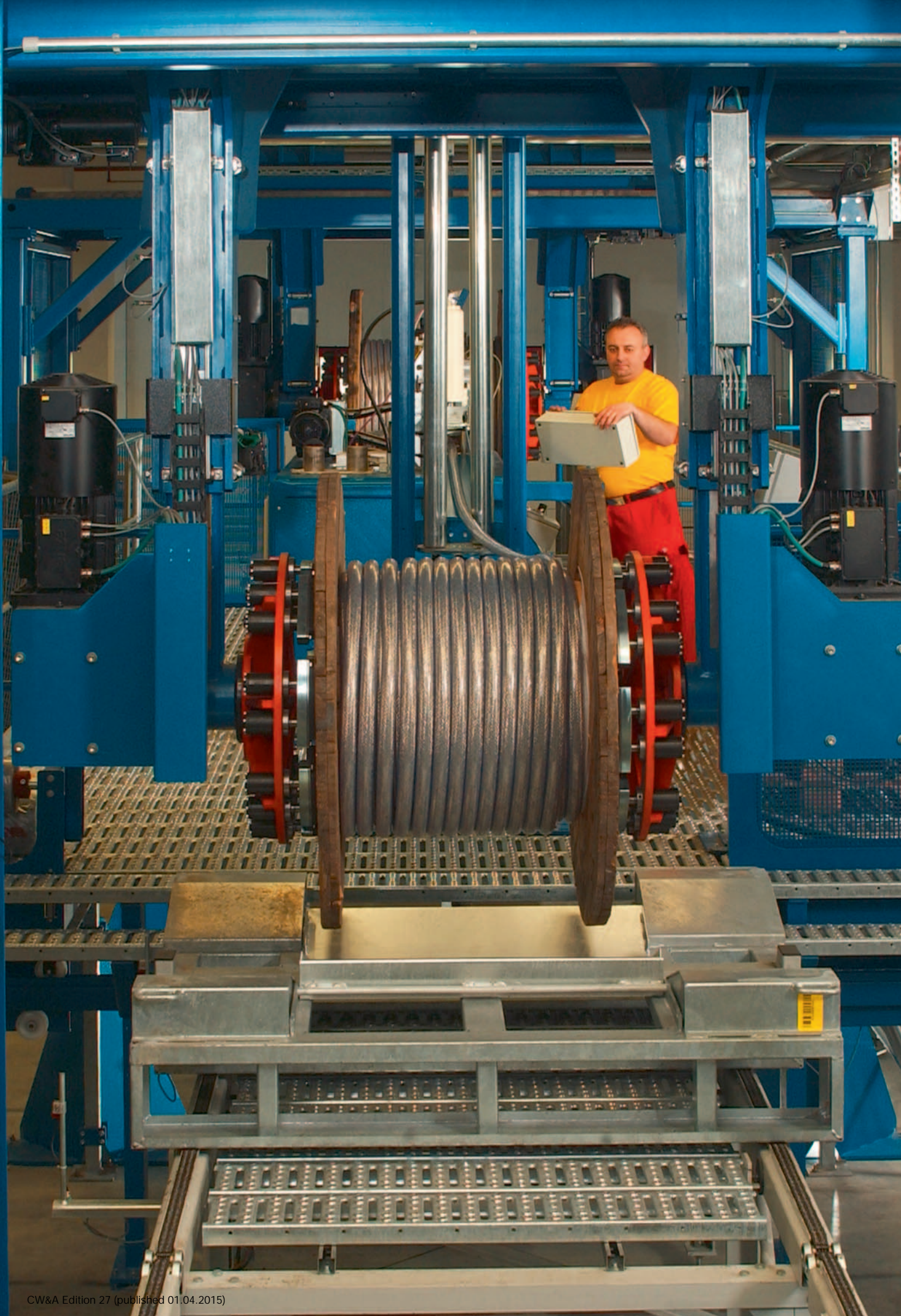
Dimensions and specifications may be changed without prior notice. (RQ03)



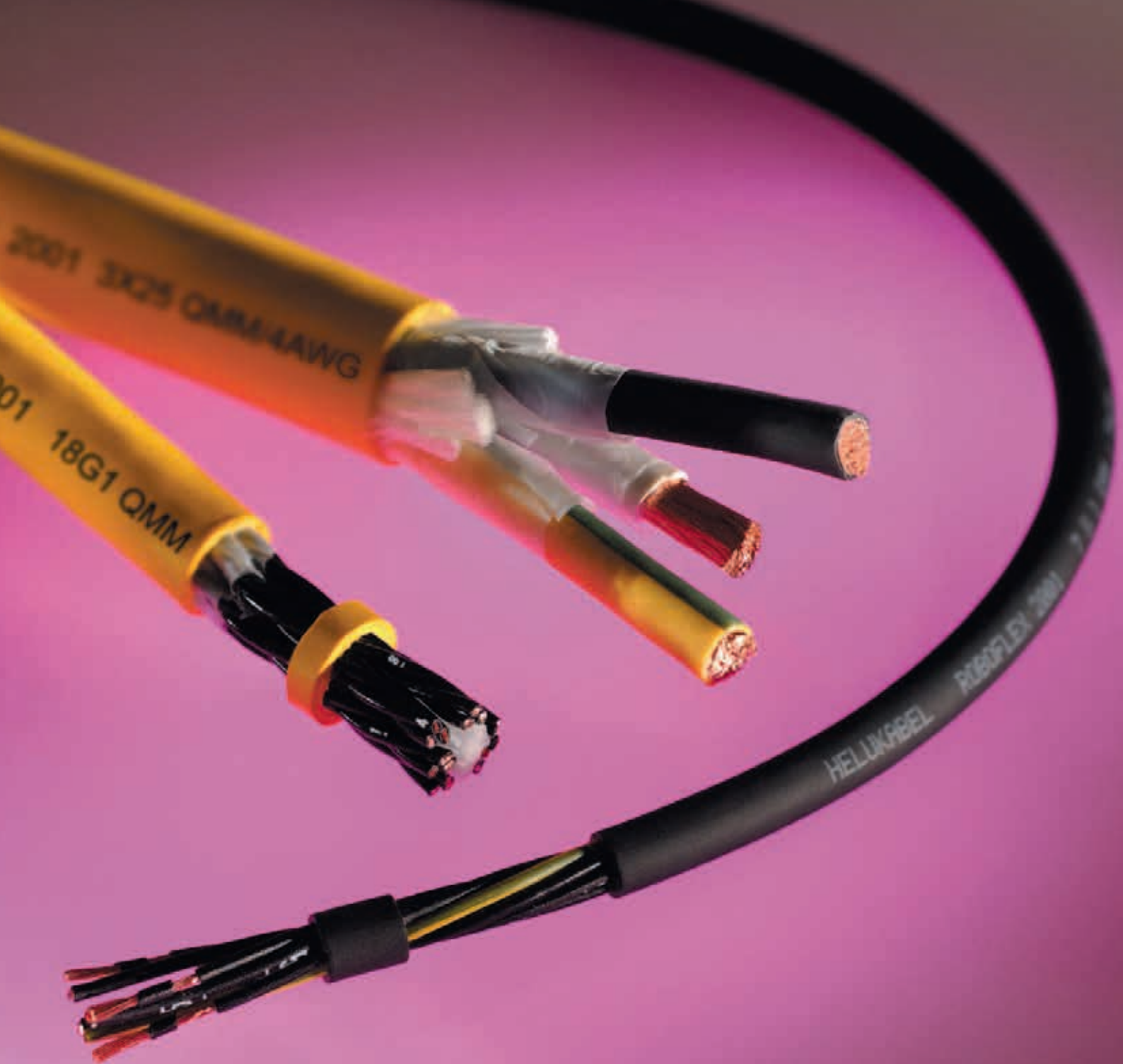
Suitable accessories can be found in Chapter X.

- Tool - HAM 1









# ROBOFLEX® 150

## ROBOFLEX® recycle

ROBOFLEX® sewer robot

ROBOFLEX® 2001

# ROBOT CABLES

Temperature (°C) - flexing

Temperature (°C) - fixed

Nominal voltage U<sub>0</sub>/U

Bending radius - flexing x Ø

Bending radius - fixed x Ø

Halogen-free

UV-resistant

Outdoor use

Drag Chain

Colored cores/VDE 0293

Screened/shielded

HAR/VDE REG no./VDE  
UL/CSA

Page

Robot cables														
	Temperature (°C) - flexing	Temperature (°C) - fixed	Nominal voltage U <sub>0</sub> /U	Bending radius - flexing x Ø	Bending radius - fixed x Ø	Halogen-free	UV-resistant	Outdoor use	Drag Chain	Colored cores/VDE 0293	Screened/shielded	HAR/VDE REG no./VDE	UL/CSA	Page
ROBOFLEX® recycle	-30 to +105	-40 to +105	300	7.5x	7.5x	X	X	X		X				262
ROBOFLEX® 2001 / 2001-C	-30 to +80	-40 to +80	300/500	7.5x	7.5x		X	X			/X			264
ROBOFLEX® 150,...151,...152,...153	-40 to +80	-40 to +80	300/500	15x	15x	X	X	X		/X	X			265
ROBOFLEX® sewer robot	-40 to +80	-40 to +80	300/500				X	X						267

The selection table is intended as an initial orientation.  
Please see the relevant page of the catalogue for detailed information on the product properties.

# ROBOFLEX® recycle



## Technical data

- **Approval:**  
UL/cUL approved, UL-Style 20233
- **Production**  
in accordance with VDE standards
- **Temperature range:**  
fixed installation -40°C to +105°C  
flexibel -30°C to +105°C
- **Nominal voltage:**  
300 V
- **Test voltage:**  
2000 V
- **Minimum bending radius:**  
7.5 x cable diameter (for flexible installation)
- **Traversing speed:**  
max. 3.3 m/s for 5 m of horizontal traverse  
path length
- **Acceleration:**  
max. 5 m/s<sup>2</sup>
- **Flexing and torsion cycles:**  
min. 10 million.
- **Torsional stress:**  
+/- 360°/m

## Cable structure

### Assembly (3-pin)

- Bare copper litz wire
- Core insulation TPE
- Cores stranded in layers
- -D-screen: screened version for robot application
- -C-screen: in drag chain systems
- Sheath, special mix
- weld splatter resistant, dull, low adhesion
- Sheath colour: see below

## Properties

- very good resistance to oil as per DIN VDE 0473-811-404/DIN EN 60811-404
- good resistance to acids, alkalis and solvents
- not cross-linked
- weld splatter resistant
- recyclable
- halogen-free
- The materials used in manufacture are cadmium-free and contain no silicone and free from substances harmful to the wetting properties of lacquers
- Free of substances harmful to paint adhesion substances
- very high mechanical load capacity
- abrasion resistant
- wear-resistant
- Highly flexible
- UV-resistant

## Application

The cables with this new sheath material cover all requirements for very large mechanical stresses for abrasion, tear resistance, torsion, flexing, flexibility and oil resistance. Using for automation technology, plant and machine construction, fixture construction for handling devices, welding devices and welding tongs, assembly and handling devices, machining production, welding robots and tool machines, blast furnaces and rolling mills. The completely new feature of this cable is the weld splatter resistance without the otherwise usual and required cross-linking process. Our newly developed non-cross-linked thermoplastic elastomer is fully recyclable. In contrast to this, the usual, cross-linked, thermoplastic elastomers cannot be recycled and put a not insignificant stress on our environment. This must be particularly interesting for customers who have an environment management system according to DIN EN ISO 14001 and thus place a great deal of importance on the use of recyclable materials. A significantly longer service life than that of existing cables on the market, because it can be used in highly flexible applications, for example on robots (torsion) and in drag chains (dynamic load).

☑= The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

## ROBOFLEX® recycle

Part no.	Sheath colour	Cable structure No. cores x cross-sec. mm <sup>2</sup>	Core colours	High flex **	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
701889	BK RAL 9005	3 x 0,25	BN, BU, BK	X	4,4	7,2	22,0	-
701891	YE RAL 1021	3 x 0,25	BN, BU, BK	X	4,4	7,2	22,0	-
701890	GY RAL 7001	3 x 0,25	BN, BU, BK	X	4,4	7,2	22,0	-
701894	YE RAL 1021	4 x 0,25	BN, BU, BK, WH	X	4,7	9,6	26,0	-
701892	BK RAL 9005	4 x 0,25	BN, BU, BK, WH	X	4,7	9,6	26,0	-
701893	GY RAL 7001	4 x 0,25	BN, BU, BK, WH	X	4,7	9,6	26,0	-
701897	YE RAL 1021	5 x 0,25	BN, BU, BK, WH, GY	X	4,8	12,0	30,0	-
701895	BK RAL 9005	5 x 0,25	BN, BU, BK, WH, GY	X	4,8	12,0	30,0	-
701896	GY RAL 7001	5 x 0,25	BN, BU, BK, WH, GY	X	4,8	12,0	30,0	-
702805	YE RAL 1021	8 x 0,25	DIN 47100	X	6,0	19,2	55,0	-
702803	BK RAL 9005	8 x 0,25	DIN 47100	X	6,0	19,2	55,0	-
702804	GY RAL 7001	8 x 0,25	DIN 47100	X	6,0	19,2	55,0	-
701900	YE RAL 1021	3 x 0,34	BN, BU, BK	X	4,9	9,8	30,0	-
701898	BK RAL 9005	3 x 0,34	BN, BU, BK	X	4,9	9,8	30,0	-
701899	GY RAL 7001	3 x 0,34	BN, BU, BK	X	4,9	9,8	30,0	-

Continuation ▶

# ROBOFLEX® recycle



## ROBOFLEX® recycle

Part no.	Sheath colour	Cable structure No. cores x cross-sec. mm <sup>2</sup>	Core colours	High flex **	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
701903	YE RAL 1021	4 x 0,34	BN, BU, BK, WH	X	5,2	13,1	43,0	-
701901	BK RAL 9005	4 x 0,34	BN, BU, BK, WH	X	5,2	13,1	43,0	-
701902	GY RAL 7001	4 x 0,34	BN, BU, BK, WH	X	5,2	13,1	43,0	-
701906	YE RAL 1021	5 x 0,34	BN, BU, BK, WH, GY	X	5,9	16,4	54,0	-
701904	BK RAL 9005	5 x 0,34	BN, BU, BK, WH, GY	X	5,9	16,4	54,0	-
701905	GY RAL 7001	5 x 0,34	BN, BU, BK, WH, GY	X	5,9	16,4	54,0	-
702808	YE RAL 1021	8 x 0,34	DIN 47100	X	6,8	26,1	78,0	-
702806	BK RAL 9005	8 x 0,34	DIN 47100	X	6,8	26,1	78,0	-
702807	GY RAL 7001	8 x 0,34	DIN 47100	X	6,8	26,1	78,0	-
701910	YE RAL 1021	5 G 0,5	BK with number, GN-YE	X	6,0	24,0	65,0	-
701908	BK RAL 9005	5 G 0,5	BK with number, GN-YE	X	6,0	24,0	65,0	-
701909	GY RAL 7001	5 G 0,5	BK with number, GN-YE	X	6,0	24,0	65,0	-
701913	YE RAL 1021	5 G 0,75	BK with number, GN-YE	X	7,0	36,0	80,0	-
701911	BK RAL 9005	5 G 0,75	BK with number, GN-YE	X	7,0	36,0	80,0	-
701912	GY RAL 7001	5 G 0,75	BK with number, GN-YE	X	7,0	36,0	80,0	-

## ROBOFLEX® recycle screened, D-screen

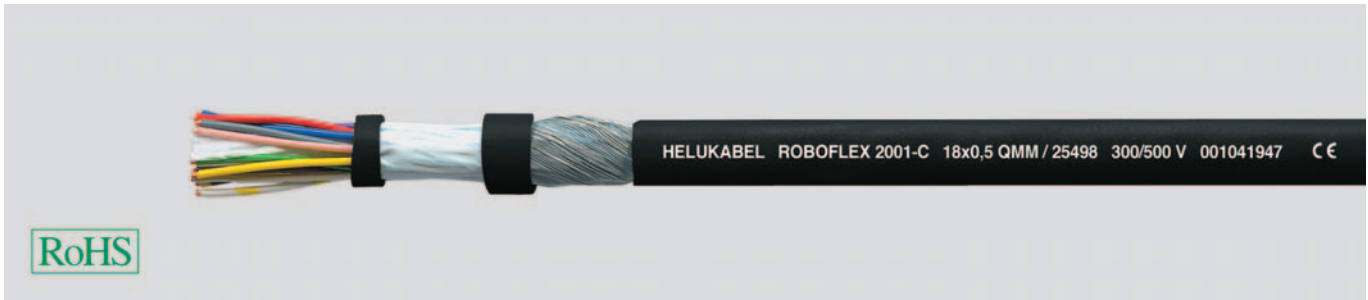
Part no.	Sheath colour	Cable structure No. cores x cross-sec. mm <sup>2</sup>	Core colours	High flex **	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
703843	BK RAL 9005	3 x 0,25	BN, BU, BK	X	5,0	17,0	44,6	-
703845	YE RAL 1021	3 x 0,25	BN, BU, BK	X	5,0	17,0	44,6	-
703844	GY RAL 7001	3 x 0,25	BN, BU, BK	X	5,0	17,0	44,6	-
703848	YE RAL 1021	4 x 0,25	BN, BU, BK, WH	X	5,2	19,4	46,3	-
703846	BK RAL 9005	4 x 0,25	BN, BU, BK, WH	X	5,2	19,4	46,3	-
703847	GY RAL 7001	4 x 0,25	BN, BU, BK, WH	X	5,2	19,4	46,3	-
703851	YE RAL 1021	5 x 0,25	BN, BU, BK, WH, GY	X	5,3	22,5	50,0	-
703849	BK RAL 9005	5 x 0,25	BN, BU, BK, WH, GY	X	5,3	22,5	50,0	-
703850	GY RAL 7001	5 x 0,25	BN, BU, BK, WH, GY	X	5,3	22,5	50,0	-
703869	YE RAL 1021	8 x 0,25	DIN 47100	X	6,8	34,1	53,5	-
703867	BK RAL 9005	8 x 0,25	DIN 47100	X	6,8	34,1	53,5	-
703868	GY RAL 7001	8 x 0,25	DIN 47100	X	6,8	34,1	53,5	-
703854	YE RAL 1021	3 x 0,34	BN, BU, BK	X	5,2	19,6	48,2	-
703852	BK RAL 9005	3 x 0,34	BN, BU, BK	X	5,2	19,6	48,2	-
703853	GY RAL 7001	3 x 0,34	BN, BU, BK	X	5,2	19,6	48,2	-
703857	YE RAL 1021	4 x 0,34	BN, BU, BK, WH	X	5,4	23,7	53,0	-
703855	BK RAL 9005	4 x 0,34	BN, BU, BK, WH	X	5,4	23,7	53,0	-
703856	GY RAL 7001	4 x 0,34	BN, BU, BK, WH	X	5,4	23,7	53,0	-
703860	YE RAL 1021	5 x 0,34	BN, BU, BK, WH, GY	X	5,8	28,7	61,9	-
703858	BK RAL 9005	5 x 0,34	BN, BU, BK, WH, GY	X	5,8	28,7	61,9	-
703859	GY RAL 7001	5 x 0,34	BN, BU, BK, WH, GY	X	5,8	28,7	61,9	-
703872	YE RAL 1021	8 x 0,34	DIN 47100	X	7,3	58,0	85,0	-
703870	BK RAL 9005	8 x 0,34	DIN 47100	X	7,3	58,0	85,0	-
703871	GY RAL 7001	8 x 0,34	DIN 47100	X	7,3	58,0	85,0	-
703863	YE RAL 1021	5 G 0,5	BK with number, GN-YE	X	7,0	52,0	76,0	-
703861	BK RAL 9005	5 G 0,5	BK with number, GN-YE	X	7,0	52,0	76,0	-
703866	YE RAL 1021	5 G 0,75	BK with number, GN-YE	X	7,6	70,0	93,0	-
703864	BK RAL 9005	5 G 0,75	BK with number, GN-YE	X	7,6	70,0	93,0	-
703865	GY RAL 7001	5 G 0,75	BK with number, GN-YE	X	7,6	70,0	93,0	-

## ROBOFLEX® recycle screened, C-screen

Part no.	Sheath colour	Cable structure No. cores x cross-sec. mm <sup>2</sup>	Core colours	High flex **	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
703873	BK RAL 9005	3 x 0,25	BN, BU, BK	X	5,0	17,0	44,6	-
703875	YE RAL 1021	3 x 0,25	BN, BU, BK	X	5,0	17,0	44,6	-
703874	GY RAL 7001	3 x 0,25	BN, BU, BK	X	5,0	17,0	44,6	-
703878	YE RAL 1021	4 x 0,25	BN, BU, BK, WH	X	5,2	19,4	46,3	-
703876	BK RAL 9005	4 x 0,25	BN, BU, BK, WH	X	5,2	19,4	46,3	-
703877	GY RAL 7001	4 x 0,25	BN, BU, BK, WH	X	5,2	19,4	46,3	-
703881	YE RAL 1021	5 x 0,25	BN, BU, BK, WH, GY	X	5,3	22,5	50,0	-
703879	BK RAL 9005	5 x 0,25	BN, BU, BK, WH, GY	X	5,3	22,5	50,0	-
703880	GY RAL 7001	5 x 0,25	BN, BU, BK, WH, GY	X	5,3	22,5	50,0	-
703899	YE RAL 1021	8 x 0,25	DIN 47100	X	6,8	34,1	53,5	-
703897	BK RAL 9005	8 x 0,25	DIN 47100	X	6,8	34,1	53,5	-
703898	GY RAL 7001	8 x 0,25	DIN 47100	X	6,8	34,1	53,5	-
703884	YE RAL 1021	3 x 0,34	BN, BU, BK	X	5,2	19,6	48,2	-
703882	BK RAL 9005	3 x 0,34	BN, BU, BK	X	5,2	19,6	48,2	-
703883	GY RAL 7001	3 x 0,34	BN, BU, BK	X	5,2	19,6	48,2	-
703887	YE RAL 1021	4 x 0,34	BN, BU, BK, WH	X	5,4	23,7	53,0	-
703885	BK RAL 9005	4 x 0,34	BN, BU, BK, WH	X	5,4	23,7	53,0	-
703886	GY RAL 7001	4 x 0,34	BN, BU, BK, WH	X	5,4	23,7	53,0	-
703890	YE RAL 1021	5 x 0,34	BN, BU, BK, WH, GY	X	5,8	28,7	61,9	-
703888	BK RAL 9005	5 x 0,34	BN, BU, BK, WH, GY	X	5,8	28,7	61,9	-
703889	GY RAL 7001	5 x 0,34	BN, BU, BK, WH, GY	X	5,8	28,7	61,9	-
703902	YE RAL 1021	8 x 0,34	DIN 47100	X	7,3	58,0	85,0	-
703900	BK RAL 9005	8 x 0,34	DIN 47100	X	7,3	58,0	85,0	-
703901	GY RAL 7001	8 x 0,34	DIN 47100	X	7,3	58,0	85,0	-
703893	YE RAL 1021	5 G 0,5	BK with number, GN-YE	X	7,0	52,0	76,0	-
703891	BK RAL 9005	5 G 0,5	BK with number, GN-YE	X	7,0	52,0	76,0	-
703892	GY RAL 7001	5 G 0,5	BK with number, GN-YE	X	7,0	52,0	76,0	-
703896	YE RAL 1021	5 G 0,75	BK with number, GN-YE	X	7,6	70,0	93,0	-
703894	BK RAL 9005	5 G 0,75	BK with number, GN-YE	X	7,6	70,0	93,0	-
703895	GY RAL 7001	5 G 0,75	BK with number, GN-YE	X	7,6	70,0	93,0	-

Dimensions and specifications may be changed without prior notice.





### Technical data

- Special TPE-E/PUR adapted to DIN VDE 0250 / DIN VDE 0285-525-1 / DIN EN 50525-1
- **Temperature range**  
flexing -30°C to +80°C  
fixed installation -40°C to +80°C
- **Nominal voltage**  
up to 0,34 mm<sup>2</sup> 350 V (operating peak voltage)  
from 0,5 mm<sup>2</sup> U<sub>0</sub>/U 300/500 V
- **Test voltage**  
up to 0,34 mm<sup>2</sup> 1,5 kV, 5 minutes  
from 0,5 mm<sup>2</sup> 3,0 kV, 5 minutes
- **Mutual capacitance**  
core/core approx. 100 nF/km  
core/screen approx. 120 nF/km
- **Inductance approx.**  
0,69 mH/km
- **Minimum bending radius**  
7,5x cabel Ø

### Cable structure

- Bare copper, stranded to DIN VDE 0295 and IEC 60228, fine or extra fine wires, cl.5 or cl.6, BS 6360 cl.5 or 6, up to 0,34 mm<sup>2</sup> cl.5, above 0,5 mm<sup>2</sup> cl.6
- Special core insulation, PP
- Cores coded up to 0,34 mm<sup>2</sup> according DIN 47100 above 0,5 mm<sup>2</sup> black cores with continuous white numbering acc. to DIN VDE 0293
- GN-YE conductor, 3 cores and above in the outer layer
- Cores stranded in layers with optimal lay-length
- Special separating foil
- Cable structure C-type, cu-screen of helically wound, approx. 85-95% coverage
- Outer sheath, special polyurethane
- Sheath colour black (RAL 9005)
- with meter marking

### Properties

- High flexibility at low temperatures
- High abrasion resistance
- Loadable under torsion stress ±360°/meter
- Low adhesion
- **Resistant to**  
Microbes and rotting  
Oxygene and ozone  
Vibrations  
UV-radiation
- **Largely resistant to**  
Oil and fats resistant
- AWG sizes are approximate equivalent values. The actual cross-section is in mm<sup>2</sup>

### Application

These special robotic control and signal cables specially designed for torsion and bending stresses in robots and connecting handling tools.

**EMC** = Electromagnetic compatibility

To optimize the EMC features we recommend a large round contact of the copper braiding on both ends.

**CE** = The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

### ROBOFLEX® 2001

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
25459	7 x 0,25	5,8	16,8	48,0	24
25439	12 x 0,25	7,6	28,8	71,0	24
25460	25 x 0,25	10,6	60,0	143,0	24
25461	2 x 0,34	4,0	6,6	28,0	22
25462	3 x 0,34	4,0	9,8	34,0	22
25440	7 x 0,34	5,7	22,8	51,0	22
25449	12 x 0,34	8,3	39,2	69,0	22
25463	12 G 0,5	10,4	57,8	90,0	20
25519	16 G 0,5	11,6	76,8	277,0	20
25464	18 G 0,5	12,7	86,4	121,0	20
25465	25 G 0,5	14,2	120,0	256,0	20
25466	4 G 0,75	6,0	28,8	63,0	19
25450	7 G 0,75	7,9	50,4	96,0	19
25467	12 G 0,75	11,5	84,4	171,0	19
25468	14 G 0,75	12,8	100,8	200,0	19
25469	2 x 1	5,5	19,2	48,0	18
25470	3 G 1	6,0	29,0	60,0	18
25471	4 G 1	6,3	38,4	78,0	18
25472	7 G 1	8,5	67,2	131,0	18
25473	12 G 1	12,5	115,2	216,0	18
25474	18 G 1	15,4	172,8	306,0	18
25475	25 G 1	17,4	240,0	432,0	18
25476	34 G 1	21,3	326,4	569,0	18
25477	41 G 1	23,2	393,6	694,0	18
25520	3 G 1,5	6,9	43,2	94,0	16
25529	4 G 1,5	7,9	57,6	107,0	16
25559	5 G 1,5	8,6	72,0	121,0	16
25509	8 G 1,5	11,1	115,2	292,0	16
25478	12 G 1,5	15,5	172,8	356,0	16
25479	18 G 1,5	19,3	259,2	445,0	16
25480	25 G 1,5	21,8	360,0	636,0	16
25481	3 G 2,5	8,4	72,0	136,0	14
25482	4 G 2,5	9,1	96,0	170,0	14
25483	3 G 4	10,3	116,0	227,0	12
25530	4 G 4	11,2	153,6	261,0	12
25510	4 G 6	14,1	230,4	341,0	10
25484	3 G 10	15,6	288,0	518,0	8
25485	3 G 16	18,2	460,8	722,0	6
25486	3 G 25	22,9	720,0	1180,0	4
25487	3 G 35	26,5	1008,0	1600,0	2

### ROBOFLEX® 2001-C

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
25539	10 x 0,14	7,8	34,2	62,0	26
25488	12 x 0,14	7,8	42,1	95,0	26
25489	18 x 0,14	9,7	54,5	120,0	26
25490	25 x 0,14	10,9	69,0	158,0	26
25491	12 x 0,25	8,3	59,5	126,0	24
25492	18 x 0,25	10,1	80,0	164,0	24
25493	25 x 0,25	11,1	103,0	215,0	24
25494	12 x 0,34	8,8	78,0	160,0	22
25495	18 x 0,34	10,8	101,0	210,0	22
25496	25 x 0,34	12,0	158,0	305,0	22
25497	12 G 0,5	11,2	117,0	175,0	20
25498	18 G 0,5	13,6	160,0	231,0	20
25499	25 G 0,5	14,8	255,0	347,0	20
25500	12 G 0,75	11,8	155,0	220,0	19
25501	18 G 0,75	15,0	210,0	305,0	19
25502	25 G 0,75	16,6	275,0	415,0	19
705462	3 G 1	6,3	76,0	90,0	18
25503	12 G 1	13,0	190,0	265,0	18
25504	18 G 1	16,1	245,0	390,0	18
25505	25 G 1	18,1	345,0	540,0	18
25506	12 G 1,5	16,2	260,0	345,0	16
25507	18 G 1,5	20,3	370,0	485,0	16
25508	25 G 1,5	22,5	498,0	710,0	16

Dimensions and specifications may be changed without prior notice. (RH01)

# ROBOFLEX® 150, ... 151, ... 152, ... 153 PUR, halogen-free, for torsional stress, meter marking



## Technical data

- Special TPE-E/PUR robot cable based on DIN VDE 0250 / DIN VDE 0285-525-1 / DIN EN 50525-1
- **Temperature range** flexing -40°C to +80°C
- **Nominal voltage** up to 0,34 mm<sup>2</sup> 350 V from 0.5 mm<sup>2</sup> U<sub>0</sub>/U 300/500 V
- **Test voltage** up to 0,34 mm<sup>2</sup> 1500 V from 0.5 mm<sup>2</sup> 3000 V
- **Insulation resistance** min. 20 MOhm x km
- **Max. torsion angle** ±360°/metre
- **Mutual capacitance** core/core approx. 100 nF/km core/screen approx. 120 nF/km
- **Minimum bending radius** 15x cable Ø

## Cable structure

- Bare copper, stranded to DIN VDE 0295 and IEC 60228, fine or extra fine wires, cl.5 or cl.6, BS 6360 cl.5 or 6, up to 0,34 mm<sup>2</sup> cl.5, above 0,5 mm<sup>2</sup> cl.6
  - TPE-E core insulation
  - Black cores continuous white numbering acc. to DIN VDE 0293 + gnye
  - Special optimised stranding
  - High-grade slide wrapping
  - with meter marking
  - Tinned copper twist screen
  - PUR outer sheath
  - Sheath colour: grey (RAL 7001) or black
- Part. nos. 77261-77263, 76158, 70561, 77267, 77268, 76165, 76166, 77424**
- Core colours DIN 47100
- Part no. 71820, 74658, 77264, 75253, 76167**
- Construction as above, but 0,5 (1,5) mm<sup>2</sup> cores screened with aluminium-coated polyester foil
- Part no. 72214**
- Construction as above, but 0,5 mm<sup>2</sup> pair screened with tinned twist screen
- Part no. 77265, 77266, 77269, 77270**
- Construction as above, but 1,0 mm<sup>2</sup> pair only, screened with tinned twist screen
- Part no. 77469**
- Construction as above, but
  - 6 cores, 1,5 mm<sup>2</sup>, screened with tinned twist screen
  - 4 pairs, 0,25 mm<sup>2</sup>, screened with tinned twist screen
  - Sheath colour: orange (RAL 2003)
  - with meter marking

## Properties

- PUR outer sheath, low adhesion, abrasion resistant, halogen-free, resistant to UV, oil, hydrolysis and microbial attack
- The smooth, high-grade core insulation, together with special stranding configuration and slide wrapping ensure long service life under combined bending and torsional stresses
- AWG sizes are approximate equivalent values. The actual cross-section is in mm<sup>2</sup>

## Application

These cables are specially designed for combined torsional and bending stresses. They are employed both for power supply and for the transmission of control and monitoring signals. ROBOFLEX® cables are used in assembly and welding robots, in handling and automation centres, in transport and conveyor equipment, and on turntables and swivel tables. In other words, anywhere where there is no defined cable routing with only alternating bending cycles on a single plane such as in drag chains.

CE= The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

Continuation ▶

# ROBOFLEX® 150,...151,...152,...153 PUR, halogen-free,



for torsional stress, meter marking

## ROBOFLEX® 150 (screened), Sheath colour grey

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
77261	(12 x 0,25)	8,3	59,5	126,0	24
77266	23 x 1 + (2 x 1,0)	17,4	262,0	473,0	-
71789	(4 x 1,5)	8,9	81,7	150,0	16
75251	(4 x 2,5)	11,2	134,0	280,0	14
75252	(4 x 4)	13,1	200,0	400,0	12
76157	(4 x 6)	15,4	286,0	550,0	10
77262	(3 x 2 x 0,14)	5,8	17,0	43,0	26
77263	(4 x 2 x 0,14)	6,9	37,0	75,0	26
76158	(5 x 2 x 0,34)	9,2	65,0	116,0	22
70561	(8 x 2 x 0,34)	10,2	90,0	150,0	22
71820	(4 x 1,5 + (2 x 0,62))	10,5	106,8	195,0	16
74658	(4 x 1,5 + (2 x 0,5))	10,7	95,0	180,0	16
77264	(4 x 1,5 + (2 x 1,0))	11,1	128,0	220,0	16
75253	(4 x 2,5 + (2 x 0,5))	12,5	180,0	270,0	14
72214	(4 x 4 + (2 x 0,62))	13,5	260,0	340,0	12
76159	(4 x 4 + (2 x 1,0))	14,0	237,0	350,0	12
76160	(4 x 6 + (2 x 1,0))	16,0	341,0	500,0	10
77265	16 x 1 + (2 x 1,0)	16,7	197,0	380,0	18

## ROBOFLEX® 152 (screened), Sheath colour black

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
76161	(4 x 1,5)	8,9	81,7	150,0	16
76162	(4 x 2,5)	11,2	164,0	280,0	14
76163	(4 x 4)	13,1	222,0	400,0	12
76164	(4 x 6)	15,4	305,0	550,0	10
77267	(3 x 2 x 0,14)	5,8	23,0	43,0	26
77268	(4 x 2 x 0,14)	6,9	26,6	55,0	26
77424	(3 x 2 x 0,25)	7,3	32,0	65,0	24
76165	(5 x 2 x 0,34)	9,2	65,0	116,0	22
76166	(8 x 2 x 0,34)	10,2	90,0	150,0	22
75415	(4 x 1,5 + (2 x 0,5))	10,7	95,0	170,0	16
75416	(4 x 2,5 + (2 x 0,5))	11,8	115,0	220,0	14
75940	(4 x 2,5 + (2 x 1,0))	12,3	147,0	250,0	14
75167	(4 x 4 + (2 x 0,5))	13,5	260,0	340,0	12
75417	(4 x 4 + (2 x 1,0))	14,0	237,0	350,0	12
75418	(4 x 6 + (2 x 1,0))	16,0	316,0	500,0	10
77269	16 x 1 + (2 x 1,0)	16,7	176,0	380,0	18
77270	23 x 1 + (2 x 1,0)	17,4	262,0	473,0	18
77469	5 x 2,5 + (6 x 1,5) + 4 x (2 x 0,25)	16,7	320,0	460,0	14

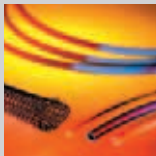
## ROBOFLEX® 151, Sheath colour grey

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
70116	12 G 0,5	8,3	57,6	131,0	20
76168	4 G 1,5	8,5	57,6	106,0	16
76169	4 G 2,5	10,8	96,0	196,0	14
76170	4 G 4	12,7	153,6	283,0	12
76171	4 G 6	15,0	230,4	432,0	10

## ROBOFLEX® 153, Sheath colour black

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
76172	4 G 1,5	8,5	57,6	106,0	16
76174	4 G 4	12,7	153,6	283,0	12
76175	4 G 6	15,0	230,4	432,0	10

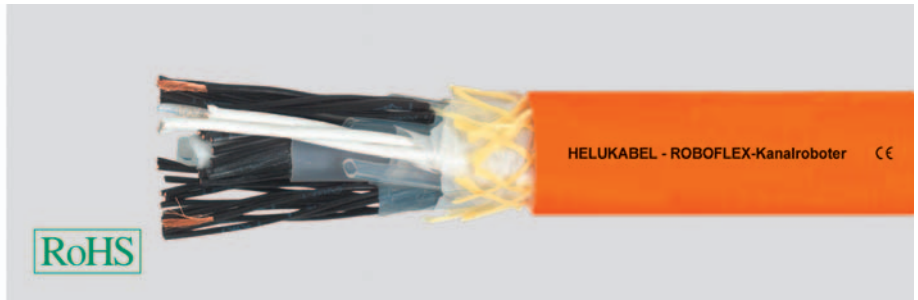
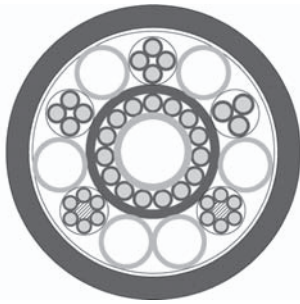
Dimensions and specifications may be changed without prior notice.



Suitable accessories can be found in Chapter X.

- Heat shrink tubing - SPSP coils

# ROBOFLEX® sewer robot trailing



## Technical data

- **Temperature range**  
flexing -40°C to +80°C
- **Nominal voltage**  
300/500 V
- **Test voltage** 3000 V
- **Insulation resistance**  
min. 20 MOhm x km

## Cable structure

### Part No. 74540

- Bare copper, ultra-fine wire conductors acc. to DIN VDE 0295 cl.6 and/or IEC 60228 cl.6
- Core insulation TPE-E, black with numbering
- 3 COAX 187/U stranded
- Cores and COAX elements and PVC sleeves, special stranded
- PUR outer sheath with embedded high-tensile and high-torsion resistant Kevlar braid
- Sheath colour orange (RAL 2003)

### Part No. 70581

- Bare copper, ultra-fine wire conductors acc. to DIN VDE 0295 cl.6 or IEC 60228 cl.6
- PVC core insulation, colour code DIN 47100
- Cores stranded with COAX
- Overall screening with tinned copper braid, coverage approx. 85%
- Special PVC sheath
- Sheath colour grey (RAL 7001)

### Part No. 76397 (trailing cable for video cameras)

- Tinned copper conductor, fine wire stranded
- Core insulation of cell polypropylene
- Screen of aluminium-coated polyester foil and tinned copper braiding
- PUR outer sheath
- Sheath colour blue (RAL 5015)

## Properties

- To enhance reliability and tensile strength, a high-tensile and high-torsion resistant Kevlar braid is incorporated into the extremely robust PUR sheath

### Part No. 74540+76397

- PUR sheath: low adhesion, extremely abrasion resistant, halogen-free, resistant to UV, oil, hydrolysis and microbial attack

### Part No. 70581

- Special PVC sheath, largely oil resistant, self-extinguishing and flame retardant acc. to DIN VDE 0482-332-1-2, DIN EN 60332-1-2, IEC 60332-1 (equivalent DIN VDE 0472 part 804 test method B) chemical resistant, (see table Technical Information)

## Application

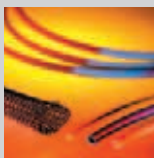
These cables are designed for use with autonomous sewer robots. These robots are used to inspect municipal sewer networks and if necessary to locate leaks or blockages. Some of these robots are even able to seal such leaks after detecting them. Besides cores for power supply, they also contain data cables, hoses for various drives, and coaxial cables for the video camera mounted on the robot.

CE The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

Part No.	No cores x cross-sec mm <sup>2</sup>	Outer Ø ca. mm	Cop. weight kg/km	Weight ca. kg/km
74540	22x0,5+6x0,75+3x1+4x1,5+COAX +PVC sleeves	26,8	206,0	450
700766	4x0,14+12x1+3x2,5+1xCOAX +4xPA sleeves	33,5	394,2	1080

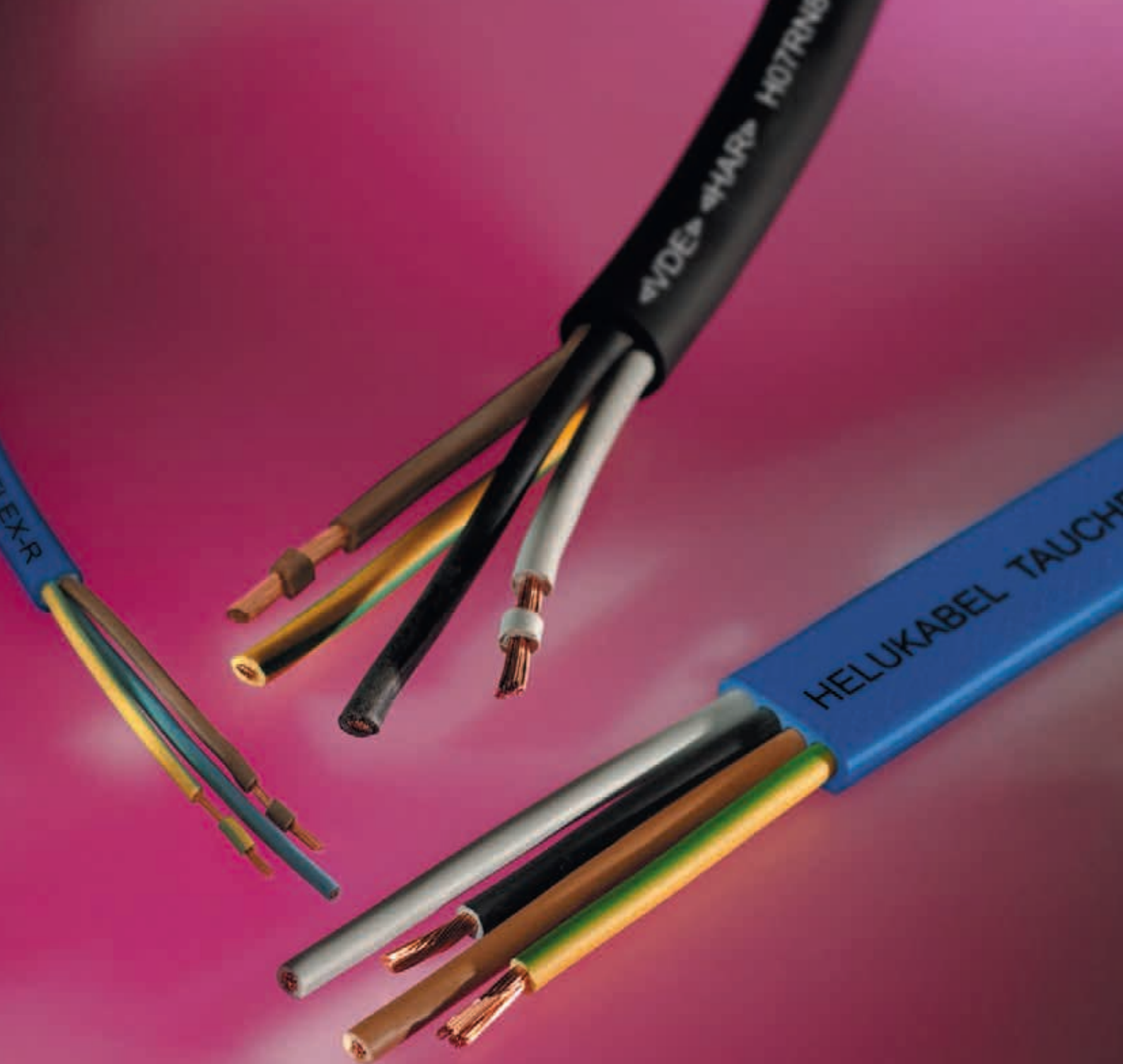
Part No.	No cores x cross-sec mm <sup>2</sup>	Outer Ø ca. mm	Cop. weight kg/km	Weight ca. kg/km
70581	12 x 0,25+1 x COAX	8,0	73,0	108
76397	1 x 1,22	6,5	24,0	50

Dimensions and specifications may be changed without prior notice. (RH01)



Suitable accessories can be found in Chapter X.

- Heat shrink tubing - SPSP coils



Tauchflex-R

**H07RN8-F**

Tauchflex-FL



# ■ WATER-RESISTANT CABLES

Temperature (°C) - flexing

Temperature (°C) - fixed

Nominal voltage U<sub>0</sub>/U

Bending radius - flexing x Ø

Bending radius - fixed x Ø

Halogen-free

UV-resistant

Outdoor use

Drag Chain

Colored cores/VDE 0293

Screened/shielded

HAR/VDE REG no./VDE

UL/CSA

**Page**

Water-resistant cables														
	Temperature (°C) - flexing	Temperature (°C) - fixed	Nominal voltage U <sub>0</sub> /U	Bending radius - flexing x Ø	Bending radius - fixed x Ø	Halogen-free	UV-resistant	Outdoor use	Drag Chain	Colored cores/VDE 0293	Screened/shielded	HAR/VDE REG no./VDE	UL/CSA	Page
Tauchflex-R	-25 to +80	-40 to +80	450/750	5x	4x			X		X				270
Tauchflex-FL	-25 to +80	-40 to +80	450/750	5x	4x			X		X				271
H07 RN8-F	-25 to +40	-40 to +40	450/750	6x	4x			X		X		X		272

The selection table is intended as an initial orientation.  
Please see the relevant page of the catalogue for detailed information on the product properties.



# Tauchflex-R 750 V, blue, submersible-pump cable



## Technical data

- Special cables corresponding adapted to DIN VDE 0250/DIN VDE 0285-525-2-21/DIN EN 50525-2-21
- **Temperature range** (max. temperature for the outer surface) -40°C to +80°C
- **Temperature limit in water:** max. +40°C, max. +60°C with limited duration of life
- **Temperature limit in air:** flexible -25°C to +80°C fixed installation -40°C to +80°C
- Permissible **operating temperature** at conductor +90°C
- **Nominal voltage**  $U_0/U$  450/750 V
- **Operating voltage** at alternating and three-phase currents  $U_0/U$  413/825 V at direct currents  $U_0/U$  619/1238 V
- **Test voltage** 2,5 kV, 15 min
- Max. permitted **tensile stress** per mm<sup>2</sup> conductor 15 N
- **Minimum bending radius flexing** up to 8 mm cable Ø: 3x cable Ø > 8-12 mm cable Ø: 4x cable Ø > 12 mm cable Ø: 5x cable Ø
- **fixed installation** up to 12 mm cable Ø: 3x cable Ø > 12 mm cable Ø: 4x cable Ø

## Cable structure

- Bare copper-conductor, to DIN VDE 0295 cl.5, fine-wire, BS 6360 cl.5, IEC 60228 cl.5
- Core insulation to EPR
- Core identification to DIN VDE 0293
- GN-YE conductor, 3 cores and above
- Cores stranded in layers with optimal lay-length
- Outer sheath of special EPR
- Sheath colour blue

## Properties

- Good insulation properties when submerged in water
- Minimal weight gain under water
- The mechanical stability of the insulation materials remains constant even when submerged
- As rotor-connection cable for motors up to 1000 V with protected fixed installation in tubes.

## Note

- G = with green-yellow conductor
- x = without green-yellow conductor
- AWG sizes are approximate equivalent values. The actual cross-section is in mm<sup>2</sup>.

## Application

Tauchflex-R is a special cable for use as a connecting and control cable for submersible motor pumps, underwater floodlights, floating switch and has proven its worth for constant use in drinking water, process water and service water up to an immersion depth of 300 m.

Tauchflex-R can also be installed for use in dry, damp and humid areas as well as in the open air. Not suitable for the installation in hazardous areas.

CE = The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

Part no.	No.cores x cross-sec. mm <sup>2</sup>	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
37100	1 x 1,5	6,0	14,0	54,0	16
37101	1 x 2,5	6,7	24,0	76,0	14
37102	1 x 4	7,2	38,0	105,0	12
37103	1 x 6	7,9	58,0	135,0	10
37104	1 x 10	9,5	96,0	200,0	8
37105	1 x 16	11,5	154,0	290,0	6
37106	1 x 25	13,5	240,0	400,0	4
37107	1 x 35	15,0	336,0	560,0	2
37108	1 x 50	17,5	480,0	730,0	1
37109	1 x 70	20,0	672,0	1000,0	2/0
37110	1 x 95	22,5	912,0	1250,0	3/0
37111	1 x 120	24,0	1152,0	1650,0	4/0
37112	1 x 150	25,2	1440,0	2000,0	300 kcmil
37113	1 x 185	27,6	1776,0	2460,0	350 kcmil
37114	1 x 240	30,6	2304,0	3050,0	500 kcmil
37115	1 x 300	33,5	2880,0	3700,0	600 kcmil
37116	2 x 1,5	8,5	29,0	130,0	16
37117	2 x 2,5	10,2	48,0	190,0	14
37118	2 x 4	11,8	77,0	260,0	12
37119	2 x 6	13,1	115,0	350,0	10
37120	2 x 10	17,7	192,0	550,0	8
37121	2 x 16	20,2	307,0	900,0	6
37122	2 x 25	24,3	480,0	1300,0	4
37123	3 G 1,5	9,5	43,0	150,0	16
37124	3 G 2,5	11,0	72,0	205,0	14
37125	3 G 4	13,0	115,0	330,0	12
37126	3 G 6	14,5	173,0	470,0	10

Part no.	No.cores x cross-sec. mm <sup>2</sup>	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
37127	3 G 10	19,0	288,0	750,0	8
37128	3 G 16	23,5	461,0	1110,0	6
37129	3 G 25	28,5	720,0	1450,0	4
37130	3 G 35	32,0	1008,0	2150,0	2
37131	3 G 50	37,0	1440,0	2800,0	1
37132	3 G 70	42,0	2016,0	3750,0	2/0
37133	3 G 95	43,3	2736,0	4590,0	3/0
37134	3 G 120	49,0	3456,0	5400,0	4/0
37135	4 G 1,5	10,7	58,0	190,0	16
37136	4 G 2,5	12,3	96,0	270,0	14
37137	4 G 4	14,0	154,0	380,0	12
37138	4 G 6	15,5	230,0	520,0	10
37139	4 G 10	21,0	384,0	955,0	8
37140	4 G 16	25,5	614,0	1400,0	6
37141	4 G 25	31,0	960,0	1950,0	4
37142	4 G 35	35,0	1344,0	2650,0	2
37143	4 G 50	41,0	1920,0	3600,0	1
37144	4 G 70	46,5	2688,0	4890,0	2/0
37145	4 G 95	51,6	3648,0	6180,0	3/0
37146	4 G 120	56,1	4608,0	7200,0	4/0
37147	5 G 1,5	11,2	72,0	225,0	16
37148	5 G 2,5	13,3	120,0	335,0	14
37149	5 G 4	15,6	192,0	470,0	12
37150	5 G 6	17,5	288,0	645,0	10
37151	5 G 10	22,9	480,0	1150,0	8
37152	5 G 16	26,4	768,0	1690,0	6
37153	5 G 25	32,0	1200,0	2400,0	4

Dimensions and specifications may be changed without prior notice. (RI01)

# Tauchflex-FL 750 V, blue, submersible pump cable



## Technical data

- Special cables corresponding adapted to DIN VDE 0250/DIN VDE 0285-525-2-21/ DIN EN 50525-2-21
- **Temperature range** (max. temperature for the outer surface) -40°C to +80°C
- **Temperature limit in water:** max. +40°C, max. +60°C with limited duration of life
- **Temperature limit in air:** flexible -25°C to +80°C fixed installation -40°C to +80°C
- Permissible **operating temperature** at conductor +90°C
- **Nominal voltage**  $U_0/U$  450/750 V
- **Operating voltage** at alternating and three-phase currents  $U_0/U$  413/825 V at direct currents  $U_0/U$  619/1238 V
- **Test voltage** 2,5 kV, 15 min.
- Max. permitted **tensile stress** per mm<sup>2</sup> conductor 15 N
- **Minimum bending radius** flexing 5x cable thickness fixed installation 4x cable thickness

## Cable structure

- Bare copper-conductor, to DIN VDE 0295 cl.5, fine-wire, BS 6360 cl.5, IEC 60228 cl.5
- Core insulation of EPR
- Core identification to DIN VDE 0293
- GN-YE conductor, 3 cores and above
- Cores laying parallel
- Outer sheath of special ERP
- Sheath colour blue

## Properties

- Good insulation properties when submerged in water
- Minimal weight gain under water
- The mechanical stability of the insulation materials remains constant even when submerged
- As rotor-connection cable for motors up to 1000 V with protected fixed installation in tubes.

## Note

- G = with green-yellow conductor
- x = without green-yellow conductor
- AWG sizes are approximate equivalent values. The actual cross-section is in mm<sup>2</sup>.

## Application

Tauchflex-FL is a special cable for use as a connecting and control cable for submersible motor pumps, underwater floodlights, floating switch and has proven its worth for constant use in drinking water, process water and service water up to an immersion depth of 300 m. Tauchflex-FL can also be installed for use in dry, damp and humid areas as well as in the open air. Not suitable for the installation in hazardous areas. CE= The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer dimension approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
37155	3 x 1,5	7,0 x 13,0	43,0	125,0	16
37156	3 x 2,5	8,0 x 16,0	72,0	185,0	14
37157	3 x 4	9,0 x 19,0	115,0	290,0	12
37158	3 x 6	10,0 x 23,0	173,0	400,0	10
37159	3 x 10	12,0 x 28,0	288,0	615,0	8
37160	3 x 16	14,0 x 31,0	461,0	890,0	6
37161	3 x 25	17,0 x 37,0	720,0	1155,0	4
37162	3 x 35	17,0 x 38,0	1008,0	1540,0	2
37163	3 x 50	20,0 x 45,0	1440,0	2190,0	1
37164	3 x 70	22,0 x 52,0	2016,0	2890,0	2/0
37165	3 x 95	25,0 x 58,0	2736,0	3800,0	3/0
37166	3 x 120	27,0 x 64,0	3456,0	4700,0	4/0

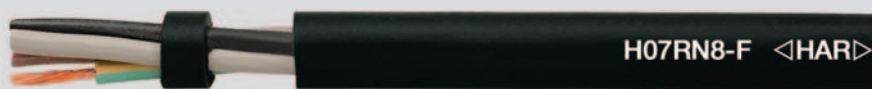
Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer dimension approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
37167	4 G 1,5	7,0 x 17,0	58,0	160,0	16
37168	4 G 2,5	8,0 x 20,0	96,0	245,0	14
37169	4 G 4	9,0 x 24,0	154,0	330,0	12
37170	4 G 6	10,0 x 26,0	230,0	450,0	10
37171	4 G 10	11,0 x 31,0	384,0	850,0	8
37172	4 G 16	13,0 x 36,0	614,0	1200,0	6
37173	4 G 25	15,0 x 45,0	960,0	1590,0	4
37174	4 G 35	17,0 x 48,0	1344,0	2085,0	2
37175	4 G 50	20,0 x 59,0	1920,0	2890,0	1

Dimensions and specifications may be changed without prior notice. (R101)



Suitable accessories can be found in Chapter X.

- Cable Gland - HELUTOP® HT-MS Plus

**H07RN8-F** waterproof rubber-sheathed cable, harmonized type**Technical data**

- Water resistant heavy hose pipe to DIN VDE 0285-525-2-21 / DIN EN 50525-2-21
- **Temperature range**  
flexing -25°C  
fixed installation -40°C  
in water max. +40°C
- Permissible **operating temperature** at conductor +60°C
- **Nominal voltage** U<sub>0</sub>/U 450/750 V  
in case of protected and fixed installation  
U<sub>0</sub>/U 600/1000 V
- **Test voltage** 2500 V
- **Permanent tensile load**  
max. 15 N/mm<sup>2</sup>
- **Minimum bending radius**  
flexing 6x cable Ø  
fixed installation 4x cable Ø

**Cable structure**

- Bare copper-conductor, to DIN VDE 0295 cl.5, fine-wire, BS 6360 cl.5, IEC 60228 cl.5
- Core insulation of rubber compound type EI4 to DIN VDE 0207-363-1 / DIN EN 50363-1
- Core identification to DIN VDE 0293-308  
- up to 5 cores coloured  
- from 6 cores, black with continuous white numbering
- GN-YE conductor, 3 cores and above
- Cores stranded in layers with optimal lay-length
- Outer sheath of special polychloroprene rubber
- Outer sheath black

**Properties**

- **Resistant to**  
Ozone  
Weather
- The core identification of a single core sheathed, of an insulated wire is black.

**Tests**

- Oil resistant acc. to DIN VDE 0473-811-404 / DIN EN 60811-404
- **Behaviour in fire**  
to DIN VDE 0482-332-1-2  
DIN EN 60332-2-1, IEC 60332-1 (equivalent  
DIN VDE 0472 part 804 test method B)

**Note**

- G = with green-yellow conductor  
x = without green-yellow conductor
- AWG sizes are approximate equivalent values. The actual cross-section is in mm<sup>2</sup>.

**Application**

Specifically designed for use in fresh water up to 10 m water depth and a maximum water temperature of 40°C for connection of submersible pumps and similar applications. Not suitable for underwater power transmission systems or in waterways or in areas where mechanical damage is possible which represent a potential danger.

☑= The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer Ø min. - max. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
37287	1 x 1,5	5,7 - 7,1	14,4	58,0	16
37288	1 x 2,5	6,3 - 7,9	24,0	71,0	14
37289	1 x 4	7,2 - 9,0	38,0	100,0	12
37290	1 x 6	7,9 - 9,8	58,0	130,0	10
37291	1 x 10	9,5 - 11,9	96,0	230,0	8
37292	1 x 16	10,8 - 13,4	154,0	290,0	6
37293	1 x 25	12,7 - 15,8	240,0	420,0	4
37294	1 x 35	14,3 - 17,9	336,0	530,0	2
37295	1 x 50	16,5 - 20,6	480,0	750,0	1
37296	1 x 70	18,6 - 23,3	672,0	960,0	2/0
37297	1 x 95	20,8 - 26,0	912,0	1250,0	3/0
37298	1 x 120	22,8 - 28,6	1152,0	1560,0	4/0
37299	1 x 150	25,2 - 31,4	1440,0	1900,0	300 kcmil
37300	1 x 185	27,6 - 34,4	1776,0	2300,0	350 kcmil
37301	1 x 240	30,6 - 38,3	2304,0	2950,0	500 kcmil
37302	1 x 300	33,5 - 41,9	2880,0	3600,0	600 kcmil
37303	1 x 400	37,4 - 46,8	3840,0	4600,0	750 kcmil
37304	1 x 500	41,3 - 52,0	4800,0	6000,0	1000 kcmil
37305	2 x 1	7,7 - 10,0	19,0	98,0	18
37306	2 x 1,5	8,5 - 11,0	29,0	135,0	16
37307	2 x 2,5	10,2 - 13,1	48,0	193,0	14
37308	2 x 4	11,8 - 15,1	77,0	280,0	12
37309	2 x 6	13,1 - 16,8	115,0	330,0	10
37310	2 x 10	17,7 - 22,6	192,0	586,0	8
37311	2 x 16	20,2 - 25,7	307,0	810,0	6
37312	2 x 25	24,3 - 30,7	480,0	1160,0	4
37313	3 G 1	8,3 - 10,7	29,0	130,0	18
37314	3 G 1,5	9,2 - 11,9	43,0	165,0	16
37315	3 G 2,5	10,9 - 14,0	72,0	235,0	14
37316	3 G 4	12,7 - 16,2	115,0	320,0	12
37317	3 G 6	14,1 - 18,0	173,0	420,0	10
37318	3 G 10	19,1 - 24,2	288,0	810,0	8
37319	3 G 16	21,8 - 27,6	461,0	1050,0	6
37320	3 G 25	26,1 - 33,0	720,0	1250,0	4
37321	3 G 35	29,3 - 37,1	1008,0	1900,0	2
37322	3 G 50	34,1 - 42,9	1440,0	2600,0	1

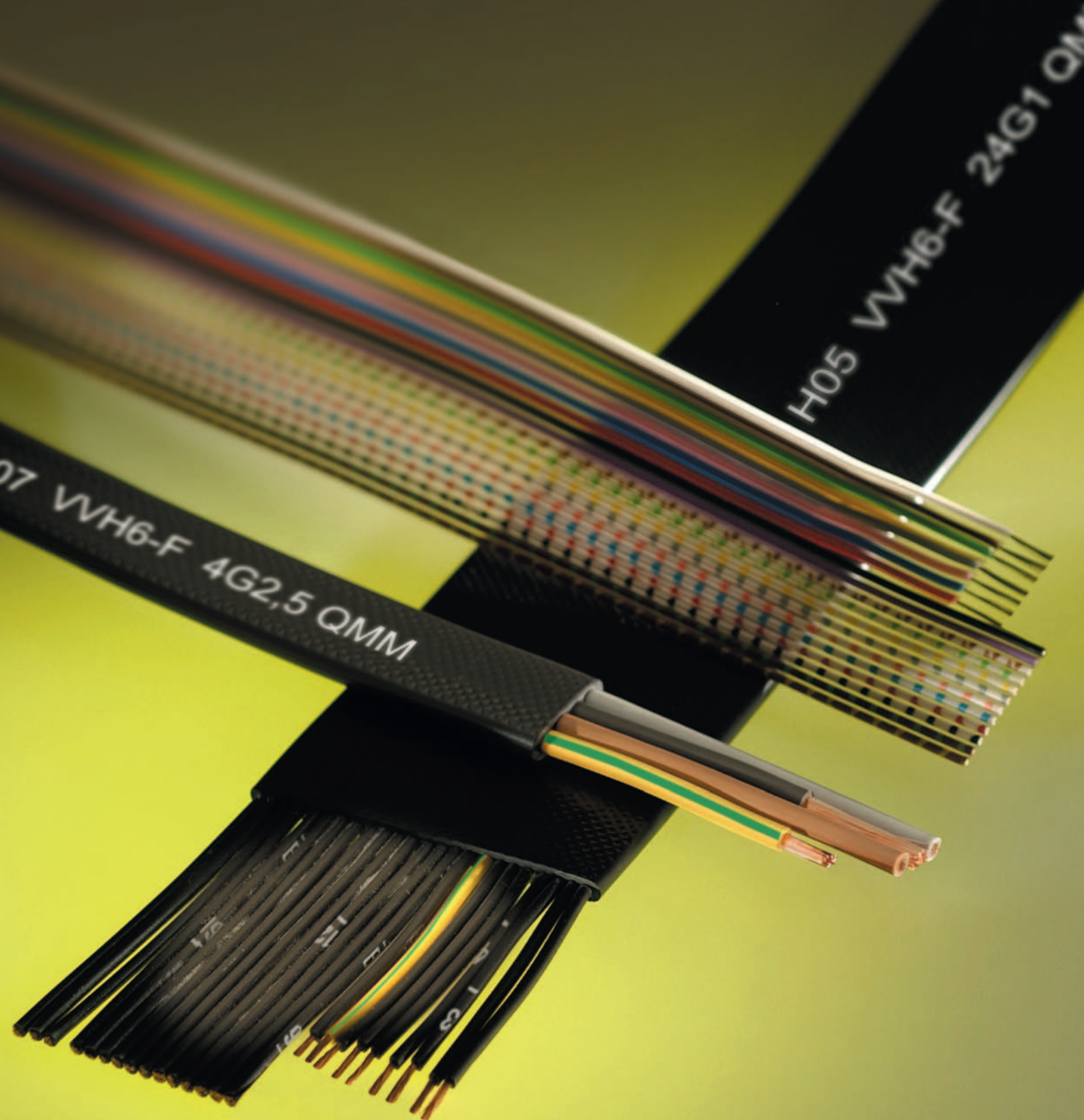
Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer Ø min. - max. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
37323	3 G 70	38,4 - 48,3	2016,0	3400,0	2/0
37324	3 G 95	43,3 - 54,0	2736,0	4450,0	3/0
37325	3 G 120	47,4 - 60,0	3456,0	5180,0	4/0
37326	3 G 150	52,0 - 66,0	4320,0	6500,0	300 kcmil
37327	3 G 185	57,0 - 72,0	5328,0	7860,0	350 kcmil
37328	3 G 240	65,0 - 82,0	6192,0	10224,0	500 kcmil
37329	3 G 300	72,0 - 90,0	8640,0	12620,0	600 kcmil
37330	4 G 1	9,2 - 11,9	38,0	150,0	18
37331	4 G 1,5	10,2 - 13,1	58,0	200,0	16
37332	4 G 2,5	12,1 - 15,5	96,0	290,0	14
37333	4 G 4	14,0 - 17,9	154,0	395,0	12
37334	4 G 6	15,7 - 20,0	230,0	540,0	10
37335	4 G 10	20,9 - 26,5	384,0	950,0	8
37336	4 G 16	23,8 - 30,1	614,0	1260,0	6
37337	4 G 25	28,9 - 36,6	960,0	1860,0	4
37338	4 G 35	32,5 - 41,1	1344,0	2380,0	2
37339	4 G 50	37,7 - 47,5	1920,0	3190,0	1
37340	4 G 70	42,7 - 54,0	2688,0	4260,0	2/0
37341	4 G 95	48,4 - 61,0	3648,0	5600,0	3/0
37342	4 G 120	53,0 - 66,0	4608,0	6830,0	4/0
37343	4 G 150	58,0 - 73,0	5760,0	8320,0	300 kcmil
37344	4 G 185	64,0 - 80,0	7104,0	9800,0	350 kcmil
37345	4 G 240	72,0 - 91,0	9216,0	12100,0	500 kcmil
37346	4 G 300	80,0 - 101,0	11520,0	15200,0	600 kcmil
37354	5 G 1	10,2 - 13,1	48,0	175,0	18
37347	5 G 1,5	11,2 - 14,4	72,0	240,0	16
37348	5 G 2,5	13,3 - 17,0	120,0	345,0	14
37349	5 G 4	15,6 - 19,9	192,0	485,0	12
37350	5 G 6	17,5 - 22,2	288,0	650,0	10
37351	5 G 10	22,9 - 29,1	480,0	1200,0	8
37352	5 G 16	26,4 - 33,3	768,0	1550,0	6
37353	5 G 25	32,0 - 40,4	1200,0	2250,0	4
37355	6 G 1,5	13,4 - 17,2	87,0	171,0	16
37356	6 G 2,5	15,7 - 20,0	144,0	279,0	14
37357	12 G 1,5	17,6 - 22,4	173,0	340,0	16
37358	12 G 2,5	20,6 - 26,2	288,0	571,0	14

Dimensions and specifications may be changed without prior notice. (RI01)









TUBEFLEX-(St)-CY

NEO-Flat-C

Ribbon Cables

**TUBEFLEX-Y**

PVC-Flat (H05 VVH-F/H07 VVH6-F)

**NEO-Flat**

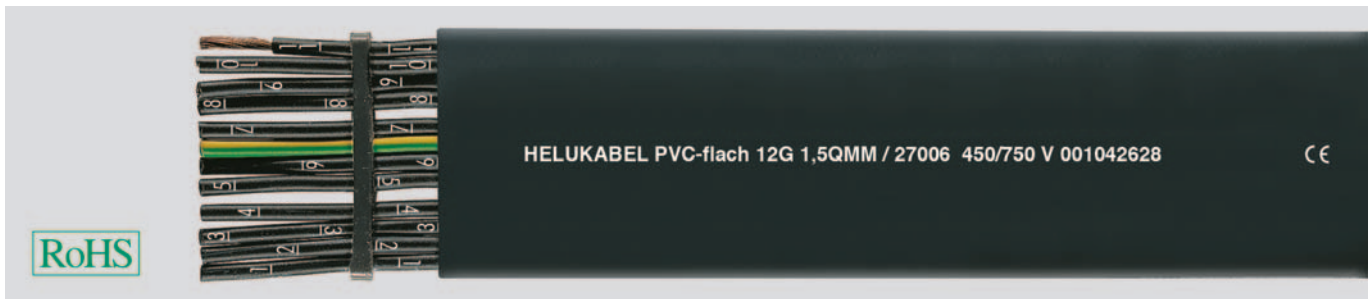
**PVC-Flat-CY**

## ■ FLAT & RIBBON CABLES

		Temperature (°C) - flexing	Temperature (°C) - fixed	Nominal voltage U <sub>0</sub> /U	Bending radius - flexing x Ø	Bending radius - fixed x Ø	Halogen-free	UV-resistant	Outdoor use	Drag Chain	Colored cores/VDE 0293	Screened/shielded	HAR/VDE REG no./VDE	UL/CSA	Page
<b>Flat &amp; ribbon cables</b>															
PVC-flat	-5 to +70	-40 to +80	300/500	10x	10x					X					<b>276</b>
NEO-flat	-30 to +80	-40 to +80	300/500	10x	10x		X			X					<b>277</b>
PVC-flat-CY	-5 to +70	-40 to +80	300/500	15x	15x					X	X				<b>278</b>
NEO-flat-C	-30 to +80	-40 to +80	300/500	15x	15x		X			X	X				<b>279</b>
Ribbon	-5 to +70	-5 to +70	350/600							X					<b>280</b>
TUBEFLEX-Y	-20 to +80	-20 to +80	300	15x	15x										<b>281</b>
TUBEFLEX-(St)-CY	-20 to +80	-20 to +80	300	15x	15x						X				<b>282</b>

The selection table is intended as an initial orientation.  
Please see the relevant page of the catalogue for detailed information on the product properties.

# PVC-flat 300/500 V and 450/750 V



## Technical data

- Special PVC-flat cable adapted to EN 50214 / DIN VDE 0283-2
- **Temperature range**  
flexing -5°C to +70°C  
fixed installation -40°C to +80°C
- **Nominal voltage**  
up to 1 mm<sup>2</sup> U<sub>0</sub>/U 300/500 V  
from 1,5 mm<sup>2</sup> U<sub>0</sub>/U 450/750 V
- **Test voltage**  
up to 1 mm<sup>2</sup> 2000 V  
from 1,5 mm<sup>2</sup> 2500 V
- **Minimum bending radius**  
10x cable thickness
- **Radiation resistance**  
up to 80x106 cJ/kg (up to 80 Mrad)

## Cable structure

- Bare copper-conductor, to DIN VDE 0295 cl.5, fine-wire, BS 6360 cl.5, IEC 60228 cl.5
- Core insulation of PVC compound type T12 to DIN VDE 0207-363-3 / DIN EN 50363-3
- Core identification to DIN VDE 0293 - up to 5 cores coloured - from 7 cores, black with continuous white numbering
- Cores laying parallel
- GN-YE conductor
- Outer sheath of special PVC compound type TM2 to DIN VDE 0207-363-4-1/DIN EN 50363-4-1
- Sheath colour black (RAL 9005)

## Properties

- Extensively oil resistant, oil-/ chemical Resistance - see table Technical Informations
  - Extremely small bending radius
  - High flexibility
  - Minimum waste of space
  - Packaging possibility
  - The materials used in manufacture are cadmium-free and contain no silicone and free from substances harmful to the wetting properties of lacquers
- Tests**
- PVC self-extinguishing and flame retardant acc. to DIN VDE 0482-332-1-2, DIN EN 60332-1-2, IEC 60332-1 (equivalent DIN VDE 0472 part 804 test method B)

## Note

- Part no. 27012 (6x4).
- G = with green-yellow conductor
- AWG sizes are approximate equivalent values. The actual cross-section is in mm<sup>2</sup>.

## Application

PVC type of flat cables are used mainly as trailing cable for crane installations, floor conveyer systems and shelf control units.

### Installation notes

Cables reels with flat cables must be transported in standing position on the flange. A bending flexibility can be achieved on a plane surface. For this purpose, the corresponding fitting instructions should be followed.

- Put the cable trolly on the guiding rail or upon carrier beam and push them together at the starting point. The distance between the bedding surface of two cable trollies must be wider than the double thickness of a cable-packet.
- During the packeting performance, it must be started with the smaller cross-section which lays on the bedding surface and will be builded successively so that the biggest cross-section is laying on the top.
- Further, be careful of a symmetrical load distribution.
- In case of multicore flat cables with small cross-section, smaller than 2,5 mm<sup>2</sup>, is very critical due to its low tensile stress. In such case, you should add 10% reserve wire for calculation.

CE= The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer dimension approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
26980	4 G 0,75	4,3 x 12,6	28,8	90,0	19
26981	5 G 0,75	4,3 x 16,1	36,0	115,0	19
26982	6 G 0,75	4,3 x 19,4	43,2	141,0	19
26983	9 G 0,75	4,3 x 26,4	64,8	198,0	19
26984	10 G 0,75	4,3 x 30,1	72,0	224,0	19
26985	12 G 0,75	4,3 x 33,8	84,4	258,0	19
26986	16 G 0,75	4,3 x 44,4	115,2	340,0	19
26987	18 G 0,75	4,3 x 49,2	129,6	380,0	19
26988	20 G 0,75	4,3 x 55,0	144,0	424,0	19
26989	24 G 0,75	4,3 x 65,6	172,8	509,0	19
26990	3 G 1	4,5 x 10,8	28,8	80,0	18
26991	4 G 1	4,5 x 13,4	38,4	104,0	18
26992	5 G 1	4,5 x 16,0	48,0	134,0	18
26993	6 G 1	4,5 x 20,6	57,6	161,0	18
26994	9 G 1	4,5 x 28,4	86,4	230,0	18
26995	10 G 1	4,5 x 30,0	96,0	256,0	18
26996	12 G 1	4,5 x 36,2	115,2	298,0	18
26997	16 G 1	4,5 x 47,6	153,6	395,0	18
26998	18 G 1	4,5 x 52,8	172,8	441,0	18
26999	20 G 1	4,5 x 59,0	192,0	495,0	18
27000	24 G 1	4,5 x 70,4	230,4	590,0	18
27001	4 G 1,5	4,5 x 13,7	58,0	133,0	16
27002	5 G 1,5	4,5 x 17,9	72,0	169,0	16
27003	7 G 1,5	4,5 x 23,5	101,0	235,0	16
27004	8 G 1,5	4,5 x 26,8	115,0	265,0	16
27005	10 G 1,5	4,5 x 33,5	144,0	332,0	16

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer dimension approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
27006	12 G 1,5	4,5 x 38,9	173,0	421,0	16
27028	16 G 1,5	4,5 x 51,5	230,4	555,0	16
27030	24 G 1,5	4,5 x 83,0	346,0	820,0	16
27007	4 G 2,5	5,5 x 17,0	96,0	205,0	14
27008	5 G 2,5	5,5 x 21,5	120,0	256,0	14
27009	7 G 2,5	5,5 x 30,3	168,0	344,0	14
27010	8 G 2,5	5,5 x 31,9	192,0	389,0	14
27011	12 G 2,5	5,8 x 47,1	288,0	580,0	14
27029	16 G 2,5	5,8 x 55,1	384,0	674,0	14
27012	24 G 2,5	15,0 x 63,0	604,0	950,0	14
27027	24 G 2,5	5,8 x 120,0	604,0	950,0	14
27013	4 G 4	7,0 x 21,8	154,0	344,0	12
27014	5 G 4	7,0 x 27,4	192,0	428,0	12
27015	7 G 4	7,9 x 36,6	269,0	590,0	12
27016	4 G 6	8,2 x 24,8	230,0	424,0	10
27017	5 G 6	8,2 x 31,8	288,0	530,0	10
27018	7 G 6	8,2 x 42,6	403,0	760,0	10
27019	4 G 10	10,0 x 29,6	384,0	710,0	8
27020	4 G 16	11,2 x 34,4	614,0	1014,0	6
27025	5 G 16	13,0 x 46,6	768,0	1370,0	6
27021	4 G 25	13,7 x 42,6	960,0	1365,0	4
27026	5 G 25	15,5 x 55,5	1200,0	2000,0	4
27022	4 G 35	15,4 x 47,6	1344,0	2100,0	2
27023	4 G 50	18,2 x 57,0	1920,0	2940,0	1
27024	4 G 70	20,0 x 64,2	2688,0	4090,0	2/0

Dimensions and specifications may be changed without prior notice. (RJ01)



### Technical data

- Special Neoprene-flat cable adapted to DIN VDE 0250 part 809
- **Temperature range**  
flexing -30°C to +80°C  
fixed installation -40°C to +80°C
- **Nominal voltage**  $U_0/U$  300/500 V
- **Test voltage** 3000 V
- **Minimum bending radius**  
10x cable thickness
- **Radiation resistance**  
up to  $50 \times 10^6$  cJ/kg (up to 50 Mrad)

### Cable structure

- Copper-conductor bare or tinned to DIN VDE 0295, BS 6360, IEC 60228
- Conductor construction  
35-120 mm<sup>2</sup> class 5: fine-wire  
1,5-25 mm<sup>2</sup> class 6 col.4: extra-fine-wire
- Special rubber core insulation
- Core identification to DIN VDE 0293  
- up to 5 cores coloured  
- from 7 cores, black with continuous white numbering
- Cores laying parallel
- GN-YE conductor
- Outer sheath of special rubber  
5GM3, to DIN VDE 0207 part 2 I
- Sheath colour black

### Properties

- Special rubber outer sheath, cold-resistant
- Extensively oil resistant, oil-/chemical resistance see table Technical Informations
- Extremely small bending radius
- High flexibility
- Minimum waste of space
- Packeting possibility
- Outdoor application

### Tests

- **Behaviour in fire**  
to DIN VDE 0482-332-1-2  
DIN EN 60332-2-1, IEC 60332-1 (equivalent DIN VDE 0472 part 804 test method B)

### Note

- G = with green-yellow conductor
- Part no. 28007 and 28013 (6x4).
- AWG sizes are approximate equivalent values. The actual cross-section is in mm<sup>2</sup>.

### Application

Neoprene type of flat cables are used mainly as trailing cable for crane installations, floor conveyer systems and shelf control units. These cables are also available for export with UL-approval on request.

### Installation notes

Cables reels with flat cables must be transported in standing position on the flange. A bending flexibility can be achieved on a plane surface. For this purpose, the corresponding fitting instructions should be followed.

- Put the cable trolly on the guiding rail or upon carrier beam and push them together at the starting point. The distance between the bedding surface of two cable trollys must be wider than the double thickness of a cable-packet.
- During the packeting performance, it must be started with the smaller cross-section which lays on the bedding surface and will be builded successively so that the biggest cross-section is laying on the top.
- Further, be careful of a symmetrical load distribution.
- In case of multicore flat cables with small cross-section, smaller than 2,5 mm<sup>2</sup>, is very critical due to its low tensile stress. In such case, you should add 10% reserve wire for calculation.

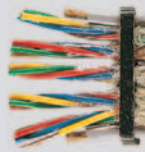
CE The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer dimension approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.	Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer dimension approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
28001	4 G 1,5	5,9 x 16,2	58,0	234,0	16	28022	4 G 16	11,6 x 35,6	614,0	1430,0	6
28002	5 G 1,5	5,9 x 23,7	72,0	304,0	16	28023	5 G 16	12,2 x 48,2	768,0	1590,0	6
28003	7 G 1,5	5,9 x 30,5	101,0	391,0	16	28024	4 G 25	14,1 x 45,8	960,0	1890,0	4
28004	8 G 1,5	5,9 x 34,0	115,0	441,0	16	28025	5 G 25	14,7 x 58,3	1200,0	2215,0	4
28005	10 G 1,5	5,9 x 43,5	144,0	460,0	16	28026	7 G 25	15,3 x 78,7	1680,0	3000,0	4
28006	12 G 1,5	6,5 x 50,4	173,0	646,0	16	28027	4 G 35	15,8 x 50,8	1344,0	2460,0	2
28007	24 G 1,5 (6 x 4)	13,0 x 56,0	346,0	1290,0	16	28028	5 G 35	16,4 x 64,4	1680,0	2880,0	2
28008	4 G 2,5	7,2 x 19,6	96,0	316,0	14	28029	7 G 35	16,4 x 86,4	2352,0	4100,0	2
28009	5 G 2,5	7,2 x 27,8	120,0	391,0	14	28030	4 G 50	18,6 x 60,2	1920,0	3385,0	1
28010	7 G 2,5	7,2 x 36,1	168,0	533,0	14	28031	4 G 70	21,0 x 68,0	2688,0	4480,0	2/0
28011	8 G 2,5	7,2 x 40,2	192,0	602,0	14	28032	4 G 95	24,1 x 78,6	3648,0	5990,0	3/0
28012	12 G 2,5	7,8 x 59,4	288,0	890,0	14	28033	4 G 120	25,5 x 84,2	4608,0	7240,0	4/0
28013	24 G 2,5 (6 x 4)	15,5 x 66,8	576,0	1480,0	14						
28014	4 G 4	8,8 x 24,2	154,0	506,0	12						
28015	5 G 4	8,8 x 33,4	192,0	621,0	12						
28016	7 G 4	8,8 x 42,5	269,0	851,0	12						
28017	4 G 6	9,6 x 27,4	230,0	661,0	10						
28018	5 G 6	9,6 x 37,4	288,0	740,0	10						
28019	7 G 6	9,6 x 47,2	403,0	1004,0	10						
28020	4 G 10	10,4 x 30,8	384,0	1027,0	8						
28021	5 G 10	10,4 x 41,6	480,0	1171,0	8						

Dimensions and specifications may be changed without prior notice. (RJ01)



# PVC-flat-CY screened, EMC-preferred type



HELUKABEL PVC-flach-CY 5x4x0,5 QMM / 27101 300/500 V 001042630



## Technical data

- Special PVC-flat cable, screened, adapted to DIN VDE 0283 part 2
- **Temperature range**  
flexing -5°C to +70°C  
fixed installation -40°C to +80°C
- **Nominal voltage**  $U_0/U$  300/500 V
- **Test voltage** 3000 V
- **Breakdown voltage**  
min. 6000 V
- **Minimum bending radius**  
15x cable thickness
- **Radiation resistance**  
up to  $80 \times 10^6$  cJ/kg (up to 80 Mrad)

## Cable structure

- Bare copper-conductor, to DIN VDE 0295 cl.5, fine-wire, BS 6360 cl.5, IEC 60228 cl.5
- Core insulation of special PVC
- Core identification see table below
- Cores screened individually or in bunches
- Copper screened braiding, approx. 85% coverage
- Outer sheath of special PVC
- Sheath colour black (RAL 9005)

## Properties

- Extensively oil resistant
- PVC self-extinguishing and flame retardant acc. to DIN VDE 0482-332-1-2, DIN EN 60332-1-2, IEC 60332-1 (equivalent DIN VDE 0472 part 804 test method B)

## Note

- G = with green-yellow conductor
- x = without green-yellow conductor
- AWG sizes are approximate equivalent values. The actual cross-section is in mm<sup>2</sup>.

## Application

PVC screened flat cables are used mainly as trailing cable for crane installations, floor conveyer systems and shelf control units.

### Installation notes

Cables reels with flat cables must be transported in standing position on the flange. A bending flexibility can be achieved on a plane surface. For this purpose, the corresponding fitting instructions should be followed.

- Put the cable trolly on the guiding rail or upon carrier beam and push them together at the starting point. The distance between the bedding surface of two cable trollys must be wider than the double thickness of a cable-packet.
- During the packeting performance, it must be started with the smaller cross-section which lays on the bedding surface and will be builded successively so that the biggest cross-section is laying on the top.
- Further, be careful of a symmetrical load distribution.
- In case of multicore flat cables with small cross-section, smaller than 2,5 mm<sup>2</sup>, is very critical due to its low tensile stress. In such case, you should add 10% reserve wire for calculation.

**EMC** = Electromagnetic compatibillity

To optimize the EMC features we recommend a large round contact of the copper braiding on both ends.

CE= The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Core marking	Outer dimension approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
27100	5 G 0,5	Colour coded, DIN VDE 0293	21,0 x 3,4	64,0	140,0	20
27101	5 x 4 x 0,5	Colour coded, (blue, red, green, yellow)	37,4 x 7,2	175,0	280,0	20
27102	8 x 7 x 0,5	Cont. white numbering, DIN VDE 0293	68,6 x 11,7	480,0	1180,0	20
27090	4 G 0,75	Colour coded, DIN VDE 0293	15,0 x 5,0	70,0	147,0	19
27103	4 x 4 G 1	Cont. white numbering	33,5 x 11,0	310,0	625,0	18
26754	4 x 4 x 1	Colour coded, (blue, red, green, yellow)	33,5 x 11,0	310,0	625,0	18
27091	4 G 1,5	Colour coded, DIN VDE 0293	18,7 x 5,9	116,0	210,0	16
27092	8 G 1,5	Cont. white numbering	35,6 x 5,9	217,0	400,0	16
27093	12 G 1,5	Cont. white numbering	52,1 x 5,9	266,0	610,0	16
27094	4 G 2,5	Colour coded, DIN VDE 0293	21,0 x 6,9	170,0	270,0	14
27104	6 G 2,5	Cont. white numbering, DIN VDE 0293	37,4 x 7,2	240,0	320,0	14
27095	4 G 4	Colour coded, DIN VDE 0293	24,5 x 7,7	225,0	400,0	12
27096	4 G 6	Colour coded, DIN VDE 0293	30,1 x 9,2	328,0	520,0	10
27097	4 G 10	Colour coded, DIN VDE 0293	35,8 x 10,5	525,0	840,0	8
27098	4 G 16	Colour coded, DIN VDE 0293	41,3 x 12,6	788,0	1280,0	6
27099	4 G 25	Colour coded, DIN VDE 0293	48,4 x 14,4	1170,0	1800,0	4

Dimensions and specifications may be changed without prior notice. (RJ01)



Suitable accessories can be found in Chapter X.

- Cable Gland - STK-F
- Cable Gland - STS-F



# NEO-Flat-C (MCHÖU) screened, EMC-preferred type



## Technical data

- Special-Neoprene-flat cable, screened, adapted to DIN VDE 0250 part 809
- **Temperature range**  
flexing -30°C bis +80°C  
fixed installation -40°C to +80°C
- **Nominal voltage** U<sub>0</sub>/U 300/500 V
- **Test voltage** 3000 V
- **Minimum bending radius**  
15x cable thickness
- **Radiation resistance**  
up to 50x10<sup>6</sup> cJ/kg (up to 50 Mrad)

## Cable structure

- Copper-conductor bare or tinned to DIN VDE 0295 cl.6, extra fine-wire, BS 6360 cl.6, IEC 60228 cl.6
- Core insulation of special rubber
- Core identification to DIN VDE 0293  
- up to 5 cores coloured  
- from 7 cores, black with continuous white numbering
- GN-YE conductor
- Cores screened individually
- Cores laying parallel
- Copper screened braiding, approx. 85% coverage
- Outer sheath of special Neoprene
- Outer sheath colour black (RAL 9005)

## Properties

- Outer sheath cold resistant
- Extensively oil resistant
- Extremely small bending radius
- High flexibility
- Minimum waste of space
- Packeting possibility
- The high degree of screening density assures disturbance-free transmission of all signal and impulses
- Outdoor application

## Tests

- **Behaviour in fire**  
to DIN VDE 0482-332-1-2  
DIN EN 60332-2-1, IEC 60332-1 (equivalent  
DIN VDE 0472 part 804 test method B)

## Note

- G = with green-yellow conductor
- AWG sizes are approximate equivalent values. The actual cross-section is in mm<sup>2</sup>.

## Application

Neoprene screened flat cables are used mainly as trailing cable for crane installations, floor conveyer systems and shelf control units. These cables are also available for export with UL-approval on request.

### Installation notes

Cables reels with flat cables must be transported in standing position on the flange. A bending flexibility can be achieved on a plane surface. For this purpose, the corresponding fitting instructions should be followed.

- Put the cable trolly on the guiding rail or upon carrier beam and push them together at the starting point. The distance between the bedding surface of two cable trollys must be wider than the double thickness of a cable-packet.
- During the packeting performance, it must be started with the smaller cross-section which lays on the bedding surface and will be builded successively so that the biggest cross-section is laying on the top.
- Further, be careful of a symmetrical load distribution.
- In case of multicore flat cables with small cross-section, smaller than 2,5 mm<sup>2</sup>, is very critical due to its low tensile stress. In such case, you should add 10% reserve wire for calculation.

**EMC** = Electromagnetic compatibillity

To optimize the EMC features we recommend a large round contact of the copper braiding on both ends.

CE = The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

Part no.	No.cores x cross-sec. mm <sup>2</sup>	Outer dimension approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
28100	8 G 1,5	7,9 x 42,0	231,0	520,0	16
28101	12 G 1,5	7,9 x 61,0	346,0	790,0	16
28102	4 G 2,5	8,5 x 25,5	164,0	420,0	14

Part no.	No.cores x cross-sec. mm <sup>2</sup>	Outer dimension approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
28103	6 G 2,5	8,5 x 34,5	247,0	540,0	14
28104	12 G 2,5	8,9 x 68,0	494,0	1000,0	14
28302	4 G 2,5	16,0 x 51,0	1116,0	1650,0	4

Dimensions and specifications may be changed without prior notice. (RJ01)



Suitable accessories can be found in Chapter X.

- Cable Gland - STK-F
- Cable Gland - STS-F

# Ribbon Cables

## Type L, Type L AWG 28, Type D



### Technical data

#### Type L (stranded wire)

- Pitch 2,54 mm
- **Nominal voltage**  
0,14 mm<sup>2</sup> = 350 V  
0,25 to 0,75 mm<sup>2</sup> = 600 V
- **Test voltage**  
0,14 mm<sup>2</sup> = 1200 V  
0,25 to 0,75 mm<sup>2</sup> = 2000 V

#### Type L AWG 28 (stranded wire)

- Pitch 1,27 mm
- **Heat-resistance** up to 105°C
- **Nominal voltage** 300 V
- **Test voltage** 2000 V

#### Type D (solid)

- Pitch 2,5 mm
- **Nominal voltage** 500 V
- **Test voltage** 1500 V

### Cable structure

#### Type L (stranded wire)

- Tinned copper, fine wire stranded to DIN VDE 0295 cl.5, BS 6360 cl.5
- Core insulation of PVC, flame retardant
- Cores colour coded

#### Type L AWG 28 (stranded wire)

- Tinned copper 7x0,127
- Core insulation of PVC, flame retardant
- Cores single coloured, edge marking on one side
- Cores moulded, can be separated easily

#### Type D (solid)

- Cu-solid, tinned 0,5 mm Ø
- Core insulation of PVC
- Cores moulded, can be separated easily
- Cores colour coded

### Properties

#### Type L AWG 28 (stranded wire)

- PVC self-extinguishing and flame retardant acc. to DIN VDE 0482-332-1-2, DIN EN 60332-1-2, IEC 60332-1 (equivalent DIN VDE 0472 part 804 test method B)

### Note

- Pitch  
(Distance between centre point)

### Application

Ribbon cables are used as connecting and control cables wherever there is a need to install quickly and with a minimum waste of space. These cables offer an excellent degree of flexibility.

☞ The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

#### Typ L (colour coded)

Part no.	No.cores x cross-sec. mm <sup>2</sup>	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
44001	2 x 0,14	3,9 x 1,4	2,7	7,0	26
44002	3 x 0,14	6,4 x 1,4	4,0	11,0	26
44003	4 x 0,14	8,9 x 1,4	5,4	14,0	26
44004	5 x 0,14	11,3 x 1,4	6,7	18,0	26
44005	6 x 0,14	13,9 x 1,4	8,1	21,0	26
44006	7 x 0,14	16,4 x 1,4	9,4	25,0	26
44007	8 x 0,14	18,9 x 1,4	10,7	28,0	26
44008	9 x 0,14	21,4 x 1,4	13,4	32,0	26
44009	10 x 0,14	23,9 x 1,4	14,4	35,0	26
44010	11 x 0,14	26,4 x 1,4	15,3	39,0	26
44011	12 x 0,14	28,9 x 1,4	16,1	42,0	26
44012	16 x 0,14	38,9 x 1,4	21,5	56,0	26
44013	20 x 0,14	48,9 x 1,4	27,0	70,0	26
44014	4 x 0,25	9,1 x 1,6	9,6	21,0	24
44015	5 x 0,25	11,6 x 1,6	12,0	26,0	24
44016	6 x 0,25	14,1 x 1,6	14,4	31,0	24
44017	7 x 0,25	16,6 x 1,6	16,8	36,0	24
44018	8 x 0,25	19,1 x 1,6	19,2	42,0	24
44019	10 x 0,25	24,1 x 1,6	24,0	52,0	24
44020	12 x 0,25	29,1 x 1,6	28,8	62,0	24
44021	16 x 0,25	39,1 x 1,6	38,4	83,0	24
44022	20 x 0,25	49,1 x 1,6	48,0	104,0	24
44023	4 x 0,5	9,0 x 2,0	19,2	38,0	20
44024	5 x 0,5	12,0 x 2,0	24,0	48,0	20
44025	6 x 0,5	15,0 x 2,0	28,8	57,0	20
44026	7 x 0,5	17,0 x 2,0	33,6	66,0	20
44027	8 x 0,5	20,0 x 2,0	38,4	76,0	20
44028	10 x 0,5	23,0 x 2,0	48,0	95,0	20
44029	12 x 0,5	30,0 x 2,0	58,0	114,0	20
44030	16 x 0,5	40,0 x 2,0	77,0	151,0	20
44031	20 x 0,5	50,0 x 2,0	101,0	190,0	20
44032	4 x 0,75	10,6 x 2,5	29,0	52,0	19
44033	5 x 0,75	13,3 x 2,5	36,0	64,0	19
44034	6 x 0,75	16,0 x 2,5	43,2	77,0	19
44035	7 x 0,75	18,7 x 2,5	50,0	90,0	19
44036	8 x 0,75	21,4 x 2,5	58,0	103,0	19
44037	10 x 0,75	26,8 x 2,5	72,0	130,0	19
44038	12 x 0,75	32,2 x 2,5	86,0	155,0	19
44039	16 x 0,75	43,0 x 2,5	112,0	206,0	19
44040	20 x 0,75	53,4 x 2,5	151,0	260,0	19

#### Typ L AWG 28 (single coloured, edge marking on one side)

Part no.	No.cores x cross-sec. mm <sup>2</sup>	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
44041	10 x 0,08	12,7 x 0,9	13,4	30,0	28
44042	14 x 0,08	17,8 x 0,9	18,0	50,0	28
44043	16 x 0,08	20,3 x 0,9	20,0	53,0	28
44044	20 x 0,08	25,4 x 0,9	25,0	65,0	28
44045	26 x 0,08	33,0 x 0,9	32,0	75,0	28
44046	34 x 0,08	43,2 x 0,9	43,0	90,0	28
44047	40 x 0,08	50,8 x 0,9	48,0	125,0	28
44048	48 x 0,08	61,0 x 0,9	59,0	145,0	28

#### Typ D (colour coded)

Part no.	No.cores x cross-sec. mm <sup>2</sup>	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
44049	2 x 0,5	3,9 x 1,4	10,0	10,0	20
44050	3 x 0,5	6,4 x 1,4	14,0	14,0	20
44051	4 x 0,5	8,9 x 1,4	19,0	17,0	20
44052	5 x 0,5	11,4 x 1,4	24,0	21,0	20
44053	6 x 0,5	13,9 x 1,4	29,0	25,0	20
44054	7 x 0,5	16,4 x 1,4	34,0	29,0	20
44055	8 x 0,5	18,9 x 1,4	38,0	33,0	20
44056	9 x 0,5	21,4 x 1,4	42,0	37,0	20
44057	10 x 0,5	23,9 x 1,4	48,0	41,0	20
44058	11 x 0,5	26,4 x 1,4	56,0	47,0	20

#### Standard-colour-code (not to DIN 47100)

1 white	12 white-green	23 brown-blue
2 brown	13 white-yellow	24 brown-red
3 green	14 white-grey	25 brown-black
4 yellow	15 white-pink	26 green-grey
5 grey	16 white-blue	27 green-pink
6 pink	17 white-red	28 green-blue
7 blue	18 white-black	29 green-red
8 red	19 brown-green	30 green-black
9 black	20 brown-yellow	31 yellow-grey
10 violet	21 brown-grey	32 yellow-pink
11 white-brown	22 brown-pink	33 yellow-blue

Dimensions and specifications may be changed without prior notice. (RJ01)

# TUBEFLEX-Y roundshaped flat ribbon cable for IDC-technique, pitch 1,27 mm



## Technical data

- Roundshaped special Flat Ribbon Cable
- **Conductor resistance** at 20°C  
max. 230 Ohm/km
- **Temperature range**  
-20°C up to +80°C
- **Voltage rating**  
max. 300 V
- **Test voltage**  
core/core 2000 V
- **Dielectric strength, Spark-test**  
3000 V
- **Insulation resistance**  
min. 20 MOhm x km
- **Capacitance** (side cores)  
ca. 75 pF/m
- **Impedance** 115 Ohm
- **Minimum bending radius**  
15x cable Ø
- **Radiation resistance**  
up to 80x10<sup>6</sup> cJ/kg (up to 80 Mrad)

## Cable structure

- Stranded tinned copper conductor, size AWG 28  
7x0,127 mm = 0,09 mm<sup>2</sup>
- Core insulation of special PVC
- Cores colour grey, edge marking on one side
- Cores laying parallel and adjacent, alternately spliced or separated and periodically slotted
- Roundshaped flat ribbon cable, folded
- Taping
- Outer sheath of special PVC
- Outer sheath Colour grey

## Properties

- The materials used in manufacture are cadmium-free and contain no silicone and free from substances harmful to the wetting properties of lacquers
- **Very interesting for cable pre-assemblers!**
- **Tests**
- PVC self-extinguishing and flame retardant acc. to DIN VDE 0482-332-1-2, DIN EN 60332-1-2, IEC 60332-1 (equivalent DIN VDE 0472 part 804 test method B)

## Application

TUBEFLEX-Y Flat ribbon cable, due to its roundshape offers considerable advantages compared with other flat ribbon cables during the installation and assembly. This roundshaped cable bids enormous profits by using the quick and economical possibilities under continuance with the efficient connection in IDC-technique. All conductors can be contacted at one working procedure without stripping the insulation. The accurate to size pitch-image of the ribbon cable is obtained due to an adapted backshaping before the plug installation.

CE = The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

Part no.	No. cores x AWG-No.	Flat ribbon dimension Width mm	Outer sheath nominal wall-thickness mm	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km
45130	9 x 28	11,43	0,8	6,1	8,7	35,0
45131	10 x 28	12,70	0,8	6,2	9,7	36,0
45132	14 x 28	17,78	0,8	7,2	13,6	48,0
45133	16 x 28	20,30	0,8	7,2	15,5	51,0
45134	20 x 28	25,40	0,8	7,3	19,4	57,0
45135	24 x 28	30,48	0,8	8,6	23,2	66,0
45136	25 x 28	31,75	0,8	8,6	24,2	69,0
45137	26 x 28	33,02	0,8	8,6	25,2	70,0
45138	30 x 28	38,10	0,8	9,0	29,0	81,0
45139	34 x 28	43,20	0,8	10,0	32,9	87,0
45140	36 x 28	45,72	0,8	10,2	34,9	91,0
45141	37 x 28	47,00	1,0	10,3	35,8	93,0
45142	40 x 28	50,80	1,0	10,7	38,7	101,0
45143	50 x 28	63,50	1,0	11,1	48,4	118,0
45144	60 x 28	76,20	1,0	12,5	58,1	135,0
45145	64 x 28	81,30	1,0	13,0	62,0	147,0

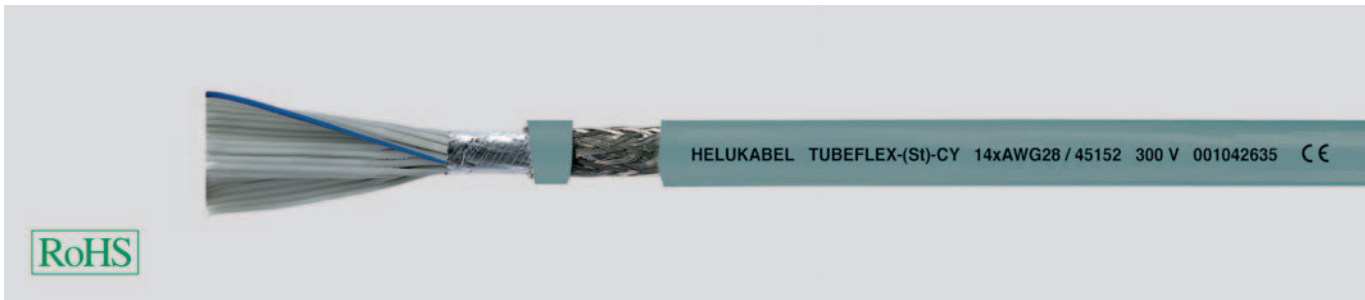
Dimensions and specifications may be changed without prior notice. (RJ01)



Suitable accessories can be found in Chapter X.

- Cable Gland - STK-F
- Cable Gland - STS-F

# TUBEFLEX-(St)-CY roundshaped flat ribbon cable, screened, for IDC-technique, pitch 1,27mm, EMC-preferred type



## Technical data

- Roundshaped special Flat Ribbon Cable, screened
- **Conductor resistance** at 20°C  
max. 230 Ohm/km
- **Temperature range**  
-20°C up to +80°C
- **Voltage rating**  
max. 300 V
- **Test voltage**  
core/core 2000 V  
core/screen 2000 V
- **Dielectric strength, Spark-test**  
3000 V
- **Insulation resistance**  
min. 20 MOhm x km
- **Capacitance** (side cores)  
ca. 75 pF/m
- **Impedance** 115 Ohm
- **Minimum bending radius**  
15x cable Ø
- **Radiation resistance**  
up to  $80 \times 10^6$  cJ/kg (up to 80 Mrad)

## Cable structure

- Stranded tinned copper conductor, size AWG 28  
 $7 \times 0,127 \text{ mm} = 0,09 \text{ mm}^2$
- Core insulation of special PVC
- Cores colour grey, edge marking on one side
- Cores laying parallel and adjacent, alternately spliced or separated and periodically slotted
- Roundshaped flat ribbon cable, folded
- Dual shielding:  
(St) - plastic coated Alu-foil and  
C - tinned copper wire braiding with optimal surface coverage
- Outer sheath of special PVC
- Outer sheath Colour grey

## Properties

- The materials used in manufacture are cadmium-free and contain no silicone and free from substances harmful to the wetting properties of lacquers
- **Very interesting for cable pre-assemblers!**
- The dual shielding with plastic coated aluminium foil (St) and the additional tinned copper wire braiding (C) protects against high frequency interference and ensures disturbance-free signal and impuls transfer.

## Tests

- PVC self-extinguishing and flame retardant acc. to DIN VDE 0482-332-1-2, DIN EN 60332-1-2, IEC 60332-1 (equivalent DIN VDE 0472 part 804 test method B)

## Application

TUBEFLEX-(St)-CY Flat ribbon cable, due to its roundshape offers considerable advantages compared with other flat ribbon cables during the installation and assembly. This roundshaped cable bids enormous profits by using the quick and economical possibilities under continuance with the efficient connection in IDC-technique. All conductors can be contacted at one working procedure without stripping the insulation. The accurate to size pitch-image of the ribbon cable is obtained due to an adapted backshaping before the plug installation.

**EMC** = Electromagnetic compatibility

To optimize the EMC features we recommend a large round contact of the copper braiding on both ends.

CE = The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

Part no.	No. cores x AWG-No.	Flat ribbon dimension Width mm	Outer sheath nominal wall-thickness mm	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km
45150	9 x 28	11,43	0,8	6,3	30,9	56,0
45151	10 x 28	12,70	0,8	6,4	31,9	57,0
45152	14 x 28	17,78	0,8	7,2	35,6	70,0
45153	16 x 28	20,30	0,8	7,4	42,0	75,0
45154	20 x 28	25,40	0,8	7,8	45,8	83,0
45155	24 x 28	30,48	0,8	9,0	54,3	97,0
45156	25 x 28	31,75	0,8	9,0	55,2	100,0
45157	26 x 28	33,02	0,8	9,0	60,0	101,0
45158	30 x 28	38,10	0,8	9,2	60,4	113,0
45159	34 x 28	43,20	0,8	10,2	68,1	122,0
45160	36 x 28	45,72	0,8	10,4	70,1	126,0

Part no.	No. cores x AWG-No.	Flat ribbon dimension Width mm	Outer sheath nominal wall-thickness mm	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km
45161	37 x 28	47,00	1,0	10,5	71,1	128,0
45162	40 x 28	50,80	1,0	11,3	74,1	135,0
45163	50 x 28	63,50	1,0	11,6	88,3	160,0
45164	60 x 28	76,20	1,0	12,9	98,7	172,0
45165	64 x 28	81,30	1,0	13,3	107,2	192,0

Dimensions and specifications may be changed without prior notice. (RJ01)



Suitable accessories can be found in Chapter X.

- Cable Gland - STK-F
- Cable Gland - STS-F





Vogel Extrumatic

EXTRUMATIC®

Vogel Extrumatic

EXTRUMATIC®

SIFORA

3.028

96.18

3.018

RELIKABEL

Edgema & Sohn GmbH  
Kaufmann & Willmann  
Kaufmann & Willmann





LiYW/H05 V2-K H05 V-K

**TOPFLEX® 300**

**HELUTHERM® 1200**

**GALVANICABEL®**

**SiF/SiFF**

**HELUFロン®-PTEF-5Y**

**NSHXAFÖ 3kV**

**KOMPOSPEED® 600**

# SINGLE CONDUCTORS

Temperature (°C) - flexing

Temperature (°C) - fixed

Nominal voltage U<sub>0</sub>/U

Bending radius - flexing x Ø

Bending radius - fixed x Ø

Halogen-free

UV-resistant

Outdoor use

Drag chain

Colored cores/VDE 0293

Screened/shielded

HAR/VDE REG no./VDE

Page

Single Conductors														
		Temperature (°C) - flexing	Temperature (°C) - fixed	Nominal voltage U <sub>0</sub> /U	Bending radius - flexing x Ø	Bending radius - fixed x Ø	Halogen-free	UV-resistant	Outdoor use	Drag chain	Colored cores/VDE 0293	Screened/shielded	HAR/VDE REG no./VDE	Page
LiYv	-5 to +70	-30 to +80	500		4x					X				287
H05V-K	-5 to +70	-30 to +80	300/500		4x					X		X		289
H07V-K / (H)07V-K	-5 to +70	-30 to +80	450/750		6x					X		X		291
H05V-K / (H)07V-K	-5 to +70	-30 to +80	300/500		6x					X		X		293
H05V-U / H07V-U	-5 to +70	-30 to +80	300/500		6x					X		X		294
H07V-R	-5 to +70	-30 to +80	450/750		6x					X		X		295
H05V-K, H07V-K, LiY - barrel opening														296
TOPFLEX® 303 X07V-K-Yö	-5 to +80	-40 to +80	0,6/1kV	12x	12x					X				297
LifY single core	-15 to +80	-15 to +80	300/500	8x	8x					X				298
PUR single cores		-40 to +80	1kV	10x	5x	X	X	X		X				299
H05Z-K / H07Z-K		-40 to +90	300/500		6x	X				X		X		300
H05G-U / -K / H07G-U / -R / -K	-25 to +110	-40 to +110	300/500		6x					X		X		302
LiYW / H05V2-K	+5 to +90	+5 to -90/105	300/500		4x					X				303
H07V2-K	+5 to +90	+5 to +90	450/750		10-15x					X		X		304
HELUTHERM® 145	-35 to +120	-55 to +145	300/500	12,5x	4x	X	X	X		X				305
SIF / SIFF		-60 to +180	300/500		6x	X				X				307
SIF/GL, SID, SID/GL		-60 to +180	300/500		15x	15x	X			X				308
FZ-LSi	+180	+180	6-10kV	7,5x	7,5x					X				309
FZ-LS	+180	+180	15-20kV	7,5x	7,5x					X				309
Neon Light Cables	+180	+180	3,5-7,5kV	7,5x	7,5x	X				X				309
HELUFLO®-FEP-6Y	-100 to +205	-100 to +205	600	10x	4x		X	X		X				310
HELUFLO®-PTFE-5Y	-190 to +260	-190 to +260	600	10x	4x		X	X		X				311
HELUFLO®-PTFE-5Y	-190 to +260	-190 to +260	1000	10x	4x		X	X		X				311
HELUTHERM® 400		-60 to +400	500	15x	15x	X				X				312
HELUTHERM® 600 / 600-ES		-60 to +600	500	15x	15x	X						/X		313
HELUTHERM® 800 / 800-ES		-120 to +750	500	15x	15x	X						/X		314
HELUTHERM® 1200 / 1200-ES		-170 to +1000	500	15x	15x	X						/X		315
Ground wire ESUY/ESY	-5 to +70	-5 to +70		12x	12x									316
GALVANIC CABLE®	-40 to +80	-50 to +80	0,6/1kV	15x	15x	X	X	X						317
H01N2-D / -E	-25 to +80	-40 to +80	100/100	12x/10x	12x/10x			X				X		318
NSGAFÖU 3kV	-25 to +80	-40 to +80	1,8/3kV	10x	6x							X		319
NSHXAFÖ 3kV	-25 to +70	-40 to +90	1,8/3kV	10x	6x	X						X		320
TOPFLEX® 300	-5 to +80	-40 to +80	0,6/1kV	7,5x	7,5x			(X)	X					321
KOMPOSPEED® 600 / 600-C	-30 to +90	-40 to +100	0,6/1kV	5/7,5x	3/4x	X	X	X	X			/X		322

The selection table is intended as an initial orientation.  
Please see the relevant page of the catalogue for detailed information on the product properties.

## SELECTION TABLE - DRAG CHAIN CABLES

Max. movement distance in m  
(10 m up to 25-cores)  
Min. bending radius - flexing  
(D=outer Ø)  
Max. speed (m/s)  
Max. acceleration (m/s<sup>2</sup>)  
Max. cycles  
Material  
Nominal voltage U<sub>0</sub>/U /  
Operating voltage  
Temperature (°C) - flexing  
Approvals  
Page  
UL/CSA  
equivalent

Single cores for drag chain cables												
KOMPOSPEED® 600	100	5 x D	4	10	11 Mio	Poly/ Poly	600/1000V	-30° to +90°			322	504
KOMPOSPEED® 600-C	100	7.5 x D	4	10	11 Mio	Poly/CU/ Poly	600/1000V	-30° to +90°			322	505
TOPFLEX® 300	5	7.5 x D	2	10	9 Mio	PVC/PVC	600/1000V	-5° to +80°			321	500

A cycle is a double lift: a representative sample has been tested and measured in our Test Workshop. The cycle count is only valid when appropriately and professionally installed (see the installation manual: cable installation in drag chains, see pages 1036 and 1037).

The selection table is intended as an initial orientation.

Please see the relevant page of the catalogue for detailed information on the product properties and the selection tables cables in drag chains, see pages 1030 and 1031.

# LiYv PVC-Single Cores, fine wire stranded, tinned



## Technical data

- PVC single cores adapted to DIN VDE 0812
- **Temperature range**  
flexing -5°C to +70°C  
fixed installation -30°C to +80°C
- **Operating peak voltage**  
0,14 mm<sup>2</sup> = 500 V  
0,25-1,5 mm<sup>2</sup> = 900 V
- **Test voltage**  
0,14 mm<sup>2</sup> = 1200 V  
0,25-1,5 mm<sup>2</sup> = 2500 V
- **Insulation resistance**  
min. 10 MOhm x km
- **Minimum bending radius**  
fixed installation 4x core Ø
- **Radiation resistance**  
up to 80x10<sup>6</sup> cJ/kg (up to 80 Mrad)

## Cable structure

- Tinned copper-conductor, to DIN VDE 0295 cl.5, fine-wire, BS 6360 cl.5, IEC 60228 cl.5
- Core insulation of PVC compound type Y13 to DIN VDE 0812
- Core identification see table below

## Properties

- The materials used in manufacture are cadmium-free and contain no silicone and free from substances harmful to the wetting properties of lacquers

## Tests

- PVC self-extinguishing and flame retardant acc. to DIN VDE 0482-332-1-2, DIN EN 60332-1-2, IEC 60332-1 (equivalent DIN VDE 0472 part 804 test method B)

## Note

- For 2-coloured combinations ring marking.

## Application

PVC insulated flexible hook-up wires are used for the connection for low voltage applications, communication apparatus, electronic assemblies and equipment, racks, switchboards etc. correspondingly of VDE 0800 part 1 for the temperature range up to +70°C. Those stranded hook-up wires are not permitted to install for heavy current application outside of the equipment.

CE The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

## LiYv

Cross-sec. mm <sup>2</sup> approx. RAL	Outer Ø approx. mm	Cop. weight kg / km	BK	GN-YE	BU	BN	RD	WH	GY	VT	YE	PK	GN	TRANS	D-BU	OG	o.col.	2-col.
			9005	-	5015	8003	3000	9003	7000	4005	1021	3015	6018	-	5010	2003	-	-



## Packing

## Spool (standard 100m capacity)

LiYv spool	Part no.	Part no.	Part no.	Part no.	Part no.	Part no.	Part no.	Part no.	Part no.	Part no.	Part no.	Part no.	Part no.	Part no.	Part no.	Part no.	Part no.	Part no.
0,14	1,1	1,4	26405	26406	26407	26408	26409	26410	26411	26412	26413	26414	26415	26416	26417	26418	26419	26420
0,25	1,3	2,4	26421	26422	26423	26424	26425	26426	26427	26428	26429	26430	26431	26432	26433	26434	26435	26436
0,5	1,8	4,8	26437	26438	26439	26440	26441	26442	26443	26444	26445	26446	26447	26448	26449	26450	26451	26452
0,75	2,0	7,2	26453	26454	26455	26456	26457	26458	26459	26460	26461	26462	26463	26464	26465	26466	26467	26468
1	2,1	9,6	26469	26470	26471	26472	26473	26474	26475	26476	26477	26478	26479	26480	26481	26482	26483	26484
1,5	2,6	14,4	26485	26486	26487	26488	26489	26490	26491	26492	26493	26494	26495	26496	26497	26498	26499	26500

Continuation ▶

**LiYv PVC-Single Cores, fine wire stranded, tinned****LiYv**

Cross-sec. mm <sup>2</sup>	Outer Ø approx. mm	Cop. weight kg / km	BK	GN-YE	BU	BN	RD	WH	GY	VT	YE	PK	GN	TRANS	D-BU	OG	o.col.	2-col.
approx. RAL			9005	-	5015	8003	3000	9003	7000	4005	1021	3015	6018	-	5010	2003	-	-

**Packing****Barrel (with various capacity)**

LiYv barrel																		
Part no.			26505	26506	26507	26508	26509	26510	26511	26512	26513	26514	26515	26516	26517	26518	26519	26520
0,25	1,3	2,4	26521	26522	26523	26524	26525	26526	26527	26528	26529	26530	26531	26532	26533	26534	26535	26536
0,5	1,8	4,8	26537	26538	26539	26540	26541	26542	26543	26544	26545	26546	26547	26548	26549	26550	26551	26552
0,75	2,0	7,2	26553	26554	26555	26556	26557	26558	26559	26560	26561	26562	26563	26564	26565	26566	26567	26568
1	2,1	9,6	26569	26570	26571	26572	26573	26574	26575	26576	26577	26578	26579	26580	26581	26582	26583	26584
1,5	2,6	14,4																

Dimensions and specifications may be changed without prior notice.



Suitable accessories can be found in Chapter X.

- Core end sleeve - ADI
- Core end sleeve - ADU



# H05V-K PVC-Single Cores, fine wire stranded



## Technical data

- PVC single cores to DIN VDE 0285-525-2-31 / DIN EN 50525-2-31 and IEC 60227-3
- **Temperature range**  
flexing -5°C to +70°C  
fixed installation -30°C to +80°C
- **Nominal voltage**  $U_0/U$  300/500 V
- **Test voltage** 2000 V
- **Insulation resistance**  
min. 10 MOhm x km
- **Minimum bending radius**  
fixed installation 4x core Ø
- **Radiation resistance**  
up to  $80 \times 10^6$  cJ/kg (up to 80 Mrad)

## Cable structure

- Bare Cu-conductor, to DIN VDE 0295 cl.5, fine-wire, BS 6360 cl.5, IEC 60228 cl.5
- Core insulation of PVC compound type T11 to DIN VDE 0207-363-3 / DIN EN 50363-3 and IEC 60227-3
- Core identification see table below

## Properties

- The materials used in manufacture are cadmium-free and contain no silicone and free from substances harmful to the wetting properties of lacquers

## Tests

- PVC self-extinguishing and flame retardant acc. to DIN VDE 0482-332-1-2, DIN EN 60332-1-2, IEC 60332-1 (equivalent DIN VDE 0472 part 804 test method B)

## Note

- The following colours are recommended: black, white, blue, grey, brown, red, orange, turquoise, violet and pink. Exceptions are the colours green and yellow; these are only permitted if the safety regulations allows. Green is permitted for the identification of luminous decorative chains. All 2-coloured combinations of the abovesingle colours are allowed

## Application

These single cores are determined for the installation to the inside of apparatus as well as for the protective laying to the lightings, in dry rooms, in production facilities, switch and distributor boards, in tubes, under and surface mounting of plasters.

CE= The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

## H05V-K

Cross-sec. mm <sup>2</sup>	Outer Ø min. - max. mm	Cop. weight kg / km	BK	GN-YE	BU	BN	RD	WH	GY	VT	YE	PK	GN	TRANS	D-BU	OG	o.col.	2-col.	U-BU
approx. RAL			9005	-	5015	8003	3000	9003	7001	4005	1021	3015	6018	-	5010	2003	-	-	5002



Coil in cardboard (100m)

## Packing

### H05V-K coil

Part no.	0,5	0,75	1	29081	29082	29083	29084	29085	29086	29087	29088	29089	29090	29091	29092	29093	29094	29095	29096	26386
Part no.	2,1 - 2,5	2,2 - 2,7	2,4 - 2,8	29097	29098	29099	29100	29101	29102	29103	29104	29105	29106	29107	29108	29109	29110	29111	29112	26387
Part no.				29113	29114	29115	29116	29117	29118	29119	29120	29121	29122	29123	29124	29125	29126	29127	29128	26388
1																				



Spool (with various capacity)

## Packing

### H05V-K spool

Part no.	0,5	0,75	1	26590	26591	26592	26593	26594	26595	26596	26597	26598	26599	26600	26601	26602	26603	26604	26605	26389
Part no.	2,1 - 2,5	2,2 - 2,7	2,4 - 2,8	26606	26607	26608	26609	26610	26611	26612	26613	26614	26615	26616	26617	26618	26619	26620	26621	26390
Part no.				26622	26623	26624	26625	26626	26627	26628	26629	26630	26631	26632	26633	26634	26635	26636	26637	26391
1																				

Continuation ▶

**H05V-K PVC-Single Cores, fine wire stranded****H05V-K**

Cross-sec. mm <sup>2</sup>	Outer Ø min. - max. mm	Cop. weight kg / km	BK	GN-YE	BU	BN	RD	WH	GY	VT	YE	PK	GN	TRANS	D-BU	OG	o.col.	2-col.	U-BU
approx. RAL			9005	-	5015	8003	3000	9003	7001	4005	1021	3015	6018	-	5010	2003	-	-	-

**Packing****Barrel (with various capacity)**

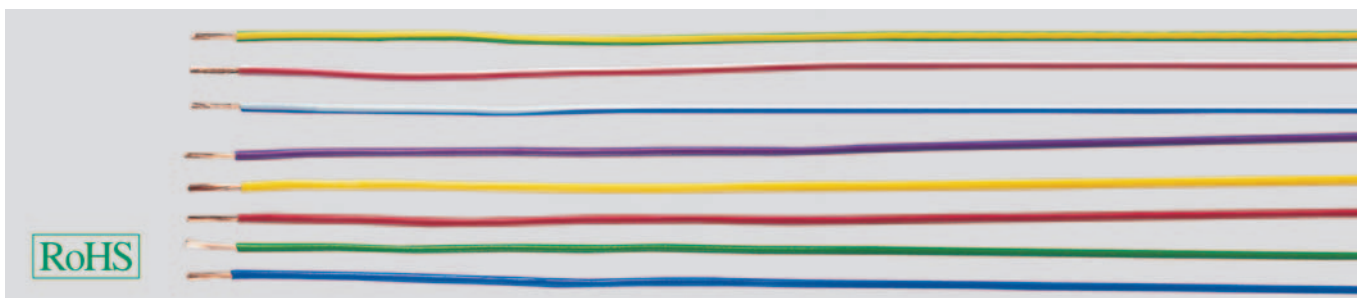
H05V-K barrel																				
Part no.			26640	26641	26642	26643	26644	26645	26646	26647	26648	26649	26650	26651	26652	26653	26654	26655	26392	
0,5	2,1 - 2,5	4,8																		
Part no.			26656	26657	26658	26659	26660	26661	26662	26663	26664	26665	26666	26667	26668	26669	26670	26671	26393	
0,75	2,2 - 2,7	7,2																		
Part no.			26672	26673	26674	26675	26676	26677	26678	26679	26680	26681	26682	26683	26684	26685	26686	26687	26394	
1	2,4 - 2,8	9,6																		

Dimensions and specifications may be changed without prior notice. (RK01)



Suitable accessories can be found in Chapter X.

- Core end sleeve - ADI
- Core end sleeve - ADU

**H07V-K / (H)07V-K** PVC-Single Cores, fine wire stranded**Technical data**

- PVC single cores to DIN VDE 0285-525-2-31 / DIN EN 50525-2-31 and IEC 60227-3
- **Temperature range**  
flexing -5°C to +70°C  
fixed installation -30°C to +80°C
- **Nominal voltage**  $U_0/U$  450/750 V
- **Test voltage** 2500 V
- **Insulation resistance**  
min. 10 MOhm x km
- **Minimum bending radius**  
fixed installation  
core  $\varnothing \leq 8$  mm: 4x core  $\varnothing$   
core  $\varnothing > 8-12$  mm: 5x core  $\varnothing$   
core  $\varnothing > 12$  mm: 6x core  $\varnothing$
- **Radiation resistance**  
up to  $80 \times 10^6$  cJ/kg (up to 80 Mrad)

**Cable structure**

- Bare Cu-conductor, to DIN VDE 0295 cl.5, fine-wire, BS 6360 cl.5, IEC 60228 cl.5
- Core insulation of PVC compound type T11 to DIN VDE 0207-363-3 / DIN EN 50363-3 and IEC 60227-3
- Core identification see table below

**Properties**

- The materials used in manufacture are cadmium-free and contain no silicone and free from substances harmful to the wetting properties of lacquers

**Tests**

- PVC self-extinguishing and flame retardant acc. to DIN VDE 0482-332-1-2, DIN EN 60332-1-2, IEC 60332-1 (equivalent DIN VDE 0472 part 804 test method B)

**Note**

- The following colours are recommended (only single colour): black, white, blue, grey, brown, red, orange, turquoise, violet and pink. Two-coloured combinations are not allowed, with exceptions of green-yellow.
- Colours yellow, green, transparent only in (H)07V-K available.
- Two-coloured combination is only permitted for (H)07V-K.

**Application**

These single cores are suitable for laying in tubes, under and surface mounting of plasters and also in closed installation conduits. These are not allowed to install for direct laying on cable trays, channels or tanks. These types are permitted for the inner wiring of equipment, distributor and switchboards and also for protective laying to the lightings with a nominal voltage up to 1000 V alternating current or up to 750 V direct current against earth.

☑= The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

**H07V-K, (H)07V-K**

Cross-sec. mm <sup>2</sup>	Outer Ø min. - max. mm	Cop. weight kg / km	BK	GN-YE	BU	BN	RD	WH	GY	VT	YE	PK	GN	TRANS	D-BU	OG	2-col.	U-BU
approx. RAL			9005	-	5015	8003	3000	9003	7001	4005	1021	3015	6018	-	5010	2003	-	5002

**Coil in cardboard (100m)****Packing****H07V-K coil**

Part no.	Outer Ø min. - max. mm	Cop. weight kg / km	29129	29130	29131	29132	29133	29134	29135	29136	29137	29138	29139	29140	29141	29142	29144	26395
1,5	2,8 - 3,4	14,4																
2,5	3,4 - 4,1	24,0	29145	29146	29147	29148	29149	29150	29151	29152	29153	29154	29155	29156	29157	29158	29160	26396
4	3,9 - 4,8	38,0	29161	29162	29163	29164	29165	29166	29167	29168	29169	29170	29171	29172	29173	29174	29176	26397
6	4,4 - 5,3	58,0	29177	29178	29179	29180	29181	29182	29183	29184	29185	29186	29187	29188	29189	29190	29192	26398

**Spool (with various capacity)****Packing****H07V-K spool**

Part no.	Outer Ø min. - max. mm	Cop. weight kg / km	26690	26691	26692	26693	26694	26695	26696	26697	26698	26699	26700	26701	26702	26703	26705	26399
1,5	2,8 - 3,4	14,4																
2,5	3,4 - 4,1	24,0	26706	26707	26708	26709	26710	26711	26712	26713	26714	26715	26716	26717	26718	26719	26721	26400
4	3,9 - 4,8	38,0	26722	26723	26724	26725	26726	26727	26728	26729	26730	26731	26732	26733	26734	26735	26737	26401
6	4,4 - 5,3	58,0	26738	26739	26740	26741	26742	26743	26744	26745	26746	26747	26748	26749	26750	26751	26753	26402

Continuation ▶

**H07V-K / (H)07V-K PVC-Single Cores, fine wire stranded****H07V-K, (H)07V-K**

Cross-sec. mm <sup>2</sup> approx. RAL	Outer Ø min. - max. mm	Cop. weight kg / km	BK	GN-YE	BU	BN	RD	WH	GY	VT	YE	PK	GN	TRANS	D-BU	OG	2-col.	U-BU
			9005	-	5015	8003	3000	9003	7001	4005	1021	3015	6018	-	5010	2003	-	-

**Packing****Barrel (with various capacity)**

H07V-K barrel																			
Part no.			26755	26756	26757	26758	26759	26760	26761	26762	26763	26764	26765	26766	26767	26768	26770	26403	
1,5	2,8 - 3,4	14,4																	
Part no.			26771	26772	26773	26774	26775	26776	26777	26778	26779	26780	26781	26782	26783	26784	26786	26404	
2,5	3,4 - 4,1	24,0																	
Part no.			26787	26788	26789	26790	26791	26792	26793	26794	26795	26796	26797	26798	26799	26800	26802	26819	
4	3,9 - 4,8	38,0																	
Part no.			26803	26804	26805	26806	26807	26808	26809	26810	26811	26812	26813	26814	26815	26816	26818	26820	
6	4,4 - 5,3	58,0																	

**Packing****Coil in foil (100m)**

H07V-K coil																			
Part no.			26060	26061	26062	26063	26064	26065	26066	26067	26068	26069	26092	26099	26108	26109	26111	26821	
1,5	2,8 - 3,4	14,4																	
Part no.			26112	26113	26114	26115	26116	26117	26118	26119	29855	29856	29857	29858	29859	29890	29892	26822	
2,5	3,4 - 4,1	24,0																	
Part no.			29893	29894	29895	29896	29897	29898	29899	29905	29906	29907	29908	29909	29910	29911	29913	26823	
4	3,9 - 4,8	38,0																	
Part no.			29914	29915	29916	29917	29918	29919	29921	29922	29923	29924	29925	29926	29927	29928	29933	26824	
6	4,4 - 5,3	58,0																	
Part no.			29193	29194	29195	29196	29197	29198	29199	29200	29201	29202	29203	29204	29205	29206	29208	-	
10	5,7 - 6,8	96,0																	
Part no.			29209	29210	29211	29212	29213	29214	29215	29216	29217	29218	29219	29220	29221	29222	29224	-	
16	6,7 - 8,1	154,0																	
Part no.			29225	29226	29227	29228	29229	29230	29231	29232	29233	29234	29235	29236	29237	29238	29240	-	
25	8,4 - 10,2	240,0																	
Part no.			29241	29242	29243	29244	29245	29246	29247	29248	29249	29250	29251	29252	29253	29254	29256	-	
35	9,7 - 11,7	336,0																	
Part no.			29257	29258	29259	29260	29261	29262	29263	29264	29265	29266	29267	29268	29269	29270	29272	-	
50	11,5 - 13,9	480,0																	
Part no.			29273	29274	29275	29276	29277	29278	29279	29280	29281	29282	29283	29284	29285	29286	29288	-	
70	13,2 - 16,0	672,0																	
Part no.			29289	29290	29291	29292	29293	29294	29295	29296	29297	29298	29299	29300	29301	29302	29304	-	
95	15,1 - 18,2	912,0																	
Part no.			29418	29419	29420	29421	29422	29423	29424	29425	29426	29427	29428	29429	29430	29431	29433	-	
120	16,7 - 20,2	1152,0																	
Part no.			29434	29435	29436	29437	29438	29439	29440	29441	29442	29443	29444	29445	29446	29447	29449	-	
150	18,6 - 22,5	1440,0																	
Part no.			29494	29495	29496	29497	29498	29499	29590	29591	29592	29593	29594	29595	29596	29597	29599	-	
185	20,6 - 24,9	1776,0																	
Part no.			29813	29814	29815	29816	29817	29818	29819	29840	29841	29842	29843	29844	29845	29846	29848	-	
240	23,5 - 28,4	2304,0																	

**Packing****Drum**

H07V-K drum																			
Part no.			26825	26826	26827	26828	26829	26830	26831	26832	26833	26834	26835	26836	26837	26838	26840	-	
10	5,7 - 6,8	96,0																	
Part no.			26841	26842	26843	26844	26845	26846	26847	26848	26849	26850	26851	26852	26853	26854	26856	-	
16	6,7 - 8,1	154,0																	
Part no.			26857	26858	26859	26860	26861	26862	26863	26864	26865	26866	26867	26868	26869	26870	26872	-	
25	8,4 - 10,2	240,0																	
Part no.			26873	26874	26875	26876	26877	26878	26879	26880	26881	26882	26883	26884	26885	26886	26888	-	
35	9,7 - 11,7	336,0																	
Part no.			26889	26890	26891	26892	26893	26894	26895	26896	26897	26898	26899	26900	26901	26902	26904	-	
50	11,5 - 13,9	480,0																	
Part no.			26905	26906	26907	26908	26909	26910	26911	26912	26913	26914	26915	26916	26917	26918	26920	-	
70	13,2 - 16,0	672,0																	
Part no.			26921	26922	26923	26924	26925	26926	26927	26928	26929	26930	26931	26932	26933	26934	26936	-	
95	15,1 - 18,2	912,0																	
Part no.			29305	29306	29307	29308	29309	29310	29311	29312	29313	29314	29315	29316	29317	29318	29320	-	
120	16,7 - 20,2	1152,0																	
Part no.			29321	29322	29323	29324	29325	29326	29327	29328	29329	29330	29331	29332	29333	29334	29336	-	
150	18,6 - 22,5	1440,0																	
Part no.			29337	29338	29339	29340	29341	29342	29343	29344	29345	29346	29347	29348	29349	29350	29352	-	
185	20,6 - 24,9	1776,0																	
Part no.			29353	29354	29355	29356	29357	29358	29359	29360	29361	29362	29363	29364	29365	29366	29368	-	
240	23,5 - 28,4	2304,0																	

Dimensions and specifications may be changed without prior notice. (RK01)

Cross-sec. mm <sup>2</sup>	Outer Ø min. - max. mm	Cop. weight kg / km	RD/WH	BU/WH	BN/WH	D-BU/WH
----------------------------	------------------------	---------------------	-------	-------	-------	---------

**Packing****Coil in cardboard (100m)**

<b>H05V-K coil</b>			RD/WH	BU/WH	BN/WH	D-BU/WH
Part no.			29370	29375	29380	29394
0,5	2,1 - 2,5	4,8				
Part no.			29371	29376	29381	29395
0,75	2,2 - 2,7	7,2				
Part no.			29372	29377	29382	29396
1	2,4 - 2,8	9,6				

**Packing****Coil in cardboard (100m)**

<b>(H)07V-K coil</b>			RD/WH	BU/WH	BN/WH	D-BU/WH
Part no.			29373	29378	29383	29397
1,5	2,8 - 3,4	14,4				
Part no.			29374	29379	29384	29398
2,5	3,4 - 4,1	24,0				
Part no.			29385	29386	29387	29399
4	3,9 - 4,8	38,0				
Part no.			29388	29389	29390	29527
6	4,4 - 5,3	58,0				
Part no.			29391	29392	29393	29528
10	5,7 - 6,8	96,0				

**Packing****Spool (with various capacity)**

<b>H05V-K spool</b>			RD/WH	BU/WH	BN/WH	D-BU/WH
Part no.			29745	29746	29747	29748
0,5	2,1 - 2,5	4,8				
Part no.			29749	29750	29751	29752
0,75	2,2 - 2,7	7,2				
Part no.			29753	29754	29755	29756
1	2,4 - 2,8	9,6				

**Packing****Spool (with various capacity)**

<b>(H)07V-K spool</b>			RD/WH	BU/WH	BN/WH	D-BU/WH
Part no.			29757	29758	29759	29760
1,5	2,8 - 3,4	14,4				
Part no.			29761	29762	29763	29764
2,5	3,4 - 4,1	24,0				
Part no.			29765	29766	29767	29768
4	3,9 - 4,8	38,0				
Part no.			29769	29770	29771	29772
6	4,4 - 5,3	58,0				
Part no.			29773	29774	29775	29776
10	5,7 - 6,8	96,0				

**Packing****Barrel (with various capacity)**

<b>H05V-K barrel</b>			RD/WH	BU/WH	BN/WH	D-BU/WH
Part no.			28948	28949	28950	28951
0,5	2,1 - 2,5	4,8				
Part no.			28952	28953	28954	28955
0,75	2,2 - 2,7	7,2				
Part no.			28956	28957	28958	28959
1	2,4 - 2,8	9,6				

**Packing****Barrel (with various capacity)**

<b>(H)07V-K barrel</b>			RD/WH	BU/WH	BN/WH	D-BU/WH
Part no.			28960	28961	28962	28963
1,5	2,8 - 3,4	14,4				
Part no.			28964	28965	28966	28967
2,5	3,4 - 4,1	24,0				
Part no.			28968	28969	28970	28971
4	3,9 - 4,8	38,0				
Part no.			28972	28973	28974	28975
6	4,4 - 5,3	58,0				
Part no.			28976	28977	28978	28979
10	5,7 - 6,8	96,0				

Dimensions and specifications may be changed without prior notice.



# H05V-U / H07V-U PVC-single cores, single wire stranded



## H05V-U

Cross-sec. mm <sup>2</sup>	Outer Ø min. - max. mm	Cop. weight kg / km	BK	GN-YE	BU	BN	RD	WH	GY	VT	o.col.	o.col.	o.col.	o.col.	o.col.	o.col.	o.col.	o.col.
approx. RAL			9005	-	5015	8003	3000	9003	7001	4005	-	-	-	-	-	-	-	-



### Packing

#### Coil in cardboard (100m)

H05V-U coil																		
Part no.			28761	28762	28763	28764	28765	28766	28767	28768	-	-	-	-	-	-	-	-
0,5	1,9 - 2,3	4,8																
Part no.			28769	28770	28771	28772	28773	28774	28775	28776	-	-	-	-	-	-	-	-
0,75	2,1 - 2,5	7,2																
Part no.			28777	28778	28779	28780	28781	28782	28783	28784	-	-	-	-	-	-	-	-
1	2,2 - 2,7	9,6																



### Packing

#### Spool (with various capacity)

H05V-U spool																		
Part no.			26937	26938	26939	26940	26941	26942	26943	26944	-	-	-	-	-	-	-	-
0,5	1,9 - 2,3	4,8																
Part no.			26945	26946	26947	26948	26949	26950	26951	26952	-	-	-	-	-	-	-	-
0,75	2,1 - 2,5	7,2																
Part no.			26953	26954	26955	26956	26957	26958	26959	26960	-	-	-	-	-	-	-	-
1	2,2 - 2,7	9,6																



### Packing

#### Coil in cardboard (100m)

H07V-U coil																		
Part no.			28785	28786	28787	28788	28789	28790	28791	28792	-	-	-	-	-	-	-	-
1,5	2,6 - 3,2	14,4																
Part no.			28793	28794	28795	28796	28797	28798	28799	28800	-	-	-	-	-	-	-	-
2,5	3,2 - 3,9	24,0																
Part no.			28801	28802	28803	28804	28805	28806	28807	28808	-	-	-	-	-	-	-	-
4	3,6 - 4,4	38,0																
Part no.			28809	28810	28811	28812	28813	28814	28815	28816	-	-	-	-	-	-	-	-
6	4,1 - 5,0	58,0																
Part no.			28817	28818	28819	28820	28821	28822	28823	28824	-	-	-	-	-	-	-	-
10	5,3 - 6,4	96,0																



### Packing

#### Drum

H07V-U drum																		
Part no.			28145	28146	28147	28148	28149	28150	28151	28152	-	-	-	-	-	-	-	-
1,5	2,6 - 3,2	14,4																
Part no.			28153	28154	28155	28156	28157	28158	28159	28160	-	-	-	-	-	-	-	-
2,5	3,2 - 3,9	24,0																
Part no.			28161	28162	28163	28164	28165	28166	28167	28168	-	-	-	-	-	-	-	-
4	3,6 - 4,4	38,0																
Part no.			28169	28170	28171	28172	28173	28174	28175	28176	-	-	-	-	-	-	-	-
6	4,1 - 5,0	58,0																
Part no.			28177	28178	28179	28180	28181	28182	28183	28184	-	-	-	-	-	-	-	-
10	5,3 - 6,4	96,0																

Dimensions and specifications may be changed without prior notice. (RK01)



Suitable accessories can be found in Chapter X.

- Core end sleeve - ADI
- Core end sleeve - ADU

# H07V-R PVC-single cores, multi wire



## H07V-R

Cross-sec. mm <sup>2</sup>	Outer Ø min. - max. mm	Cop. weight kg / km	BK	GN-YE	BU	BN	RD	WH	GY	VT	o.col.	o.col.	o.col.	o.col.	o.col.	o.col.	o.col.
approx. RAL			9005	-	5015	8003	3000	9003	7001	4005	-	-	-	-	-	-	-



Coil in foil

### Packing

#### H07V-R coil

Part no.	Outer Ø min. - max. mm	Cop. weight kg / km	28825	28826	28827	28828	28829	28830	28831	28832	-	-	-	-	-	-	-
16	6,4 - 7,8	154,0															
25	8,1 - 9,7	240,0															
35	9,0 - 10,9	336,0															
50	10,6 - 12,8	480,0															
70	12,1 - 14,6	672,0															
95	14,1 - 17,1	912,0															
120	15,6 - 18,8	1152,0															
150	17,3 - 20,9	1440,0															
185	19,3 - 23,3	1776,0															
240	22,0 - 26,6	2304,0															



Drum

### Packing

#### H07V-R drum

Part no.	Outer Ø min. - max. mm	Cop. weight kg / km	28185	28186	28187	28188	28189	28190	28191	28192	-	-	-	-	-	-	-
16	6,4 - 7,8	154,0															
25	8,1 - 9,7	240,0															
35	9,0 - 10,9	336,0															
50	10,6 - 12,8	480,0															
70	12,1 - 14,6	672,0															
95	14,1 - 17,1	912,0															
120	15,6 - 18,8	1152,0															
150	17,3 - 20,9	1440,0															
185	19,3 - 23,3	1776,0															
240	22,0 - 26,6	2304,0															

Dimensions and specifications may be changed without prior notice. (RK01)



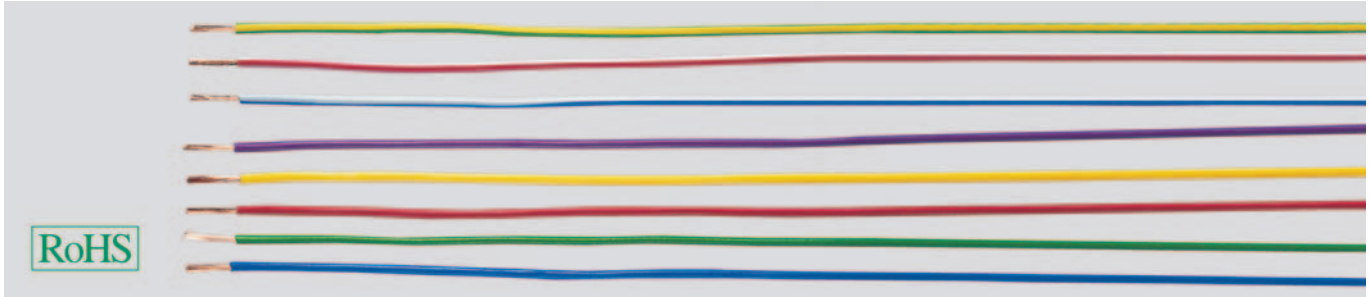
Suitable accessories can be found in Chapter X.

- Core end sleeve - ADI
- Core end sleeve - ADU

K

# H05V-K, H07V-K

## PVC-Single Cores



CE = The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

### Barrels, one-way barrels or barrels on hire

Type cross section mm <sup>2</sup>	one-way cardboard 8-on guar dimension in mm	ca. contents in m
<b>LiY</b>		
0,25	500 x 500 x 420	10000
0,50	500 x 500 x 420	7000
0,75	500 x 500 x 420	5000
1,00	500 x 500 x 420	4000
1,50	500 x 500 x 420	3000

Type cross section mm <sup>2</sup>	one-way barrels 8-on guar dimension in mm	ca. contents in m
<b>H05 V-K</b>		
<b>H07 V-K</b>		
0,50	400 x 400 x 500	4000
0,75	400 x 400 x 500	3500
1,00	400 x 400 x 500	3000
1,50	400 x 400 x 500	2000
2,50	400 x 400 x 500	1200
4,00	400 x 400 x 500	900
6,00	400 x 400 x 500	800



Delivery for one-way barrel

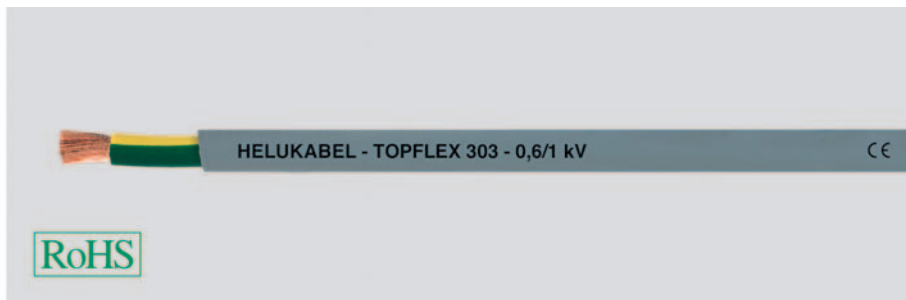
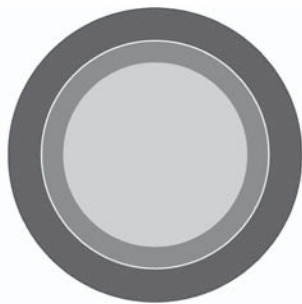
Works photo: HELUKABEL®

Type cross section mm <sup>2</sup>	one-way barrels 8-on guar dimension in mm	ca. contents in m
<b>H05 V-K</b>		
<b>H07 V-K</b>		
0,50	400 x 400 x 800	7000
0,75	400 x 400 x 800	6000
1,00	400 x 400 x 800	5200
1,50	400 x 400 x 800	3500
2,50	400 x 400 x 800	2000

- The materials used in manufacture are cadmium-free and contain no silicone and free from substances harmful to the wetting properties of lacquers
- PVC self-extinguishing and flame retardant according to DIN VDE 0482-332-1-2, DIN EN 60332-1-2/IEC 60332-1 (equivalent DIN VDE 0472 part 804 test method B)

K = Fine stranded conductor

# TOPFLEX® 303 X07V-K-YÖ double insulation 0,6/1kV flexible PVC single core, oil resistant



## Technical data

- Special PVC single-core cable with double insulation and oil-resistant sheath
- **Temperature range**  
flexing -5°C to +80°C  
fixed installation -40°C to +80°C
- **Nominal voltage**  $U_0/U$  600/1000 V
- **A.C. test voltage**, 50 Hz  
3000 V
- **Insulation resistance**  
min. 20 MΩ/km
- **Minimum bending radius**  
flexing 12x cable Ø

## Cable structure

- Bare copper-conductor, to DIN VDE 0295 cl.5, fine-wire, BS 6360 cl.5, IEC 60228 cl.5
- Core insulation of special PVC
- Core identification BK or GN-YE
- Outer sheath of special PVC compound type TM5 to DIN VDE 0207-363-4-1/ DIN EN 50363-4-1
- Sheath colour grey

## Properties

- Largely resistant to oil, weather, and chemicals; Chemical resistance (see table Technical Information)
- Improved mechanical protection due the double insulation

## Tests

- PVC self-extinguishing and flame retardant acc. to DIN VDE 0482-332-1-2, DIN EN 60332-1-2, IEC 60332-1 (equivalent DIN VDE 0472 part 804 test method B)

## Note

- AWG sizes are approximate equivalent values. The actual cross-section is in mm<sup>2</sup>.

## Application

This cable is used for conditions of increased mechanical stress. For flexible use with free movement without tensile stress or forced movements in dry, moist and wet environments, but not suitable for use outdoors. The cable may be laid in trays, troughs and channels.

CE= The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

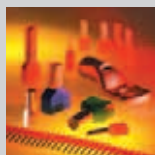
### core-/sheath-color black/grey

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
75460	1 x 6	6,0	58,0	84,0	10
75461	1 x 10	9,5	96,0	143,0	8
75462	1 x 16	10,3	154,0	209,0	6
75463	1 x 25	11,1	240,0	308,0	4
75464	1 x 35	15,0	336,0	440,0	2
75465	1 x 50	17,5	480,0	572,0	1
75466	1 x 70	20,0	672,0	792,0	2/0
75467	1 x 95	22,0	912,0	1155,0	3/0
72184	1 x 120	23,5	1152,0	1267,0	4/0
72185	1 x 150	26,5	1440,0	1650,0	300 kcmil
75468	1 x 185	29,0	1776,0	2134,0	350 kcmil
74221	1 x 240	31,0	2304,0	2943,0	500 kcmil
72082	1 x 300	35,0	2880,0	3600,0	600 kcmil

### core-/sheath-color green-yellow/grey

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
75449	1 G 6	6,0	57,6	84,0	10
75469	1 G 10	9,5	96,0	143,0	8
73859	1 G 16	10,3	154,0	209,0	6
75470	1 G 25	11,1	240,0	325,0	4
75471	1 G 35	15,0	336,0	440,0	2
75472	1 G 50	17,5	480,0	572,0	1
75473	1 G 70	20,0	672,0	792,0	2/0
75474	1 G 95	22,0	912,0	1155,0	3/0
75475	1 G 120	23,5	1152,0	1267,0	4/0
75476	1 G 150	26,5	1440,0	1650,0	300 kcmil
75477	1 G 185	29,0	1776,0	2134,0	350 kcmil
75478	1 G 240	31,0	2304,0	2943,0	500 kcmil
75479	1 G 300	35,0	2280,0	3600,0	600 kcmil

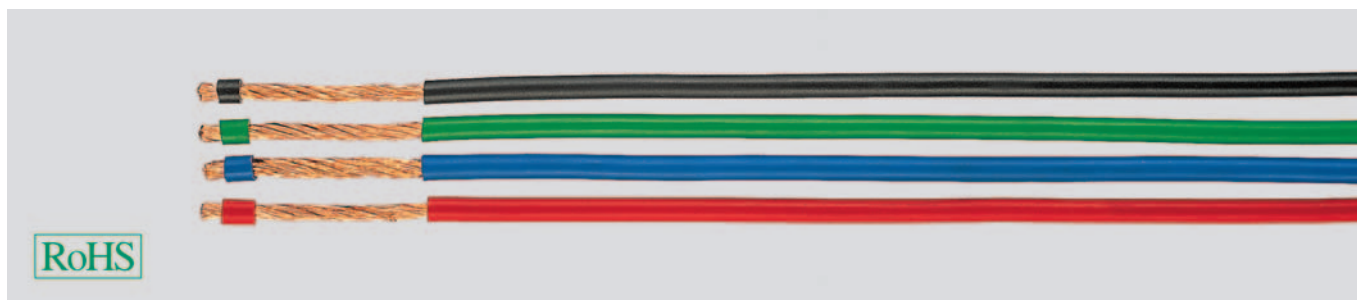
Dimensions and specifications may be changed without prior notice.



Suitable accessories can be found in Chapter X.

- Core end sleeve - ADI
- Core end sleeve - ADU

# LifY Single Core extra fine wires with highest flexibility



## Technical data

- Special plastic stranded wire
- by special design extremely flexible
- adapted to DIN VDE 0250, DIN VDE 0285-525-1 / DIN EN 50525-1
- **Temperature range**  
flexing -15°C to +80°C
- **Operating voltage**  
up to 0,25 mm<sup>2</sup> 300 V  
(not for purposes of high current and power installation)
- **Nominal voltage**  
0,5-1 mm<sup>2</sup> U<sub>0</sub>/U 300/500 V  
from 1,5 mm<sup>2</sup> U<sub>0</sub>/U 450/750 V
- **Test voltage**  
up to 0,25 mm<sup>2</sup> = 2 kV  
0,5-1 mm<sup>2</sup> = 2,5 kV  
from 1,5 mm<sup>2</sup> = 3 kV
- **Minimum bending radius**  
flexing 8x core Ø

## Cable structure

- Bare Cu-conductors, extra fine-wire
- conductor construction see table below
- Core insulation of PVC (soft, smooth)
- stranded specially

## Properties

- The materials used in manufacture are cadmium-free and contain no silicone and free from substances harmful to the wetting properties of lacquers

## Tests

- PVC self-extinguishing and flame retardant acc. to DIN VDE 0482-332-1-2, DIN EN 60332-1-2/IEC 60332-1 (equivalent DIN VDE 0472 part 804 test method B)

## Note

- Please complete the part number for these cores by adding the suffix for the colour required as per the list:  
00 = green, 01 = black, 02 = red, 03 = blue, 04 = brown, 05 = white, 06 = grey, 07 = violet, 08 = yellow, 09 = orange, 10 = transparent, 11 = pink, 12 = beige, 13 = 2-colour 15= darkblue
- AWG sizes are approximate equivalent values. The actual cross-section is in mm<sup>2</sup>.

## Application

The LifY single cores are used as super flexible insulated strand wires for switch cabinets, as measuring cable for testing, laboratories, research etc.

CE = The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

Part no.	Core colour	Cross-sec. mm <sup>2</sup>	Cond. make-up (nom. val.) n x wire Ø	Outer Ø approx. mm	Cop. weight approx. kg / km	Weight approx. kg / km	AWG-No.
151xx	-	0,1	51 x 0,05	1,0	1,2	2,1	-
152xx	-	0,14	72 x 0,05	1,0	1,4	2,6	26
153xx	-	0,25	65 x 0,07	1,3	2,5	4,2	24
154xx	-	0,5	132 x 0,07	2,0	5,5	8,0	20
155xx	-	0,75	195 x 0,07	2,2	8,0	12,0	18
156xx	-	1	260 x 0,07	2,5	10,8	18,0	17
157xx	-	1,5	192 x 0,1	3,5	15,0	22,0	16
158xx	-	2,5	320 x 0,1	3,8	25,0	37,0	14
159xx	-	4	512 x 0,1	4,9	40,0	50,0	12
15093	BK	6	768 x 0,1	6,0	60,0	71,0	10
15135	GN-YE	6	768 x 0,1	6,0	60,0	71,0	10
15115	BU	6	768 x 0,1	6,0	60,0	71,0	10
15116	BN	6	768 x 0,1	6,0	60,0	71,0	10
15114	RD	6	768 x 0,1	6,0	60,0	71,0	10
15094	BK	10	1280 x 0,1	7,3	100,0	130,0	8
15136	GN-YE	10	1280 x 0,1	7,3	100,0	130,0	8
15118	BU	10	1280 x 0,1	7,3	100,0	130,0	8
15119	BN	10	1280 x 0,1	7,3	100,0	130,0	8
15117	RD	10	1280 x 0,1	7,3	100,0	130,0	8
15095	BK	16	2048 x 0,1	8,8	160,0	187,0	6
15137	GN-YE	16	2048 x 0,1	8,8	160,0	187,0	6
15121	BU	16	2048 x 0,1	8,8	160,0	187,0	6
15122	BN	16	2048 x 0,1	8,8	160,0	187,0	6
15120	RD	16	2048 x 0,1	8,8	160,0	187,0	6
15096	BK	25	3234 x 0,1	10,5	240,0	294,0	4
15138	GN-YE	25	3234 x 0,1	10,5	240,0	294,0	4
15124	BU	25	3234 x 0,1	10,5	240,0	294,0	4
15125	BN	25	3234 x 0,1	10,5	240,0	294,0	4
15123	RD	25	3234 x 0,1	10,5	240,0	294,0	4

Part no.	Core colour	Cross-sec. mm <sup>2</sup>	Cond. make-up (nom. val.) n x wire Ø	Outer Ø approx. mm	Cop. weight approx. kg / km	Weight approx. kg / km	AWG-No.
15097	BK	35	4508 x 0,1	11,7	336,0	380,0	2
15139	GN-YE	35	4508 x 0,1	11,7	336,0	380,0	2
15127	BU	35	4508 x 0,1	11,7	336,0	380,0	2
15128	BN	35	4508 x 0,1	11,7	336,0	380,0	2
15126	RD	35	4508 x 0,1	11,7	336,0	380,0	2
15098	BK	50	6468 x 0,1	14,7	480,0	521,0	1
15140	GN-YE	50	6468 x 0,1	14,7	480,0	521,0	1
15130	BU	50	6468 x 0,1	14,7	480,0	521,0	1
15131	BN	50	6468 x 0,1	14,7	480,0	521,0	1
15129	RD	50	6468 x 0,1	14,7	480,0	521,0	1
15099	BK	70	8967 x 0,1	15,5	672,0	740,0	2/0
15141	GN-YE	70	8967 x 0,1	15,5	672,0	740,0	2/0
15133	BU	70	8967 x 0,1	15,5	672,0	740,0	2/0
15134	BN	70	8967 x 0,1	15,5	672,0	740,0	2/0
15132	RD	70	8967 x 0,1	15,5	672,0	740,0	2/0

Dimensions and specifications may be changed without prior notice. (RK01)



# PUR Single Core cold resistant, halogen-free



## Technical data

- PUR-single cores, halogen-free
- **Temperature range**  
-40°C to +80°C  
(up to +100°C for short time)
- **Operating voltage** 1000 V
- **Test voltage**  
3500 V, 15 min.
- **Minimum bending radius**  
occasionally moved 10x core Ø  
fixed installation 5x core Ø
- **Radiation resistance**  
up to 100x10<sup>6</sup> cJ/kg (up to 100 Mrad)

## Cable structure

- Bare copper-conductor, to  
DIN VDE 0295 cl.5, fine-wire,  
BS 6360 cl.5, IEC 60228 cl.5
- Core insulation of special PUR
- Core identification see table below

## Properties

- Halogen-free
- Flexible at low temperatures up to -40°C
- Resistant against pressure
- Overroll steady
- Cut and scratchproof

## Resistant to

- Oil
- See and waste water
- Acids
- Lye
- UV-radiation

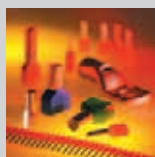
## Application

PUR-single cores are suited for installation in switch cabinets, cable assemblies and electronic equipment. Inductive loops in the road surface for controlling of light signalling equipment.

CE= The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

Cross-sec. mm <sup>2</sup> approx. RAL	Outer Ø approx. mm	Cop. weight kg / km	BK 9005	GN-YE -	BU 5015	BN 8003	RD 3000	WH 1013	GY 7000	VT 4005	YE 1021	PK 3015	TRANS -	D-BU 5010	OG 2003	BEIGE 1001	2-col. -
Part no. 0,5	2,2	4,8	50651	50650	50652	50653	50654	50655	50656	50657	50658	50661	50660	50662	50659	50663	50664
Part no. 0,75	2,4	7,2	50666	50665	50667	50668	50669	50670	50671	50672	50673	50676	50675	50677	50674	50678	50679
Part no. 1	2,5	9,6	50681	50680	50682	50683	50684	50685	50686	50687	50688	50691	50690	50692	50689	50693	50694
Part no. 1,5	3,0	14,4	50696	50695	50697	50698	50699	50700	50701	50702	50703	50706	50705	50707	50704	50708	50709
Part no. 2,5	3,7	24,0	50711	50710	50712	50713	50714	50715	50716	50717	50718	50721	50720	50722	50719	50723	50724
Part no. 4	4,3	38,0	50726	50725	50727	50728	50729	50730	50731	50732	50733	50736	50735	50737	50734	50738	50739
Part no. 6	5,1	58,0	50741	50740	50742	50743	50744	50745	50746	50747	50748	50751	50750	50752	50749	50753	50754
Part no. 10	6,8	96,0	50756	50755	50757	50758	50759	50760	50761	50762	50763	50766	50765	50767	50764	50768	50769
Part no. 16	7,8	154,0	50771	50770	50772	50773	50774	50775	50776	50777	50778	50781	50780	50782	50779	50783	50784
Part no. 25	10,0	240,0	50786	50785	50787	50788	50789	50790	50791	50792	50793	50796	50795	50797	50794	50798	50799
Part no. 35	11,4	336,0	50801	50800	50802	50803	50804	50805	50806	50807	50808	50811	50810	50812	50809	50813	50814
Part no. 50	13,2	480,0	50816	50815	50817	50818	50819	50820	50821	50822	50823	50826	50825	50827	50824	50828	50829
Part no. 70	15,4	672,0	50831	50830	50832	50833	50834	50835	50836	50837	50838	50841	50840	50842	50839	50843	50844
Part no. 95	17,7	912,0	50846	50845	50847	50848	50849	50850	50851	50852	50853	50856	50855	50857	50854	50858	50859
Part no. 120	19,2	1152,0	50861	50860	50862	50863	50864	50865	50866	50867	50868	50871	50870	50872	50869	50873	50874
Part no. 150	22,0	1440,0	50876	50875	50877	50878	50879	50880	50881	50882	50883	50886	50885	50887	50884	50888	50889

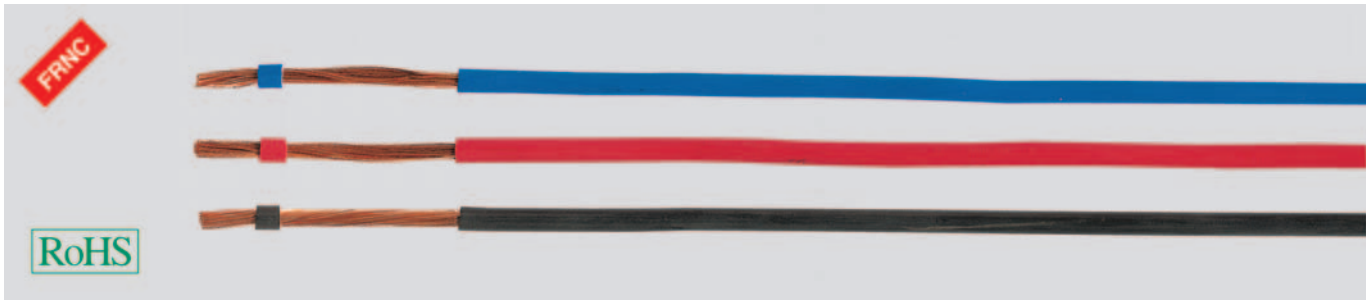
Dimensions and specifications may be changed without prior notice. (RK01)



Suitable accessories can be found in Chapter X.

- Core end sleeve - ADI
- Core end sleeve - ADU

# H05Z-K / H07Z-K single core, halogen-free



## Technical data

- Single cores for low emission of smoke and corrosive gases in case of fire to DIN VDE 0285-525-3-41 / DIN EN 50525-3-41
- **Conductor resistance** acc. to DIN VDE 0295 cl.5
- **Temperature range** -40°C to +90°C
- Permissible **working temperature** at conductor +90°C
- **Nominal voltage**  
H05Z-K =  $U_0/U$  300/500 V  
H07Z-K =  $U_0/U$  450/750 V
- **Test voltage** 2500 V
- **Insulation resistance** at 90°C to DIN VDE 0282 part 9
- **Minimum bending radius** fixed installation  
core  $\varnothing \leq 8$  mm: 4x core  $\varnothing$   
core  $\varnothing > 8-12$  mm: 5x core  $\varnothing$   
core  $\varnothing > 12$  mm: 6x core  $\varnothing$
- **Radiation resistance** up to  $20 \times 10^6$  cJ/kg (up to 20 Mrad)

## Cable structure

- Bare Cu-conductor, to DIN VDE 0295 cl.5, fine-wire, BS 6360 cl.5, IEC 60228 cl.5
- Separating foil over conductor permitted
- Core insulation of cross-linked polyolefin compound type EI5 to DIN VDE 0207-363-5 / DIN EN 50363-5
- Core identification see table below
- **LSOH**= Low Smoke Zero Halogen

## Properties

- The materials used in manufacture are cadmium-free and contain no silicone and free from substances harmful to the wetting properties of lacquers

## Tests

- Behaviour in fire self-extinguishing and flame retardant to DIN VDE 0482-332-1-2, DIN EN 60332-1-2, IEC 60332-1 (equivalent DIN VDE 0472 part 804 test method B)
- Ozone resistant acc. to DIN VDE 0473-811-403, DIN EN 60811-403
- Smoke density acc. to DIN VDE 0482 part 1034-1+2, DIN EN 61034-1+2, IEC 61034-1+2, BS 7622 part 1+2 (previously DIN VDE 0472 part 816)
- Halogen-free acc. to DIN VDE 0285-525-1, DIN EN 50525-1 appendix B

## Note

- Type H07Z-K  
Colour yellow only as (H)07Z-K available

## Application

Halogen-free single-core wires are used for installation in dry environments for wiring up lighting fixtures and units where valuable assets are to be protected from further damage resulting from fire. These types are suitable for laying in tubes on and under plaster, as well as in closed installation ducts.

**H07Z-K**, suitable for protected, permanent laying in or on lighting installations or switching and control equipment up to 1000 V AC or 750 V DC to earth.

CE= The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

## H05Z-K

Cross-sec. mm <sup>2</sup>	Outer Ø min. - max. mm	Cop. weight kg / km	Weight approx. kg / km	BK	GN-YE	BU	BN	RD	WH	GY	VT	YE	D-BU	OG	U-BU
Part no. 0,5	2,1 - 2,6	4,8	9,0	52872	52873	52874	52875	52876	52877	52878	52879	52880	52945	52946	53071
Part no. 0,75	2,2 - 2,8	7,2	12,4	52881	52882	52883	52884	52885	52886	52887	52888	52889	52947	52948	53072
Part no. 1	2,4 - 2,9	9,6	15,0	52890	52891	52892	52893	52894	52895	52896	52897	52898	52949	52950	53073

## H07Z-K

Cross-sec. mm <sup>2</sup>	Outer Ø min. - max. mm	Cop. weight kg / km	Weight approx. kg / km	BK	GN-YE	BU	BN	RD	WH	GY	VT	YE	D-BU	OG	U-BU
Part no. 1,5	2,8 - 3,5	14,4	24,0	51768	51769	51770	51771	51772	51773	51774	51775	51776	52951	52952	53074
Part no. 2,5	3,4 - 4,3	24,0	35,0	51777	51778	51779	51780	51781	51782	51783	51784	51785	52953	52954	53075
Part no. 4	3,9 - 4,9	38,0	51,0	51786	51787	51788	51789	51790	51791	51792	51793	51794	52955	52956	53076
Part no. 6	4,4 - 5,5	58,0	71,0	51795	51796	51797	51798	51799	51800	51801	51802	51803	52957	52958	53077
Part no. 10	5,7 - 7,1	96,0	118,0	51804	51805	51806	51807	51808	51809	51810	51811	51812	52959	52960	53078
Part no. 16	6,7 - 8,4	154,0	180,0	51813	51814	51815	51816	51817	51818	51819	51820	51821	52961	52962	53079
Part no. 25	8,4 - 10,6	240,0	278,0	51822	51823	51824	51825	51826	51827	51828	51829	51830	52963	52964	53080
Part no. 35	9,7 - 12,1	336,0	375,0	51831	51832	51833	51834	51835	51836	51837	51838	51839	52965	52966	53081
Part no. 50	11,5 - 14,4	480,0	560,0	51840	51841	51842	51843	51844	51845	51846	51847	51848	52967	52968	53082

Continuation ►

**H05Z-K / H07Z-K** single core, halogen-free**H07Z-K**

Cross-sec. mm <sup>2</sup>	Outer Ø min. - max. mm	Cop. weight kg / km	Weight approx. kg / km	BK	GN-YE	BU	BN	RD	WH	GY	VT	YE	D-BU	OG	U-BU
Part no. 70	13,2 - 16,6	672,0	780,0	51849	51850	51851	51852	51853	51854	51855	51856	51857	52969	52970	53083
Part no. 95	15,1 - 18,8	912,0	952,0	51858	51859	51860	51861	51862	51863	51864	51865	51866	52971	52972	53084
Part no. 120	16,7 - 20,9	1152,0	1200,0	51867	51868	51869	51870	51871	51872	51873	51874	51875	52973	52974	53085
Part no. 150	18,6 - 23,3	1440,0	1505,0	51876	51877	51878	51879	51880	51881	51882	51883	51884	52975	52976	53086
Part no. 185	20,6 - 25,8	1776,0	1845,0	51885	51886	51887	51888	51889	51890	51891	51892	51893	52977	52978	53087
Part no. 240	23,5 - 29,4	2304,0	2400,0	51894	51895	51896	51897	51898	51899	51900	51901	51902	52979	52980	53088

**H05Z-K two colour, coil in foil**

Cross-sec. mm <sup>2</sup>	Outer Ø min. - max. mm	Cop. weight kg / km	Weight	RD/WH	BU/WH	BN/WH	D-BU/WH
Part no. 0,5	2,1 - 2,6	4,8	9,0	51392	51393	51394	51395
Part no. 0,75	2,2 - 2,8	7,2	12,4	51396	51397	51398	51399
Part no. 1	2,2 - 2,8	9,6	15,0	51400	51401	51402	51403

**H07Z-K two colour, coil in foil**

Cross-sec. mm <sup>2</sup>	Outer Ø min. - max. mm	Cop. weight kg / km	Weight	RD/WH	BU/WH	BN/WH	D-BU/WH
Part no. 1,5	2,8 - 3,5	14,4	24,0	51404	51405	51406	51407
Part no. 2,5	3,4 - 4,3	24,0	35,0	51408	51409	51410	51411
Part no. 4	3,9 - 4,9	38,0	51,0	51412	51413	51414	51415
Part no. 6	4,4 - 5,5	58,0	71,0	51416	51417	51418	50899

**H05Z-K, barrel (with various capacity)**

Cross-sec. mm <sup>2</sup>	Outer Ø min. - max. mm	Cop. weight kg / km	Weight approx. kg / km	BK	GN-YE	BU	BN	RD	WH	GY	VT	YE	D-BU	OG	U-BU
Part no. 0,5	2,1 - 2,6	4,8	9,0	52809	52810	52811	52812	52813	52814	52815	52816	-	52817	52819	-
Part no. 0,75	2,2 - 2,8	7,2	12,4	52821	52822	52823	52824	52825	52826	52827	52828	-	52829	52831	-
Part no. 1	2,4 - 2,9	9,6	15,0	52833	52834	52835	52836	52837	52838	52839	52840	-	52841	52843	-

**H07Z-K, barrel (with various capacity)**

Cross-sec. mm <sup>2</sup>	Outer Ø min. - max. mm	Cop. weight kg / km	Weight approx. kg / km	BK	GN-YE	BU	BN	RD	WH	GY	VT	YE	D-BU	OG	U-BU
Part no. 1,5	2,8 - 3,5	14,4	24,0	52845	52846	52847	52848	52849	52850	52851	52852	-	52853	52855	-
Part no. 2,5	3,4 - 4,3	24,0	35,0	52857	52858	52859	52860	52861	52862	52863	52864	-	52865	52867	-
Part no. 4	3,9 - 4,9	38,0	51,0	52135	52136	52137	52138	52139	52140	52141	52142	-	52143	52144	-
Part no. 6	4,4 - 5,5	58,0	71,0	52145	52146	52147	52148	52149	52150	52151	52152	-	52153	52154	-

Dimensions and specifications may be changed without prior notice. (RK01)



Suitable accessories can be found in Chapter X.

- Core end sleeve - ADI
- Core end sleeve - ADU

K

# H05G-U / -K / H07G-U / -R / -K



## Technical data

- Heat-resistant (+110°C) rubber-insulated cable to DIN VDE 0285-525-2-42/ DIN EN 50525-2-42
- **Max. permissible operating temperature** at conductor +110°C
- **Lowest ambient temperatures** flexing up to -25°C fixed installation up to -40°C
- **Nominal voltage**  
H05G =  $U_0/U$  300/500 V  
H07G =  $U_0/U$  450/750 V
- **Test voltage**  
H05G = 2000 V  
H05G = 2500 V
- **Minimum bending radius** fixed installation  
core  $\varnothing \leq 8$  mm: 4x core  $\varnothing$   
core  $\varnothing > 8-12$  mm: 5x core  $\varnothing$   
core  $\varnothing > 12$  mm: 6x core  $\varnothing$

## Cable structure

- Tinned Cu-conductor, to DIN VDE 0295, IEC 60228, BS 6360  
class 1: single-wire  
class 2: multi-wire  
class 5: fine-wire
- Separating foil over conductor permitted
- Core insulation of rubber compound type E13 (EVA) to DIN VDE 0207-363-1 / DIN EN 50363-1

## Properties

- Single core colours green and yellow can only be applied where the safety regulations are allowed
- The identification for the lighting chain cable is green permitted

## Note

- Please complete the part number for these cores by adding the suffix for the colour required as per the list:  
00 = green  
01 = black  
02 = blue  
03 = brown  
04 = grey  
05 = orange  
06 = pink  
07 = turquoise  
08 = white  
09 = violet  
10 = yellow  
11 = green-yellow
- bare conductor on request
- AWG sizes are approximate equivalent values. The actual cross-section is in mm<sup>2</sup>.

## Application

For inside wiring of switch boards and distributors as well as of operating parts such as in or on lights, for the connection of electric heaters with a nominal voltage up to 1000 V alternating voltage or up to 750 V direct voltage against ground. These single cores are all allowed for laying in tubes, on and under plaster.

CE= The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

### H05G-U (single wire)

Part no.	Cross-section mm <sup>2</sup>	Outer Ø min. - max. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
541xx	0,5	1,9 - 2,4	4,8	10,0	20
542xx	0,75	2,1 - 2,6	7,2	15,0	18
543xx	1	2,2 - 2,8	9,6	16,0	17

### H05G-K (fine wire)

Part no.	Cross-section mm <sup>2</sup>	Outer Ø min. - max. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
550xx	0,5	2,1 - 2,6	4,8	13,0	20
551xx	0,75	2,2 - 2,8	7,2	16,0	18
552xx	1	2,4 - 2,9	9,6	22,0	17

### H07G-U (single wire)

Part no.	Cross-section mm <sup>2</sup>	Outer Ø min. - max. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
544xx	1,5	2,8 - 3,5	14,4	24,0	16
545xx	2,5	3,4 - 4,3	24,0	35,0	14
546xx	4	4,0 - 5,0	38,0	53,0	12

### H07G-K (fine wire)

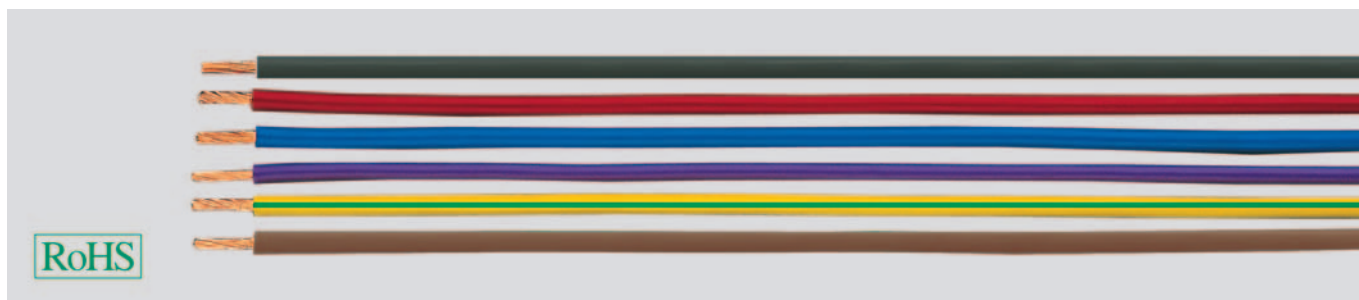
Part no.	Cross-section mm <sup>2</sup>	Outer Ø min. - max. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
553xx	1,5	3,0 - 3,7	14,4	24,0	16
554xx	2,5	3,6 - 4,5	24,0	42,0	14
555xx	4	4,3 - 5,4	38,0	61,0	12
556xx	6	4,8 - 6,0	58,0	78,0	10
557xx	10	6,0 - 7,6	96,0	130,0	8
558xx	16	7,1 - 8,9	154,0	212,0	6
559xx	25	8,8 - 11,0	240,0	323,0	4
560xx	35	10,1 - 12,6	336,0	422,0	2
561xx	50	11,9 - 14,9	480,0	527,0	1
562xx	70	13,6 - 17,0	672,0	726,0	2/0
563xx	95	15,5 - 19,3	912,0	937,0	3/0
564xx	120	17,1 - 21,4	1152,0	1192,0	4/0

### H07G-R (multi wire)

Part no.	Cross-section mm <sup>2</sup>	Outer Ø min. - max. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
547xx	6	4,7 - 5,9	58,0	72,0	10
548xx	10	6,0 - 7,4	96,0	123,0	8
549xx	16	6,8 - 8,5	154,0	184,0	6

Dimensions and specifications may be changed without prior notice. (RK01)

# LiYW / H05V2-K PVC-Single Cores, 90°C, heat-resistant



## Technical data

- Special PVC single core with increased heat-resistance  
**LiYW** up to 105°C adapted to DIN VDE 0285-525-1/DIN EN 50525-1  
**H05V2-K** to 90°C acc. to DIN VDE 0285-525-2-31 / DIN EN 50525-2-31
- **Temperature range**  
**LiYW**  
flexing +5°C to +105°C  
fixed installation -10°C to +105°C  
**H05V2-K**  
flexing +5°C to +90°C
- **max. Temperatur** at conductor under permanent load +90°C
- **Nominal voltage**  
**LiYW**  $U_0/U$  300/500 V  
**H05V2-K**  $U_0/U$  300/500 V
- **Test voltage** 2000 V
- **Insulation resistance**  
min. 20 MOhm x km
- **Minimum bending radius**  
fixed installation 4x core Ø
- **Radiation resistance**  
up to 80x10<sup>6</sup> cJ/kg (up to 80 Mrad)

## Cable structure

- Bare copper-conductor, from 0,5 mm<sup>2</sup> to DIN VDE 0295 cl.5, fine-wire, BS 6360 cl.5, IEC 60228 cl.5
- Wire make-up for:  
0,14 mm<sup>2</sup> = 18x0,1 mm  
0,25 mm<sup>2</sup> = 14x0,15 mm
- **LiYW** special core insulation up to +105°C heat-resistant, adapted to DIN VDE 0207  
**H05V2-K** core insulation up to +90°C heat-resistant, compound type TI3 to DIN VDE 0207-363-3 / DIN EN 50363-3
- Core identification see table below

## Properties

- The materials used in manufacture are cadmium-free and contain no silicone and free from substances harmful to the wetting properties of lacquers
  - Heat-resistant special PVC compound of selected stabilizer and plasticizer
  - Not to be used in contact with objects higher than 85°C
- ### Tests
- All requirements and test methods conform DIN VDE 0285-525-2-31, DIN EN 50525-2-31, deviates however the maximal permissible operating temperature up to +105°C for LiYW
  - PVC self-extinguishing and flame retardant acc. to DIN VDE 0482-332-1-2, DIN EN 60332-1-2, IEC 60332-1 (equivalent DIN VDE 0472 part 804 test method B)

## Application

Therm insulated wires are ideal for use in power current installation, switch cabinets, motors and transformers which are subject to direct contact with high temperatures (e. g. varnishing machines and drying towers etc.). These are also suitable for inside wiring of electrical equipments such as lighting and heating apparatus.

☑= The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

### LiYW 105°C

Cross-section mm <sup>2</sup>	Outer Ø mm	Cop. weight kg / km	Weight approx. kg / km	BK	GN-YE	BU	BN	RD	WH	GY	VT	D-BU
Part no. 0,14	1,3	1,4	3,2	29500	29501	29502	29503	29504	29505	29506	29507	29508
Part no. 0,25	1,8	2,4	4,3	29509	29510	29511	29512	29513	29514	29515	29516	29517
Part no. 0,5	2,6	4,8	7,2	29518	29519	29520	29521	29522	29523	29524	29525	29526

### H05V2-K 90°C

Cross-section mm <sup>2</sup>	Outer Ø min. - max. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No. BK	AWG-No. GN-YE	AWG-No. BU	AWG-No. BN	AWG-No. RD	AWG-No. WH	AWG-No. GY	AWG-No. VT	AWG-No. D-BU
Part no. 0,5	2,1 - 2,5	4,8	8,7	29942	29943	29944	29945	29946	29947	29948	29949	29950
Part no. 0,75	2,2 - 2,7	7,2	11,9	29951	29952	29953	29954	29955	29956	29957	29958	29959
Part no. 1	2,4 - 2,8	9,6	14,0	29960	29961	29962	29963	29964	29965	29966	29967	29968

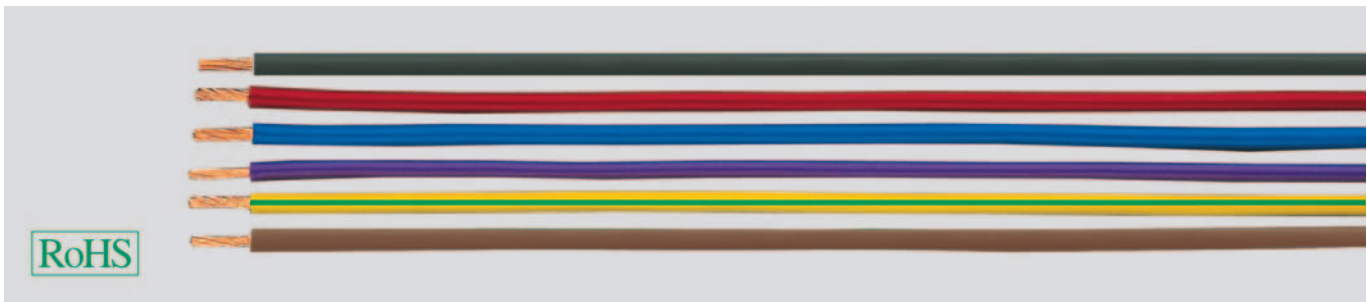
Dimensions and specifications may be changed without prior notice. (RK01)



Suitable accessories can be found in Chapter X.

- Core end sleeve - ADI
- Core end sleeve - ADU



**H07V2-K** PVC single core, 90°C, heat resistant**Technical data**

- Special PVC single core with increased heat-resistance up to 90°C acc. to DIN VDE 0285-525-2-31 / DIN EN 50525-2-31
- **Temperature range** flexing +5°C to +90°C
- **max. Temperature** at conductor under permanent load: +90°C
- **Nominal voltage**  $U_0/U$  450/750 V
- **Test voltage** 2000 V
- **Insulation resistance** min. 20 MOhm x km
- **Minimum bending radius** 10-15x core Ø
- **Radiation resistance** up to  $80 \times 10^6$  cJ/kg (up to 80 Mrad)

**Cable structure**

- Bare copper-conductor, to DIN VDE 0295 cl.5, fine-wire, BS 6360 cl.5, IEC 60228 cl.5
- Core insulation of heat-resistant PVC compound type T13 to DIN VDE 0207-363-3/DIN EN 50363-3
- Core identification see table below

**Properties**

- Heat-resistant special PVC compound of selected stabilizer and plasticizer
- Not to be used in contact with objects higher than 85°C
- The materials used in manufacture are cadmium-free and contain no silicone and free from substances harmful to the wetting properties of lacquers

**Tests**

- PVC self-extinguishing and flame retardant acc. to DIN VDE 0482-332-1-2, DIN EN 60332-1-2/IEC 60332-1 (equivalent DIN VDE 0472 part 804 test method B)

**Application**

Therm insulated wires are ideal for use in power current installation, switch cabinets, motors and transformers which are subject to direct contact with high temperatures (e. g. varnishing machines and drying towers etc.). These are also suitable for inside wiring of electrical equipments such as lighting and heating apparatus. Suitable for fixed protected installation in, or on lighting or controlgear for voltages up to 1000 V a.c. or, up to 750 V d.c. to earth.

CE= The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

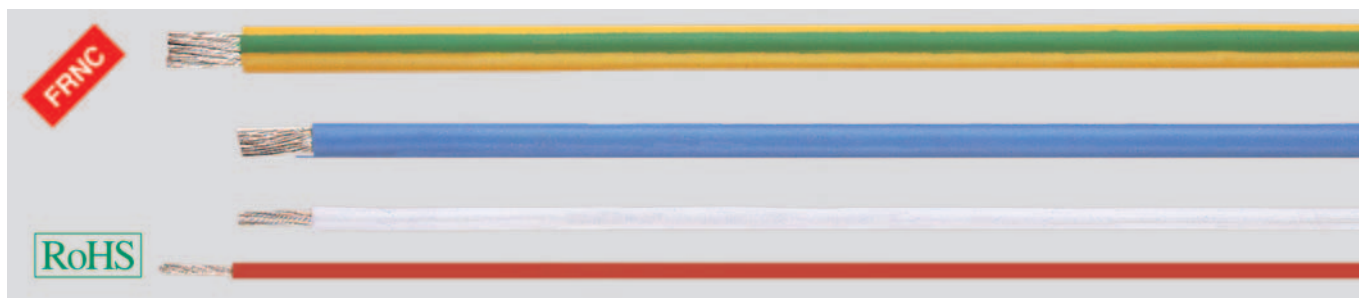
Cross-section mm <sup>2</sup>	Outer Ø min. - max. mm	Cop. weight kg / km	Weight approx. kg / km	BK	GN-YE	BU	BN	RD	WH	GY	VT	D-BU
Part no. 1,5	2,8 - 3,4	14,4	20,0	29970	29971	29972	29973	29974	29975	29976	29977	29978
Part no. 2,5	3,4 - 4,1	24,0	33,3	29979	29980	29981	29982	29983	29984	29985	29986	29987
Part no. 4	3,9 - 4,8	38,0	48,3	29988	29989	29990	29991	29992	29993	29994	29995	29996
Part no. 6	4,4 - 5,3	58,0	68,5	29997	29998	29999	30000	30001	30002	30003	30004	30005
Part no. 10	5,7 - 6,8	96,0	115,0	30006	30007	30008	30009	30010	30011	30012	30013	30014
Part no. 16	6,7 - 8,1	154,0	170,0	30015	30016	30017	30018	30019	30020	30021	30022	30023
Part no. 25	8,4 - 10,2	240,0	270,0	30024	30025	30026	30027	30028	30029	30030	30031	30032
Part no. 35	9,7 - 11,7	336,0	367,0	30033	30034	30035	30036	30037	30038	30039	30040	30041

Dimensions and specifications may be changed without prior notice. (RK01)



Suitable accessories can be found in Chapter X.

- Core end sleeve - ADI
- Core end sleeve - ADU

**Technical data**

- Halogen-free single cores with increased heat resistance
- **Temperature range**  
flexing -35°C to +120°C  
fixed installation -55°C to +145°C
- **Nominal voltage**  
up to 1 mm<sup>2</sup> = U<sub>0</sub>/U 300/500 V  
from 1,5 mm<sup>2</sup> = U<sub>0</sub>/U 450/750 V  
at fixed and protected installation  
from 1,5 mm<sup>2</sup> = U<sub>0</sub>/U 600/1000 V
- **Test voltage** 3500 V
- **Minimum bending radius**  
flexing 12,5x core Ø  
fixed installation 4x core Ø
- **Caloric load values**  
see Technical Informations
- **Approval**  
Germanischer Lloyd

**Cable structure**

- Tinned copper-conductor, to DIN VDE 0295 cl.5, fine-wire, BS 6360 cl.5, IEC 60228 cl.5
- Core insulation of polyolefin-copolymer cross-linked and halogen-free
- Core identification see table below

**Tests**

- Flame test (unit flame test) acc. to DIN VDE 0482-332-3-22, BS 4066 Teil 3, DIN EN 60332-3-22, IEC 60332-3-22 (previously DIN VDE 0472 part 804 test method C)
- Flame test (cable) acc. to DIN VDE 0482-332-1-2, DIN EN 60332-1-2, IEC 60332-1-2 (equivalent DIN VDE 0472 part 804 test method B)
- Corrosiveness of combustion gases acc. to DIN VDE 0482 part 267, DIN EN 50267-2-2, IEC 60754-2 (equivalent DIN VDE 0472 part 813)
- Halogen-free acc. to DIN VDE 0482 part 267, DIN EN 50267-2-1, IEC 60754-1 (equivalent DIN VDE 0472 part 815)
- Smoke density acc. to DIN VDE 0482 part 1034-1+2, DIN EN 61034-1+2, IEC 61034-1+2, BS 7622 part 1+2 (previously DIN VDE 0472 part 816)

**Properties**

- Lower propagation of fire
- Low development of smoke and fumes
- Good abrasion and notch resistance
- Good resistance to oils and weathering
- Resistant to UV radiation and ozone
- Resistant to soldering temperatures
- Thermal class B
- These single-core cables are resistant to melting, even when in contact with a soldering iron at temperatures of between 300°C and 380°C, because of the cross-linking for the insulation material
- Due to the high temperature profile the cross-section of conductor can under certain circumstances be reduced, hereby enabling a saving in space requirement and weight
- The materials used in manufacture are cadmium-free and contain no silicone and free from substances harmful to the wetting properties of lacquers

**Application**

These temperature resistant single-core cables are used for the internal wiring of lighting fixtures, heaters, electrical machinery, switching systems and distributors in equipment and plant and machinery, suitable for laying in tubes on and under plaster, in closed installation ducts, as well as for traffic systems and outdoor applications. These cables are not approved for direct routing on racks, gutters or tanks. For a protected installation, these cables may be used at a nominal voltage of up to 1000 V alternating current or a direct current up to 750 V when earthed. The maximum operating d. c. voltage used in rail vehicles shall not exceed 900 V when earthed. These halogen-free single core cables are characterised by their amazingly high long-time resistance to temperature and feature among the leading halogen-free, flame resistant products in the world. These single core cables significantly contribute to safety and the environment.

☑= The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

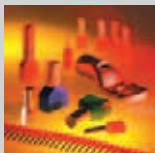
Cross-sec. mm <sup>2</sup>	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	BK	GN-YE	BU	BN	RD	WH	GY	VT	YE	GN	D-BU	OG	BEIGE	2-col.
Part no. 0,25	1,6	2,4	4,0	50999	50998	51070	51071	51072	51073	51074	51075	51076	51078	51079	51077	51164	51165
Part no. 0,34	1,7	3,2	5,0	51167	51166	51168	51169	51170	51171	51172	51173	51174	51176	51177	51175	51178	51179
Part no. 0,5	1,9	4,8	7,0	51281	51280	51282	51283	51284	51285	51286	51287	51288	51290	51291	51289	51292	51293
Part no. 0,75	2,2	7,2	11,0	51295	51294	51296	51297	51298	51299	51300	51301	51302	51304	51305	51303	51306	51307
Part no. 1	2,5	9,6	14,0	51309	51308	51310	51311	51312	51313	51314	51315	51316	51318	51319	51317	51320	51321
Part no. 1,5	2,9	14,4	20,0	51323	51322	51324	51325	51326	51327	51328	51329	51330	51332	51333	51331	51334	51335
Part no. 2,5	3,5	24,0	30,0	51337	51336	51338	51339	51340	51341	51342	51343	51344	51346	51347	51345	51348	51349
Part no. 4	4,3	38,0	47,0	51351	51350	51352	51353	51354	51355	51356	51357	51358	51360	51361	51359	51362	51363
Part no. 6	5,0	58,0	72,0	51365	51364	51366	51367	51368	51369	51370	51371	51372	51374	51375	51373	51376	51377
Part no. 10	6,3	96,0	120,0	51379	51378	51380	51381	51382	51383	51384	51385	51386	51388	51389	51387	51390	51391

Continuation ▶

**HELUTHERM® 145** flexible, cross-linked, halogen-free

Cross-sec. mm²	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	BK	GN-YE	BU	BN	RD	WH	GY	VT	YE	GN	D-BU	OG	BEIGE	2-col.
Part no. 16	7,3	154,0	182,0	51420	51419	51421	51422	51423	51424	51425	51426	51427	51429	51430	51428	51431	51432
Part no. 25	9,6	240,0	272,0	51434	51433	51435	51436	51437	51438	51439	51440	51441	51443	51444	51442	51445	51446
Part no. 35	10,8	336,0	371,0	51448	51447	51449	51450	51451	51452	51453	51454	51455	51457	51458	51456	51459	51460
Part no. 50	12,6	480,0	530,0	51462	51461	51463	51464	51465	51466	51467	51468	51469	51471	51472	51470	51473	51474
Part no. 70	14,6	672,0	730,0	51476	51475	51477	51478	51479	51480	51481	51482	51483	51485	51486	51484	51487	51488
Part no. 95	16,5	912,0	964,0	51490	51489	51491	51492	51493	51494	51495	51496	51497	51499	51500	51498	51501	51502
Part no. 120	18,0	1152,0	1235,0	51504	51503	51505	51506	51507	51508	51509	51510	51511	51513	51514	51512	51515	51516
Part no. 150	20,0	1440,0	1523,0	51518	51517	51519	51520	51521	51522	51523	51524	51525	51527	51528	51526	51529	51530
Part no. 185	22,2	1776,0	1850,0	51532	51531	51533	51534	51535	51536	51537	51538	51539	51541	51542	51540	51543	51544
Part no. 240	24,5	2304,0	2432,0	51546	51545	51547	51548	51549	51550	51551	51552	51553	51555	51556	51554	51557	51558

Dimensions and specifications may be changed without prior notice. (RK01)



Suitable accessories can be found in Chapter X.

- Core end sleeve - ADI
- Core end sleeve - ADU

**Technical data**

- Spezial-silicon single core with higher heat-resistance range adapted to DIN VDE 0250 Teil 1 and part 502
- **Temperature range**  
-60°C to +180°C  
(up to +220°C for short time)
- **Temperature limit at the conductor**  
in operation +180°C
- **Nominal voltage** U<sub>0</sub>/U 300/500 V
- **Test voltage** 2000 V
- **Breakdown voltage** min. 5000 V
- **Minimum bending radius**  
6x core Ø
- **Radiation resistance**  
up to 20 x 10<sup>6</sup> cJ/kg (up to 20 Mrad)

**Cable structure****Type SiF**

- Tinned copper-conductor, from 0,5 mm<sup>2</sup> to DIN VDE 0295 cl.5, fine-wire, BS 6360 cl.5, IEC 60228 cl.5
- Conductor construction  
0,25 mm<sup>2</sup> = 14x0,15 mm
- Core insulation of silicone

**Type SiFF**

- Tinned Cu-conductor, to DIN VDE 0295 cl.6, extra fine-wire, BS 6360 cl.6, IEC 60228 cl.6 (single wire Ø 0,07 mm)
- Core insulation of silicone

**Properties****Resistant to**

- high molecular oils, fats from vegetables and animals, alcohols, plasticizers and clophenes, diluted acids, lyes and salt dissolution, oxidation substances, tropical influences and weather, lake water, oxygen
- High flash points
- For laying as a fixed installation only in open or ventilated pipe systems as well as in ducts. Otherwise the mechanical properties of the silicon are reduced by the enclosed air at temperatures exceeding 90°C.

**Tests**

- Corrosiveness of combustion gases (Halogen-free) acc. to DIN VDE 0482 part 267, DIN EN 50267-2-2, IEC 60754-2 (equivalent DIN VDE 0472 part 813)
- Behaviour in fire no flame propagation acc. to DIN VDE 0482-332-1-2, DIN EN 60332-1-2, IEC 60332-1 (equivalent DIN VDE 0472 part 804 test method B)

**Note**

- Please complete the part number for these cables by adding the suffix for the colour required as per the list:  
00 = green, 01 = black, 02 = red, 03 = blue, 04 = brown, 05 = white, 06 = grey, 07 = violet, 08 = yellow, 09 = orange, 10 = transparent, 11 = pink, 12 = beige, 13 = 2-colour
- AWG sizes are approximate equivalent values. The actual cross-section is in mm<sup>2</sup>.

**Application**

Special single cores for use in high, resp. low temperature areas. They are used mainly in the steel producing industries, in aviation industries as well as in ship building, cement, glas and ceramic factories. As this single cores are halogen-free, especially suited for use in power stations.

☑ The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

**SiF**

Part no.	Cross-section mm <sup>2</sup>	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
232xx	0,25	1,9	2,4	5,5	24
233xx	0,5	2,1	4,8	8,6	20
234xx	0,75	2,4	7,2	11,8	18
235xx	1	2,5	9,6	13,5	17
236xx	1,5	2,8	14,4	18,5	16
237xx	2,5	3,4	24,0	30,0	14
238xx	4	4,2	38,0	47,3	12
239xx	6	5,0	58,0	71,1	10
246xx	10	6,6	96,0	119,4	8
247xx	16	7,4	154,0	187,7	6
248xx	25	9,2	240,0	289,6	4

**SiFF**

Part no.	Cross-section mm <sup>2</sup>	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
451xx	0,25	1,9	2,4	6,0	24
452xx	0,5	2,2	4,8	10,0	20
453xx	0,75	2,5	7,2	13,0	18
454xx	1	2,6	9,6	15,0	17
455xx	1,5	3,1	14,4	19,0	16
456xx	2,5	3,7	24,0	32,0	14
457xx	4	4,4	38,0	50,0	12
458xx	6	5,2	58,0	73,0	10
459xx	10	6,8	96,0	125,0	8

**SiF (wire colour black)**

Part no.	Cross-section mm <sup>2</sup>	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
23953	35	10,3	336,0	398,3	2
23954	50	11,8	480,0	559,7	1
23955	70	13,6	672,0	765,8	2/0
23956	95	15,6	912,0	1031,5	3/0
23957	120	17,6	1152,0	1284,6	4/0
23958	150	19,6	1440,0	1563,4	300 kcmil
23959	185	22,4	1776,0	1858,2	350 kcmil

Dimensions and specifications may be changed without prior notice. (RK01)

**Technical data**

- Spezial-silicon single core with higher heat-resistance range adapted to DIN VDE 0250 Teil 1 and part 502
- **Temperature range**  
-60°C to +180°C  
(for short time +220°C)
- **Temperature limit at the conductor**  
in operation +180°C
- **Nominal voltage**  $U_0/U$  300/500 V
- **Test voltage** 2000 V
- **Breakdown voltage** min. 5000 V
- **Minimum bending radius**  
15x core Ø  
(SiD only for permanent installation)
- **Radiation resistance**  
up to 20 x 10<sup>6</sup> cJ/kg (up to 20 Mrad)

**Cable structure****Type SiF/GL**

- Tinned copper-conductor, from 0,5 mm<sup>2</sup> to DIN VDE 0295 cl.5, fine-wire, BS 6360 cl.5, IEC 60228 cl.5
- Conductor construction:  
0,25 mm<sup>2</sup> = 14x0,15 mm
- Core insulation of silicone
- Glass-fibre braiding

**Type SiD**

- Tinned copper-conductor, single-wire
- Core insulation of silicone

**Type SiD/GL**

- Tinned copper-conductor, single-wire
- Core insulation of silicone
- Glass-fibre braiding

**Properties****• Resistant to**

- high molecular oils, fats from vegetables and animals, alcohols, plasticizers and clophenes, diluted acids, lyes and salt dissolution, oxidation substances, tropical influences and weather, lake water, oxygen
- High flash points
- For laying as a fixed installation only in open or ventilated pipe systems as well as in ducts. Otherwise the mechanical properties of the silicon are reduced by the enclosed air at temperatures exceeding 90°C.

**Tests**

- Corrosiveness of combustion gases (Halogen-free) acc. to DIN VDE 0482 part 267, DIN EN 50267-2-2, IEC 60754-2 (equivalent DIN VDE 0472 part 813)
- Behaviour in fire no flame propagation acc. to DIN VDE 0482-332-1-2, DIN EN 60332-1-2, IEC 60332-1 (equivalent DIN VDE 0472 part 804 test method B)

**Note**

- Please complete the part number for these cables by adding the suffix for the colour required as per the list:  
00 = green, 01 = black, 02 = red, 03 = blue, 04 = brown, 05 = white, 06 = grey, 07 = violet, 08 = yellow, 09 = orange, 10 = transparent, 11 = pink, 12 = beige, 13 = 2-colour
- AWG sizes are approximate equivalent values. The actual cross-section is in mm<sup>2</sup>.

**Application**

Special single cores for use in high, resp. low temperature areas. They are used mainly in the steel producing industries, in aviation industries as well as in ship building, cement, glass and ceramic factories. As this single cores are halogen-free, especially suited for use in power stations.

CE= The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

**SiF/GL**

Part no.	Cross-section mm <sup>2</sup>	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
47001	0,25	2,4	2,4	7,7	24
47002	0,5	2,5	4,8	12,4	20
47003	0,75	2,8	7,2	16,2	18
47004	1	2,9	9,6	18,2	17
47005	1,5	3,2	14,4	23,4	16
47006	2,5	3,8	24,0	35,2	14
47007	4	4,6	38,0	53,5	12
47008	6	5,4	58,0	77,4	10
47009	10	7,6	96,0	129,2	8
47010	16	8,4	154,0	198,4	6
47011	25	10,2	240,0	303,0	4
47012	35	11,3	336,0	413,2	2
47013	50	13,4	480,0	577,8	1

**SiD**

Part no.	Cross-section mm <sup>2</sup>	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
461xx	0,2	1,7	1,9	4,2	-
462xx	0,28	1,8	2,7	5,1	-
463xx	0,5	2,0	4,8	7,5	20
464xx	0,75	2,1	7,2	10,2	18
465xx	1	2,3	9,6	12,6	17
466xx	1,5	2,5	14,4	18,1	16
467xx	2,5	3,2	24,0	28,7	14
468xx	4	3,9	38,0	45,2	12
469xx	6	4,4	58,0	64,3	10

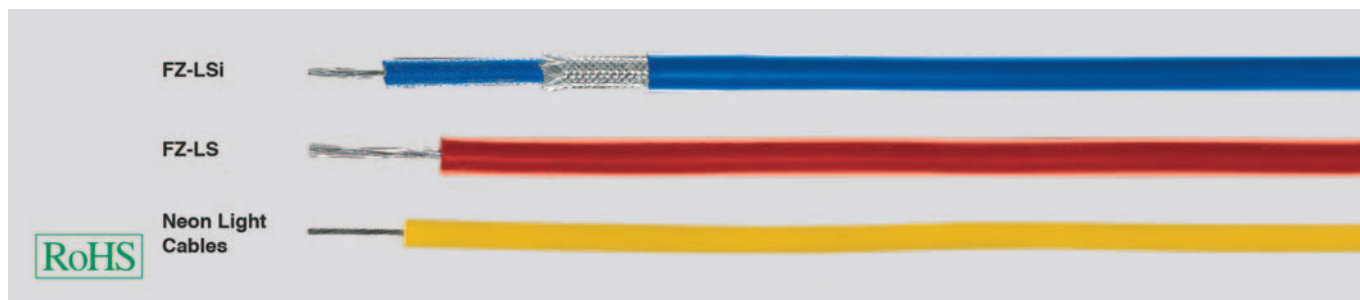
**SiD/GL**

Part no.	Cross-section mm <sup>2</sup>	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
47014	0,5	2,4	4,8	10,0	20
47015	0,75	2,6	7,2	15,0	18
47016	1	2,7	9,6	19,0	17
47017	1,5	3,0	14,4	28,0	16
47018	2,5	3,6	24,0	40,0	14
47019	4	4,3	36,0	55,0	12
47020	6	5,0	58,0	80,0	10

Dimensions and specifications may be changed without prior notice. (RK01)



# FZ-LSi / FZ-LS / Neon Light Cables



## Technical data

### FZ-LSi, blue

- **Test voltage** 20 kV
- **Breakdown voltage** min. 30 kV
- **Ignition voltage** (kV eff.)  
0,5 mm<sup>2</sup> = 6 kV  
1,0 mm<sup>2</sup> = 8 kV  
1,5 mm<sup>2</sup> = 10 kV

### FZ-LS, red

- **Test voltage**  
for 5 mm Ø = 15 kV  
for 7 mm Ø = 20 kV
- **Breakdown voltage**  
for 5 mm Ø = min. 25 kV  
for 7 mm Ø = min. 35 kV

### Neon-light-Cable, yellow

- **Nominal voltage**  
3,5 kV, 4,0 kV or 7,5 kV
- **Test voltage** 10 kV
- **Specific volume resistivity**  
min. 10<sup>12</sup> Ohm x cm
- **Minimum bending radius**  
7,5x cable Ø
- **Radiation resistance**  
up to 20x10<sup>6</sup> cJ/kg (up to 20 Mrad)

## Cable structure

### FZ-LSi, blue

- Tinned copper-conductor
- Conductor construction see table below
- Core insulation of silicone compound type 2GI1 to DIN VDE 0207 part 20
- Glass-fibre braiding
- Outer sheath of silicone compound type 2GM1 to DIN VDE 0207 part 21
- Sheath colour blue

### FZ-LS, red

- Tinned copper-conductor, 19x0,25 mm Ø
- Core insulation of silicone compound type 2GI1 to DIN VDE 0207 part 20
- Sheath colour redbrown

### Neon-light-cable, yellow

- in adapted to DIN VDE 0250 part 1+5
- Tinned copper-conductor, 30x0,25 mm
- Core insulation of silicone compound type 2GI1 to DIN VDE 0207 part 20
- Sheath colour yellow

## Properties

### Neon-light-cable, yellow

- Halogen-free  
acc. to DIN VDE 0482 part 267,  
DIN EN 50267-2-2, IEC 60754-2  
(equivalent DIN VDE 0472 part 813)
- Behaviour in fire no flame propagation  
acc. to DIN VDE 0482-332-1-2,  
DIN EN 60332-1-2, IEC 60332-1 (equivalent  
DIN VDE 0472 part 804 test method B)
- No formation of corrosive gases
- Low smoke density
- Very good weather resistance

## Note

- AWG sizes are approximate equivalent values. The actual cross-section is in mm<sup>2</sup>.

## Application

### FZ-LSi, blue

This ignition cable is suitable for use at high and extremely alternating ambient temperatures up to +180°C. Applications include engine manufacturing, valve manufacturing and heating technology. As protection against mechanical damages a glass fibre braiding and a silicone sheath covers the core insulation.

### FZ-LS, red

This ignition cable is suitable for use at high and extremely alternating ambient temperatures up to +180°C. Applications include the lamp and lighting industry and cooling and airconditioning technology.

### Neon-light-cable, yellow

This cable is primarily suitable for use at high and extremely alternating ambient temperatures such as in the lamp and lighting industry. Protected installation is required.

### FZ-LSi ignition cable

Part no.	Core colour	Cross-sec. mm <sup>2</sup>	Cond. make-up (nom. val.) n x wire Ø	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
23110	BU	0,5	7 x 0,3	5,0	4,8	36,0	20
23106	BU	1	19 x 0,25	7,5	9,5	65,0	17
23107	BU	1,5	28 x 0,26	8,5	14,4	88,0	16

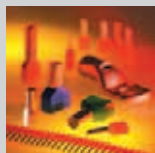
### FZ-LS high-voltage ignition cable 15 and 20kV

Part no.	Core colour	Cross-sec. approx. mm <sup>2</sup>	Cond. make-up (nom. val.) n x wire Ø	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
23109	red-brown	1	19 x 0,25	5,0	9,6	34,0	17
23108	red-brown	1	19 x 0,25	7,0	9,6	60,0	17

### neon light cables (neon cable) 3,5kV, 4,0kV and 7,5kV

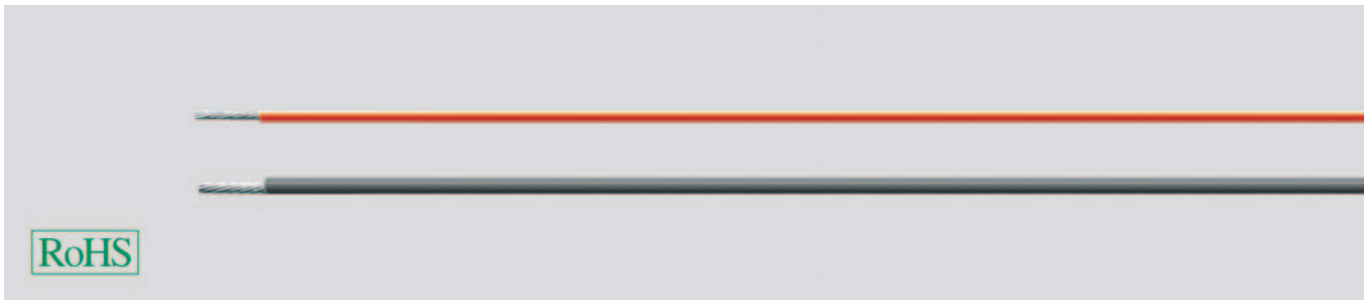
Part no.	Core colour	Cross-sec. mm <sup>2</sup>	Cond. make-up (nom. val.) n x wire Ø	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
23147	YE	1,5	30 x 0,25	4,4	14,4	32,0	16
23148	YE	1,5	30 x 0,25	6,6	14,4	59,0	16
23149	YE	1,5	30 x 0,25	7,6	14,4	75,0	16

Dimensions and specifications may be changed without prior notice. (RK01)



Suitable accessories can be found in Chapter X.

- Core end sleeve - ADI
- Core end sleeve - ADU

**HELUFロン®-FEP-6Y** fluorinated polymeric materials, single core, 600 V**Technical data**

- Fluorinated polymeric insulation FEP (Fluorethylenpropylene)
- **Temperature range**  
-100°C to +205°C  
(up to +230°C for short time)
- **Nominal voltage** 600 V
- **Test voltage** 2500 V
- **Insulation resistance**  
min. 2 GOhm x km
- **Minimum bending radius**  
flexing 10x core Ø  
fixed installation 4x core Ø
- **Radiation resistance**  
up to 1x10<sup>6</sup> cJ/kg (up to 1 Mrad)
- **Conductor temperature range**  
bare copper +130°C  
tinned copper +180°C  
silver pl. copper +260°C

**Cable structure**

- Stranded copper wire, bare, tinned, silver
- Make-up fine wire stranded to DIN VDE 0295 cl.5, BS 6360 cl.5 and IEC 60228 cl.5
- Core insulation FEP-HELUFロン®

**Properties**

- Higher insulation resistance
- Low dielectric loss
- Not flammable
- Min. 20 kV dielectric strength
- Resistant to micro-cultures
- Do not permit any fungus-formation
- Absolute ozone resistant
- Absolute weather resistant
- Water absorption <0,01%
- Minimal water vapour permeability (approx. 0,18 mgr/cm<sup>2</sup> in 24 hours)
- The materials used in manufacture are cadmium-free and contain no silicone and free from substances harmful to the wetting properties of lacquers

**Tests**

- self-extinguishing and flame retardant acc. to DIN VDE 0482-332-1-2, DIN EN 60332-1-2, IEC 60332-1 (equivalent DIN VDE 0472 part 804 test method B)

**Note**

- Please complete the above part-no. for the colour required using the following table:  
1 = black, 2 = red, 3 = blue,  
4 = brown, 5 = white, 6 = transparent,  
7 = 2-colour, 8 = other colours
- AWG sizes are approximate equivalent values. The actual cross-section is in mm<sup>2</sup>.

**Application**

HELUFロン® single cores are predominantly used for installing in control cabinets subjected to high thermal effects as well as in brickworks, heaters, kitchen fitments and measuring appliances as well as in the chemical industry. These single cores are non-flammable and resistant to acids, alkalis, solvents, oil and petrol.

☑ The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

**Copper wire, tinned**

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
2551x	1 x 0,14	1,0	1,4	2,6	26
2552x	1 x 0,25	1,1	2,4	4,1	24
2553x	1 x 0,5	1,4	4,8	8,0	20
2554x	1 x 0,75	1,5	7,2	9,7	18
2555x	1 x 1	1,8	9,6	12,7	17
2556x	1 x 1,5	2,2	14,4	17,9	16
2557x	1 x 2,5	2,6	24,0	26,4	14
2558x	1 x 4	3,2	38,0	43,1	12
2559x	1 x 6	3,9	58,0	65,9	10
2560x	1 x 10	5,1	96,0	115,0	8
2561x	1 x 16	6,7	154,0	175,0	6

**Copper wire, bare**

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
2490x	1 x 0,14	1,0	1,35	2,6	26
2491x	1 x 0,25	1,1	2,4	4,1	24
2492x	1 x 0,5	1,4	4,8	8,0	20
2493x	1 x 0,75	1,5	7,2	9,7	18
2494x	1 x 1	1,8	9,6	12,7	17
2495x	1 x 1,5	2,2	14,4	17,9	16

**Copper wire, bare**

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
2496x	1 x 2,5	2,6	24,0	26,4	14
2497x	1 x 4	3,2	38,0	43,1	12
2498x	1 x 6	3,9	58,0	65,9	10
2499x	1 x 10	5,1	96,0	115,0	8
2037x	1 x 16	6,7	154,0	175,0	6

**copper wires, silvered**

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer Ø approx. mm	Cop. weight kg / km	AG weight kg / km	Weight approx. kg / km	AWG-No.
2026x	1 x 0,14	1,0	1,35	0,09	2,6	26
2027x	1 x 0,25	1,1	2,4	0,13	4,1	24
2028x	1 x 0,5	1,4	4,8	0,17	8,0	20
2029x	1 x 0,75	1,5	7,2	0,20	9,7	18
2030x	1 x 1	1,8	9,6	0,26	12,7	17
2031x	1 x 1,5	2,2	14,4	0,35	17,9	16
2032x	1 x 2,5	2,6	24,0	0,70	26,4	14
2033x	1 x 4	3,2	38,0	1,20	43,1	12
2034x	1 x 6	3,9	58,0	1,70	65,9	10
2035x	1 x 10	5,1	96,0	2,80	115,0	8
2036x	1 x 16	6,7	154,0	4,80	175,0	6

Dimensions and specifications may be changed without prior notice. (RK01)

# HELUFロン®-PTFE-5Y fluorinated polymeric materials, single core, 600 V or 1000 V



## Technical data

- Fluorinated polymeric insulation PTFE (Polytetrafluorethylene)
- Design to DIN VDE 0881 an IEC 60673
- **Temperature range**  
-190°C to +260°C  
(up to +300°C for short time)
- **Nominal voltage**  
type E = 600 V  
type EE = 1000 V
- **Test voltage**  
type E = 3,4 kV  
type EE = 5 kV
- **Insulation resistance**  
min. 1 GOhm x km
- **Minimum bending radius**  
10x core Ø
- **Radiation resistance**  
up to 1x10<sup>5</sup> cJ/kg (up to 0,1 Mrad)
- **Conductor temperature range**  
bare copper +130°C  
tinned copper +180°C  
silver pl. copper +200°C  
nickel pl. copper +260°C

## Cable structure

- Stranded copper wire, silver
- Core insulation PTFE-HELUFロン® to DIN VDE 207 part 6
- PTFE as per MIL-W 16878

## Properties

- Higher insulation resistance
- Low dielectric loss
- Not flammable
- Resistant to micro-cultures
- Do not permit any fungus-formation
- Absolute ozone resistant
- Absolute weather resistant
- Water absorption <0,01%
- Minimal water vapour permeability (approx. 0,18 mgr/cm<sup>2</sup> in 24 hours)
- The materials used in manufacture are cadmium-free and contain no silicone and free from substances harmful to the wetting properties of lacquers

## Tests

- self-extinguishing and flame retardant acc. to DIN VDE 0482-332-1-2, DIN EN 60332-1-2, IEC 60332-1 (equivalent DIN VDE 0472 part 804 test method B)

## Note

- Please complete the above part-no. for the colour required using the following table:  
1 = black, 2 = red, 3 = blue,  
4 = brown, 5 = white, 6 = transparent,  
7 = 2-colour, 8 = other colour
- Conductor bare, tinned or nickel plated on request

## Application

HELUFロン® single cores are predominantly used for installing in control cabinets subjected to high thermal effects as well as in brickworks, heaters, kitchen fitments and measuring appliances as well as in the chemical industry. These single cores are non-flammable and resistant to acids, alkalis, solvents, oil and petrol.

CE The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

### 600 V

Part no.	AWG-No.	No. cond.	Cross-section mm <sup>2</sup>	Outer Ø approx. mm	Cop. weight kg / km	AG weight kg / km	Weight approx. kg / km
2511x	32	7	0,03	0,70	0,4	0,03	0,4
2512x	30	7	0,06	0,81	0,6	0,04	0,59
2513x	28	7	0,09	0,89	0,9	0,06	0,93
2514x	26	7	0,14	0,99	1,4	0,07	1,47
2515x	26	19	0,14	0,99	1,4	0,09	1,58
2516x	24	7	0,21	1,12	2,3	0,07	2,31
2517x	24	19	0,24	1,12	2,3	0,13	2,52
2518x	22	7	0,35	1,27	3,5	0,10	3,68
2519x	22	19	0,38	1,27	3,5	0,17	3,99
2520x	20	7	0,57	1,47	5,6	0,12	6,0
2521x	20	19	0,57	1,47	6,1	0,18	6,4
2522x	18	7	0,90	1,74	9,6	0,22	9,45
2523x	18	19	0,95	1,74	9,6	0,27	10,2
2524x	16	19	1,23	2,04	13,5	0,29	12,9
2525x	14	19	1,94	2,40	18,0	0,38	20,3

### 1000 V

Part no.	AWG-No.	No. cond.	Cross-section mm <sup>2</sup>	Outer Ø approx. mm	Cop. weight kg / km	AG weight kg / km	Weight approx. kg / km
2531x	32	7	0,03	1,00	0,4	0,03	0,42
2532x	30	7	0,06	1,07	0,6	0,04	0,65
2533x	28	7	0,09	1,14	0,9	0,06	1,0
2534x	26	7	0,14	1,24	1,4	0,07	1,56
2535x	26	19	0,14	1,24	1,4	0,09	1,68
2536x	24	7	0,21	1,37	2,3	0,07	2,4
2537x	24	19	0,24	1,37	2,3	0,13	2,65
2538x	22	7	0,35	1,52	3,5	0,10	3,85
2539x	22	19	0,38	1,50	3,5	0,17	4,2
2540x	20	7	0,57	1,72	5,6	0,12	6,3
2541x	20	19	0,57	1,72	6,1	0,18	6,9
2542x	18	7	0,90	2,00	9,6	0,22	10,65
2543x	18	19	0,95	2,00	9,6	0,27	13,65
2544x	16	19	1,23	2,26	13,5	0,29	21,38
2545x	14	19	1,94	2,76	18,0	0,38	33,95

Dimensions and specifications may be changed without prior notice. (RK01)

# HELUTHERM® 400 Insulation class C, halogen-free



## Technical data

- Special core insulation mono or multi coloured
- **Temperature range**  
-60°C to +400°C  
operating temperature  
(up to +450°C for short time)
- **Nominal voltage** 500 V
- **Test voltage** 2000 V
- **Minimum bending radius**  
15x outer Ø
- **Radiation resistance**  
up to  $1 \times 10^{10}$  cJ/kg (up to  $1 \times 10^4$  Mrad)

## Cable structure

- Stranded nickel conductor
- Overlapping with special heat-resistant impregnation
- Colour identification through helix (colour see table)

## Properties

- These cables have very good electronic, chemical and radiation resistant properties

## Note

- Also available with additional Kapton film at extra cost.

## Application

The wide temperature range offered by this cable type makes it especially suited for use in the aviation and aerospace industries, for atomic power stations and in the steel making and chemical industries. For the critical applications, for example mechanical stress, we advise for consultation.

☞= The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

Cross-sec. mm <sup>2</sup>	Conductor construction	Outer Ø approx. mm	Nickel weight kg / km	BK	GN-YE	BU	BN	RD	WH	GY	VT	YE	PK	OG	BEIGE	TRANS	2-col.
Part no. 0,5	16 x 0,2	2,2	4,8	50901	50900	50902	50903	50904	50905	50906	50907	50908	50911	50909	50912	50910	50913
Part no. 0,75	24 x 0,2	2,4	7,2	50915	50914	50916	50917	50918	50919	50920	50921	50922	50925	50923	50926	50924	50927
Part no. 1	32 x 0,2	2,7	9,6	50929	50928	50930	50931	50932	50933	50934	50935	50936	50939	50937	50940	50938	50941
Part no. 1,5	30 x 0,25	2,8	14,4	50943	50942	50944	50945	50946	50947	50948	50949	50950	50953	50951	50954	50952	50955
Part no. 2,5	50 x 0,25	3,4	24,0	50957	50956	50958	50959	50960	50961	50962	50963	50964	50967	50965	50968	50966	50969
Part no. 4	56 x 0,3	4,5	38,0	50971	50970	50972	50973	50974	50975	50976	50977	50978	50981	50979	50982	50980	50983
Part no. 6	84 x 0,3	4,9	58,0	50985	50984	50986	50987	50988	50989	50990	50991	50992	50995	50993	50996	50994	50997
Part no. 10	141 x 0,3	5,8	96,0	50890	50209	50891	50892	50893	50894	50895	50896	50897	51560	50898	51561	51559	51562
Part no. 16	226 x 0,3	7,4	154,0	51564	51563	51565	51566	51567	51568	51569	51570	51571	51574	51572	51575	51573	51576
Part no. 25	196 x 0,4	9,6	240,0	51578	51577	51579	51580	51581	51582	51583	51584	51585	51588	51586	51589	51587	51590
Part no. 35	276 x 0,4	11,5	336,0	51592	51591	51593	51594	51595	51596	51597	51598	51599	51602	51600	51603	51601	51604
Part no. 50	396 x 0,4	12,7	480,0	51606	51605	51607	51608	51609	51610	51611	51612	51613	51616	51614	51617	51615	51618
Part no. 70	360 x 0,5	16,0	672,0	51620	51619	51621	51622	51623	51624	51625	51626	51627	51630	51628	51631	51629	51632
Part no. 95	485 x 0,5	18,0	912,0	51634	51633	51635	51636	51637	51638	51639	51640	51641	51644	51642	51645	51643	51646
Part no. 120	608 x 0,5	19,0	1152,0	51648	51647	51649	51650	51651	51652	51653	51654	51655	51658	51656	51659	51657	51660
Part no. 150	756 x 0,5	22,0	1440,0	51662	51661	51663	51664	51665	51666	51667	51668	51669	51672	51670	51673	51671	51674
Part no. 185	944 x 0,5	24,0	1776,0	51676	51675	51677	51678	51679	51680	51681	51682	51683	51686	51684	51687	51685	51688
Part no. 240	1222 x 0,5	27,0	2304,0	51690	51689	51691	51692	51693	51694	51695	51696	51697	51700	51698	51701	51699	51702

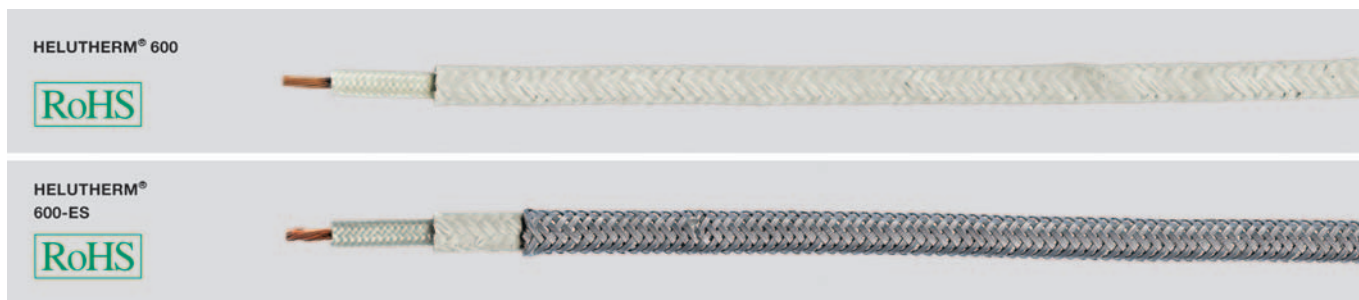
Dimensions and specifications may be changed without prior notice. (RK01)



Suitable accessories can be found in Chapter X.

- Core end sleeve - ADI
- Core end sleeve - ADU

# HELUTHERM® 600 / 600-ES halogen-free / high-grade steel braiding



## Technical data

- Special core insulation for high temperatures
- **Temperature range** -60°C to +600°C
- **Permissible temperature** +400°C to +600°C (up to +700°C for short time)
- **Nominal voltage** 500 V
- **Test voltage** 2500 V
- **Minimum bending radius** 15x outer Ø

## Cable structure

### HELUTHERM® 600

- Stranded nickel conductor
- Double-insulated glass-fibre braiding, impregnated with silicone
- Braiding of special mineral fibres and additional impregnation with silicone

### HELUTHERM® 600-ES

- As per above
- Additional braided high-grade steel, coverage approx. 80%

## Properties

- Asbestos and cadmium-free

## Note

- AWG sizes are approximate equivalent values. The actual cross-section is in mm<sup>2</sup>.

## Application

### HELUTHERM® 600

Cables are used in applications where extremely high connecting and ambient temperatures occur, e. g. in iron and steel works, rolling mills, foundries, glass and ceramic plants, in power construction as well as for wiring resistances in electrical heating equipment, furnaces and in thermoplastic forming. Good characteristics in the presence of moisture and chemical effects.

### HELUTHERM® 600-ES

The robust braiding of high-grade steel protects the cable from aggressive atmospheres and mechanical stresses. The high-grade braiding also gives this cable an attractive appearance. The braided screen can also be used for earthing purposes.

☑ The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

### HELUTHERM® 600

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Conductor construction	Outer Ø approx. mm	Conductor resistance at 20°C Ohm / km	Max. permitt. current carrying capacity at +400°C (A)	Nickel weight kg / km	Weight approx. kg / km	AWG-No.
51703	1 x 0,25	4 x 0,3	2,0	346	1,5	2,4	9,5	24
51704	1 x 0,5	7 x 0,3	2,3	175	2,5	4,8	11,5	20
51705	1 x 0,75	11 x 0,3	2,6	115	4,5	7,2	15,0	18
51706	1 x 1	14 x 0,3	2,8	88	5,5	9,6	17,8	17
51707	1 x 1,5	21 x 0,3	3,2	59	7	14,4	24,0	16
51708	1 x 2,5	35 x 0,3	3,7	35	10	24,0	36,0	14
51709	1 x 4	56 x 0,3	4,5	22	13,5	38,0	54,5	12
51710	1 x 6	84 x 0,3	6,0	14,6	16	58,0	77,0	10
51711	1 x 10	140 x 0,3	8,0	8,8	21	96,0	150,0	8
51712	1 x 16	228 x 0,3	9,1	5,5	28	154,0	225,0	6
51713	1 x 25	354 x 0,3	10,8	3,5	36	240,0	340,0	4
51714	1 x 35	495 x 0,3	13,0	2,5	58	336,0	440,0	2
51715	1 x 50	707 x 0,3	13,5	1,5	70	480,0	600,0	1

### HELUTHERM® 600-ES

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Conductor construction	Outer Ø approx. mm	Conductor resistance at 20°C Ohm / km	Max. permitt. current carrying capacity at +400°C (A)	Nickel weight kg / km	Weight approx. kg / km	AWG-No.
50475	1 x 0,5	7 x 0,3	3,2	175	2,5	4,8	21,0	20
50476	1 x 0,75	11 x 0,3	3,5	115	4,5	7,2	29,0	18
50477	1 x 1	14 x 0,3	3,7	88	5,5	9,6	38,0	17
50478	1 x 1,5	21 x 0,3	4,1	59	7	14,4	44,0	16
50479	1 x 2,5	35 x 0,3	4,6	35	10	24,0	56,0	14
50480	1 x 4	56 x 0,3	5,4	22	13,5	38,0	78,0	12
50481	1 x 6	84 x 0,3	6,9	14,6	16	58,0	112,0	10
50482	1 x 10	140 x 0,3	8,9	8,8	21	96,0	198,0	8
50483	1 x 16	228 x 0,3	10,0	5,5	28	154,0	281,0	6
50484	1 x 25	354 x 0,3	11,7	3,5	36	240,0	410,0	4
50485	1 x 35	495 x 0,3	15,1	2,5	58	336,0	536,0	2
50486	1 x 50	707 x 0,3	15,6	1,5	70	480,0	697,0	1

Dimensions and specifications may be changed without prior notice. (RK01)



Suitable accessories can be found in Chapter X.

- Core end sleeve - ADI
- Core end sleeve - ADU



# HELUTHERM® 800 / 800-ES halogen-free / high-grade steel braiding



## Technical data

- Special core insulation for high temperatures
- **Temperature range**  
-120°C to +750°C
- **Permissible temperature**  
+600°C to +800°C  
(up to +1200°C for short time)
- **Nominal voltage** 500 V
- **Test voltage** 2000 V
- **Minimum bending radius**  
15x outer Ø

## Cable structure

### HELUTHERM® 800

- Stranded nickel conductor
- Double-insulated glass-fibre braiding, impregnated with silicone
- Braiding of special mineral fibres and additional impregnation with silicone

### HELUTHERM® 800-ES

- As per above
- Additional braided high-grade steel, coverage approx. 80%

## Properties

- Asbestos and cadmium-free

## Note

- AWG sizes are approximate equivalent values. The actual cross-section is in mm<sup>2</sup>.

## Application

### HELUTHERM® 800

Cables are used in applications where extremely high connecting and ambient temperatures occur, e. g. in iron and steel works, rolling mills, foundries, glass and ceramic plants, in power construction as well as for wiring resistances in electrical heating equipment, furnaces and in thermoplastic forming. Good characteristics in the presence of moisture and chemical effects.

### HELUTHERM® 800-ES

The robust braiding of high-grade steel protects the cable from aggressive atmospheres and mechanical stresses. The high-grade braiding also gives this cable an attractive appearance. The braided screen can also be used for earthing purposes.

☑= The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

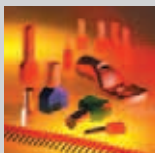
### HELUTHERM® 800

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Conductor construction	Outer Ø approx. mm	Conductor resistance at 20°C Ohm / km	Max. perm. current carrying capacity at +700°C (A)	Nickel weight kg / km	Weight approx. kg / km	AWG-No.
51716	1 x 0,25	4 x 0,3	2,2	346	1	2,4	10,2	24
51717	1 x 0,5	7 x 0,3	2,3	175	2	4,8	12,0	20
51718	1 x 0,75	11 x 0,3	2,9	115	3	7,2	16,0	18
51719	1 x 1	14 x 0,3	3,2	88	4	9,6	19,0	17
51720	1 x 1,5	21 x 0,3	3,2	59	5	14,4	26,5	16
51721	1 x 2,5	35 x 0,3	3,7	35	7	24,0	38,8	14
51722	1 x 4	56 x 0,3	4,5	22	9	38,0	57,0	12
51723	1 x 6	84 x 0,3	5,9	14,6	12	58,0	81,0	10
51724	1 x 10	140 x 0,3	8,0	8,8	14	96,0	156,0	8
51725	1 x 16	228 x 0,3	9,0	5,5	20	154,0	240,0	6
51726	1 x 25	354 x 0,3	10,6	3,5	24	240,0	370,0	4
51727	1 x 35	495 x 0,3	13,4	2,5	40	336,0	490,0	2
51728	1 x 50	707 x 0,3	14,0	1,5	48	480,0	645,0	1

### HELUTHERM® 800-ES

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Conductor construction	Outer Ø approx. mm	Conductor resistance at 20°C Ohm / km	Max. perm. current carrying capacity at +700°C (A)	Nickel weight kg / km	Weight approx. kg / km	AWG-No.
50488	1 x 0,5	7 x 0,3	3,5	175	2	4,8	23,0	20
50489	1 x 0,75	11 x 0,3	3,8	115	3	7,2	31,0	18
50490	1 x 1	14 x 0,3	4,1	88	4	9,6	40,0	17
50491	1 x 1,5	21 x 0,3	4,5	59	5	14,4	47,0	16
50492	1 x 2,5	35 x 0,3	4,9	35	7	24,0	59,0	14
50493	1 x 4	56 x 0,3	5,8	22	9	38,0	82,0	12
50494	1 x 6	84 x 0,3	7,3	14,6	12	58,0	118,0	10
50495	1 x 10	140 x 0,3	9,4	8,8	14	96,0	209,0	8
50496	1 x 16	228 x 0,3	10,5	5,5	20	154,0	298,0	6
50497	1 x 25	354 x 0,3	12,2	3,5	24	240,0	452,0	4
50498	1 x 35	495 x 0,3	15,5	2,5	40	336,0	592,0	2
50499	1 x 50	707 x 0,3	16,1	1,5	48	480,0	650,0	1

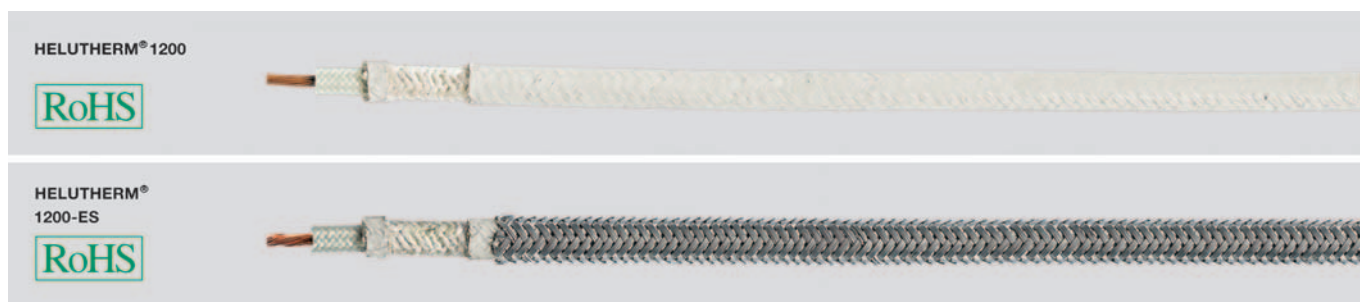
Dimensions and specifications may be changed without prior notice. (RK01)



Suitable accessories can be found in Chapter X.

- Core end sleeve - ADI
- Core end sleeve - ADU

# HELUTHERM® 1200 / 1200-ES halogen-free / high-grade steel braiding



## Technical data

- Special core insulation for high temperatures
- **Temperature range** -170°C to +1000°C
- **Permissible temperature** +800°C to +1100°C (up to +1400°C for short time)
- **Nominal voltage** 500 V
- **Test voltage** 2000 V
- **Minimum bending radius** 15x outer Ø

## Cable structure

### HELUTHERM® 1200

- Stranded nickel conductor
- Double-insulated glass-fibre braiding, impregnated with silicone
- Braiding of special mineral fibres and additional impregnation with silicone

### HELUTHERM® 1200-ES

- As per above
- Additional braided high-grade steel, coverage approx. 80%

## Properties

- Asbestos and cadmium-free

## Note

- AWG sizes are approximate equivalent values. The actual cross-section is in mm<sup>2</sup>.

## Application

### HELUTHERM® 1200

Cables are used in applications, where extremely high connecting and ambient temperatures occur, e. g. in iron and steel works, rolling mills, foundries, glass and ceramic plants, in furnace and power plant construction as well for wiring resistances in electrical heating equipment, furnaces and in thermoplastic forming. Good characteristics in the presence of moisture and chemical effects.

### HELUTHERM® 1200-ES

The robust braiding of high-grade steel protects the cable from aggressive atmospheres and mechanical stresses. The high-grade braiding also gives this cable an attractive appearance. The braided screen can also be used for earthing purposes.

☑ The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

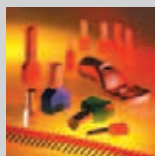
### HELUTHERM® 1200

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Conductor construction	Outer Ø approx. mm	Conductor resistance at 20°C Ohm / km	Max. permitt. current carrying capacity at +700°C (A)	Nickel weight kg / km	Weight approx. kg / km	AWG-No.
51729	1 x 0,5	7 x 0,3	2,3	175	2	4,8	12,3	20
51730	1 x 0,75	11 x 0,3	2,6	115	3	7,2	16,1	18
51731	1 x 1	14 x 0,3	2,8	88	4	9,6	19,8	17
51732	1 x 1,5	21 x 0,3	3,2	59	5	14,4	27,5	16
51733	1 x 2,5	35 x 0,3	3,7	35	7	24,0	39,8	14
51734	1 x 4	56 x 0,3	4,5	22	9	38,0	58,0	12
51735	1 x 6	84 x 0,3	5,9	14,6	12	58,0	83,0	10
51736	1 x 10	140 x 0,3	8,0	8,8	14	96,0	160,0	8
51737	1 x 16	228 x 0,3	9,0	5,5	20	154,0	244,0	6
51738	1 x 25	354 x 0,3	10,6	3,5	24	240,0	376,0	4
51739	1 x 35	495 x 0,3	13,6	2,5	40	336,0	495,0	2
51740	1 x 50	707 x 0,3	14,5	1,5	48	480,0	654,0	1

### HELUTHERM® 1200-ES

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Conductor construction	Outer Ø approx. mm	Conductor resistance at 20°C Ohm / km	Max. permitt. current carrying capacity at +700°C (A)	Nickel weight kg / km	Weight approx. kg / km	AWG-No.
50635	1 x 0,5	7 x 0,3	3,6	175	2	4,8	26,0	20
50636	1 x 0,75	11 x 0,3	3,8	115	3	7,2	34,0	18
50637	1 x 1	14 x 0,3	4,2	88	4	9,6	42,0	17
50638	1 x 1,5	21 x 0,3	4,7	59	5	14,4	53,0	16
50639	1 x 2,5	35 x 0,3	5,0	35	7	24,0	64,0	14
50640	1 x 4	56 x 0,3	6,0	22	9	38,0	87,0	12
50641	1 x 6	84 x 0,3	7,5	14,6	12	58,0	120,0	10
50642	1 x 10	140 x 0,3	9,7	8,8	14	96,0	218,0	8
50643	1 x 16	228 x 0,3	10,9	5,5	20	154,0	314,0	6
50644	1 x 25	354 x 0,3	12,9	3,5	24	240,0	453,0	4
50645	1 x 35	495 x 0,3	15,7	2,5	40	336,0	593,0	2
50646	1 x 50	707 x 0,3	16,7	1,5	48	480,0	760,0	1

Dimensions and specifications may be changed without prior notice. (RK01)



Suitable accessories can be found in Chapter X.

- Core end sleeve - ADI
- Core end sleeve - ADU

# Earth Conductors ESUY and ESY



## Technical data

### ESUY (H00 V-D)

- Earthing cable of braided wires over core strands in adapted to DIN VDE 0283 part 3 and EN 61138

### ESY

- Earthing cable in adapted to DIN VDE 0283 part 3 and EN 61138

### ESUY (H00 V-D) and ESY

- **Conductor resistance** at 20°C according DIN VDE 0283 part 3
- **Temperature range** -5°C to +70°C
- **Test voltage** 2000 V
- **Spark test** (during winding)
  - 16 mm<sup>2</sup> to 35 mm<sup>2</sup> = 5000 V
  - 50 mm<sup>2</sup> to 70 mm<sup>2</sup> = 6000 V
  - 95 mm<sup>2</sup> to 240 mm<sup>2</sup> = 8000 V
- **Insulation resistance** min. 20 MOhm x km
- **Minimal bending radius** 12x outer Ø

## Cable structure

### ESUY (H00V-D)

- Bare copper-conductor, extra fine-wire, high flexible
- Braiding of bare copper wires over the stranded copper conductor
- Outer sheath of PVC compound type TM2 according DIN VDE 0207-363-4-1/DIN EN 50363-4-1
- Sheath colour transparent (glass clear)

### ESY

- Bare Cu-conductor, fine-wire
- Copper conductors of stranded wires
- Outer sheath of PVC compound type TM2 according DIN VDE 0207-363-4-1/DIN EN 50363-4-1
- Sheath colour transparent (glass clear)

## Properties

- For these cable types no nominal voltages are mentioned, as these are: only used for earthing performances
- For further requirements see European Norm EN 61 230 and DIN VDE 0683 part 100: "Live working - Portable equipment for earthing and earthing"

## Note

- AWG sizes are approximate equivalent values. The actual cross-section is in mm<sup>2</sup>.

## Application

### ESUY (H00V-D)

These high flexible earth conductors are used for earthing of portable equipment and short-circuiting. These cables specially perform a protective function in repair live working of high voltage power supply company as EVU, in railway systems, failing current equipment, alternating current systems and in networks of transmission and distribution. Because of that these are designated as safety cables.

### ESY

These earthing cables offer special characteristics with low weights, high flexibility to a wide temperature range and the behavior in high temperature. The protective sheath over conductor assures the essential function for protection against the mechanical and chemical stresses.

### ESUY (H00V-D), high flexible

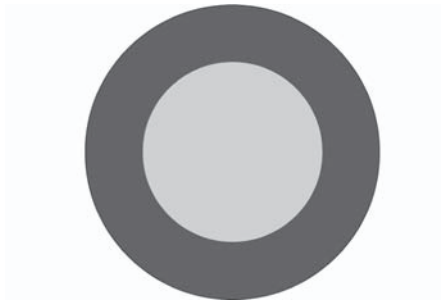
Part no.	Cross-section mm <sup>2</sup>	Cond. make-up n x wire Ø	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
28930	16	4200 x 0,07	8,3	194,0	230,0	6
28931	25	3192 x 0,1	9,5	280,0	335,0	4
28932	35	4480 x 0,1	11,2	415,0	475,0	2
28933	50	6383 x 0,1	13,2	585,0	670,0	1
28934	70	8918 x 0,1	15,6	820,0	905,0	2/0
28935	95	12100 x 0,1	17,4	1090,0	1220,0	3/0
28936	120	15300 x 0,1	19,8	1360,0	1505,0	4/0
28937	150	19152 x 0,1	23,4	1650,0	1940,0	300 kcmil
28938	185	23580 x 0,1	26,6	2150,0	2390,0	350 kcmil
28939	240	30600 x 0,1	30,2	2750,0	3090,0	500 kcmil

### ESY, flexible

Part no.	Cross-section mm <sup>2</sup>	Cond. make-up n x wire Ø	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
28940	16	525 x 0,2	8,4	155,0	185,0	6
28941	25	798 x 0,2	9,8	240,0	270,0	4
28942	35	1120 x 0,2	11,4	336,0	390,0	2
28943	50	1617 x 0,2	13,8	480,0	575,0	1
28944	70	2254 x 0,2	16,4	672,0	810,0	2/0
28945	95	3087 x 0,2	18,2	912,0	1080,0	3/0
28946	120	3822 x 0,2	20,1	1152,0	1320,0	4/0
28947	150	4802 x 0,2	23,0	1440,0	1680,0	300 kcmil

Dimensions and specifications may be changed without prior notice. (RK01)

# GALVANICABLE® high-current cable, high flexible and halogen-free



## Technical data

- **Temperature range**  
flexing -40°C to +80°C  
fixed installation -50°C to +80°C
- **Nominal voltage**  
 $U_0/U$  0,6/1 kV
- **Test voltage**  
3500 V
- **Insulation resistance**  
min. 20 MOhm/km
- **Minimum bending radius**  
15x cable Ø

## Cable structure

- Bare copper, ultra-fine wire conductors acc. to DIN VDE 0295 cl.6 and IEC 60228 cl.6
- Extremely thick PUR wearing sheath
- Natural colour, smooth, glossy

## Properties

- PUR wearing sheath: extremely abrasion resistant, halogen-free, resistant to UV, oil, hydrolysis and microbial attack
- Chemical resistance:  
PUR demonstrates significantly better chemical resistance when compared with other materials, e.g. rubber or PVC
- The extremely thick polyurethane sheath stands for a longer life

## Application

This cable is employed as a highly-flexible high-current cathode cable for electroplating drum systems and as a wearing cable in the chemical industry. Special feature: Despite the extremely thick wearing sheath, the highly flexible conductor enables good contact when installing the pear push. Good flexibility is likewise ensured when the pear push comes into contact with the parts to be electroplated.

☑= The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
700768	1 x 35	17,2	336,0	548,0	2
75497	1 x 50	19,0	480,0	686,0	1
75498	1 x 70	21,5	672,0	950,0	2/0
75499	1 x 95	24,0	912,0	1386,0	3/0

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
74749	1 x 120	27,0	1152,0	1520,0	4/0
700769	1 x 150	28,0	1440,0	2002,0	300 kcmil
700770	1 x 185	30,5	1776,0	2610,0	350 kcmil
700771	1 x 240	36,0	2304,0	3820,0	500 kcmil

Dimensions and specifications may be changed without prior notice.



Suitable accessories can be found in Chapter X.

- Core end sleeve - ADI
- Core end sleeve - ADU

K

**H01N2-D / H01N2-E** 100 V, VDE approved, welding cable**Technical data**

- Harmonized welding cable with rubber sheath, according to DIN VDE 0285-525-2-81 / DIN EN 50525-2-81
- **Temperature range** flexing -25°C to +80°C fixed installation -40°C to +80°C
- **Admissible working temperature** at conductor +85°C
- **Nominal voltage** U<sub>0</sub>/U 100/100 V
- **Test voltage** 1000 V
- **Minimum bending radius**  
H01N2-D 12x outer Ø  
H01N2-E 10x outer Ø

**Cable structure**

- Bare Cu- conductor, extra fine-wire to DIN VDE 0295, BS 6360, IEC 60228
- Separator over conductor
- Neoprene outer sheath, chlorinated rubber compound EM5
- Sheath colour black
- Without green-yellow marking

**Properties**

- Test according to DIN VDE 0482-332-1-2, DIN EN 60332-1-2/ IEC 60332-1 (equivalent DIN VDE 0472 part 804 test method B)
- Oil resistant to DIN VDE 0473-811-404/ DIN EN 60811-404
- The cable also maintains its high flexibility under the effect of ozone, light, oxygen, inert gas, oil or petrol

**Note**

- No. wires = Gauiding value; the number of individual wires are without obligation.
- Tinned conductor on request
- AWG sizes are approximate equivalent values. The actual cross-section is in mm<sup>2</sup>.

**Application**

For use between the welding generator and the hand-electrode and the workpiece. For use in the automobile industry, in shipbuilding, in transport and conveyor systems, tool making machinery, welding robots etc. These cables retain their high flexibility even under influence of ozone, light, oxygen, protective gases, oil and petrol. The robust construction makes these cables resistant to both to cold and the heat as well as to flames. They are suitable for use in open spaces and in dry and damp conditions.

☑= The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

**H01N2-D: Cables with standard flexibility**

Part no.	No. cores x cross-sec. mm <sup>2</sup>	No. wires x single wire Ø mm	Sheath Nominal value mm	Outer Ø min. - max. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
31001	1 x 10	320 x 0,2	2,0	7,7 - 9,7	96,0	135,0	8
31002	1 x 16	512 x 0,2	2,0	8,8 - 11,0	154,0	205,0	6
31003	1 x 25	800 x 0,2	2,0	10,1 - 12,7	240,0	302,0	4
31004	1 x 35	1120 x 0,2	2,0	11,4 - 14,2	336,0	420,0	2
31005	1 x 50	1600 x 0,2	2,2	13,2 - 16,5	480,0	586,0	1
31006	1 x 70	2240 x 0,2	2,4	15,3 - 19,2	672,0	798,0	2/0
31007	1 x 95	3024 x 0,2	2,6	17,1 - 21,4	912,0	1015,0	3/0
31008	1 x 120	614 x 0,5	2,8	19,2 - 24,0	1152,0	1310,0	4/0
31030	1 x 150	765 x 0,5	3,0	21,2 - 26,4	1440,0	1620,0	300 kcmil
31031	1 x 185	944 x 0,5	3,2	23,1 - 28,9	1776,0	1916,0	350 kcmil
31009	1 x 240	1225 x 0,5	3,4	25,0 - 29,5	2304,0	2540,0	500 kcmil

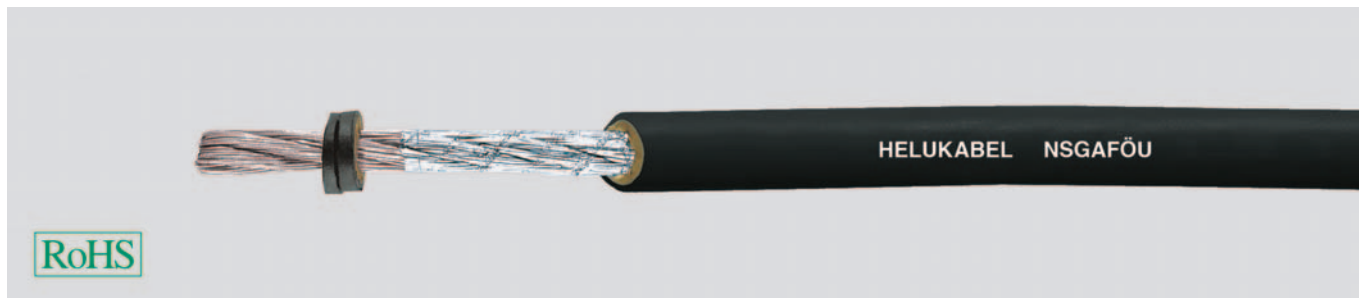
**H01N2-E: Cables with extreme high flexibility**

Part no.	No. cores x cross-sec. mm <sup>2</sup>	No. wires x single wire Ø mm	Sheath Nominal value mm	Outer Ø min. - max. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
31032	1 x 10	566 x 0,15	1,2	6,2 - 7,8	96,0	119,0	8
31033	1 x 16	903 x 0,15	1,2	7,3 - 9,1	154,0	181,0	6
31034	1 x 25	1407 x 0,15	1,2	8,6 - 10,8	240,0	270,0	4
31035	1 x 35	1974 x 0,15	1,2	9,8 - 12,3	336,0	363,0	2
31036	1 x 50	2830 x 0,15	1,5	11,9 - 14,8	480,0	528,0	1
31037	1 x 70	3952 x 0,15	1,5	13,6 - 17,0	672,0	716,0	2/0
31038	1 x 95	5370 x 0,15	1,8	15,6 - 19,5	912,0	1012,0	3/0
31039	1 x 120	3819 x 0,2	1,8	17,2 - 21,6	1152,0	1190,0	4/0
31019	1 x 150	4788 x 0,2	1,8	18,8 - 23,5	1440,0	1305,0	300 kcmil
31020	1 x 185	5852 x 0,2	1,8	20,4 - 25,5	1776,0	1511,0	350 kcmil

Dimensions and specifications may be changed without prior notice. (RK01)



# NSGAFÖU 3kV Special Rubber-Insulated Cable, VDE approved, short-circuit up to 1000 V



## Technical data

- Special rubber-insulated single core cables to DIN VDE 0250 part 602
- **Temperature range**  
flexing -25°C to +80°C  
fixed installation -40°C to +80°C
- Permissible **operating temperature** at conductor +90°C
- **Nominal voltage**  $U_0/U$  1,8/3 kV
- Max. permissible **operating voltage** in three and one-phase alternating current operation  $U_0/U$  2,1/3,6 kV, for direct current operation  $U_0/U$  2,7/5,4 kV
- **Test voltage** 6 kV
- **Minimum bending radius**  
flexing 10x outer  $\emptyset$   
fixed installation 6x outer  $\emptyset$

## Cable structure

- Tinned copper, fine wire conductors, bunch stranded to DIN VDE 0295 cl.5 and IEC 60228 cl.5
- EPR-insulation, compound type 3GI3 to DIN VDE 0207 part 20
- Outer casing: Polychloroprene 5GM3 acc. to DIN VDE 0207 part 21
- Colour black

## Properties

- Oil resistant  
Test to DIN VDE 0473-811-404/  
DIN EN 60811-404
- Behaviour in fire  
to DIN VDE 0482-332-1-2  
DIN EN 60332-2-1, IEC 60332-1 (equivalent DIN VDE 0472 part 804 test method B)
- Considered as being short-circuit safe and inherently earth-fault-proof are those operating materials and conducting assemblies where because of suitable measures and/or means applied, neither a short circuit nor a short to ground is to be expected under operating conditions which are in accordance with those specified for the intended application.

## Note

- Version in 6 kV available on request.
- AWG sizes are approximate equivalent values. The actual cross-section is in mm<sup>2</sup>.

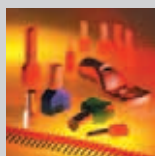
## Application

Particularly suitable for protection against short circuits in laying and for inherently earth-fault-proof routing in rail vehicles and omnibuses. Also suitable for laying in dry environments.

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer $\emptyset$ approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
38501	1 x 1,5	7,0	14,4	62,0	16
38502	1 x 2,5	7,5	24,0	76,0	14
38503	1 x 4	9,0	38,0	95,0	12
38504	1 x 6	9,5	58,0	140,0	10
38505	1 x 10	11,0	96,0	190,0	8
38506	1 x 16	13,0	154,0	270,0	6
38507	1 x 25	15,0	240,0	410,0	4
38508	1 x 35	16,5	336,0	490,0	2

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer $\emptyset$ approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
38509	1 x 50	18,0	480,0	650,0	1
38510	1 x 70	20,5	672,0	900,0	2/0
38511	1 x 95	24,0	912,0	1200,0	3/0
38513	1 x 120	26,0	1152,0	1450,0	4/0
38514	1 x 150	28,0	1440,0	1800,0	300 kcmil
38512	1 x 185	31,0	1776,0	2200,0	350 kcmil
38515	1 x 240	34,5	2304,0	2650,0	500 kcmil
38516	1 x 300	38,0	2880,0	3250,0	600 kcmil

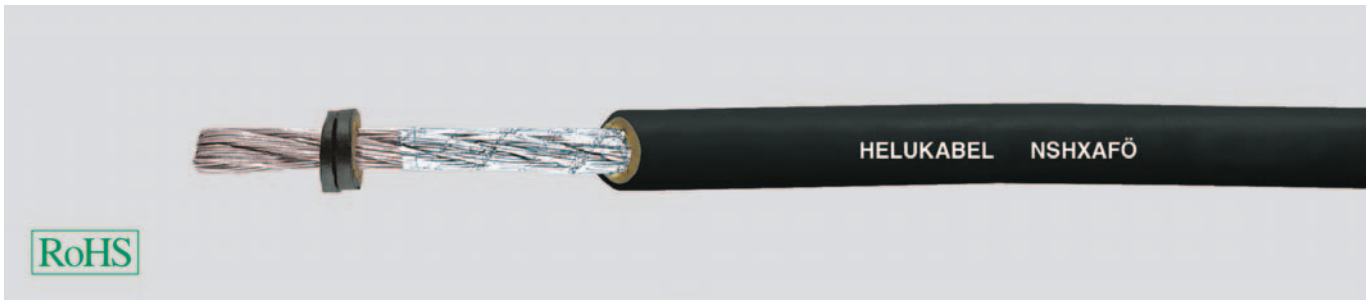
Dimensions and specifications may be changed without prior notice. (RK01)



Suitable accessories can be found in Chapter X.

- Core end sleeve - ADI
- Core end sleeve - ADU

# NSHXAFÖ 3kV halogen-free Special Rubber-Insulated Cable, VDE approved, short-circuit up to 1000 V



## Technical data

- Special rubber core cable acc. to E DIN VDE 0250 part 606
- **Temperature range**  
flexing -25°C to +70°C  
fixed installation -40°C to +90°C
- Permissible **operating temperature** at conductor +90°C
- **Nominal voltage**  $U_0/U$  1,8/3 kV
- Highest permissible **operating voltage** in three-phase and one-phase a.c. systems  $U_0/U$  2,1/3,6 kV in d.c. systems  $U_0/U$  2,7/5,4 kV
- **Test voltage** 6 kV
- **Minimum bending radius**  
flexing 10x outer  $\varnothing$   
fixed 6x outer  $\varnothing$

## Cable structure

- Tinned copper conductor, fine wire to DIN VDE 0295 cl.5, BS 6360 cl.5 and/or IEC 60228 cl.5
- EPR-insulation, 3GI3 acc. to DIN VDE 0207 part 20
- Outer casing: halogen-free polymer compound HM3 acc. to DIN VDE 0207 part 24
- Colour black

## Properties

### Tests

- Corrosiveness of corrosive gases acc. to DIN VDE 0482 part 267, DIN EN 50267-2-2, IEC 607542 (equivalent DIN VDE 0472 part 813)
- Smoke density acc. to DIN VDE 0482 part 1034-1+2, DIN EN 61034-1+2, IEC 61034-1+2, BS 7622 part 1+2 (equivalent DIN VDE 0472 part 816)
- Oil resistant acc. to DIN VDE 0473-811-404, DIN EN 60811-404
- Behaviour in fire to DIN VDE 0482-332-1-2 DIN EN 60332-2-1, IEC 60332-1 (equivalent DIN VDE 0472 part 804 test method B)

### Note

- AWG sizes are approximate equivalent values. The actual cross-section is in mm<sup>2</sup>.

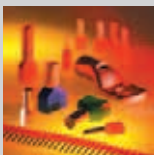
## Application

Particularly suitable for protection against short circuits in laying and for inherently earth-fault-proof routing in rail vehicles and omnibuses. Also suitable for laying in dry environments. In switching units and distributors, they are considered to be short circuit and inherently earth proof to 1000 V. Note: Considered as being short-circuit safe and inherently earth-fault-proof are those operating materials and conducting assemblies where because of suitable measures and/or means applied, neither a short circuit nor a short to ground is to be expected under operating conditions which are in accordance with those specified for the intended application.

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer $\varnothing$ approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
38517	1 x 1,5	5,9	14,4	62,0	16
38518	1 x 2,5	6,2	24,0	76,0	14
38519	1 x 4	6,8	38,0	95,0	12
38520	1 x 6	7,4	58,0	140,0	10
38521	1 x 10	8,7	96,0	190,0	8
38522	1 x 16	9,5	154,0	270,0	6
38523	1 x 25	11,9	240,0	410,0	4
38524	1 x 35	13,1	336,0	490,0	2

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer $\varnothing$ approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
38525	1 x 50	14,5	480,0	650,0	1
38526	1 x 70	16,3	672,0	900,0	4
38527	1 x 95	19,2	912,0	1200,0	3/0
38528	1 x 120	21,0	1152,0	1450,0	4/0
38529	1 x 150	22,8	1440,0	1800,0	300 kcmil
38530	1 x 185	24,8	1776,0	2200,0	350 kcmil
38531	1 x 240	27,1	2304,0	2650,0	500 kcmil
38532	1 x 300	30,3	2880,0	3250,0	600 kcmil

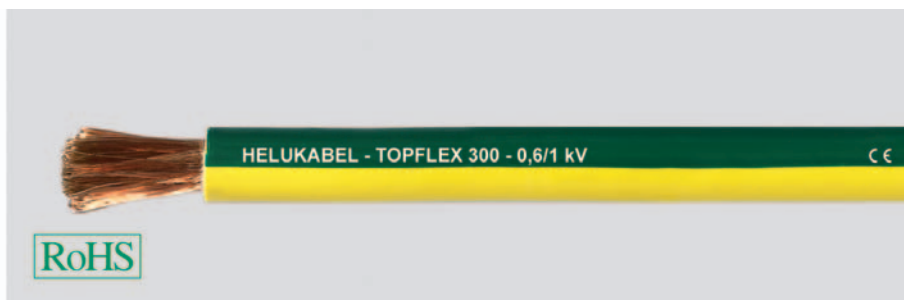
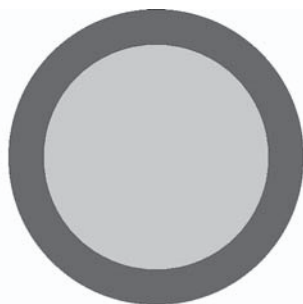
Dimensions and specifications may be changed without prior notice. (RK01)



Suitable accessories can be found in Chapter X.

- Core end sleeve - ADI
- Core end sleeve - ADU

# TOPFLEX® 300 high flexible PVC single core, 0,6/1kV for drag chain and free move application



## Technical data

- Special PVC single-core cable with oil-resistant insulation based on DIN VDE 0285-525-2-31/DIN EN 50525-2-31
- **Temperature range**  
flexing -5°C to +80°C  
fixed installation -40°C to +80°C
- **Nominal voltage**  
U<sub>0</sub>/U 600/1000 V
- **A.C. test voltage**, 50 Hz  
3000 V
- **Insulation resistance**  
min. 20 MOhm/km
- **Minimum bending radius**  
for flexible installation  
7,5 cable Ø

## Cable structure

- Bare copper, extra fine wire conductor to DIN VDE 0295 cl.6 and IEC 60228 cl.6
- Oil-resistant special PVC insulation
- Colour see table, or as desired
- If this cable is to be double-insulated, then its external diameter and weight must be adapted.
- Caution with existing cables.

## Properties

- PVC self-extinguishing and flame retardant acc. to DIN VDE 0482-332-1-2, DIN EN 60332-1-2, IEC 60332-1 (equivalent DIN VDE 0472 part 804 test method B)
- Chemical resistance see table Technical Information

## Application

Thanks to their outstanding alternating bending stress characteristics, these cables are ideally suited for use in drag chains, and also for use in handling devices, robots, and nearly any area requiring flexible used and free motion. Due to its resistance to mineral oils these cables are well suited for use in mechanical engineering, tool making, and systems engineering, and in steel mills and rolling mills in particularly critical areas. Suitable for installation in dry, damp and wet environments. With the black sheath, can also be used outdoors.

CE= The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

### TOPFLEX® 300 black

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
79623	1 x 2,5	4,2	24,0	42,0	14
79624	1 x 4	5,1	38,4	58,0	12
79625	1 x 6	6,0	57,6	85,0	10
79626	1 x 10	7,4	96,0	130,0	8
75431	1 x 16	8,8	154,0	210,0	6
75432	1 x 25	10,7	240,0	300,0	4
75433	1 x 35	12,1	336,0	420,0	2
70519	1 x 50	14,0	480,0	580,0	1
75434	1 x 70	16,3	672,0	780,0	2/0
73714	1 x 95	18,3	912,0	1010,0	3/0
75435	1 x 120	20,0	1152,0	1200,0	4/0
75436	1 x 150	23,0	1440,0	1600,0	300 kcmil
72872	1 x 185	24,8	1776,0	2030,0	350 kcmil
75437	1 x 240	28,7	2304,0	2600,0	500 kcmil

### TOPFLEX® 300 green-yellow

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
79627	1 G 2,5	4,2	24,0	42,0	14
79628	1 G 4	5,1	38,4	58,0	12
79629	1 G 6	6,0	57,6	85,0	10
79630	1 G 10	7,4	96,0	130,0	8
75438	1 G 16	8,8	154,0	210,0	6
75439	1 G 25	10,7	240,0	300,0	4
75440	1 G 35	12,1	336,0	420,0	2
70536	1 G 50	14,0	480,0	580,0	1
75441	1 G 70	16,3	672,0	780,0	2/0
75442	1 G 95	18,3	912,0	1010,0	3/0
73885	1 G 120	20,0	1152,0	1200,0	4/0
75443	1 G 150	23,0	1440,0	1600,0	300 kcmil
75444	1 G 185	24,8	1776,0	2030,0	350 kcmil
75445	1 G 240	28,7	2304,0	2600,0	500 kcmil

### TOPFLEX® 300 red

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
79631	1 x 2,5	4,2	24,0	42,0	14
79632	1 x 4	5,1	38,4	58,0	12
79633	1 x 6	6,0	57,6	85,0	10
79634	1 x 10	7,4	96,0	130,0	8
78106	1 x 16	8,8	154,0	210,0	6
78107	1 x 25	10,7	240,0	300,0	4
78108	1 x 35	12,1	336,0	420,0	2
70518	1 x 50	14,0	480,0	580,0	1
78109	1 x 70	16,3	672,0	780,0	2/0
78110	1 x 95	18,3	912,0	1010,0	3/0
78111	1 x 120	20,0	1152,0	1200,0	4/0

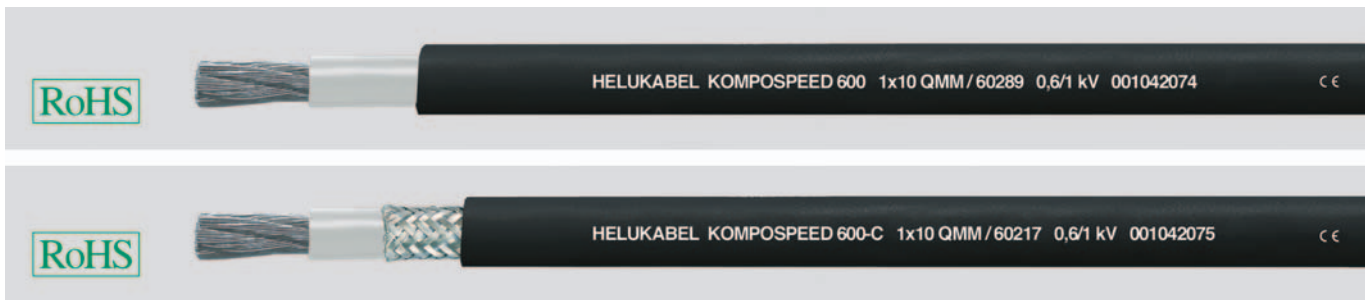
### TOPFLEX® 300 blue

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
79635	1 x 2,5	4,2	24,0	42,0	14
79636	1 x 4	5,1	38,4	58,0	12
79637	1 x 6	6,0	57,6	85,0	10
79638	1 x 10	7,4	96,0	130,0	8
78112	1 x 16	8,8	154,0	210,0	6
78113	1 x 25	10,7	240,0	300,0	4
78114	1 x 35	12,1	336,0	420,0	2
78115	1 x 50	14,0	480,0	580,0	1
78116	1 x 70	16,3	672,0	780,0	2/0
78117	1 x 95	18,3	912,0	1010,0	3/0
73884	1 x 120	20,0	1152,0	1200,0	4/0

Dimensions and specifications may be changed without prior notice.

# KOMPOSPEED® 600 / 600-C 0,6/1kV, halogen-free, special

## single cores for drag chains, EMC-preferred type



### Technical data

- Special drag chain single cores for high mechanical stress, adapted to DIN VDE 0285-525-2-31 / DIN EN 50525-2-31
- **Temperature range**  
flexing -30°C to +90°C  
fixed installation -40°C to +100°C
- Permissible **operating temperature** at conductor +90°C
- **Nominal voltage** U<sub>0</sub>/U 600/1000 V
- **Test voltage** 3000 V
- **Insulation resistance**  
min. 20 MOhm x km
- **Minimum bending radius**  
**KOMPOSPEED® 600**  
flexing installation 5x outer Ø  
fixed installation 3x outer Ø  
**KOMPOSPEED® 600-C**  
flexing installation 7,5x outer Ø  
fixed installation 4x outer Ø

### Cable structure

#### KOMPOSPEED® 600

- Tinned copper, extra fine wire conductors, bunch stranded to DIN VDE 0295 cl.6, col. 4, BS 6360 cl.6 and IEC 60228 cl.6
- Core insulation of special thermoplastic polymer, natural coloured
- Outer sheath of special polyolefin black (RAL 9005)

#### KOMPOSPEED® 600-C

- Structure as above up to core insulation
- Screen of tinned cu-braid, coverage approx. 85%
- Outer sheath of special polyolefin black (RAL 9005)

### Properties

- Very good oil resistant
- Halogen free
- Abrasion resistant
- **Resistant to**  
Coolants  
Microbes  
UV-radiation  
Weather  
Hydrofluoric acid  
Hydrochloric acid  
Diluted sulfuric acid
- The materials used in manufacture are cadmium-free and contain no silicone and free from substances harmful to the wetting properties of lacquers

### Note

- AWG sizes are approximate equivalent values. The actual cross-section is in mm<sup>2</sup>.

### Application

The special single cores are used for permanent flexible applications in machineries, machine tools, composting appliances and sewage-treatment plants, animal stalls and greenhouses and used for permanent flexible application for movable automated machinery parts and multi-shift operation as well as in open air. These cables are installed for flexible use with free movements without tensile stress or forced movements and suitable for application in drag chains. The selected tinned copper wire conductor and tinned copper wire braid permit the installation in aggressive environments as well as hydrogen sulfide, ammonia and sulfur dioxide.

For applications which go beyond standard solutions (for example for composting appliances or high shelf conveyors with extremely high processing speeds etc.) we recommend for our especially developed enquiry sheet for energy guiding systems. Before installation in cable trays please read the instructions. Further technical details see selection table for drag chain cables, see lead text.

#### KOMPOSPEED® 600-C

These screened cables are particularly suitable for the interference-free transmission in instrumentation and control engineering applications (electromagnetic compatibility).

**EMC** = Electromagnetic compatibility

To optimize the EMC features we recommend a large round contact of the copper braiding on both ends.

CE = The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

#### KOMPOSPEED® 600

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
60288	1 x 6	6,5	58,0	83,0	10
60289	1 x 10	8,4	96,0	132,0	8
60290	1 x 16	9,5	154,0	188,0	6
60291	1 x 25	11,2	240,0	281,0	4
60292	1 x 35	13,0	336,0	404,0	2
60293	1 x 50	15,4	480,0	531,0	1
60294	1 x 70	17,2	672,0	729,0	2/0
60295	1 x 95	20,0	912,0	1049,0	3/0
60296	1 x 120	21,0	1152,0	1220,0	4/0
60297	1 x 150	23,8	1440,0	1510,0	300 kcmil
60298	1 x 185	26,2	1776,0	1932,0	350 kcmil

#### KOMPOSPEED® 600-C

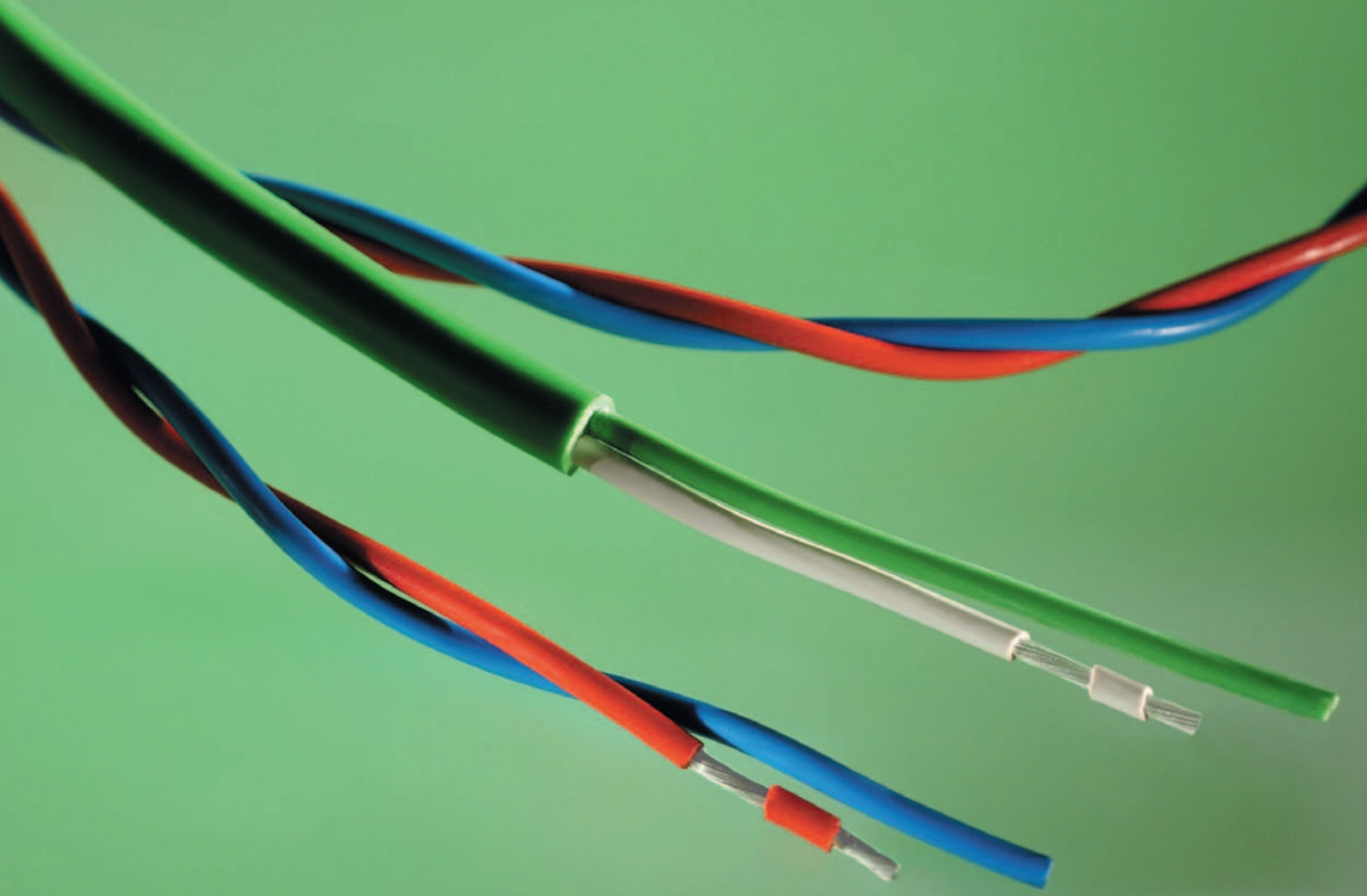
Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
60216	1 x 6	7,3	71,0	101,0	10
60217	1 x 10	9,1	122,0	168,0	8
60218	1 x 16	10,1	180,0	217,0	6
60219	1 x 25	12,2	282,0	342,0	4
60220	1 x 35	14,2	386,0	468,0	2
60221	1 x 50	17,0	535,0	584,0	1
60222	1 x 70	19,2	750,0	822,0	2/0
60223	1 x 95	21,8	1004,0	1190,0	3/0
60224	1 x 120	23,8	1260,0	1400,0	4/0
60225	1 x 150	26,0	1570,0	1710,0	300 kcmil
60226	1 x 185	28,8	1911,0	2021,0	350 kcmil
62500	1 x 240	34,0	2470,0	2850,0	500 kcmil

Dimensions and specifications may be changed without prior notice. (RK01)

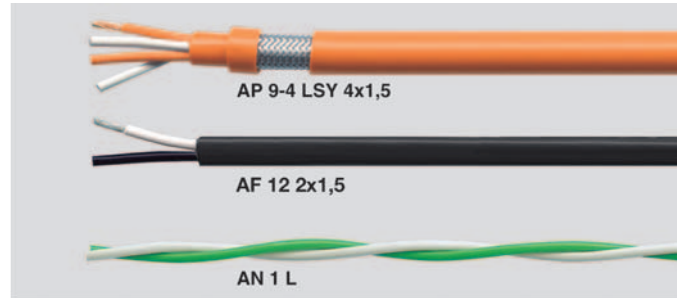
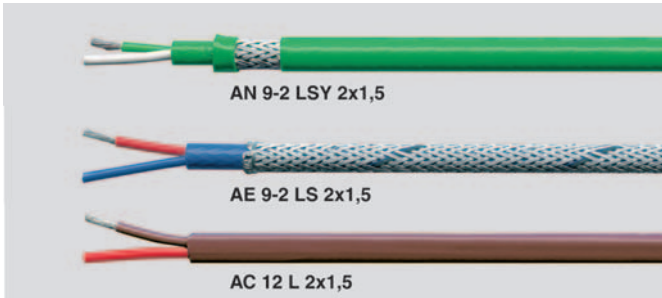








# COMPENSATING CABLES



## Technical data

- Special insulation of PVC, silicone, fluoropolymers, or glass fiber depending on the requirement

- **Conductor resistance** in accordance with DIN 43713

Fe:	0.080 ohm/m
CuNi:	0.327 ohm/m
NiCr:	0.07 ohm/m
Ni:	0.3 ohm/m
PtRh:	0.023 ohm/m
Pt:	0.041 ohm/m

- **Test voltages** for PVC, fluoropolymers and silicone-cables

core/core	500 V
core/screen	500 V
screen/screen	500 V

- **Test voltage** for glass-fiber lines

core/core	500 V
-----------	-------

- **Insulation resistance**

for PVC, silicone and fluoropolymers

min. 10 MOhm x km

- **Operating capacity**

(approx. value) – nF/km

	Stranded 1.5 mm <sup>2</sup>	Solid 1.5 mm <sup>2</sup>	Stranded 0.22 mm <sup>2</sup>
•PVC			
core	135	138	115
pair			
screened	240	245	180
•FEP			
core	60	60	45
pair			
screened	120	120	70
•Silicone			
core	80	70	45

- **Inductivity** (guide value)

for PVC, fluoropolymers and silicone versions < 1 mH/km

- **Corrosiveness of fire gases (halogen-free)**

• **Silicone + glass-fiber**  
test in accordance with VDE 0472 Part 813 and IEC 60754-1

• No development of corrosive gases

## Fire behavior

Self-extinguishing and flame-retardant in accordance with VDE 0482 322-1-2, DIN EN 60332-1-2/IEC 60332-1 (corresponds to DIN VDE 0472 Part 804 test type B)

## Structure

- Conductors made of special materials

- Conductor type: Fe-Cu Ni, SoNiCr-SoNi, SoPtRh-SoPt, Cu-CuNi

- Insulation of PVC, silicone, fluoropolymers or glass-fiber

- Core coding: Single color (see Color table)

- Coding of the pairs, starting at 2 pairs the individual pairs are marked with imprinted numbering

- Jacket material of PVC, silicone, fluoropolymers or glass-fiber braid

- Braided screen of galvanized steel wire (type SY) or Cu-braid (type CY)

## Measuring

For temperature measuring, the temperature-dependent characteristics of materials are taken into consideration, for example, the expansion thermometers or thermocouples, etc. Temperature measuring devices with a thermocouple as transducer usually consist of thermocouple, the connecting line from the connection point to the reference junction, a reference junction with a known temperature and a voltage measuring device.

The connecting line between the thermocouple and the reference junction must have the same thermo-electric properties as the thermocouple itself. The temperature differential is measured between the measuring point and the reference junction. Tolerance of the meter resistances  $\pm 10\%$ .

## Hazardous areas

The compensating cables for thermocouples with plastic insulation can be imprinted with longitudinal colored stripes depending on the type of the thermocouple, as follows:  
Cu/Cu-Ni = brown, Fe/Cu-Ni = dark blue, NiCr/Ni = green, Pt-Rh/Pt = white  
In the case of compensating cables for thermocouples with mineral insulation or with metal braiding, for color coding of the intrinsically safe property, a light blue band of sufficient width must also be woven in.

## Use

For instrumentation and control technology, compensating cables (also referred to as compensation cables) are required for precise temperature measurements. They are used as a thermo-electric extension from the thermocouple to the measurement device.

The compensating cable consists of a positive core and a negative core, that generate the same thermo-electric voltage at connector head temperatures up to +200°C, as the thermocouple in accordance with DIN 43710.

## Materials

(Compensating wires and strands) There is a distinction between original materials and substitutes.

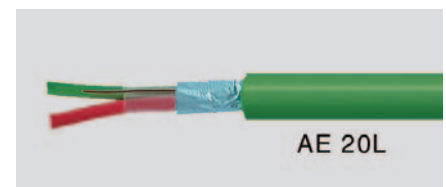
- Compensating wires and strands of **original materials** are made of the same material as the associated thermocouple and they are referred to as thermocable or thermocouple cable.
- Compensating wires and strands of **substitute materials** that consist of alloys and which are not identical to the associated thermocouple are called compensating cables.
  - **Substitute materials** are used for the Type K and Type N thermocouples
  - **Precious metal thermocouples** Type R, Type S, Type B consist of thermal materials.

## Thermocouple cables

Thermocouple cables are made of the same element material as the thermocouple and are tested to the same temperatures. We offer thermocouple cables on customer request only.

## Note

Thermal materials consist of very expensive materials while the substitutes are significantly cheaper.



# ■ COLOR CODING AND TEMPERATURE RANGES FOR THERMAL CABLES & COMPENSATING CABLES

Code letter of the thermocouple	Material combination		 NFC 42-324		 BS 4937	
	+	-	Identification		Identification	
	(plus)	(minus)	THL	AGL	THL	AGL
<b>T</b>	<b>Cu</b>	<b>Cu Ni</b>	<b>TX</b> -25°C to +100°C		<b>TC</b> -25°C to +100°C	
<b>U</b>	<b>Cu</b>	<b>Cu Ni</b>				
<b>J</b>	<b>Fe</b>	<b>Cu Ni</b>	<b>JX</b> -25°C to +200°C		<b>JC</b> -25°C to +250°C	
<b>L</b>	<b>Fe</b>	<b>Cu Ni</b>				
<b>E</b>	<b>Ni Cr</b>	<b>Cu Ni</b>	<b>EX</b> -25°C to +200°C		<b>EC</b> -25°C to +250°C	
	<b>Ni Cr</b>	<b>Ni</b>	<b>KX</b> -25°C to +200°C		<b>KC</b> -25°C to +200°C	
<b>K</b>	<b>Ni Cr</b>	<b>Ni</b>			<b>WC</b> 0°C to +100°C	
	<b>Ni Cr</b>	<b>Ni</b>			<b>VC</b> 0°C to +100°C	
<b>N</b>	<b>Ni Cr Si</b>	<b>Ni Si</b>				
<b>R</b>	<b>PtRh 13</b>	<b>Pt</b>			<b>SC</b> 0°C to +200°C	
<b>S</b>	<b>PtRh 10</b>	<b>Pt</b>				
<b>B</b>	<b>PtRh 30</b>	<b>PtRh 6</b>			<b>BC</b> 0°C to +100°C	

The highest application temperature of the insulating materials or the application temperature range of the conductor material limits the application temperature range of the cable. The lower value is valid.

As a rule, intrinsically safe cables have a blue jacket color and an identification stripe assigned to the element.



ANSI MC 96.1



DIN IEC 584



DIN 43710\*

ANSI MC 96.1		DIN IEC 584		DIN 43710*	
Identification		Identification		Identification	
THL	AGL	THL	AGL	THL	AGL
<b>TX</b> 0°C to +100°C		<b>TX</b> -25°C to +100°C			
<b>JX</b> 0°C to +200°C		<b>JX**</b> -25°C to +200°C		<b>UX**</b> 0°C to +200°C	
<b>EX</b> 0°C to +200°C		<b>EX</b> -25°C to +200°C			
<b>KX</b> 0°C to +200°C		<b>KX</b> -25°C to +200°C			
			<b>KCA**</b> 0°C to +150°C		
			<b>KCB</b> 0°C to +100°C		
		<b>NX</b> -25°C to +200°C		<b>NC</b> 0°C to +150°C	
			<b>RCA/SCA</b> 0°C to +100°C	<b>RCB/SCB**</b> 0°C to +200°C	
	<b>SX</b> 0°C to +200°C				
	<b>BX</b> 0°C to +100°C	(According to DIN 43710/85)		<b>BC</b> 0°C to +100°C	

**THL = Thermocouple wire**  
**AGL = Compensating cable**

Example: KCA Compensating cable KCA (plus) ≙ positive core for AGL KC  
KCA (minus) ≙ negative core for AGL KC

\*) DIN 43710 was withdrawn in April 1994. Thus the element types "U" and "L" are no longer standardized.

\*\* standard type

# ■ COMPENSATING CABLES

## Materials for compensating cables

Standards	Element type			Material of the compensating cable		
	Type	Plus pole (+)	Minus pole (-)	Code	Plus pole (+)	Minus pole (-)
DIN 43710	U	Cu	CuNi	UX	Cu	CuNi
	L	Fe	CuNi	LX	Fe	CuNi
DIN IEC 584	T	Cu	CuNi	TX	Cu	CuNi
	E	NiCr	CuNi	EX	NiCr	CuNi
	J	Fe	CuNi	JX	Fe	CuNi
	K	NiCr	Ni	KX	NiCr	Ni
	K	NiCr	Ni	KC 1	Fe	CuNi
	K	NiCr	Ni	KC 2	Cu	CuNi
	R/S	Pt 13/10 Rh	Pt	RC A/SC A	Cu	CuNi
R/S	Pt 13/10 Rh	Pt	RC B/SC B	Cu	CuNi	
NF	T	Cu	CuNi	TX	Cu	CuNi
	E	NiCr	CuNi	EX	NiCr	CuNi
	J	Fe	CuNi	JX	Fe	CuNi
	K	NiCr	Ni	KX	NiCr	Ni
	K	NiCr	Ni	VC	Cu	CuNi
	K	NiCr	Ni	WC	Fe	CuNi
	R/S	Pt 13/10 Rh	Pt	RC/SC	Cu	CuNi
B	Pt 30 Rh	Pt 6 Rh	BC	Cu-ALY	Cu	
ANSI	T	Cu	CuNi	TX	Cu	CuNi
	E	NiCr	CuNi	EX	NiCr	CuNi
	J	Fe	CuNi	JX	Fe	CuNi
	K	NiCr	Ni	KX	NiCr	Ni
	R/S	Pt 13/10 Rh	Pt	RX/SX	Cu	CuNi
	B	Pt 30 Rh	Pt 6 Rh	BX	Cu	Cu

## Properties of the wires for thermocouples and compensating cables

Materials	Main components approx. %				Density at 20°C $\frac{g}{cm^3}$	Spec. resistance at 20°C $\mu\text{ohm} \cdot \text{cm}$	Resistance value (guide value) in ohm/m	
	Cu	Ni	Mn	Other			mm ø 0.20	mm ø 1.38
CuNi	55	44	1	-	8.85	49	15.60	0.328
SoNi	51	45	2	Fe2	8.85	51	16.26	0.341
NiCr	-	Rest	-	Cr 10	8.7	72	22.90	0.481
Ni	-	95	MnAlSi	5	8.55	27	8.59	0.180
SoPt	95	3	2	-	8.9	12	3.82	0.0802
ECu	In accordance with DIN 46 431				8.9	1.7	0.54	0.011
Fe	-	-	-	-	7.85	12	3.82	0.08
BPX	97	-	3	-	8.9	12.5	3.98	0.084



# COMPENSATING CABLES

Part no.	Thermocouple element material in accordance with DIN 43713	Thermocouple type	Core insulation	Jacket/armoring jacket	Outer ø approx. mm	Form	Temperature range of insulation °C	Installation temperature range °C	min. bending radius x cable ø	Weight approx. kg/km
<b>Single-pair: 2 x 1.5 mm<sup>2</sup> (L = stranded wire, conductor make-up 48 x 0.20 mm; M = solid conductor, conductor ø 1.38 mm)</b>										
48001	FE-CuNi (Ko)	L	AE 1 L stranded	PVC	5.4	round	-10°C to +80°C	stationary -25°C to +70°C flexing -5°C to +70°C	7.5	40
48002	SoNiCr-SoNi	K	AN 1 L stranded	PVC	5.4	round			7.5	40
48003	SoPtRh-SoPt	S	AP 1 L stranded	PVC	5.4	round			7.5	40
48230	Cu-CuNi (Ko)	U	AC 1 L stranded	PVC	5.4	round			7.5	40
48478	Fe-CuNi	J	AF 1 L stranded	PVC	5.4	round			7.5	40
48004	Fe-CuNi (Ko)	L	AE 1 M stranded	PVC	5.4	round	-10°C to +80°C	stationary -25°C to +70°C flexing -5°C to +70°C	10	40
48005	SoNiCr-SoNi	K	AN 1 M stranded	PVC	5.4	round			10	40
48006	SoPtRh-SoPt	S	AP 1 M stranded	PVC	5.4	round			10	40
48231	Cu-CuNi (Ko)	U	AC 1 M stranded	PVC	5.4	round			10	40
48007	Fe-CuNi (Ko)	L	AE 1 L-SIL stranded	silicone	5.4	round	-60°C to +180°C	stationary -25°C to +180°C flexing -25°C to +180°C (short time +200°C)	7.5	40
48008	SoNiCr-SoNi	K	AN 1 L-SIL stranded	silicone	5.4	round			7.5	40
48009	SoPtRh-SoPt	S	AP 1 L-SIL stranded	silicone	5.4	round			7.5	40
48232	Cu-CuNi (Ko)	U	AC 1 L-SIL stranded	silicone	5.4	round			7.5	40
48233	Fe-CuNi (Ko)	L	AE 2 M-SIL stranded	silicone	7.8	round	-60°C to +180°C	stationary -25°C to +180°C flexing -25°C to +180°C (short time +200°C)	15	248
48234	SoNiCr-SoNi	K	AN 2 M-SIL stranded	silicone	7.8	round			15	248
48235	SoPtRh-SoPt	S	AP 2 M-SIL stranded	silicone	7.8	round			15	248
48236	Cu-CuNi (Ko)	U	AC 2 M-SIL stranded	silicone	7.8	round			15	248
48010	Fe-CuNi (Ko)	L	AE 3 L parallel	glass-fiber	5.0x7.2	oval	-60°C to +200°C	stationary -25°C to +200°C flexing -25°C to +200°C	7.5	64
48011	SoNiCr-SoNi	K	AN 3 L parallel	glass-fiber	5.0x7.2	oval			7.5	64
48012	SoPtRh-SoPt	S	AP 3 L parallel	glass-fiber	5.0x7.2	oval			7.5	64
48237	Cu-CuNi (Ko)	U	AC 3 L parallel	glass-fiber	5.0x7.2	oval			7.5	64
48238	Fe-CuNi (Ko)	L	AE 3 Ln-SIL parallel	silicone	5.2x7.4	oval	-60°C to +180°C	stationary -25°C to +180°C flexing -25°C to +180°C (short time +200°C)	7.5	62
48239	SoNiCr-SoNi	K	AN 3 Ln-SIL parallel	silicone	5.2x7.4	oval			7.5	62
48240	SoPtRh-SoPt	S	AP 3 Ln-SIL parallel	silicone	5.2x7.4	oval			7.5	62
48241	Cu-CuNi (Ko)	U	AC 3 Ln-SIL parallel	silicone	5.2x7.4	oval			7.5	62
48013	Fe-CuNi (Ko)	L	AE 4 L parallel	glass-fiber	5.8x8.0	oval	-60°C to +200°C	stationary -25°C to +200°C flexing -25°C to +200°C	7.5	87
48014	SoNiCr-SoNi	K	AN 4 L parallel	glass-fiber	5.8x8.0	oval			7.5	87
48015	SoPtRh-SoPt	S	AP 4 L parallel	glass-fiber	5.8x8.0	oval			7.5	87
48242	Cu-CuNi (Ko)	U	AC 4 L parallel	glass-fiber	5.8x8.0	oval			7.5	87
48016	Fe-CuNi (Ko)	L	AE 4 Ln-SIL	silicone	6.0x8.2	oval	-60°C to +180°C	stationary -25°C to +180°C flexing -25°C to +180°C (short time +200°C)	7.5	85
48017	SoNiCr-SoNi	K	AN 4 Ln-SIL	silicone	6.0x8.2	oval			7.5	85
48018	SoPtRh-SoPt	S	AP 4 Ln-SIL	silicone	6.0x8.2	oval			7.5	85
48243	Cu-CuNi (Ko)	U	AC 4 Ln-SIL	silicone	6.0x8.2	oval			7.5	85
48244	Fe-CuNi (Ko)	L	AE 5 L	PVC	8.1	round	-10°C to +80°C	stationary -25°C to +70°C flexing -5°C to +70°C	7.5	93
48245	SoNiCr-SoNi	K	AN 5 L	PVC	8.1	round			7.5	93
48246	SoPtRh-SoPt	S	AP 5 L	PVC	8.1	round			7.5	93
48247	Cu-CuNi (Ko)	U	AC 5 L	PVC	8.1	round			7.5	93
48248	Fe-CuNi (Ko)	L	AE 6 L-SIL	silicone	8.0	round	-60°C to +180°C	stationary -25°C to +180°C flexing -25°C to +180°C (short time +200°C)	7.5	94
48249	SoNiCr-SoNi	K	AN 6 L-SIL	silicone	8.0	round			7.5	94
48250	SoPtRh-SoPt	S	AP 6 L-SIL	silicone	8.0	round			7.5	94
48251	Cu-CuNi (Ko)	U	AC 6 L-SIL	silicone	8.0	round			7.5	94
48252	Fe-CuNi (Ko)	L	AE 6 M-SIL	silicone	7.8	round	-60°C to +180°C	stationary -25°C to +180°C flexing -25°C to +180°C (short time +200°C)	12	92
48253	SoNiCr-SoNi	K	AN 6 M-SIL	silicone	7.8	round			12	92
48254	SoPtRh-SoPt	S	AP 6 M-SIL	silicone	7.8	round			12	92
48255	Cu-CuNi (Ko)	U	AC 6 M-SIL	silicone	7.8	round			12	92
48019	Fe-CuNi (Ko)	L	AE 7 L parallel	PVC	5.5x8.2	oval	-10°C to +80°C	stationary -25°C to +70°C flexing -5°C to +70°C	7.5	60
48020	SoNiCr-SoNi	K	AN 7 L parallel	PVC	5.5x8.2	oval			7.5	60
48021	SoPtRh-SoPt	S	AP 7 L parallel	PVC	5.5x8.2	oval			7.5	60
48256	Cu-CuNi (Ko)	U	AC 7 L parallel	PVC	5.5x8.2	oval			7.5	60
48022	Fe-CuNi (Ko)	L	AE 8 L	PVC	6.9x9.0	oval	-10°C to +80°C	stationary -25°C to +70°C flexing -5°C to +70°C	7.5	82
48023	SoNiCr-SoNi	K	AN 8 L	PVC	6.9x9.0	oval			7.5	82
48024	SoPtRh-SoPt	S	AP 8 L	PVC	6.9x9.0	oval			7.5	82
48257	Cu-CuNi (Ko)	U	AC 8 L	PVC	6.9x9.0	oval			7.5	82
48025	Fe-CuNi (Ko)	L	AE 9 L	PVC	7.0	round	-10°C to +80°	stationary -25°C to +70°C flexing -5°C to +70°C	7.5	79
48026	SoNiCr-SoNi	K	AN 9 L	PVC	7.0	round			7.5	79
48027	SoPtRh-SoPt	S	AP 9 L	PVC	7.0	round			7.5	79
48258	Cu-CuNi (Ko)	U	AC 9 L	PVC	7.0	round			7.5	79
48479	Fe-CuNi	J	AF 9 L	PVC	7.0	round			7.5	79
48028	Fe-CuNi (Ko)	L	AE 9-2 LS	PVC	7.8	round	-10°C to +80°C	stationary -25°C to +70°C flexing -5°C to +70°C	7.5	108
48029	SoNiCr-SoNi	K	AN 9-2 LS	PVC	7.8	round			7.5	108
48030	SoPtRh-SoPt	S	AP 9-2 LS	PVC	7.8	round			7.5	108
48259	Cu-CuNi (Ko)	U	AC 9-2 LS	PVC	7.8	round			7.5	108
48480	Fe-CuNi	J	AF 9-2 LS	PVC	7.8	round			7.5	108
48031	Fe-CuNi (Ko)	L	AE 9-2 LSY	PVC	9.8	round	-10°C to +80°C	stationary -25°C to +70°C flexing -5°C to +70°C	7.5	147
48032	SoNiCr-SoNi	K	AN 9-2 LSY	PVC	9.8	round			7.5	147
48069	SoPtRh-SoPt	S	AP 9-2 LSY	PVC	9.8	round			7.5	147
48260	Cu-CuNi (Ko)	U	AC 9-2 LSY	PVC	9.8	round			7.5	147

L = stranded conductor  
M = solid conductor  
tin. = tinned  
galv. = galvanized

# COMPENSATING CABLES

Part no.	Thermocouple element material in accordance with DIN 43713	Thermocouple type	Type	Core insulation	Jacket/ armoring jacket	Outer ø approx. mm	Form	Temperature range of insulation °C	Installation temperature range °C	min. bending radius x cable ø	Weight approx. kg/km
<b>Single-pair: 2 x 1.5 mm<sup>2</sup> (L = stranded wire, conductor make-up 48 x 0.20 mm; M = solid conductor, conductor ø 1.38 mm)</b>											
48033	FE-CuNi (Ko)	L	AE 9 M	PVC		7.0	round	-10°C to +80°	stationary	12	79
48034	SoNiCr-SoNi	K	AN 9 M	PVC	PVC	7.0	round		-25°C to +70°C	12	79
48035	SoPtRh-SoPt	S	AP 9 M	PVC		7.0	round		flexing	12	79
48261	Cu-CuNi (Ko)	U	AC 9 M	PVC		7.0	round	-5°C to +70°C	12	79	
48262	Fe-CuNi (Ko)	L	AE 9-2 MSY	PVC	PVC/galv. steel wire braid/ PVC	9.6	round	-10°C to +80°C	stationary	12	144
48263	SoNiCr-SoNi	K	AN 9-2 MSY	PVC		9.6	round		-25°C to +70°C	12	144
48264	SoPtRh-SoPt	S	AP 9-2 MSY	PVC		9.6	round		flexing	12	144
48265	Cu-CuNi (Ko)	U	AC 9-2 MSY	PVC		9.6	round	-5°C to +70°C	12	144	
48036	Fe-CuNi (Ko)	L	AE 10 L-SIL parallel	silicone	glass-fiber	5.5x8.2	oval	-60°C to +180°C	stationary	7.5	59
48037	SoNiCr-SoNi	K	AN 10 L-SIL parallel	silicone		5.5x8.2	oval		-25°C to +180°C	7.5	59
48038	SoPtRh-SoPt	S	AP 10 L-SIL parallel	silicone		5.5x8.2	oval		flexing	7.5	59
48266	Cu-CuNi (Ko)	U	AC 10 L-SIL parallel	silicone		5.5x8.2	oval	(short time +200°C)	7.5	59	
48039	Fe-CuNi (Ko)	L	AE 11 L	silicone	Glass-fiber/ galv. steel wire braid	6.3x9.0	oval	-60°C to +180°C	stationary	7.5	82
48040	SoNiCr-SoNi	K	AN 11 L	silicone		6.3x9.0	oval		-25°C to +180°C	7.5	82
48041	SoPtRh-SoPt	S	AP 11 L	silicone		6.3x9.0	oval		flexing	7.5	82
48267	Cu-CuNi (Ko)	U	AC 11 L	silicone		6.3x9.0	oval	(short time +200°C)	7.5	82	
48042	Fe-CuNi (Ko)	L	AE 11 Lr	silicone	Glass-fiber/ galv. steel wire braid	6.7	round	-60°C to +180°C	stationary	7.5	83
48043	SoNiCr-SoNi	K	AN 11 Lr	silicone		6.7	round		-25°C to +180°C	7.5	83
48044	SoPtRh-SoPt	S	AP 11 Lr	silicone		6.7	round		flexing	7.5	83
48268	Cu-CuNi (Ko)	U	AC 11 Lr	silicone		6.7	round	(short time +200°C)	7.5	83	
48045	Fe-CuNi (Ko)	L	AE 11 Mr	silicone	Glass-fiber/ galv. steel wire braid	6.5	round	-60°C to +180°C	stationary	12	83
48046	SoNiCr-SoNi	K	AN 11 Mr	silicone		6.5	round		-25°C to +180°C	12	83
48047	SoPtRh-SoPt	S	AP 11 Mr	silicone		6.5	round		flexing	12	83
48269	Cu-CuNi (Ko)	U	AC 11 Mr	silicone		6.5	round	(short time +200°C)	12	83	
48048	Fe-CuNi (Ko)	L	AE 12 L parallel	PVC	PVC	4.3x7.0	oval	-10°C to +80°C	stationary	7.5	69
48049	SoNiCr-SoNi	K	AN 12 L parallel	PVC		4.3x7.0	oval		-25°C to +70°C	7.5	69
48050	SoPtRh-SoPt	S	AP 12 L parallel	PVC		4.3x7.0	oval		flexing	7.5	69
48270	Cu-CuNi (Ko)	U	AC 12 L parallel	PVC		4.3x7.0	oval	-5°C to +70°C	7.5	69	
48481	Fe-CuNi	J	AF 12 L parallel	PVC		4.3x7.0	oval		7.5	69	
48051	Fe-CuNi (Ko)	L	AE 12 M parallel	PVC	PVC	4.2x6.8	oval	-10°C to +80°C	stationary	12	61
48052	SoNiCr-SoNi	K	AN 12 M parallel	PVC		4.2x6.8	oval		-25°C to +70°C	12	61
48053	SoPtRh-SoPt	S	AP 12 M parallel	PVC		4.2x6.8	oval		flexing	12	61
48271	Cu-CuNi (Ko)	U	AC 12 M parallel	PVC		4.2x6.8	oval	-5°C to +70°C	12	61	
48054	Fe-CuNi (Ko)	L	AE 13 L parallel	silicone	Glass-fiber	3.2x5.9	oval	-60°C to +180°C	stationary	7.5	45
48055	SoNiCr-SoNi	K	AN 13 L parallel	silicone		3.2x5.9	oval		-25°C to +180°C	7.5	45
48056	SoPtRh-SoPt	S	AP 13 L parallel	silicone		3.2x5.9	oval		flexing	7.5	45
48272	Cu-CuNi (Ko)	U	AC 13 L parallel	silicone		3.2x5.9	oval	(short time +200°C)	7.5	45	
48057	Fe-CuNi (Ko)	L	AE 13 M	silicone	Glass-fiber	3.5x6.0	oval	-60°C to +180°C	stationary	12	45
48058	SoNiCr-SoNi	K	AN 13 M	silicone		3.5x6.0	oval		-25°C to +180°C	12	45
48059	SoPtRh-SoPt	S	AP 13 M	silicone		3.5x6.0	oval		flexing	12	45
48273	Cu-CuNi (Ko)	U	AC 13 M	silicone		3.5x6.0	oval	(short time +200°C)	12	45	
48060	Fe-CuNi (Ko)	L	AE 14 L	silicone	Special foamed silicone mixture/ galv. Steel hose	11.7	round	-60°C to +180°C	stationary	7.5	196
48061	SoNiCr-SoNi	K	AN 14 L	silicone		11.7	round		-25°C to +180°C	7.5	196
48062	SoPtRh-SoPt	S	AP 14 L	silicone		11.7	round		flexing	7.5	196
48274	Cu-CuNi (Ko)	U	AC 14 L	silicone		11.7	round	(short time +200°C)	7.5	196	
48063	Fe-CuNi (Ko)	L	AE 15 L	silicone	silicone	7.7	round	-60°C to +180°C	stationary	7.5	76
48064	SoNiCr-SoNi	K	AN 15 L	silicone		7.7	round		-25°C to +180°C	7.5	76
48065	SoPtRh-SoPt	S	AP 15 L	silicone		7.7	round		flexing	7.5	76
48275	Cu-CuNi (Ko)	U	AC 15 L	silicone		7.7	round	(short time +200°C)	7.5	76	
48482	Fe-CuNi	J	AF 15 L	silicone		7.7	round		7.5	76	
48066	Fe-CuNi (Ko)	L	AE 15 LS	silicone	silicone/ galv. steel wire braid	7.8	round	-10°C to +180°C	stationary	7.5	105
48067	SoNiCr-SoNi	K	AN 15 LS	silicone		7.8	round		-25°C to +180°C	7.5	105
48068	SoPtRh-SoPt	S	AP 15 LS	silicone		7.8	round		flexing	7.5	105
48276	Cu-CuNi (Ko)	U	AC 15 LS	silicone		7.8	round	(short time +200°C)	7.5	105	
48277	Fe-CuNi (Ko)	L	AE 16 L-SIL parallel	silicone	-	2.8x5.6	oval	-10°C to +180°C	stationary	7.5	38
48278	SoNiCr-SoNi	K	AN 16 L-SIL parallel	silicone		2.8x5.6	oval		-25°C to +180°C	7.5	38
48279	SoPtRh-SoPt	S	AP 16 L-SIL parallel	silicone		2.8x5.6	oval		flexing	7.5	38
48280	Cu-CuNi (Ko)	U	AC 16 L-SIL parallel	silicone		2.8x5.6	oval	(short time +200°C)	7.5	38	
48281	Fe-CuNi (Ko)	L	AE 18 L	HELUFLO <sup>®</sup> -FEP	HELUFLO <sup>®</sup> -FEP	4.4	round	-100°C to 200°C	stationary	7.5	37
48282	SoNiCr-SoNi	K	AN 18 L	HELUFLO <sup>®</sup> -FEP		4.4	round		-25°C to +205°C	7.5	37
48283	SoPtRh-SoPt	S	AP 18 L	HELUFLO <sup>®</sup> -FEP		4.4	round		flexing	7.5	37
48284	Cu-CuNi (Ko)	U	AC 18 L	HELUFLO <sup>®</sup> -FEP		4.4	round	-25°C to +205°C	7.5	37	
48285	Fe-CuNi (Ko)	L	AE 19 L	HELUFLO <sup>®</sup> -FEP	PETP tape/ tin. Cu-round wire braid/ HELUFLO <sup>®</sup> -FEP	5.6	round	-100°C to 200°C	stationary	7.5	60
48286	SoNiCr-SoNi	K	AN 19 L	HELUFLO <sup>®</sup> -FEP		5.6	round		-25°C to +205°C	7.5	60
48287	SoPtRh-SoPt	S	AP 19 L	HELUFLO <sup>®</sup> -FEP		5.6	round		flexing	7.5	60
48288	Cu-CuNi (Ko)	U	AC 19 L	HELUFLO <sup>®</sup> -FEP		5.6	round	(short time +200°C)	7.5	60	

L = stranded conductor  
M = solid conductor  
tin. = tinned  
galv. = galvanized

# COMPENSATING CABLES

Part no.	Thermocouple element material in accordance with DIN 43713	Thermocouple type	Core insulation	Jacket/armoring jacket	Outer ø approx. mm	Form	Temperature range of insulation °C	Installation temperature range °C	min. bending radius x cable ø	Weight approx. kg/km	
<b>Single-pair: 2 x 1.5 mm<sup>2</sup> (L = stranded wire, conductor make-up 48 x 0.20 mm; M = solid conductor, conductor ø 1.38 mm)</b>											
48289	Fe-CuNi (Ko)	L	AE 20 L	PVC	PETP tape/	8.0	round	-10°C to +80°C	stationary	7.5	75
48290	SoNiCr-SoNi	K	AE 20 L	PVC	bl. Cu-ground wire	8.0	round		-25°C to +70°C	7.5	75
48291	SoPtRh-SoPt	S	AE 20 L	PVC	0.5 mm ø /	8.0	round		flexing	7.5	75
48292	Cu-CuNi (Ko)	U	AE 20 L	PVC	Alu-tape/PVC	8.0	round		-5°C to +70°C	7.5	75
48293	Fe-CuNi (Ko)	L	AE 20 M	PVC	PETP tape/	8.2	round	-10°C to +80°C	stationary	12	82
48294	SoNiCr-SoNi	K	AE 20 M	PVC	bl. Cu-ground wire	8.2	round		-25°C to +70°C	12	82
48295	SoPtRh-SoPt	S	AE 20 M	PVC	0.5 mm ø /	8.2	round		flexing	12	82
48296	Cu-CuNi (Ko)	U	AE 20 M	PVC	Alu-tape/PVC	8.2	round		-5°C to +70°C	12	82
<b>Multiple-pair: 2 pair (4 x 1.5 mm<sup>2</sup>) (L = stranded wire, conductor make-up 48 x 0.20 mm; M = solid conductor, conductor ø 1.38 mm)</b>											
48100	Fe-CuNi (Ko)	L	AE 9-4 L	PVC		8.3	round	-10°C to +80°C	stationary	7.5	125
48101	SoNiCr-SoNi	K	AN 9-4 L	PVC	PVC	8.3	round		-25°C to +70°C	7.5	125
48102	SoPtRh-SoPt	S	AP 9-4 L	PVC		8.3	round		flexing	7.5	125
48297	Cu-CuNi (Ko)	U	AC 9-4 L	PVC		8.3	round		-5°C to +70°C	7.5	125
48483	Fe-CuNi	J	AF 9-4 L	PVC		8.3	round		7.5	125	
48298	Fe-CuNi (Ko)	L	AE 9-4 LS	PVC		8.9	round	-10°C to +80°C	stationary	7.5	155
48299	SoNiCr-SoNi	K	AN 9-4 LS	PVC	PVC/	8.9	round		-25°C to +70°C	7.5	155
48300	SoPtRh-SoPt	S	AP 9-4 LS	PVC	galv. steel wire braid	8.9	round		flexing	7.5	155
48301	Cu-CuNi (Ko)	U	AC 9-4 LS	PVC		8.9	round		-5°C to +70°C	7.5	155
48137	Fe-CuNi (Ko)	L	AE 9-4 LSY	PVC		11.4	round	-10°C to +80°C	stationary	7.5	220
48138	SoNiCr-SoNi	K	AN 9-4 LSY	PVC	PVC/	11.4	round		-25°C to +70°C	7.5	220
48139	SoPtRh-SoPt	S	AP 9-4 LSY	PVC	galv. steel wire braid/	11.4	round		flexing	7.5	220
48302	Cu-CuNi (Ko)	U	AC 9-4 LSY	PVC	PVC	11.4	round		-5°C to +70°C	7.5	220
48303	Fe-CuNi (Ko)	L	AE 9-4 MSY	PVC		11.0	round	-10°C to +80°C	stationary	12	210
48304	SoNiCr-SoNi	K	AN 9-4 MSY	PVC	PVC/	11.0	round		-25°C to +70°C	12	210
48305	SoPtRh-SoPt	S	AP 9-4 MSY	PVC	galv. steel wire braid/	11.0	round		flexing	12	210
48306	Cu-CuNi (Ko)	U	AC 9-4 MSY	PVC	PVC	11.0	round		-5°C to +70°C	12	210
48307	Fe-CuNi (Ko)	L	AE 20-4 M	PVC	PETP tape/	10.8	round	-10°C to +80°C	stationary	12	137
48308	SoNiCr-SoNi	K	AN 20-4 M	PVC	bl. Cu-ground wire	10.8	round		-25°C to +70°C	12	137
48309	SoPtRh-SoPt	S	AP 20-4 M	PVC	0.5 mm ø /	10.8	round		flexing	12	137
48310	Cu-CuNi (Ko)	U	AC 20-4 M	PVC	Alu-tape/PVC	10.8	round		-5°C to +70°C	12	137
<b>Multiple-pair: 4 x 1.5 mm<sup>2</sup> (L = stranded wire, conductor make-up 48 x 0.20 mm)</b>											
48474	Fe-CuNi (Ko)	L	AE 11-4 Lr	silicone		7.8	round	-60°C to +180°C	stationary	7.5	11.8
48475	SoNiCr-SoNi	K	AE 11-4 Lr	silicone	Glass-fiber/galv. steel	7.8	round		-25°C to +180°C	7.5	11.8
48476	SoPtRh-SoPt	S	AE 11-4 Lr	silicone	wire braid	7.8	round		flexing	7.5	11.8
48477	Cu-CuNi (Ko)	U	AE 11-4 Lr	silicone		7.8	round		-25°C to +180°C (short time +200°C)	7.5	11.8
<b>Multiple-pair: 3 pairs (6 x 1.5 mm<sup>2</sup>) (L = stranded wire, conductor make-up 48 x 0.20 mm; M = solid conductor, conductor ø 1.38 mm)</b>											
48103	Fe-CuNi (Ko)	L	AE 9-6 L	PVC		10.3	round	-10°C to +80°C	stationary	7.5	190
48104	SoNiCr-SoNi	K	AN 9-6 L	PVC	PVC	10.3	round		-25°C to +70°C	7.5	190
48105	SoPtRh-SoPt	S	AP 9-6 L	PVC		10.3	round		flexing	7.5	190
48311	Cu-CuNi (Ko)	U	AC 9-6 L	PVC		10.3	round		-5°C to +70°C	7.5	190
48484	Fe-CuNi	J	AF 9-6 L	PVC		10.3	round		7.5	190	
48312	Fe-CuNi (Ko)	L	AE 9-6 LS	PVC		10.9	round	-10°C to +80°C	stationary	7.5	226
48313	SoNiCr-SoNi	K	AN 9-6 LS	PVC	PVC/	10.9	round		-25°C to +70°C	7.5	226
48314	SoPtRh-SoPt	S	AP 9-6 LS	PVC	galv. steel wire braid	10.9	round		flexing	7.5	226
48315	Cu-CuNi (Ko)	U	AC 9-6 LS	PVC		10.9	round		-5°C to +70°C	7.5	226
48140	Fe-CuNi (Ko)	L	AE 9-6 LSY	PVC		13.4	round	-10°C to +80°C	stationary	7.5	292
48141	SoNiCr-SoNi	K	AN 9-6 LSY	PVC	PVC/	13.4	round		-25°C to +70°C	7.5	292
48142	SoPtRh-SoPt	S	AP 9-6 LSY	PVC	galv. steel wire braid/	13.4	round		flexing	7.5	292
48316	Cu-CuNi (Ko)	U	AC 9-6 LSY	PVC	PVC	13.4	round		-5°C to +70°C	7.5	292
48317	Fe-CuNi (Ko)	L	AE 9-6 MSY	PVC		12.5	round	-10°C to +80°C	stationary	12	272
48318	SoNiCr-SoNi	K	AN 9-6 MSY	PVC	PVC/	12.5	round		-25°C to +70°C	12	272
48319	SoPtRh-SoPt	S	AP 9-6 MSY	PVC	galv. steel wire braid/	12.5	round		flexing	12	272
48320	Cu-CuNi (Ko)	U	AC 9-6 MSY	PVC	PVC	12.5	round		-5°C to +70°C	12	272
48321	Fe-CuNi (Ko)	L	AE 20-6 M	PVC	PETP tape/	12.4	round	-10°C to +80°C	stationary	12	186
48322	SoNiCr-SoNi	K	AN 20-6 M	PVC	bl. Cu-ground wire	12.4	round		-25°C to +70°C	12	186
48323	SoPtRh-SoPt	S	AP 20-6 M	PVC	0.5 mm ø /	12.4	round		flexing	12	186
48324	Cu-CuNi (Ko)	U	AC 20-6 M	PVC	Alu-tape/PVC	12.4	round		-5°C to +70°C	12	186
<b>Multiple-pair: 4 pairs (8 x 1.5 mm<sup>2</sup>) (L = stranded wire, conductor make-up 48 x 0.20 mm)</b>											
48106	Fe-CuNi (Ko)	L	AE 9-8 L	PVC		11.0	round	-10°C to +80°C	stationary	7.5	238
48107	SoNiCr-SoNi	K	AN 9-8 L	PVC	PVC	11.0	round		-25°C to +70°C	7.5	238
48108	SoPtRh-SoPt	S	AP 9-8 L	PVC		11.0	round		flexing	7.5	238
48325	Cu-CuNi (Ko)	U	AC 9-8 L	PVC		11.0	round		-5°C to +70°C	7.5	238
48485	Fe-CuNi	J	AF 9-8 L	PVC		11.0	round		7.5	238	
48143	Fe-CuNi (Ko)	L	AE 9-8 LSY	PVC		14.0	round	-10°C to +80°C	stationary	7.5	410
48144	SoNiCr-SoNi	K	AN 9-8 LSY	PVC	PVC/	14.0	round		-25°C to +70°C	7.5	410
48145	SoPtRh-SoPt	S	AP 9-8 LSY	PVC	galv. steel wire braid/	14.0	round		flexing	7.5	410
48326	Cu-CuNi (Ko)	U	AC 9-8 LSY	PVC	PVC	14.0	round		-5°C to +70°C	7.5	410

L = stranded conductor  
M = solid conductor  
tin. = tinned  
galv. = galvanized



# COMPENSATING CABLES

Part no.	Thermocouple element material in accordance with DIN 43713	Thermocouple type	Core insulation	Jacket/ armoring jacket	Outer ø approx. mm	Form	Temperature range of insulation °C	Installation temperature range °C	min. bending radius x cable ø	Weight approx. kg/km
<b>Multiple-pair: 5 pairs (10 x 1.5 mm<sup>2</sup>) (L = stranded wire, conductor make-up 48 x 0.20 mm)</b>										
48109	FE-CuNi (Ko)	L	AE 9-10 L	PVC	13.0	round	-10°C to +80°C	stationary -25°C to +70°C flexing -5°C to +70°C	7.5	284
48110	SoNiCr-SoNi	K	AN 9-10 L	PVC	13.0	round			7.5	284
48111	SoPtRh-SoPt	S	AP 9-10 L	PVC	13.0	round			7.5	284
48327	Cu-CuNi (Ko)	U	AC 9-10 L	PVC	13.0	round			7.5	284
48486	FE-CuNi (Ko)	J	AF 9-10 L	PVC	13.0	round			7.5	284
48146	Fe-CuNi (Ko)	L	AE 9-10 LSY	PVC	16.5	round	-10°C to +80°C	stationary -25°C to +70°C flexing -5°C to +70°C	7.5	475
48147	SoNiCr-SoNi	K	AN 9-10 LSY	PVC	16.5	round			7.5	475
48148	SoPtRh-SoPt	S	AP 9-10 LSY	PVC	16.5	round			7.5	475
48328	Cu-CuNi (Ko)	U	AC 9-10 LSY	PVC	16.5	round			7.5	475
<b>Multiple-pair: 6 pairs (12 x 1.5 mm<sup>2</sup>) (L = stranded wire, conductor make-up 48 x 0.20 mm; M = solid conductor, conductor ø 1.38 mm)</b>										
48112	Fe-CuNi (Ko)	L	AE 9-12 L	PVC	13.5	round	-10°C to +80°C	stationary -25°C to +70°C flexing -5°C to +70°C	7.5	320
48113	SoNiCr-SoNi	K	AN 9-12 L	PVC	13.5	round			7.5	320
48114	SoPtRh-SoPt	S	AP 9-12 L	PVC	13.5	round			7.5	320
48329	Cu-CuNi (Ko)	U	AC 9-12 L	PVC	13.5	round			7.5	320
48487	Fe-CuNi	J	AF 9-12 L	PVC	13.5	round			7.5	320
48330	Fe-CuNi (Ko)	L	AE 9-12 LS	PVC	14.2	round	-10°C to +80°C	stationary -25°C to +70°C flexing -5°C to +70°C	7.5	384
48331	SoNiCr-SoNi	K	AN 9-12 LS	PVC	14.2	round			7.5	384
48332	SoPtRh-SoPt	S	AP 9-12 LS	PVC	14.2	round			7.5	384
48333	Cu-CuNi (Ko)	U	AC 9-12 LS	PVC	14.2	round			7.5	384
48149	Fe-CuNi (Ko)	L	AE 9-12 LSY	PVC	17.5	round			-10°C to +80°C	stationary -25°C to +70°C flexing -5°C to +70°C
48150	SoNiCr-SoNi	K	AN 9-12 LSY	PVC	17.5	round	7.5	483		
48151	SoPtRh-SoPt	S	AP 9-12 LSY	PVC	17.5	round	7.5	483		
48334	Cu-CuNi (Ko)	U	AC 9-12 LSY	PVC	17.5	round	7.5	483		
48335	Fe-CuNi (Ko)	L	AE 9-12 MSY	PVC	16.5	round	-10°C to +80°C	stationary -25°C to +70°C flexing -5°C to +70°C		
48336	SoNiCr-SoNi	K	AN 9-12 MSY	PVC	16.5	round			12	478
48337	SoPtRh-SoPt	S	AP 9-12 MSY	PVC	16.5	round			12	478
48338	Cu-CuNi (Ko)	U	AC 9-12 MSY	PVC	16.5	round			12	478
48339	Fe-CuNi (Ko)	L	AE 20-12 M	PVC	16.3	round			-10°C to +80°C	stationary -25°C to +70°C flexing -5°C to +70°C
48340	SoNiCr-SoNi	K	AN 20-12 M	PVC	16.3	round	12	362		
48341	SoPtRh-SoPt	S	AP 20-12 M	PVC	16.3	round	12	362		
48342	Cu-CuNi (Ko)	U	AC 20-12 M	PVC	16.3	round	12	362		
<b>Multiple-pair: 7 pairs (14 x 1.5 mm<sup>2</sup>) (L = stranded wire, conductor make-up 48 x 0.20 mm)</b>										
48115	Fe-CuNi (Ko)	L	AE 9-14 L	PVC	14.5	round	-10°C to +80°C	stationary -25°C to +70°C flexing -5°C to +70°C	7.5	396
48116	SoNiCr-SoNi	K	AN 9-14 L	PVC	14.5	round			7.5	396
48117	SoPtRh-SoPt	S	AP 9-14 L	PVC	14.5	round			7.5	396
48343	Cu-CuNi (Ko)	U	AC 9-14 L	PVC	14.5	round			7.5	396
48488	Fe-CuNi	J	AF 9-14 L	PVC	14.5	round			7.5	396
48152	Fe-CuNi (Ko)	L	AE 9-14 LSY	PVC	18.5	round	-10°C to +80°C	stationary -25°C to +70°C flexing -5°C to +70°C	7.5	640
48153	SoNiCr-SoNi	K	AN 9-14 LSY	PVC	18.5	round			7.5	640
48154	SoPtRh-SoPt	S	AP 9-14 LSY	PVC	18.5	round			7.5	640
48344	Cu-CuNi (Ko)	U	AC 9-14 LSY	PVC	18.5	round			7.5	640
<b>Multiple-pair: 8 pairs (16 x 1.5 mm<sup>2</sup>) (L = stranded wire, conductor make-up 48 x 0.20 mm; M = solid conductor, conductor ø 1.38 mm)</b>										
48118	Fe-CuNi (Ko)	L	AE 9-16 L	PVC	15.1	round	-10°C to +80°C	stationary -25°C to +70°C flexing -5°C to +70°C	7.5	419
48119	SoNiCr-SoNi	K	AN 9-16 L	PVC	15.1	round			7.5	419
48120	SoPtRh-SoPt	S	AP 9-16 L	PVC	15.1	round			7.5	419
48345	Cu-CuNi (Ko)	U	AC 9-16 L	PVC	15.1	round			7.5	419
48489	Fe-CuNi	J	AF 9-16 L	PVC	15.1	round			7.5	419
48346	Fe-CuNi (Ko)	L	AE 9-16 LS	PVC	16.1	round	-10°C to +80°C	stationary -25°C to +70°C flexing -5°C to +70°C	7.5	495
48347	SoNiCr-SoNi	K	AN 9-16 LS	PVC	16.1	round			7.5	495
48348	SoPtRh-SoPt	S	AP 9-16 LS	PVC	16.1	round			7.5	495
48349	Cu-CuNi (Ko)	U	AC 9-16 LS	PVC	16.1	round			7.5	495
48155	Fe-CuNi (Ko)	L	AE 9-16 LSY	PVC	19.3	round			-10°C to +80°C	stationary -25°C to +70°C flexing -5°C to +70°C
48156	SoNiCr-SoNi	K	AN 9-16 LSY	PVC	19.3	round	7.5	623		
48157	SoPtRh-SoPt	S	AP 9-16 LSY	PVC	19.3	round	7.5	623		
48350	Cu-CuNi (Ko)	U	AC 9-16 LSY	PVC	19.3	round	7.5	623		
48351	Fe-CuNi (Ko)	L	AE 9-16 MSY	PVC	18.7	round	-10°C to +80°C	stationary -25°C to +70°C flexing -5°C to +70°C		
48352	SoNiCr-SoNi	K	AN 9-16 MSY	PVC	18.7	round			12	616
48353	SoPtRh-SoPt	S	AP 9-16 MSY	PVC	18.7	round			12	616
48354	Cu-CuNi (Ko)	U	AC 9-16 MSY	PVC	18.7	round			12	616
48355	Fe-CuNi (Ko)	L	AE 20-16 M	PVC	16.8	round			-10°C to +80°C	stationary -25°C to +70°C flexing -5°C to +70°C
48356	SoNiCr-SoNi	K	AN 20-16 M	PVC	16.8	round	12	423		
48357	SoPtRh-SoPt	S	AP 20-16 M	PVC	16.8	round	12	423		
48358	Cu-CuNi (Ko)	U	AC 20-16 M	PVC	16.8	round	12	423		

L = stranded conductor  
M = solid conductor  
tin. = tinned  
galv. = galvanized

# COMPENSATING CABLES

Part no.	Thermocouple element material in accordance with DIN 43713	Thermocouple type	Core insulation	Jacket/armoring jacket	Outer $\phi$ approx. mm	Form	Temperature range of insulation °C	Installation temperature range °C	min. bending radius x cable $\phi$	Weight approx. kg/km
<b>Multiple-pair: 9 pairs (18 x 1.5 mm<sup>2</sup>) (L = stranded wire, conductor make-up 48 x 0.20 mm)</b>										
48121	Fe-CuNi (Ko)	L	AE 9-18 L	PVC	16.5	round	-10°C to +80°C	stationary	7.5	480
48122	SoNiCr-SoNi	K	AE 9-18 L	PVC	16.5	round			flexing	7.5
48123	SoPtRh-SoPt	S	AE 9-18 L	PVC	16.5	round		-25°C to +70°C	7.5	480
48359	Cu-CuNi (Ko)	U	AE 9-18 L	PVC	16.5	round			flexing	7.5
48490	Fe-CuNi	J	AF 9-18 L	PVC	16.5	round	-5°C to +70°C	7.5	480	
48158	Fe-CuNi (Ko)	L	AE 9-18 LSY	PVC	20.5	round	-10°C to +80°C	stationary	7.5	758
48159	SoNiCr-SoNi	K	AE 9-18 LSY	PVC	20.5	round			flexing	7.5
48160	SoPtRh-SoPt	S	AE 9-18 LSY	PVC	20.5	round		-25°C to +70°C	7.5	758
48360	Cu-CuNi (Ko)	U	AE 9-18 LSY	PVC	20.5	round			flexing	7.5
<b>Multiple-pair: 10 pairs (20 x 1.5 mm<sup>2</sup>) (L = stranded wire, conductor make-up 48 x 0.20 mm; M = solid conductor, conductor <math>\phi</math> 1.38 mm)</b>										
48124	Fe-CuNi (Ko)	L	AE 9-20 L	PVC	16.7	round	-10°C to +80°C	stationary	7.5	520
48125	SoNiCr-SoNi	K	AN 9-20 L	PVC	16.7	round			flexing	7.5
48126	SoPtRh-SoPt	S	AP 9-20 L	PVC	16.7	round		-25°C to +70°C	7.5	520
48361	Cu-CuNi (Ko)	U	AC 9-20 L	PVC	16.7	round			flexing	7.5
48491	Fe-CuNi	J	AF 9-20 L	PVC	16.7	round	-5°C to +70°C	7.5	520	
48362	Fe-CuNi (Ko)	L	AE 9-20 LS	PVC	17.7	round	-10°C to +80°C	stationary	7.5	613
48363	SoNiCr-SoNi	K	AN 9-20 LS	PVC	17.7	round			flexing	7.5
48364	SoPtRh-SoPt	S	AP 9-20 LS	PVC	17.7	round		-25°C to +70°C	7.5	613
48365	Cu-CuNi (Ko)	U	AC 9-20 LS	PVC	17.7	round			flexing	7.5
48161	Fe-CuNi (Ko)	L	AE 9-20 LSY	PVC	20.9	round	-10°C to +80°C	stationary	7.5	752
48162	SoNiCr-SoNi	K	AN 9-20 LSY	PVC	20.9	round			flexing	7.5
48163	SoPtRh-SoPt	S	AP 9-20 LSY	PVC	20.9	round		-25°C to +70°C	7.5	752
48366	Cu-CuNi (Ko)	U	AC 9-20 LSY	PVC	20.9	round			flexing	7.5
48367	Fe-CuNi (Ko)	L	AE 9-20 MSY	PVC	20.3	round	-10°C to +80°C	stationary	12	744
48368	SoNiCr-SoNi	K	AN 9-20 MSY	PVC	20.3	round			flexing	12
48369	SoPtRh-SoPt	S	AP 9-20 MSY	PVC	20.3	round		-25°C to +70°C	12	744
48370	Cu-CuNi (Ko)	U	AC 9-20 MSY	PVC	20.3	round			flexing	12
48371	Fe-CuNi (Ko)	L	AE 20-20 M	PVC	20.3	round	-10°C to +80°C	stationary	12	542
48372	SoNiCr-SoNi	K	AN 20-20 M	PVC	20.3	round			flexing	12
48373	SoPtRh-SoPt	S	AP 20-20 M	PVC	20.3	round		-25°C to +70°C	12	542
48374	Cu-CuNi (Ko)	U	AC 20-20 M	PVC	20.3	round			flexing	12
<b>Multiple-pair: 12 pairs (24 x 1.5 mm<sup>2</sup>) (L = stranded wire, conductor make-up 48 x 0.20 mm; M = solid conductor, conductor <math>\phi</math> 1.38 mm)</b>										
48127	Fe-CuNi (Ko)	L	AE 9-24 L	PVC	19.0	round	-10°C to +80°C	stationary	7.5	614
48128	SoNiCr-SoNi	K	AN 9-24 L	PVC	19.0	round			flexing	7.5
48129	SoPtRh-SoPt	S	AP 9-24 L	PVC	19.0	round		-25°C to +70°C	7.5	614
48375	Cu-CuNi (Ko)	U	AC 9-24 L	PVC	19.0	round			flexing	7.5
48492	Fe-CuNi	J	AF 9-24 L	PVC	19.0	round	-5°C to +70°C	7.5	614	
48376	Fe-CuNi (Ko)	L	AE 9-24 LS	PVC	20.2	round	-10°C to +80°C	stationary	7.5	738
48377	SoNiCr-SoNi	K	AN 9-24 LS	PVC	20.2	round			flexing	7.5
48378	SoPtRh-SoPt	S	AP 9-24 LS	PVC	20.2	round		-25°C to +70°C	7.5	738
48379	Cu-CuNi (Ko)	U	AC 9-24 LS	PVC	20.2	round			flexing	7.5
48164	Fe-CuNi (Ko)	L	AE 9-24 LSY	PVC	24.2	round	-10°C to +80°C	stationary	7.5	938
48165	SoNiCr-SoNi	K	AN 9-24 LSY	PVC	24.2	round			flexing	7.5
48166	SoPtRh-SoPt	S	AP 9-24 LSY	PVC	24.2	round		-25°C to +70°C	7.5	938
48380	Cu-CuNi (Ko)	U	AC 9-24 LSY	PVC	24.2	round			flexing	7.5
48381	Fe-CuNi (Ko)	L	AE 9-24 MSY	PVC	23.1	round	-10°C to +80°C	stationary	12	907
48382	SoNiCr-SoNi	K	AN 9-24 MSY	PVC	23.1	round			flexing	12
48383	SoPtRh-SoPt	S	AP 9-24 MSY	PVC	23.1	round		-25°C to +70°C	12	907
48384	Cu-CuNi (Ko)	U	AC 9-24 MSY	PVC	23.1	round			flexing	12
48385	Fe-CuNi (Ko)	L	AE 20-24 M	PVC	22.5	round	-10°C to +80°C	stationary	12	638
48386	SoNiCr-SoNi	K	AN 20-24 M	PVC	22.5	round			flexing	12
48387	SoPtRh-SoPt	S	AP 20-24 M	PVC	22.5	round		-25°C to +70°C	12	638
48388	Cu-CuNi (Ko)	U	AC 20-24 M	PVC	22.5	round			flexing	12
<b>Multiple-pair: 16 pairs (32 x 1.5 mm<sup>2</sup>) (L = stranded wire, conductor make-up 48 x 0.20 mm; M = solid conductor, conductor <math>\phi</math> 1.38 mm)</b>										
48389	Fe-CuNi (Ko)	L	AE 9-32 L	PVC	20.9	round	-10°C to +80°C	stationary	7.5	793
48390	SoNiCr-SoNi	K	AN 9-32 L	PVC	20.9	round			flexing	7.5
48391	SoPtRh-SoPt	S	AP 9-32 L	PVC	20.9	round		-25°C to +70°C	7.5	793
48392	Cu-CuNi (Ko)	U	AC 9-32 L	PVC	20.9	round			flexing	7.5
48493	Fe-CuNi	J	AF 9-32 L	PVC	20.9	round	-5°C to +70°C	7.5	793	
48393	Fe-CuNi (Ko)	L	AE 9-32 LS	PVC	22.1	round	-10°C to +80°C	stationary	7.5	923
48394	SoNiCr-SoNi	K	AN 9-32 LS	PVC	22.1	round			flexing	7.5
48395	SoPtRh-SoPt	S	AP 9-32 LS	PVC	22.1	round		-25°C to +70°C	7.5	923
48396	Cu-CuNi (Ko)	U	AC 9-32 LS	PVC	22.1	round			flexing	7.5

L = stranded conductor  
M = solid conductor  
tin. = tinned  
galv. = galvanized



# COMPENSATING CABLES

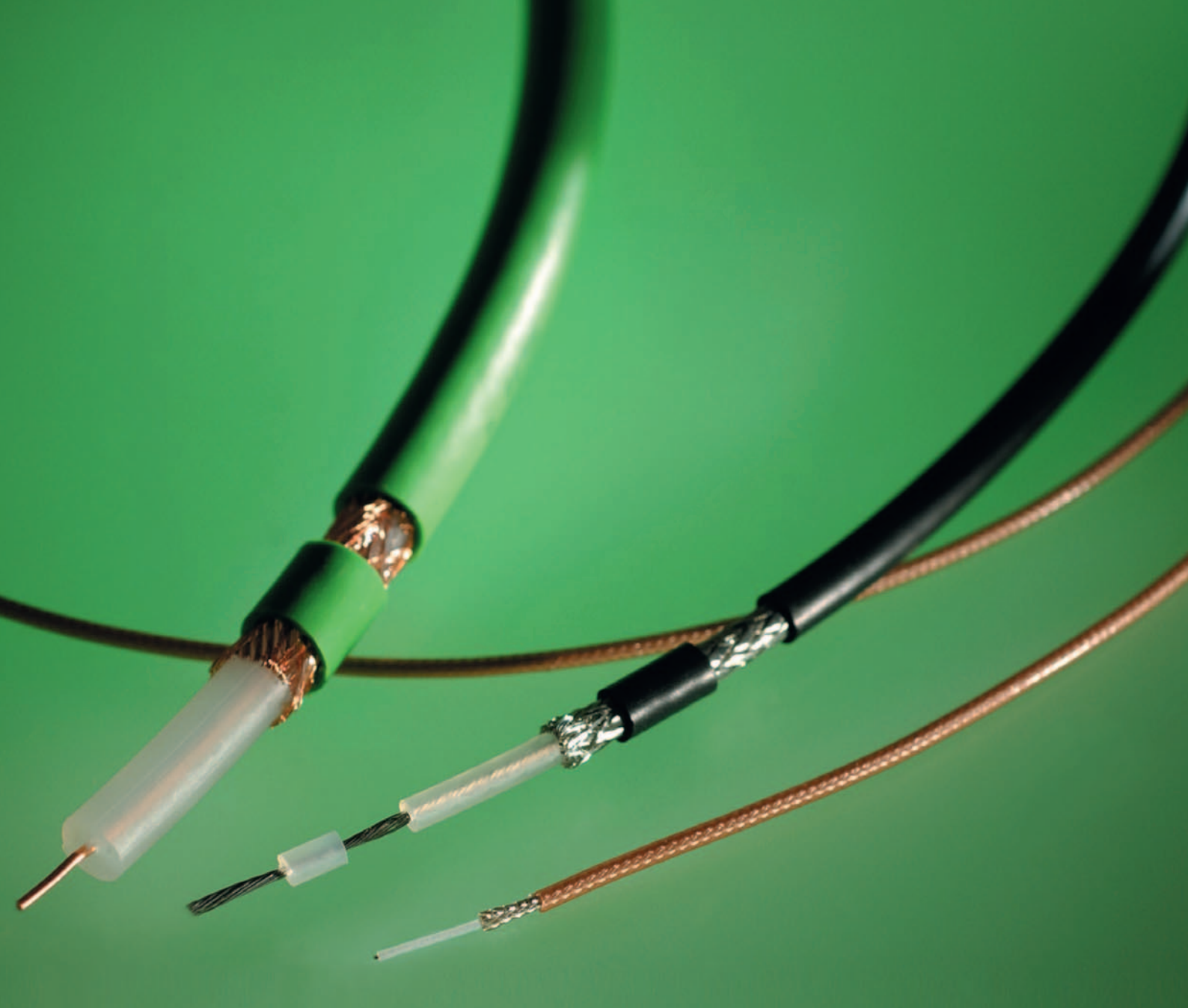
Part no.	Thermocouple element material in accordance with DIN 43713	Thermocouple type	Core insulation	Jacket/armor jacket	Outer ø approx. mm	Form	Temperature range of insulation °C	Installation temperature range °C	min. bending radius x cable ø	Weight approx. kg/km
<b>Multiple-pair: 16 pairs (32 x 1.5 mm<sup>2</sup>) (L = stranded wire, conductor make-up 48 x 0.20 mm; M = solid conductor, conductor ø 1.38 mm)</b>										
48397	FE-CuNi (Ko)	L	AE 9-32 LSY	PVC	26.1	round	-10°C to +80°C	stationary	7.5	1141
48398	SoNiCr-SoNi	K	AN 9-32 LSY	PVC	26.1	round		-25°C to +70°C	7.5	1141
48399	SoPtRh-SoPt	S	AP 9-32 LSY	PVC	26.1	round		flexing	7.5	1141
48400	Cu-CuNi (Ko)	U	AC 9-32 LSY	PVC	26.1	round		-5°C to +70°C	7.5	1141
48401	Fe-CuNi (Ko)	L	AE 9-32 MSY	PVC	25.3	round	-10°C to +80°C	stationary	12	1130
48402	SoNiCr-SoNi	K	AN 9-32 MSY	PVC	25.3	round		-25°C to +70°C	12	1130
48403	SoPtRh-SoPt	S	AP 9-32 MSY	PVC	25.3	round		flexing	12	1130
48404	Cu-CuNi (Ko)	U	AC 9-32 MSY	PVC	25.3	round		-5°C to +70°C	12	1130
48405	Fe-CuNi (Ko)	L	AE 20-32 M	PVC	25.1	round	-10°C to +80°C	stationary	12	847
48406	SoNiCr-SoNi	K	AN 20-32 M	PVC	25.1	round		-25°C to +70°C	12	847
48407	SoPtRh-SoPt	S	AP 20-32 M	PVC	25.1	round		flexing	12	847
48408	Cu-CuNi (Ko)	U	AC 20-32 M	PVC	25.1	round		-5°C to +70°C	12	847
<b>Multiple-pair: 18 pair (36 x 1.5 mm<sup>2</sup>) (L = stranded wire, conductor make-up 48 x 0.20 mm; M = solid conductor, conductor ø 1.38 mm)</b>										
48130	Fe-CuNi (Ko)	L	AE 9-36 L	PVC	22.1	round	-10°C to +80°C	stationary	7.5	904
48132	SoNiCr-SoNi	K	AN 9-36 L	PVC	22.1	round		-25°C to +70°C	7.5	904
48133	SoPtRh-SoPt	S	AP 9-36 L	PVC	22.1	round		flexing	7.5	904
48409	Cu-CuNi (Ko)	U	AC 9-36 L	PVC	22.1	round		-5°C to +70°C	7.5	904
48494	Fe-CuNi	J	AF 9-36 L	PVC	22.1	round		7.5	904	
48410	Fe-CuNi (Ko)	L	AE 9-36 LS	PVC	23.3	round	-10°C to +80°C	stationary	7.5	1040
48411	SoNiCr-SoNi	K	AN 9-36 LS	PVC	23.3	round		-25°C to +70°C	7.5	1040
48412	SoPtRh-SoPt	S	AP 9-36 LS	PVC	23.3	round		flexing	7.5	1040
48413	Cu-CuNi (Ko)	U	AC 9-36 LS	PVC	23.3	round		-5°C to +70°C	7.5	1040
48167	Fe-CuNi (Ko)	L	AE 9-36 LSY	PVC	27.3	round	-10°C to +80°C	stationary	7.5	1268
48169	SoNiCr-SoNi	K	AN 9-36 LSY	PVC	27.3	round		-25°C to +70°C	7.5	1268
48170	SoPtRh-SoPt	S	AP 9-36 LSY	PVC	27.3	round		flexing	7.5	1268
48414	Cu-CuNi (Ko)	U	AC 9-36 LSY	PVC	27.3	round		-5°C to +70°C	7.5	1268
48415	Fe-CuNi (Ko)	L	AE 9-36 MSY	PVC	26.1	round	-10°C to +80°C	stationary	12	1232
48416	SoNiCr-SoNi	K	AN 9-36 MSY	PVC	26.1	round		-25°C to +70°C	12	1232
48417	SoPtRh-SoPt	S	AP 9-36 MSY	PVC	26.1	round		flexing	12	1232
48418	Cu-CuNi (Ko)	U	AC 9-36 MSY	PVC	26.1	round		-5°C to +70°C	12	1232
48419	Fe-CuNi (Ko)	L	AE 20-36 M	PVC	26.0	round	-10°C to +80°C	stationary	12	944
48420	SoNiCr-SoNi	K	AN 20-36 M	PVC	26.0	round		-25°C to +70°C	12	944
48421	SoPtRh-SoPt	S	AP 20-36 M	PVC	26.0	round		flexing	12	944
48422	Cu-CuNi (Ko)	U	AC 20-36 M	PVC	26.0	round		-5°C to +70°C	12	944
<b>Multiple-pair: 19 pairs (38 x 1.5 mm<sup>2</sup>) (L = stranded wire, conductor make-up 48 x 0.20 mm)</b>										
48134	Fe-CuNi (Ko)	L	AE 9-38 L	PVC	22.5	round	-10°C to +80°C	stationary	7.5	937
48135	SoNiCr-SoNi	K	AN 9-38 L	PVC	22.5	round		-25°C to +70°C	7.5	937
48136	SoPtRh-SoPt	S	AP 9-38 L	PVC	22.5	round		flexing	7.5	937
48423	Cu-CuNi (Ko)	U	AC 9-38 L	PVC	22.5	round		-5°C to +70°C	7.5	937
48171	Fe-CuNi (Ko)	L	AE 9-38 LSY	PVC	26.5	round	-10°C to +80°C	stationary	7.5	1340
48172	SoNiCr-SoNi	K	AN 9-38 LSY	PVC	26.5	round		-25°C to +70°C	7.5	1340
48173	SoPtRh-SoPt	S	AP 9-38 LSY	PVC	26.5	round		flexing	7.5	1340
48424	Cu-CuNi (Ko)	U	AC 9-38 LSY	PVC	26.5	round		-5°C to +70°C	7.5	1340
<b>Multiple-pair: 20 pairs (40 x 1.5 mm<sup>2</sup>) (L = stranded wire, conductor make-up 48 x 0.20 mm; M = solid conductor, conductor ø 1.38 mm)</b>										
48425	Fe-CuNi (Ko)	L	AE 9-40 L	PVC	24.1	round	-10°C to +80°C	stationary	7.5	1032
48426	SoNiCr-SoNi	K	AN 9-40 L	PVC	24.1	round		-25°C to +70°C	7.5	1032
48427	SoPtRh-SoPt	S	AP 9-40 L	PVC	24.1	round		flexing	7.5	1032
48428	Cu-CuNi (Ko)	U	AC 9-40 L	PVC	24.1	round		-5°C to +70°C	7.5	1032
48429	Fe-CuNi (Ko)	L	AE 9-40 LS	PVC	25.3	round	-10°C to +80°C	stationary	7.5	1200
48430	SoNiCr-SoNi	K	AN 9-40 LS	PVC	25.3	round		-25°C to +70°C	7.5	1200
48431	SoPtRh-SoPt	S	AP 9-40 LS	PVC	25.3	round		flexing	7.5	1200
48432	Cu-CuNi (Ko)	U	AC 9-40 LS	PVC	25.3	round		-5°C to +70°C	7.5	1200
48433	Fe-CuNi (Ko)	L	AE 9-40 LSY	PVC	29.3	round	-10°C to +80°C	stationary	7.5	1446
48434	SoNiCr-SoNi	K	AN 9-40 LSY	PVC	29.3	round		-25°C to +70°C	7.5	1446
48435	SoPtRh-SoPt	S	AP 9-40 LSY	PVC	29.3	round		flexing	7.5	1446
48436	Cu-CuNi (Ko)	U	AC 9-40 LSY	PVC	29.3	round		-5°C to +70°C	7.5	1446
48437	Fe-CuNi (Ko)	L	AE 9-40 MSY	PVC	28.0	round	-10°C to +80°C	stationary	12	1381
48438	SoNiCr-SoNi	K	AN 9-40 MSY	PVC	28.0	round		-25°C to +70°C	12	1381
48439	SoPtRh-SoPt	S	AP 9-40 MSY	PVC	28.0	round		flexing	12	1381
48440	Cu-CuNi (Ko)	U	AC 9-40 MSY	PVC	28.0	round		-5°C to +70°C	12	1381
48441	Fe-CuNi (Ko)	L	AE 9-40M	PVC	26.0	round	-10°C to +80°C	stationary	12	1001
48442	SoNiCr-SoNi	K	AN 9-40 M	PVC	26.0	round		-25°C to +70°C	12	1001
48443	SoPtRh-SoPt	S	AP 9-40 M	PVC	26.0	round		flexing	12	1001
48444	Cu-CuNi (Ko)	U	AC 9-40 M	PVC	26.0	round		-5°C to +70°C	12	1001

L = stranded conductor  
M = solid conductor  
tin. = tinned  
galv. = galvanized

# COMPENSATING CABLES

Part no.	Thermocouple element material in accordance with DIN 43 713	Thermocouple type	Type	Core insulation	Jacket/armoring jacket	Outer ø approx. mm	Form	Temperature range of insulation °C	Installation temperature range °C	min. bending radius x cable ø	Weight approx. kg/km
<b>Single-pair: 2 x 0.22 mm<sup>2</sup> (L = stranded wire, conductor make-up 7 x 0.20 mm)</b>											
48200	Fe-CuNi (Ko)	L	AE 1 L	PVC		1.0	round	-10°C to +80°C	stationary	7.5	10
48201	SoNiCr-SoNi	K	AE 1 L	PVC		1.0	round				
48202	SoPtRh-SoPt	S	AE 1 L	PVC		1.0	round		flexing	7.5	10
48460	Cu-CuNi (Ko)	U	AE 1 L	PVC		1.0	round		-5°C to +70°C	7.5	10
<b>Single-pair: 2 x 0.22 mm<sup>2</sup> (L = stranded wire, conductor make-up 7 x 0.20 mm)</b>											
48203	Fe-CuNi (Ko)	L	AE 9-022	PVC	PVC	4.0	round	-10°C to +80°C	stationary	7.5	22
48204	SoNiCr-SoNi	K	AE 9-022	PVC		4.0	round				
48205	SoPtRh-SoPt	S	AE 9-022	PVC		4.0	round		flexing	7.5	22
48461	Cu-CuNi (Ko)	U	AE 9-022	PVC		4.0	round		-5°C to +70°C	7.5	22
48206	Fe-CuNi (Ko)	L	AE 5-022	PVC	PETP tape/ galv. Cu-round wire braid/ PVC	4.9	round	-10°C to +80°C	stationary	7.5	31
48207	SoNiCr-SoNi	K	AN 5-022	PVC		4.9	round				
48208	SoPtRh-SoPt	S	AP 5-022	PVC		4.9	round		flexing	7.5	31
48462	Cu-CuNi (Ko)	U	AC 5-022	PVC		4.9	round		-5°C to +70°C	7.5	31
48463	Fe-CuNi (Ko)	L	AE 15-022	glass-fiber	silicone	3.4	round	-40°C to +200°C	stationary	7.5	16
48464	SoNiCr-SoNi	K	AN 15-022	glass-fiber		3.4	round				
48465	SoPtRh-SoPt	S	AP 15-022	glass-fiber		3.4	round		flexing	7.5	16
48466	Cu-CuNi (Ko)	U	AC 15-022	glass-fiber		3.4	round		(short time +200°C)	7.5	16
48209	Fe-CuNi (Ko)	L	AE 15-G 022	glass-fiber	silicone/glass-fiber	3.9	round	-40°C to +200°C	stationary	7.5	22
48210	SoNiCr-SoNi	K	AN 15-G 022	glass-fiber		3.9	round				
48211	SoPtRh-SoPt	S	AP 15-G 022	glass-fiber		3.9	round		flexing	7.5	22
48467	Cu-CuNi (Ko)	U	AC 15-G 022	glass-fiber		3.9	round		(short time +200°C)	7.5	22
48212	Fe-CuNi (Ko)	L	AE (GI-SIL-GI-S)	glass-fiber	silicone/ Glass-fiber/ galv. steel wire braid	5.0	round	-40°C to +200°C	stationary	7.5	25
48213	SoNiCr-SoNi	K	AN (GI-SIL-GI-S)	glass-fiber		5.0	round				
48214	SoPtRh-SoPt	S	AP (GI-SIL-GI-S)	glass-fiber		5.0	round		flexing	7.5	25
48468	Cu-CuNi (Ko)	U	AC (GI-SIL-GI-S)	glass-fiber		5.0	round		(short time +200°C)	7.5	25
<b>Single-pair: 2 x 0.5 mm<sup>2</sup> (L = stranded wire, conductor make-up 16 x 0.20 mm)</b>											
48215	Fe-CuNi (Ko)	L	AE (GI-SIL)	glass-fiber	silicone	4.6	round	-40°C to +200°C	stationary	7.5	18
48216	SoNiCr-SoNi	K	AN (GI-SIL)	glass-fiber		4.6	round				
48217	SoPtRh-SoPt	S	AP (GI-SIL)	glass-fiber		4.6	round		flexing	7.5	18
48469	Cu-CuNi (Ko)	U	AC (GI-SIL)	glass-fiber		4.6	round		-25°C to +200°C	7.5	18
<b>Single-pair: 2 x 0.75 mm<sup>2</sup> (L = stranded wire, conductor make-up 24 x 0.20 mm)</b>											
48218	Fe-CuNi (Ko)	L	AE (PVC-PVC)	PVC	PVC	6.0	round	-10°C to +80°C	stationary	7.5	25
48219	SoNiCr-SoNi	K	AN (PVC-PVC)	PVC		6.0	round				
48220	SoPtRh-SoPt	S	AP (PVC-PVC)	PVC		6.0	round		flexing	7.5	25
48470	Cu-CuNi (Ko)	U	AC (PVC-PVC)	PVC		6.0	round		-5°C to +70°C	7.5	25
<b>Multiple-pair: 4 x 0.22 mm<sup>2</sup> (stranded wire, conductor make-up 7 x 0.20 mm)</b>											
48221	Fe-CuNi (Ko)	L	AE (PVC-PVC)	PVC	PVC	6.0	round	-10°C to +80°C	stationary	7.5	33
48222	SoNiCr-SoNi	K	AN (PVC-PVC)	PVC		6.0	round				
48223	SoPtRh-SoPt	S	AP (PVC-PVC)	PVC		6.0	round		flexing	7.5	33
48471	Cu-CuNi (Ko)	U	AC (PVC-PVC)	PVC		6.0	round		-5°C to +80°C	7.5	33
48224	Fe-CuNi (Ko)	L	AE (PVC-C-PVC)	PVC	galv. Cu-braid/ PVC jacket	6.0	round	-10°C to +80°C	stationary	7.5	37
48225	SoNiCr-SoNi	K	AN (PVC-C-PVC)	PVC		6.0	round				
48226	SoPtRh-SoPt	S	AP (PVC-C-PVC)	PVC		6.0	round		flexing	7.5	37
48472	Cu-CuNi (Ko)	U	AC (PVC-C-PVC)	PVC		6.0	round		-5°C to +80°C	7.5	37
48227	Fe-CuNi (Ko)	L	AE (GIL-SIL)	glass-fiber	silicone	6.0	round	-40°C to +200°C	stationary	7.5	35
48228	SoNiCr-SoNi	K	AN (GIL-SIL)	glass-fiber		6.0	round				
48229	SoPtRh-SoPt	S	AP (GIL-SIL)	glass-fiber		6.0	round		flexing	7.5	35
48473	Cu-CuNi (Ko)	U	AC (GIL-SIL)	glass-fiber		6.0	round		-25°C to +180°C	7.5	35

L = stranded conductor  
M = solid conductor  
tin. = tinned  
galv. = galvanized



## **RG-Coaxial Cable**

Multimedia Coaxial Cable

CATV-Cable

## **SAT-Coaxial Cable**

RGB-COAX-CY/RGB-COAX-(ST) Y

Halogen-Free RG-Coaxial Cables

# ■ COAXIAL CABLES

Description	Properties	Page
RG-Coaxial Cables		338
RG-Coaxial Cables		339
RG-Coaxial Cables		340
Halogen-Free RG-Coaxial Cables		341
CATV-Cables		342
SAT-Coaxial Cables	up to 2150 MHz, for satellite-receivers, double screened	343
Multimedia-Coaxial Cables	SAT 1,0/4,6GH, up to 2400MHz, for digital-tv, double screened, screening efficiency >90dB	344
SAT-Coaxial Cables	for digital-tv, screening efficiency >90dB / >95dB, for satellite-receivers, double screened	345
RGB-COAX-CY / RGB-COAX-(St)Y	transmission cables for colour monitor	346

# RG-Coaxial Cables



Type	RG 6 A/U	RG 11 A/U	RG 58 C/U	RG 59 B/U	RG 62 A/U	RG 71 B/U
Part no.	40001	40002	40003	40004	40005	40006
<b>Cable structure</b>						
Inner conductor diameter mm	1 x 0,7	7 x 0,4	19 x 0,2	1 x 0,6	1 x 0,6	1 x 0,6
	Steel/copper, bare	Tinned copper	Tinned copper	Steel/copper, bare	Steel/copper, bare	Steel/copper, bare
Insulation Ø mm	4,7 PE	7,3 PE	2,95 PE	3,7 PE	3,7 PE, hollow	3,7 PE, hollow
Outer conductor	2 braids Silvered copper Copper, bare	Braid Copper, bare	Braid Tinned copper	Braid Copper, bare	Braid Copper, bare	2 braids Copper, bare Tinned copper
Outer sheath	PVC	PVC	PVC	PVC	PVC	PVC
Min. bending radius approx. mm	40	50	25	30	30	30
Temperature range °C	-35 to +80	-35 to +80	-35 to +80	-35 to +80	-35 to +80	-50 to +70
Copper weight kg/km	72,0	58,0	29,0	28,0	28,0	48,0
Outer Ø approx. mm	8,4	10,3	5,0	6,2	6,2	6,2
Weight approx. kg / km	115	140	38	57	52	62
<b>Electrical characteristics</b>						
<b>Impedance (Ohm)</b>	<b>75 ± 3</b>	<b>75 ± 3</b>	<b>50 ± 2</b>	<b>75 ± 3</b>	<b>93 ± 5</b>	<b>93 ± 3</b>
Frequency range						
f (max.) GHz	3	3	3	3	3	3
Propagation velocity v/c	0,7	0,7	0,7	0,7	0,8	0,8
Attenuation at 20°C (db/100m)						
100 MHz	8,8	7,5	17	11,5	10,5	10,5
200 MHz	13,5	11	24	16,5	15	15
500 MHz	21	18,5	39	27	24,5	24,5
800 MHz	27,5	24	51	35	32,5	32,5
1000 MHz	-	30	56	41	35	-
1350 MHz	-	-	-	-	-	-
1750 MHz	-	-	-	-	-	-
Capacitance pF/m	67	67	101	67	42,5	42,5
Rel. velocity of propagation %	67	67	67	67	83	83
Insulation resistance						
MOhm x kmmin.	10 <sup>5</sup>	10 <sup>5</sup>	10 <sup>5</sup>	10 <sup>5</sup>	10 <sup>5</sup>	10 <sup>5</sup>
Loop resistance						
max. (Ohm/km)	110	23	53	171	155	136
Nominal peak voltage kVs	3	5	2	4	1	2
Dielectric strength						
50 Hz kVeff	7	10	5	7	3	3

Dimensions and specifications may be changed without prior notice. (RM01)

## Note

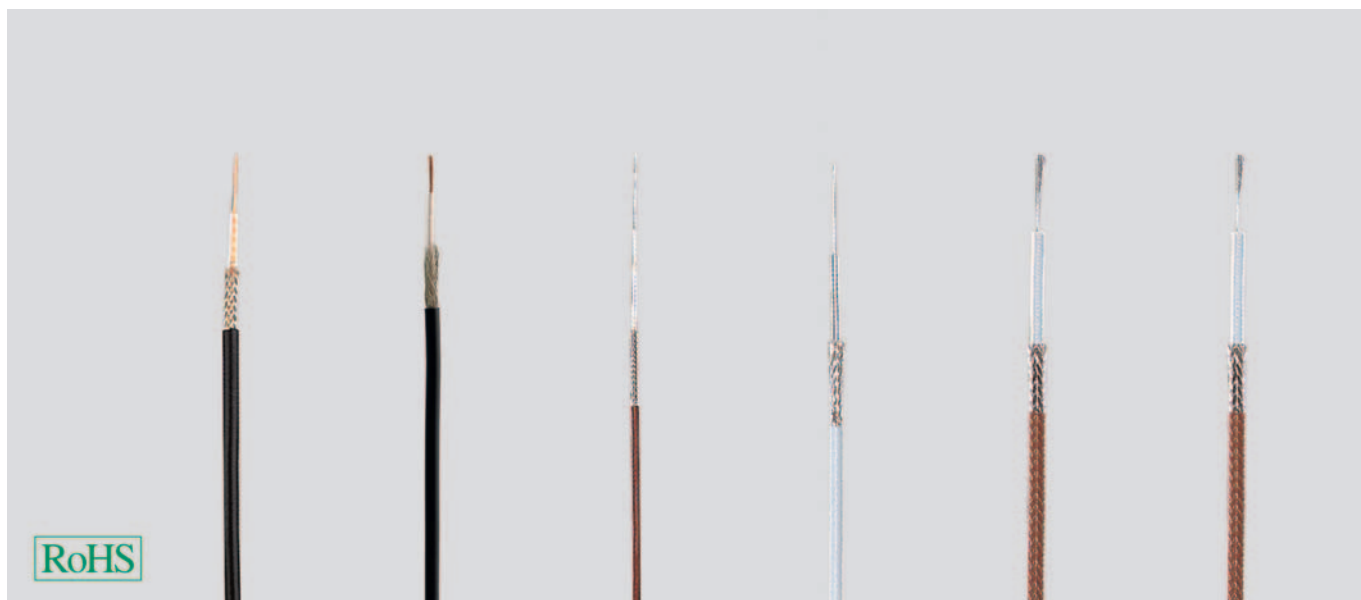
- The materials used in manufacture are cadmium-free and contain no silicone and free from substances harmful to the wetting properties of lacquers.
- RG-Coaxial types are in accordance with US-Military specifications MIL-C-17.
- RG/U: R=Radio, G=Guide, U=Utility

## Application

Coaxial cables are used in high frequency transmission, especially for transmitters and receivers, computers, radio and TV transmissions. The varied mechanical, thermal and electronic properties of Coaxial cables mean that they can be used up into the GHz levels, as per cable type.



# RG-Coaxial Cables



Type	RG 174 A/U	RG 174 U	RG 178 B/U	RG 179 B/U	RG 180 B/U	RG 187 A/U
Part no.	40197	400189	40007	40008	40009	40010
<b>Cable structure</b>						
Inner conductor diameter mm	7 x 0,2	7 x 0,2	7 x 0,1	7 x 0,1	7 x 0,1	7 x 0,1
	Steel/copper, bare	Steel/copper, bare	Steel/copper, silvered	Steel/copper, silvered	Steel/copper, silvered	Steel/copper, silvered
Insulation Ø mm	1,52 PE	1,52 PE	0,86 PTFE	1,6 PTFE	2,6 PTFE	1,6 PTFE
Outer conductor	Braid Tinned copper	Braid Tinned copper	Braid Silvered copper	Braid Silvered copper	Braid Silvered copper	Braid Silvered copper
Outer sheath	PVC	PVC	FEP	FEP	FEP	PFA
Min. bending radius approx. mm	15	15	10	15	25	15
Temperature range °C	-35 to +80	-35 to +80	-55 to +200	-55 to +200	-55 to +200	-55 to +260
Copper weight kg/km	7,0	7,0	7,0	8,0	11,0	9,0
Outer Ø approx. mm	2,8	2,6	1,8	2,5	3,7	2,6
Weight approx. kg / km	11	11	8	16	28	17
<b>Electrical characteristics</b>						
<b>Impedance (Ohm)</b>	<b>50 ± 2</b>	<b>50 ± 2</b>	<b>50 ± 2</b>	<b>75 ± 3</b>	<b>95 ± 5</b>	<b>75 ± 3</b>
Frequency range						
f (max.) GHz	1	1	3	3	3	3
Propagation velocity v/c	0,7	0,7	0,7	0,7	0,7	0,7
Attenuation at 20°C (db/100m)						
100 MHz	30	30	43	28	20	28
200 MHz	45	45	62	41	33	41
500 MHz	73	73	102	69	-	69
800 MHz	93	93	134	92	-	92
1000 MHz	-	-	-	-	-	-
1350 MHz	-	-	-	-	-	-
1750 MHz	-	-	-	-	-	-
Capacitance pF/m	101	101	93	63	50	64
Rel. velocity of propagation %	70	70	70	70	70	70
Insulation resistance						
MOhm x kmmin.	10 <sup>5</sup>	10 <sup>5</sup>	10 <sup>5</sup>	10 <sup>5</sup>	10 <sup>5</sup>	10 <sup>5</sup>
Loop resistance						
max. (Ohm/km)	360	360	860	840	840	840
Nominal peak voltage kVs	1	1	1	1	2	1
Dielectric strength						
50 Hz kVeff	2	2	2	2	2	2

Dimensions and specifications may be changed without prior notice.

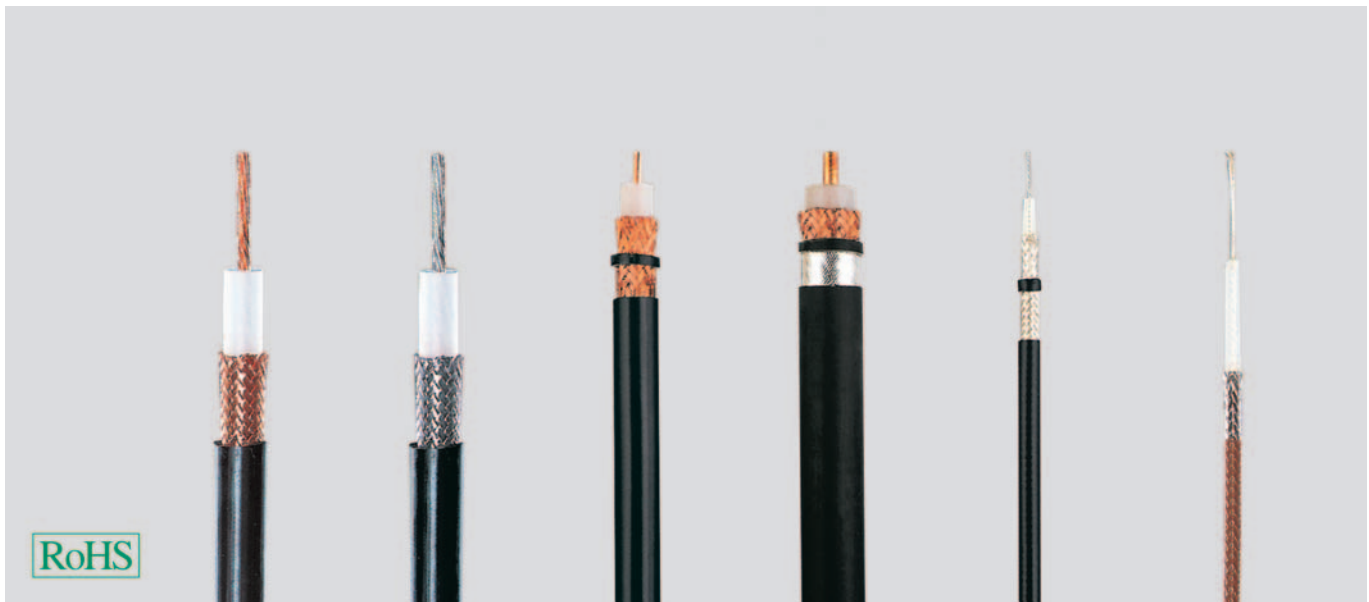
## Note

- The materials used in manufacture are cadmium-free and contain no silicone and free from substances harmful to the wetting properties of lacquers.
- The colour at FEP and PFA outer sheath is brown or white as per production outlet.
- RG-Coaxial types are in accordance with US-Military specifications MIL-C-17.
- RG/U: R=Radio, G=Guide, U=Utility

## Application

Coaxial cables are used in high frequency transmission, especially for transmitters and receivers, computers, radio and TV transmissions. The varied mechanical, thermal and electronic properties of Coaxial cables mean that they can be used up into the GHz levels, as per cable type.

# RG-Coaxial Cables



Type	RG 213	RG 214 U	RG 217	RG 218	RG 223 U	RG 316 B/U
Part no.	40012	40011	40200	40201	40202	40203
<b>Cable structure</b>						
Inner conductor diameter mm	7 x 0,8	7 x 0,8	1 x 2,7	1 x 4,95	1 x 0,9	7 x 0,2
Insulation Ø mm	7,24 PE	7,24 PE	9,4 PE	17,3 PE	2,95 PE	1,52 PTFE
Outer conductor	Braid Copper, bare	2 braids 2x silvered copper	2 braids Copper, bare	Braid Copper, bare	2 braids 2x silvered copper	Braid Silvered copper
Outer sheath	PVC	PVC	PVC	PVC	PVC	PTFE/ alt. FEP
Min. bending radius approx. mm	50	50	70	110	25	15
Temperature range °C	-35 to +80	-35 to +80	-35 to +80	-35 to +80	-35 to +80	-55 to +200
Copper weight kg/km	85,0	120,0	187,0	348,0	44,0	9,0
Outer Ø approx. mm	10,3	10,8	13,84	22,1	5,2	2,5
Weight approx. kg / km	159	198	300	710	60	15
<b>Electrical characteristics</b>						
<b>Impedance (Ohm)</b>	<b>50 ± 2</b>	<b>50 ± 2</b>	<b>50 ± 2</b>	<b>50 ± 2</b>	<b>50 ± 2</b>	<b>50 ± 2</b>
Frequency range						
f (max.) GHz	3	11	3	3	3	3
Propagation velocity v/c	0,7	0,7	0,66	0,66	0,7	0,7
Attenuation at 20°C (db/100m)						
100 MHz	7	7	4,8	2,9	17	28
200 MHz	10,2	10,2	7,1	4,5	23	40
500 MHz	17	17	12,3	8,1	38	68
800 MHz	23	23	16,8	11,2	50	90
1000 MHz	-	-	-	-	-	-
1350 MHz	-	-	-	-	-	-
1750 MHz	-	-	-	-	-	-
Capacitance pF/m	101	101	101	101	101	95
Rel. velocity of propagation %	100	67	100	100	67	70
Insulation resistance MOhm x kmmin.	10 <sup>5</sup>	10 <sup>5</sup>	10 <sup>5</sup>	10 <sup>5</sup>	10 <sup>5</sup>	10 <sup>5</sup>
Loop resistance max. (Ohm/km)	10	10	5	2	36	310
Nominal peak voltage kVs	5	5	7	11	2	1
Dielectric strength 50 Hz kVeff	10	10	10	15	5	2

Dimensions and specifications may be changed without prior notice.

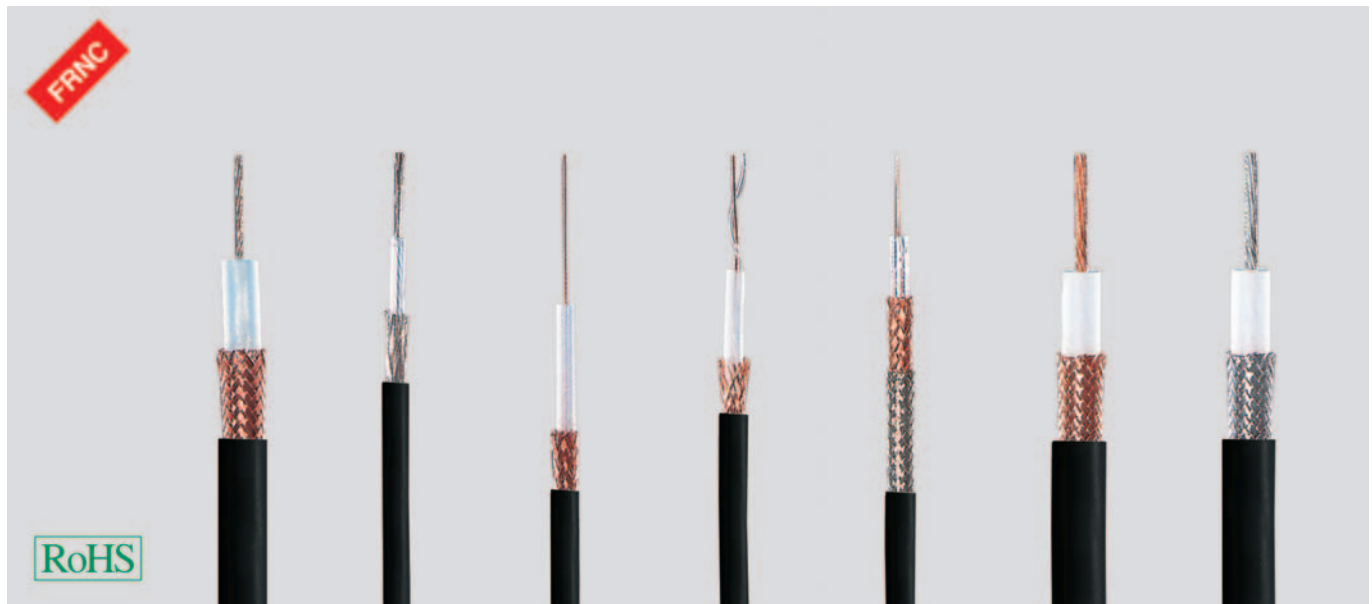
## Note

- The materials used in manufacture are cadmium-free and contain no silicone and free from substances harmful to the wetting properties of lacquers.
- The colour outer sheath at PTFE is brown or transparent as per production outlet.
- RG-Coaxial types are in accordance with US-Military specifications MIL-C-17.
- RG/U: R=Radio, G=Guide, U=Utility

## Application

Coaxial cables are used in high frequency transmission, especially for transmitters and receivers, computers, radio and TV transmissions. The varied mechanical, thermal and electronic properties of Coaxial cables mean that they can be used up into the GHz levels, as per cable type.

# Halogen-Free RG-Coaxial Cables



Type RG.../U	11 A/U	58 C/U	59 B/U	62 A/U	71 B/U	213 U	214 U
Part no.	40190	40191	40192	40193	40194	40195	40196

## Cable structure

Inner conductor diameter mm	7 x 0,4	19 x 0,2	1 x 0,6	1 x 0,6	1 x 0,6	7 x 0,8	7 x 0,8
	Tinned copper	Tinned copper	Steel/copper, bare	Steel/copper, bare	Steel/copper, bare	Copper, bare	Silvered copper
Insulation Ø mm	7,3 PE	2,95 PE	3,7 PE	3,7 PE, hollow	3,7 PE, hollow	7,24 PE	7,24 PE
Outer conductor	Braid Copper, bare	Braid Tinned copper	Braid Copper, bare	Braid Copper, bare	2 braids Copper, bare Tinned copper	Braid Copper, bare	2 braids 2x silvered copper
Outer sheath	HM2	HM2	HM2	HM2	HM2	HM2	HM2
Min. bending radius approx. mm	50	25	30	30	30	50	50
Temperature range °C	-35 to +80	-35 to +80	-35 to +80	-35 to +80	-50 to +70	-35 to +80	-35 to +80
Copper weight kg/km	58,0	29,0	28,0	28,0	48,0	85,0	120,0
Outer Ø approx. mm	10,3	5,4	6,4	6,4	6,9	10,3	10,8
Weight approx. kg / km	144	38	57	54	64	155	203

## Electrical characteristics

Impedance (Ohm)	75 ± 3	50 ± 2	75 ± 3	93 ± 5	93 ± 3	50 ± 2	50 ± 2
Frequency range f (max.) GHz	3	3	3	3	3	3	11
Propagation velocity v/c	0,7	0,7	0,7	0,8	0,8	0,7	0,7
Attenuation at 20°C (db/100m)							
3 MHz	1,3	2,9	2	2	2	1,2	1,2
10 MHz	2,4	5,3	3,8	3,7	3,7	2,3	2,3
100 MHz	7,8	17	12,2	12	12,5	7,5	7,5
200 MHz	11,3	24,4	17,6	17,3	17,3	10,9	10,9
500 MHz	18,7	39,2	27,2	24,7	24,7	17,2	17,2
800 MHz	23,4	47,8	35,2	34,6	34,6	22,6	22,6
Capacitance pF/m	68	0	68	42,5	42,5	101	101
Rel. velocity of propagation %	67	67	67	43	43	101	101
Insulation resistance MOhm x kmmin.	10 <sup>5</sup>	10 <sup>5</sup>	10 <sup>5</sup>	10 <sup>5</sup>	10 <sup>5</sup>	10 <sup>5</sup>	10 <sup>5</sup>
Loop resistance max. (Ohm/km)	23	53	171	155	136	10	10
Nominal peak voltage kVs	5	2	2	1	1	5	5
Dielectric strength 50 Hz kVeff.	10	5	7	3	3	10	10

Dimensions and specifications may be changed without prior notice. (RM01)

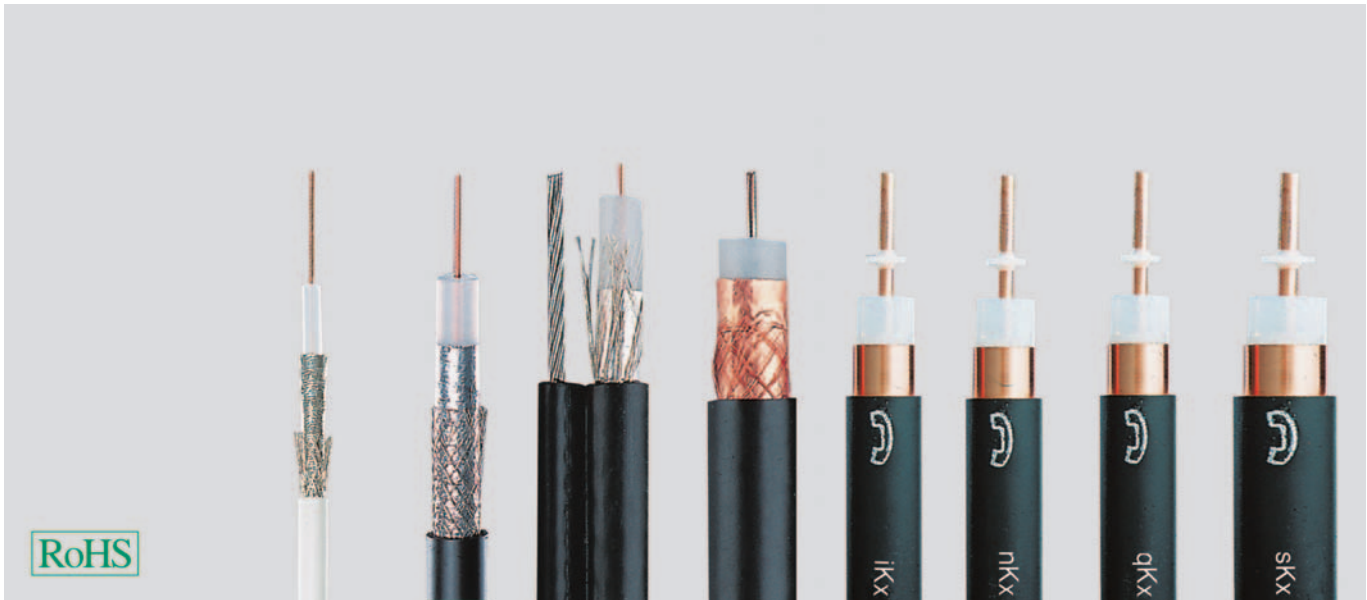
## Note

- The materials used in manufacture are cadmium-free and contain no silicone and free from substances harmful to the wetting properties of lacquers.
- H-outer sheath = halogen-free material (HM2)
- RG-Coaxial types are in accordance with US-Military specifications MIL-C-17.
- RG/U: R=Radio, G=Guide, U=Utility
- FRNC = Flame Retardant Non-Corrosive

## Application

Coaxial cables are used in high frequency transmission, especially for transmitters and receivers, computers, radio and TV transmissions where no flame propagation under behaviour in fire is permitted. The varied mechanical, thermal and electronic properties of Coaxial cables mean that they can be used up into the GHz levels, as per cable type.

# CATV-Cables with alu- or copper foil and braiding



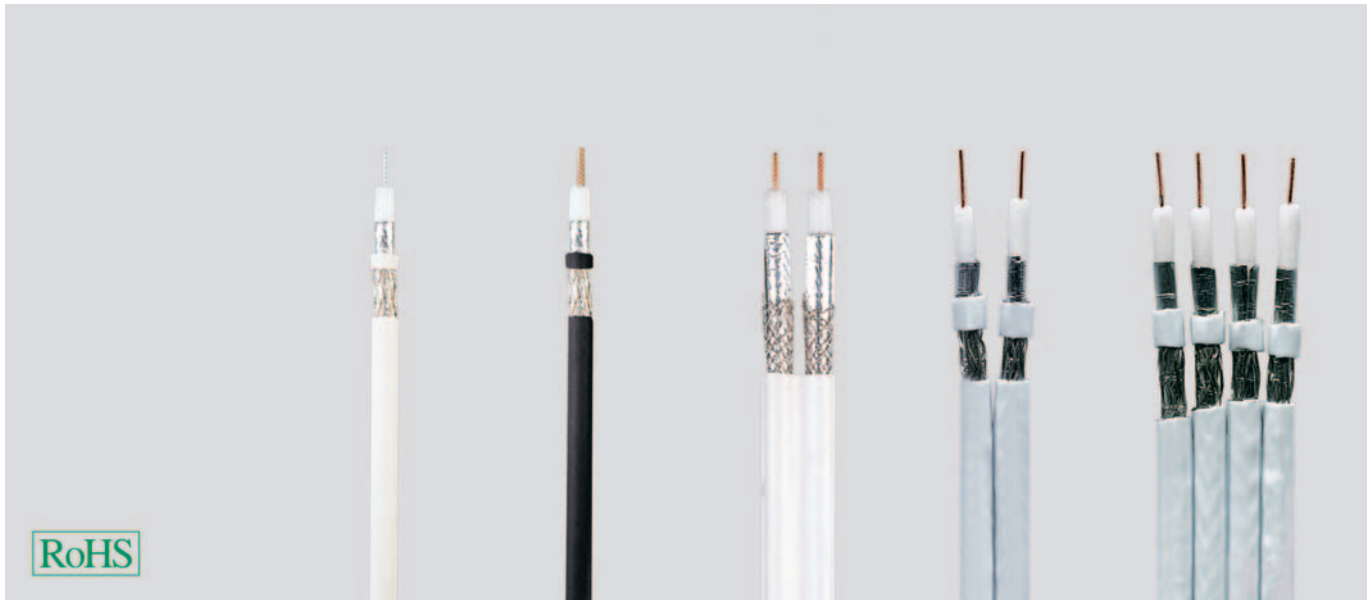
used as Type	0.7/4.4 ALG	Underground 1.1/7.3 ALG	Outdoor span 1.1/7.3 ALG-T	Underground 1.8/11.5 FG	BK-Underground A-2YK2Y1 iKx 1.1/7.3	BK-Underground A-2Y0K2Y1 nKx 2.2/8.8	BK-Underground A-2Y0K2Y1 qKx 3.3/13.5	BK-Underground A-2Y0K2Y1 sKx 4.9/19.4
Part no.	40135	40139	40140	40141	40142	40143	40144	40179
<b>Cable structure</b>								
Inner conductor diameter mm	0,7	1,1	1,1	1,8	1,1	2,2	3,3	4,9
Insulation Ø mm	4,4 PE	7,3 PE	7,3 PE	11,5 PE	7,3 PE	8,8 PE, hollow	13,5 PE, hollow	19,4 PE, hollow
Outer conductor	Polyester foil coated with aluminium on both sides	Polyester foil coated with aluminium on both sides	Polyester foil coated with aluminium on both sides	Copper tape	Copper tube, welded	Copper tube, welded	Copper tube, welded	Copper tube, welded
Braid	-	Braid	Braid	Braid	-	-	-	-
Outer sheath	PVC	PE	PE	PE	PE	PE	PE	PE
Sheath colour	white	black	black	black	black	black	black	black
Outer Ø approx. mm	6,6	10,5	2,8	15,0	11,0	12,5	17,0	24,4
Min. bending radius approx. mm	35	100	150	150	160	200	300	400
Strain/suspending wire N	-	-	5500	-	-	-	-	-
Weight approx. kg / km	44	98	177	218	142	183	347	500
<b>Electrical characteristics</b>								
<b>Impedance (Ohm)</b>	<b>75 ± 3</b>	<b>75 ± 3</b>	<b>75 ± 3</b>	<b>75 ± 3</b>	<b>75 ± 2</b>	<b>75 ± 2</b>	<b>75 ± 1</b>	<b>75 ± 1</b>
Capacitance pF/m	67	67	67	67	65	51	51	50
Propagation velocity v/c	0,7	0,7	0,7	0,7	0,7	0,88	0,88	0,89
Attenuation at 20°C (db/100m)								
100 MHz	9	5,2	5,2	3,5	5,4	2,8	1,9	1,3
200 MHz	12	7,3	7,3	5,2	7,9	4	2,7	1,9
500 MHz	21,2	12,6	12,6	9	12,9	6,6	4,4	3,1
800 MHz	27,5	16,8	16,8	12	17,3	8,4	5,7	4,1
950 MHz	30,5	18,8	18,8	13	18,9	9,3	6,3	4,4
1350 MHz	37	23	23	-	-	-	-	-
1750 MHz	43	27,7	27,7	-	-	-	-	-
2050 MHz	47,5	30,2	30,2	-	-	-	-	-
Structural return loss min. (dB) between								
30 and 300 MHz	30	32	32	30	26	26	28	28
300 and 600 MHz	30	32	32	30	23	23	25	25
600 and 960 MHz	25	30	30	28	21	21	23	23
960 and 1750 MHz	23	27	27	25	-	-	-	-
<b>DC resistance at 20°C</b>								
Inner conductor max. Ohm/km	47	18,5	18,5	7,3	22	5,6	2,5	1
Outer conductor max. Ohm/km	23	11	11	6,5	3,1	3	2	1
<b>Screening efficiency (dB)</b>								
50 and 100 MHz≥	75	80	80	80	110	110	110	110
100 and 500 MHz≥	75	85	85	85	110	110	110	110
500 and 1000 MHz≥	75	85	85	85	110	110	110	110
1000 and 2050 MHz≥	75	78	78	80	110	110	110	110
<b>Post office approved</b>								
	G670009A	G670011A	G622015B	G622010B	-	-	-	-

Dimensions and specifications may be changed without prior notice. (RM01)

## Note

- The materials used in manufacture are cadmium-free and contain no silicone and free from substances harmful to the wetting properties of lacquers.
- BK-underground: broadband cable in accordance with FTZ 15 TV 11 (post cable)
- **AL**=Aluminium, **ALPR**=Polyesterfoil coated with Aluminium on both sides  
**BK-cable**=broadband communication cable, **Cu**=Copper, **CuR**=Cu-tube welded, **CuW**=Copperweld, **F**=Foil, **G**=Braid, **PE**=Polyethylene, **PEH**=Polyethylene air-space insulation, **PVC**=Polyvinylchloride

# SAT-Coaxial Cables up to 2150 MHz, for satellite-receivers, double screened



Type	1,1/4,8	1.65/7.2 ALG	SAT-MINI 1	DUO 2x0.7/2.9	QUADRO 4x0.7/2.9
Part no.	40150	40151	40159	40168	40169
<b>Cable structure</b>					
Inner conductor diameter mm	1,1 Tinned copper	1,6 Copper, bare	0,8 Copper, bare	0,65 Copper, bare	0,6 Copper, bare
Insulation Ø mm	5 Cell PE	7,2 Cell PE	3,5 Cell PE	3 Cell PE	3 Cell PE
Core colours	-	-	-	-	-
Outer conductor	Polyester foil coated with aluminium on both sides Braid	Polyester foil coated with aluminium on both sides Braid	Polyester foil coated with aluminium on both sides Braid	Polyester foil coated with aluminium on both sides Braid	Polyester foil coated with aluminium on both sides Braid
Outer sheath	PVC	PE	PVC	PVC	PVC
Sheath colour	white	black	white	white	white
Outer Ø approx. mm	6,8	10,1	5,4 x 10,8	8,6 x 4,3	20,0 x 4,3
Min. bending radius approx. mm	50	60	40	35	80
Weight approx. kg / km	49	81	62	40	82
<b>Electrical characteristics</b>					
<b>Impedance (Ohm)</b>	<b>75 ± 3</b>	<b>75 ± 3</b>	<b>75 ± 3</b>	<b>75 ± 3</b>	<b>75 ± 3</b>
Capacitance pF/m	55	55	55	55	55
Propagation velocity v/c	0,8	0,82	0,82	0,8	0,8
Attenuation at 20°C (db/100m)					
100 MHz	5	3,7	8	8,9	8,9
200 MHz	7,3	5,1	11,5	13,5	13,5
500 MHz	13	9	18,5	22	22
800 MHz	17,2	11,8	23,5	28	28
950 MHz	19,5	13,6	25,5	31,5	31,5
1350 MHz	23,5	16,8	31	37	37
1750 MHz	27,6	19,7	35,5	42,3	42,3
2050 MHz	30	22	39,5	45,9	45,9
2150 MHz	31	22,5	43	50,4	50,4
Structural return loss min. (dB) between					
30 and 300 MHz	28	31	27	20	20
300 and 600 MHz	28	30	25	17	18
600 and 960 MHz	26	30	20	17	15
960 and 2050 MHz	24	28	20	-	-
<b>DC resistance at 20°C</b>					
Inner conductor max.Ohm/km	18	9	36	110	52
Outer conductor max.Ohm/km	20	12	28	22	26
Max. nominal voltage (V)	-	-	-	-	-
<b>Screening efficiency (dB)</b>					
50 and 100 MHz≥	75	80	78	75	75
100 and 500 MHz≥	75	85	78	75	75
500 and 1000 MHz≥	75	85	75	75	75
1000 and 2050 MHz≥	75	78	75	75	75
<b>Post office approved</b>					
	G670010A	G622016B	-	-	-
Copper weight kg/km	21,0	35,0	30,0	16,0	50,0

Dimensions and specifications may be changed without prior notice. (RM01)

## Note

- The materials used in manufacture are cadmium-free and contain no silicone and free from substances harmful to the wetting properties of lacquers.
- **AL**=Aluminium, **ALPR**=Polyesterfoil coated with Aluminium on both sides  
**Cu**=Copper, **CuW**=Copperweld, **F**=Foil, **G**=Braid, **PE**=Polyethylene, **PEH**=Polyethylene air-space insulation, **PVC**=Polyvinylchloride, **vz**=tinned



# Multimedia-Coaxial Cables SAT 1,0/4,6GH, up to 2400MHz, for digital-tv, double screened, screening efficiency >90dB



used as Type	inner/outer 1.0/4.6 GH-Y	Underground 1.0/4.6 GH-2Y	Safety zones 1.0/4.6 GH-FRNC
Part no.	40176	40177	40178
<b>Cable structure</b>			
Inner conductor diameter mm	1 Copper with skin	1 Copper with skin	1 Copper with skin
Insulation Ø mm	4,6 Cell polyethylene with skin and PIB coating	4,6 Cell polyethylene with skin and PIB coating	4,6 Cell polyethylene with skin and PIB coating
Outer conductor	Polyester foil coated with aluminium on both sides	Polyester foil coated with aluminium on both sides	Polyester foil coated with aluminium on both sides
Outer sheath	PVC	PE	FRNC
Sheath colour	white	black	grey
Outer Ø approx. mm	6,6	6,6	6,6
Approx. bending radius approx. mm	45	45	45
Weight approx. kg / km	40	40	40
<b>Electrical characteristics</b>			
<b>Impedance (Ohm)</b>	<b>75 ± 1</b>	<b>75 ± 1</b>	<b>75 ± 1</b>
Capacitance pF/m	55	55	55
Propagation velocity v/c	0,8	0,85	0,85
Attenuation at 20°C (db/100m)			
100 MHz	5,8	5,8	5,8
200 MHz	7,8	7,8	7,8
450 MHz	12,5	12,5	12,5
600 MHz	14,7	14,7	14,7
800 MHz	17,2	17,2	17,2
1000 MHz	19,1	19,1	19,1
1750 MHz	26,2	26,2	26,2
2050 MHz	28,5	28,5	28,5
2400 MHz	31,3	31,3	31,3
Structural return loss min. (dB) between			
30 and 300 MHz	30	30	30
300 and 600 MHz	32	32	32
600 and 960 MHz	31	31	31
960 and 1750 MHz	26	26	26
1750 and 2400 MHz	30	30	30
<b>DC resistance at 20°C</b>			
Inner conductor max.Ohm/km	18	18	18
Outer conductor max.Ohm/km	20	20	20
Max. nominal voltage (V)	-	-	-
Screening efficiency (dB) ≥	90	90	90
Copper weight kg/km	22,0	22,0	22,0

Dimensions and specifications may be changed without prior notice. (RM01)

## Note

- The materials used in manufacture are cadmium-free and contain no silicone and free from substances harmful to the wetting properties of lacquers.
- FRNC**=Flame Retardant Non Corrosive, **PEE**= Cell-Polyethylene, **PIB**= Polyisobutylene, **ALPR**=Polyesterfoil coated with Aluminium on both sides  
**F**=Foil, **G**=Braid, **GH**=Braid-covering ca. 88%

## Application

### • Copper inner-conductor 1,02 with skin-effect

Protection against humidity and corrosion / Solid compound of dielectric. No change of position during installation in narrow bending radius.

### • Dielectric 4,6 mm Ø : - special PE-compound, foaming by GAS-INJEKTION

Important improvement of propagation velocity values / Very high transmission speed of individual signals (presumption for Multimedia) / Improvement for the resistance to ageing / Reduction of attenuation-loss by approx. 2dB

### • The over surface of dielectric consists too a skin-coating (smooth over surface)

Protection against humidity and other chemical influences / Minimum impedance tolerance ± 2 Ohm / This coaxial cable is crimpable / Installation in narrow bending radius, no kinking risk / The transmission-loss of signals are hardly measurable to the advance in years / Additionally to the skin-effect, the dielectric contains a gel-coating (special PIB-cmpound) / We therefore offer a **15 years guarantee for attenuation-loss** by installation at 20°C room-temperature

### • Screening

a) AL/PR-foil, polyesterfoil coated with aluminium on both sides or b) Copper braiding of tinned wires, **screening efficiency >90 dB**

# SAT-Coaxial Cables for digital-tv, screening efficiency >90dB / >95dB, for satellite-receivers, double screened



used as Type	inner 0,7/2,9	inner/outer 0,7/4,5	inner/outer 0,8/3,5	inner 1,1/5,0	Underground 1.6/7,0	inner 1,1/5,0 FRNC	inner/outer 1,1/5,0 FRNC	inner 1.6/7.0 FRNC
Part no.	40015	40016	40085	40017	40018	40019	40021	40020
<b>Cable structure</b>								
Inner conductor diameter mm	0,6	0,75	0,8	1,1	1,63	1,1	1,1	1,6
	Copper, bare	Tinned copper	Copper, bare	Copper, bare	Copper, bare	Copper, bare	Copper, bare	Copper, bare
Insulation Ø mm	3 Polyethylene, foamed	4,5 Polyethylene, foamed	3,5 Polyethylene, foamed	4,8 Polyethylene, foamed	7,1 Polyethylene, foamed	4,8 Cell PE, foamed	4,8 Cell PE, foamed	7,1 Polyethylene, foamed
Outer conductor	ALPR-FG	ALPR-FG	ALPR-FG	ALPR-FG	ALPR-FG	ALPR-FG	ALPR-FG	ALPR-FG
1st Screen - ALPR	foil	foil	foil	foil	foil	foil	foil	foil
2nd Screen - Cu-Braid	Braid	Braid	Braid	Braid	Braid	Braid	Braid	Braid
Outer sheath	PVC	PVC	PVC	PVC	PE	FRNC	FRNC	FRNC
Sheath colour	white	white	white	white	black	white	black	white
Outer Ø approx. mm	4,3	6,6	5,0	6,9	10,3	6,8	6,8	10,0
Min. bending radius approx. mm	43	35	50	45	60	48	48	60
Weight approx. kg / km	20	40	32	47	110	47	47	110
<b>Electrical characteristics</b>								
<b>Impedance (Ohm)</b>	<b>75 ± 3</b>	<b>75 ± 3</b>	<b>75 ± 3</b>	<b>75 ± 2</b>	<b>75 ± 2</b>	<b>75 ± 2</b>	<b>75 ± 2</b>	<b>75 ± 2</b>
Capacitance pF/m	55	67	53	55	55	53	55	53
Propagation velocity v/c	0,8	0,66	0,8	0,8	0,85	0,8	0,8	0,8
Attenuation at 20°C (db/100m)								
100 MHz	8,1	7,1	6,3	4,9	3	4,7	4,9	3,8
200 MHz	13,3	10,4	11,5	7,7	6,1	7	7,2	5,5
450 MHz	20,9	16,8	17,1	11,6	9	11,5	11,6	8,6
800 MHz	-	25	-	-	-	17	-	12,1
1000 MHz	31,5	27,4	26,5	18,9	14,3	18,1	18,9	13,2
1750 MHz	42,2	37,4	36,4	26,6	20,1	25	26,6	17,5
2050 MHz	45,8	40,5	39,7	28,2	22,5	27,3	28,2	19
2250 MHz	49,9	44,3	43,1	29,5	24	28	29,5	19,9
2400 MHz	55,5	45	-	31,9	-	29,3	31,9	22,5
Structural return loss min. (dB) between								
30 and 300 MHz	20	20	35	25	40	25	40	25
300 and 600 MHz	18	18	35	18	35	18	40	18
600 and 960 MHz	16	18	30	17	35	17	35	17
960 and 1750 MHz	-	-	30	15	30	15	30	15
<b>DC resistance at 20°C</b>								
Inner conductor max.Ohm/km	52	110	36	18	9	18	18	9
Outer conductor max.Ohm/km	29	22	28	14	21	14	14	21
Max. nominal voltage (V)	-	-	-	-	-	-	-	-
<b>Screening efficiency (dB)</b>								
50 and 100 MHz≥	95	90	90	95	90	90	95	90
100 and 500 MHz≥	95	90	90	95	90	90	95	90
500 and 1000 MHz≥	95	90	90	95	90	90	95	90
1000 and 2050 MHz≥	95	90	90	95	90	90	95	90
Copper weight kg/km	12,5	9,0	9,0	25,0	32,0	25,0	25,0	50,5

Dimensions and specifications may be changed without prior notice. (RM01)

# RGB-COAX-CY / RGB-COAX-(St)Y transmission cables for colour monitor



## Technical data

- Base cable **0,37/1,5** or **0,6/3,7**

- **Temperature range**

fixed installation -10°C to +80°C  
flexing -5°C to +50°C

- **Mutual capacitance** 67 nF/km

- **Impedance** 75 Ohm

- **Attenuation**

RGB-Coax 0,37/1,5

1 MHz = 2,0 dB/100m  
2 MHz = 2,8 dB/100m  
5 MHz = 4,0 dB/100m  
10 MHz = 5,8 dB/100m  
20 MHz = 8,4 dB/100m  
50 MHz = 13,9 dB/100m  
100 MHz = 19,8 dB/100m  
200 MHz = 28,5 dB/100m

RGB-Coax 0,6/3,7

1 MHz = 1,1 dB/100m  
2 MHz = 1,5 dB/100m  
5 MHz = 2,5 dB/100m  
10 MHz = 3,5 dB/100m  
20 MHz = 4,5 dB/100m  
50 MHz = 7,2 dB/100m  
100 MHz = 10,4 dB/100m  
200 MHz = 15,1 dB/100m

- **Minimum bending radius**

15x cable Ø

## Cable structure

### RGB-COAX-CY ... x0,37/1,5

- Inner conductor bare copper, solid, conductor Ø 0,37 mm
- Dielectric (insulation) of cell-Polyethylene
- Outer conductor of tinned copper wire braiding
- PVC-sheath in colour  
red, green, blue for 3xRGB COAX  
red, green, blue, white, black for 5xRGB COAX
- 3 or 5 Coax twisted with optimal lay-length
- Foil taping
- Overall braid-screening, tinned copper with optimal surface coverage and drain-wire
- PVC-outer sheath, black

### RGB-COAX-CY 3x0,37/1,5 + 3x0,25

- Cable structure as per above, but with 3 additional control cores (3x0,25) in the interstices, colour brown, green, white

### RGB-COAX-(St)Y ... x0,6/3,7 (deviation)

- Inner conductor, bare copper, solid, conductor Ø 0,6 mm
- Outer conductor of tinned or bare copper wire braiding
- Foil taping
- Plastic coated aluminium foil and drain wire
- Outer sheath of PVC, green or black

## Properties

- The materials used in manufacture are cadmium-free and contain no silicone and free from substances harmful to the wetting properties of lacquers.

## Application

RGB cables are suitable for the transmission of both analogue and digital video signals.

They are used particularly as connecting cables for data systems, engineering applications (CAD, high-definition graphics) and in television studios. The three main signals (red, green, blue) are transmitted separately. Depending on the application, it is possible to supply the base cable with further coaxial cables or with symmetrical signal cores for the intensity and horizontal or vertical synchronisation.

### RGB-COAX-CY ... 0,37/1,5

Part no.	No. RGB-Coax n x mm	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km
40145	3 x 0,37/1,5	7,2	23,0	59,0
40147	3 x 0,37/1,5 + 3 x 0,25	8,2	60,5	89,0
40146	5 x 0,37/1,5	9,0	36,0	89,0

### RGB-COAX-(St)Y ... 0,6/3,7

Part no.	No. RGB-Coax n x mm	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km
40148	3 x 0,6/3,7	16,0	66,0	278,0
40149	5 x 0,6/3,7	19,0	102,0	397,0

Dimensions and specifications may be changed without prior notice. (RM01)









**TRAYCONTROL® 500**

**JZ-602-PUR**

**H05VV-F/SJT**

**TOPGEBER 512 PUR**

**MEGAFLEX® 500**

**MULTISPEED® 500-PVC UL/CSA**

**SUPER-PAAR-TRONIC 340-C-PUR**

**PURö-JZ-HF-FCP**

**MULTIFLEX 512® C-PUR UL/CSA**

**HELUTHERM® 145**



# ■ NFPA 79 EDITION 2012

## Challenges and solutions

In 1897 the first edition of the National Electrical Code (NEC), also referred to as NFPA 70, was published. The NEC is the only code for electrical installations that is recognized at the national level in the USA. It deals with fire triggered by electricity. It is updated every three years, i.e. the 2012 edition appeared in 2011. In article 670 "Industrial Machinery", the NEC refers to NFPA code no. 79 (Electrical Standard for Industrial Machinery). This standard cites basic requirements imposed on the electrical equipment of machines and devices. Manufacturers and owners of machines and equipment must comply with this standard, for example, to meet product liability and insurance requirements.

Machines placed in service in the USA are always subject to an approval obligation. This can occur either through the individual acceptance of a piece of equipment prior to commissioning (e.g. in Germany) or through a test institute recognized in the USA. The final decision concerning commissioning is made on site through a local inspector, who may not necessarily be a specialist in the area of electronic equipment. The inspector can mandate the provisional stoppage of the machine if there are doubts relative to the machine's conformity with US standards.

NFPA 79: 2007 in chapter 12.2.7.3 "When part of a listed assembly suitable for the intended application, type AWM shall be permissible." Allows AWM cables, if they have been used as part of a listed system, and were suitable for the intended application.

However there are applications for which previously there were no NFPA 79 cables. For example, cables for use in energy drag chains or those with superstructures. There were objections and protests from the industry in this regard. The NFPA reacted accordingly and called in a committee of experts. As a result, in NFPA 79: Edition 2012, use of AWM cables under certain conditions was again approved. As before, unrestricted use is not permitted. Rather the responsibility for the implementation is now placed on the manufacturer or the erector of the equipment. Article 12.2.7. of edition 2007 was completely eliminated. All recommendations have been summarized in the new article 12.9.

### SUMMARY

- Machines and equipment that is already certified (e.g. through UL) may continue to be repaired, modified, or extended in accordance with the previous rules.

### THE COMPLETE ORIGINAL WORDING

- 12.9** Special Cables and Conductors
- 12.9.1** Other listed cables and conductors shall be permitted where identified as suitable for the identified use
- 12.9.2** Appliance Wiring Material (AWM) shall be permitted under 12.9.2.1 through 12.9.2.3
- 12.9.2.1** Where part of an assembly that has been identified for intended use
- 12.9.2.2** Where specified for use with approved equipment and used in accordance with the equipment manufacturers instructions.
- 12.9.2.3** Where its construction meets all applicable requirements of sections 12.2 – 12.6 with modifications as follows:
- (1)** Stranded conductors with wire sizes smaller than those listed in 12.2.2 shall have a minimum of 7 strands.
  - (2)** Conductor insulation and cable jacket materials not specified in 12.3.1 have flame resistant properties in compliance with applicable standards for intended use such as FT2 (horizontal wire) flame test or VW-1 (Vertical Wire) flame test in ANSI/UL 1581-2001, Reference Standard for Electrical Wires, Cables and Flexible Cords.
  - (3)** Minimum insulation thickness for single conductor AWM shall be as specified in 12.3.2. Minimum insulation thickness for conductors that are part of a multi conductor jacketed AWM cable shall be as specified by the AWM Style number and by the marked voltage rating of the cable.
  - (4)** AWM shall be marked in accordance with 12.4.1, 12.4.3 and 12.4.4. The legend shall include manufacturer's name or trademark, AWM style number, voltage rating (unless marking is prohibited by 12.4.2), wire gauge(s), temperature rating and flame resistance. Additional markings for properties such as oil, water, UV and chemical resistance identifiers shall be permitted where in compliance with applicable standards for intended use. Where markings alone are insufficient to identify for the intended application, suitable information shall be included with the technical machine documentation.

- New certified machines and equipment may continue to be built in accordance with the previous rules. The certification will be recognized.
- For new machines and equipment without certification, in some areas higher requirements imposed on certain cables (e.g. UL Listing) could apply. In this case the important thing is to consult with the respective certification authority.

In many cases, HELUKABEL recommends the use of UL-listed lines, as before. Our technical dept. would be pleased to provide additional information at tel. +49 7150 92 09 -0.

# CABLES ACCORDING TO INTERNATIONAL APPROVALS

Temperature (°C) - flexing  
 Temperature (°C) - fixed  
 Nominal voltage U<sub>0</sub>/U /  
 Nominal voltage  
 Bending radius - flexing x Ø  
 Bending radius - fixed x Ø  
 Halogen-free  
 UV-resistant  
 Outdoor use  
 Drag chain  
 Colored cores/VDE 0293  
 Screened/shielded  
 HAR/VDE REG no./VDE  
 UL/CSA  
 NFPA 79  
**Page**

PVC control lines UL/CSA														
JZ-602	-5 to +90	-40 to +90	600	7.5x	4x								X	356
JZ-603	-5 to +90	-40 to +90	600	7.5x	4x							X	X	358
TRAYCONTROL® 500	-5 to +90	-40 to +90	600	4x	4x							X	X	359
TRAYCONTROL® 530	-5 to +90	-40 to +90	600	5x	5x							X	X	361
JZ-600 UL/CSA	-5 to +80	-40 to +80	1000	7.5x	4x		X	X				X		362
JZ 604 TC TRAY CABLE	-5 to +75	-25 to +75	600	7.5x	7.5x		X	X				X	X	364
TRAYCONTROL® 600		-40 to +90	600	5x	5x		X	X				X	X	366
H05VV-F/SJT	-5 to +60	-40 to +60	300	7.5x	7.5x					X		X	X	368
H05VV-F/SJT	-5 to +60	-40 to +60	300	7.5x	7.5x					X		X	X	369
H05VV-F/UL	-5 to +75	-40 to +75	300/500	7.5x	7.5x					X		X	X	370
FROR CEI 20-22 II	-5 to +70	-35 to +70	300/500	10x	10x					(X)				371
C.N.O.M.O	-5 to +80	-30 to +80	500	15x	15x									372
JZ-602-CY	-5 to +90	-40 to +90	600	10x	5x						X		X	373
JZ-603-CY	-5 to +90	-40 to +90	600	10x	5x						X	X	X	375
TRAYCONTROL® 500-C	-5 to +90	-40 to +90	600	6x	6x						X		X	376
JZ-600-Y-CY UL/CSA	-5 to +80	-40 to +80	1000	10x	5x		X	X			X		X	378
JZ 604-FCY TC TRAY CABLE	-5 to +75	-25 to +75	600	10x	10x		X	X			X		X	380
JZ 604-FCY TC TRAY CABLE	-5 to +75	-25 to +75	600	10x	10x		X	X			X		X	381
TRAYCONTROL® 600-C		-40 to +90	600	6x	6x		X	X			X		X	382
PUR/TPE control lines UL/CSA														
JZ-602-PUR	-5 to +80	-40 to +80	600	7.5x	4x		X	X					X	384
JZ-602-PUR DC/AC	-5 to +80	-40 to +80	600	7.5x	4x		X	X					X	386
JZ-600 PUR	-5 to +80	-40 to +80	1000	7.5x	4x		X	X					X	387
JZ-602-C-PUR	-5 to +80	-40 to +80	600	10x	5x		X	X			X		X	389
JZ-600-YC-PUR	-5 to +80	-40 to +80	1000	10x	5x		X	X			X		X	390
TRAYCONTROL® 670 HDP / 670-C HDP		-40 to +105	600	7.5x	7.5x			X			/X		X	392
Halogen-free control lines UL/CSA														
MEGAFLEX® 500	-30 to +80	-40 to +80	600	10x	4x		X	X	X				X	394
MEGAFLEX® 600	-30 to +80	-40 to +80	600	10x	4x		X	X	X				X	396
MEGAFLEX® 500-C	-30 to +80	-40 to +80	600	10x	4x		X	X	X		X		X	398
MEGAFLEX® 600-C	-30 to +80	-40 to +80	600	10x	4x		X	X	X		X		X	400
Data lines UL/CSA														
Command Cable UL (LiYY)	-10 to +80	-20 to +80	300	15x	7.5x						X		X	403
Command Cable UL (LiYY)	-10 to +105	-20 to +105	600	15x	7.5x						X		X	404
TRAYCONTROL® 300		-25 to +105	300	6x	6x						X		X	405
Command Cable UL (LiYY-TP))	-10 to +80	-20 to +80	300	15x	7.5x						X		X	407
TRAYCONTROL® 300 TP		-25 to +105	300	6x	6x						X		X	409
VERTEILERFLEX two-approvals	-5 to +80	-30 to +80	300/500	15x/7.5x	15x/7.5x					(X)	X		X	411
Command Cable UL (LiYCY)	-10 to +80	-20 to +80	300	15x	7.5x						X	X	X	413
Command Cable UL (LiYCY)	-10 to +105	-20 to +105	600	15x	7.5x						X	X	X	415
TRAYCONTROL® 300-C		-25 to +105	300	6x	6x						X	X	X	416

The selection table is intended as an initial orientation. Please see the relevant page of the catalogue for detailed information on the product properties.



# CABLES ACCORDING TO INTERNATIONAL APPROVALS

	Temperature (°C) - flexing	Temperature (°C) - fixed	Nominal voltage U <sub>0</sub> /U / Nominal voltage	Bending radius - flexing x Ø	Bending radius - fixed x Ø	Halogen-free	UV-resistant	Outdoor use	Drag chain	Colored cores/VDE 0293	Screened/shielded	HAR/VDE REG no./VDE	UL/CSA	NFPA 79	Page
<b>Data lines UL/CSA</b>															
Command Cable UL (LiYCY-TP)	-10 to +80	-20 to +80	300	15x	7.5x				X	X		X			418
TRAYCONTROL® 300-C TP		-25 to +105	300	6x	6x				X	X		X	X		420
<b>Drag chain cables UL/CSA</b>															
JZ-602 RC	-5 to +90	-40 to +90	600	7.5x	4x			X	X	X		X			423
MULTIFLEX 600	-5 to +90	-40 to +90	600	7.5x	7.5x			X	X	X		X	X		424
MULTISPEED® 500-PVC UL/CSA	-5 to +80	-30 to +80	600	7.5x	4x			X	X	X		X			425
JZ-HF-FCY	-5 to +80	-40 to +80	1000	10x	5x				X	X		X			426
JZ-602 RC -CY	-5 to +90	-40 to +90	600	10x	5x			X	X	X		X			427
MULTIFLEX 600-C	-5 to +90	-40 to +90	600	10x	10x			X	X	X		X	X		428
MULTISPEED® 500-C-PVC UL/CSA	-5 to +80	-30 to +80	600	7.5x	4x			X	X	X		X			429
JZ-602 RC -PUR	-5 to +80	-40 to +80	600	7.5x	4x			X	X	X		X			430
MULTIFLEX 512® PUR UL/CSA	-30 to +80	-40 to +80	600	5x	3x	X	X	X	X	X		X			431
MULTISPEED® 500-PUR UL/CSA	-30 to +80	-40 to +80	600	7.5x	4x	X	X	X	X	X		X			433
PURö-JZ-HF-FCP	-5 to +80	-40 to +80	1000	10x	5x			X	X	X		X			435
JZ-602 RC -C-PUR	-5 to +80	-40 to +80	600	10x	5x			X	X	X		X			436
MULTIFLEX 512® C-PUR UL/CSA	-30 to +80	-40 to +80	600	7.5x	4x	X	X	X	X	X		X			437
MULTISPEED® 500-C-PUR UL/CSA	-30 to +80	-40 to +80	600	7.5x	4x	X	X	X	X	X		X			539
MULTISPEED® 500-TPE UL/CSA	-30 to +80	-40 to +80	600	5x	3x	X	X	X	X	X		X			441
MULTISPEED® 500-C-TPE UL/CSA	-30 to +80	-40 to +80	600	5x	3x	X	X	X	X	X		X			443
SUPERTRONIC®-310-PVC	-5 to +80	-40 to +80	300	5x	3x				X			X			445
SUPERTRONIC®-310-C-PVC	-5 to +80	-40 to +80	300	7.5x	4x				X	X		X			446
SUPERTRONIC®-330 PURö	-30 to +80	-40 to +80	300	5x	3x	X	X	X	X	X		X			447
MULTISPEED® TRONIC-PUR	-30 to +80	-40 to +80	300	7.5x	4x	X	X	X	X	X		X			448
SUPERTRONIC® 330 C-PURö	-30 to +80	-40 to +80	300	7.5x	4x	X	X	X	X	X		X			449
MULTISPEED® TRONIC-C-PUR	-30 to +80	-40 to +80	300	7.5x	4x	X	X	X	X	X		X			450
SUPER-PAAR-TRONIC 340-C-PUR	-30 to +80	-40 to +80	300	10x	5x	X	X	X	X	X		X			451
<b>Motor, servo, feedback cables UL/CSA</b>															
TOPFLEX® - EMV-UV-2YSLCYK-J	-5 to +80	-40 to +80	1000	20x	10x			X	X		X	X			453
TOPFLEX® - EMV-UV-3 PLUS 2YSLCYK-J	-5 to +80	-40 to +80	1000	20x	10x			X	X		X	X			455
TOPFLEX® MOTOR-EMV 103	-5 to +70	-40 to +80	1000	20x	10x					X	X	X			457
TOPFLEX® 600 VFD		-25 to +90	600	6x	6x			X	X		X		X		458
TOPFLEX® 650 VFD	-25 to +105	-25 to +105	600	6x	6x			X	X		X		X	X	459
TOPFLEX® 1000 VFD	-25 to +90	-25 to +90	600	15x	7.5x			X	X		X		X	X	460
TOPFLEX® EMV UV 2YSLC11Y-J	-5 to +80	-40 to +80	1000	20x	10x			X	X		X		X		461
TOPFLEX® MOTOR EMV 1/1	-30 to +80	-40 to +80	1000	20x	10x			X	X		X		X		462
TOPFLEX® MOTOR EMV 3/3	-30 to +80	-40 to +80	1000	20x	10x			X	X		X		X		463
TOPSERV® PVC 108, 112, 119	-0 to +60	-20 to +80	1000	15x	5x						X		X		465
TOPGEBER 511 PVC	-0 to +60	-20 to +80	30	15x	6x						X		X		467
TOPSERV® PUR 109, 113, 121	-30 to +80	-40 to +80	1000	7.5x	4x			X	X	X		X			468
TOPGEBER 512 PUR	-30 to +80	-40 to +80	30	10x	6x			X	X	X		X			470
TOPSERV® 600 VFD	-25 to +90	-25 to +90	600	7.5x	5x			X	X	X		X	X		472

The selection table is intended as an initial orientation.  
Please see the relevant page of the catalogue for detailed information on the product properties.

# CABLES ACCORDING TO INTERNATIONAL APPROVALS

Temperature (°C) - flexing

Temperature (°C) - fixed

Nominal voltage U<sub>0</sub>/U /  
Nominal voltage

Bending radius - flexing x Ø

Bending radius - fixed x Ø

Halogen-free

UV-resistant

Outdoor use

Drag chain

Colored cores/VDE 0293

Screened/shielded

HAR/VDE REG no./VDE  
UL/CSA

NFPA 79

Page

Motor, servo, feedback cables UL/CSA													
TOPSERV® 650 VFD	-25 to +105	-25 to +105	600	7.5x	5x		X	X	X		X	X	473
TOPSERV® Hybrid	-30 to +80	-40 to +80	1000	7.5x	4x		X	X	/X		X		474
Heat-resistant cables UL/CSA													
SiHF UL/CSA		-50 to +150	600	7.5x	4x	X		X		X		X	476
SiHF-C-Si UL/CSA		-50 to +150	600	10x	5x	X		X		X	X	X	478
All-weather cables & rubber cables UL/CSA													
Rubber cable/neoprene hose cable		-40 to +90	300				X	X		X		X	480
H07RN-F/SOOW		-40 to +90	600	10x	7.5x		X	X		X		X	481
Easy-to-wind cables UL/CSA													
TROMM-PUR®-H	-40 to +80	-50 to +80	1000	6x	6x	X	X	X				X	483
Single-core UL/CSA													
UL-Style 1007, CSA TR 64	-5 to +80	-30 to +80	300	10x	5x					X		X	485
UL-Style 1569, CSA TR 64	-5 to +105	-30 to +105	300	10x	5x					X		X	486
UL-Style 1015	-5 to +105	-30 to +105	600	10x	5x					X		X	487
THREENORM	+5 to +70	-10 to +70	600		6x					X	X	X	488
FIVENORM	+5 to +90	-40 to +90	600		6x					X	X	X	490
THHN/THWN		/ +90	600	8x	8x							X	493
PVC single-cores	-5 to +80	-30 to +80	300/300		6x					X			494
HELUTHERM® 145	-35 to +105	-55 to +105	300	12.5x	4x	X	X	X		X		X	495
HELUTHERM® 145	-35 to +105	-55 to +105	600	12.5x	4x	X	X	X		X		X	496
UL-Style 3135		-60 to +200	600	15x	15x	X				X		X	497
Single 600-J/-O	-5 to +90	-40 to +90	600	7.5x	4x		X	X				X	498
Single 600-CY -J/-O	-5 to +90	-40 to +90	600	7.5x	4x		X	X		X		X	499
TOPFLEX® 302 / 302-UL	-15 to +80	-40 to +80	0.6/1 kV	5x	5x		X	X				/X	500
Single 602-RC -J/O	-5 to +90	-40 to +90	600	7.5x	3x					X		X	501
Single 602-RC-CY -J/O	-5 to +90	-40 to +90	600	7.5x	3x					X	X	X	502
TOPFLEX® 304 / 304-C	-5 to +80	-40 to +80	1000	5x	5x					X	/X	X	503
MULTISPEED® 600-PUR -J/-O	-30 to +80	-40 to +80	1000	5x	3x	X	X	X	X			X	504
MULTISPEED® 600-C-PUR -J/-O	-30 to +80	-40 to +80	1000	5x	3x	X	X	X	X	X		X	505
TOPFLEX® 301 / 301-C	-15 to +80		1000	7.5x	7.5x		X	X	X		/X	X	506
British standard cables													
HELUKABEL BS 5308-1		-20 to +65	300/500		6x					X	X		508
HELUKABEL BS 5308-2		-20 to +65	300/500		6x					X	X		509
HELUKABEL BS 5467	0 to +90	-15 to +90	0.6/1 kV		8x			X		X	X		510
HELUKABEL BS 6724	0 to +90	-20 to +90	0.6/1 kV		8x	X				X	X		511

The selection table is intended as an initial orientation.  
Please see the relevant page of the catalogue for detailed information on the product properties.

# SELECTION TABLE - DRAG CHAIN CABLES

			Max. movement distance in m (10 m up to 25-cores)	Min. bending radius - flexing (D=outer Ø)	Max. speed (m/s)	Max. acceleration (m/s <sup>2</sup> )	Max. cycles	Material	Nominal voltage U <sub>0</sub> /U / Operating voltage	Temperature (°C) - flexing	Approvals	Page
<b>PVC drag chain cables UL/CSA</b>												
SUPERTRONIC®-310-PVC	5	5 x D	2	10	9 Mio	PVC/PVC	300V	300V	-5° to +80°	UL/CSA	<b>445</b>	
SUPERTRONIC®-310-C-PVC	5	7.5 x D	2	10	9 Mio	PVC/CU/PVC	300V	300V	-5° to +80°	UL/CSA	<b>446</b>	
MULTISPEED® 500-PVC UL/CSA	100	7.5 x D	5	50	9 Mio	PP/PVC	600V	600V	-5° to +80°	UL/CSA	<b>425</b>	
MULTISPEED® 500-C-PVC UL/CSA	100	7.5 x D	5	50	9 Mio	PP/CU/PVC	600V	600V	-5° to +80°	UL/CSA	<b>429</b>	
JZ-HF-FCY	10	10 x D	2	10	9 Mio	PVC/CU/PVC	1000V	1000V	-5° to +80°	UL/CSA	<b>426</b>	
JZ-602 RC	10	7.5 x D	2	10	9 Mio	PVC/PVC	600V	600V	-5° to +90°	UL/CSA	<b>423</b>	
JZ-602 RC-CY	10	10 x D	2	10	9 Mio	PVC/CU/PVC	600V	600V	-5° to +90°	UL/CSA	<b>427</b>	
MULTIFLEX 600	10	7.5 x D	2	10	9 Mio	PVC/PVC	600V	600V	-5° to +90°	UL/CSA	<b>424</b>	
MULTIFLEX 600-C	10	10 x D	2	10	9 Mio	PVC/CU/PVC	600V	600V	-5° to +90°	UL/CSA	<b>428</b>	
<b>PUR &amp; TPE drag chain cables UL/CSA</b>												
SUPERTRONIC®-330 PURö	15	5 x D	4	10	11 Mio	PP/PUR	300V	300V	-30° to +80°	UL/CSA	<b>447</b>	
SUPERTRONIC®-330 C-PURö	15	7.5 x D	4	10	11 Mio	PP/CU/PUR	300V	300V	-30° to +80°	UL/CSA	<b>449</b>	
SUPER-PAAR-TRONIC 340-C-PUR	30	10 x D	4	50	11 Mio	PP/CU/PUR	300V	300V	-30° to +80°	UL/CSA	<b>451</b>	
JZ-602 RC-PUR	15	7.5 x D	3	10	9 Mio	PVC/PUR	600V	600V	-5° to +80°	UL/CSA	<b>430</b>	
JZ 602 RC-C-PUR	15	10 x D	3	10	9 Mio	PVC/CU/PUR	600V	600V	-5° to +80°	UL/CSA	<b>436</b>	
PURö-JZ-HF-FCP	15	10 x D	3	10	9 Mio	PVC/CU/PUR	1000V	1000V	-5° to +80°	UL/CSA	<b>435</b>	
MULTIFLEX 512®-PUR UL/CSA	100	5 x D	4	10	11 Mio	PP/PUR	600V	600V	-30° to +80°	UL/CSA	<b>431</b>	
MULTIFLEX 512®-C-PUR UL/CSA	100	7.5 x D	4	10	11 Mio	PP/CU/PUR	600V	600V	-30° to +80°	UL/CSA	<b>437</b>	
MULTISPEED®-TRONIC-PUR	450	7.5 x D	5	50	11 Mio	PP/PUR	300V	300V	-30° to +80°	UL/CSA	<b>448</b>	
MULTISPEED®-TRONIC-C-PUR	450	7.5 x D	5	50	11 Mio	PP/CU/PUR	300V	300V	-30° to +80°	UL/CSA	<b>450</b>	
MULTISPEED® 500-PUR UL/CSA	450	7.5 x D	5	50	11 Mio	PP/PUR	600V	600V	-30° to +80°	UL/CSA	<b>433</b>	
MULTISPEED® 500-C-PUR UL/CSA	450	7.5 x D	5	50	11 Mio	PP/CU/PUR	600V	600V	-30° to +80°	UL/CSA	<b>439</b>	
MULTISPEED® 500-TPE UL/CSA	450	5 x D	5	50	11 Mio	PP/TPE	600V	600V	-30° to +80°	UL/CSA	<b>441</b>	
MULTISPEED® 500-C-TPE UL/CSA	450	5 x D	5	50	11 Mio	PP/CU/TPE	600V	600V	-30° to +80°	UL/CSA	<b>443</b>	
<b>Single-cores for drag chain cables UL/CSA</b>												
SINGLE 602-RC-J/-O	5	7.5 x D	2	10	9 Mio	PVC/PVC	600V	600V	-5° to +90°	UL/CSA	<b>501</b>	
SINGLE 602-RC-CY-J/-O	5	7.5 x D	2	10	9 Mio	PVC/CU/PVC	600V	600V	-5° to +90°	UL/CSA	<b>502</b>	
MULTISPEED® 600-PUR-J/-O	450	5 x D	5	50	11 Mio	Poly/PUR	1000V	1000V	-30° to +80°	UL/CSA	<b>504</b>	
MULTISPEED® 600-C-PUR-J/-O	450	5 x D	5	50	11 Mio	Poly/CU/TPE	1000V	1000V	-30° to +80°	UL/CSA	<b>505</b>	
TOPFLEX® 301	5	7.5 x D	2	10	10 Mio	PVC/PUR	1000V	1000V	-15° to +80°	UL/CSA	<b>506</b>	
TOPFLEX® 301 C	5	7.5 x D	2	10	10 Mio	PVC/CU/PUR	1000V	1000V	-15° to +80°	UL/CSA	<b>506</b>	
TOPFLEX® 304	5	5 x D	2	10	9 Mio	PVC/PVC	1000V	1000V	-5° to +80°	UL/CSA	<b>503</b>	
TOPFLEX® 304 C	5	5 x D	2	10	9 Mio	PVC/CU/PVC	1000V	1000V	-5° to +80°	UL/CSA	<b>503</b>	

A cycle is a double lift: a representative sample has been tested and measured in our Test Workshop. The cycle count is only valid when appropriately and professionally installed (see the installation manual: cable installation in drag chains, see pages 1036 and 1037).

The selection table is intended as an initial orientation.

Please see the relevant page of the catalogue for detailed information on the product properties and the selection tables cables in drag chains, see pages 1030 and 1031.



# SELECTION TABLE - DRAG CHAIN CABLES

			Max. movement distance in m (10 m up to 25-cores)	Min. bending radius - flexing (D=outer Ø)	Max. speed (m/s)	Max. acceleration (m/s <sup>2</sup> )	Max. cycles	Material	Nominal voltage U <sub>0</sub> /U / Operating voltage	Temperature (°C) - flexing	Approvals	Page
<b>Motor cables &amp; servo cables for drag chain cables UL/CSA</b>												
TOPSERV® 109 PUR	30	7.5 x D	4	10	11 Mio	PP/CU/PUR	1000V	-30° to +80°	UL/CSA			<b>468</b>
TOPSERV® 113 PUR	30	7.5 x D	4	10	11 Mio	PP/CU/PUR	1000V	-30° to +80°	UL/CSA			<b>468</b>
TOPSERV® 121 PUR	30	7.5 x D	4	10	11 Mio	PP/CU/PUR	1000V	-30° to +80°	UL/CSA			<b>468</b>
TOPSERV® 600 VFD	10	7.5 x D	2	10	9 Mio	PVC/CU/TPE	600V	-25° to +90°	UL/CSA			<b>472</b>
TOPSERV® 650 VFD	10	7.5 x D	2	10	9 Mio	PVC/CU/TPE	600V	-25° to +90°	UL/CSA			<b>473</b>
<b>Feedback cables for drag chain cables UL/CSA</b>												
TOPGEBER 512 PUR	30	10 x D	4	50	11 Mio	PP/CU/PUR	30V	-30° to +80°	UL/CSA			<b>470</b>
TOPSERV® HYBRID PVC	5	7.5 x D	0,5	2	5 Mio	PP/PVC	1000V	-30° to +80°	UL/CSA			<b>474</b>
TOPSERV® HYBRID PUR	50	7.5 x D	5	30	5 Mio	PP/PUR	1000V	-30° to +80°	UL/CSA			<b>474</b>

A cycle is a double lift: a representative sample has been tested and measured in our Test Workshop. The cycle count is only valid when appropriate and professionally installed (see the installation manual: cable installation in drag chains, see pages 1036 and 1037).

The selection table is intended as an initial orientation.

Please see the relevant page of the catalogue for detailed information on the product properties and the selection tables cables in drag chains, see pages 1030 and 1031.



# UL/CSA CONTROL CABLES





# JZ-602 two approval control cable, 90°C, 600 V, oil resistant, meter marking



HELUKABEL JZ-602 AWM 14 AWG (2,5 mm<sup>2</sup>) 3C E170315 CSA AWM 1A/B 2A/B FT 1 600 V 90°C

CE



## Technical data

- Control cable of special-PVC acc. to UL CSA AWM I/II A/B Style 2587 (sheath insulation) and CSA
- Temperature range**  
flexing -5°C to +90°C  
fixed installation -40°C to +90°C
- Nominal voltage**  
UL/CSA 600 V
- Test voltage** 3000 V
- Breakdown voltage** min. 6000 V
- Insulation resistance**  
min 20 MOhm x km
- Minimum bending radius**  
flexing 7,5x cable Ø  
fixed installation 4x cable Ø
- Radiation resistance**  
up to 80x10<sup>6</sup> cJ/kg (up to 80 Mrad)

## Cable structure

- Bare copper-conductor, to DIN VDE 0295 cl.5, fine-wire, BS 6360 cl.5, IEC 60228 cl.5
- Core insulation of PVC compound type T13 to DIN VDE 0207-363-3 / DIN EN 50363-3 and class 43 acc. to UL-Std. 1581
- Core identification black cores with continuous white numbering
- GN-YE conductor, 3 cores and above in the outer layer
- Cores stranded in layers with optimal lay-length
- Outer sheath of special PVC compound type YM5 to DIN VDE 0207 part 5 and class 43 acc. to UL-Std. 1581
- Sheath colour grey (RAL 7001)
- with meter marking

## Properties

- Resistant to mineral oils, synthetic oils and coolant
- The outer sheath is approved with an improved oil-resistance-test
- The materials used in manufacture are cadmium-free and contain no silicone and free from substances harmful to the wetting properties of lacquers

## Tests

- PVC self-extinguishing and flame retardant acc. to DIN VDE 0482-332-1-2, DIN EN 60332-1-2, IEC 60332-1 (equivalent DIN VDE 0472 part 804 test method B), UL VW-1, CSA FT1

## Note

- G = with green-yellow conductor  
x = without green-yellow conductor (OZ)
- Please note the cleanroom qualification when ordering.
- AWG sizes are approximate equivalent values. The actual cross-section is in mm<sup>2</sup>.
- screened analogue type:  
**JZ-602-CY**, confer page 373

## Application

UL-approved and CSA certified flexible control cable rated at 600 V. Used in machine tools, control systems, connection between control panels and machines, assembly lines and other industrial equipment. Suitable for installation in dry, moist or wet environment and moderate flexing applications.

CE= The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

Part no.	No. cores x cross-sec. mm <sup>2</sup>	AWG-No.	Outer Ø app. mm	Cop. weight kg / km	Weight app. kg / km
83090	2 x 0,5	20	5,6	9,6	49,0
83091	3 G 0,5	20	5,9	14,0	58,0
83092	4 G 0,5	20	6,4	19,0	69,0
83093	5 G 0,5	20	6,9	24,0	84,0
83094	7 G 0,5	20	7,5	34,0	123,0
83100	8 G 0,5	20	8,3	38,4	140,0
83101	9 G 0,5	20	8,9	43,2	177,0
83095	12 G 0,5	20	9,8	58,0	192,0
83096	18 G 0,5	20	12,0	86,0	256,0
83097	25 G 0,5	20	14,3	120,0	358,0
83098	34 G 0,5	20	16,5	163,0	487,0
83099	41 G 0,5	20	17,9	197,0	580,0
83080	2 x 1	18	6,3	19,2	53,0
83081	3 G 1	18	6,6	27,0	61,0
83082	4 G 1	18	7,2	38,4	74,0
83565	3 x 1	18	6,6	27,0	61,0
83083	5 G 1	18	7,9	48,0	90,0
83084	7 G 1	18	8,7	67,0	130,0
83102	8 G 1	18	9,5	76,8	144,0
83103	9 G 1	18	10,4	86,4	180,0
83085	12 G 1	18	11,2	115,2	198,0
83086	18 G 1	18	14,1	173,0	274,0
83087	25 G 1	18	16,8	240,0	384,0
83088	34 G 1	18	19,5	326,0	494,0
83089	41 G 1	18	21,2	394,0	508,0
83070	2 x 1,5	16	6,8	28,8	73,0
83071	3 G 1,5	16	7,2	44,0	94,0
83072	4 G 1,5	16	7,9	58,0	117,0
83073	5 G 1,5	16	8,7	72,0	140,0
83074	7 G 1,5	16	9,7	101,0	186,0

Part no.	No. cores x cross-sec. mm <sup>2</sup>	AWG-No.	Outer Ø app. mm	Cop. weight kg / km	Weight app. kg / km
83104	9 G 1,5	16	11,5	129,7	244,0
83075	12 G 1,5	16	12,6	173,0	319,0
83076	18 G 1,5	16	15,8	260,0	451,0
83077	25 G 1,5	16	18,3	360,0	625,0
83078	34 G 1,5	16	21,4	490,0	840,0
83079	41 G 1,5	16	23,3	590,0	1032,0
83060	2 x 2,5	14	7,8	48,0	115,0
83061	3 G 2,5	14	8,5	72,0	143,0
83062	4 G 2,5	14	9,3	96,0	185,0
83063	5 G 2,5	14	10,4	120,0	221,0
83064	7 G 2,5	14	11,5	168,0	293,0
83065	9 G 2,5	14	13,9	216,0	429,0
83066	12 G 2,5	14	15,2	288,0	563,0
83067	18 G 2,5	14	18,7	432,0	854,0
83068	19 G 2,5	14	18,7	456,0	914,0
83069	25 G 2,5	14	22,2	600,0	1188,0
83051	3 G 4	12	9,7	115,0	232,0
83052	4 G 4	12	10,6	154,0	298,0
83053	5 G 4	12	11,8	192,0	358,0
83054	7 G 4	12	13,1	269,0	460,0
83041	3 G 6	10	11,3	173,0	360,0
83042	4 G 6	10	12,5	231,0	402,0
83043	5 G 6	10	13,9	288,0	484,0
83044	7 G 6	10	15,4	403,0	630,0
83031	3 G 10	8	14,7	288,0	535,0
83032	4 G 10	8	16,3	384,0	653,0
83033	5 G 10	8	18,3	480,0	786,0
83034	7 G 10	8	20,2	672,0	1100,0

Continuation ▶

# JZ-602 two approval control cable, 90°C, 600 V, oil resistant, meter marking



Part no.	No. cores x cross-sec. mm <sup>2</sup>	AWG-No.	Outer Ø app. mm	Cop. weight kg / km	Weight app. kg / km
83020	2 x 16	6	18,8	307,0	640,0
83021	3 G 16	6	20,2	461,0	810,0
83022	4 G 16	6	22,3	615,0	1045,0
83023	5 G 16	6	24,9	768,0	1260,0
83024	7 G 16	6	27,5	1075,0	1760,0
83011	3 G 25	4	24,0	720,0	1180,0
83012	4 G 25	4	26,9	960,0	1507,0
83013	5 G 25	4	31,9	1200,0	1858,0
83014	7 G 25	4	33,0	1680,0	2830,0
83001	3 G 35	2	26,2	1008,0	1590,0
83002	4 G 35	2	29,7	1344,0	2123,0
83003	5 G 35	2	33,0	1680,0	2612,0
83004	3 G 50	1	31,9	1440,0	2652,0
83005	4 G 50	1	35,6	1920,0	3058,0
83006	5 G 50	1	39,7	2400,0	4093,0

Part no.	No. cores x cross-sec. mm <sup>2</sup>	AWG-No.	Outer Ø app. mm	Cop. weight kg / km	Weight app. kg / km
83007	3 G 70	2/0	36,8	2016,0	3307,0
83008	4 G 70	2/0	40,9	2688,0	4254,0
83009	5 G 70	2/0	45,6	3360,0	5661,0
83010	3 G 95	3/0	40,9	2736,0	4867,0
83015	4 G 95	3/0	45,6	3648,0	5762,0
83016	5 G 95	3/0	50,7	4560,0	7208,0
83017	3 G 120	4/0	48,1	3456,0	5580,0
83018	4 G 120	4/0	53,3	4608,0	7280,0
83019	5 G 120	4/0	58,9	5760,0	8692,0

Dimensions and specifications may be changed without prior notice. (RN01)



Suitable accessories can be found in Chapter X.

- Cable Gland - HELUTOP® HT-PA
- Cable Gland - HELUTOP® HT-MS

**JZ-603** Multi approval control cable, oil resistant, meter marking

JZ-603 <VDE><HAR> H05VV5-F 4 G 0,5 QMM AWM STYLE 2587 20AWG 4C VW-1 LL113926 CSA  
AWM I/II A/B 90°C 600V FT1 CCC A014024 HELUKABEL GMBH 60227IEC75(RVVY) 300/500V GOST-R / 83651

**Technical data**

- Special PVC control cable with oil resistant outer sheath to DIN VDE 0285-525-2-51 / DIN EN 50525-2-51 and UL-Style 2587
- **Temperature range**  
HAR  
flexing -5°C to +70°C  
fixed installation -40°C to +70°C  
UL/CSA  
flexing -5°C to +90°C  
fixed installation -40°C to +90°C
- **Nominal voltage**  
HAR U<sub>0</sub>/U 300/500 V  
UL/CSA 600 V
- **Test voltage** 3000 V
- **Breakdown voltage** min. 6000 V
- **Insulation resistance**  
min. 20 MOhm x km
- **Minimum bending radius**  
flexing 7,5x cable Ø  
fixed installation 4x cable Ø
- **Radiation resistance**  
up to 80x10<sup>6</sup> cJ/kg (up to 80 Mrad)

**Cable structure**

- Bare copper-conductor, to DIN VDE 0295 cl.5, fine-wire, BS 6360 cl.5, IEC 60228 cl.5
- Core insulation of special PVC compound type T12 to DIN VDE 0207-363-3 / DIN EN 50363-3 and class 43 acc. to UL-Std. 1581
- Core identification to DIN VDE 0293 black cores with continuous white numbering
- GN-YE conductor, 3 cores and above in the outer layer
- Cores stranded in layers with optimal lay-length
- Outer sheath of oil resistant special PVC compound type TM5 to DIN VDE 0207-363-4-1 / DIN EN 50363-4-1 and class 43 acc. to UL-Std. 1581
- Sheath colour grey (RAL 7001)
- with meter marking

**Properties**

- The materials used in manufacture are cadmium-free and contain no silicone and free from substances harmful to the wetting properties of lacquers

**Tests**

- PVC self-extinguishing and flame retardant acc. to DIN VDE 0482-332-1-2, DIN EN 60332-1-2/IEC 60332-1 (equivalent DIN VDE 0472 part 804 test method B), UL VW-1, CSA FT1
- Oil resistant to DIN VDE 0473-811-404 / DIN EN 60811-404, UL-Std. 1581 part 50.182

**Note**

- G = with green-yellow conductor  
x = without green-yellow conductor (OZ)
- AWG sizes are approximate equivalent values. The actual cross-section is in mm<sup>2</sup>.
- screened analogue type:  
**JZ-603-CY**, confer page 375

**Application**

UL-CSA-HAR approved cables offer any company exporting anywhere in the world, primarily designed for exporters, used in machine tools, control systems, assembly lines and other industrial equipment. These cables are suitable for flexible use for mechanical stresses with free movements in dry, moist and wet rooms but not for open air.

☑= The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

Part no.	No. cores x cross-sec. mm <sup>2</sup>	AWG-No.	Outer Ø app. mm	Cop. weight kg / km	Weight app. kg / km
83704	2 x 0,5	20	5,8	9,6	52,0
83650	3 G 0,5	20	6,1	14,0	63,0
83651	4 G 0,5	20	6,7	19,0	69,0
83652	5 G 0,5	20	7,3	24,0	87,0
83653	7 G 0,5	20	8,8	34,0	119,0
83654	12 G 0,5	20	11,1	58,0	198,0
83655	18 G 0,5	20	12,9	86,0	266,0
83656	25 G 0,5	20	16,0	120,0	380,0
83657	34 G 0,5	20	17,7	163,0	508,0
83658	41 G 0,5	20	19,5	197,0	594,0
83659	50 G 0,5	20	21,3	240,0	715,0
83660	61 G 0,5	20	23,8	293,0	840,0
83705	2 x 0,75	19	6,1	14,4	66,0
83661	3 G 0,75	19	6,5	22,0	76,0
83662	4 G 0,75	19	7,1	29,0	85,0
83663	5 G 0,75	19	7,9	36,0	113,0
83664	7 G 0,75	19	9,5	50,0	144,0
83665	12 G 0,75	19	11,6	86,0	245,0
83666	18 G 0,75	19	13,9	130,0	327,0
83667	25 G 0,75	19	17,1	180,0	466,0
83668	34 G 0,75	19	19,1	245,0	626,0
83669	41 G 0,75	19	20,9	296,0	747,0
83670	50 G 0,75	19	23,0	360,0	896,0
83671	61 G 0,75	19	25,3	439,0	1070,0
83706	2 x 1	18	6,4	19,2	70,0
83672	3 G 1	18	6,8	29,0	88,0
83673	4 G 1	18	7,5	39,0	99,0
83674	5 G 1	18	8,4	48,0	132,0
83675	7 G 1	18	10,0	67,0	170,0
83676	12 G 1	18	12,5	115,0	285,0
83677	18 G 1	18	14,7	173,0	405,0
83678	25 G 1	18	18,0	240,0	570,0

Part no.	No. cores x cross-sec. mm <sup>2</sup>	AWG-No.	Outer Ø app. mm	Cop. weight kg / km	Weight app. kg / km
83679	34 G 1	18	20,3	326,0	742,0
83680	41 G 1	18	22,4	394,0	885,0
83681	50 G 1	18	24,3	480,0	1071,0
83682	61 G 1	18	26,8	586,0	1265,0
83707	2 x 1,5	16	7,4	28,8	91,0
83683	3 G 1,5	16	8,0	43,0	110,0
83684	4 G 1,5	16	8,7	58,0	141,0
83685	5 G 1,5	16	9,8	72,0	167,0
83686	7 G 1,5	16	11,9	101,0	225,0
83687	12 G 1,5	16	14,5	173,0	361,0
83688	18 G 1,5	16	17,4	259,0	518,0
83689	25 G 1,5	16	21,3	360,0	730,0
83690	34 G 1,5	16	24,1	490,0	945,0
83691	41 G 1,5	16	26,2	591,0	1135,0
83692	50 G 1,5	16	28,8	720,0	1381,0
83693	61 G 1,5	16	31,5	878,0	1640,0
83708	2 x 2,5	14	9,1	48,0	125,0
83694	3 G 2,5	14	9,9	72,0	169,0
83695	4 G 2,5	14	11,0	96,0	209,0
83696	5 G 2,5	14	12,0	120,0	256,0
83697	7 G 2,5	14	14,6	168,0	340,0
83698	12 G 2,5	14	18,1	288,0	579,0
83699	18 G 2,5	14	22,1	432,0	851,0
83700	25 G 2,5	14	26,5	600,0	1175,0
83701	34 G 2,5	14	29,9	816,0	1529,0
83702	50 G 2,5	14	35,2	1200,0	2290,0
83703	61 G 2,5	14	38,4	1464,0	2724,0

Dimensions and specifications may be changed without prior notice. (RN01)



**TRAYCONTROL® 500** flexible, oil-resistant, open installation

TC-ER, PLTC-ER, ITC-ER, NFPA 79 Edition 2012



HELUKABEL TRAYCONTROL 500 P/N 63111 14AWG (2,08mm<sup>2</sup>)4C (UL) TC-ER 90°C DRY 75°C WET 600 V SUN RES DIR BUR OIL RES I/II E330430 OR MTW "FLEXING" OR WTTC 1000 V OR c(UL)CIC TC FT4 LL257839 CSA AWM I/II 90°C 600 V FT4 CE ROHS

**Technical data**

- PVC control cable acc. to UL-Std.1277 and UL-Std.2277
- **Temperature range**  
flexing -5°C to +90°C  
fixed installation -40°C to +90°C
- **Nominal voltage**  
TC 600 V  
AWM 1000 V  
TC Wind Turbine (WTTC) 1000 V
- **Test voltage** 3000 V
- **Minimum bending radius**  
flexing 4x cable Ø
- **Insulation resistance**  
min. 20 MOhm x km
- **Radiation resistance**  
up to 80x10<sup>6</sup> cJ/kg (up to 80 Mrad)

**Cable structure**

- Bare copper conductor, fine wire with AWG dimensions
- Core insulation of special PVC with transparent nylon skin
- Core identification to DIN VDE 0293 black cores with continuous white numbering
- GN-YE conductor, 3 cores and above in the outer layer
- Cores stranded in layers with optimal lay-length
- Separator
- Outer sheath of special PVC
- Sheath colour grey (RAL 7001)
- With length marking in feet

**Properties**

- self-extinguishing and flame retardant acc. to CSA FT4
- The materials used in manufacture are cadmium-free and contain no silicone and free from substances harmful to the wetting properties of lacquers

**Tests**

- **UL:**TC-ER, PLTC-ER (AWG 18 - AWG 12), ITC-ER (AWG 18 - AWG 12), MTW, NFPA 79 2012, WTTC 1000V, DP-1, OIL RES I & II, 90°C dry / 75°C wet, Class 1 Div. 2 per NEC Art. 336, 392, 501, crush impact test acc. to UL 1277
- **CSA:**  
c(UL) CIC-TC FT4, CSA AWM I/II A/B FT4

**Note****Advantages**

- Highly-flexible, easy to install

**Available on request**

- with blue cores (DC)
- with red cores (AC)
- Black or TPE outer sheath

**Application**

HELUKABEL® TRAYCONTROL® 500 is a flexible, oil-resistant control cable. The special combination of TC-ER, PLTC-ER and ITC-ER allows this cable to be used as a connecting cable for industrial plant and machinery in accordance with NFPA 79 edition 2012. Approved for open, unprotected installation in cable trays to the machine. Its outstanding oil resistance (OIL RES I & II) guarantees a long service life for industrial applications in dry, damp and wet environments. Recommended applications: production lines, bottling plants, machine construction, switch cabinets, conveyor systems, packaging machines, automotive industry.

☞ The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

Part no.	Cross-section mm <sup>2</sup> x AWG-No.	No.cores	Outer Ø app. mm	Cop. weight kg / km	Weight app. kg / km
63079	0,507	2 x 20	6,6	9,8	58,0
63080	0,507	3 x 20	7,0	14,6	61,0
63081	0,507	4 x 20	7,5	19,5	76,0
63082	0,507	5 x 20	8,1	24,4	89,0
63083	0,507	7 x 20	8,7	34,1	120,0
63084	0,507	9 x 20	9,8	43,8	201,0
63085	0,507	12 x 20	10,1	58,4	250,0
63086	0,507	18 x 20	12,9	87,6	295,0
63087	0,507	25 x 20	15,7	121,7	362,0
63088	0,963	2 x 18	7,3	18,5	68,0
63089	0,963	3 x 18	7,6	27,8	88,0
63090	0,963	4 x 18	8,2	37,0	98,0
63091	0,963	5 x 18	8,9	46,3	116,0
63092	0,963	7 x 18	9,6	64,8	149,0
63093	0,963	9 x 18	11,0	83,2	186,0
63094	0,963	10 x 18	11,6	92,5	199,0
63095	0,963	12 x 18	12,2	111,0	245,0
63096	0,963	15 x 18	13,5	138,7	292,0
63097	0,963	16 x 18	13,6	147,9	306,0
63098	0,963	18 x 18	15,0	166,4	366,0
63099	0,963	19 x 18	15,1	175,7	384,0
63100	0,963	25 x 18	17,4	231,2	451,0
63101	0,963	27 x 18	17,7	249,6	521,0
63102	0,963	34 x 18	19,7	314,4	625,0
63103	0,963	37 x 18	20,1	342,0	684,0
63104	0,963	41 x 18	21,0	379,0	744,0
63105	0,963	50 x 18	24,0	462,3	933,0
63106	0,963	61 x 18	25,2	564,0	1095,0

Part no.	Cross-section mm <sup>2</sup> x AWG-No.	No.cores	Outer Ø app. mm	Cop. weight kg / km	Weight app. kg / km
63107	1,31	2 x 16	7,8	25,2	80,0
63108	1,31	3 x 16	8,2	37,8	86,0
63109	1,31	4 x 16	8,8	50,3	115,0
63110	1,31	5 x 16	9,6	62,9	126,0
63112	1,31	6 x 16	10,2	75,5	164,0
63113	1,31	7 x 16	10,5	88,0	171,0
63114	1,31	8 x 16	11,1	100,7	201,0
63115	1,31	9 x 16	12,0	113,2	237,0
63116	1,31	10 x 16	12,4	125,8	259,0
63117	1,31	12 x 16	13,6	151,0	301,0
63118	1,31	14 x 16	14,5	176,1	365,0
63119	1,31	15 x 16	15,2	188,7	379,0
63120	1,31	16 x 16	16,0	201,3	405,0
63121	1,31	18 x 16	16,4	226,4	443,0
63122	1,31	19 x 16	16,6	239,0	458,0
63123	1,31	20 x 16	17,2	251,6	491,0
63124	1,31	25 x 16	18,9	314,5	564,0
63125	1,31	27 x 16	19,3	339,6	629,0
63126	1,31	30 x 16	20,0	377,3	701,0
63127	1,31	34 x 16	22,5	427,6	775,0
63128	1,31	40 x 16	23,5	503,1	946,0
63129	1,31	41 x 16	24,0	515,7	967,0
63130	1,31	50 x 16	26,1	628,8	1137,0
63131	1,31	61 x 16	27,5	767,2	1345,0
63132	2,08	2 x 14	8,9	40,0	100,0
63133	2,08	3 x 14	9,2	60,0	112,0
63111	2,08	4 x 14	10,1	80,0	141,0
63164	2,08	5 x 14	10,9	100,0	152,0

Continuation ▶

**TRAYCONTROL® 500** flexible, oil-resistant, open installation

TC-ER, PLTC-ER, ITC-ER, NFPA 79 Edition 2012



Part no.	Cross-section mm <sup>2</sup> x AWG-No.	No.cores	Outer Ø app. mm	Cop. weight kg / km	Weight app. kg / km
63165	2,08	6 x 14	11,5	120,0	205,0
63166	2,08	7 x 14	12,0	140,0	216,0
63167	2,08	9 x 14	14,7	180,0	312,0
63168	2,08	10 x 14	15,8	200,0	378,0
63169	2,08	12 x 14	16,4	240,0	434,0
63170	2,08	16 x 14	18,0	320,0	550,0
63171	2,08	18 x 14	18,9	359,0	616,0
63172	2,08	19 x 14	19,0	380,0	634,0
63173	2,08	25 x 14	23,0	500,0	817,0
63174	3,31	2 x 12	9,7	63,0	132,0
63175	3,31	3 x 12	10,2	95,0	177,0
63176	3,31	4 x 12	11,2	127,0	201,0
63177	3,31	5 x 12	12,3	159,0	274,0
63178	3,31	6 x 12	13,6	191,0	315,0
63179	3,31	7 x 12	13,9	222,0	353,0
63180	3,31	9 x 12	16,4	286,0	476,0
63181	3,31	12 x 12	18,3	381,0	613,0
63182	3,31	16 x 12	19,8	508,0	783,0
63183	3,31	19 x 12	22,3	604,0	918,0
63184	3,31	20 x 12	23,1	636,0	961,0
63185	3,31	25 x 12	25,8	794,0	1236,0
63186	5,26	2 x 10	12,2	101,0	213,0
63187	5,26	3 x 10	12,9	151,5	283,0

Part no.	Cross-section mm <sup>2</sup> x AWG-No.	No.cores	Outer Ø app. mm	Cop. weight kg / km	Weight app. kg / km
63188	5,26	4 x 10	15,0	202,0	387,0
63189	5,26	5 x 10	16,3	252,5	473,0
63190	5,26	7 x 10	17,7	353,5	607,0
63191	5,26	9 x 10	20,6	454,5	771,0
63192	5,26	12 x 10	24,1	606,0	1061,0
63193	5,26	19 x 10	27,2	959,5	1528,0
63194	8,37	3 x 8	17,0	241,1	420,0
63195	8,37	4 x 8	19,2	321,4	662,0
63196	8,37	5 x 8	21,0	401,8	784,0
63197	13,3	3 x 6	19,5	383,1	701,0
63198	13,3	4 x 6	22,4	510,7	908,0
63199	13,3	5 x 6	24,5	638,4	1149,0
62802	21,2	3 x 4	24,4	610,6	1061,0
62803	21,2	4 x 4	27,0	814,1	1366,0
62804	21,2	5 x 4	29,9	1017,6	1631,0
62805	33,6	3 x 2	28,2	967,7	1480,0
62806	33,6	4 x 2	31,4	1290,3	1922,0
62807	33,6	5 x 2	34,6	1612,8	2363,0
62808	42,3	4 x 1	35,6	1624,0	2397,0
62809	52,9	4 x 1/0	38,7	2031,0	2938,0
62810	67,3	4 x 2/0	42,1	2584,0	3559,0
62811	84,4	4 x 3/0	49,4	3256,0	4181,0
62812	106,7	4 x 4/0	52,0	4097,0	5747,0

Dimensions and specifications may be changed without prior notice. (RN01)



Suitable accessories can be found in Chapter X.

- Cable Gland - HELUTOP® HT-E

**TRAYCONTROL® 530** flexible TC-ER control cable with coloured cores**Technical data**

- Flexible PVC tray cable to UL-Std. 1277 and UL-Std.2277
- **Temperature range** flexing -5°C to +90°C fixed installation -40°C to +90°C
- **Nominal voltage** TC 600 V AWM 1000 V TC Wind Turbine (WTTC) 1000 V
- **Test voltage** 3000 V
- **Minimum bending radius** 5x cable Ø

**Cable structure**

- Bare copper conductor, fine wire with AWG dimensions
- Core insulation of special PVC with transparent nylon skin
- Core identification 2 cores = blue-with from 3 cores = blue cores with continuous white numbering
- GN-YE conductor, 3 cores and above in the outer layer
- Conductor cabled with non-wicking fillers
- Separator
- Outer sheath of special PVC
- Sheath colour grey (RAL 7001)

**Properties**

- self-extinguishing and flame retardant acc. to CSA FT4
- The materials used in manufacture are cadmium-free and contain no silicone and free from substances harmful to the wetting properties of lacquers
- **Tests**
- **UL:** TC-ER, PLTC-ER (AWG 18 - AWG 12), ITC-ER (AWG 18 - AWG 12), MTW, NFPA 79 2012, WTTC 1000V, DP-1, OIL RES I & II, 90°C dry / 75°C wet, Class 1 Div. 2 per NEC Art. 336, 392, 501, crush impact test in accordance with UL 1277
- **CSA:** c(UL) CIC-TC FT4 CSA AWM I/II A/B FT4

**Note****Available on request**

- with red, black, yellow or orange cores
- Black or TPE outer sheath

**Application**

TRAYCONTROL® 530 is a flexible, oil-resistant control cable. The special combination of TC-ER, PLTC-ER and ITC-ER allows this cable to be used as a connecting cable for AC, DC or control wiring in accordance with NFPA 79 Edition 2012. Approved for open, unprotected installation in cable trays to the machine. Its outstanding oil resistance (OIL RES I & II) guarantees a long service life for industrial applications in dry, damp and wet environments. Recommended Applications: automotive industry, machine tool, production lines.

CE The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

Part no.	No. cores x cross-sec. mm <sup>2</sup>	AWG-No.	Outer Ø app. mm	Cop. weight kg / km	Weight app. kg / km
66840	2 x 1	18	7,0	19,0	68,0
66841	3 G 1	18	7,1	29,0	88,0
66842	4 G 1	18	8,0	38,0	98,0
66843	5 G 1	18	8,6	48,0	116,0
66844	7 G 1	18	9,3	67,0	149,0
66845	9 G 1	18	10,7	86,0	186,0
66846	10 G 1	18	11,6	96,0	199,0
66847	12 G 1	18	11,9	115,0	245,0
66848	15 G 1	18	13,2	144,0	292,0
66849	16 G 1	18	13,3	154,0	306,0
66850	18 G 1	18	14,6	173,0	366,0
66851	19 G 1	18	14,7	182,0	384,0
66852	25 G 1	18	17,0	240,0	451,0
66853	27 G 1	18	17,4	259,0	521,0
66854	33 G 1	18	18,7	317,0	590,0
66855	34 G 1	18	19,3	326,0	625,0
66856	41 G 1	18	20,7	394,0	744,0
66857	42 G 1	18	20,8	403,0	758,0
66858	49 G 1	18	23,0	470,0	917,0
66859	50 G 1	18	23,5	480,0	933,0
66860	61 G 1	18	24,9	624,0	1095,0
66861	65 G 1	18	25,6	624,0	1125,0

Part no.	No. cores x cross-sec. mm <sup>2</sup>	AWG-No.	Outer Ø app. mm	Cop. weight kg / km	Weight app. kg / km
66862	2 x 1,32	16	7,5	25,0	80,0
66863	3 G 1,32	16	7,8	38,0	86,0
66864	4 G 1,32	16	8,5	51,0	115,0
66865	5 G 1,32	16	9,3	63,0	126,0
66866	7 G 1,32	16	10,1	89,0	171,0
66867	9 G 1,32	16	11,7	114,0	237,0
66868	10 G 1,32	16	12,4	127,0	259,0
66869	12 G 1,32	16	12,9	152,0	301,0
66870	15 G 1,32	16	15,0	190,0	379,0
66871	16 G 1,32	16	15,2	203,0	405,0
66872	18 G 1,32	16	15,9	228,0	443,0
66873	19 G 1,32	16	16,0	241,0	458,0
66874	25 G 1,32	16	18,6	317,0	564,0
66875	27 G 1,32	16	19,0	342,0	629,0
66876	33 G 1,32	16	20,4	418,0	758,0
66877	34 G 1,32	16	20,5	431,0	775,0
66878	41 G 1,32	16	23,4	520,0	967,0
66879	42 G 1,32	16	24,1	532,0	972,0
66880	49 G 1,32	16	25,5	621,0	1132,0
66881	50 G 1,32	16	25,6	634,0	1137,0
66882	61 G 1,32	16	27,2	773,0	1345,0
66883	65 G 1,32	16	28,5	824,0	1376,0

Dimensions and specifications may be changed without prior notice. (RN01)



Suitable accessories can be found in Chapter X.

- Cable Gland - HELUTOP® HT-E

**JZ-600 UL/CSA** flexible, number coded, 1000 V, meter marking**Technical data**

- Special PVC control cables adapted to DIN VDE 0276 part 627, DIN VDE 0285-525-2-51 / DIN EN 50525-2-51, with insulation thickness for 1 kV type and to UL-Std.758 Style 21179
- **Temperature range**  
flexing -5°C to +80°C  
fixed installation -40°C to +80°C
- **Nominal voltage**  
VDE U<sub>0</sub>/U 600/1000 V  
UL/CSA 1000 V
- **Test voltage** 4000 V
- **Breakdown voltage** min. 8000 V
- **Insulation resistance**  
min. 20 MOhm x km
- **Minimum bending radius**  
flexing 7,5x cable Ø  
fixed installation 4x cable Ø
- **Radiation resistance**  
up to 80x10<sup>6</sup> cJ/kg (up to 80 Mrad)

**Cable structure**

- Bare copper-conductor, to DIN VDE 0295 cl.5, fine-wire, BS 6360 cl.5, IEC 60228 cl.5
- Core insulation of special PVC compound type T12 to DIN VDE 0207-363-3 / DIN EN 50363-3 and class 43 acc. to UL-Std.1581
- Core identification to DIN VDE 0293 black cores with continuous white numbering
- GN-YE conductor, 3 cores and above in the outer layer
- Cores stranded in layers with optimal lay-length
- Outer sheath of special PVC compound type TM2 to DIN VDE 0207-363-4-1 / DIN EN 50363-4-1 and class 43 acc. to UL-Std.1581
- Sheath colour black (RAL 9005) or grey (RAL 7001)
- with meter marking

**Properties**

- Extensively oil resistant, oil-/ chemical Resistance - see table Technical Informations
  - UV-resistant (building with black sheath)
  - The materials used in manufacture are cadmium-free and contain no silicone and free from substances harmful to the wetting properties of lacquers
- Tests**
- PVC self-extinguishing and flame retardant acc. to DIN VDE 0482-332-1-2, DIN EN 60332-1-2/IEC 60332-1 (equivalent DIN VDE 0472 part 804 test method B) UL VW1, CSA FT1

**Note**

- G = with green-yellow conductor  
x = without green-yellow conductor (OZ)
- AWG sizes are approximate equivalent values. The actual cross-section is in mm<sup>2</sup>.
- screened analogue type:  
**JZ-600-Y-CY UL/CSA**, confer page 378

**Application**

Wiring cable for measuring and controlling purposes in tool machinery, conveyor belts and production lines, for plant installations, air conditioning and in steel production plants and rolling mills. Suitable for installation for flexible use for medium mechanical stresses with free movement without tensile stress or forced movements in dry, moist and wet rooms as well as outside (fixed installation, building with black sheath). Is not suitable to be used as direct burial- or as underwater cable. The cores have been numbered in such a way that the numbers are easily identifiable, even if the cable has only been stripped back a few cm. The core numbers have been underlined to avoid confusion. The earth core is located in the outer layer. The black, special PVC outer sheath is resistant to the ultra violet radiation. Mainly used in South-European, Eastern and Arabian countries.

CE= The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

Part no.	No. cores x cross-sec. mm <sup>2</sup>	AWG-No.	Outer Ø app. mm	Cop. weight kg / km	Weight app. kg / km
<b>black</b>					
11815	2 x 0,5	20	6,4	9,6	56,0
11816	3 G 0,5	20	6,8	14,4	68,0
11817	4 G 0,5	20	7,6	19,0	100,0
11818	5 G 0,5	20	8,2	24,0	117,0
11819	7 G 0,5	20	9,8	33,6	138,0
11820	12 G 0,5	20	12,2	58,0	200,0
11821	18 G 0,5	20	14,4	86,0	276,0
11822	25 G 0,5	20	17,2	120,0	335,0
11823	2 x 0,75	19	6,8	14,4	66,0
11824	3 G 0,75	19	7,2	21,6	74,0
11825	4 G 0,75	19	8,0	29,0	126,0
11826	5 G 0,75	19	8,8	36,0	140,0
11827	7 G 0,75	19	10,7	50,0	190,0
11828	12 G 0,75	19	13,1	86,0	257,0
11829	18 G 0,75	19	15,6	130,0	362,0
11830	25 G 0,75	19	18,9	180,0	486,0
11831	2 x 1	18	7,4	19,2	80,0
11832	3 G 1	18	8,0	29,2	96,0
11833	4 G 1	18	8,8	38,4	100,0
11834	5 G 1	18	9,8	48,0	130,0
11835	7 G 1	18	11,7	67,0	170,0
11836	12 G 1	18	14,5	115,0	290,0
11837	18 G 1	18	17,3	173,0	405,0
11838	25 G 1	18	21,1	240,0	570,0
11839	2 x 1,5	16	8,4	29,0	95,0
11840	3 G 1,5	16	9,1	43,0	112,0
11841	4 G 1,5	16	9,9	58,0	139,0
11842	5 G 1,5	16	11,0	72,0	170,0
11843	7 G 1,5	16	13,3	101,0	225,0
11844	12 G 1,5	16	16,6	173,0	370,0
11845	18 G 1,5	16	19,7	259,0	520,0
11846	25 G 1,5	16	23,9	360,0	730,0

Part no.	No. cores x cross-sec. mm <sup>2</sup>	AWG-No.	Outer Ø app. mm	Cop. weight kg / km	Weight app. kg / km
<b>grey</b>					
11880	2 x 0,5	20	6,4	9,6	56,0
11881	3 G 0,5	20	6,8	14,4	68,0
11882	4 G 0,5	20	7,6	19,0	100,0
11883	5 G 0,5	20	8,2	24,0	117,0
11884	7 G 0,5	20	9,8	33,6	138,0
11885	12 G 0,5	20	12,2	58,0	200,0
11886	18 G 0,5	20	14,4	86,0	276,0
11887	25 G 0,5	20	17,2	120,0	335,0
11888	2 x 0,75	19	6,8	14,4	66,0
11889	3 G 0,75	19	7,2	21,6	74,0
11890	4 G 0,75	19	8,0	29,0	126,0
11891	5 G 0,75	19	8,8	36,0	140,0
11892	7 G 0,75	19	10,7	50,0	190,0
11893	12 G 0,75	19	13,1	86,0	257,0
11894	18 G 0,75	19	15,6	130,0	362,0
11895	25 G 0,75	19	18,9	180,0	486,0
11896	2 x 1	18	7,4	19,2	80,0
11897	3 G 1	18	8,0	29,2	96,0
11898	4 G 1	18	8,8	38,4	100,0
11899	5 G 1	18	9,8	48,0	130,0
11900	7 G 1	18	11,7	67,0	170,0
11901	12 G 1	18	14,5	115,0	290,0
11902	18 G 1	18	17,3	173,0	405,0
11903	25 G 1	18	21,1	240,0	570,0
11904	2 x 1,5	16	8,4	29,0	95,0
11905	3 G 1,5	16	9,1	43,0	112,0
11906	4 G 1,5	16	9,9	58,0	139,0
11907	5 G 1,5	16	11,0	72,0	170,0
11908	7 G 1,5	16	13,3	101,0	225,0
11909	12 G 1,5	16	16,6	173,0	370,0
11910	18 G 1,5	16	19,7	259,0	520,0
11911	25 G 1,5	16	23,9	360,0	730,0

Continuation ▶

**JZ-600 UL/CSA** flexible, number coded, 1000 V, meter marking

Part no. Sheath colour	No. cores x cross-sec. mm <sup>2</sup>	AWG-No.	Outer Ø app. mm	Cop. weight kg / km	Weight app. kg / km
11847	2 x 2,5	14	9,4	48,0	160,0
11848	3 G 2,5	14	9,9	72,0	175,0
11849	4 G 2,5	14	11,1	96,0	203,0
11850	5 G 2,5	14	12,4	120,0	251,0
11851	7 G 2,5	14	15,0	168,0	330,0
11852	12 G 2,5	14	18,4	288,0	553,0
11853	18 G 2,5	14	22,0	432,0	795,0
11854	25 G 2,5	14	26,9	600,0	1110,0
11855	2 x 4	12	11,4	77,0	180,0
11856	3 G 4	12	12,3	115,0	230,0
11857	4 G 4	12	13,8	154,0	310,0
11858	5 G 4	12	15,3	192,0	410,0
11859	7 G 4	12	16,8	269,0	540,0
11860	12 G 4	12	22,9	461,0	860,0
11861	3 G 6	10	14,1	173,0	370,0
11862	4 G 6	10	15,6	230,0	430,0
11863	5 G 6	10	17,3	288,0	650,0
11864	7 G 6	10	19,3	403,0	860,0
11865	3 G 10	8	16,5	288,0	660,0
11866	4 G 10	8	18,1	384,0	790,0
11867	5 G 10	8	20,5	480,0	960,0
11868	7 G 10	8	22,5	672,0	1300,0
11869	3 G 16	6	19,6	461,0	760,0
11870	4 G 16	6	21,7	614,0	1100,0
11871	5 G 16	6	24,2	768,0	1600,0
11872	7 G 16	6	25,7	1075,0	1890,0
11873	3 G 25	4	24,0	720,0	1450,0
11874	4 G 25	4	26,9	960,0	1600,0
11875	5 G 25	4	29,4	1200,0	2050,0
11876	7 G 25	4	32,8	1680,0	2900,0

Part no. Sheath colour	No. cores x cross-sec. mm <sup>2</sup>	AWG-No.	Outer Ø app. mm	Cop. weight kg / km	Weight app. kg / km
11912	2 x 2,5	14	9,4	48,0	160,0
11913	3 G 2,5	14	9,9	72,0	175,0
11914	4 G 2,5	14	11,1	96,0	203,0
11915	5 G 2,5	14	12,4	120,0	251,0
11916	7 G 2,5	14	15,0	168,0	330,0
11917	12 G 2,5	14	18,4	288,0	553,0
11918	18 G 2,5	14	22,0	432,0	795,0
11919	25 G 2,5	14	26,9	600,0	1110,0
11920	2 x 4	12	11,4	77,0	180,0
11921	3 G 4	12	12,3	115,0	230,0
11922	4 G 4	12	13,8	154,0	310,0
11923	5 G 4	12	15,3	192,0	410,0
11924	7 G 4	12	16,8	269,0	540,0
11925	12 G 4	12	22,9	461,0	860,0
11926	3 G 6	10	14,1	173,0	370,0
11927	4 G 6	10	15,6	230,0	430,0
11928	5 G 6	10	17,3	288,0	650,0
11929	7 G 6	10	19,3	403,0	860,0
11930	3 G 10	8	16,5	288,0	660,0
11931	4 G 10	8	18,4	384,0	790,0
11932	5 G 10	8	20,5	480,0	960,0
11933	7 G 10	8	22,5	672,0	1300,0
11934	3 G 16	6	19,6	461,0	760,0
11935	4 G 16	6	21,7	614,0	1100,0
11936	5 G 16	6	24,2	768,0	1600,0
11937	7 G 16	6	25,7	1075,0	1890,0
11938	3 G 25	4	24,0	720,0	1450,0
11939	4 G 25	4	26,9	960,0	1600,0
11940	5 G 25	4	29,3	1200,0	2050,0
11941	7 G 25	4	32,6	1680,0	2900,0

Dimensions and specifications may be changed without prior notice. (RN01)



Suitable accessories can be found in Chapter X.

- Cable Gland - HELUTOP® HT-PA
- Cable Gland - HELUTOP® HT-MS



# JZ-604 TC TRAY CABLE

PVC power cable, exposed run, NFPA79

Edition 2012, 90°C, 600 V, meter marking

HELUKABEL JZ-604 TC-ER UL 1277 18AWG / 1 QMM 7C 600V MTW 90C DRY 75C WET SUN RES  
DIR BUR FT4 OR AWN STYLE 2587 CSA AWM I/II A/B 90C FT4 600V LL113926 CE

## Technical data

- PVC power cable to UL-Std.1277 TRAY CABLE
- **Multinorm**  
The TRAY CABLE also conforms to the following standards:  
AWM-Style 2587 to UL-Std.758 and CSA C22.2 No 210 I/II A/B 90C 600 V
- **Temperature range**  
dry environment  
flexing -5°C to +90°C  
fixed installation -25°C to +90°C  
wet environment  
flexing -5°C to +75°C  
fixed installation -25°C to +75°C
- **Nominal voltage** UL 600 V
- **Test voltage** 3000 V
- **Breakdown voltage** min. 6000 V
- **Insulation resistance**  
min. 20 MOhm x km
- **Minimum bending radius**  
7,5x cable Ø
- **Radiation resistance**  
up to 80x10<sup>6</sup> cJ/kg (up to 80 Mrad)

## Cable structure

- Bare copper, fine wire conductors, acc. to DIN VDE 0295 cl.5, BS 6360 cl.5 and IEC 60228 cl.5
- Core insulation of special PVC class 12 B to tab. 50.155 UL-standard 1581, type TFF acc. to UL-Std. 62(AWG 20-AWG 16)  
type THHW acc. to UL-Std. 83 (≥AWG 14)
- Core identification to DIN VDE 0293 black cores with continuous white numbering
- GN-YE conductor, 3 cores and above in the outer layer
- Cores stranded in layers with optimal lay-length
- Outer sheath of special PVC acc. to UL-Std.1277 tab.11.2
- Sheath colour black (RAL 9005)
- with meter marking

## Properties

- self-extinguishing and flame retardant acc. to CSA FT4
- The materials used in manufacture are cadmium-free and contain no silicone and free from substances harmful to the wetting properties of lacquers
- uv-resistant

## Note

- G = with green-yellow conductor  
x = without green-yellow conductor (OZ)
- AWG sizes are approximate equivalent values. The actual cross-section is in mm<sup>2</sup>.
- screened analogue type:  
**JZ-604-FCY TC TRAY CABLE**, confer page 380  
**JZ-604-YCY TC TRAY CABLE**, confer page 381

## Application

USA NFPA79, edition 2012 conformant flexible power cables up to 600 V, for all machinery in tool and plant construction, suitable for installation in dry, humid and damp environments, in the open and in pipes. For underground installation and for open, unprotected installation from the cable rack to machines and industrial plants.

CE= The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

Part no.	No. cores x cross-sec. mm <sup>2</sup>	AWG-No.	Outer Ø app. mm	Cop. weight kg / km	Weight app. kg / km
69661	2 x 1	18	8,0	19,2	72,0
69662	3 G 1	18	8,4	29,0	84,0
69663	4 G 1	18	9,1	39,0	96,0
69664	5 G 1	18	10,0	48,0	114,0
69665	7 G 1	18	11,7	67,0	147,0
69666	9 G 1	18	12,6	84,0	172,0
69667	10 G 1	18	14,3	96,0	206,0
69668	12 G 1	18	14,7	115,0	256,0
69669	18 G 1	18	17,1	173,0	367,0
69670	25 G 1	18	20,3	240,0	477,0
69671	34 G 1	18	23,7	326,0	551,0
69672	50 G 1	18	26,1	480,0	959,0
69673	2 x 1,5	16	8,4	28,8	88,0
69674	3 G 1,5	16	8,8	43,0	102,0
69675	4 G 1,5	16	9,6	58,0	119,0
69676	5 G 1,5	16	10,5	72,0	144,0
69677	7 G 1,5	16	12,3	101,0	192,0
69678	8 G 1,5	16	13,3	115,0	213,0
69679	9 G 1,5	16	13,3	130,0	261,0
69680	10 G 1,5	16	15,1	144,0	294,0
69681	12 G 1,5	16	15,6	173,0	328,0
69682	16 G 1,5	16	17,1	230,0	402,0
69683	18 G 1,5	16	18,2	259,0	427,0
69684	25 G 1,5	16	22,7	360,0	594,0
69685	34 G 1,5	16	25,3	489,0	714,0
69686	41 G 1,5	16	27,0	590,0	803,0
69687	50 G 1,5	16	27,3	720,0	1021,0
69688	61 G 1,5	16	29,4	878,0	1238,0

Part no.	No. cores x cross-sec. mm <sup>2</sup>	AWG-No.	Outer Ø app. mm	Cop. weight kg / km	Weight app. kg / km
69689	2 x 2,5	14	9,4	48,0	108,0
69690	3 G 2,5	14	9,9	72,0	137,0
69691	4 G 2,5	14	10,8	96,0	157,0
69692	5 G 2,5	14	11,8	120,0	190,0
69693	7 G 2,5	14	14,7	168,0	253,0
69694	8 G 2,5	14	16,0	192,0	339,0
69695	9 G 2,5	14	16,0	216,0	341,0
69696	10 G 2,5	14	17,1	240,0	392,0
69697	12 G 2,5	14	17,7	288,0	470,0
69698	18 G 2,5	14	20,8	432,0	682,0
69699	25 G 2,5	14	25,8	600,0	891,0
69700	3 G 4	12	11,0	115,0	187,0
69701	4 G 4	12	12,0	154,0	226,0
69702	5 G 4	12	13,2	192,0	280,0
69703	7 G 4	12	16,5	269,0	390,0
69704	9 G 4	12	17,8	346,0	480,0
69705	12 G 4	12	19,9	461,0	841,0
69706	18 G 4	12	24,2	691,0	981,0
69707	3 G 6	10	12,5	173,0	290,0
69708	4 G 6	10	14,5	230,0	381,0
69709	5 G 6	10	15,8	288,0	465,0
69710	7 G 6	10	17,3	403,0	654,0
69711	3 G 10	8	16,9	288,0	511,0
69712	4 G 10	8	18,6	384,0	584,0
69713	5 G 10	8	20,4	480,0	781,0
69714	7 G 10	8	23,5	672,0	970,0

Continuation ▶

**JZ-604 TC TRAY CABLE** PVC power cable, exposed run, NFPA79

Edition 2012, 90°C, 600 V, meter marking

Part no.	No. cores x cross-sec. mm <sup>2</sup>	AWG-No.	Outer Ø app. mm	Cop. weight kg / km	Weight app. kg / km
69715	3 G 16	6	21,0	461,0	651,0
69716	4 G 16	6	23,9	614,0	866,0
69717	5 G 16	6	26,3	768,0	1117,0
69718	7 G 16	6	28,8	1075,0	1364,0
69719	3 G 25	4	24,9	720,0	1090,0
69720	4 G 25	4	27,2	960,0	1421,0
69721	5 G 25	4	30,3	1200,0	1611,0
69722	7 G 25	4	33,1	1680,0	1943,0
69723	3 G 35	2	27,1	1008,0	1734,0
69724	4 G 35	2	29,8	1344,0	2011,0
69725	5 G 35	2	33,0	1680,0	2347,0
69726	3 G 50	1	33,2	1440,0	2041,0
69727	4 G 50	1	36,7	1920,0	2539,0
69728	5 G 50	1	41,5	2400,0	2894,0

Part no.	No. cores x cross-sec. mm <sup>2</sup>	AWG-No.	Outer Ø app. mm	Cop. weight kg / km	Weight app. kg / km
69729	3 G 70	2/0	37,6	2016,0	2831,0
69730	4 G 70	2/0	42,0	2688,0	3494,0
69731	5 G 70	2/0	47,6	3360,0	4260,0
69732	3 G 95	3/0	41,8	2736,0	5010,0
69733	4 G 95	3/0	47,0	3648,0	6104,0
69734	5 G 95	3/0	52,5	4560,0	7891,0
69735	3 G 120	4/0	46,0	3456,0	5940,0
69736	4 G 120	4/0	51,5	4608,0	7604,0
69737	5 G 120	4/0	56,5	5760,0	8751,0

Dimensions and specifications may be changed without prior notice. (RN01)

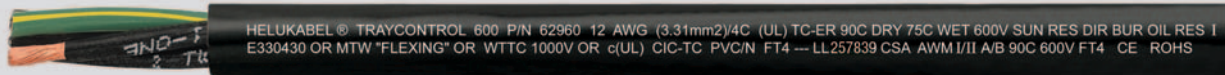


Suitable accessories can be found in Chapter X.

- Cable Gland - HELUTOP® HT-E

# TRAYCONTROL® 600 flexible, oil-resistant, open installation

(TC-ER), NFPA 79 Edition 2012



## Technical data

- PVC-power cable according to UL-Std.1277 and UL-Std.2277
- **Temperature range**  
UL/CSA TC -40°C to +90°C  
UL/AWM -40°C to +90°C
- **Nominal voltage**  
TC 600 V  
AWM 1000 V  
WTTC 1000 V
- **Test voltage** 3000 V
- **Minimum bending radius**  
5x cable Ø
- **Insulation resistance**  
min. 20 MOhm x km
- **Radiation resistance**  
up to 80x10<sup>6</sup> cJ/kg (up to 80 Mrad)

## Cable structure

- Bare copper-conductor, fine wire with AWG dimensions
- Core insulation of special PVC with transparent nylon skin
- Core identification to DIN VDE 0293 black cores with continuous white numbering
- GN-YE conductor, 3 cores and above in the outer layer
- Cores stranded in layers with optimal lay-length
- Separator
- Outer sheath of special PVC
- Sheath colour black (RAL 9005)
- With length marking in feet

## Properties

- self-extinguishing and flame retardant according to CSA FT4
- The materials used in manufacture are cadmium-free and contain no silicone and free from substances harmful to the wetting properties of lacquers
- UV-resistant
- **Tests**
- **UL:**  
TC-ER, PLTC-ER (AWG 18 - AWG 12), ITC-ER (AWG 18 - AWG 12), UL Type WTTC, UL Type MTW, NFPA 79 2012, Oil Res I (Oil Res II also available), 90° C dry / 75° C wet, Class 1 Div. 2 per NEC Art. 336, 392, 501
- **CSA:**  
c(UL) CIC-TC FT4  
CSA AWM I/II A/B FT4

## Note

### Advantages

- TC-ER, Tray Cable Exposed Run
- simple Installation
- outstanding flexibility

## Application

USA NFPA 79 edition 2012 conformant flexible power cables up to 600 V (WTTC 1000 V), for all machinery in tool and plant construction, suitable for installation in dry, humid and damp environments, in the open and in pipes. For underground installation and for open, unprotected installation from the cable rack to machines and industrial plants.

CE = The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

Part no.	Cross-section mm <sup>2</sup> x AWG-No.	No. cores	Outer Ø app. mm	Cop. weight kg / km	Weight app. kg / km
62020	0,507	2 x 20	6,6	9,8	60,0
62021	0,507	3 x 20	7,0	14,6	64,0
62022	0,507	4 x 20	7,5	19,5	79,0
62023	0,507	5 x 20	8,1	24,4	92,0
62024	0,507	7 x 20	8,7	34,1	124,0
62025	0,507	9 x 20	9,8	43,8	210,0
62026	0,507	12 x 20	10,1	58,4	263,0
62027	0,507	18 x 20	12,9	87,6	305,0
62028	0,507	25 x 20	15,7	121,7	371,0
62902	0,963	2 x 18	7,3	18,5	68,0
62903	0,963	3 x 18	7,6	27,8	68,0
62904	0,963	4 x 18	8,2	37,0	97,0
62905	0,963	5 x 18	8,9	46,3	116,0
62906	0,963	7 x 18	9,6	64,8	147,0
62907	0,963	9 x 18	11,0	83,2	186,0
62908	0,963	10 x 18	11,6	92,5	199,0
62909	0,963	12 x 18	12,2	111,0	250,0
62910	0,963	15 x 18	13,5	138,7	292,0
62911	0,963	16 x 18	13,6	147,9	306,0
62912	0,963	18 x 18	15,0	166,4	365,0
62913	0,963	19 x 18	15,1	175,7	384,0
62914	0,963	25 x 18	17,4	231,2	480,0
62915	0,963	27 x 18	17,7	249,6	521,0
62916	0,963	34 x 18	19,7	314,4	625,0
62917	0,963	37 x 18	20,1	342,0	684,0
62918	0,963	41 x 18	21,0	379,0	744,0
62919	0,963	50 x 18	24,0	462,3	933,0
62920	0,963	61 x 18	25,2	564,0	1095,0
62921	1,31	2 x 16	7,8	25,2	80,0
62922	1,31	3 x 16	8,2	37,8	86,0

Part no.	Cross-section mm <sup>2</sup> x AWG-No.	No. cores	Outer Ø app. mm	Cop. weight kg / km	Weight app. kg / km
62923	1,31	4 x 16	8,8	50,3	120,0
62924	1,31	5 x 16	9,6	62,9	130,0
62925	1,31	6 x 16	10,2	75,5	164,0
62926	1,31	7 x 16	10,5	88,0	188,0
62927	1,31	8 x 16	11,1	100,7	201,0
62928	1,31	9 x 16	12,0	113,2	238,0
62929	1,31	10 x 16	12,4	125,8	259,0
62930	1,31	12 x 16	13,6	151,0	301,0
62931	1,31	14 x 16	14,5	176,1	356,0
62932	1,31	15 x 16	15,2	188,7	379,0
62933	1,31	16 x 16	16,0	201,3	405,0
62934	1,31	18 x 16	16,4	226,4	430,0
62935	1,31	19 x 16	16,6	239,0	450,0
62936	1,31	20 x 16	17,2	251,6	481,0
62937	1,31	25 x 16	18,9	314,5	564,0
62938	1,31	27 x 16	19,3	339,6	629,0
62939	1,31	30 x 16	20,0	377,3	701,0
62940	1,31	34 x 16	22,5	427,6	775,0
62941	1,31	40 x 16	23,5	503,1	946,0
62942	1,31	41 x 16	24,0	515,7	967,0
62943	1,31	50 x 16	26,1	628,8	1137,0
62944	1,31	61 x 16	27,5	767,2	1345,0
62945	2,08	2 x 14	8,9	40,0	100,0
62946	2,08	3 x 14	9,2	60,0	117,0
62947	2,08	4 x 14	10,1	80,0	141,0
62948	2,08	5 x 14	10,9	100,0	152,0
62949	2,08	6 x 14	11,5	120,0	216,0
62950	2,08	7 x 14	12,0	140,0	255,0
62951	2,08	9 x 14	14,7	180,0	312,0
62952	2,08	10 x 14	15,8	200,0	378,0

Continuation ▶

# TRAYCONTROL® 600 flexible, oil-resistant, open installation

(TC-ER), NFPA 79 Edition 2012



Part no.	Cross-section mm <sup>2</sup> x AWG-No.	No. cores	Outer Ø app. mm	Cop. weight kg / km	Weight app. kg / km
62953	2,08	12 x 14	16,4	240,0	434,0
62954	2,08	16 x 14	18,0	320,0	550,0
62955	2,08	18 x 14	18,9	359,0	616,0
62956	2,08	19 x 14	19,0	380,0	634,0
62957	2,08	25 x 14	23,0	500,0	817,0
62958	3,31	2 x 12	9,7	63,0	132,0
62959	3,31	3 x 12	10,2	95,0	177,0
62960	3,31	4 x 12	11,2	127,0	201,0
62961	3,31	5 x 12	12,3	159,0	274,0
62962	3,31	6 x 12	13,6	191,0	315,0
62963	3,31	7 x 12	13,9	222,0	353,0
62964	3,31	9 x 12	16,4	286,0	476,0
62965	3,31	12 x 12	18,3	381,0	613,0
62966	3,31	16 x 12	19,8	508,0	783,0
62967	3,31	19 x 12	22,3	604,0	918,0
62968	3,31	20 x 12	23,1	636,0	916,0
62969	3,31	25 x 12	25,8	794,0	1286,0
62970	5,26	2 x 10	12,2	101,0	213,0
62971	5,26	3 x 10	12,9	151,5	283,0
62972	5,26	4 x 10	15,0	202,0	387,0
62973	5,26	5 x 10	16,3	252,5	473,0
62974	5,26	7 x 10	17,7	353,5	607,0

Part no.	Cross-section mm <sup>2</sup> x AWG-No.	No. cores	Outer Ø app. mm	Cop. weight kg / km	Weight app. kg / km
62975	5,26	9 x 10	20,6	454,5	771,0
62976	5,26	12 x 10	24,1	606,0	1061,0
62977	5,26	19 x 10	27,2	959,5	1528,0
62978	8,37	4 x 8	19,2	321,4	615,0
62979	8,37	5 x 8	21,0	401,8	768,0
62980	13,3	3 x 6	19,5	383,1	700,0
62981	13,3	4 x 6	22,4	510,7	907,0
62982	13,3	5 x 6	24,5	638,4	1100,0
62983	21,2	3 x 4	24,4	610,6	1061,0
62984	21,2	4 x 4	27,0	814,1	1366,0
62985	21,2	5 x 4	29,9	1017,6	1631,0
62986	33,6	3 x 2	28,2	967,7	1480,0
62987	33,6	4 x 2	31,4	1290,3	1922,0
62988	33,6	5 x 2	34,6	1612,8	2360,0
62989	42,3	4 x 1	35,6	1624,0	2397,0
62990	52,9	4 x 1/0	38,7	2031,0	2938,0
62991	67,3	4 x 2/0	42,1	2584,0	3569,0
62992	84,4	4 x 3/0	49,4	3256,0	4181,0
62993	106,7	4 x 4/0	52,0	4097,0	5747,0
62994	128,4	4 x 250 kcmil	55,8	4931,0	7591,0
62995	181,9	4 x 350 kcmil	64,3	6985,0	8299,0
62996	257,6	4 x 500 kcmil	74,1	9892,0	11549,0

Dimensions and specifications may be changed without prior notice. (RN01)



Suitable accessories can be found in Chapter X.

- Cable Gland - HELUTOP® HT-E

**H05VV-F/SJT 300 V****Technical data**

- PVC control cable to  
DIN VDE 0285-525-2-11/  
DIN EN 50525-2-11  
IEC 60227-5 and UL-Std.62  
and CSA 22.2 No. 49
- **Temperature range**  
HAR  
flexing -5°C to +70°C  
fixed installation -40°C to +70°C  
UL/CSA  
flexing -5°C to +60°C  
fixed installation -40°C to +60°C
- **Nominal voltage**  
HAR U<sub>0</sub>/U 300/500 V  
UL/CSA 300 V
- **Test voltage** 2500 V, 5 min.
- **Breakdown voltage** min. 5000 V
- **Spark-Test** 6000 V
- **Insulation resistance**  
min. 20 MOhm x km
- **Minimum bending radius**  
7,5x cable Ø
- **Radiation resistance**  
up to 80x10<sup>6</sup> cJ/kg (up to 80 Mrad)

**Cable structure**

- Bare copper-conductor, fine-wire with  
AWG dimensions to UL-Std.62
- Core insulation of special PVC,  
compound type T12 acc. to  
DIN VDE 0207-363-3/ DIN EN 50363-3  
and class 43 acc. to UL-Std.62  
(tab.50.182, UL-Std.1581)  
acc. to CSA C22.2 No 49 type SJT
- Core identification acc. to  
DIN VDE 0293-308 one coloured
- GN-YE conductor, 3 cores and above
- Core stranded with optimal lay-length
- Outer sheath of PVC,  
compound type TM2 to  
DIN VDE 0207-363-4-1/DIN EN 50363-4-1  
and class 43 acc. to UL-Std.62  
(tab. 50.182, UL-Std.1581)  
acc. to CSA-Std. C 22.2 No 49 type SJT
- Sheath colour black, white or grey

**Properties**

- The materials used in manufacture are  
cadmium-free and contain no silicone  
and free from substances harmful to  
the wetting properties of lacquers

**Tests**

- PVC self-extinguishing and flame retardant  
acc. to DIN VDE 0482-332-1-2,  
DIN EN 60332-1-2, IEC 60332-1 (equivalent  
DIN VDE 0472 part 804 test method B),  
CSA FT2

**Application**

These flexible PVC control cables, VDE-HAR-UL-CSA approved, are designed for the export and also for the export-orientated-equipment. These cables are especially suited to use for the appliance with medium mechanical stresses with free movement without tensile stress in households, kitchens and offices, also for household appliances in damp and wet areas, e. g. refrigerators, washing machines, spin-driver etc. , as far as this cable is admitted to the relevant specifications of the equipment. These cables are suited to be used for cooking and heating apparatus under the condition that cable does not come in direct contact with hot parts of the apparatus and no other influences or heat. The cables are suitable for fixed installation in furnitures, partition walls, decoration covering and in hollow spaces of prefabricated building parts. They are not suitable for use in open air, in industries (also permitted to tailor workshops and of that kind) and in agriculture plants and for connecting commercial electrical tools.

CE= The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

Part no.	Cross-section mm <sup>2</sup>	No.cores x AWG-No.	Sheath colour	Outer Ø app. mm	Cop. weight kg / km	Weight app. kg / km
28034	1,04	2 x 17	black	7,4	20,0	86,0
28066	1,04	2 x 17	grey	7,4	20,0	86,0
28050	1,04	2 x 17	white	7,4	20,0	86,0
28035	1,04	3 x 17	black	7,9	30,0	98,0
28067	1,04	3 x 17	grey	7,9	30,0	98,0
28051	1,04	3 x 17	white	7,9	30,0	98,0
28036	1,04	4 x 17	black	8,8	40,0	123,0
28068	1,04	4 x 17	grey	8,8	40,0	123,0
28052	1,04	4 x 17	white	8,8	40,0	123,0
28037	1,04	5 x 17	black	9,6	50,0	146,0
28069	1,04	5 x 17	grey	9,6	50,0	146,0
28053	1,04	5 x 17	white	9,6	50,0	146,0
28038	1,65	2 x 15	black	8,1	31,7	106,0
28070	1,65	2 x 15	grey	8,1	31,7	106,0
28054	1,65	2 x 15	white	8,1	31,7	106,0
28039	1,65	3 x 15	black	8,7	47,5	128,0
28071	1,65	3 x 15	grey	8,7	47,5	128,0
28055	1,65	3 x 15	white	8,7	47,5	128,0
28040	1,65	4 x 15	black	9,8	63,4	164,0
28072	1,65	4 x 15	grey	9,8	63,4	164,0
28056	1,65	4 x 15	white	9,8	63,4	164,0
28041	1,65	5 x 15	black	10,8	79,2	201,0
28073	1,65	5 x 15	grey	10,8	79,2	201,0
28057	1,65	5 x 15	white	10,8	79,2	201,0

Part no.	Cross-section mm <sup>2</sup>	No.cores x AWG-No.	Sheath colour	Outer Ø app. mm	Cop. weight kg / km	Weight app. kg / km
28042	2,63	2 x 13	black	9,5	50,5	150,0
28074	2,63	2 x 13	grey	9,5	50,5	150,0
28058	2,63	2 x 13	white	9,5	50,5	150,0
28043	2,63	3 x 13	black	10,2	75,7	184,0
28075	2,63	3 x 13	grey	10,2	75,7	184,0
28059	2,63	3 x 13	white	10,2	75,7	184,0
28044	2,63	4 x 13	black	11,2	101,0	229,0
28076	2,63	4 x 13	grey	11,2	101,0	229,0
28060	2,63	4 x 13	white	11,2	101,0	229,0
28045	2,63	5 x 13	black	12,5	126,2	281,0
28077	2,63	5 x 13	grey	12,5	126,2	281,0
28061	2,63	5 x 13	white	12,5	126,2	281,0
28046	4,17	2 x 11	black	10,8	80,1	204,0
28078	4,17	2 x 11	grey	10,8	80,1	204,0
28062	4,17	2 x 11	white	10,8	80,1	204,0
28047	4,17	3 x 11	black	11,6	120,1	254,0
28079	4,17	3 x 11	grey	11,6	120,1	254,0
28063	4,17	3 x 11	white	11,6	120,1	254,0
28048	4,17	4 x 11	black	12,8	160,1	315,0
28080	4,17	4 x 11	grey	12,8	160,1	315,0
28064	4,17	4 x 11	white	12,8	160,1	315,0
28049	4,17	5 x 11	black	14,4	200,2	393,0
28081	4,17	5 x 11	grey	14,4	200,2	393,0
28065	4,17	5 x 11	white	14,4	200,2	393,0

Dimensions and specifications may be changed without prior notice. (RN01)



# H05VV-F/SJT 300 V



## Technical data

- PVC control cable to  
DIN VDE 0285-525-2-11/  
DIN EN 50525-2-11, IEC 60227-5 and  
UL-Std.62 and CSA 22.2 No. 49
- **Temperature range**  
HAR  
flexing -5°C to +70°C  
fixed installation -40°C to +70°C  
UL/CSA  
flexing -5°C to +60°C  
fixed installation -40°C to +60°C
- **Nominal voltage**  
HAR U<sub>0</sub>/U 300/500 V  
UL/CSA 300 V
- **Test voltage** 2500 V, 5 min.
- **Breakdown voltage** min. 5000 V
- **Spark-Test** 6000 V
- **Insulation resistance**  
min. 20 MOhm x km
- **Minimum bending radius**  
7,5x cable Ø
- **Radiation resistance**  
up to 80x10<sup>6</sup> Cj/kg (up to 80 Mrad)

## Cable structure

- Bare copper-conductor, fine-wire with  
AWG dimensions acc. to UL-Std.62
- Core insulation of PVC  
compound type TI2 to  
DIN VDE 0207-363-3 / DIN EN 50363-3  
and class 43 acc. to UL-Std. 62  
(tab.50.182, UL-Std.1581)  
acc. to CSA C22.2 No 49 type SJT
- Core identification to  
DIN VDE 0293-308 coloured
- GN-YE conductor, 3 cores and above
- Core stranded with optimal lay-length
- Outer sheath of PVC  
compound type TM2 to  
DIN VDE 0207-363-4-1/DIN EN 50363-4-1  
and class 43 acc. to UL-Std.62  
(tab.50.182, UL-Std.1581)  
acc. to CSA-Std. C 22.2 No 49 type SJT
- Sheath colour by request

## Properties

- PVC self-extinguishing and flame retardant  
acc. to DIN VDE 0482-332-1-2,  
DIN EN 60332-1-2, IEC 60332-1 (equivalent  
DIN VDE 0472 part 804 test method B),  
CSA FT2
- The materials used in manufacture are  
cadmium-free and contain no silicone  
and free from substances harmful to  
the wetting properties of lacquers

## Note

- Please complete the part number for  
these cables by adding the suffix for  
the colour required as per the list:  
0 = approx.RAL 5015 blue  
1 = approx.RAL 6018 green  
2 = approx.RAL 8003 brown  
3 = approx.RAL 1021 yellow  
4 = approx.RAL 3000 red  
5 = approx.RAL 2003 orange  
6 = approx.RAL 4005 violet  
7 = gold  
8 = dusty gold  
Further colours on request.

## Application

These flexible PVC control cables, VDE-HAR-UL-CSA approved, are designed for the export and also for the export-orientated-equipment. These cables are especially suited to use for the appliance with medium mechanical stresses with free movement without tensile stress in households, kitchens and offices, also for household appliances in damp and wet areas, e. g. refrigerators, washing machines, spin-driver etc. , as far as this cable is admitted to the relevant specifications of the equipment. These cables are suited to be used for cooking and heating apparatus under the condition that cable does not come in direct contact with hot parts of the apparatus and no other influences or heat. The cables are suitable for fixed installation in furnitures, partition walls, decoration covering and in hollow spaces of prefabricated building parts. They are not suitable for use in open air, in industries (also permitted to tailor workshops and of that kind) and in agriculture plants and for connecting commercial electrical tools.

CE= The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

Part no.	Cross-section mm <sup>2</sup> x AWG-No.	No.cores	Outer Ø app. mm	Cop. weight kg / km	Weight app. kg / km
3110x	1,04	2 x 17	7,4	20,0	86,0
3111x	1,04	3 G 17	7,9	30,0	98,0
3112x	1,04	4 G 17	8,8	40,0	123,0
3113x	1,04	5 G 17	9,6	50,0	146,0
3114x	1,65	2 x 15	8,1	31,7	106,0
3115x	1,65	3 G 15	8,7	47,5	128,0
3116x	1,65	4 G 15	9,8	63,4	164,0
3117x	1,65	5 G 15	10,8	79,2	201,0

Part no.	Cross-section mm <sup>2</sup> x AWG-No.	No.cores	Outer Ø app. mm	Cop. weight kg / km	Weight app. kg / km
3118x	2,63	2 x 13	9,5	50,5	150,0
3119x	2,63	3 G 13	10,2	75,7	184,0
3120x	2,63	4 G 13	11,2	101,0	229,0
3121x	2,63	5 G 13	12,5	126,2	281,0
3122x	4,17	2 x 11	10,8	80,1	204,0
3123x	4,17	3 G 11	11,6	120,1	254,0
3124x	4,17	4 G 11	12,8	160,1	315,0
3125x	4,17	5 G 11	14,4	200,2	393,0

Dimensions and specifications may be changed without prior notice. (RN01)



Suitable accessories can be found in Chapter X.

- Cable Gland - HELUTOP® HT-PA
- Cable Gland - HELUTOP® HT-MS

# H05VV-F/UL 500 V



## Technical data

- PVC control cable to DIN VDE 0285-525-2-11 / DIN EN 50525-2-11, IEC 60227-5 and UL-Std. 758 AWM-Style 20195
- **Temperature range**  
HAR  
flexing -5°C to +70°C  
fixed installation -40°C to +70°C  
UL  
flexing -5°C to +75°C  
fixed installation -40°C to +75°C
- **Nominal voltage**  
HAR U<sub>0</sub>/U 300/500 V  
UL U<sub>0</sub>/U 300/500 V
- **Test voltage** 2500 V
- **Breakdown voltage** min. 5000 V
- **Insulation resistance**  
min. 20 MΩ x km
- **Minimum bending radius**  
7,5x cable Ø
- **Radiation resistance**  
up to 80x10<sup>6</sup> cJ/kg (up to 80 Mrad)

## Cable structure

- Bare copper, fine wire to DIN VDE 0295 cl.5, BS 6360 cl.5, IEC 60228 cl.5 acc. to UL-Std.62
- Core insulation of special PVC compound type T12 to DIN VDE 0207-363-3 / DIN EN 50363-3
- Core identification to DIN VDE 0293-308, one coloured
- Core stranded in layers with optimal lay-length
- GN-YE conductor, 3 cores and above
- Outer sheath of special PVC compound type TM2 to DIN VDE 0207-363-4-1/DIN EN 50363-4-1
- Sheath colour by request

## Properties

- PVC self-extinguishing and flame retardant acc. to VDE 0482-332-1-2, DIN EN 60332-1-2/IEC 60332-1 (equivalent DIN VDE 0472 part 804 test method B)
- The materials used in manufacture are cadmium-free and contain no silicone and free from substances harmful to the wetting properties of lacquers

## Note

- G = with green-yellow conductor  
x = without green-yellow conductor
- AWG sizes are approximate equivalent values. The actual cross-section is in mm<sup>2</sup>.
- Please complete the part number for these cables by adding the suffix for the colour required as per the list:  
0 = approx.RAL 9005 black  
1 = approx.RAL 9003 white  
2 = approx.RAL 5015 blue  
3 = approx.RAL 6018 green  
4 = approx.RAL 8003 brown  
5 = approx.RAL 1021 yellow  
6 = approx.RAL 3000 red  
7 = approx.RAL 2003 orange  
8 = approx.RAL 4005 violet  
9 = approx.RAL 7001/7032 grey  
Further colours on request.

## Application

These flexible PVC control cables, VDE-HAR-AWM approved, are designed for the export and also for the export-orientated-equipment. These cables are especially suited to use for the appliance with medium mechanical stresses with free movement without tensile stress in households, kitchens and offices, also for household appliances in damp and wet areas, e. g. refrigerators, washing machines, spin-driver etc. , as far as this cable is admitted to the relevant specifications of the equipment. These cables are suited to be used for cooking and heating apparatus under the condition that cable does not come in direct contact with hot parts of the apparatus and no other influences or heat. The cables are suitable for fixed installation in furnitures, partition walls, decoration covering and in hollow spaces of prefabricated building parts. They are not suitable for use in open air, in industries (also permitted to tailor workshops and of that kind) and in agriculture plants and for connecting commercial electrical tools.

☑= The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

Part no.	No. cores x cross-sec. mm <sup>2</sup>	AWG-No.	Outer Ø app. mm	Cop. weight kg / km	Weight app. kg / km
3269x	2 x 0,75	18	6,4	14,4	50,0
3270x	3 G 0,75	18	6,8	21,6	60,0
3271x	4 G 0,75	18	7,4	29,0	73,0
3272x	5 G 0,75	18	8,3	36,0	88,0
3273x	2 x 1	17	7,3	19,0	57,0
3274x	3 G 1	17	7,8	29,0	73,0
3275x	4 G 1	17	8,6	38,0	85,0
3276x	5 G 1	17	9,4	48,0	105,0
3277x	2 x 1,5	15	7,9	29,0	82,0
3278x	3 G 1,5	15	8,4	43,0	95,0

Part no.	No. cores x cross-sec. mm <sup>2</sup>	AWG-No.	Outer Ø app. mm	Cop. weight kg / km	Weight app. kg / km
3279x	4 G 1,5	15	9,3	58,0	117,0
3280x	5 G 1,5	15	10,4	72,0	144,0
3281x	3 G 2,5	13	10,0	72,0	152,0
3282x	4 G 2,5	13	10,9	96,0	192,0
3283x	5 G 2,5	13	12,2	120,0	243,0

Dimensions and specifications may be changed without prior notice. (RN01)



Suitable accessories can be found in Chapter X.

- Cable Gland - HELUTOP® HT-PA
- Cable Gland - HELUTOP® HT-MS

## FROR CEI 20-22 II



### Technical data

- Special PVC-sheath flexible cord as per Italian standard CEI 20-22
- **Temperature range**  
flexing -5°C to +70°C  
fixed installation -35°C to +70°C
- **Nominal voltage**  
up to 5-cores U<sub>0</sub>/U 450/750 V  
from 7-cores U<sub>0</sub>/U 300/500 V
- **Test voltage** 2000 V
- **Insulation resistance**  
min. 20 MOhm x km
- **Radiation resistance**  
up to 80x10<sup>6</sup> cJ/kg (80 Mrad)
- **Minimum bending radius**  
10x cable Ø

### Cable structure

- Bare copper conductor, fine wire stranded to CEI 20-29 cl.5
- Special PVC compound T12
- Core identification up to 4 cores to HELUKABEL®-JB colour code, from 5 cores black with continuous white number printing
- GN-YE conductor
- Cores stranded in layers with optimal lay-length
- Outer sheath of special PVC
- Sheath colour grey, similar to RAL 7035, with printing CEI 20-22 II

### Properties

- Oil- and petrol resistant as per CEI 20-22 II
- **Conditionally resistant to**  
Oil  
Solvents  
Acids  
Lyes
- The materials used in manufacture are cadmium-free and contain no silicone and free from substances harmful to the wetting properties of lacquers

### Tests

- PVC self-extinguishing and flame retardant, test methods analog to IEC 60332-3

### Note

- G = with green-yellow conductor
- AWG sizes are approximate equivalent values. The actual cross-section is in mm<sup>2</sup>.

### Application

Well known companies (FIAT, COMAU, etc.) use this cable for measurement and control purposes on machine tools and conveyors, as well as on production lines in equipment production and for special mechanical engineering. These cables are used for flexible use for medium mechanical stresses with free movement without tensile stress or forced movements in dry, moist and wet rooms but not suitable for open air. Due to special conductor insulation- and sheath compound, this cable is flame resistant in case of fire and self-extinguishing. The good oil- and petrol resistance allows the usage of this cable also in problem areas.

CE= The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

Part no.	No.cores x cross-sec. mm <sup>2</sup>	Outer Ø app. mm	Cop. weight kg / km	Weight app. kg / km	AWG-No.
60250	3 G 1	8,5	29,0	85,0	17
60251	4 G 1	9,5	39,0	100,0	17
60252	5 G 1	10,5	48,0	123,0	17
60253	7 G 1	10,8	67,0	160,0	17
60254	12 G 1	13,8	115,0	270,0	17
60255	18 G 1	16,5	173,0	380,0	17
60256	25 G 1	19,5	240,0	500,0	17
60284	27 G 1	20,0	259,0	560,0	17
60285	33 G 1	20,8	317,0	700,0	17
60257	34 G 1	21,0	326,0	720,0	17
60258	42 G 1	23,3	405,0	800,0	17
60259	50 G 1	25,0	480,0	1050,0	17
60260	3 G 1,5	9,6	43,0	105,0	16
60261	4 G 1,5	11,0	58,0	150,0	16
60262	5 G 1,5	12,0	72,0	190,0	16
60263	7 G 1,5	12,5	101,0	220,0	16
60264	12 G 1,5	16,0	173,0	350,0	16
60265	18 G 1,5	18,8	259,0	515,0	16
60266	25 G 1,5	23,0	360,0	705,0	16
60267	34 G 1,5	26,0	490,0	990,0	16
60286	37 G 1,5	26,5	533,0	1005,0	16
60268	42 G 1,5	29,5	605,0	1080,0	16
60269	50 G 1,5	30,5	720,0	1330,0	16

Part no.	No.cores x cross-sec. mm <sup>2</sup>	Outer Ø app. mm	Cop. weight kg / km	Weight app. kg / km	AWG-No.
60287	3 G 2,5	11,3	72,0	190,0	14
60270	4 G 2,5	12,3	96,0	215,0	14
60271	5 G 2,5	12,6	120,0	270,0	14
60272	7 G 2,5	14,5	168,0	350,0	14
60273	12 G 2,5	18,0	288,0	550,0	14
60274	4 G 4	14,0	154,0	300,0	12
60275	7 G 4	16,0	269,0	500,0	12
60276	4 G 6	16,0	230,0	430,0	10
60277	4 G 10	19,0	384,0	700,0	8
60278	4 G 16	23,0	614,0	1000,0	6
60279	4 G 25	28,0	960,0	1550,0	4
60280	4 G 35	31,0	1344,0	2070,0	2
60281	4 G 50	37,0	1920,0	2850,0	1
60282	4 G 70	43,0	2688,0	4000,0	2/0
60283	4 G 95	50,0	3648,0	5400,0	3/0

Dimensions and specifications may be changed without prior notice. (RN01)



Suitable accessories can be found in Chapter X.

- Cable Gland - HELUTOP® HT-PA
- Cable Gland - HELUTOP® HT-MS

**C.N.O.M.O** Type N0VV5-F according to NFC 32-206**Technical data**

- Special PVC based core insulation
- As per to the french motor industry standard for tool machines 04-24-22
- **Temperature range**  
flexing -5°C to +80°C  
fixed installation -30°C to +80°C
- **Nominal voltage** 500 V
- **Test voltage** 2000 V
- **Insulation resistance**  
min. 20 MOhm x km
- **Radiation resistance**  
up to 80x10<sup>6</sup> cJ/kg (80 Mrad)
- **Minimum bending radius**  
15x cable Ø

**Cable structure**

- Bare copper conductor, fine wire stranded to NFC 32-013 class 5 bzw. IEC 60228 class 5
- Core insulation of special PVC
- Core identification red or black cores with continuous white numbering
- GN-YE conductor
- Cores stranded in layers with optimal lay-length
- Outer sheath of special PVC
- Sheath colour gray

**Properties**

- The materials used in manufacture are cadmium-free and contain no silicone and free from substances harmful to the wetting properties of lacquers

**Tests**

- PVC self-extinguishing and flame retardant, test method B and IEC 60332-1

**Resistant to**

Oil  
Petrol  
Cutting oil acc. to C.N.O.M.O recommendation E 03.40.150N (VDE 0472 part 803)

**Note**

- G = with green-yellow conductor  
x = without green-yellow conductor (OZ)
- AWG sizes are approximate equivalent values. The actual cross-section is in mm<sup>2</sup>.
- Further types and sizes available on request.

**Application**

These cables are constructed specially for the french automobile industries and used for the installation in tool making machines, production lines, industrial plants, air conditioning as well as for use in steel production. These cables are used for flexible use for medium mechanical stresses with free movement without tensile stress or forced movements in dry, moist and wet rooms but not suitable for open air.

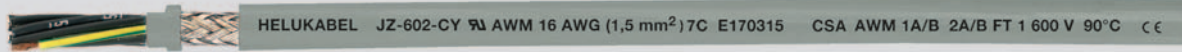
CE= The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

Part no.	No.cores x cross-sec. mm <sup>2</sup>	Outer Ø app. mm	Cop. weight kg / km	Weight app. kg / km	AWG-No.
60000	2 x 0,75	6,2	14,4	50,0	18
60001	3 G 0,75	6,6	21,6	59,0	18
60002	4 G 0,75	7,2	29,0	72,0	18
60003	5 G 0,75	8,0	36,0	87,0	18
60004	6 G 0,75	8,9	50,0	105,0	18
60005	12 G 0,75	11,6	86,0	175,0	18
60006	18 G 0,75	13,9	144,0	267,0	18
60007	27 G 0,75	17,2	230,0	404,0	18
60008	36 G 0,75	19,7	288,0	503,0	18
60009	48 G 0,75	22,8	360,0	670,0	18
60010	60 G 0,75	24,9	439,0	805,0	18
60011	2 x 1	6,5	19,0	56,0	17
60012	3 G 1	6,9	29,0	72,0	17
60013	4 G 1	7,7	38,0	84,0	17
60014	5 G 1	8,5	48,0	104,0	17
60015	6 G 1	9,2	67,0	124,0	17
60016	12 G 1	12,4	115,0	219,0	17
60017	18 G 1	15,2	192,0	314,0	17
60018	27 G 1	18,7	308,0	485,0	17
60019	36 G 1	21,1	384,0	620,0	17
60020	48 G 1	24,3	480,0	809,0	17
60021	60 G 1	26,4	586,0	1000,0	17
60022	2 x 1,5	7,5	29,0	76,0	16
60023	3 G 1,5	8,1	43,0	94,0	16
60024	4 G 1,5	9,1	58,0	116,0	16
60025	5 G 1,5	10,1	72,0	143,0	16
60026	6 G 1,5	11,0	101,0	173,0	16
60027	12 G 1,5	15,1	173,0	307,0	16
60028	18 G 1,5	17,9	263,0	464,0	16
60029	24 G 1,5	21,0	341,0	629,0	16
60030	27 G 1,5	21,8	372,0	708,0	16
60031	36 G 1,5	24,5	498,0	985,0	16
60032	48 G 1,5	28,4	641,0	1175,0	16
60033	60 G 1,5	31,3	878,0	1415,0	16

Part no.	No.cores x cross-sec. mm <sup>2</sup>	Outer Ø app. mm	Cop. weight kg / km	Weight app. kg / km	AWG-No.
60034	2 x 2,5	10,5	48,0	122,0	14
60035	3 G 2,5	11,0	72,0	151,0	14
60036	4 G 2,5	12,0	96,0	191,0	14
60037	5 G 2,5	13,1	120,0	244,0	14
60038	6 G 2,5	15,0	168,0	292,0	14
60039	12 G 2,5	18,0	288,0	524,0	14
60040	2 x 4	10,4	77,0	178,0	12
60041	3 G 4	11,3	115,0	230,0	12
60042	4 G 4	12,8	154,0	300,0	12
60043	5 G 4	14,2	192,0	362,0	12
60044	2 x 6	11,6	115,0	218,0	10
60045	3 G 6	12,7	173,0	325,0	10
60046	4 G 6	14,2	230,0	481,0	10
60047	5 G 6	15,7	288,0	584,0	10
60048	2 x 10	15,0	194,0	505,0	8
60049	3 G 10	16,6	288,0	610,0	8
60050	4 G 10	18,4	384,0	736,0	8
60051	5 G 10	20,9	480,0	913,0	8

Dimensions and specifications may be changed without prior notice. (RN01)

# JZ-602-CY screened two approval control cable, oil resistant, EMC-preferred type, 90°C, 600 V, meter marking



## Technical data

- Special PVC-insulated sheathed cable acc. to UL AWM Style 10012 (core insulation) Style 2587 and CSA
- **Temperature range**  
flexing -5°C to +90°C  
fixed installation -40°C to +90°C
- **Nominal voltage**  
UL/CSA 600 V
- **Test voltage** 3000 V
- **Breakdown voltage** min. 6000 V
- **Insulation resistance**  
min. 20 MOhm x km
- **Minimum bending radius**  
flexing 10x cable Ø  
fixed installation 5x cable Ø
- **Radiation resistance**  
up to 80x10<sup>6</sup> cJ/kg (up to 80 Mrad)
- **Coupling resistance**  
max. 250 Ohm/km

## Cable structure

- Bare copper, fine wire stranded to DIN VDE 0295 cl.5, BS 6360 cl.5 and IEC 60228 cl.5
- Core insulation of PVC compound type T13 to DIN VDE 0207-363-3 / DIN EN 50363-3 and class 43 acc. to UL-Std.1581
- Core identification to DIN VDE 0293 black cores with continuous white numbering
- GN-YE conductor, 3 cores and above in the outer layer
- Cores stranded in layers with optimal lay-length
- PVC-insulated inner sheath YM5 to DIN VDE 0207 part 5
- Braided screen of tinned Cu wires approx. 85% coverage
- Outer sheath of special PVC compound type YM5 to DIN VDE 0207 part 5 and class 43 acc. to UL-Std.1581
- Sheath colour grey (RAL 7001)
- with meter marking

## Properties

- Resistant to mineral oils, synthetic oils and coolant. The outer sheath is approved with an improved oil-resistance-test.
- The materials used in manufacture are cadmium-free and contain no silicone and free from substances harmful to the wetting properties of lacquers

## Tests

- PVC self-extinguishing and flame retardant acc. to DIN VDE 0482-332-1-2, DIN EN 60332-1-2, IEC 60332-1 (equivalent DIN VDE 0472 part 804 test method B), UL VW-1, CSA FT1

## Note

- G = with green-yellow conductor  
x = without green-yellow conductor (OZ)
- Cleanroom qualification tested with analog type. Please note "cleanroom qualified" when ordering.
- AWG sizes are approximate equivalent values. The actual cross-section is in mm<sup>2</sup>.
- Unscreened analogue type:  
**JZ-602**, confer page 356

## Application

UL and CSA approved flexible control cables up to 600 V, for all machinery in tooling and plant construction, suitable for installation in dry, moist or wet environments for medium mechanical loads. Designed for the export-orientated machinery manufacturer, specifically for USA and Canada. The thick braiding screen ensures compliance with electromagnetic requirements.

**EMC** = Electromagnetic compatibility

To optimize the EMC features we recommend a large round contact of the copper braiding on both ends.

CE = The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

Part no.	No. cores x cross-sec. mm <sup>2</sup>	AWG-No.	Outer Ø app. mm	Cop. weight kg / km	Weight app. kg / km
82990	2 x 0,5	20	7,4	35,0	93,0
82991	3 G 0,5	20	7,7	42,0	124,0
82992	4 G 0,5	20	8,2	47,0	133,0
82993	5 G 0,5	20	9,0	56,0	153,0
82994	7 G 0,5	20	9,6	69,0	191,0
82995	9 G 0,5	20	11,2	87,0	243,0
82996	12 G 0,5	20	12,3	108,0	322,0
82997	18 G 0,5	20	14,7	145,0	374,0
82998	25 G 0,5	20	17,0	240,0	436,0
82999	34 G 0,5	20	21,4	312,0	560,0
83000	41 G 0,5	20	21,4	348,0	663,0
82979	2 x 1	18	8,1	50,0	107,0
82980	3 G 1	18	8,5	60,0	130,0
82981	4 G 1	18	9,2	71,0	155,0
82982	5 G 1	18	10,1	88,0	181,0
82983	7 G 1	18	10,8	111,0	209,0
82984	9 G 1	18	12,7	139,0	321,0
82985	12 G 1	18	14,1	184,0	341,0
82986	18 G 1	18	16,6	260,0	473,0
82987	25 G 1	18	19,7	349,0	650,0
82988	34 G 1	18	22,6	486,0	781,0
82989	41 G 1	18	24,7	531,0	892,0
82968	2 x 1,5	16	8,6	63,0	136,0
82969	3 G 1,5	16	9,2	80,0	165,0
82970	4 G 1,5	16	10,0	97,0	192,0
82971	5 G 1,5	16	11,0	119,0	224,0
82972	7 G 1,5	16	11,8	147,0	273,0
82973	9 G 1,5	16	14,0	182,0	340,0
82974	12 G 1,5	16	15,3	267,0	461,0
82975	18 G 1,5	16	18,5	374,0	674,0
82976	25 G 1,5	16	21,8	526,0	950,0

Part no.	No. cores x cross-sec. mm <sup>2</sup>	AWG-No.	Outer Ø app. mm	Cop. weight kg / km	Weight app. kg / km
82977	34 G 1,5	16	25,2	629,0	1203,0
82978	41 G 1,5	16	27,6	801,0	1588,0
82959	2 x 2,5	14	10,1	96,0	173,0
82960	3 G 2,5	14	10,6	144,0	220,0
82961	4 G 2,5	14	11,6	148,0	270,0
82962	5 G 2,5	14	12,7	181,0	329,0
82963	7 G 2,5	14	14,0	255,0	428,0
82964	9 G 2,5	14	16,4	309,0	580,0
82965	12 G 2,5	14	18,1	441,0	761,0
82966	18 G 2,5	14	22,2	570,0	1140,0
82967	25 G 2,5	14	27,0	738,0	1551,0
82954	2 x 4	12	11,2	120,0	209,0
82955	3 G 4	12	11,9	174,0	310,0
82956	4 G 4	12	13,3	230,0	456,0
82957	5 G 4	12	14,6	273,0	532,0
82958	7 G 4	12	15,9	316,0	737,0
82949	2 x 6	10	12,9	173,0	318,0
82950	3 G 6	10	14,0	240,0	411,0
82951	4 G 6	10	15,4	305,0	572,0
82952	5 G 6	10	17,0	439,0	732,0
82953	7 G 6	10	18,3	505,0	961,0
82945	3 G 10	8	16,3	350,0	741,0
82946	4 G 10	8	19,4	535,0	988,0
82947	5 G 10	8	21,6	592,0	1202,0
82948	7 G 10	8	23,9	810,0	1743,0
82941	3 G 16	6	23,9	585,0	1088,0
82942	4 G 16	6	26,4	740,0	1662,0

Continuation ▶



# JZ-602-CY screened two approval control cable, oil resistant, EMC-preferred type, 90°C, 600 V, meter marking



Part no.	No. cores x cross-sec. mm <sup>2</sup>	AWG-No.	Outer Ø app. mm	Cop. weight kg / km	Weight app. kg / km
82943	5 G 16	6	29,6	895,0	2021,0
82944	7 G 16	6	32,6	1282,0	2720,0
82937	3 G 25	4	28,3	1070,0	1947,0
82938	4 G 25	4	31,4	1140,0	2591,0
82939	5 G 25	4	34,6	1380,0	3197,0
82940	7 G 25	4	38,1	1870,0	4530,0
82934	3 G 35	2	31,3	1240,0	2701,0
82935	4 G 35	2	34,4	1576,0	3277,0
82936	5 G 35	2	38,1	1930,0	4530,0
82488	3 G 50	1	37,0	1675,0	2870,0
82780	4 G 50	1	40,9	2155,0	3960,0
82781	5 G 50	1	45,0	2794,0	4371,0
82782	3 G 70	2/0	42,1	2288,0	3647,0
82783	4 G 70	2/0	46,2	3120,0	4882,0
82914	5 G 70	2/0	50,9	3705,0	5876,0
82915	3 G 95	3/0	46,2	3010,0	4751,0
82916	4 G 95	3/0	50,0	4043,0	6368,0
82917	5 G 95	3/0	56,0	5026,0	7843,0

Part no.	No. cores x cross-sec. mm <sup>2</sup>	AWG-No.	Outer Ø app. mm	Cop. weight kg / km	Weight app. kg / km
82918	3 G 120	4/0	52,8	3812,0	5899,0
82919	4 G 120	4/0	58,2	5069,0	8010,0
82920	5 G 120	4/0	63,8	5877,0	9205,0

Dimensions and specifications may be changed without prior notice. (RN01)



Suitable accessories can be found in Chapter X.

- Cable Gland - HELUTOP® HT-PA
- Cable Gland - HELUTOP® HT-MS

# JZ-603-CY Multi approval control cable, oil resistant,

## Cu-screened, EMC-preferred, meter marking



JZ-603-CY <VDE><HAR> H05VVC4V5-K 4 G 0,5 QMM AWG STYLE 2587 20AWG 4C VW-1 LL113926 CSA  
AWM I/II A/B 90°C 600V FT1 CCC A014024 HELUKABEL GMBH 602271EC74(RVVVP) 300/500V GOST-R / 83721



### Technical data

- Special PVC control cable with oil resistant outer sheath to DIN VDE 0285-525-2-51 / DIN EN 50525-2-51 and to UL-Style 2587
- Temperature range**  
HAR  
flexing -5°C to +70°C  
fixed installation -40°C to +70°C  
UL/CSA  
flexing -5°C to +90°C  
fixed installation -40°C to +90°C
- Nominal voltage**  
HAR U<sub>0</sub>/U 300/500 V  
UL/CSA 600 V
- Test voltage** 3000 V
- Breakdown voltage** min. 6000 V
- Insulation resistance**  
min. 20 MOhm x km
- Minimum bending radius**  
flexing 10x cable Ø  
fixed installation 5x cable Ø
- Radiation resistance**  
up to 80x10<sup>6</sup> cJ/kg (up to 80 Mrad)
- Coupling resistance**  
max. 250 Ohm/km

### Cable structure

- Bare copper, fine wire conductor to DIN VDE 0295 cl.5, BS 6360 cl.5 and IEC 60228 cl.5
- Core insulation of special PVC compound type T12 to DIN VDE 0207-363-3 / DIN EN 50363-3 and class 43 acc. to UL-Std.1581
- Core identification to DIN VDE 0293 black cores with continuous white numbering
- GN-YE conductor in the outer layer
- Cores stranded in layers with optimal lay-length
- PVC based inner sheath
- Tinned copper braiding screening, 85% coverage
- Outer sheath of special PVC, oil resistant compound type TM5 to DIN VDE 0207-363-4-1/DIN EN 50363-4-1 and class 43 acc. to UL-Std.1581
- Sheath colour grey (RAL 7001)
- with meter marking

### Properties

- Oil resistant to DIN VDE 0473-811-404 / DIN EN 60811-404, UL 1581 part 50.182
- The materials used in manufacture are cadmium-free and contain no silicone and free from substances harmful to the wetting properties of lacquers

### Tests

- PVC self-extinguishing and flame retardant acc. to DIN VDE 0482-332-1-2, DIN EN 60332-1-2, IEC 60332-1 (equivalent DIN VDE 0472 part 804 test method B) UL VW-1, CSA FT1

### Note

- G = with green-yellow conductor  
x = without green-yellow conductor (OZ)
- AWG sizes are approximate equivalent values. The actual cross-section is in mm<sup>2</sup>.
- unscreened analogue type:  
**JZ-603**, confer page 358

### Application

UL-CSA-HAR approved cables offer any company exporting anywhere in the world, primarily designed for exporters, used in machine tools, control systems, assembly lines and other industrial equipment. These cables are suitable for flexible use for medium mechanical stresses with free movements in dry, moist and wet rooms but not for open air.

**EMC** = Electromagnetic compatibility

To optimize the EMC features we recommend a large round contact of the copper braiding on both ends.

**CE** = The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

Part no.	No.cores x cross-sec. mm <sup>2</sup>	AWG-No.	Outer Ø app. mm	Cop. weight kg / km	Weight app. kg / km
83709	2 x 0,5	20	8,0	41,0	90,0
83720	3 G 0,5	20	8,3	45,0	105,0
83721	4 G 0,5	20	8,9	54,0	123,0
83722	5 G 0,5	20	9,7	66,0	147,0
83723	7 G 0,5	20	11,2	79,0	195,0
83724	12 G 0,5	20	13,6	137,0	276,0
83725	18 G 0,5	20	15,4	156,0	418,0
83726	25 G 0,5	20	18,6	250,0	504,0
83727	34 G 0,5	20	20,8	316,0	632,0
83728	41 G 0,5	20	22,6	348,0	750,0
83729	50 G 0,5	20	24,8	407,0	968,0
83730	61 G 0,5	20	26,0	520,0	1068,0
83710	2 x 0,75	19	8,3	46,0	101,0
83731	3 G 0,75	19	8,6	57,0	127,0
83732	4 G 0,75	19	9,4	63,0	155,0
83733	5 G 0,75	19	10,1	76,0	180,0
83734	7 G 0,75	19	11,9	100,0	225,0
83735	12 G 0,75	19	14,2	175,0	326,0
83736	18 G 0,75	19	16,6	240,0	457,0
83737	25 G 0,75	19	20,0	306,0	635,0
83738	34 G 0,75	19	22,4	346,0	805,0
83739	41 G 0,75	19	24,0	403,0	908,0
83740	50 G 0,75	19	26,2	470,0	1155,0
83741	61 G 0,75	19	30,0	550,0	1400,0
83711	2 x 1	18	8,6	54,0	113,0
83742	3 G 1	18	9,2	64,0	144,0
83743	4 G 1	18	9,8	76,0	178,0
83744	5 G 1	18	10,7	89,0	205,0
83745	7 G 1	18	12,5	114,0	263,0
83746	12 G 1	18	15,1	186,0	424,0

Dimensions and specifications may be changed without prior notice. (RN01)

Part no.	No.cores x cross-sec. mm <sup>2</sup>	AWG-No.	Outer Ø app. mm	Cop. weight kg / km	Weight app. kg / km
83747	18 G 1	18	17,3	284,0	560,0
83748	25 G 1	18	21,1	387,0	760,0
83749	34 G 1	18	23,5	500,0	945,0
83750	41 G 1	18	25,5	578,0	1151,0
83751	50 G 1	18	27,6	681,0	1300,0
83752	61 G 1	18	32,4	710,0	1500,0
83712	2 x 1,5	16	9,6	64,0	144,0
83753	3 G 1,5	16	10,1	82,0	160,0
83754	4 G 1,5	16	11,0	99,0	210,0
83755	5 G 1,5	16	12,3	123,0	240,0
83756	7 G 1,5	16	14,2	148,0	305,0
83757	12 G 1,5	16	17,1	274,0	482,0
83758	18 G 1,5	16	20,0	386,0	611,0
83759	25 G 1,5	16	24,0	531,0	950,0
83760	34 G 1,5	16	27,1	671,0	1200,0
83761	41 G 1,5	16	29,7	840,0	1400,0
83762	50 G 1,5	16	31,8	997,0	1665,0
83763	61 G 1,5	16	34,6	1120,0	1852,0
83713	2 x 2,5	14	11,4	110,0	189,0
83764	3 G 2,5	14	12,0	148,0	244,0
83765	4 G 2,5	14	13,4	169,0	296,0
83766	5 G 2,5	14	14,6	220,0	367,0
83767	7 G 2,5	14	17,2	284,0	478,0
83768	12 G 2,5	14	21,2	470,0	622,0
83769	18 G 2,5	14	24,8	572,0	1010,0
83770	25 G 2,5	14	29,8	740,0	1375,0
83771	34 G 2,5	14	33,4	1179,0	1893,0
83772	50 G 2,5	14	39,0	1660,0	2666,0
83773	61 G 2,5	14	41,0	1992,0	3077,0

# TRAYCONTROL® 500-C flexible, oil-resistant, screened, EMC-preferred type, open installation TC-ER, PLTC-ER, ITC-ER, NFPA 79 Edition 2012



HELUKABEL TRAYCONTROL 500-C P/N 62855 12AWG (3,31mm<sup>2</sup>) 4C (UL) TC-ER 90°C DRY 75°C WET 600 V SUN RES DIR BUR OIL RES I/II E330430 OR MTW "FLEXING" OR WTTC 1000 V OR c(UL)CIC TC FT4 LL257839 CSA AWM I/II 90°C 600 V FT4 CE ROHS



## Technical data

- PVC control cable acc. to UL-Std.1277 and UL-Std.2277
- **Temperature range**  
flexing -5°C to +90°C  
fixed installation -40°C to +90°C
- **Nominal voltage**  
TC 600 V  
AWM 1000 V  
TC Wind Turbine (WTTC) 1000 V
- **Test voltage** 3000 V
- **Coupling resistance**  
max. 250 Ohm/km
- **Minimum bending radius**  
flexing 6x cable Ø
- **Insulation resistance**  
min. 20 MOhm x km
- **Radiation resistance**  
up to 80x10<sup>6</sup> cJ/kg (up to 80 Mrad)

## Cable structure

- Bare copper conductor, fine wire with AWG dimensions
- Core insulation of special PVC with transparent nylon skin
- Core identification to DIN VDE 0293 black cores with continuous white numbering
- GN-YE conductor, 3 cores and above in the outer layer
- Cores stranded in layers with optimal lay-length
- Separating foil
- Braided screening of tinned copper wires, coverage approx. 85%
- Separator
- Outer sheath of special PVC
- Sheath colour - grey (RAL 7001)
- with length marking in feet

## Properties

- self-extinguishing and flame retardant acc. to CSA FT4
- The materials used in manufacture are cadmium-free and contain no silicone and free from substances harmful to the wetting properties of lacquers

## Tests

- **UL:**  
TC-ER, PLTC-ER (AWG 18 - AWG 12), ITC-ER (AWG 18 - AWG 12), MTW, NFPA 79 2012, WTTC 1000V, DP-1, OIL RES I & II, 90°C dry / 75°C wet, Class 1 Div. 2 per NEC Art 336, 392, 501, crush impact test in accordance with UL 1277
- **CSA:**  
c(UL) CIC-TC FT4, CSA AWM I/II A/B FT4

## Note

### Advantages

- Highly-flexible, easy to install

### Available on request

- with blue cores (DC)
- with red cores (AC)
- Black or TPE outer sheath

## Application

HELUKABEL® TRAYCONTROL® 500-C is a flexible, screened and oil-resistant control cable. The special combination of TC-ER, PLTC-ER and ITC-ER allows this cable to be used as a connecting cable for industrial plant and machinery in accordance with NFPA 79 edition 2012. Approved for open, unprotected installation in cable trays to the machine. Its outstanding oil resistance (OIL RES I & II) guarantees a long service life for industrial applications in dry, damp and wet environments. Recommended applications: production lines, bottling plants, machine construction, switch cabinets, conveyor systems, packaging machines, automotive industry.

**EMC** = Electromagnetic compatibility

To optimize the EMC features we recommend a large round contact of the copper braiding on both ends.

☞ = The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

Part no.	Cross-section mm <sup>2</sup> x AWG-No.	No. cores	Outer Ø app. mm	Cop. weight kg / km	Weight app. kg / km
62813	0,507	2 x 20	7,0	35,0	95,0
62814	0,507	3 x 20	7,6	42,0	115,0
62815	0,507	7 x 20	9,4	69,0	164,0
62816	0,507	12 x 20	11,0	108,0	266,0
62817	0,507	25 x 20	16,1	240,0	435,0
62818	0,963	2 x 18	8,1	50,0	110,0
62819	0,963	3 x 18	8,2	60,0	118,0
62820	0,963	4 x 18	8,8	71,0	136,0
62821	0,963	5 x 18	9,4	88,0	148,0
62822	0,963	7 x 18	10,1	111,0	192,0
62823	0,963	9 x 18	11,4	140,0	244,0
62824	0,963	10 x 18	12,0	150,0	283,0
62825	0,963	12 x 18	12,9	184,0	329,0
62826	0,963	15 x 18	14,8	207,0	377,0
62827	0,963	18 x 18	15,7	260,0	435,0
62828	0,963	19 x 18	15,7	280,0	443,0
62829	0,963	25 x 18	17,7	349,0	571,0
62830	1,31	3 x 16	8,9	74,0	144,0
62831	1,31	4 x 16	9,6	90,0	172,0
62832	1,31	5 x 16	10,3	104,0	188,0
62833	1,31	6 x 16	10,5	120,0	203,0
62834	1,31	7 x 16	11,3	134,0	244,0
62835	1,31	9 x 16	12,6	165,0	308,0
62836	1,31	10 x 16	12,9	180,0	346,0
62837	1,31	12 x 16	15,1	244,0	423,0
62838	1,31	15 x 16	16,4	270,0	441,0
62839	1,31	18 x 16	17,3	319,0	512,0
62840	1,31	19 x 16	17,6	327,0	503,0

Part no.	Cross-section mm <sup>2</sup> x AWG-No.	No. cores	Outer Ø app. mm	Cop. weight kg / km	Weight app. kg / km
62841	1,31	20 x 16	17,5	340,0	524,0
62842	1,31	25 x 16	19,6	434,0	704,0
62843	2,08	3 x 14	9,8	112,0	179,0
62844	2,08	4 x 14	10,7	121,0	222,0
62845	2,08	5 x 14	11,6	150,0	266,0
62846	2,08	7 x 14	12,5	200,0	326,0
62847	2,08	9 x 14	15,0	240,0	435,0
62848	2,08	10 x 14	16,3	264,0	427,0
62849	2,08	12 x 14	16,9	350,0	592,0
62850	2,08	15 x 14	18,3	409,0	635,0
62851	2,08	18 x 14	19,5	471,0	780,0
62852	2,08	19 x 14	19,7	505,0	799,0
62853	2,08	25 x 14	23,3	652,0	1042,0
62854	3,31	3 x 12	11,4	137,0	237,0
62855	3,31	4 x 12	12,2	169,0	314,0
62856	3,31	5 x 12	13,4	201,0	386,0
62857	3,31	6 x 12	14,6	236,0	425,0
62858	3,31	7 x 12	15,5	262,0	496,0
62859	3,31	9 x 12	17,7	334,0	740,0
62860	3,31	12 x 12	19,7	434,0	887,0
62861	3,31	15 x 12	21,0	531,0	903,0
62862	3,31	19 x 12	23,1	720,0	1123,0
62863	3,31	20 x 12	25,0	764,0	1490,0
62864	3,31	25 x 12	27,1	914,0	1865,0
62865	5,26	3 x 10	14,1	240,0	389,0
62866	5,26	4 x 10	15,5	305,0	549,0
62867	5,26	5 x 10	16,8	399,0	610,0
62868	5,26	7 x 10	18,2	505,0	851,0

Continuation ▶

# TRAYCONTROL® 500-C flexible, oil-resistant, screened, EMC-preferred type, open installation TC-ER, PLTC-ER, ITC-ER, NFPA 79 Edition 2012



Part no.	Cross-section mm² x AWG-No.	No. cores	Outer Ø app. mm	Cop. weight kg / km	Weight app. kg / km
62869	5,26	9 x 10	20,9	704,0	1132,0
62870	5,26	12 x 10	24,4	940,0	1523,0
62871	5,26	19 x 10	27,5	1210,0	1952,0
62872	8,37	4 x 8	19,9	535,0	852,0

Part no.	Cross-section mm² x AWG-No.	No. cores	Outer Ø app. mm	Cop. weight kg / km	Weight app. kg / km
62873	13,3	4 x 6	23,3	740,0	1202,0
62874	21,2	4 x 4	28,6	1140,0	1971,0
62875	33,6	4 x 2	33,2	1576,0	2887,0

Dimensions and specifications may be changed without prior notice. (RN01)



Suitable accessories can be found in Chapter X.

- Cable Gland - HELUTOP® HT-MS-EP4

# JZ-600-Y-CY UL/CSA flexible, number coded, 1000 V, EMC-preferred

type, meter marking



## Technical data

- Special PVC control cables adapted to DIN VDE 0276 part 627, DIN VDE 0285-525-2-51 / DIN EN 50525-2-51, with insulation thickness for 1 kV type and UL-Std.758 Style 21179
- **Temperature range**  
flexing -5°C to +80°C  
fixed installation -40°C to +80°C
- **Nominal voltage**  
VDE U<sub>0</sub>/U 600/1000 V  
UL/CSA 1000 V
- **Test voltage** 4000 V
- **Breakdown voltage** min. 8000 V
- **Insulation resistance**  
min. 20 MOhm x km
- **Minimum bending radius**  
flexing 10x cable Ø  
fixed installation 5x cable Ø
- **Radiation resistance**  
up to 80x10<sup>6</sup> cJ/kg (up to 80 Mrad)
- **Coupling resistance**  
max. 250 Ohm/km

## Cable structure

- Bare copper, fine wire conductors, acc. to DIN VDE 0295 cl.5, BS 6360 cl.5 and IEC 60228 cl.5
- Core insulation of special PVC compound type T12 to DIN VDE 0207-363-3 / DIN EN 50363-3 and class 43 acc. to UL-Std.1581
- Core identification to DIN VDE 0293 black cores with continuous white numbering
- GN-YE conductor, 3 cores and above in the outer layer
- Cores stranded in layers with optimal lay-length
- PVC-insulated inner sheath TM2, to DIN VDE 0207-363-4-1/DIN EN 50363-4-1, class 43 acc. to UL-Std.1581
- Braided screen of tinned Cu wires, coverage approx. 85%
- Outer sheath of special PVC compound type TM2 to DIN VDE 0207-363-4-1/DIN EN 50363-4-1 and class 43 acc. to UL-Std.1581
- Sheath colour black (RAL 9005) or grey (RAL 7001)
- with meter marking

## Properties

- Extensively oil resistant, oil-/ chemical Resistance - see table Technical Informations
- UV-resistant (building with black sheath)
- The materials used in manufacture are cadmium-free and contain no silicone and free from substances harmful to the wetting properties of lacquers

## Tests

- PVC self-extinguishing and flame retardant acc. to DIN VDE 0482-332-1-2, DIN EN 60332-1-2, IEC 60332-1 (equivalent DIN VDE 0472 part 804 test method B), UL VW-1, CSA FT1

## Note

- G = with green-yellow conductor  
x = without green-yellow conductor (OZ)
- AWG sizes are approximate equivalent values. The actual cross-section is in mm<sup>2</sup>.
- unscreened analogue type:  
**JZ-600 UL/CSA**, confer page 362

## Application

PVC control cable for measuring, monitoring and control purposes in tool machinery, conveyor belts and production lines in machinery, in air conditioning, in foundries and steel mills. Suitable for installation for flexible use for medium mechanical stresses with free movement without tensile stress or forced movements in dry, moist and wet rooms as well as outside (fixed installation, building with black sheath). Is not suitable to be used as direct burial- or as underwater cable. Interference-free transmission of signals and pulses is assured by the high degree of screening.

**EMC** = Electromagnetic compatibility

To optimize the EMC features we recommend a large round contact of the copper braiding on both ends.

**CE** = The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

Part no.	No. cores x cross-sec.	AWG-No.	Outer Ø app. mm	Cop. weight kg / km	Weight app. kg / km
12345	2 x 0,5	20	8,3	41,0	129,0
12346	3 G 0,5	20	8,6	45,0	150,0
12347	4 G 0,5	20	9,4	54,0	170,0
12348	5 G 0,5	20	10,1	66,0	199,0
12349	7 G 0,5	20	12,1	79,0	235,0
12350	12 G 0,5	20	14,7	137,0	320,0
12351	18 G 0,5	20	17,3	156,0	428,0
12352	25 G 0,5	20	20,6	250,0	503,0
12353	2 x 0,75	19	8,7	46,0	143,0
12354	3 G 0,75	19	9,0	57,0	155,0
12355	4 G 0,75	19	9,9	63,0	190,0
12356	5 G 0,75	19	10,8	76,0	228,0
12357	7 G 0,75	19	13,0	100,0	323,0
12358	12 G 0,75	19	15,8	175,0	410,0
12359	18 G 0,75	19	17,9	240,0	560,0
12360	25 G 0,75	19	22,8	306,0	730,0
12361	2 x 1	18	9,4	54,0	150,0
12362	3 G 1	18	9,8	64,0	163,0
12363	4 G 1	18	10,8	76,0	200,0
12364	5 G 1	18	12,1	89,0	239,0
12365	7 G 1	18	14,5	114,0	289,0
12366	12 G 1	18	17,4	186,0	464,0
12367	18 G 1	18	20,7	284,0	628,0
12368	25 G 1	18	24,8	387,0	855,0
12369	2 x 1,5	16	10,2	64,0	162,0
12370	3 G 1,5	16	10,9	82,0	187,0
12371	4 G 1,5	16	12,2	99,0	240,0

Part no.	No. cores x cross-sec.	AWG-No.	Outer Ø app. mm	Cop. weight kg / km	Weight app. kg / km
12410	2 x 0,5	20	8,3	41,0	129,0
12411	3 G 0,5	20	8,6	45,0	150,0
12412	4 G 0,5	20	9,4	54,0	170,0
12413	5 G 0,5	20	10,1	66,0	199,0
12414	7 G 0,5	20	12,1	79,0	235,0
12415	12 G 0,5	20	14,7	137,0	320,0
12416	18 G 0,5	20	17,3	156,0	428,0
12417	25 G 0,5	20	20,6	250,0	503,0
12418	2 x 0,75	19	8,7	46,0	143,0
12419	3 G 0,75	19	9,0	57,0	155,0
12420	4 G 0,75	19	9,9	63,0	190,0
12421	5 G 0,75	19	10,8	76,0	228,0
12422	7 G 0,75	19	13,0	100,0	323,0
12423	12 G 0,75	19	15,8	175,0	410,0
12424	18 G 0,75	19	17,9	240,0	560,0
12425	25 G 0,75	19	22,8	306,0	730,0
12426	2 x 1	18	9,4	54,0	150,0
12427	3 G 1	18	9,8	64,0	163,0
12428	4 G 1	18	10,8	76,0	200,0
12429	5 G 1	18	12,1	89,0	239,0
12430	7 G 1	18	14,5	114,0	289,0
12431	12 G 1	18	17,4	186,0	464,0
12432	18 G 1	18	20,7	284,0	628,0
12433	25 G 1	18	24,8	387,0	855,0
12434	2 x 1,5	16	10,2	64,0	162,0
12435	3 G 1,5	16	10,9	82,0	187,0
12436	4 G 1,5	16	12,2	99,0	240,0

Continuation ▶



**JZ-600-Y-CY UL/CSA** flexible, number coded, 1000 V, EMC-preferred

type, meter marking

Part no. Sheath colour	No. cores x cross-sec. mm <sup>2</sup>	AWG-No.	Outer Ø app. mm	Cop. weight kg / km	Weight app. kg / km
12372	5 G 1,5	16	13,3	123,0	289,0
12373	7 G 1,5	16	16,0	148,0	383,0
12374	12 G 1,5	16	19,6	274,0	592,0
12375	18 G 1,5	16	23,4	386,0	806,0
12376	25 G 1,5	16	28,2	531,0	1241,0
12377	2 x 2,5	14	11,5	110,0	272,0
12378	3 G 2,5	14	12,2	148,0	298,0
12379	4 G 2,5	14	13,4	169,0	345,0
12380	5 G 2,5	14	14,9	220,0	427,0
12381	7 G 2,5	14	17,9	284,0	561,0
12382	12 G 2,5	14	21,9	470,0	857,0
12383	18 G 2,5	14	26,1	572,0	1355,0
12384	25 G 2,5	14	31,9	740,0	1995,0
12385	2 x 4	12	14,3	124,0	306,0
12386	3 G 4	12	15,1	178,0	391,0
12387	4 G 4	12	16,7	234,0	527,0
12388	5 G 4	12	18,6	284,0	700,0
12389	7 G 4	12	20,0	321,0	920,0
12390	3 G 6	10	17,0	245,0	629,0
12391	4 G 6	10	18,7	316,0	731,0
12392	5 G 6	10	20,7	442,0	1105,0
12393	7 G 6	10	23,0	530,0	1465,0
12394	3 G 10	8	19,6	367,0	1125,0
12395	4 G 10	8	21,9	549,0	1345,0
12396	5 G 10	8	24,1	604,0	1635,0
12397	7 G 10	8	26,8	820,0	2210,0
12398	3 G 16	6	23,5	653,0	1395,0
12399	4 G 16	6	26,4	807,0	1870,0
12400	5 G 16	6	28,8	940,0	2720,0
12401	7 G 16	6	31,9	1345,0	3213,0
12402	3 G 25	4	28,0	920,0	2465,0
12403	4 G 25	4	32,5	1169,0	2750,0
12404	5 G 25	4	35,7	1420,0	3490,0
12405	7 G 25	4	39,0	1921,0	4980,0

Part no. Sheath colour	No. cores x cross-sec. mm <sup>2</sup>	AWG-No.	Outer Ø app. mm	Cop. weight kg / km	Weight app. kg / km
12437	5 G 1,5	16	13,3	123,0	289,0
12438	7 G 1,5	16	16,0	148,0	383,0
12439	12 G 1,5	16	19,6	274,0	592,0
12440	18 G 1,5	16	23,4	386,0	806,0
12441	25 G 1,5	16	28,2	531,0	1241,0
12442	2 x 2,5	14	11,5	110,0	272,0
12443	3 G 2,5	14	12,2	148,0	298,0
12444	4 G 2,5	14	13,4	169,0	345,0
12445	5 G 2,5	14	14,9	220,0	427,0
12446	7 G 2,5	14	17,9	284,0	561,0
12447	12 G 2,5	14	21,9	470,0	857,0
12448	18 G 2,5	14	26,1	572,0	1355,0
12449	25 G 2,5	14	31,9	740,0	1995,0
12450	2 x 4	12	14,3	124,0	306,0
12451	3 G 4	12	15,1	178,0	391,0
12452	4 G 4	12	16,7	234,0	527,0
12453	5 G 4	12	18,6	284,0	700,0
12454	7 G 4	12	20,0	321,0	920,0
12455	3 G 6	10	17,0	245,0	629,0
12456	4 G 6	10	18,7	316,0	731,0
12457	5 G 6	10	20,7	442,0	1105,0
12458	7 G 6	10	23,0	530,0	1465,0
12459	3 G 10	8	19,6	367,0	1125,0
12460	4 G 10	8	21,9	549,0	1345,0
12461	5 G 10	8	24,1	604,0	1635,0
12462	7 G 10	8	26,8	820,0	2210,0
12463	3 G 16	6	23,5	653,0	1395,0
12464	4 G 16	6	26,4	807,0	1870,0
12465	5 G 16	6	28,8	940,0	2720,0
12466	7 G 16	6	31,9	1345,0	3213,0
12467	3 G 25	4	28,0	920,0	2465,0
12468	4 G 25	4	32,5	1169,0	2750,0
12469	5 G 25	4	35,7	1420,0	3490,0
12470	7 G 25	4	39,0	1921,0	4980,0

Dimensions and specifications may be changed without prior notice. (RN01)



Suitable accessories can be found in Chapter X.

- Cable Gland - HELUTOP® HT-MS-EP4

# JZ-604-FCY TC TRAY CABLE

PVC power cable, exposed run, screened, NFPA 79 Edition 2012, 90°C, 600 V, EMC-preferred type, meter marking



HELUKABEL JZ-604 FCY TC-ER UL 1277 18AWG / 1 OMM 7C 600V MTW 90C DRY 75C WET SUN RES  
DIR BUR FT4 OR AWN STYLE 2587 CSA AWM III A/B 90C FT4 600V LL113926



## Technical data

- PVC power cable, screened to UL-Std.1277 TRAY CABLE
- **Multinorm**  
AWM-Style 2587 to UL-Std.758 and CSA C22.2 No 210 I/II A/B 90°C 600 V
- **Temperature range**  
dry environment  
flexing -5°C to +90°C  
fixed installation -25°C to +90°C  
wet environment  
flexing -5°C to +75°C  
fixed installation -25°C to +75°C
- **Nominal voltage** UL 600 V
- **Test voltage** 3000 V
- **Breakdown voltage** min. 6000 V
- **Insulation resistance**  
min. 20 MOhm x km
- **Minimum bending radius**  
10x cable Ø
- **Radiation resistance**  
up to 80x10<sup>6</sup> cJ/kg (up to 80 Mrad)
- **Coupling resistance**  
max. 250 Ohm/km

## Cable structure

- Bare copper, fine wire conductors, acc. to DIN VDE 0295 cl.5, BS 6360 cl.5 and IEC 60228 cl.5
- Core insulation of special PVC class 12 B to tab.50.155 acc. to UL-Std.1581, type TFF acc. to UL-Std. 62 (AWG 20-AWG 16), type THHW acc. to UL-Std.83 (AWG 14)
- Core identification to DIN VDE 0293 black cores with continuous white numbering
- GN-YE conductor, 3 cores and above in the outer layer
- Cores stranded in layers with optimal lay-length
- Special separation foil
- Tinned copper braided screening, approx. 85% coverage
- Outer sheath of special PVC acc. to UL-Std.1277 tab.11.2
- Sheath colour black (RAL 9005)
- with meter marking

## Properties

- self-extinguishing and flame retardant acc. to CSA FT4
- The materials used in manufacture are cadmium-free and contain no silicone and free from substances harmful to the wetting properties of lacquers
- uv-resistant

## Note

- G = with green-yellow conductor  
x = without green-yellow conductor (OZ)
- AWG sizes are approximate equivalent values. The actual cross-section is in mm<sup>2</sup>.
- unscreened analogue type:  
**JZ-604 TC TRAY CABLE**, confer page 364

## Application

USA NFPA 79 edition 2012 conformant flexible power cables up to 600 V, for all machinery in tool and plant construction, suitable for installation in dry, humid and damp environments, in the open and in pipes. For underground installation and for open, unprotected installation from the cable rack to machines and industrial plants.

**EMC** = Electromagnetic compatibility

To optimize the EMC features we recommend a large round contact of the copper braiding on both ends.

☑ = The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

Part no.	No.cores x cross-sec. mm <sup>2</sup>	AWG-No.	Outer Ø app. mm	Cop. weight kg / km	Weight app. kg / km
69750	2 x 1	18	8,6	50,0	151,0
69751	3 G 1	18	9,0	60,0	164,0
69752	4 G 1	18	9,7	71,0	200,0
69753	5 G 1	18	10,5	88,0	229,0
69754	7 G 1	18	12,2	111,0	306,0
69755	9 G 1	18	13,2	139,0	371,0
69756	10 G 1	18	15,0	150,0	411,0
69757	12 G 1	18	15,4	184,0	460,0
69758	18 G 1	18	17,8	260,0	624,0
69759	25 G 1	18	21,9	349,0	845,0
69760	34 G 1	18	24,5	486,0	984,0
69761	50 G 1	18	26,2	625,0	1096,0
69762	2 x 1,5	16	9,0	63,0	161,0
69763	3 G 1,5	16	9,4	80,0	181,0
69764	4 G 1,5	16	10,2	97,0	240,0
69765	5 G 1,5	16	11,1	119,0	274,0
69766	7 G 1,5	16	12,9	147,0	367,0
69767	8 G 1,5	16	14,5	170,0	431,0
69768	9 G 1,5	16	14,5	182,0	437,0
69769	10 G 1,5	16	15,8	193,0	511,0
69770	12 G 1,5	16	16,2	267,0	598,0
69771	16 G 1,5	16	17,9	315,0	630,0
69772	18 G 1,5	16	18,9	374,0	787,0
69773	25 G 1,5	16	22,3	526,0	1240,0
69774	34 G 1,5	16	24,9	629,0	1401,0
69775	41 G 1,5	16	26,7	801,0	2671,0
69776	50 G 1,5	16	33,7	885,0	3614,0
69777	61 G 1,5	16	36,0	1100,0	4089,0
69778	2 x 2,5	14	10,0	96,0	269,0
69779	3 G 2,5	14	10,5	144,0	294,0

Part no.	No.cores x cross-sec. mm <sup>2</sup>	AWG-No.	Outer Ø app. mm	Cop. weight kg / km	Weight app. kg / km
69780	4 G 2,5	14	11,4	148,0	341,0
69781	5 G 2,5	14	12,4	181,0	420,0
69782	7 G 2,5	14	15,3	255,0	551,0
69783	8 G 2,5	14	16,5	285,0	583,0
69784	9 G 2,5	14	16,5	309,0	593,0
69785	10 G 2,5	14	17,9	340,0	631,0
69786	12 G 2,5	14	18,4	441,0	847,0
69787	18 G 2,5	14	22,4	570,0	1336,0
69788	25 G 2,5	14	26,5	738,0	1921,0
69789	3 G 4	12	11,6	174,0	381,0
69790	4 G 4	12	12,6	230,0	504,0
69791	5 G 4	12	14,5	273,0	692,0
69792	7 G 4	12	17,1	316,0	908,0
69793	9 G 4	12	18,4	402,0	1104,0
69794	12 G 4	12	20,5	507,0	1497,0
69795	18 G 4	12	25,0	751,0	2104,0
69796	3 G 6	10	13,8	240,0	623,0
69797	4 G 6	10	15,1	305,0	729,0
69798	5 G 6	10	16,4	439,0	1082,0
69799	7 G 6	10	18,0	505,0	1414,0
69800	3 G 10	8	17,6	350,0	1108,0
69801	4 G 10	8	19,3	535,0	1324,0
69802	5 G 10	8	22,1	592,0	1596,0
69803	7 G 10	8	24,2	810,0	2186,0

Dimensions and specifications may be changed without prior notice. (RN01)

# JZ-604-YCY TC TRAY CABLE

PVC power cable, exposed run, screened, NFPA 79 Edition 2012, 90°C, 600 V, EMC-preferred type, meter marking



## Technical data

- PVC power cable, screened to UL-Std. 1277 TRAY CABLE
- **Multinorm**  
also conforms to the following standards:  
AWM-Style 2587 to UL-Std. 758 (cUL) and CSA type TC FT4 to C22.2 no 230, CSA C22.2 No 210 I/II A/B 90°C 600 V FT4
- **Temperature range**  
dry environment  
flexing -5°C to +90°C  
fixed installation -25°C to +90°C  
wet environment  
flexing -5°C to +75°C  
fixed installation -25°C to +75°C
- **Nominal voltage** UL 600 V
- **Test voltage** 3000 V
- **Breakdown voltage** min. 6000 V
- **Insulation resistance**  
min. 20 MOhm x km
- **Minimum bending radius**  
10x cable Ø
- **Radiation resistance**  
up to 80x10<sup>6</sup> cJ/kg (up to 80 Mrad)
- **Coupling resistance**  
max. 250 Ohm/km

## Cable structure

- Bare copper, fine wire conductors, acc. to DIN VDE 0295 cl.5, BS 6360 cl.5 and IEC 60228 cl.5
- Core insulation of special PVC class 12 B to tab.50.155 acc. to UL-Std. 1581 type TFF acc. to UL-Std.62 (AWG 20-AWG 16)  
type THHW to UL-Std.83 (AWG 14)
- Core identification to DIN VDE 0293 black cores with continuous white numbering
- GN-YE conductor, 3 cores and above in the outer layer
- Cores stranded in layers with optimal lay-length
- PVC-inner sheath acc. to UL-Std.1277 tab.11.2
- Tinned copper braided screening, approx. 85% coverage
- Outer sheath of special PVC acc. to UL-Std.1277 tab.11.2,
- Sheath colour black (RAL 9005)
- with meter marking

## Properties

- self-extinguishing and flame retardant acc. to CSA FT4
- The materials used in manufacture are cadmium-free and contain no silicone and free from substances harmful to the wetting properties of lacquers
- uv-resistant

## Note

- G = with green-yellow conductor  
x = without green-yellow conductor (OZ)
- AWG sizes are approximate equivalent values. The actual cross-section is in mm<sup>2</sup>.
- unscreened analogue type:  
**JZ 604 TC TRAY CABLE**, confer page 364

## Application

USA NFPA 79 edition 2012 conformant flexible power cables up to 600 V, for all machinery in tool and plant construction, suitable for installation in dry, humid and damp environments, in the open and in pipes. For underground installation and for open, unprotected installation from the cable rack to machines and industrial plants.

**EMC** = Electromagnetic compatibility

To optimize the EMC features we recommend a large round contact of the copper braiding on both ends.

**CE** = The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

Part no.	No. cores x cross-sec. mm <sup>2</sup>	AWG-No.	Outer Ø app. mm	Cop. weight kg / km	Weight app. kg / km
69804	3 G 16	6	25,2	653,0	1385,0
69805	4 G 16	6	27,8	807,0	1861,0
69806	5 G 16	6	31,2	940,0	2614,0
69807	7 G 16	6	34,5	1345,0	3211,0
69808	3 G 25	4	29,0	920,0	2455,0
69809	4 G 25	4	32,4	1169,0	2721,0
69810	5 G 25	4	34,2	1420,0	3490,0
69811	7 G 25	4	40,3	1921,0	4960,0
69812	3 G 35	2	32,4	1250,0	3130,0
69813	4 G 35	2	36,2	1680,0	4100,0
69814	5 G 35	2	40,5	2020,0	4921,0
69815	3 G 50	1	40,4	1887,0	4560,0
69816	4 G 50	1	45,5	2370,0	5761,0
69817	5 G 50	1	50,0	2880,0	7186,0
69818	3 G 70	2/0	47,1	2516,0	5580,0
69819	4 G 70	2/0	51,1	3257,0	7387,0
69820	5 G 70	2/0	56,0	4032,0	9290,0
69821	3 G 95	3/0	50,1	3086,0	8520,0

Part no.	No. cores x cross-sec. mm <sup>2</sup>	AWG-No.	Outer Ø app. mm	Cop. weight kg / km	Weight app. kg / km
69822	4 G 95	3/0	55,0	4060,0	10200,0
69823	5 G 95	3/0	60,5	5244,0	13800,0
69824	3 G 120	4/0	54,0	4176,0	11090,0
69825	4 G 120	4/0	59,5	5231,0	13620,0
69826	5 G 120	4/0	64,5	6624,0	15420,0

Dimensions and specifications may be changed without prior notice. (RN01)

# TRAYCONTROL® 600-C flexible, oil-resistant, screened, EMC-preferred type, open installation (TC-ER), NFPA 79 Edition 2012



## Technical data

- PVC power cable acc. to UL-Std.1277 and UL-Std.2277
- **Temperature range**  
UL+CSA TC -40°C to +90°C  
AWM -40°C to +90°C
- **Nominal voltage**  
TC 600 V  
AWM 1000 V  
WTTC 1000 V
- **Test voltage** 3000 V
- **Coupling resistance**  
max. 250 Ohm/km
- **Minimum bending radius**  
6x cable Ø
- **Insulation resistance**  
min. 20 MOhm x km
- **Radiation resistance**  
up to 80x10<sup>6</sup> cJ/kg (up to 80 Mrad)

## Cable structure

- Bare copper conductor, fine wire with AWG dimensions
- Core insulation of special PVC with transparent nylon skin
- Core identification to DIN VDE 0293 black cores with continuous white numbering
- GN-YE conductor, 3 cores and above in the outer layer
- Cores stranded in layers with optimal lay-lengths
- Separating foil
- Braided screening of tinned copper wires, coverage approx. 85%
- Separator
- Outer sheath of special PVC
- Sheath colour - black (RAL 9005)
- with length marking in feet

## Properties

- self-extinguishing and flame retardant acc. to CSA FT4
- The materials used in manufacture are cadmium-free and contain no silicone and free from substances harmful to the wetting properties of lacquers
- **UV-resistant**
- **UL:**  
TC-ER, PLTC-ER (AWG 18 - AWG 12), ITC-ER (AWG 18 - AWG 12), UL Type WTTC, UL Type MTW  
NFPA 79 2012, Oil Res I (Oil Res II also available), 90°C dry / 75°C wet, Class 1 Div. 2 per NEC Art. 336, 392, 501
- **CSA:**  
c (UL) CIC-TC FT4,  
CSA AWM I/II A/B FT4

## Note

- **Advantages**
- TC-ER, Tray Cable Exposed Run
- Simple installation
- Outstanding flexibility

## Application

USA NFPA 79 edition 2012 compliant, screened, flexible power cable to 600 V (WTTC 1000 V), for all tool and plant construction machinery, suitable for installation in dry, damp and wet environments, outdoors and in pipes. For underground installation and for open, unprotected installation from the cable tray to the machine and industrial plants.

**EMC** = Electromagnetic compatibility

To optimize the EMC features we recommend a large round contact of the copper braiding on both ends.

☑ = The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

Part no.	Cross-section mm <sup>2</sup> x AWG-No.	No. cores	Outer Ø app. mm	Cop. weight kg / km	Weight app. kg / km
63049	0,963	3 x 18	8,2	31,0	118,0
63050	0,963	4 x 18	8,8	52,0	136,0
63051	0,963	5 x 18	9,4	62,0	149,0
63052	0,963	7 x 18	10,1	83,0	193,0
63053	0,963	12 x 18	12,9	143,0	328,0
63054	0,963	18 x 18	15,7	207,0	431,0
63055	0,963	25 x 18	17,7	284,0	569,0
62997	1,31	3 x 16	8,9	57,0	144,0
63056	1,31	4 x 16	9,6	72,0	172,0
63057	1,31	5 x 16	10,3	84,0	186,0
63058	1,31	7 x 16	11,3	124,0	243,0
63059	1,31	12 x 16	15,1	199,0	421,0
63060	1,31	18 x 16	17,3	290,0	510,0
63061	1,31	25 x 16	19,6	384,0	704,0
63062	2,08	3 x 14	9,8	85,0	178,0
63063	2,08	4 x 14	10,7	115,0	220,0

Part no.	Cross-section mm <sup>2</sup> x AWG-No.	No. cores	Outer Ø app. mm	Cop. weight kg / km	Weight app. kg / km
63064	2,08	5 x 14	11,6	139,0	264,0
63065	2,08	7 x 14	12,5	185,0	325,0
63066	2,08	12 x 14	16,9	309,0	591,0
63067	2,08	18 x 14	19,5	448,0	780,0
63068	2,08	25 x 14	23,3	632,0	1041,0
63069	3,31	4 x 12	12,2	179,0	313,0
63070	3,31	5 x 12	13,4	223,0	384,0
63071	3,31	7 x 12	15,5	298,0	492,0
63072	5,26	4 x 10	15,5	256,0	547,0
63073	5,26	5 x 10	16,8	312,0	608,0
63074	5,26	7 x 10	18,2	430,0	850,0
63075	8,37	4 x 8	19,9	426,0	851,0
63076	13,3	4 x 6	23,3	657,0	1197,0
63077	21,2	4 x 4	28,6	1026,0	1970,0
63078	33,6	4 x 2	33,2	1412,0	2874,0

Dimensions and specifications may be changed without prior notice. (RN01)

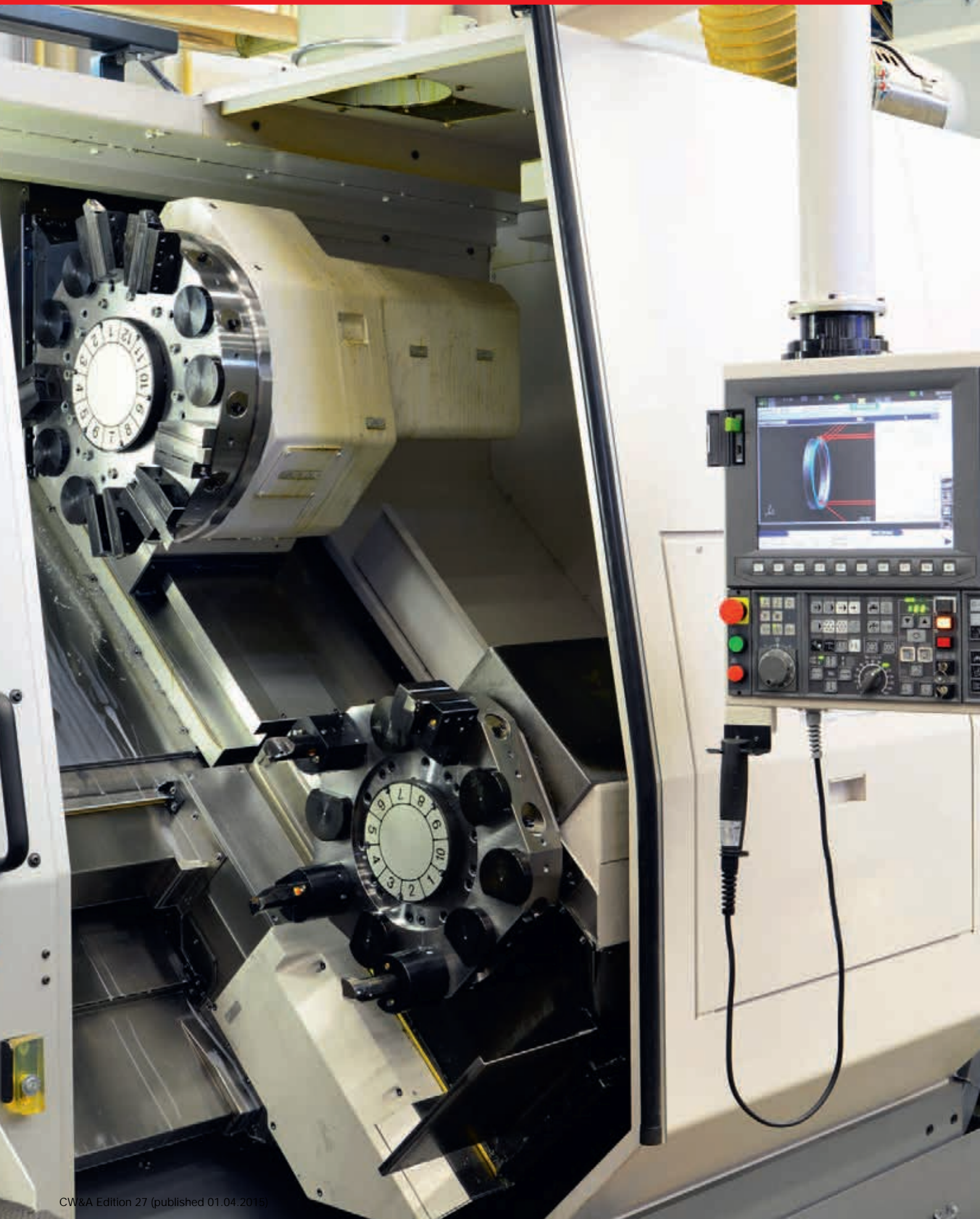


Suitable accessories can be found in Chapter X.

- Cable Gland - HELUTOP® HT-MS-EP4



# UL/CSA PUR/TPE CONTROL CABLES





**JZ-602-PUR 80°C, 600 V, two approval control cable, meter marking**

HELUKABEL JZ-602-PUR AWM 14 AWG/2,5 QMM 4C E170315 CSA AWM III A/B 80°C 600V FT 1 CE

**Technical data**

- Control cable of special-PUR to UL CSA AWM I/II A/B Style 20939 (sheath insulation) and CSA
- **Temperature range**  
flexing -5°C to +80°C  
fixed installation -40°C to +80°C
- **Nominal voltage**  
UL/CSA 600 V
- **Test voltage** 3000 V
- **Breakdown voltage** min. 6000 V
- **Insulation resistance**  
min 20 MOhm x km
- **Minimum bending radius**  
flexing 7,5x cable Ø  
fixed installation 4x cable Ø
- **Radiation resistance**  
up to 100x10<sup>6</sup> cJ/kg (up to 100 Mrad)

**Cable structure**

- Bare copper, fine wire stranded to DIN VDE 0295 cl.5, BS 6360 cl.5 and IEC 60228 cl.5
- Core insulation of PVC compound type T13 to DIN VDE 0207-363-3 / DIN EN 50363-3 and UL-Style 10012
- Core identification to DIN VDE 0293 black cores with continuous white numbering
- GN-YE conductor, 3 cores and above in the outer layer
- Cores stranded in layers with optimal lay-length
- Outer sheath of special **full-polyurethane**
- Sheath colour grey (RAL 7001)
- with meter marking

**Properties**

- Resistant to mineral oils, synthetic oils, coolant, UV-radiation, oxygene, ozon and hydrolysis. Conditionally resistant to microbes.
- The materials used in manufacture are cadmium-free and contain no silicone and free from substances harmful to the wetting properties of lacquers

**Note**

- G = with green-yellow conductor  
x = without green-yellow conductor (OZ)
- AWG sizes are approximate equivalent values. The actual cross-section is in mm<sup>2</sup>.
- unscreened analogue type:  
**JZ-602-C-PUR**, confer page 389

**Application**

UL and CSA approved flexible control cable rated at 600 V, primarily designed for exporters to the US or Canadian market. Used in machine tools, control systems, connection between control panels and machines, assembly lines and other industrial equipment. Suitable for installation in dry, moist, wet and outdoor environment and moderate flexing applications.

CE= The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

Part no.	No. cores x cross-sec. mm <sup>2</sup>	AWG-No.	Outer Ø app. mm	Cop. weight kg / km	Weight app. kg / km
12471	2 x 0,5	20	5,8	9,6	52,0
12472	3 G 0,5	20	6,2	14,0	64,0
12473	4 G 0,5	20	6,6	19,0	72,0
12474	5 G 0,5	20	7,2	24,0	88,0
12475	7 G 0,5	20	8,4	34,0	130,0
12476	8 G 0,5	20	9,5	38,4	145,0
12477	9 G 0,5	20	10,3	43,2	180,0
12478	12 G 0,5	20	10,8	58,0	196,0
12479	18 G 0,5	20	12,8	86,0	260,0
12480	25 G 0,5	20	15,4	120,0	368,0
12481	34 G 0,5	20	17,6	163,0	502,0
12482	41 G 0,5	20	19,7	197,0	594,0
12483	2 x 1	18	6,2	19,2	57,0
12484	3 G 1	18	6,6	27,0	68,0
12485	4 G 1	18	7,2	38,4	79,0
12486	5 G 1	18	7,8	48,0	97,0
12487	7 G 1	18	9,1	67,0	141,0
12488	8 G 1	18	9,9	76,8	152,0
12489	9 G 1	18	11,0	86,4	190,0
12490	12 G 1	18	11,7	115,2	211,0
12491	18 G 1	18	14,0	173,0	284,0
12492	25 G 1	18	17,0	240,0	394,0
12493	34 G 1	18	19,2	326,0	521,0
12494	41 G 1	18	21,0	394,0	609,0

Part no.	No. cores x cross-sec. mm <sup>2</sup>	AWG-No.	Outer Ø app. mm	Cop. weight kg / km	Weight app. kg / km
12495	2 x 1,5	16	6,8	28,8	75,0
12496	3 G 1,5	16	7,4	44,0	96,0
12497	4 G 1,5	16	8,0	58,0	117,0
12498	5 G 1,5	16	8,6	72,0	140,0
12499	7 G 1,5	16	10,5	101,0	186,0
12500	9 G 1,5	16	12,7	129,7	244,0
12501	12 G 1,5	16	13,3	173,0	319,0
12502	18 G 1,5	16	15,7	260,0	451,0
12503	25 G 1,5	16	18,8	360,0	625,0
12504	34 G 1,5	16	22,0	490,0	850,0
12505	41 G 1,5	16	23,6	590,0	1041,0
12506	2 x 2,5	14	8,1	48,0	115,0
12507	3 G 2,5	14	8,6	72,0	143,0
12508	4 G 2,5	14	10,0	96,0	185,0
12509	5 G 2,5	14	10,8	120,0	221,0
12510	7 G 2,5	14	13,0	168,0	293,0
12511	9 G 2,5	14	15,5	216,0	429,0
12512	12 G 2,5	14	16,6	288,0	563,0
12513	18 G 2,5	14	19,5	432,0	854,0
12514	19 G 2,5	14	19,5	456,0	914,0
12515	25 G 2,5	14	23,8	600,0	1188,0
12516	3 G 4	12	11,1	115,0	232,0
12517	4 G 4	12	12,4	154,0	298,0

Continuation ▶

**JZ-602-PUR 80°C, 600 V, two approval control cable, meter marking**

Part no.	No. cores x cross-sec. mm <sup>2</sup>	AWG-No.	Outer Ø app. mm	Cop. weight kg / km	Weight app. kg / km
12518	5 G 4	12	13,7	192,0	358,0
12519	7 G 4	12	16,2	269,0	460,0
12520	3 G 6	10	12,8	173,0	360,0
12521	4 G 6	10	14,1	231,0	402,0
12522	5 G 6	10	15,7	288,0	484,0
12523	7 G 6	10	19,2	403,0	630,0
12524	3 G 10	8	16,8	288,0	535,0
12525	4 G 10	8	18,3	384,0	653,0
12526	5 G 10	8	20,1	480,0	786,0
12527	7 G 10	8	22,4	672,0	1100,0
12528	2 x 16	6	19,2	307,0	640,0
12529	3 G 16	6	20,5	461,0	810,0

Part no.	No. cores x cross-sec. mm <sup>2</sup>	AWG-No.	Outer Ø app. mm	Cop. weight kg / km	Weight app. kg / km
12530	4 G 16	6	23,0	615,0	1045,0
12531	5 G 16	6	25,5	768,0	1260,0
12532	7 G 16	6	28,2	1075,0	1760,0
12533	3 G 25	4	25,0	720,0	1180,0
12534	4 G 25	4	28,1	960,0	1507,0
12535	5 G 25	4	30,9	1200,0	1858,0
12536	7 G 25	4	35,5	1680,0	2830,0
12537	3 G 35	2	28,6	1008,0	1590,0
12538	4 G 35	2	31,7	1344,0	2123,0
12539	5 G 35	2	35,5	1680,0	2612,0
12540	4 G 50	1	35,8	1920,0	3058,0
12541	4 G 70	2/0	41,6	2688,0	4254,0
12542	4 G 95	3/0	46,0	3648,0	5762,0
12543	4 G 120	4/0	52,8	4608,0	7280,0

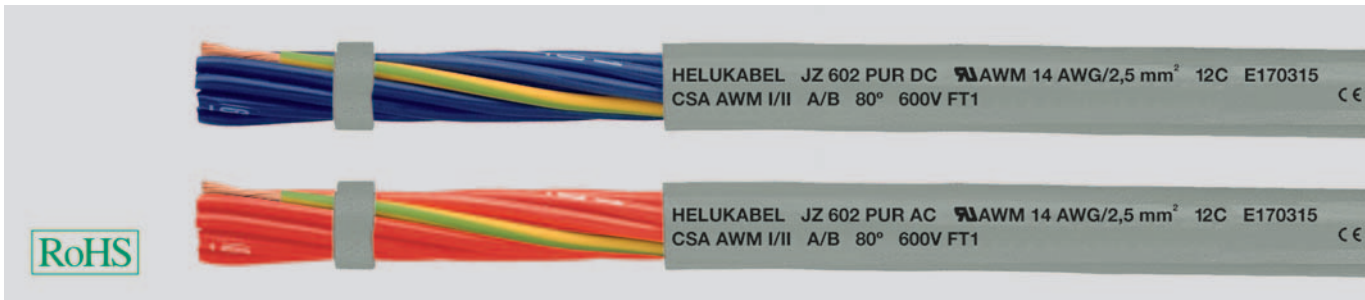
Dimensions and specifications may be changed without prior notice. (RN01)



Suitable accessories can be found in Chapter X.

- Cable Gland - HELUTOP® HT-PA
- Cable Gland - HELUTOP® HT-MS
- Cable Gland - HELUTOP® HT-MS-EP 4

# JZ-602-PUR DC/AC 80°C, 600 V, two approval control cable, meter marking



## Technical data

- Control cable of special-PUR to UL CSA AWM I/II A/B Style 20939 (sheath insulation) and CSA
- Temperature range**  
flexing -5°C to +80°C  
fixed installation -40°C to +80°C
- Nominal voltage** UL/CSA 600 V
- Test voltage** 3000 V
- Breakdown voltage** min. 6000 V
- Insulation resistance**  
min 20 MOhm x km
- Minimum bending radius**  
flexing 7,5x cable Ø  
fixed installation 4x cable Ø
- Radiation resistance**  
up to 100x10<sup>6</sup> cJ/kg (up to 100 Mrad)

## Cable structure

- Bare copper, fine wire stranded to DIN VDE 0295 cl.5, BS 6360 cl.5 and IEC 60228 cl.5
- Core insulation of PVC compound type T13 to DIN VDE 0207-363-3 / DIN EN 50363-3 and UL-Style 10012
- Core identification blue (DC) or red (AC) with continuous white numbering
- GN-YE conductor
- Cores stranded in layers with optimal lay-length
- Outer sheath of special **full-polyurethane**
- Sheath colour grey (RAL 7001)
- with meter marking

## Properties

- Resistant to mineral oils, synthetic oils, coolant, UV-radiation, oxygene, ozon and hydrolysis. Conditionally resistant to microbes.
- High abrasion resistance
- Tear and cut resistant
- The materials used in manufacture are cadmium-free and contain no silicone and free from substances harmful to the wetting properties of lacquers

## Note

- G = with green-yellow conductor
- DC = blue cores;
- AC = red cores;
- AWG sizes are approximate equivalent values. The actual cross-section is in mm<sup>2</sup>.

## Application

For use on conveyor belts, tooling machines, conveyor system, production lines and automotive production plants. Also for medium mechanical stress in flexible applications with free movement and without tensile stress. UL and CSA approved control cables especially for U. S. and Canadian markets.

CE= The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

### JZ-602 PUR DC (blue core)

Part no.	No. cores x cross-sec. mm <sup>2</sup>	AWG-No.	Outer Ø app. mm	Cop. weight kg / km	Weight app. kg / km
12805	3 G 1	18	6,6	27,0	68,0
12806	4 G 1	18	7,2	38,0	79,0
12807	5 G 1	18	7,8	48,0	97,0
12808	7 G 1	18	9,1	67,0	141,0
12809	12 G 1	18	11,7	115,0	211,0
12810	18 G 1	18	14,0	173,0	284,0
12811	25 G 1	18	17,0	240,0	394,0
12812	3 G 1,5	16	7,4	44,0	96,0
12813	4 G 1,5	16	8,0	58,0	117,0
12814	5 G 1,5	16	8,6	72,0	140,0
12815	7 G 1,5	16	10,5	101,0	186,0
12816	12 G 1,5	16	13,3	173,0	319,0
12817	18 G 1,5	16	15,7	260,0	451,0
12818	25 G 1,5	16	18,8	360,0	625,0
12819	3 G 2,5	14	8,6	72,0	143,0
12820	4 G 2,5	14	10,0	96,0	185,0
12821	5 G 2,5	14	10,8	120,0	221,0
12822	7 G 2,5	14	13,0	168,0	293,0
12823	12 G 2,5	14	16,6	288,0	563,0
12824	18 G 2,5	14	19,5	432,0	854,0
12825	25 G 2,5	14	23,8	600,0	1188,0

### JZ-602 PUR AC (red core)

Part no.	No. cores x cross-sec. mm <sup>2</sup>	AWG-No.	Outer Ø app. mm	Cop. weight kg / km	Weight app. kg / km
12826	3 G 1	18	6,6	27,0	68,0
12827	4 G 1	18	7,2	38,0	79,0
12828	5 G 1	18	7,8	48,0	97,0
12829	7 G 1	18	9,1	67,0	141,0
12830	12 G 1	18	11,7	115,0	211,0
12831	18 G 1	18	14,0	173,0	284,0
12832	25 G 1	18	17,0	240,0	394,0
12833	3 G 1,5	16	7,4	44,0	96,0
12834	4 G 1,5	16	8,0	58,0	117,0
12835	5 G 1,5	16	8,6	72,0	140,0
12836	7 G 1,5	16	10,5	101,0	186,0
12837	12 G 1,5	16	13,3	173,0	319,0
12838	18 G 1,5	16	15,7	260,0	451,0
12839	25 G 1,5	16	18,8	360,0	625,0
12840	3 G 2,5	14	8,6	72,0	143,0
12841	4 G 2,5	14	10,0	96,0	185,0
12842	5 G 2,5	14	10,8	120,0	221,0
12843	7 G 2,5	14	13,0	168,0	293,0
12844	12 G 2,5	14	16,6	288,0	563,0
12845	18 G 2,5	14	19,5	432,0	854,0
12846	25 G 2,5	14	23,8	600,0	1188,0

Dimensions and specifications may be changed without prior notice. (RN01)



Suitable accessories can be found in Chapter X.

- Cable Gland - HELUTOP® HT-PA
- Cable Gland - HELUTOP® HT-MS
- Cable Gland - HELUTOP® HT-MS-EP 4

# JZ-600 PUR tear and coolant resistant, 1000 V, meter marking



## Technical data

- Special PUR control cables Adapted to DIN VDE 0276 part 627, DIN VDE 0285-525-2-51 / DIN EN 50525-2-51, with insulation thickness for 1 kV type and UL-Std.758 Style 20234
- **Temperature range** flexing -5°C to +80°C fixed installation -40°C to +80°C
- **Nominal voltage** VDE U<sub>0</sub>/U 600/1000 V UL/CSA 1000 V
- **Test voltage** 4000 V
- **Breakdown voltage** min. 8000 V
- **Insulation resistance** min. 20 MOhm x km
- **Minimum bending radius** flexing 7,5x cable Ø fixed installation 4x cable Ø
- **Radiation resistance** up to 100x10<sup>6</sup> cJ/kg (up to 100 Mrad)

## Cable structure

- Bare copper, fine wire conductors, as per DIN VDE 0295 cl.5, BS 6360 cl.5 and IEC 60228 cl.5
- Core insulation of special PVC compound type T12 to DIN VDE 0207-363-3 / DIN EN 50363-3 and class 43 acc. to UL-Std.1581 UL-Style 10012
- Core identification to DIN VDE 0293 black cores with continuous white numbering
- GN-YE conductor, 3 cores and above in the outer layer
- Cores stranded in layers with optimal lay-length
- Outer sheath of special full-polyurethane adapted to DIN VDE 0207-363-10-2 / DIN EN 50363-10-2, flame retardant acc. to UL-Std.758
- Sheath colour black (RAL 9005) or grey (RAL 7001)
- with meter marking

## Properties

- High abrasion resistance
- High flexibility
- Resistant to ultra violet rays
- Wear resistant
- resistant to mineral oils and coolant emulsions
- The materials used in manufacture are cadmium-free and contain no silicone and free from substances harmful to the wetting properties of lacquers

## Note

- G = with green-yellow conductor x = without green-yellow conductor
- AWG sizes are approximate equivalent values. The actual cross-section is in mm<sup>2</sup>.
- screened analogue type: **JZ-600-YC-PUR**, confer page 390

## Application

Extremely robust, control cable resistant to mineral oils and to coolant emulsions. In tool machinery, conveyor belts and production lines, for plant installations, air conditioning and in steel production plants and rolling mills. Suitable for installation for flexible use for medium mechanical stresses with free movement without tensile stress or forced movements in dry, moist and wet rooms as well as outside. Interesting for the export-oriented machinery plants.

CE= The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

Part no.	No. cores x Sheath colour	cross-sec. mm <sup>2</sup>	AWG-No.	Outer Ø app. mm	Cop. weight kg / km	Weight app. kg / km	Part no.	No. cores x Sheath colour	cross-sec. mm <sup>2</sup>	AWG-No.	Outer Ø app. mm	Cop. weight kg / km	Weight app. kg / km				
28240	2 x 0,5	20	6,9	9,6	60,0	28305	2 x 0,5	20	6,9	9,6	60,0	28305	2 x 0,5	20	6,9	9,6	60,0
28241	3 G 0,5	20	7,3	14,4	70,0	28306	3 G 0,5	20	7,3	14,4	70,0	28306	3 G 0,5	20	7,3	14,4	70,0
28242	4 G 0,5	20	7,9	19,0	104,0	28307	4 G 0,5	20	7,9	19,0	104,0	28307	4 G 0,5	20	7,9	19,0	104,0
28243	5 G 0,5	20	8,5	24,0	120,0	28308	5 G 0,5	20	8,5	24,0	120,0	28308	5 G 0,5	20	8,5	24,0	120,0
28244	7 G 0,5	20	9,9	33,6	141,0	28309	7 G 0,5	20	9,9	33,6	141,0	28309	7 G 0,5	20	9,9	33,6	141,0
28245	12 G 0,5	20	12,2	58,0	208,0	28310	12 G 0,5	20	12,2	58,0	208,0	28310	12 G 0,5	20	12,2	58,0	208,0
28246	18 G 0,5	20	14,4	86,0	289,0	28311	18 G 0,5	20	14,4	86,0	289,0	28311	18 G 0,5	20	14,4	86,0	289,0
28247	25 G 0,5	20	17,2	120,0	342,0	28312	25 G 0,5	20	17,2	120,0	342,0	28312	25 G 0,5	20	17,2	120,0	342,0
28248	2 x 0,75	19	7,3	14,4	70,0	28313	2 x 0,75	19	7,3	14,4	70,0	28313	2 x 0,75	19	7,3	14,4	70,0
28249	3 G 0,75	19	7,7	21,6	78,0	28314	3 G 0,75	19	7,7	21,6	78,0	28314	3 G 0,75	19	7,7	21,6	78,0
28250	4 G 0,75	19	8,3	29,0	134,0	28315	4 G 0,75	19	8,3	29,0	134,0	28315	4 G 0,75	19	8,3	29,0	134,0
28251	5 G 0,75	19	9,1	36,0	149,0	28316	5 G 0,75	19	9,1	36,0	149,0	28316	5 G 0,75	19	9,1	36,0	149,0
28252	7 G 0,75	19	10,7	50,0	201,0	28317	7 G 0,75	19	10,7	50,0	201,0	28317	7 G 0,75	19	10,7	50,0	201,0
28253	12 G 0,75	19	13,1	86,0	269,0	28318	12 G 0,75	19	13,1	86,0	269,0	28318	12 G 0,75	19	13,1	86,0	269,0
28254	18 G 0,75	19	15,6	130,0	378,0	28319	18 G 0,75	19	15,6	130,0	378,0	28319	18 G 0,75	19	15,6	130,0	378,0
28255	25 G 0,75	19	18,9	180,0	498,0	28320	25 G 0,75	19	18,9	180,0	498,0	28320	25 G 0,75	19	18,9	180,0	498,0
28256	2 x 1	18	7,9	19,2	86,0	28321	2 x 1	18	7,9	19,2	86,0	28321	2 x 1	18	7,9	19,2	86,0
28257	3 G 1	18	8,3	29,0	100,0	28322	3 G 1	18	8,3	29,0	100,0	28322	3 G 1	18	8,3	29,0	100,0
28258	4 G 1	18	9,1	38,4	107,0	28323	4 G 1	18	9,1	38,4	107,0	28323	4 G 1	18	9,1	38,4	107,0
28259	5 G 1	18	9,9	48,0	130,0	28324	5 G 1	18	9,9	48,0	130,0	28324	5 G 1	18	9,9	48,0	130,0
28260	7 G 1	18	11,7	67,0	174,0	28325	7 G 1	18	11,7	67,0	174,0	28325	7 G 1	18	11,7	67,0	174,0
28261	12 G 1	18	14,5	115,0	290,0	28326	12 G 1	18	14,5	115,0	290,0	28326	12 G 1	18	14,5	115,0	290,0
28262	18 G 1	18	17,3	173,0	405,0	28327	18 G 1	18	17,3	173,0	405,0	28327	18 G 1	18	17,3	173,0	405,0
28263	25 G 1	18	21,1	240,0	570,0	28328	25 G 1	18	21,1	240,0	570,0	28328	25 G 1	18	21,1	240,0	570,0
28264	2 x 1,5	16	8,7	29,0	97,0	28329	2 x 1,5	16	8,7	29,0	97,0	28329	2 x 1,5	16	8,7	29,0	97,0
28265	3 G 1,5	16	9,2	43,0	118,0	28330	3 G 1,5	16	9,2	43,0	118,0	28330	3 G 1,5	16	9,2	43,0	118,0
28266	4 G 1,5	16	10,0	58,0	141,0	28331	4 G 1,5	16	10,0	58,0	141,0	28331	4 G 1,5	16	10,0	58,0	141,0
28267	5 G 1,5	16	11,0	72,0	181,0	28332	5 G 1,5	16	11,0	72,0	181,0	28332	5 G 1,5	16	11,0	72,0	181,0
28268	7 G 1,5	16	13,3	101,0	234,0	28333	7 G 1,5	16	13,3	101,0	234,0	28333	7 G 1,5	16	13,3	101,0	234,0
28269	12 G 1,5	16	16,6	173,0	370,0	28334	12 G 1,5	16	16,6	173,0	370,0	28334	12 G 1,5	16	16,6	173,0	370,0
28270	18 G 1,5	16	19,7	259,0	520,0	28335	18 G 1,5	16	19,7	259,0	520,0	28335	18 G 1,5	16	19,7	259,0	520,0
28271	25 G 1,5	16	23,9	360,0	730,0	28336	25 G 1,5	16	23,9	360,0	730,0	28336	25 G 1,5	16	23,9	360,0	730,0

Continuation ▶

**JZ-600 PUR** tear and coolant resistant, 1000 V, meter marking

Part no. Sheath colour black	No. cores x cross-sec. mm <sup>2</sup>	AWG-No.	Outer Ø app. mm	Cop. weight kg / km	Weight app. kg / km
28272	2 x 2,5	14	9,5	48,0	170,0
28273	3 G 2,5	14	10,0	72,0	181,0
28274	4 G 2,5	14	11,1	96,0	203,0
28275	5 G 2,5	14	12,4	120,0	251,0
28276	7 G 2,5	14	15,0	168,0	330,0
28277	12 G 2,5	14	18,4	288,0	553,0
28278	18 G 2,5	14	22,0	432,0	795,0
28279	25 G 2,5	14	26,9	600,0	1110,0
28280	2 x 4	12	11,4	77,0	190,0
28281	3 G 4	12	12,3	115,0	235,0
28282	4 G 4	12	13,8	154,0	310,0
28283	5 G 4	12	15,3	192,0	410,0
28284	7 G 4	12	16,8	269,0	540,0
28285	12 G 4	12	22,9	461,0	860,0
28286	3 G 6	10	14,1	173,0	370,0
28287	4 G 6	10	15,6	230,0	430,0
28288	5 G 6	10	17,3	288,0	650,0
28289	7 G 6	10	19,3	403,0	860,0
28290	3 G 10	8	16,5	288,0	660,0
28291	4 G 10	8	18,4	384,0	790,0
28292	5 G 10	8	20,5	480,0	960,0
28293	7 G 10	8	22,5	672,0	1300,0
28294	3 G 16	6	19,6	461,0	709,0
28295	4 G 16	6	21,7	614,0	1114,0
28296	5 G 16	6	24,2	768,0	1620,0
28297	7 G 16	6	25,7	1075,0	1900,0
28298	3 G 25	4	24,0	720,0	1450,0
28299	4 G 25	4	26,9	960,0	1600,0
28300	5 G 25	4	29,3	1200,0	2050,0
28301	7 G 25	4	32,6	1680,0	2900,0

Part no. Sheath colour grey	No. cores x cross-sec. mm <sup>2</sup>	AWG-No.	Outer Ø app. mm	Cop. weight kg / km	Weight app. kg / km
28337	2 x 2,5	14	9,5	48,0	170,0
28338	3 G 2,5	14	10,0	72,0	181,0
28339	4 G 2,5	14	11,1	96,0	203,0
28340	5 G 2,5	14	12,4	120,0	251,0
28341	7 G 2,5	14	15,0	168,0	330,0
28342	12 G 2,5	14	18,4	288,0	553,0
28343	18 G 2,5	14	22,0	432,0	795,0
28344	25 G 2,5	14	26,9	600,0	1110,0
28345	2 x 4	12	11,4	77,0	190,0
28346	3 G 4	12	12,3	115,0	235,0
28347	4 G 4	12	13,8	154,0	310,0
28348	5 G 4	12	15,3	192,0	410,0
28349	7 G 4	12	16,8	269,0	540,0
28350	12 G 4	12	22,9	461,0	860,0
28351	3 G 6	10	14,1	173,0	370,0
28352	4 G 6	10	15,6	230,0	430,0
28353	5 G 6	10	17,3	288,0	650,0
28354	7 G 6	10	19,3	403,0	860,0
28355	3 G 10	8	16,5	288,0	660,0
28356	4 G 10	8	18,4	384,0	790,0
28357	5 G 10	8	20,5	480,0	960,0
28358	7 G 10	8	22,5	672,0	1300,0
28359	3 G 16	6	19,6	461,0	709,0
28360	4 G 16	6	21,7	614,0	1114,0
28361	5 G 16	6	24,2	768,0	1620,0
28362	7 G 16	6	25,8	1075,0	1900,0
28363	3 G 25	4	24,0	720,0	1450,0
28364	4 G 25	4	26,9	960,0	1600,0
28365	5 G 25	4	29,3	1200,0	2050,0
28366	7 G 25	4	32,6	1680,0	2900,0

Dimensions and specifications may be changed without prior notice. (RN01)

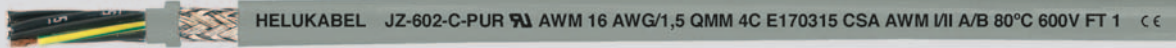


Suitable accessories can be found in Chapter X.

- Cable Gland - HELUTOP® HT-PA
- Cable Gland - HELUTOP® HT-MS
- Cable Gland - HELUTOP® HT-MS-EP 4



# JZ-602-C-PUR screened two approval control cable, 80°C, 600 V, EMC-preferred type, meter marking



## Technical data

- Special PUR-insulated to UL CSA AWM I/II A/B Style 20939 and CSA
- **Temperature range**  
flexing -5°C to +80°C  
fixed installation -40°C to +80°C
- **Nominal voltage**  
UL/CSA 600 V
- **Test voltage** 3000 V
- **Breakdown voltage** min. 6000 V
- **Insulation resistance**  
min. 20 MOhm x km
- **Minimum bending radius**  
flexing 10x cable Ø  
fixed installation 5x cable Ø
- **Radiation resistance**  
up to 100x10<sup>6</sup> cJ/kg (up to 100 Mrad)
- **Coupling resistance**  
max. 250 Ohm/km

## Cable structure

- Bare copper, fine wire stranded to DIN VDE 0295 cl.5, BS 6360 cl.5 and IEC 60228 cl.5
- Core insulation of special PVC compound type T12 to DIN VDE 0207-363-3 / DIN EN 50363-3 and UL-Style 10012
- Core identification to DIN VDE 0293 black cores with continuous white numbering
- GN-YE conductor, 3 cores and above in the outer layer
- Cores stranded in layers with optimal lay-length
- PVC-insulated inner sheath YM5 to DIN VDE 0207-363-4-1 / DIN EN 50363-4-1
- Braided screen of tinned Cu wires, approx. 85% coverage
- Outer sheath of **full-polyurethane**
- Sheath colour grey (RAL 7001)
- with meter marking

## Properties

- Resistant to mineral oils, synthetic oils and coolant, UV-radiation, osygene, ozon and hydrolysis. Conditionally resistant to microbes.
- The materials used in manufacture are cadmium-free and contain no silicone and free from substances harmful to the wetting properties of lacquers

## Note

- G = with green-yellow conductor  
x = without green-yellow conductor (OZ)
- AWG sizes are approximate equivalent values. The actual cross-section is in mm<sup>2</sup>.
- unscreened analogue type:  
**JZ-602 PUR**, confer page 384

## Application

UL and CSA approved flexible control cables up to 600 V, for all machinery in tooling and plant construction, suitable for installation in dry, moist, wet and outdoor environments for medium mechanical loads. Designed for the export-orientated machinery manufacturer, specifically for USA and Canada.

**EMC** = Electromagnetic compatibility

To optimize the EMC features we recommend a large round contact of the copper braiding on both ends.

CE = The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

Part no.	No. cores x cross-sec. mm <sup>2</sup>	AWG-No.	Outer Ø app. mm	Cop. weight kg / km	Weight app. kg / km
12550	2 x 0,5	20	7,7	41,0	93,0
12551	3 G 0,5	20	8,0	45,0	124,0
12552	4 G 0,5	20	8,6	54,0	133,0
12553	5 G 0,5	20	9,2	66,0	153,0
12554	7 G 0,5	20	10,5	79,0	191,0
12555	9 G 0,5	20	12,3	94,0	243,0
12556	12 G 0,5	20	13,0	137,0	322,0
12557	18 G 0,5	20	15,6	156,0	374,0
12558	25 G 0,5	20	18,2	250,0	436,0
12559	34 G 0,5	20	20,1	316,0	560,0
12560	41 G 0,5	20	22,4	348,0	663,0
12561	2 x 1	18	8,1	54,0	107,0
12562	3 G 1	18	8,4	64,0	130,0
12563	4 G 1	18	9,1	76,0	155,0
12564	5 G 1	18	10,0	89,0	181,0
12565	7 G 1	18	11,3	114,0	209,0
12566	9 G 1	18	13,3	144,0	321,0
12567	12 G 1	18	13,8	186,0	341,0
12568	18 G 1	18	16,2	284,0	473,0
12569	25 G 1	18	19,5	387,0	650,0
12570	34 G 1	18	22,5	500,0	781,0
12571	41 G 1	18	24,2	578,0	892,0
12572	2 x 1,5	16	8,7	64,0	136,0
12573	3 G 1,5	16	9,2	82,0	165,0
12574	4 G 1,5	16	10,0	99,0	192,0
12575	5 G 1,5	16	10,8	123,0	224,0
12576	7 G 1,5	16	12,9	148,0	273,0
12577	9 G 1,5	16	14,8	187,0	340,0
12578	12 G 1,5	16	15,6	274,0	461,0
12579	18 G 1,5	16	18,3	386,0	674,0
12580	25 G 1,5	16	22,5	531,0	950,0
12581	34 G 1,5	16	25,1	671,0	1203,0
12582	41 G 1,5	16	27,3	840,0	1588,0
12583	2 x 2,5	14	10,3	110,0	173,0
12584	3 G 2,5	14	10,8	148,0	220,0
12585	4 G 2,5	14	11,8	169,0	270,0

Part no.	No. cores x cross-sec. mm <sup>2</sup>	AWG-No.	Outer Ø app. mm	Cop. weight kg / km	Weight app. kg / km
12586	5 G 2,5	14	13,2	220,0	329,0
12587	7 G 2,5	14	15,6	284,0	428,0
12588	9 G 2,5	14	18,1	349,0	580,0
12589	12 G 2,5	14	19,2	470,0	761,0
12590	18 G 2,5	14	23,0	572,0	1140,0
12591	25 G 2,5	14	28,3	740,0	1551,0
12592	2 x 4	12	12,5	124,0	209,0
12593	3 G 4	12	13,1	178,0	310,0
12594	4 G 4	12	14,5	234,0	456,0
12595	5 G 4	12	15,8	284,0	532,0
12596	7 G 4	12	19,0	321,0	737,0
12597	2 x 6	10	14,2	176,0	318,0
12598	3 G 6	10	15,2	245,0	411,0
12599	4 G 6	10	16,6	316,0	572,0
12600	5 G 6	10	18,4	442,0	732,0
12601	7 G 6	10	22,2	530,0	961,0
12602	3 G 10	8	19,1	367,0	741,0
12603	4 G 10	8	21,1	549,0	988,0
12604	5 G 10	8	23,7	604,0	1202,0
12605	7 G 10	8	26,5	820,0	1743,0
12606	3 G 16	6	24,2	653,0	1088,0
12607	4 G 16	6	27,2	807,0	1662,0
12608	5 G 16	6	30,6	940,0	2021,0
12609	7 G 16	6	33,6	1345,0	2720,0
12610	3 G 25	4	40,2	920,0	1947,0
12611	4 G 25	4	33,3	1169,0	2591,0
12612	5 G 25	4	36,8	1420,0	3197,0
12613	7 G 25	4	40,6	1921,0	4530,0
12614	3 G 35	2	33,8	1250,0	2701,0
12615	4 G 35	2	37,7	1680,0	3277,0
12616	5 G 35	2	41,5	2020,0	4530,0
12617	4 G 50	1	40,5	2370,0	3370,0
12618	4 G 70	2/0	46,1	3257,0	4630,0
12619	4 G 95	3/0	50,7	4060,0	6114,0
12620	4 G 120	4/0	57,0	5231,0	7417,0

Dimensions and specifications may be changed without prior notice. (RN01)

# JZ-600-YC-PUR tear and coolant resistant, 1000 V, Cu-screened, EMC-preferred type, meter marking



## Technical data

- Special PUR control cables acc. to DIN VDE 0276 part 627, DIN VDE 0285-525-2-51/ DIN EN 50525-2-51, with insulation thickness for 1 kV type and UL-Std.758 Style 20234
- **Temperature range**  
flexing -5°C to +80°C  
fixed installation -40°C to +80°C
- **Nominal voltage**  
VDE U<sub>0</sub>/U 600/1000 V  
UL/CSA 1000 V
- **Test voltage** 4000 V
- **Breakdown voltage** min. 8000 V
- **Insulation resistance**  
min. 20 MOhm x km
- **Minimum bending radius**  
flexing 10x cable Ø  
fixed installation 5x cable Ø
- **Radiation resistance**  
up to 100x10<sup>6</sup> cJ/kg (up to 100 Mrad)
- **Coupling resistance**  
max. 250 Ohm/km

## Cable structure

- Bare copper, fine wire conductors, acc. to DIN VDE 0295 cl.5, BS 6360 cl.5 and IEC 60228 cl.5
- Core insulation of PVC compound type T12 to DIN VDE 0207-363-3 / DIN EN 50363-3 and class 43 acc. to UL-Std.1581 UL-Style 10012
- Core identification to DIN VDE 0293 black cores with continuous white numbering
- GN-YE conductor, 3 cores and above in the outer layer
- Cores stranded in layers with optimal lay-length
- Oil resistant PVC inner sheath, TM5 to DIN VDE 0207-363-4-1 / DIN EN 50363-4-1 and class 43 acc. to UL-Std.1581
- Tinned copper braided screening, approx. 85% coverage
- Outer sheath, special full-polyurethane compound type TMPU adapted to DIN VDE 0207-363-10-2 / DIN EN 50363-10-2, flame retardant acc. to UL-Std.758
- Sheath colour black (RAL 9005) or grey (RAL 7001)
- with meter marking

## Properties

- High abrasion resistance
- High flexibility
- Resistant to ultra violet rays
- Wear resistant
- resistant to mineral oils and coolant emulsions
- The materials used in manufacture are cadmium-free and contain no silicone and free from substances harmful to the wetting properties of lacquers

## Note

- G = with green-yellow conductor  
x = without green-yellow conductor
- AWG sizes are approximate equivalent values. The actual cross-section is in mm<sup>2</sup>.
- unscreened analogue type:  
**JZ-600 PUR**, confer page 387

## Application

Extremely robust sheathed cable, used in machinery, tools and plant, in rolling and steel mills at particularly critical point. For medium mechanical stress for flexible use with free movement without tensile stress or forced movements in dry, damp and wet rooms and outdoors. Through the good flexibility quickly and safely to install. Designed for the export-oriented engineering.

**EMC** = Electromagnetic compatibility

To optimize the EMC features we recommend a large round contact of the copper braiding on both ends.

CE = The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

Part no.	No. cores x cross-sec. mm <sup>2</sup>	AWG-No.	Outer Ø app. mm	Cop. weight kg / km	Weight app. kg / km
28370	2 x 0,5	20	9,0	41,0	131,0
28371	3 G 0,5	20	9,3	45,0	154,0
28372	4 G 0,5	20	9,9	54,0	176,0
28373	5 G 0,5	20	10,6	66,0	204,0
28374	7 G 0,5	20	12,2	79,0	237,0
28375	12 G 0,5	20	14,7	137,0	323,0
28376	18 G 0,5	20	17,3	156,0	431,0
28377	25 G 0,5	20	20,6	250,0	507,0
28378	2 x 0,75	19	9,4	46,0	143,0
28379	3 G 0,75	19	9,8	57,0	158,0
28380	4 G 0,75	19	10,4	63,0	193,0
28381	5 G 0,75	19	11,1	76,0	231,0
28382	7 G 0,75	19	13,0	100,0	337,0
28383	12 G 0,75	19	15,8	175,0	424,0
28384	18 G 0,75	19	17,9	240,0	568,0
28385	25 G 0,75	19	22,8	306,0	741,0
28386	2 x 1	18	9,9	54,0	158,0
28387	3 G 1	18	10,3	64,0	169,0
28388	4 G 1	18	11,1	76,0	207,0
28389	5 G 1	18	12,2	89,0	244,0
28390	7 G 1	18	14,5	114,0	292,0
28391	12 G 1	18	17,4	186,0	472,0
28392	18 G 1	18	20,7	284,0	634,0
28393	25 G 1	18	24,8	387,0	861,0

Part no.	No. cores x cross-sec. mm <sup>2</sup>	AWG-No.	Outer Ø app. mm	Cop. weight kg / km	Weight app. kg / km
28430	2 x 0,5	20	9,0	41,0	131,0
28431	3 G 0,5	20	9,3	45,0	154,0
28432	4 G 0,5	20	9,9	54,0	176,0
28433	5 G 0,5	20	10,6	66,0	204,0
28434	7 G 0,5	20	12,2	79,0	237,0
28435	12 G 0,5	20	14,7	137,0	323,0
28436	18 G 0,5	20	17,3	156,0	431,0
28437	25 G 0,5	20	20,6	250,0	507,0
28438	2 x 0,75	19	9,4	46,0	143,0
28439	3 G 0,75	19	9,8	57,0	158,0
28440	4 G 0,75	19	10,4	63,0	193,0
28441	5 G 0,75	19	11,1	76,0	231,0
28442	7 G 0,75	19	13,0	100,0	337,0
28443	12 G 0,75	19	15,8	175,0	424,0
28444	18 G 0,75	19	17,9	240,0	568,0
28445	25 G 0,75	19	22,8	306,0	741,0
28446	2 x 1	18	9,9	54,0	158,0
28447	3 G 1	18	10,3	64,0	169,0
28448	4 G 1	18	11,1	76,0	207,0
28449	5 G 1	18	12,2	89,0	244,0
28450	7 G 1	18	14,5	114,0	292,0
28451	12 G 1	18	17,4	186,0	472,0
28452	18 G 1	18	20,7	284,0	634,0
28453	25 G 1	18	24,8	387,0	861,0

Continuation ►

# JZ-600-YC-PUR tear and coolant resistant, 1000 V, Cu-screened, EMC-preferred type, meter marking



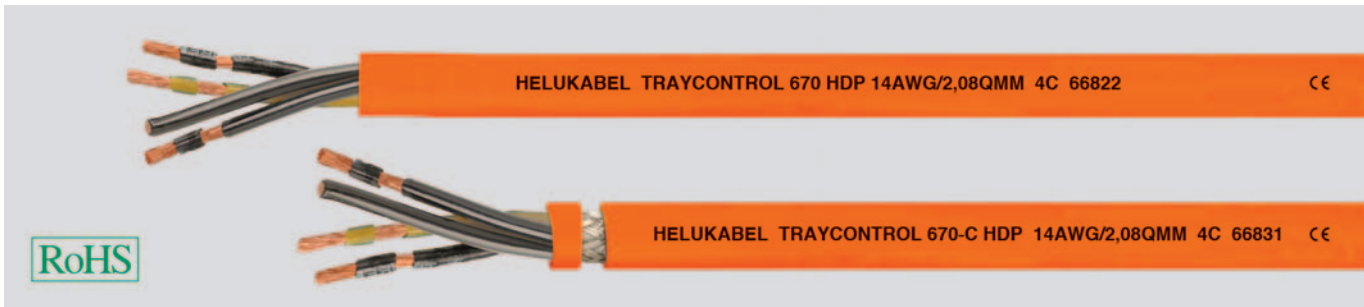
Part no. Sheath colour	No. cores x cross-sec. mm <sup>2</sup>	AWG-No.	Outer Ø app. mm	Cop. weight kg / km	Weight app. kg / km
28394	2 x 1,5	16	10,7	64,0	166,0
28395	3 G 1,5	16	11,2	82,0	192,0
28396	4 G 1,5	16	12,3	99,0	246,0
28397	5 G 1,5	16	13,3	123,0	294,0
28398	7 G 1,5	16	16,0	148,0	392,0
28399	12 G 1,5	16	19,6	274,0	599,0
28400	18 G 1,5	16	23,4	386,0	817,0
28401	25 G 1,5	16	28,2	531,0	1261,0
28402	2 x 2,5	14	11,8	110,0	280,0
28403	3 G 2,5	14	12,3	148,0	301,0
28404	4 G 2,5	14	13,4	169,0	352,0
28405	5 G 2,5	14	14,9	220,0	433,0
28406	7 G 2,5	14	17,9	284,0	569,0
28407	12 G 2,5	14	21,9	470,0	864,0
28408	18 G 2,5	14	26,1	572,0	1365,0
28409	25 G 2,5	14	31,9	740,0	1997,0
28410	2 x 4	12	14,3	124,0	310,0
28411	3 G 4	12	15,1	178,0	396,0
28412	4 G 4	12	16,7	234,0	531,0
28413	5 G 4	12	18,6	284,0	704,0
28414	7 G 4	12	20,0	321,0	932,0
28415	3 G 6	10	17,0	245,0	633,0
28416	4 G 6	10	18,7	316,0	742,0
28417	5 G 6	10	20,7	442,0	1117,0
28418	3 G 10	8	19,6	367,0	1131,0
28419	4 G 10	8	21,9	549,0	1357,0
28420	5 G 10	8	24,1	604,0	1646,0
28421	3 G 16	6	23,5	653,0	1397,0
28422	4 G 16	6	26,4	807,0	1880,0
28423	5 G 16	6	28,8	940,0	2721,0

Part no. Sheath colour	No. cores x cross-sec. mm <sup>2</sup>	AWG-No.	Outer Ø app. mm	Cop. weight kg / km	Weight app. kg / km
28454	2 x 1,5	16	10,7	64,0	166,0
28455	3 G 1,5	16	11,2	82,0	192,0
28456	4 G 1,5	16	12,3	99,0	246,0
28457	5 G 1,5	16	13,3	123,0	294,0
28458	7 G 1,5	16	16,0	148,0	392,0
28459	12 G 1,5	16	19,6	274,0	599,0
28460	18 G 1,5	16	23,4	386,0	817,0
28461	25 G 1,5	16	28,2	531,0	1261,0
28462	2 x 2,5	14	11,8	110,0	280,0
28463	3 G 2,5	14	12,3	148,0	301,0
28464	4 G 2,5	14	13,4	169,0	352,0
28465	5 G 2,5	14	14,9	220,0	433,0
28466	7 G 2,5	14	17,9	284,0	569,0
28467	12 G 2,5	14	21,9	470,0	864,0
28468	18 G 2,5	14	26,1	572,0	1365,0
28469	25 G 2,5	14	31,9	740,0	1997,0
28470	2 x 4	12	14,3	124,0	310,0
28471	3 G 4	12	15,1	178,0	396,0
28472	4 G 4	12	16,7	234,0	531,0
28473	5 G 4	12	18,6	284,0	704,0
28474	7 G 4	12	20,0	321,0	932,0
28475	3 G 6	10	17,0	245,0	633,0
28476	4 G 6	10	18,7	316,0	742,0
28477	5 G 6	10	20,7	442,0	1117,0
28478	3 G 10	8	19,6	367,0	1131,0
28479	4 G 10	8	21,9	549,0	1357,0
28480	5 G 10	8	24,1	604,0	1646,0
28481	3 G 16	6	23,5	653,0	1397,0
28482	4 G 16	6	26,4	807,0	1880,0
28483	5 G 16	6	28,8	940,0	2721,0

Dimensions and specifications may be changed without prior notice. (RN01)

# TRAYCONTROL® 670 HDP / 670-C HDP flexible,

oil-resistant, open installation (TC-ER), NFPA 79 Edition 2012



## Technical data

- TPE motor supply cable acc. to UL-Std. 1277 and UL-Std. 2277
- **Temperature range**  
flexing -40°C bis +105°C
- **Nominal voltage**  
TC 600 V  
AWM 1000 V  
TC Wind Turbine (WTTTC) 1000 V
- **Test voltage** 4000 V
- **Minimum bending radius**  
7,5 cable Ø
- **Coupling resistance (-C-type)**  
max. 250 Ohm/km

## Cable structure

- Bare copper-conductor, fine-wire with AWG dimensions
- Core insulation of special PVC with transparent nylon skin
- Core identification to DIN VDE 0293 black cores with continuous white numbering
- GN-YE conductor in the outer layer
- Cores stranded in layers with optimal lay-length
- Separator
- Outer sheath of special TPE
- Sheath colour orange (RAL 2003)
- with length marking in feet
- **C-Type**  
Screening with braid of tinned copper wires, optimal coverage, approx. 85%

## Properties

- self-extinguishing and flame retardant acc. to CSA FT4
- The materials used in manufacture are cadmium-free and contain no silicone and free from substances harmful to the wetting properties of lacquers

## Tests

- **UL:**  
TC-ER, WTTTC, MTW, NFPA 79 2012, UL AWM 105°C, OIL RES I & II, 75° C wet Bus Drop Cable, Class 1 Div. 2 per NEC Art. 336, 318, 501
- **CSA:**  
c (UL) CIC-TC FT4,  
AWM I/II A/B FT4

## Note

- HDP = Heavy Duty Power

## Application

HELUKABEL® TRAYCONTROL® 670 HDP / 670-C-HDP are multi-conductor severe duty motor supply cables with Bus Drop, TC-ER and CIC/TC approval. Superior oil performance for long cable life and permitted to be used in hazardous (classified) locations Class I Div 2 per NEC 336, 318 and 501. Special extruded sheath and fine copper stranding approved for exposed run, pipes and burial installation. Excellent flexibility and easier to pull than standard tray cables. Suitable for installation in the open unprotected installation on cable tray and from cable tray to machines according to NFPA 79 edition 2012.

Recommended Applications: Motor connections in industrial and automation environments, machine tool, automotive and renewable energies.

CE= The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

## TRAYCONTROL® 670 HDP

Part no.	No. cores x cross-sec. mm <sup>2</sup>	AWG-No.	Outer Ø app. mm	Cop. weight kg / km	Weight app. kg / km
66820	4 x 1	18	8,4	39,0	103,0
66821	4 G 1,32	16	9,2	51,0	133,0
66822	4 G 2,08	14	10,0	80,0	170,0
66823	4 G 3,31	12	11,2	127,0	229,0
66824	4 G 6	10	15,2	230,0	393,0
66825	4 G 10	8	19,3	384,0	626,0
66826	4 G 16	6	22,4	614,0	885,0
66827	4 G 25	4	26,7	960,0	1301,0
66828	4 G 35	2	31,5	1344,0	1983,0

## TRAYCONTROL® 670-C HDP

Part no.	No. cores x cross-sec. mm <sup>2</sup>	AWG-No.	Outer Ø app. mm	Cop. weight kg / km	Weight app. kg / km
66829	4 x 1	18	9,8	52,0	133,0
66830	4 G 1,32	16	10,5	72,0	159,0
66831	4 G 2,08	14	11,7	115,0	222,0
66832	4 G 3,31	12	12,8	179,0	283,0
66833	4 G 6	10	16,9	256,0	460,0
66834	4 G 10	8	22,1	426,0	741,0
66835	4 G 16	6	26,2	657,0	1059,0
66836	4 G 25	4	30,8	1026,0	1497,0
66837	4 G 35	2	35,0	1412,0	2058,0

Dimensions and specifications may be changed without prior notice. (RN01)



Suitable accessories can be found in Chapter X.

- Cable Gland - HELUTOP® HT-E

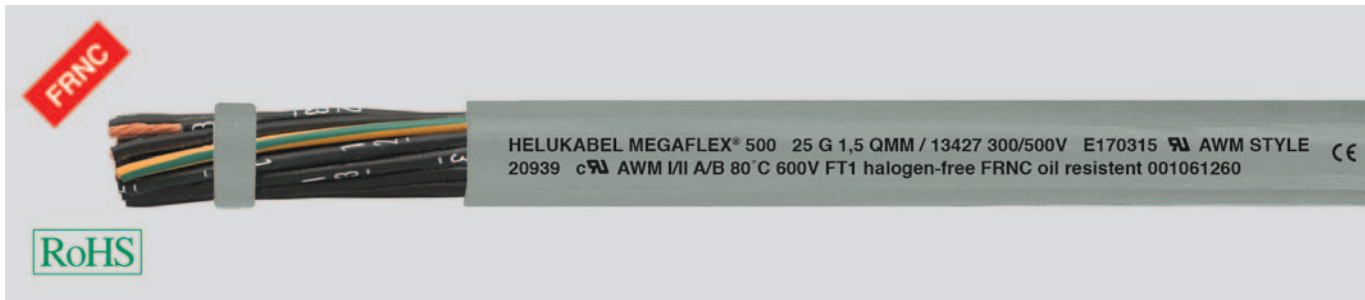


# UL/CSA HALOGEN-FREE CONTROL CABLES





# MEGAFLEX® 500 halogen-free, flame retardant, oil-resistant, UV-resistant, flexible, meter marking



## Technical data

- Halogen-free flexible control cable adapted to  
DIN VDE 0285-525-3-11/  
DIN EN 50525-3-11,  
to UL-Style 20939, UL-Std.758
- **Temperature range**  
flexing -30°C to +80°C  
fixed installation -40°C to +80°C
- **Nominal voltage**  
U<sub>0</sub>/U 300/500 V  
UL/CSA 600 V
- **Test voltage** 3000 V
- **Minimum bending radius**  
flexing 10x cable Ø  
fixed installation 4x cable Ø
- **Flexibility**  
Alternate bending test acc. to  
DIN VDE 0473-396 / DIN EN 50396

## Cable structure

- Bare copper-conductor, to  
DIN VDE 0295 cl.5, fine-wire,  
BS 6360 cl.5, IEC 60228 cl.5
- Core insulation of halogen-free  
special polymer
- Core identification to DIN VDE 0293  
black cores with continuous white  
numbering
- GN-YE conductor, 3 cores and above  
in the outer layer
- Cores stranded in layers with  
optimal lay-length
- Outer sheath of halogen-free  
special polymer
- Sheath colour grey (RAL 7001)
- with meter marking
- **LSOH**= Low Smoke Zero Halogen

## Note

- G = with green-yellow conductor  
x = without green-yellow conductor (OZ)
- Also available as a 0,6/1 kV cable  
MEGAFLEX® 600
- AWG sizes are approximate equivalent  
values. The actual cross-section is in mm<sup>2</sup>.
- screened analogue type:  
**MEGAFLEX® 500-C**, confer page 398

## Properties

- Highly flame-retardant
- Resistant to oils and greases
- Resistant to UV and weathering
- Hydrolysis resistant
- Flexible, abrasion- and wear-resistant
- Ozone-resistant, recyclable
- The materials used in manufacture are  
cadmium-free and contain no silicone  
and free from substances harmful to  
the wetting properties of lacquers

## Tests

- Flame test acc. to DIN VDE 0482-332-3-24,  
BS 4066 part 3, DIN EN 60332-3-24,  
IEC 60332-3-24 (previously DIN VDE 0472  
part 804 test method C)
- Self-extinguishing and flame retardant  
acc. to DIN VDE 0482-332-1-2,  
DIN EN 60332-1-2 / IEC 60332-1 (previously  
DIN VDE 0472 part 804 test method B),  
CSA FT 1
- Corrosiveness of combustion gases  
acc. to NF X 10-702
- Halogen-free acc. to DIN VDE 0482  
part 267 / DIN EN 50267-2-1 / IEC 60754-1  
(equivalent DIN VDE 0472 part 815)
- Smoke density acc. to DIN VDE 0482  
part 1034-1+2, DIN EN 61034-1+2,  
IEC 61034-1+2, BS 7622 part 1+2  
(previously DIN VDE 0472 part 816)
- Oil-resistant to DIN VDE 0473-811-404/  
DIN EN 60811-404
- Hydrolysis-resistant to DIN EN 61234-1
- Ozone-resistant to  
DIN VDE 0473-811-403/DIN EN 60811-403

## Application

For fixed installation or flexible application, with free movements without forcing which do not constantly recur and without tensile stress, for high mechanical strain. As a measuring and control cable primarily in machinery and plant construction, in air-conditioning systems, at the warehouse and conveyor systems, in ship-building and in the renewable energies such as in the construction of wind power stations.

CE= The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

Part no.	No. cores x cross-sec. mm <sup>2</sup>	AWG-No.	Outer Ø app. mm	Cop. weight kg / km	Weight app. kg / km
13344	2 x 0,5	20	5,0	9,6	43,0
13345	3 G 0,5	20	5,3	14,4	50,0
13346	3 x 0,5	20	5,3	14,4	50,0
13347	4 G 0,5	20	5,7	19,0	60,0
13348	4 x 0,5	20	5,7	19,0	60,0
13349	5 G 0,5	20	6,2	24,0	71,0
13350	5 x 0,5	20	6,2	24,0	71,0
13351	7 G 0,5	20	7,4	33,6	84,0

Part no.	No. cores x cross-sec. mm <sup>2</sup>	AWG-No.	Outer Ø app. mm	Cop. weight kg / km	Weight app. kg / km
13352	8 G 0,5	20	8,0	38,0	101,0
13353	10 G 0,5	20	8,8	48,0	121,0
13354	12 G 0,5	20	9,1	58,0	142,0
13355	16 G 0,5	20	10,0	76,0	183,0
13356	18 G 0,5	20	10,7	86,0	204,0
13357	20 G 0,5	20	11,2	96,0	227,0
13359	25 G 0,5	20	12,7	120,0	283,0
13360	30 G 0,5	20	13,5	144,0	324,0

Continuation ▶

# MEGAFLEX® 500 halogen-free, flame retardant, oil-resistant, UV-resistant, flexible, meter marking



Part no.	No. cores x cross-sec. mm²	AWG-No.	Outer Ø app. mm	Cop. weight kg / km	Weight app. kg / km
13361	34 G 0,5	20	14,5	163,0	367,0
13362	37 G 0,5	20	14,5	178,0	381,0
13363	41 G 0,5	20	15,8	197,0	417,0
13364	42 G 0,5	20	15,8	202,0	454,0
13365	50 G 0,5	20	17,3	240,0	519,0
13366	61 G 0,5	20	18,5	293,0	635,0
13367	65 G 0,5	20	19,4	312,0	694,0
13368	2 x 0,75	19	5,4	14,4	47,0
13369	3 G 0,75	19	5,7	21,6	56,0
13370	3 x 0,75	19	5,7	21,6	56,0
13371	4 G 0,75	19	6,2	29,0	69,0
13372	4 x 0,75	19	6,2	29,0	69,0
13373	5 G 0,75	19	6,8	36,0	83,0
13374	5 x 0,75	19	6,8	36,0	83,0
13375	7 G 0,75	19	8,1	50,0	114,0
13376	7 x 0,75	19	8,1	50,0	114,0
13377	8 G 0,75	19	8,9	58,0	136,0
13378	10 G 0,75	19	9,6	72,0	172,0
13379	12 G 0,75	19	9,9	86,0	183,0
13380	16 G 0,75	19	11,2	115,0	241,0
13381	18 G 0,75	19	11,9	130,0	266,0
13382	20 G 0,75	19	12,6	144,0	291,0
13383	25 G 0,75	19	14,1	180,0	374,0
13384	30 G 0,75	19	15,4	216,0	450,0
13385	34 G 0,75	19	16,4	245,0	517,0
13386	37 G 0,75	19	16,4	260,0	541,0
13387	41 G 0,75	19	17,6	296,0	611,0
13388	42 G 0,75	19	17,6	302,0	621,0
13389	50 G 0,75	19	19,8	360,0	742,0
13390	61 G 0,75	19	20,9	439,0	853,0
13392	65 G 0,75	19	21,8	468,0	909,0
13393	2 x 1	18	5,7	19,2	63,0
13394	3 G 1	18	6,0	29,0	74,0
13395	3 x 1	18	6,0	29,0	74,0
13396	4 G 1	18	6,6	38,4	90,0
13397	4 x 1	18	6,6	38,4	90,0
13398	5 G 1	18	7,2	48,0	109,0
13399	7 G 1	18	8,6	67,0	151,0
13400	8 G 1	18	9,4	77,0	184,0
13401	10 G 1	18	10,4	96,0	224,0
13402	12 G 1	18	10,7	115,0	243,0
13403	16 G 1	18	12,0	154,0	314,0
13404	18 G 1	18	12,7	173,0	361,0
13405	20 G 1	18	13,5	192,0	387,0
13406	25 G 1	18	15,2	240,0	496,0
13407	34 G 1	18	17,4	326,0	670,0
13408	37 G 1	18	17,4	355,0	713,0
13409	41 G 1	18	18,9	394,0	784,0
13410	42 G 1	18	18,9	403,0	824,0
13411	50 G 1	18	21,0	480,0	952,0
13412	61 G 1	18	22,2	586,0	1140,0
13413	65 G 1	18	23,2	628,0	1201,0
13414	2 x 1,5	16	6,3	29,0	70,0
13415	3 G 1,5	16	6,6	43,0	94,0
13416	3 x 1,5	16	6,6	43,0	94,0
13417	4 G 1,5	16	7,2	58,0	112,0
13418	5 G 1,5	16	7,9	72,0	141,0
13419	7 G 1,5	16	9,5	101,0	191,0
13420	8 G 1,5	16	10,4	115,0	224,0
13421	10 G 1,5	16	11,3	144,0	282,0
13422	12 G 1,5	16	11,7	173,0	311,0
13423	16 G 1,5	16	13,3	230,0	392,0
13425	18 G 1,5	16	14,0	259,0	450,0
13426	20 G 1,5	16	14,9	288,0	497,0
13427	25 G 1,5	16	16,8	360,0	630,0
13428	34 G 1,5	16	19,4	490,0	842,0
13429	37 G 1,5	16	19,4	533,0	897,0
13430	50 G 1,5	16	23,4	720,0	1277,0
13431	61 G 1,5	16	24,8	878,0	1460,0
13432	65 G 1,5	16	25,8	936,0	1612,0
13433	2 x 2,5	14	7,6	48,0	118,0
13434	3 G 2,5	14	8,3	72,0	151,0
13435	4 G 2,5	14	9,1	96,0	181,0
13436	5 G 2,5	14	10,2	120,0	224,0

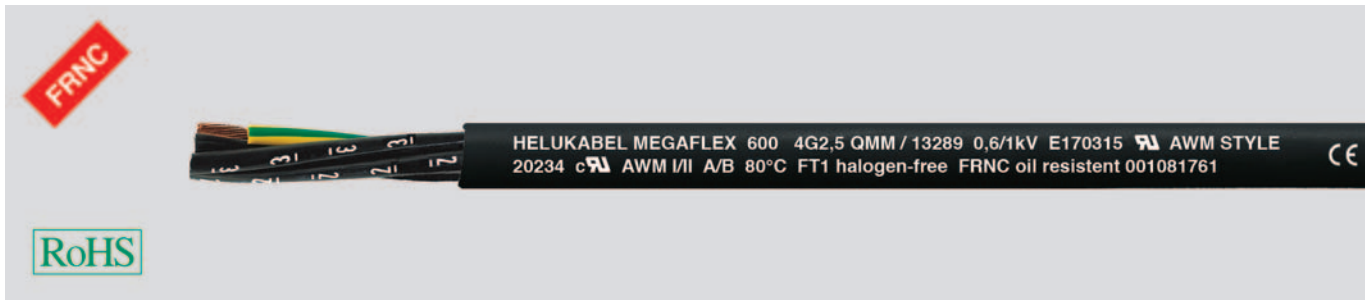
Part no.	No. cores x cross-sec. mm²	AWG-No.	Outer Ø app. mm	Cop. weight kg / km	Weight app. kg / km
13437	7 G 2,5	14	12,1	168,0	316,0
13438	8 G 2,5	14	13,2	192,0	370,0
13439	10 G 2,5	14	14,6	240,0	451,0
13440	12 G 2,5	14	15,2	288,0	499,0
13441	16 G 2,5	14	16,8	384,0	720,0
13442	18 G 2,5	14	18,1	432,0	769,0
13443	20 G 2,5	14	19,0	480,0	911,0
13444	25 G 2,5	14	22,2	600,0	1047,0
13445	30 G 2,5	14	22,9	720,0	1280,0
13446	2 x 4	12	9,2	77,0	199,0
13447	3 G 4	12	9,9	115,0	247,0
13448	4 G 4	12	11,0	154,0	299,0
13449	5 G 4	12	12,1	192,0	369,0
13450	7 G 4	12	13,3	269,0	463,0
13451	8 G 4	12	15,9	307,0	601,0
13452	10 G 4	12	17,3	384,0	698,0
13453	12 G 4	12	18,3	461,0	790,0
13454	16 G 4	12	20,2	614,0	1130,0
13455	18 G 4	12	21,8	691,0	1280,0
13456	2 x 6	10	10,8	115,0	266,0
13457	3 G 6	10	11,7	173,0	360,0
13458	4 G 6	10	13,0	230,0	429,0
13459	5 G 6	10	14,5	288,0	529,0
13460	7 G 6	10	16,0	403,0	631,0
13461	2 x 10	8	14,0	192,0	440,0
13462	3 G 10	8	15,0	288,0	550,0
13463	4 G 10	8	16,8	384,0	708,0
13464	5 G 10	8	18,7	480,0	862,0
13465	7 G 10	8	20,6	672,0	1124,0
13466	2 x 16	6	16,5	307,0	642,0
13467	3 G 16	6	17,6	461,0	830,0
13468	4 G 16	6	19,7	641,0	1060,0
13469	5 G 16	6	21,9	768,0	1270,0
13470	7 G 16	6	24,4	1075,0	1794,0
13471	3 G 25	4	22,5	720,0	1190,0
13472	4 G 25	4	25,2	960,0	1594,0
13473	5 G 25	4	27,9	1200,0	2014,0
13474	3 G 35	2	26,3	1008,0	1590,0
13475	4 G 35	2	28,5	1344,0	2200,0
13476	5 G 35	2	31,2	1680,0	2693,0
13477	3 G 50	1	30,2	1440,0	2571,0
13478	4 G 50	1	34,0	1920,0	3087,0
13479	5 G 50	1	37,8	2400,0	3980,0
13480	3 G 70	2/0	37,0	2016,0	3207,0
13481	4 G 70	2/0	41,5	2688,0	4077,0
13482	5 G 70	2/0	46,2	3360,0	5501,0
13483	3 G 95	3/0	41,4	2736,0	4708,0
13484	4 G 95	3/0	46,2	3648,0	5590,0
13485	5 G 95	3/0	51,5	4560,0	6972,0
13486	3 G 120	4/0	45,7	3456,0	5515,0
13487	4 G 120	4/0	51,2	4608,0	7100,0
13488	3 G 150	300 kcmil	52,8	4320,0	6279,0
13489	4 G 150	300 kcmil	58,3	5760,0	7781,0

Dimensions and specifications may be changed without prior notice. (RA03)



Suitable accessories can be found in Chapter X.  
• Cable Gland - HELUTOP® HT-E

# MEGAFLEX® 600 halogen-free, flame retardant, oil-resistant, UV-resistant, flexible, meter marking



## Technical data

- Halogen-free flexible control cable to UL-Style 20234, UL-Std.758
- **Temperature range**  
flexing -30°C to +80°C  
fixed installation -40°C to +80°C
- **Nominal voltage**  $U_0/U$  600/1000 V
- **Test voltage** 4000 V
- **Minimum bending radius**  
flexing 10x cable  $\varnothing$   
fixed installation 4x cable  $\varnothing$
- **Flexibility**  
Alternate bending test acc. to DIN VDE 0473-396 / DIN EN 50396

## Cable structure

- Bare copper, fine wire conductors, to DIN VDE 0295 cl.5, BS 6360 cl.5 and IEC 60228 cl.5
- Core insulation of halogen-free special polymer
- Core identification to DIN VDE 0293 black cores with continuous white numbering
- GN-YE conductor, 3 cores and above in the outer layer
- Cores stranded in layer with optimal lay-length
- Outer sheath, halogen-free special polymer
- Sheath colour black (RAL 9005)
- with meter marking

## Properties

- Halogen-free
- Highly flame-retardant
- Resistant to oils and greases
- Resistant to UV and weathering
- Hydrolysis resistant
- Flexible, abrasion- and wear-resistant
- Ozone-resistant/Recycleable

## Tests

- Flame test acc. to DIN VDE 0482-332-3-24, BS 4066 part 3, DIN EN 60332-3-24, IEC 60332-3-24 (previously DIN VDE 0472 part 804 test method C)
- Self-extinguishing and flame retardant acc. to DIN VDE 0482-332-1-2, DIN EN 60332-1-2/IEC 60332-1 (previously DIN VDE 0472 part 804 test method B)
- The materials used in manufacture are cadmium-free and contain no silicone and free from substances harmful to the wetting properties of lacquers
- Corrosiveness of combustion gases acc. to NF X 10-702
- Halogen-free acc. to DIN VDE 0482 part 267/ EN 50267-2-1/ IEC 60754-1 (equivalent DIN VDE 0472 part 815)
- Smoke density acc. to DIN VDE 0482 part 1034-1+2, DIN EN 61034-1+2/ IEC 61034-1+2, BS 7622 part 1+2 (previously DIN VDE 0472 part 816)
- Oil-resistant to DIN VDE 0473-811-404/ DIN EN 60811-404
- Hydrolysis-resistant to DIN EN 61234-1
- Ozone-resistant to DIN VDE 0473-811-403/DIN EN 60811-403

## Note

- G = with green-yellow conductor  
x = without green-yellow conductor
- screened analogue type:  
**MEGAFLEX® 600-C**, confer page 400

## Application

For fixed installation or flexible application, with occasional not permanently recurring free movement without forced motion and without tensile stress, for high mechanical strain. As a measuring and control cable in tool machinery, conveyor belts and production lines, plant engineering, climate engineering, in foundries and steel mills. Especially suited for wind power plant and computer equipment.

CE= The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

Part no.	No.cores x cross-sec. mm <sup>2</sup>	AWG-No.	Outer $\varnothing$ app. mm	Cop. weight kg / km	Weight app. kg / km
13200	2 x 0,5	20	6,4	9,6	56,0
13201	3 G 0,5	20	6,8	14,4	68,0
13202	3 x 0,5	20	6,8	14,4	68,0
13203	4 G 0,5	20	7,6	19,0	100,0
13204	4 x 0,5	20	7,6	19,0	100,0
13205	5 G 0,5	20	8,2	24,0	117,0
13206	5 x 0,5	20	8,2	24,0	117,0
13207	7 G 0,5	20	9,8	33,6	138,0

Part no.	No.cores x cross-sec. mm <sup>2</sup>	AWG-No.	Outer $\varnothing$ app. mm	Cop. weight kg / km	Weight app. kg / km
13208	8 G 0,5	20	10,7	38,0	150,0
13209	10 G 0,5	20	11,6	48,0	176,0
13210	12 G 0,5	20	12,2	58,0	200,0
13211	16 G 0,5	20	13,7	76,0	250,0
13212	18 G 0,5	20	14,4	86,0	276,0
13213	20 G 0,5	20	15,3	96,0	293,0
13214	25 G 0,5	20	17,2	120,0	335,0
13215	30 G 0,5	20	18,0	144,0	348,0

Continuation ►

# MEGAFLEX® 600 halogen-free, flame retardant, oil-resistant, UV-resistant, flexible, meter marking



Part no.	No. cores x cross-sec. mm²	AWG-No.	Outer Ø app. mm	Cop. weight kg / km	Weight app. kg / km
13216	34 G 0,5	20	19,8	163,0	520,0
13217	37 G 0,5	20	15,0	178,0	561,0
13218	41 G 0,5	20	21,3	197,0	590,0
13219	42 G 0,5	20	21,2	202,0	595,0
13220	50 G 0,5	20	23,4	240,0	715,0
13221	61 G 0,5	20	26,0	293,0	840,0
13222	65 G 0,5	20	26,8	312,0	880,0
13223	2 x 0,75	19	6,8	14,4	66,0
13224	3 G 0,75	19	7,2	21,6	74,0
13225	3 x 0,75	19	7,2	21,6	74,0
13226	4 G 0,75	19	8,0	29,0	126,0
13227	4 x 0,75	19	8,0	29,0	126,0
13228	5 G 0,75	19	8,8	36,0	140,0
13229	5 x 0,75	19	8,8	36,0	140,0
13230	7 G 0,75	19	10,7	50,0	190,0
13231	7 x 0,75	19	10,7	50,0	190,0
13232	8 G 0,75	19	11,5	58,0	212,0
13233	10 G 0,75	19	12,7	72,0	238,0
13234	12 G 0,75	19	13,1	86,0	257,0
13235	16 G 0,75	19	14,6	115,0	304,0
13236	18 G 0,75	19	15,6	130,0	362,0
13237	20 G 0,75	19	16,6	144,0	394,0
13238	25 G 0,75	19	18,9	180,0	486,0
13239	30 G 0,75	19	15,4	216,0	450,0
13241	34 G 0,75	19	21,5	245,0	638,0
13242	37 G 0,75	19	21,5	260,0	696,0
13243	41 G 0,75	19	23,2	296,0	750,0
13244	42 G 0,75	19	23,2	302,0	770,0
13245	50 G 0,75	19	25,6	360,0	895,0
13246	61 G 0,75	19	28,2	439,0	1070,0
13247	65 G 0,75	19	29,0	468,0	1110,0
13248	2 x 1	18	7,4	19,2	80,0
13249	3 G 1	18	8,0	29,0	96,0
13250	3 x 1	18	8,0	29,0	96,0
13251	4 G 1	18	8,8	38,4	100,0
13252	4 x 1	18	8,8	38,4	100,0
13253	5 G 1	18	9,8	48,0	130,0
13254	7 G 1	18	11,7	67,0	170,0
13255	8 G 1	18	12,8	77,0	230,0
13256	10 G 1	18	14,3	96,0	270,0
13257	12 G 1	18	14,5	115,0	290,0
13258	16 G 1	18	16,5	154,0	360,0
13259	18 G 1	18	17,3	173,0	405,0
13260	20 G 1	18	18,4	192,0	450,0
13261	25 G 1	18	21,1	240,0	570,0
13262	34 G 1	18	24,0	326,0	750,0
13263	37 G 1	18	24,3	355,0	790,0
13264	41 G 1	18	25,9	394,0	890,0
13265	42 G 1	18	25,9	403,0	900,0
13266	50 G 1	18	28,5	480,0	1100,0
13267	61 G 1	18	31,4	586,0	1266,0
13268	65 G 1	18	32,5	628,0	1560,0
13269	2 x 1,5	16	8,4	29,0	95,0
13270	3 G 1,5	16	9,1	43,0	112,0
13271	3 x 1,5	16	9,1	43,0	112,0
13272	4 G 1,5	16	9,9	58,0	139,0
13273	5 G 1,5	16	11,0	72,0	170,0
13274	7 G 1,5	16	13,3	101,0	225,0
13275	8 G 1,5	16	14,5	115,0	250,0
13276	10 G 1,5	16	16,1	144,0	300,0
13277	12 G 1,5	16	16,6	173,0	370,0
13278	16 G 1,5	16	18,5	230,0	450,0
13279	18 G 1,5	16	19,7	259,0	520,0
13280	20 G 1,5	16	20,9	288,0	600,0

Part no.	No. cores x cross-sec. mm²	AWG-No.	Outer Ø app. mm	Cop. weight kg / km	Weight app. kg / km
13281	25 G 1,5	16	23,9	360,0	730,0
13282	34 G 1,5	16	27,2	490,0	950,0
13283	37 G 1,5	16	29,4	533,0	1094,0
13284	50 G 1,5	16	32,5	720,0	1400,0
13285	61 G 1,5	16	35,7	878,0	1700,0
13286	65 G 1,5	16	36,8	936,0	1900,0
13287	2 x 2,5	14	9,4	48,0	160,0
13288	3 G 2,5	14	9,9	72,0	175,0
13289	4 G 2,5	14	11,1	96,0	203,0
13290	5 G 2,5	14	12,4	120,0	251,0
13291	7 G 2,5	14	15,0	168,0	330,0
13292	8 G 2,5	14	16,1	192,0	400,0
13293	10 G 2,5	14	17,0	240,0	461,0
13294	12 G 2,5	14	18,4	288,0	553,0
13295	16 G 2,5	14	19,4	384,0	742,0
13296	18 G 2,5	14	22,0	432,0	795,0
13297	20 G 2,5	14	32,2	480,0	924,0
13298	25 G 2,5	14	26,9	600,0	1110,0
13299	30 G 2,5	14	28,1	720,0	1370,0
13300	2 x 4	12	11,4	77,0	180,0
13301	3 G 4	12	12,3	115,0	230,0
13302	4 G 4	12	13,8	154,0	310,0
13303	5 G 4	12	15,3	192,0	410,0
13304	7 G 4	12	16,8	269,0	540,0
13305	8 G 4	12	20,0	307,0	710,0
13306	10 G 4	12	21,6	384,0	760,0
13307	12 G 4	12	22,9	461,0	860,0
13308	16 G 4	12	23,6	614,0	910,0
13309	18 G 4	12	24,2	691,0	980,0
13310	2 x 6	10	13,1	115,0	205,0
13311	3 G 6	10	14,1	173,0	370,0
13312	4 G 6	10	15,6	230,0	430,0
13313	5 G 6	10	17,3	288,0	650,0
13314	7 G 6	10	19,3	403,0	860,0
13315	2 x 10	8	15,4	192,0	330,0
13316	3 G 10	8	16,5	288,0	660,0
13317	4 G 10	8	18,1	384,0	790,0
13318	5 G 10	8	20,5	480,0	960,0
13319	7 G 10	8	22,5	672,0	1300,0
13320	2 x 16	6	18,3	307,0	580,0
13321	3 G 16	6	19,6	461,0	700,0
13322	4 G 16	6	21,7	641,0	1100,0
13323	5 G 16	6	24,2	768,0	1600,0
13324	7 G 16	6	25,7	1075,0	1890,0
13325	3 G 25	4	24,0	720,0	1450,0
13326	4 G 25	4	26,9	960,0	1600,0
13327	5 G 25	4	29,4	1200,0	2050,0
13328	3 G 35	2	26,2	1008,0	1900,0
13329	4 G 35	2	29,4	1344,0	2400,0
13330	5 G 35	2	32,8	1680,0	2900,0
13331	3 G 50	1	31,6	1440,0	2700,0
13332	4 G 50	1	35,5	1920,0	3400,0
13333	5 G 50	1	40,0	2400,0	4361,0
13334	3 G 70	2/0	36,7	2016,0	3300,0
13335	4 G 70	2/0	40,7	2688,0	4400,0
13336	5 G 70	2/0	45,7	3360,0	5807,0
13337	3 G 95	3/0	41,2	2736,0	5050,0
13338	4 G 95	3/0	46,2	3648,0	6010,0
13339	5 G 95	3/0	50,7	4560,0	7752,0
13340	3 G 120	4/0	45,9	3456,0	5620,0
13341	4 G 120	4/0	50,3	4608,0	7500,0
13342	3 G 150	300 kcmil	52,7	4320,0	6390,0
13343	4 G 150	300 kcmil	58,8	5760,0	6840,0

Dimensions and specifications may be changed without prior notice. (RA03)



Suitable accessories can be found in Chapter X.

- Cable Gland - HELUTOP® HT-E

N

# MEGAFLEX® 500-C halogen-free, flame retardant, oil-resistant, UV-resistant, flexible, screened, EMC-preferred types, meter marking



## Technical data

- Halogen-free flexible control cable adapted to DIN VDE 0285-525-3-11 / DIN EN 50525-3-11, to UL-Style 20939, UL-Std.758
- **Temperature range**  
flexing -30°C to +80°C  
fixed installation -40°C to +80°C
- **Nominal voltage**  
U<sub>0</sub>/U 300/500 V  
UL/CSA 600 V
- **Test voltage** 3000 V
- **Coupling resistance**  
max. 250 Ohm/km
- **Minimum bending radius**  
flexing 10x cable Ø  
fixed installation 4x cable Ø
- **Flexibility**  
Alternate bending test acc. to DIN VDE 0473-396 / DIN EN 50396

## Cable structure

- Bare copper, fine wire conductors, to DIN VDE 0295 cl.5, BS 6360 cl.5 and IEC 60228 cl.5
- Core insulation of halogen-free special polymer
- Core identification to DIN VDE 0293 black cores with continuous white numbering
- GN-YE conductor, 3 cores and above in the outer layer
- Cores stranded in layers with optimal lay-length
- Separating foil
- Tinned copper braided screen, approx. 85% coverage
- Outer sheath of halogen-free special polymer
- Sheath colour grey (RAL 7001)
- with meter marking
- **LS0H**= Low Smoke Zero Halogen

## Note

- G = with green-yellow conductor  
x = without green-yellow conductor (OZ)
- AWG sizes are approximate equivalent values. The actual cross-section is in mm<sup>2</sup>.
- unscreened analogue type:  
**MEGAFLEX® 500**, confer page 394

## Properties

- Halogen-free
- Highly flame-retardant
- Resistant to oils and greases
- Resistant to UV and weathering
- Flexible, abrasion- and wear-resistant
- Ozone-resistant
- Recyclable
- The materials used in manufacture are cadmium-free and contain no silicone and free from substances harmful to the wetting properties of lacquers

## Tests

- Flame test acc. to DIN VDE 0482-332-3-24, BS 4066 part 3, DIN EN 60332-3-24, IEC 60332-3-24 (previously DIN VDE 0472 part 804 test method C)
- Self-extinguishing and flame retardant acc. to DIN VDE 0482-332-1-2, DIN EN 60332-1-2, IEC 60332-1 (previously DIN VDE 0472 part 804 test method B) CSA FT1
- Corrosiveness of combustion gases acc. to NF X 10-702
- Halogen-free acc. to DIN VDE 0482 part 267, DIN EN 50267-2-1, IEC 60754-1 (equivalent DIN VDE 0472 part 815)
- Smoke density acc. to DIN VDE 0482 part 1034-1+2, DIN EN 61034-1+2, IEC 61034-1+2, BS 7622 part 1+2 (previously DIN VDE 0472 part 816)
- Oil-resistant to DIN VDE 0473-811-404 / DIN EN 60811-404
- Hydrolysis resistant to DIN EN 61234-1
- Ozone-resistant to DIN VDE 0473-811-403 / DIN EN 60811-403

## Application

For fixed installation or flexible application that does not permanently recurring free movement without forced motion and without tensile stress, for high mechanical strain. As a measuring and control cable e. g. in machine and plant engineering, air conditioning in the warehouse and materials handling, shipbuilding and in the newable energies such as wind power stations.

**EMC** = Electromagnetic compatibility

To optimize the EMC features we recommend a large round contact of the copper braiding on both ends.

CE = The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

Part no.	No. cores x cross-sec. mm <sup>2</sup>	AWG-No.	Outer Ø app. mm	Cop. weight kg / km	Weight app. kg / km
13500	2 x 0,5	20	5,7	35,0	46,0
13501	3 G 0,5	20	6,0	42,0	56,0
13502	3 x 0,5	20	6,0	42,0	56,0
13503	4 G 0,5	20	6,5	47,0	62,0
13504	4 x 0,5	20	6,5	47,0	62,0
13505	5 G 0,5	20	7,0	56,0	75,0
13506	5 x 0,5	20	7,0	56,0	75,0
13507	7 G 0,5	20	7,9	69,0	98,0

Part no.	No. cores x cross-sec. mm <sup>2</sup>	AWG-No.	Outer Ø app. mm	Cop. weight kg / km	Weight app. kg / km
13508	8 G 0,5	20	8,5	80,0	116,0
13509	10 G 0,5	20	9,3	94,0	135,0
13510	12 G 0,5	20	9,6	108,0	158,0
13511	16 G 0,5	20	10,7	129,0	210,0
13512	18 G 0,5	20	11,2	145,0	216,0
13514	20 G 0,5	20	11,9	172,0	240,0
13515	25 G 0,5	20	13,4	240,0	315,0

Continuation ▶



# MEGAFLEX® 500-C halogen-free, flame retardant, oil-resistant, UV-resistant, flexible, screened, EMC-preferred types, meter marking



Part no.	No. cores x cross-sec. mm <sup>2</sup>	AWG-No.	Outer Ø app. mm	Cop. weight kg / km	Weight app. kg / km
13516	2 x 0,75	19	6,1	40,0	60,0
13517	3 G 0,75	19	6,4	52,0	68,0
13518	3 x 0,75	19	6,4	52,0	68,0
13519	4 G 0,75	19	6,9	60,0	78,0
13520	4 x 0,75	19	6,9	60,0	78,0
13521	5 G 0,75	19	7,4	71,0	95,0
13522	5 x 0,75	19	7,4	71,0	95,0
13523	7 G 0,75	19	8,6	91,0	130,0
13524	7 x 0,75	19	8,6	91,0	130,0
13525	8 G 0,75	19	9,4	110,0	145,0
13526	10 G 0,75	19	10,2	137,0	180,0
13527	12 G 0,75	19	10,4	142,0	203,0
13528	16 G 0,75	19	11,6	200,0	275,0
13529	18 G 0,75	19	12,4	212,0	290,0
13530	20 G 0,75	19	12,9	238,0	320,0
13531	25 G 0,75	19	14,8	281,0	413,0
13532	2 x 1	18	6,4	50,0	66,0
13533	3 G 1	18	6,7	60,0	80,0
13534	3 x 1	18	6,7	60,0	80,0
13535	4 G 1	18	7,3	71,0	100,0
13536	4 x 1	18	7,3	71,0	100,0
13537	5 G 1	18	7,8	88,0	130,0
13538	7 G 1	18	9,1	111,0	160,0
13539	8 G 1	18	9,9	127,0	197,0
13540	10 G 1	18	10,8	150,0	232,0
13541	12 G 1	18	11,2	184,0	260,0
13542	16 G 1	18	12,3	209,0	346,0
13543	18 G 1	18	13,2	260,0	382,0
13544	20 G 1	18	13,8	317,0	440,0
13545	25 G 1	18	15,8	349,0	540,0
13546	2 x 1,5	16	7,0	63,0	88,0
13547	3 G 1,5	16	7,3	80,0	100,0
13548	3 x 1,5	16	7,3	80,0	100,0
13549	4 G 1,5	16	7,9	97,0	125,0
13550	5 G 1,5	16	8,6	119,0	158,0
13552	7 G 1,5	16	10,2	147,0	210,0
13554	8 G 1,5	16	11,1	170,0	244,0
13556	10 G 1,5	16	12,0	193,0	315,0
13557	12 G 1,5	16	12,5	267,0	340,0
13558	16 G 1,5	16	13,8	315,0	424,0
13559	18 G 1,5	16	15,0	374,0	480,0
13560	20 G 1,5	16	15,7	396,0	545,0
13561	25 G 1,5	16	18,0	526,0	702,0
13562	2 x 2,5	14	8,3	96,0	132,0
13563	3 G 2,5	14	9,0	144,0	168,0
13565	4 G 2,5	14	9,8	148,0	195,0

Part no.	No. cores x cross-sec. mm <sup>2</sup>	AWG-No.	Outer Ø app. mm	Cop. weight kg / km	Weight app. kg / km
13566	5 G 2,5	14	10,9	181,0	256,0
13567	7 G 2,5	14	12,9	255,0	345,0
13568	8 G 2,5	17	13,8	285,0	390,0
13569	10 G 2,5	14	15,8	340,0	482,0
13570	12 G 2,5	14	15,9	441,0	572,0
13571	2 x 4	12	9,8	120,0	220,0
13572	3 G 4	12	10,6	174,0	251,0
13573	4 G 4	12	11,5	230,0	305,0
13574	5 G 4	12	12,7	273,0	388,0
13575	7 G 4	12	13,9	316,0	504,0
13576	2 x 6	10	11,5	173,0	270,0
13577	3 G 6	10	12,4	240,0	351,0
13578	4 G 6	10	13,8	305,0	464,0
13579	5 G 6	10	15,7	439,0	546,0
13580	7 G 6	10	16,6	505,0	670,0
13581	2 x 10	8	14,9	255,0	461,0
13582	3 G 10	8	15,9	350,0	574,0
13583	4 G 10	8	17,8	535,0	785,0
13584	5 G 10	8	19,6	592,0	914,0
13585	7 G 10	8	21,6	810,0	1308,0
13586	2 x 16	6	17,3	422,0	670,0
13587	3 G 16	6	18,5	585,0	911,0
13588	4 G 16	6	20,8	740,0	1105,0
13589	5 G 16	6	22,9	895,0	1293,0
13590	7 G 16	6	25,0	1282,0	2149,0
13591	4 G 25	4	26,2	1140,0	1911,0
13592	4 x 35	2	30,4	1576,0	2542,0
13593	4 G 50	1	34,6	2155,0	3550,0
13594	4 G 70	2/0	41,3	3120,0	4939,0
13595	4 G 95	3/0	46,2	4043,0	6690,0
13596	4 G 120	4/0	51,0	5069,0	8453,0
13597	4 G 150	300 kcmil	59,0	5792,0	9104,0

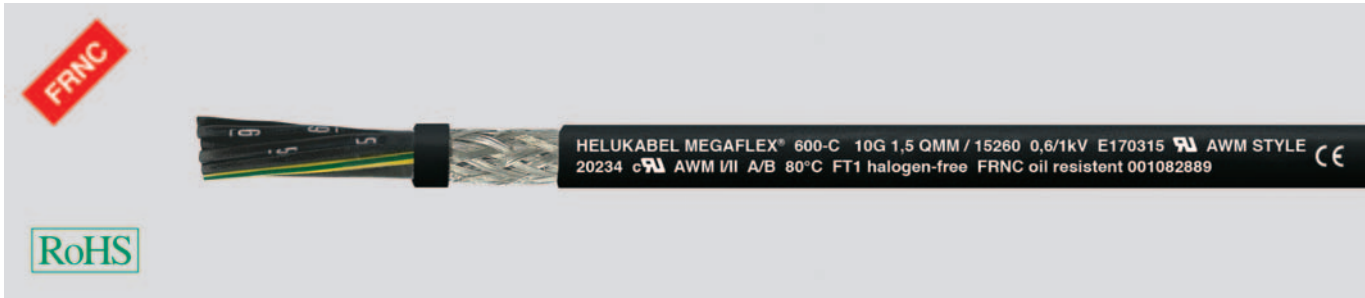
Dimensions and specifications may be changed without prior notice. (RA03)



Suitable accessories can be found in Chapter X.

- Cable Gland - HELUTOP® HT-E

# MEGAFLEX® 600-C halogen-free, flame retardant, oil-resistant, UV-resistant, flexible, meter marking



## Technical data

- Halogen-free flexible control cable to UL-Style 20234, UL-Std.758
- **Temperature range**  
flexing -30°C to +80°C  
fixed installation -40°C to +80°C
- **Nominal voltage**  $U_0/U$  600/1000 V
- **Test voltage** 4000 V
- **Minimum bending radius**  
flexing 10x cable  $\varnothing$   
fixed installation 4x cable  $\varnothing$
- **Flexibility**  
Alternate bending test acc. to DIN VDE 0473-396 / DIN EN 50396
- **Coupling resistance**  
max. 250 Ohm/km

## Cable structure

- Bare copper, fine wire conductors, to DIN VDE 0295 cl.5, BS 6360 cl.5 and IEC 60228 cl.5
- Core insulation of halogen-free special polymer
- Core identification to DIN VDE 0293 black cores with continuous white numbering
- GN-YE conductor, 3 cores and above in the outer layer
- Cores stranded in layer with optimal lay-length
- Separating foil
- Tinned copper braided screening, coverage approx. 85%
- Outer sheath, halogen-free special polymer
- Sheath colour black (RAL 9005)
- with meter marking

## Properties

- Halogen-free
- Highly flame-retardant
- Resistant to oils and greases
- Resistant to UV and weathering
- Flexible, abrasion- and wear-resistant
- Ozone-resistant
- Recyclable

## Tests

- Flame test acc. to DIN VDE 0482-332-3-24, BS 4066 part 3, DIN EN 60332-3-24, IEC 60332-3-24 (previously DIN VDE 0472 part 804 test method C)
- Self-extinguishing and flame retardant acc. to DIN VDE 0482-332-1-2, DIN EN 60332-1-2/IEC 60332-1 (previously DIN VDE 0472 part 804 test method B)
- The materials used in manufacture are cadmium-free and contain no silicone and free from substances harmful to the wetting properties of lacquers
- Corrosiveness of combustion gases acc. to NF X 10-702
- Halogen-free according to DIN VDE 0482 part 267/ EN 50267-2-1/ IEC 60754-1 (equivalent DIN VDE 0472 part 815)
- Smoke density acc. to DIN VDE 0482 part 1034-1+2, DIN EN 61034-1+2/ IEC 61034-1+2, BS 7622 part 1+2 (previously DIN VDE 0472 part 816)
- Oil-resistant to DIN VDE 0473-811-404/DIN EN 60811-404
- hydrolysebeständig nach DIN EN 61234-1
- Ozone-resistant to DIN VDE 0473-811-403/DIN EN 60811-403

## Note

- G = with green-yellow conductor  
x = without green-yellow conductor
- unscreened analogue type:  
**MEGAFLEX® 600**, confer page 396

## Application

For fixed installation or flexible application, with occasional not permanently recurring free movement without forced motion and without tensile stress, for high mechanical strain. As a measuring and control cable in tool machinery, conveyor belts and production lines, plant engineering, climate engineering, in foundries and steel mills. Especially suited for wind power plant and computer equipment.

**EMC** = Electromagnetic compatibility

To optimize the EMC features we recommend a large round contact of the copper braiding on both ends.

**CE** = The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

Part no.	No. cores x cross-sec. mm <sup>2</sup>	AWG-No.	Outer $\varnothing$ app. mm	Cop. weight kg / km	Weight app. kg / km
15217	2 x 0,5	20	6,9	35,0	46,0
15218	3 G 0,5	20	7,3	42,0	56,0
15219	3 x 0,5	20	7,3	42,0	56,0
15220	4 G 0,5	20	8,1	47,0	62,0
15221	4 x 0,5	20	8,1	47,0	62,0
15222	5 G 0,5	20	8,7	56,0	75,0
15223	5 x 0,5	20	8,7	56,0	75,0
15224	7 G 0,5	20	10,3	69,0	98,0

Part no.	No. cores x cross-sec. mm <sup>2</sup>	AWG-No.	Outer $\varnothing$ app. mm	Cop. weight kg / km	Weight app. kg / km
15225	10 G 0,5	20	12,1	94,0	135,0
15226	12 G 0,5	20	12,7	108,0	158,0
15227	18 G 0,5	20	14,9	145,0	216,0
15228	20 G 0,5	20	15,8	172,0	240,0
15229	25 G 0,5	20	17,7	240,0	315,0
15230	2 x 0,75	18	7,3	40,0	60,0
15231	3 G 0,75	18	7,7	52,0	68,0
15232	3 x 0,75	18	7,7	52,0	68,0

Continuation ▶

# MEGAFLEX® 600-C halogen-free, flame retardant, oil-resistant, UV-resistant, flexible, meter marking



Part no.	No. cores x cross-sec. mm <sup>2</sup>	AWG-No.	Outer Ø app. mm	Cop. weight kg / km	Weight app. kg / km
15233	4 G 0,75	18	8,5	60,0	78,0
15234	4 x 0,75	18	8,5	60,0	78,0
15235	5 G 0,75	18	9,3	71,0	95,0
15236	5 x 0,75	18	9,3	71,0	95,0
15237	7 G 0,75	18	10,7	91,0	130,0
15238	7 x 0,75	18	10,7	91,0	130,0
15239	12 G 0,75	18	13,1	142,0	203,0
15240	18 G 0,75	18	16,2	212,0	290,0
15241	20 G 0,75	18	17,2	238,0	320,0
15242	25 G 0,75	18	19,5	281,0	413,0
15243	2 x 1	17	8,0	50,0	66,0
15244	3 G 1	17	8,6	60,0	80,0
15245	3 x 1	17	8,6	60,0	80,0
15246	4 G 1	17	9,4	71,0	100,0
15247	4 G 1	17	9,4	71,0	100,0
15248	5 G 1	17	10,4	88,0	130,0
15249	10 G 1	17	14,9	150,0	232,0
15250	12 G 1	17	14,5	184,0	260,0
15251	18 G 1	17	17,9	260,0	382,0
15252	20 G 1	17	19,0	317,0	440,0
15253	25 G 1	17	21,7	349,0	540,0
15254	2 x 1,5	16	9,0	63,0	88,0
15255	3 G 1,5	16	9,7	80,0	100,0
15256	3 x 1,5	16	9,7	80,0	100,0
15257	4 G 1,5	16	10,5	97,0	125,0
15258	5 G 1,5	16	11,6	119,0	158,0

Part no.	No. cores x cross-sec. mm <sup>2</sup>	AWG-No.	Outer Ø app. mm	Cop. weight kg / km	Weight app. kg / km
15259	7 G 1,5	16	13,9	147,0	210,0
15260	10 G 1,5	16	16,7	193,0	315,0
15261	12 G 1,5	16	17,2	267,0	340,0
15262	18 G 1,5	16	20,5	374,0	480,0
15263	20 G 1,5	16	21,7	396,0	545,0
15264	25 G 1,5	16	24,7	526,0	702,0
15265	2 x 2,5	14	10,2	96,0	132,0
15266	3 G 2,5	14	10,7	144,0	168,0
15267	4 G 2,5	14	11,9	148,0	195,0
15268	5 x 2,5	14	13,2	181,0	256,0
15269	7 G 2,5	14	15,8	255,0	345,0
15270	10 G 2,5	14	17,0	340,0	482,0
15271	12 G 2,5	14	19,2	441,0	572,0
15272	3 G 4	12	13,1	174,0	251,0
15273	4 G 4	12	14,6	230,0	305,0
15274	5 G 4	12	16,1	273,0	388,0
15275	7 G 4	12	17,6	316,0	504,0
15276	3 G 6	10	14,9	240,0	351,0
15277	4 G 6	10	16,4	305,0	464,0
15278	5 G 6	10	18,1	439,0	546,0
15279	7 G 6	10	20,1	505,0	670,0
15280	3 G 10	8	16,6	350,0	574,0
15281	4 G 10	8	18,1	535,0	785,0
15282	5 G 10	8	20,6	592,0	914,0
15283	7 G 10	8	22,6	810,0	1308,0

Dimensions and specifications may be changed without prior notice. (RA03)



Suitable accessories can be found in Chapter X.

- Cable Gland - HELUTOP® HT-E



# UL/CSA DATA CABLES





# Command Cable UL (LiYY) Style 2464/300 V, (80°C)



## Technical data

- Special PVC command cable, approved to UL-Style 2464, cores acc. to AWG 26-20 to UL-Style 1061/1729 AWG 18-16 to UL-Style 1007/1569
- **Temperature range**  
flexing -10°C to +80°C  
fixed installation -20°C to +80°C
- **Nominal voltage** 300 V
- **Test voltage** 1500 V
- **Breakdown voltage** min. 3000 V
- **Minimum bending radius**  
fixed 7,5x cable Ø  
flexing 15x cable Ø

## Cable structure

- Tinned copper, fine wire conductors  
AWG 26-20, ASTM-B 174-95 class J-M,  
AWG 18-16 ASTM-B 286  
Conductor make-up to:  
0,14 mm<sup>2</sup> = 7x0,162 mm  
0,23 mm<sup>2</sup> = 7x0,202 mm  
0,34 mm<sup>2</sup> = 7x0,254 mm  
0,56 mm<sup>2</sup> = 7x0,32 mm  
0,82 mm<sup>2</sup> = 19x0,235 mm  
1,30 mm<sup>2</sup> = 19x0,31 mm
- Core insulation of special PVC class 43 respectively semirigid acc. to UL-Std.1581 tab.50.182 and 50.183
- Core identification to DIN 47100 or international colour code
- Cores stranded in layers with optimal lay-length
- Outer sheath of special PVC class 43 acc. to UL-Std.1581 tab.50.182
- Sheath colour  
black (international colour code)  
grey (DIN 47100 / preferred type for stock)

## Properties

- The materials used in manufacture are cadmium-free and contain no silicone and free from substances harmful to the wetting properties of lacquers

## Tests

- PVC flame retardant according to UL VW-1, CSA FT1
- **Conditionally resistant to**  
Oil  
Solvents  
Acids  
Lyes

## Note

- AWG sizes are approximate equivalent values. The actual cross-section is in mm<sup>2</sup>.
- screened analogue type:  
**command cable UL (LiYCY)**,  
confer page 413

## Application

As a flexible connector and connecting cable, as control, signal and measuring line of machine tools, conveyor belts and plant construction, air conditioning systems, in foundries and steel mills.

CE= The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

Part no. Sheath colour grey	Part no. Sheath colour black	No.cores x cross-sec. mm <sup>2</sup>	AWG-No.	Outer Ø app. mm	Cop. weight kg / km	Weight app. kg / km
83137	83045	2 x 0,14	26	3,6	3,6	13,0
83138	83046	3 x 0,14	26	3,8	4,0	15,0
83139	83047	4 x 0,14	26	4,0	5,4	18,0
83140	83048	6 x 0,14	26	4,6	8,1	25,0
83141	83049	10 x 0,14	26	5,6	13,4	38,0
83142	83050	12 x 0,14	26	5,8	16,2	46,0
83143	83055	16 x 0,14	26	6,3	21,5	56,0
83144	83056	18 x 0,14	26	6,6	34,4	62,0
83145	83057	24 x 0,14	26	7,5	32,4	82,0
83146	83058	27 x 0,14	26	7,6	36,3	97,0
83147	83059	30 x 0,14	26	8,0	40,4	110,0
83153	83130	2 x 0,23	24	3,8	4,6	16,0
83154	83131	3 x 0,23	24	4,0	7,1	19,0
83155	83132	4 x 0,23	24	4,3	9,4	23,0
83156	83133	6 x 0,23	24	4,9	14,2	32,0
83157	83134	10 x 0,23	24	6,0	23,8	55,0
83158	83135	12 x 0,23	24	6,2	28,5	60,0
83159	83136	16 x 0,23	24	6,8	38,1	75,0
83160	83371	18 x 0,23	24	7,1	43,1	82,0
83161	83372	24 x 0,23	24	8,1	59,7	116,0
83162	83373	27 x 0,23	24	8,4	64,7	140,0
83163	83374	30 x 0,23	24	8,9	71,9	150,0
83169	83375	2 x 0,34	22	4,1	6,5	25,0
83170	83376	3 x 0,34	22	4,3	9,8	30,0
83171	83377	4 x 0,34	22	4,6	13,0	45,0
83172	83378	6 x 0,34	22	5,4	19,6	60,0
83173	83379	10 x 0,34	22	6,6	32,5	80,0
83174	83380	12 x 0,34	22	6,8	39,1	105,0
83175	83381	16 x 0,34	22	7,5	52,0	130,0
83176	83382	18 x 0,34	22	8,1	59,0	140,0
83177	83383	24 x 0,34	22	9,4	79,0	190,0
83178	83384	27 x 0,34	22	9,7	88,0	207,0
83179	83385	30 x 0,34	22	10,2	97,8	225,0
83185	83386	2 x 0,56	20	4,6	9,8	30,0
83186	83387	3 x 0,56	20	4,8	14,6	33,0
83187	83388	4 x 0,56	20	5,2	19,4	41,0

Part no. Sheath colour grey	Part no. Sheath colour black	No.cores x cross-sec. mm <sup>2</sup>	AWG-No.	Outer Ø app. mm	Cop. weight kg / km	Weight app. kg / km
83188	83389	6 x 0,56	20	6,1	29,0	65,0
83189	83390	10 x 0,56	20	7,6	48,2	102,0
83190	83391	12 x 0,56	20	7,8	58,2	120,0
83191	83392	16 x 0,56	20	8,7	77,3	152,0
83192	83393	18 x 0,56	20	9,3	87,0	168,0
83193	83394	24 x 0,56	20	10,9	116,3	224,0
83194	83395	27 x 0,56	20	11,2	129,8	260,0
83195	83396	30 x 0,56	20	11,8	144,6	300,0
83201	83397	2 x 0,82	18	6,1	15,2	50,0
83202	83398	3 x 0,82	18	6,4	23,2	62,0
83203	83399	4 x 0,82	18	6,9	31,3	72,0
83204	83474	6 x 0,82	18	8,1	47,0	100,0
83205	83475	10 x 0,82	18	10,4	78,2	180,0
83206	83476	12 x 0,82	18	10,9	94,0	182,0
83207	83477	16 x 0,82	18	12,2	125,1	240,0
83208	83478	18 x 0,82	18	13,0	141,1	270,0
83209	83479	24 x 0,82	18	15,2	188,2	370,0
83210	83480	27 x 0,82	18	15,8	212,0	400,0
83211	83481	30 x 0,82	18	16,3	235,6	470,0
83217	83482	2 x 1,3	16	6,6	24,4	70,0
83218	83483	3 x 1,3	16	7,0	37,1	90,0
83219	83484	4 x 1,3	16	7,6	49,4	110,0
83220	83491	6 x 1,3	16	9,2	74,2	160,0
83221	83492	10 x 1,3	16	11,8	124,0	250,0
83222	83493	12 x 1,3	16	12,2	149,0	300,0
83223	83494	16 x 1,3	16	13,7	198,7	400,0
83224	83495	18 x 1,3	16	14,6	224,0	450,0
83225	83496	24 x 1,3	16	17,0	298,4	650,0
83226	83497	27 x 1,3	16	17,6	336,0	680,0
83227	83498	30 x 1,3	16	18,6	373,6	750,0

Dimensions and specifications may be changed without prior notice. (RN02)



# Command Cable UL (LiYY) Style 2516, 600 V, 105°C



## Technical data

- Special PVC command cable, approved to UL-Style 2516
- **Temperature range**  
flexing -10°C to +105°C  
fixed installation -20°C to +105°C
- **Nominal voltage** 600 V
- **Test voltage** 2000 V
- **Breakdown voltage** min. 4000 V
- **Minimum bending radius**  
fixed 7,5x cable Ø  
flexing 15x cable Ø

## Cable structure

- Tinned copper, fine wire conductors acc. to ASTM-B 174, class J-K  
Conductor make-up to:  
2,08 mm<sup>2</sup> = 41x0,254 mm  
3,20 mm<sup>2</sup> = 65x0,254 mm
- Core insulation of special PVC class 43 acc. to UL-Std.1581 tab.50.182 (105°C)
- Core identification to DIN 47100 or international colour code
- Cores stranded in layers with optimal lay-length
- Outer sheath of special PVC class 43 acc. to UL-Std.1581 tab.50.182 (105°C)
- Sheath colour  
black (international colour code)  
grey (DIN 47100 / preferred type from stock)

## Properties

- The materials used in manufacture are cadmium-free and contain no silicone and free from substances harmful to the wetting properties of lacquers

### Tests

- PVC flame retardant acc. to UL VW-1, CSA FT1
- **Conditionally resistant to**  
Oil  
Solvents  
Acids  
Lyes

### Note

- AWG sizes are approximate equivalent values. The actual cross-section is in mm<sup>2</sup>.
- screened analogue type:  
**command cable UL (LiYCY)**, confer page 415

## Application

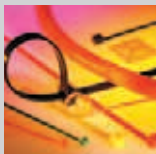
As a flexible connector and connecting cable, as control, signal and measuring line of machine tools, conveyor belts and plant construction, air conditioning systems, in foundries and steel mills.

CE= The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

Part no. Sheath colour grey	Part no. Sheath colour black	No. cores x cross-sec. mm <sup>2</sup>	AWG-No.	Outer Ø app. mm	Cop. weight kg / km	Weight app. kg / km
83233	83624	2 x 2,08	14	8,4	39,6	120,0
83234	83625	3 x 2,08	14	8,9	59,6	150,0
83235	83626	4 x 2,08	14	9,6	79,2	190,0
83236	83627	6 x 2,08	14	11,4	119,0	300,0
83237	83628	10 x 2,08	14	15,1	198,4	450,0
83238	83629	12 x 2,08	14	15,6	238,7	500,0
83239	83630	16 x 2,08	14	17,2	319,0	700,0
83240	83631	18 x 2,08	14	18,3	358,4	750,0
83241	83632	24 x 2,08	14	21,5	478,4	900,0
83242	83633	27 x 2,08	14	22,7	538,1	1100,0
83243	83634	30 x 2,08	14	23,5	598,4	1150,0
83244	83635	36 x 2,08	14	25,4	717,2	1800,0

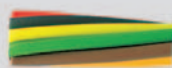
Part no. Sheath colour grey	Part no. Sheath colour black	No. cores x cross-sec. mm <sup>2</sup>	AWG-No.	Outer Ø app. mm	Cop. weight kg / km	Weight app. kg / km
83245	83636	2 x 3,2	12	9,3	61,0	150,0
83246	83637	3 x 3,2	12	9,8	91,4	210,0
83247	83638	4 x 3,2	12	10,8	121,6	300,0
83248	83639	6 x 3,2	12	12,8	183,7	430,0
83249	83640	10 x 3,2	12	17,0	305,9	500,0
83250	83641	12 x 3,2	12	17,5	367,6	700,0
83251	83642	16 x 3,2	12	19,8	490,9	810,0
83252	83643	18 x 3,2	12	21,0	551,7	970,0
83253	83644	24 x 3,2	12	24,8	736,4	1200,0

Dimensions and specifications may be changed without prior notice. (RN02)



Suitable accessories can be found in Chapter X.

- Cable tie

HELUKABEL TRAYCONTROL 300 24AWG/0,241 mm<sup>2</sup> 6C/62652

CE

**Technical data**

- Flexible PVC data and control cable
- **Temperature range**  
-25°C to +105°C
- **Nominal voltage** 300 V
- **Test voltage** 2000 V
- **Minimum bending radius**  
flexing 6x cable Ø
- **Radiation resistance**  
up to 80x10<sup>6</sup> cJ/kg (up to 80 Mrad)

**Cable structure**

- Tinned copper conductor, fine wire with AWG dimensions
- Outer sheath of special PVC (AWG 22 -AWG 16 with transparent nylon skin)
- Core identification to international colour code
- Cores stranded in layers with optimal lay-lengths
- Separator
- Outer sheath of special PVC
- Sheath colour grey (RAL 7001)
- With length marking in feet

**Properties**

- The materials used in manufacture are cadmium-free and contain no silicone and free from substances harmful to the wetting properties of lacquers

**Tests**

- self-extinguishing and flame retardant acc. to CSA FT4
- **UL (AWG 22 - AWG 16):**  
PLTC-ER, ITC-ER, Type CM, NFPA 79 2012, OIL RES I & II, Class I Div. 2, NEC Art. 501, 725, 760 & 800, AWM 2517
- **UL (AWG 24 - AWG 28):**  
CM, AWM 2464, rated OIL RES I & II, NEC Art. 725, 760 & 800, NFPA 79 2012
- **CSA:**  
CSA CMG FT4, AWM I/II A/B FT4

**Note****Advantages**

- highly-flexible easy to install
- Oil-resistant to OIL RES I & II

**Available on request**

- PUR or TPE outer sheath
- Sheath colour to suit customer requirements

**Application**

HELUKABEL® TRAYCONTROL® 300 is a multi-core PVC data and control cable. Cross-sections with PLTC-ER and ITC-ER approval suitable for open, unprotected installation in cable trays to the machine; their outstanding oil resistance (OIL RES I & II) makes them ideally suited as connecting and joining cables and also for control, signal and measuring systems in industrial plants. The flexible cable structure facilitates installation inside and outside of machines and switch cabinets. Applications: tool machines, control panels, control and instrumentation technology, production automation, cable ducts, renewable energies.

CE= The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

Part no.	Cross-section mm <sup>2</sup> x AWG-No.	No.cores	Outer Ø app. mm	Cop. weight kg / km	Weight app. kg / km
62625	0,093	2 x 28	3,9	1,8	12,0
62626	0,093	3 x 28	4,2	2,7	18,0
62627	0,093	4 x 28	4,4	3,6	21,0
62628	0,093	6 x 28	4,9	5,4	27,0
62629	0,093	8 x 28	5,2	7,2	30,0
62630	0,093	10 x 28	5,8	8,9	30,0
62631	0,093	15 x 28	6,4	13,4	43,0
62632	0,093	20 x 28	7,0	17,9	54,0
62633	0,093	25 x 28	8,0	22,3	63,0
62634	0,093	30 x 28	8,4	26,8	73,0
62635	0,093	40 x 28	9,1	35,7	89,0
62636	0,093	50 x 28	10,1	44,7	109,0
62637	0,154	2 x 26	4,2	3,0	18,0
62638	0,154	3 x 26	4,3	4,4	21,0
62639	0,154	4 x 26	4,5	5,9	24,0
62640	0,154	6 x 26	5,2	8,9	30,0
62641	0,154	8 x 26	5,5	11,8	34,0
62642	0,154	10 x 26	6,2	14,8	42,0
62643	0,154	15 x 26	6,8	22,2	52,0
62644	0,154	20 x 26	7,7	29,6	67,0
62645	0,154	25 x 26	8,5	37,0	80,0
62646	0,154	30 x 26	8,8	44,4	92,0
62647	0,154	40 x 26	9,6	59,1	116,0
62648	0,154	50 x 26	10,8	73,9	145,0
62649	0,241	2 x 24	4,4	4,7	19,0
62650	0,241	3 x 24	4,6	7,0	22,0
62651	0,241	4 x 24	4,9	9,3	27,0
62652	0,241	6 x 24	5,6	13,9	33,0
62653	0,241	8 x 24	5,9	18,5	42,0
62654	0,241	10 x 24	6,6	23,2	49,0

Part no.	Cross-section mm <sup>2</sup> x AWG-No.	No.cores	Outer Ø app. mm	Cop. weight kg / km	Weight app. kg / km
62655	0,241	15 x 24	7,4	34,7	69,0
62656	0,241	20 x 24	8,4	46,3	86,0
62657	0,241	25 x 24	9,3	57,9	103,0
62658	0,241	30 x 24	9,6	69,4	131,0
62659	0,241	40 x 24	11,2	92,6	173,0
62660	0,241	50 x 24	12,4	115,7	219,0
62661	0,382	2 x 22	6,1	7,4	22,0
62662	0,382	3 x 22	6,7	11,0	28,0
62663	0,382	4 x 22	7,2	14,7	32,0
62664	0,382	6 x 22	7,8	22,0	46,0
62665	0,382	8 x 22	8,8	29,4	54,0
62666	0,382	10 x 22	9,1	36,7	66,0
62667	0,382	15 x 22	9,7	55,0	90,0
62668	0,382	20 x 22	10,5	73,4	115,0
62669	0,382	25 x 22	11,9	91,7	141,0
62670	0,382	30 x 22	12,3	110,0	176,0
62671	0,382	40 x 22	13,5	146,7	234,0
62672	0,382	50 x 22	14,9	183,4	293,0
62673	0,616	2 x 20	6,9	11,9	57,0
62674	0,616	3 x 20	7,2	17,8	60,0
62675	0,616	4 x 20	7,8	23,7	73,0
62676	0,616	6 x 20	9,0	35,5	97,0
62677	0,616	8 x 20	9,6	47,4	133,0
62678	0,616	10 x 20	10,8	59,2	143,0
62679	0,616	15 x 20	12,4	88,8	177,0
62680	0,616	20 x 20	14,5	118,3	261,0
62681	0,616	25 x 20	15,3	147,9	353,0
62682	0,616	30 x 20	15,9	177,5	419,0
62683	0,616	40 x 20	18,1	236,6	562,0
62684	0,616	50 x 20	20,1	295,7	699,0

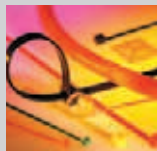
Continuation ▶

**TRAYCONTROL® 300** flexible, oil-resistant, NFPA 79 Edition 2012

Part no.	Cross-section mm <sup>2</sup> x AWG-No.	No.cores	Outer Ø app. mm	Cop. weight kg / km	Weight app. kg / km
62685	0,963	2 x 18	7,4	18,5	61,0
62686	0,963	3 x 18	7,6	27,8	64,0
62687	0,963	4 x 18	8,3	37,0	77,0
62688	0,963	6 x 18	9,5	55,5	101,0
62689	0,963	8 x 18	10,1	74,0	142,0
62690	0,963	10 x 18	12,1	92,5	195,0
62691	0,963	15 x 18	13,6	138,7	247,0
62692	0,963	20 x 18	14,9	184,9	328,0
62693	0,963	25 x 18	17,6	231,2	407,0
62694	0,963	30 x 18	17,7	277,4	539,0
62695	0,963	40 x 18	19,5	369,8	717,0
62696	0,963	50 x 18	21,8	462,3	894,0

Part no.	Cross-section mm <sup>2</sup> x AWG-No.	No.cores	Outer Ø app. mm	Cop. weight kg / km	Weight app. kg / km
62697	1,31	2 x 16	7,5	25,2	83,0
62698	1,31	3 x 16	8,4	37,8	91,0
62699	1,31	4 x 16	8,8	50,3	109,0
62700	1,31	6 x 16	10,1	75,5	162,0
62702	1,31	8 x 16	11,4	100,7	243,0
62703	1,31	10 x 16	13,0	125,8	267,0
62704	1,31	15 x 16	14,7	188,7	364,0
62705	1,31	20 x 16	16,1	251,6	493,0
62706	1,31	25 x 16	18,3	314,5	608,0
62707	1,31	30 x 16	19,2	377,3	729,0
62708	1,31	40 x 16	21,3	503,1	967,0
62709	1,31	50 x 16	23,9	628,8	1214,0

Dimensions and specifications may be changed without prior notice. (RN02)



Suitable accessories can be found in Chapter X.

- Cable tie

# Command Cable UL (LiYY-TP) Style 2464, 300 V, 80°C



## Technical data

- Special PVC command cable, approved to UL-Style 2464, cores acc. to UL-Style 1061/1729
- **Temperature range**  
flexing -10°C to +80°C  
fixed installation -20°C to +80°C
- **Nominal voltage** 300 V
- **Test voltage** 1500 V
- **Breakdown voltage** min. 3000 V
- **Insulation resistance**  
min. 100 MOhm x km
- **Minimum bending radius**  
fixed 7,5x cable Ø  
flexing 15x cable Ø

## Cable structure

- Tinned copper, fine wire conductors acc. to ASTM-B 174-95 class J-M
- conductor make-up to
  - 0,14 mm<sup>2</sup> = 7x0,162 mm
  - 0,23 mm<sup>2</sup> = 7x0,202 mm
  - 0,34 mm<sup>2</sup> = 7x0,254 mm
  - 0,56 mm<sup>2</sup> = 7x0,32 mm
- Core insulation of special PVC class 43 respectively semirigid acc. to UL-Std.1581 tab.50.182 and 50183
- Core identification (pair) to DIN 47100, with colour repetition from pair no. 23 or international colour code
- Cores stranded in pairs with optimal lay-length
- Pairs stranded in layers with optimal lay-length
- Separator-foil
- Outer sheath of special PVC class 43 acc. to UL-Std.1581 tab.50.182
- Sheath colour  
black (international colour code)  
grey (DIN 47100 - preferred type)

## Properties

- The materials used in manufacture are cadmium-free and contain no silicone and free from substances harmful to the wetting properties of lacquers

## Tests

- PVC flame retardant acc. to UL VW-1, CSA FT1
- **Conditionally resistant to**  
Oil  
Solvents  
Acids  
Lyes

## Note

- AWG sizes are approximate equivalent values. The actual cross-section is in mm<sup>2</sup>.
- screened analogue type:  
**command cable UL (LiYCY-TP)**, confer page 418

## Application

Twisted pair control cable for use in tool making machinery conveyor system and production lines, in industrial plants and in air conditioning as well as in the steel producing industries.

☑ The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

Part no. Sheath colour	No.pairs x cross-sec. mm <sup>2</sup>	AWG-No.	Outer Ø app. mm	Cop. weight kg / km	Weight app. kg / km
<b>grey</b>					
83904	1 x 2 x 0,14	26	3,6	2,7	20,0
83905	2 x 2 x 0,14	26	5,1	5,4	24,0
83906	3 x 2 x 0,14	26	5,3	8,1	30,0
83907	4 x 2 x 0,14	26	5,8	10,8	38,0
83908	5 x 2 x 0,14	26	6,2	13,6	44,0
83909	6 x 2 x 0,14	26	6,8	16,2	51,0
83910	7 x 2 x 0,14	26	6,8	19,0	57,0
83911	8 x 2 x 0,14	26	7,3	21,7	64,0
83912	10 x 2 x 0,14	26	7,4	26,7	76,0
83913	12 x 2 x 0,14	26	9,1	32,6	93,0
83914	14 x 2 x 0,14	26	9,8	37,4	103,0
83915	15 x 2 x 0,14	26	10,6	40,7	109,0
83916	16 x 2 x 0,14	26	10,6	43,4	112,0
83917	18 x 2 x 0,14	26	11,1	48,5	119,0
83918	20 x 2 x 0,14	26	11,9	54,2	130,0
83919	22 x 2 x 0,14	26	12,4	59,3	150,0
83920	24 x 2 x 0,14	26	13,1	64,7	169,0
83921	25 x 2 x 0,14	26	13,4	67,2	178,0
83922	1 x 2 x 0,23	24	3,8	4,8	32,0
83923	2 x 2 x 0,23	24	5,3	9,7	36,0
83924	3 x 2 x 0,23	24	5,7	14,7	48,0
83925	4 x 2 x 0,23	24	6,2	19,6	56,0
83926	5 x 2 x 0,23	24	6,6	24,6	71,0
83927	6 x 2 x 0,23	24	7,2	29,3	80,0
83928	7 x 2 x 0,23	24	7,2	34,1	89,0
83929	8 x 2 x 0,23	24	7,8	39,1	98,0
83930	10 x 2 x 0,23	24	9,2	48,9	111,0
83931	12 x 2 x 0,23	24	9,7	59,4	135,0
83932	14 x 2 x 0,23	24	10,2	68,7	160,0

Part no. Sheath colour	No.pairs x cross-sec. mm <sup>2</sup>	AWG-No.	Outer Ø app. mm	Cop. weight kg / km	Weight app. kg / km
<b>black</b>					
65214	1 x 2 x 0,14	26	3,6	2,7	20,0
65215	2 x 2 x 0,14	26	5,1	5,4	24,0
65216	3 x 2 x 0,14	26	5,3	8,1	30,0
65217	4 x 2 x 0,14	26	5,8	10,8	38,0
65218	5 x 2 x 0,14	26	6,2	13,6	44,0
65219	6 x 2 x 0,14	26	6,8	16,2	51,0
65220	7 x 2 x 0,14	26	6,8	19,0	57,0
65221	8 x 2 x 0,14	26	7,3	21,7	64,0
65222	10 x 2 x 0,14	26	7,4	26,7	76,0
65223	12 x 2 x 0,14	26	9,1	32,6	93,0
65224	14 x 2 x 0,14	26	9,8	37,4	103,0
65225	15 x 2 x 0,14	26	10,6	40,7	109,0
65226	16 x 2 x 0,14	26	10,6	43,4	112,0
65227	18 x 2 x 0,14	26	11,1	48,5	119,0
65228	20 x 2 x 0,14	26	11,9	54,2	130,0
65229	22 x 2 x 0,14	26	12,4	59,3	150,0
65230	24 x 2 x 0,14	26	13,1	64,7	169,0
65231	25 x 2 x 0,14	26	13,4	67,2	178,0
65232	1 x 2 x 0,23	24	3,8	4,8	32,0
65233	2 x 2 x 0,23	24	5,3	9,7	36,0
65234	3 x 2 x 0,23	24	5,7	14,7	48,0
65235	4 x 2 x 0,23	24	6,2	19,6	56,0
65236	5 x 2 x 0,23	24	6,6	24,6	71,0
65237	6 x 2 x 0,23	24	7,2	29,3	80,0
65238	7 x 2 x 0,23	24	7,2	34,1	89,0
65239	8 x 2 x 0,23	24	7,8	39,1	98,0
65240	10 x 2 x 0,23	24	9,2	48,9	111,0
65241	12 x 2 x 0,23	24	9,7	59,4	135,0
65242	14 x 2 x 0,23	24	10,2	68,7	160,0

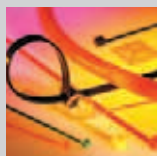
Continuation ▶

**Command Cable UL (LiYY-TP) Style 2464, 300 V, 80°C**

Part no. Sheath colour grey	No.pairs x cross-sec. mm <sup>2</sup>	AWG-No.	Outer Ø app. mm	Cop. weight kg / km	Weight app. kg / km
83933	15 x 2 x 0,23	24	10,9	73,7	171,0
83934	16 x 2 x 0,23	24	10,9	79,1	185,0
83935	18 x 2 x 0,23	24	11,5	88,9	209,0
83936	20 x 2 x 0,23	24	12,2	98,4	230,0
83937	22 x 2 x 0,23	24	13,0	108,6	248,0
83938	24 x 2 x 0,23	24	13,7	117,9	279,0
83939	25 x 2 x 0,23	24	14,2	123,5	292,0
83940	1 x 2 x 0,34	22	4,2	6,5	38,0
83941	2 x 2 x 0,34	22	5,9	13,0	44,0
83942	3 x 2 x 0,34	22	6,3	19,5	60,0
83943	4 x 2 x 0,34	22	7,0	26,1	79,0
83944	5 x 2 x 0,34	22	7,6	32,6	92,0
83945	6 x 2 x 0,34	22	8,2	39,2	119,0
83946	7 x 2 x 0,34	22	8,2	45,7	128,0
83947	8 x 2 x 0,34	22	9,0	52,3	139,0
83948	10 x 2 x 0,34	22	10,7	65,3	171,0
83949	12 x 2 x 0,34	22	11,3	78,4	194,0
83950	14 x 2 x 0,34	22	12,1	91,5	222,0
83951	15 x 2 x 0,34	22	12,7	97,8	231,0
83952	16 x 2 x 0,34	22	12,7	104,6	240,0
83953	18 x 2 x 0,34	22	13,6	117,8	264,0
83954	20 x 2 x 0,34	22	14,4	130,7	291,0
83955	22 x 2 x 0,34	22	15,1	143,6	300,0
83956	24 x 2 x 0,34	22	16,2	156,8	359,0
83957	25 x 2 x 0,34	22	16,7	163,3	381,0
83958	1 x 2 x 0,56	20	4,6	10,8	60,0
83959	2 x 2 x 0,56	20	6,5	21,5	80,0
83960	3 x 2 x 0,56	20	7,1	32,3	94,0
83961	4 x 2 x 0,56	20	7,8	43,1	104,0
83962	5 x 2 x 0,56	20	8,6	53,8	130,0
83963	6 x 2 x 0,56	20	9,6	64,6	151,0
83964	7 x 2 x 0,56	20	9,6	75,3	174,0
83965	8 x 2 x 0,56	20	12,2	86,1	262,0
83966	10 x 2 x 0,56	20	12,5	107,7	298,0
83967	12 x 2 x 0,56	20	13,1	129,1	302,0
83968	14 x 2 x 0,56	20	13,8	150,6	327,0
83969	15 x 2 x 0,56	20	14,7	161,3	370,0
83970	16 x 2 x 0,56	20	14,7	172,1	402,0
83971	18 x 2 x 0,56	20	15,7	193,6	480,0
83972	20 x 2 x 0,56	20	16,7	215,1	551,0
83973	22 x 2 x 0,56	20	17,2	236,6	621,0
83974	24 x 2 x 0,56	20	18,6	258,0	703,0
83975	25 x 2 x 0,56	20	19,2	268,9	721,0

Part no. Sheath colour black	No.pairs x cross-sec. mm <sup>2</sup>	AWG-No.	Outer Ø app. mm	Cop. weight kg / km	Weight app. kg / km
65243	15 x 2 x 0,23	24	10,9	73,7	171,0
65244	16 x 2 x 0,23	24	10,9	79,1	185,0
65245	18 x 2 x 0,23	24	11,5	88,9	209,0
65246	20 x 2 x 0,23	24	12,2	98,4	230,0
65247	22 x 2 x 0,23	24	13,0	108,6	248,0
65248	24 x 2 x 0,23	24	13,7	117,9	279,0
65249	25 x 2 x 0,23	24	14,2	123,5	292,0
65250	1 x 2 x 0,34	22	4,2	6,5	38,0
65251	2 x 2 x 0,34	22	5,9	13,0	44,0
65252	3 x 2 x 0,34	22	6,3	19,5	60,0
65253	4 x 2 x 0,34	22	7,0	26,1	79,0
65254	5 x 2 x 0,34	22	7,6	32,6	92,0
65255	6 x 2 x 0,34	22	8,2	39,2	119,0
65256	7 x 2 x 0,34	22	8,2	45,7	128,0
65257	8 x 2 x 0,34	22	9,0	52,3	139,0
65258	10 x 2 x 0,34	22	10,7	65,3	171,0
65259	12 x 2 x 0,34	22	11,3	78,4	194,0
65260	14 x 2 x 0,34	22	12,1	91,5	222,0
65261	15 x 2 x 0,34	22	12,7	97,8	231,0
65262	16 x 2 x 0,34	22	12,7	104,6	240,0
65263	18 x 2 x 0,34	22	13,6	117,8	264,0
65264	20 x 2 x 0,34	22	14,4	130,7	291,0
65265	22 x 2 x 0,34	22	15,1	143,6	300,0
65266	24 x 2 x 0,34	22	16,2	156,8	359,0
65267	25 x 2 x 0,34	22	16,7	163,3	381,0
65268	1 x 2 x 0,56	20	4,6	10,8	60,0
65269	2 x 2 x 0,56	20	6,5	21,5	80,0
65270	3 x 2 x 0,56	20	7,1	32,3	94,0
65271	4 x 2 x 0,56	20	7,8	43,1	104,0
65272	5 x 2 x 0,56	20	8,6	53,8	130,0
65273	6 x 2 x 0,56	20	9,6	64,6	151,0
65274	7 x 2 x 0,56	20	9,6	75,3	174,0
65275	8 x 2 x 0,56	20	12,2	86,1	262,0
65276	10 x 2 x 0,56	20	12,5	107,7	298,0
65277	12 x 2 x 0,56	20	13,1	129,1	302,0
65278	14 x 2 x 0,56	20	13,8	150,6	327,0
65279	15 x 2 x 0,56	20	14,7	161,3	370,0
65280	16 x 2 x 0,56	20	14,7	172,1	402,0
65281	18 x 2 x 0,56	20	15,7	193,6	480,0
65282	20 x 2 x 0,56	20	16,7	215,1	551,0
65283	22 x 2 x 0,56	20	17,2	236,6	621,0
65284	24 x 2 x 0,56	20	18,6	258,0	703,0
65285	25 x 2 x 0,56	20	19,2	268,9	721,0

Dimensions and specifications may be changed without prior notice. (RN02)



Suitable accessories can be found in Chapter X.

- Cable tie



**TRAYCONTROL® 300 TP** twisted pair, flexible, oil-resistant,

NFPA 79 Edition 2012

**Technical data**

- Flexible PVC data and control cable
- **Temperature range**  
-25°C to +105°C
- **Nominal voltage** 300 V
- **Test voltage** 2000 V
- **Minimum bending radius**  
flexing 6x cable Ø
- **Radiation resistance**  
up to 80x10<sup>6</sup> cJ/kg (up to 80 Mrad)

**Cable structure**

- Tinned copper conductor, fine wire stranded, with AWG measures
- Core insulation of special PVC (AWG 22 - AWG 18 with transparent nylon skin)
- Core identification (pair) acc. to international colour code
- Cores stranded in pairs with optimal lay-length
- Pairs stranded in layers with optimal lay-length
- Separator
- Outer sheath of special PVC
- Sheath colour - grey (RAL 7001)
- with length marking in feet

**Properties**

- Self-extinguishing and flame retardant in acc. to CSA FT4
- The materials used in manufacture are free of silicone, cadmium and substances that impair paint wetting

**Tests**

- **UL (AWG 22 - AWG 18):** PLTC-ER, ITC-ER, Type CM, NFPA 79 2012, OIL RES I & II, Class I Div. 2, NEC Art. 501, 725, 760 & 800, AWM 2517
- **UL (AWG 24 - AWG 26):** CM, AWM 2464, rated OIL RES I & II, NEC Art. 725, 760 & 800, NFPA 79 2012
- **CSA:** CSA CMG FT4, AWM I/II A/B FT4

**Note****Advantages**

- Highly-flexible, easy to install
- Oil-resistant to OIL RES I & II

**Available on request**

- PUR or TPE outer sheath
- Sheath colour to suit customer requirement

**Application**

HELUKABEL® TRAYCONTROL® 300 TP is a twisted pair data and control cable. Cross-sections with PLTC-ER and ITC-ER approval for open, unprotected installation in cable trays to the machine; their outstanding oil resistance (OIL RES I & II) makes them ideally suited as connecting and joining cables and also for control, signal and measuring systems in industrial plants. The flexible cable structure facilitates installation inside and outside of machines and switch cabinets. Applications: tool machines, control panels, measuring devices, production automation, cable ducts, renewable energies.

CE The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

Part no.	Cross-section mm <sup>2</sup>	No.pairs x No.cores x AWG-no.	Outer Ø app. mm	Cop. weight kg / km	Weight app. kg / km
62794	0,154	1 x 2 x 26	3,6	3,0	20,0
62795	0,154	2 x 2 x 26	5,1	5,0	24,0
62796	0,154	3 x 2 x 26	5,3	8,0	30,0
62797	0,154	4 x 2 x 26	5,8	11,0	38,0
62798	0,154	5 x 2 x 26	6,2	14,0	44,0
62799	0,154	6 x 2 x 26	6,8	16,0	51,0
62800	0,154	7 x 2 x 26	6,9	19,0	57,0
61928	0,154	8 x 2 x 26	7,3	22,0	64,0
61929	0,154	10 x 2 x 26	7,4	27,0	76,0
61930	0,154	12 x 2 x 26	9,1	33,0	93,0
61931	0,154	14 x 2 x 26	9,8	38,0	103,0
61932	0,154	15 x 2 x 26	10,6	41,0	109,0
61933	0,154	16 x 2 x 26	10,7	43,0	112,0
61934	0,154	18 x 2 x 26	11,1	49,0	119,0
61935	0,154	20 x 2 x 26	11,9	54,0	130,0
61936	0,154	22 x 2 x 26	12,4	59,0	150,0
61937	0,154	24 x 2 x 26	13,1	65,0	169,0
61938	0,154	25 x 2 x 26	13,4	67,0	178,0
61939	0,241	1 x 2 x 24	3,9	5,0	32,0
61940	0,241	2 x 2 x 24	5,9	10,0	36,0
61941	0,241	3 x 2 x 24	6,2	15,0	48,0
61942	0,241	4 x 2 x 24	6,5	20,0	56,0
61943	0,241	5 x 2 x 24	7,2	25,0	71,0
61944	0,241	6 x 2 x 24	8,1	29,0	80,0
61945	0,241	7 x 2 x 24	8,2	34,0	89,0
61946	0,241	8 x 2 x 24	8,9	39,0	98,0
61947	0,241	10 x 2 x 24	10,5	49,0	111,0
61948	0,241	12 x 2 x 24	11,0	59,0	135,0
61949	0,241	14 x 2 x 24	11,6	69,0	160,0
61950	0,241	15 x 2 x 24	12,0	74,0	171,0

Part no.	Cross-section mm <sup>2</sup>	No.pairs x No.cores x AWG-no.	Outer Ø app. mm	Cop. weight kg / km	Weight app. kg / km
61951	0,241	16 x 2 x 24	12,1	79,0	185,0
61952	0,241	18 x 2 x 24	13,5	89,0	209,0
61953	0,241	20 x 2 x 24	14,4	98,0	230,0
61954	0,241	22 x 2 x 24	15,3	109,0	248,0
61955	0,241	24 x 2 x 24	16,1	118,0	279,0
61956	0,241	25 x 2 x 24	16,7	124,0	292,0
61957	0,382	1 x 2 x 22	4,2	7,0	38,0
61958	0,382	2 x 2 x 22	6,4	13,0	44,0
61959	0,382	3 x 2 x 22	6,8	20,0	60,0
61960	0,382	4 x 2 x 22	9,2	29,3	79,0
61961	0,382	5 x 2 x 22	8,2	33,0	92,0
61962	0,382	6 x 2 x 22	8,9	39,0	119,0
61963	0,382	7 x 2 x 22	9,0	46,0	128,0
61964	0,382	8 x 2 x 22	9,9	52,0	139,0
61965	0,382	10 x 2 x 22	11,7	65,0	171,0
61966	0,382	12 x 2 x 22	12,4	78,0	194,0
61967	0,382	14 x 2 x 22	13,0	92,0	222,0
61968	0,382	15 x 2 x 22	13,2	98,0	231,0
61969	0,382	16 x 2 x 22	13,3	105,0	240,0
61970	0,382	18 x 2 x 22	14,2	118,0	264,0
61971	0,382	20 x 2 x 22	15,1	131,0	291,0
61972	0,382	22 x 2 x 22	15,8	144,0	300,0
61973	0,382	24 x 2 x 22	17,0	157,0	359,0
61974	0,382	25 x 2 x 22	17,5	163,0	381,0
61975	0,616	1 x 2 x 20	5,2	11,0	60,0
61976	0,616	2 x 2 x 20	8,8	22,0	80,0
61977	0,616	3 x 2 x 20	9,3	32,0	94,0
61978	0,616	4 x 2 x 20	10,2	43,0	104,0
61979	0,616	5 x 2 x 20	11,3	54,0	130,0
61980	0,616	6 x 2 x 20	12,5	65,0	151,0

Continuation ▶

# TRAYCONTROL® 300 TP twisted pair, flexible, oil-resistant,

## NFPA 79 Edition 2012



Part no.	Cross-section mm <sup>2</sup>	No.pairs x Outer Ø No.cores x AWG-no.	Outer Ø app. mm	Cop. weight kg / km	Weight app. kg / km
61981	0,616	7 x 2 x 20	12,6	75,0	174,0
61982	0,616	8 x 2 x 20	15,9	86,0	262,0
61983	0,616	10 x 2 x 20	16,4	108,0	298,0
61984	0,616	12 x 2 x 20	17,2	129,0	302,0
61985	0,616	14 x 2 x 20	18,1	151,0	327,0
61986	0,616	15 x 2 x 20	18,5	161,0	370,0
61987	0,616	16 x 2 x 20	18,6	172,0	402,0
61988	0,616	18 x 2 x 20	19,9	194,0	480,0
61989	0,616	20 x 2 x 20	21,1	215,0	551,0

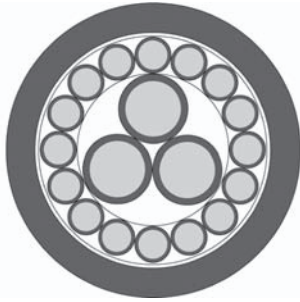
Part no.	Cross-section mm <sup>2</sup>	No.pairs x Outer Ø No.cores x AWG-no.	Outer Ø app. mm	Cop. weight kg / km	Weight app. kg / km
61990	0,616	22 x 2 x 20	21,8	237,0	621,0
61991	0,616	24 x 2 x 20	23,5	258,0	703,0
61992	0,616	25 x 2 x 20	24,3	269,0	721,0
61993	0,963	1 x 2 x 18	5,6	18,0	61,0
61994	0,963	2 x 2 x 18	9,6	36,0	77,0
61995	0,963	3 x 2 x 18	10,6	54,0	103,0
61996	0,963	6 x 2 x 18	13,7	107,0	216,0
61997	0,963	9 x 2 x 18	16,4	162,0	328,0
61998	0,963	15 x 2 x 18	20,4	271,0	542,0

Dimensions and specifications may be changed without prior notice. (RN02)



Suitable accessories can be found in Chapter X.

- Cable tie

**SENSORFLEX® / VERTEILERFLEX****two-approvals** sensor actuator and distributor cables PVC, PUR, PVC/PUR**Technical data**

- Special PVC or PUR sheath acc. to
  - UL-Style 2464 for PVC
  - UL-Style 20233 for PUR
- **Temperature range**
  - flexing -5°C to +80°C
  - fixed installation -30°C to +80°C
- **Nominal voltage** U<sub>0</sub>/U 300/500 V
- **Test voltage**
  - up to 0,25 mm<sup>2</sup> 1200 V
  - from 0,34 mm<sup>2</sup> 2000 V
- **Minimum bending radius**
  - SENSORFLEX® two-approvals PVC 15x cable Ø
  - SENSORFLEX® two-approvals PUR 7,5x cable Ø

**Cable structure****PVC cables**

- Bare copper-conductor, to DIN VDE 0295 cl.5, fine-wire, BS 6360 cl.5, IEC 60228 cl.5
- Core insulation of PVC
- Core identification see table below
- Outer sheath of special PVC

**PUR cables**

- Bare copper-conductor, to DIN VDE 0295 cl.6, extra fine-wire, BS 6360 cl.6, IEC 60228 cl.6
- Core insulation of PVC
- Core identification see table below
- Outer sheath of PUR

**Part no. 79907, 75642, 79850**

- Construction as per SENSORFLEX® two-approvals
- Core insulation of polypropylene

**Properties****PVC cables**

- Extensively oil resistant; Chemical Resistance (see table Technical Informations)
- PVC self-extinguishing and flame retardant acc. to DIN VDE 0482-332-1-2, DIN EN 60332-1-2, IEC 60332-1 (equivalent DIN VDE 0472 part 804 test method B)

**PUR cables**

- Low adhesion, extremely abrasion resistant, resistant to hydrolysis and microbial attack

**Special feature**

- The cables with the highly flexible stranded conductor cl.6, are **suitable for drag chain applications**
- The types with **PVC/PUR** sheath material have a PVC inner sheath, with a PUR sheath applied over it by means of coextrusion

**Note**

- AWG sizes are approximate equivalent values. The actual cross-section is in mm<sup>2</sup>.

**Application**

For decentralised installation and control technology. These cables are used in connector systems for sensors and actuators. In combination with injected circular connectors and installed actuator-sensor boxes, they constitute an important connecting element between the periphery and the PLC in production systems. The assembled cables offer attractive opportunities for reducing costs, not only in the field of automation technology, but also in the entire manufacturing industry. While previously it was necessary to carry out time-consuming wiring of switchgear cabinets and machines, now field bus technology has made it possible to move the periphery interfaces from the switchgear cabinets to the machines and systems. Moving the I/O points to the system periphery enables significant reductions in installation costs.

CE= The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

**SENSORFLEX® 2-APPROVALS**

Part no.	Sheath colour	Cable structure No. cores x cross-sec. mm <sup>2</sup>	Sheath material	Core colours	Fine wire	High flex **	Outer Ø app. mm	Cop. weight kg / km	Weight app. kg / km	AWG-No.
78284	GY RAL 7001	3 x 0,25	PUR	BN, BU, BK		X	4,4	7,2	18,0	24
79907	GY RAL 7001	4 x 0,25	PUR	BN, BU, BK, WH		X	4,7	9,6	18,0	24
78286	GY RAL 7001	6 x 0,25	PVC	BN, BU, BK, WH, GY, PK	X		5,2	14,4	36,0	24
76345	GY RAL 7001	3 x 0,34	PVC	BN, BU, BK	X		4,9	9,8	30,0	22
76347	GY RAL 7001	4 x 0,34	PVC	BN, BU, BK, WH		X	5,2	13,1	43,0	22
76348	GY RAL 7001	5 G 0,34	PVC/PUR	BN, BU, BK, WH, GN-YE	X		5,9	16,4	54,0	22
76349	GY RAL 7001	5 G 0,34	PVC/PUR	BN, BU, BK, WH, GN-YE		X	5,9	16,4	54,0	22
78287	GY RAL 7001	5 G 0,34	PVC/PUR	BK with number, GN-YE		X	5,9	16,4	54,0	22
79850	GY RAL 7001	5 G 0,34	PUR	BN, BU, BK, WH, GN-YE		X	5,9	16,4	54,0	22
73571	GY RAL 7001	3 G 0,75	PVC	BK with number, GN-YE	X		6,7	21,6	58,0	18
75642	BK RAL 9005	3 G 0,75	PUR	BK with number, GN-YE		X	5,9	21,6	58,0	18
76351	GY RAL 7001	3 G 0,75	PVC	BN, BU, GN-YE	X		6,7	28,8	88,0	18
78288	GY RAL 7001	3 G 0,75	PUR	BK with number, GN-YE		X	5,9	21,6	58,0	18

Continuation ▶

**SENSORFLEX® / VERTEILERFLEX****two-approvals** sensor actuator and distributor cables PVC, PUR, PVC/PUR**SENSORFLEX® 2-APPROVALS**

Part no.	Sheath colour	Cable structure No.cores x cross-sec. mm <sup>2</sup>	Sheath material	Core colours	Fine wire	High flex **	Outer Ø app. mm	Cop. weight kg / km	Weight app. kg / km	AWG-No.
74551	GY RAL 7001	4 G 0,75	PUR	BK with number, GN-YE		X	6,9	29,0	66,0	18
78289	GY RAL 7001	4 G 0,75	PVC/PUR	BK with number, GN-YE	X		7,0	29,0	66,0	18
77352	BK RAL 9005	2 x 1	PVC	SW mit Ziffer 1-2	X		7,2	19,2	56,0	17
78290	GY RAL 7001	2 x 1	PVC	SW mit Ziffer 1-2	X		7,2	19,2	56,0	17
76350	GY RAL 7001	11 G 1	PVC/PUR	BK with number 1-8, BN, BU, GN-YE	X		12,0	105,6	225,0	17
78291	GY RAL 7001	2 x 1,5	PVC	BN, BU	X		6,8	29,0	75,0	16
73587	GY RAL 7001	3 G 1,5	PVC	BN, BU, GN-YE	X		6,9	44,0	94,0	16

Dimensions and specifications may be changed without prior notice.



Suitable accessories can be found in Chapter X.

- Cable Gland - HELUTOP® HT-MS-EP4

# Command Cable UL (LiYCY) Style 2464, 300 V, 80°C,

EMC-preferred type



## Technical data

- Special PVC command cable, approved to UL-Style 2464, cores acc. to UL-Style 1061/1729 for AWG 26-20, UL-Style 1007/1569 for AWG 18-16
- **Temperature range**  
flexing -10°C to +80°C  
fixed installation -20°C to +80°C
- **Nominal voltage** 300 V
- **Test voltage** 1500 V
- **Breakdown voltage** min. 3000 V
- **Minimum bending radius**  
fixed 7,5x cable Ø  
flexing 15x cable Ø
- **Coupling resistance**  
max. 250 Ohm/km

## Cable structure

- Tinned copper, fine wire conductors AWG 26-20 gem. ASTM-B 174-95 class J-M, AWG 18-16 gem. ASTM-B 286 conductor make-up to  
0,14 mm<sup>2</sup> = 7x0,162 mm  
0,23 mm<sup>2</sup> = 7x0,202 mm  
0,34 mm<sup>2</sup> = 7x0,254 mm  
0,56 mm<sup>2</sup> = 7x0,32 mm  
0,82 mm<sup>2</sup> = 19x0,235 mm  
1,30 mm<sup>2</sup> = 19x0,31 mm
- Core insulation of special PVC class 43 respectively semirigid acc. to UL-Std. 1581 tab.50.182 and 50.183
- Colour coded to DIN 47100 or international colour code
- Cores stranded in layers with optimal lay-length
- Separator-foil
- Drain wire
- Tinned copper wire braiding, approx. 85% coverage
- Outer sheath of PVC class 43 acc. to UL-Std.1581 tab.50.182
- Sheath colour  
black (international colour code)  
grey (DIN 47100 - preferred type from stock)

## Properties

- The materials used in manufacture are cadmium-free and contain no silicone and free from substances harmful to the wetting properties of lacquers

## Tests

- PVC flame retardant acc. to UL VW-1, CSA FT1
- **Conditionally resistant to**  
Oil  
Solvents  
Acids  
Lyes

## Note

- AWG sizes are approximate equivalent values. The actual cross-section is in mm<sup>2</sup>.
- non-screened analogue types: **command cable UL (LiYY)**, confer page 403

## Application

As a flexible interconnecting cable for electronics, control and command technology, as well as in measurement, signal, and pulse technology. Fast and inexpensive contacting by cutting and clamping technology.

EMC = Electromagnetic compatibility

To optimize the EMC features we recommend a large round contact of the copper braiding on both ends.

CE = The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

Part no.	Part no.	No. cores x	AWG-No.	Outer Ø	Cop.	Weight	Part no.	Part no.	No. cores x	AWG-No.	Outer Ø	Cop.	Weight
Sheath	Sheath	cross-sec.		app.	weight	app.	Sheath	Sheath	cross-sec.		app.	weight	app.
colour	colour	mm <sup>2</sup>		mm	kg / km	kg / km	colour	colour	mm <sup>2</sup>		mm	kg / km	kg / km
83254	83976	2 x 0,14	26	3,9	12,6	20,0	83270	83987	2 x 0,23	24	4,3	16,1	20,0
83255	83977	3 x 0,14	26	4,2	13,7	25,0	83271	83988	3 x 0,23	24	4,5	18,9	25,0
83256	83978	4 x 0,14	26	4,4	14,9	28,0	83272	83989	4 x 0,23	24	4,8	23,0	30,0
83257	83979	6 x 0,14	26	5,0	18,9	30,0	83273	83990	6 x 0,23	24	5,4	32,8	40,0
83258	83980	10 x 0,14	26	6,1	29,5	50,0	83274	83991	10 x 0,23	24	6,5	50,9	60,0
83259	83981	12 x 0,14	26	6,3	31,4	53,0	83275	83992	12 x 0,23	24	6,7	59,1	70,0
83260	83982	16 x 0,14	26	6,8	43,9	60,0	83276	83993	16 x 0,23	24	7,4	68,4	90,0
83261	83983	18 x 0,14	26	7,1	52,1	70,0	83277	83994	18 x 0,23	24	7,7	79,5	123,0
83262	83984	24 x 0,14	26	8,0	62,8	100,0	83278	83995	24 x 0,23	24	8,8	97,3	131,0
83263	83985	27 x 0,14	26	8,4	66,3	105,0	83279	83996	27 x 0,23	24	9,0	122,0	160,0
83264	83986	30 x 0,14	26	8,6	70,4	110,0	83280	83997	30 x 0,23	24	9,3	132,0	170,0

Continuation ▶

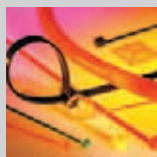


**Command Cable UL (LiYCY) Style 2464, 300 V, 80°C,****EMC-preferred type**

Part no. Sheath colour grey	Part no. Sheath colour black	No. cores x cross-sec. mm <sup>2</sup>	AWG-No.	Outer Ø app. mm	Cop. weight kg / km	Weight app. kg / km
83286	65044	2 x 0,34	22	4,6	18,1	40,0
83287	65045	3 x 0,34	22	4,8	22,2	50,0
83288	65046	4 x 0,34	22	5,1	28,7	60,0
83289	65047	6 x 0,34	22	6,0	45,4	80,0
83290	65048	10 x 0,34	22	7,3	66,1	130,0
83291	65049	12 x 0,34	22	7,5	70,8	140,0
83292	65050	16 x 0,34	22	8,2	88,4	160,0
83293	65051	18 x 0,34	22	8,7	104,1	170,0
83294	65052	24 x 0,34	22	9,9	129,0	220,0
83295	65053	27 x 0,34	22	10,4	138,4	250,0
83296	65054	30 x 0,34	22	10,9	159,0	280,0
83302	65055	2 x 0,56	20	5,1	29,4	50,0
83303	65056	3 x 0,56	20	5,3	39,7	55,0
83304	65057	4 x 0,56	20	5,6	46,1	61,0
83305	65058	6 x 0,56	20	6,6	66,8	90,0
83306	65059	10 x 0,56	20	8,1	93,1	133,0
83307	65060	12 x 0,56	20	8,4	117,4	151,0
83308	65061	16 x 0,56	20	9,5	130,4	190,0
83309	65062	18 x 0,56	20	9,9	151,4	216,0
83310	65063	24 x 0,56	20	11,5	237,0	339,0
83311	65064	27 x 0,56	20	12,0	257,4	374,0
83312	65065	30 x 0,56	20	12,4	297,0	397,0

Part no. Sheath colour grey	Part no. Sheath colour black	No. cores x cross-sec. mm <sup>2</sup>	AWG-No.	Outer Ø app. mm	Cop. weight kg / km	Weight app. kg / km
83318	65066	2 x 0,82	18	6,5	39,1	60,0
83319	65067	3 x 0,82	18	6,8	50,0	75,0
83320	65068	4 x 0,82	18	7,4	59,1	90,0
83321	65069	6 x 0,82	18	8,8	89,1	125,0
83322	65070	10 x 0,82	18	10,9	141,4	180,0
83323	65071	12 x 0,82	18	11,2	152,8	220,0
83324	65072	16 x 0,82	18	12,9	184,1	290,0
83325	65073	18 x 0,82	18	13,5	207,2	300,0
83326	65074	24 x 0,82	18	15,6	272,6	450,0
83327	65075	27 x 0,82	18	15,9	289,1	470,0
83328	65076	30 x 0,82	18	16,6	317,4	490,0
83334	65077	2 x 1,3	16	6,9	59,1	90,0
83335	65078	3 x 1,3	16	7,3	74,1	160,0
83336	65079	4 x 1,3	16	7,9	96,4	200,0
83337	65080	6 x 1,3	16	9,6	137,4	290,0
83338	65081	10 x 1,3	16	12,4	191,7	450,0
83339	65082	12 x 1,3	16	12,8	251,7	600,0
83340	65083	16 x 1,3	16	12,8	276,1	650,0
83341	65084	18 x 1,3	16	15,5	364,1	680,0
83342	65085	24 x 1,3	16	18,1	442,4	900,0
83343	65086	27 x 1,3	16	18,7	494,7	990,0
83344	65087	30 x 1,3	16	19,5	521,4	1050,0

Dimensions and specifications may be changed without prior notice. (RN02)



Suitable accessories can be found in Chapter X.

- Cable tie

# Command Cable UL (LiYCY) Style 2516/600 V, 105°C,

EMC-preferred type



## Technical data

- Special PVC command cable, approved to UL-Style 2516 cores acc. UL-Style 10012
- **Temperature range**  
flexing -10°C to +105°C  
fixed installation -20°C to +105°C
- **Nominal voltage** 600 V
- **Test voltage** 2000 V
- **Breakdown voltage** min. 4000 V
- **Minimum bending radius**  
fixed 7,5x cable Ø  
flexing 15x cable Ø
- **Coupling resistance**  
max. 250 Ohm/km

## Cable structure

- Tinned copper, fine wire conductors acc. to ASTM-B 174, class J-K conductor make-up to  
2,08 mm<sup>2</sup> = 41x0,254 mm  
3,20 mm<sup>2</sup> = 65x0,254 mm
- Core insulation of special PVC class 43 acc. to UL-Std.1581 tab.50.182 (105°C)
- Core identification to DIN 47100 or international colour code
- Cores stranded in layers with optimal lay-length
- Separator-foil
- Drain wire
- Tinned copper wire braiding, approx. 85% coverage
- Outer sheath of PVC class 43 acc. to UL-Std.1581 tab.50.182 (105°C)
- Sheath colour  
black (international colour code)  
grey (DIN 47100/preferred type from stock)

## Properties

- The materials used in manufacture are cadmium-free and contain no silicone and free from substances harmful to the wetting properties of lacquers

## Tests

- PVC flame retardant according to UL VW-1, CSA FT1
- **Conditionally resistant to**  
Oil  
Solvents  
Acids  
Lyes

## Note

- AWG sizes are approximate equivalent values. The actual cross-section is in mm<sup>2</sup>.
- non-screened analogue types:  
**command cable UL (LiYY)**, confer page 404

## Application

As a flexible interconnecting cable for electronics, control and command technology, as well as in measurement, signal, and pulse technology. Fast and inexpensive contacting by cutting and clamping technology.

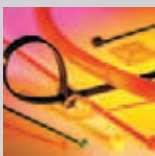
EMC = Electromagnetic compatibility

To optimize the EMC features we recommend a large round contact of the copper braiding on both ends.

CE = The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

Part no. Sheath colour grey	Part no. Sheath colour black	No. cores x cross-sec. mm <sup>2</sup>	AWG-No.	Outer Ø app. mm	Cop. weight kg / km	Weight app. kg / km
83350	65114	2 x 2,08	14	9,1	92,1	180,0
83351	65115	3 x 2,08	14	9,6	140,6	220,0
83352	65116	4 x 2,08	14	10,4	162,4	270,0
83353	65117	6 x 2,08	14	12,1	200,0	380,0
83354	65118	10 x 2,08	14	16,0	313,1	600,0
83355	65119	12 x 2,08	14	16,5	417,6	770,0
83356	65120	16 x 2,08	14	18,1	510,3	870,0
83357	65121	18 x 2,08	14	19,4	540,4	990,0
83358	65122	24 x 2,08	14	23,4	0,0	1300,0
83359	65123	27 x 2,08	14	23,9	604,2	1400,0
83360	65124	30 x 2,08	14	24,6	660,1	1610,0
83362	65125	2 x 3,2	12	10,0	131,4	200,0
83363	65126	3 x 3,2	12	10,6	162,6	240,0
83364	65127	4 x 3,2	12	11,4	221,7	300,0
83365	65128	6 x 3,2	12	14,4	328,1	400,0
83366	65129	10 x 3,2	12	17,8	401,8	580,0
83367	65130	12 x 3,2	12	18,4	460,2	800,0
83368	65131	16 x 3,2	12	20,6	532,3	900,0
83369	65132	18 x 3,2	12	22,7	573,4	1000,0
83370	65133	24 x 3,2	12	26,1	626,8	1300,0

Dimensions and specifications may be changed without prior notice. (RN02)



Suitable accessories can be found in Chapter X.

- Cable tie

# TRAYCONTROL® 300-C flexible, oil-resistant, screened, EMC-preferred type, NFPA 79 Edition 2012

HELUKABEL TRAYCONTROL 300-C 24AWG/0,241 mm<sup>2</sup> 6C/62737

CE



## Technical data

- Flexible screened PVC data and control cable
- **Temperature range**  
-25°C to +105°C
- **Nominal voltage** 300 V
- **Test voltage** 2000 V
- **Minimum bending radius**  
flexing 6x cable Ø
- **Coupling resistance**  
max. 250 Ohm/km
- **Radiation resistance**  
up to 80x10<sup>6</sup> cJ/kg (up to 80 Mrad)

## Cable structure

- Tinned copper conductor, fine wire with AWG dimensions
- Core insulation of special PVC (AWG 22 - AWG 16 with transparent nylon skin)
- Core identification to international colour code
- Cores stranded in layers with optimal lay-length
- 1. Screen with special aluminium film
- 2. Tinned copper braided screen, approx. 85%
- Separator
- Outer sheath of special PVC
- Sheath colour grey (RAL 7001)
- with length marking in feet

## Properties

- The materials used in manufacture are cadmium-free and contain no silicone and free from substances harmful to the wetting properties of lacquers

### Tests

- self-extinguishing and flame retardant acc. to CSA FT4
- **UL (AWG 22 - AWG 16):** PLTC-ER, ITC-ER, Type CM, NFPA 79 2012, OIL RES I & II, Class I Div. 2, NEC Art. 501, 725, 760 & 800, AWM 2517
- **UL (AWG 24 - AWG 28):** CM, AWM 2464, rated OIL RES I & II, NEC Art. 725, 760 & 800, NFPA 79 2012
- **CSA:** CSA CMG FT4, AWM I/II A/B FT4

## Note

### Advantages

- Highly-flexible, easy to install
- Oil-resistant to OIL RES I & II

### Available on request

- PUR or TPE outer sheath
- Sheath colour to suit customer requirement

## Application

HELUKABEL® TRAYCONTROL® 300 is a screened, multi-core PVC data and control cable. Cross-sections with PLTC-ER and ITC-ER approval suitable for open, unprotected installation in cable trays to the machine; their outstanding oil resistance (OIL RES I & II) makes them ideally suited as connecting and joining cables and also for control, signal and measuring systems in industrial plants. The flexible cable structure facilitates installation inside and outside of machines and switch cabinets. The double-screening with aluminium foil (100% coverage) and copper braid (approx. 85% coverage) guarantee superior EMC protection. Applications: tool machines, control panels, measuring devices, production automation, cable ducts, renewable energies.

**EMC** = Electromagnetic compatibility

To optimize the EMC features we recommend a large round contact of the copper braiding on both ends.

CE = The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

Part no.	Cross-section mm <sup>2</sup> x AWG-No.	No. cores	Outer Ø app. mm	Cop. weight kg / km	Weight app. kg / km
62710	0,093	2 x 28	4,5	6,0	16,0
62711	0,093	3 x 28	4,7	7,0	22,0
62712	0,093	4 x 28	5,0	9,0	27,0
62713	0,093	6 x 28	5,5	12,0	34,0
62714	0,093	8 x 28	5,8	15,0	37,0
62715	0,093	10 x 28	6,4	18,0	43,0
62716	0,093	15 x 28	7,0	24,0	52,0
62717	0,093	20 x 28	7,6	30,0	67,0
62718	0,093	25 x 28	8,6	37,0	79,0
62719	0,093	30 x 28	8,9	43,0	88,0
62720	0,093	40 x 28	9,7	54,0	112,0
62721	0,093	50 x 28	11,4	67,0	131,0
62722	0,154	2 x 26	4,7	9,0	24,0
62723	0,154	3 x 26	4,9	10,0	27,0
62724	0,154	4 x 26	5,1	12,0	31,0
62725	0,154	6 x 26	5,8	16,0	39,0
62726	0,154	8 x 26	6,1	19,0	43,0
62727	0,154	10 x 26	6,8	24,0	51,0
62728	0,154	15 x 26	7,5	31,0	66,0
62729	0,154	20 x 26	8,3	40,0	79,0
62730	0,154	25 x 26	9,2	49,0	92,0
62731	0,154	30 x 26	9,5	57,0	110,0
62732	0,154	40 x 26	10,4	72,0	136,0
62733	0,154	50 x 26	12,1	88,0	165,0
62734	0,241	2 x 24	4,9	15,0	30,0
62735	0,241	3 x 24	5,1	16,0	33,0
62736	0,241	4 x 24	5,3	19,0	37,0
62737	0,241	6 x 24	6,1	27,0	48,0

Part no.	Cross-section mm <sup>2</sup> x AWG-No.	No. cores	Outer Ø app. mm	Cop. weight kg / km	Weight app. kg / km
62738	0,241	8 x 24	6,4	31,0	57,0
62739	0,241	10 x 24	7,3	39,0	67,0
62740	0,241	15 x 24	8,2	51,0	85,0
62741	0,241	20 x 24	9,0	64,0	106,0
62742	0,241	25 x 24	9,9	77,0	128,0
62743	0,241	30 x 24	10,3	92,0	155,0
62744	0,241	40 x 24	11,4	118,0	206,0
62745	0,241	50 x 24	13,2	148,0	249,0
62746	0,382	2 x 22	6,6	19,0	34,0
62747	0,382	3 x 22	5,5	22,0	40,0
62748	0,382	4 x 22	5,8	27,0	46,0
62749	0,382	6 x 22	6,5	34,0	60,0
62750	0,382	8 x 22	9,3	45,0	72,0
62751	0,382	10 x 22	9,8	69,0	85,0
62752	0,382	15 x 22	9,7	77,0	115,0
62753	0,382	20 x 22	11,1	92,0	140,0
62754	0,382	25 x 22	12,6	121,0	176,0
62755	0,382	30 x 22	13,0	139,0	210,0
62756	0,382	40 x 22	14,1	177,0	273,0
62757	0,382	50 x 22	15,5	215,0	331,0
62758	0,616	2 x 20	7,4	28,0	73,0
62759	0,616	3 x 20	7,7	34,0	77,0
62760	0,616	4 x 20	8,3	40,0	91,0
62761	0,616	6 x 20	8,6	54,0	118,0
62762	0,616	8 x 20	9,1	70,0	158,0
62763	0,616	10 x 20	10,4	83,0	173,0
62764	0,616	15 x 20	12,9	119,0	218,0
62765	0,616	20 x 20	14,8	130,0	298,0

Continuation ▶

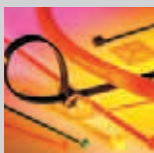
# TRAYCONTROL® 300-C flexible, oil-resistant, screened, EMC-preferred type, NFPA 79 Edition 2012



Part no.	Cross-section mm² x AWG-No.	No. cores	Outer Ø app. mm	Cop. weight kg / km	Weight app. kg / km
62766	0,616	25 x 20	16,0	186,0	401,0
62767	0,616	30 x 20	16,5	224,0	477,0
62768	0,616	40 x 20	18,7	288,0	623,0
62769	0,616	50 x 20	20,7	337,0	752,0
62770	0,963	2 x 18	7,8	37,0	80,0
62771	0,963	3 x 18	8,1	49,0	86,0
62772	0,963	4 x 18	8,8	58,0	101,0
62773	0,963	6 x 18	10,0	82,0	130,0
62774	0,963	8 x 18	10,6	100,0	168,0
62775	0,963	10 x 18	12,8	124,0	226,0
62776	0,963	15 x 18	14,3	180,0	295,0
62777	0,963	20 x 18	15,5	234,0	386,0
62778	0,963	25 x 18	17,7	277,0	462,0
62779	0,963	30 x 18	18,4	323,0	590,0

Part no.	Cross-section mm² x AWG-No.	No. cores	Outer Ø app. mm	Cop. weight kg / km	Weight app. kg / km
62780	0,963	40 x 18	20,2	416,0	773,0
62781	0,963	50 x 18	22,4	508,0	958,0
62782	1,31	2 x 16	8,2	51,0	110,0
62783	1,31	3 x 16	8,9	63,0	116,0
62784	1,31	4 x 16	9,5	76,0	139,0
62785	1,31	6 x 16	10,8	104,0	195,0
62786	1,31	8 x 16	12,0	134,0	283,0
62787	1,31	10 x 16	13,9	168,0	316,0
62788	1,31	15 x 16	15,3	234,0	410,0
62789	1,31	20 x 16	17,0	301,0	551,0
62790	1,31	25 x 16	19,4	367,0	675,0
62791	1,31	30 x 16	20,1	428,0	794,0
62792	1,31	40 x 16	22,3	550,0	1033,0
62793	1,31	50 x 16	25,1	669,0	1274,0

Dimensions and specifications may be changed without prior notice. (RN02)

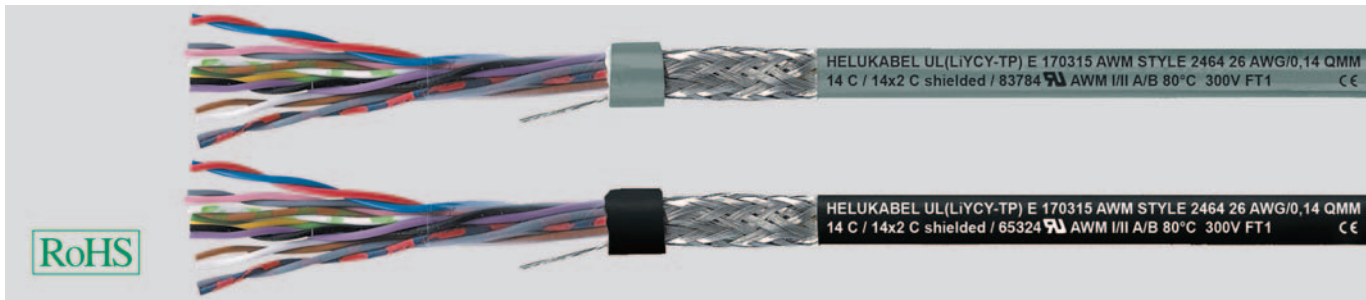


Suitable accessories can be found in Chapter X.

- Cable tie

# Command Cable UL (LiYCY-TP) style 2464/300 V, 80°C,

EMC-preferred type



## Technical data

- Special PVC command cable, approved to UL-Style 2464, cores acc. to UL-Style 1061/1729
- **Temperature range**  
flexing -10°C to +80°C  
fixed installation -20°C to +80°C
- **Nominal voltage** 300 V
- **Test voltage** 1500 V
- **Breakdown voltage** min. 3000 V
- **Insulation resistance**  
min. 100 MOhm x km
- **Minimum bending radius**  
fixed 7,5x cable Ø  
flexing 15x cable Ø
- **Coupling resistance**  
max. 250 Ohm/km

## Cable structure

- Tinned copper, fine wire conductors acc. to ASTM-B 174-95 class J-M  
Conductor make-up to  
0,14 mm<sup>2</sup> = 7x0,162 mm  
0,23 mm<sup>2</sup> = 7x0,202 mm  
0,34 mm<sup>2</sup> = 7x0,254 mm  
0,56 mm<sup>2</sup> = 7x0,32 mm
- Core insulation of special PVC class 43 respectively semirigid acc. to UL-Std. 1581 tab.50.182 and 50183
- Core identification (pair) to DIN 47100 with colour repetition from pair no. 23 and above or international colour code
- Cores stranded in pairs to optimal lay-length
- Pairs stranded with optimal lay-length in layers
- Separator-foil
- Drain wire
- Tinned copper wire braiding, approx. 85% coverage
- Outer sheath of special PVC class 43 acc. to UL-Std. 1581 tab.50.182
- Sheath colour  
black (international colour code)  
grey (DIN 47100 - preferred type from stock)

## Properties

- The materials used in manufacture are cadmium-free and contain no silicone and free from substances harmful to the wetting properties of lacquers

### Tests

- PVC flame retardant acc. to UL VW-1, CSA FT1
- **Conditionally resistant to**  
Oil  
Solvents  
Acids  
Lyes

### Note

- AWG sizes are approximate equivalent values. The actual cross-section is in mm<sup>2</sup>.
- non-screened analogue type: **command cable UL (LiYY-TP)**, confer page 407

## Application

Flexiblescreenedpaircableconnection,as control,signaland measuring cablesin tool machinery,conveyor belts and,inplant construction,air conditioning,in foundries and steel mills.

**EMC** = Electromagnetic compatibility

To optimize the EMC features we recommend a large round contact of the copper braiding on both ends.

CE = The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

Part no.	Sheath colour	Sheath colour	No.pairs x cross-sec. mm <sup>2</sup>	AWG-No.	Outer Ø app. mm	Cop. weight kg / km	Weight app. kg / km
83774	grey	black	1 x 2 x 0,14	26	4,0	15,7	32,0
83775	65314	65315	2 x 2 x 0,14	26	5,6	19,5	39,0
83776	65316	65317	3 x 2 x 0,14	26	5,8	23,7	47,0
83777	65318	65319	4 x 2 x 0,14	26	6,3	26,9	55,0
83778	65320	65321	5 x 2 x 0,14	26	6,7	31,2	68,0
83779	65322	65323	6 x 2 x 0,14	26	7,3	49,7	86,0
83780	65324	65325	7 x 2 x 0,14	26	7,3	52,0	92,0
83781	65326	65327	8 x 2 x 0,14	26	7,8	53,9	97,0
83782	65328	65329	10 x 2 x 0,14	26	9,1	59,6	111,0
83783	65330	65331	12 x 2 x 0,14	26	9,8	67,1	141,0
83784	65332	65333	14 x 2 x 0,14	26	10,5	75,2	150,0
83785	65334	65335	15 x 2 x 0,14	26	11,1	77,3	154,0
83786	65336	65337	16 x 2 x 0,14	26	11,1	80,4	155,0
83787	65338	65339	18 x 2 x 0,14	26	11,8	84,2	170,0
83788	65340	65341	20 x 2 x 0,14	26	12,4	98,2	183,0
83789	65342	65343	22 x 2 x 0,14	26	13,1	104,1	207,0
83790	65344	65345	24 x 2 x 0,14	26	13,6	112,0	228,0
83791	65346	65347	25 x 2 x 0,14	26	15,1	114,4	239,0

Part no.	Sheath colour	Sheath colour	No.pairs x cross-sec. mm <sup>2</sup>	AWG-No.	Outer Ø app. mm	Cop. weight kg / km	Weight app. kg / km
83792	grey	black	1 x 2 x 0,23	24	4,2	16,4	46,0
83793	65332	65333	2 x 2 x 0,23	24	5,9	27,4	53,0
83794	65334	65335	3 x 2 x 0,23	24	6,2	31,7	65,0
83795	65336	65337	4 x 2 x 0,23	24	6,7	37,4	79,0
83796	65338	65339	5 x 2 x 0,23	24	7,2	54,7	98,0
83797	65340	65341	6 x 2 x 0,23	24	7,7	65,6	114,0
83798	65342	65343	7 x 2 x 0,23	24	7,7	60,2	121,0
83799	65344	65345	8 x 2 x 0,23	24	8,4	74,1	129,0
83800	65346	65347	10 x 2 x 0,23	24	9,9	109,3	152,0
83801	65348	65349	12 x 2 x 0,23	24	10,2	115,8	189,0
83802	65350	65351	14 x 2 x 0,23	24	10,9	120,7	213,0
83803	65352	65353	15 x 2 x 0,23	24	11,4	132,4	225,0
83804	65354	65355	16 x 2 x 0,23	24	11,4	141,6	227,0
83805	65356	65357	18 x 2 x 0,23	24	12,2	146,6	238,0
83806	65358	65359	20 x 2 x 0,23	24	12,7	160,6	270,0
83807	65360	65361	22 x 2 x 0,23	24	13,5	170,8	300,0
83808	65362	65363	24 x 2 x 0,23	24	14,5	229,7	321,0
83809	65364	65365	25 x 2 x 0,23	24	14,8	231,4	340,0

Continuation ▶

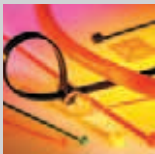


**Command Cable UL (LiYCY-TP) Style 2464/300 V, 80°C,****EMC-preferred type**

Part no.	Sheath colour	Sheath colour	No.pairs x cross-sec. mm <sup>2</sup>	AWG-No.	Outer Ø app. mm	Cop. weight kg / km	Weight app. kg / km
83810	grey	black	1 x 2 x 0,34	22	4,6	17,0	58,0
83811	grey	black	2 x 2 x 0,34	22	6,4	36,7	65,0
83812	grey	black	3 x 2 x 0,34	22	6,9	44,6	78,0
83813	grey	black	4 x 2 x 0,34	22	7,5	54,1	88,0
83814	grey	black	5 x 2 x 0,34	22	8,1	63,4	110,0
83815	grey	black	6 x 2 x 0,34	22	8,8	73,4	126,0
83816	grey	black	7 x 2 x 0,34	22	8,8	79,4	140,0
83817	grey	black	8 x 2 x 0,34	22	9,7	88,4	148,0
83818	grey	black	10 x 2 x 0,34	22	11,5	107,0	184,0
83819	grey	black	12 x 2 x 0,34	22	12,0	122,4	210,0
83820	grey	black	14 x 2 x 0,34	22	12,6	138,2	241,0
83821	grey	black	15 x 2 x 0,34	22	13,4	154,3	245,0
83822	grey	black	16 x 2 x 0,34	22	13,4	161,4	251,0
83823	grey	black	18 x 2 x 0,34	22	14,4	197,9	275,0
83824	grey	black	20 x 2 x 0,34	22	15,0	211,4	300,0
83825	grey	black	22 x 2 x 0,34	22	15,9	217,6	320,0
83826	grey	black	24 x 2 x 0,34	22	17,0	230,4	371,0
83827	grey	black	25 x 2 x 0,34	22	17,3	138,5	402,0

Part no.	Sheath colour	Sheath colour	No.pairs x cross-sec. mm <sup>2</sup>	AWG-No.	Outer Ø app. mm	Cop. weight kg / km	Weight app. kg / km
83828	grey	black	1 x 2 x 0,56	20	5,0	26,0	70,0
83829	grey	black	2 x 2 x 0,56	20	7,0	56,1	89,0
83830	grey	black	3 x 2 x 0,56	20	7,6	71,7	102,0
83831	grey	black	4 x 2 x 0,56	20	8,3	92,4	119,0
83832	grey	black	5 x 2 x 0,56	20	9,1	107,4	140,0
83833	grey	black	6 x 2 x 0,56	20	10,1	122,4	162,0
83834	grey	black	7 x 2 x 0,56	20	10,1	131,7	198,0
83835	grey	black	8 x 2 x 0,56	20	12,7	144,3	272,0
83836	grey	black	10 x 2 x 0,56	20	13,2	179,6	307,0
83837	grey	black	12 x 2 x 0,56	20	13,6	201,7	318,0
83838	grey	black	14 x 2 x 0,56	20	14,4	221,4	342,0
83839	grey	black	15 x 2 x 0,56	20	15,5	231,6	381,0
83840	grey	black	16 x 2 x 0,56	20	15,5	257,1	417,0
83841	grey	black	18 x 2 x 0,56	20	16,3	282,4	494,0
83842	grey	black	20 x 2 x 0,56	20	17,1	306,7	570,0
83843	grey	black	22 x 2 x 0,56	20	18,0	321,8	643,0
83844	grey	black	24 x 2 x 0,56	20	19,4	342,4	724,0
83845	grey	black	25 x 2 x 0,56	20	19,8	361,2	740,0

Dimensions and specifications may be changed without prior notice. (RN02)



Suitable accessories can be found in Chapter X.

- Cable tie

# TRAYCONTROL® 300-C TP twisted pair, flexible, screened, oil-resistant, EMC-preferred type, NFPA 79 Edition 2012



## Technical data

- Flexible screened PVC data and control cable
- **Temperature range** -25°C to +105°C
- **Nominal voltage** 300 V
- **Test voltage** 2000 V
- **Minimum bending radius** flexing 6x cable Ø
- **Coupling resistance** max. 250 Ohm/km
- **Radiation resistance** up to 80x10<sup>6</sup> cJ/kg (up to 80 Mrad)

## Cable structure

- Tinned copper conductor, fine wire stranded, with AWG measures
- Core insulation of special PVC (AWG 22 - AWG 18 with transparent nylon skin)
- Core identification (pair) acc. to international colour code
- Cores stranded in pairs with optimal lay-length
- Pairs stranded in layers with optimal lay-length
- 1. Screening with special aluminium foil
- 2. Tinned copper braided screen, approx. 85% coverage
- Separator
- Outer sheath of special PVC
- Sheath colour grey (RAL 7001)
- with length marking in feet

## Properties

- Self-extinguishing and flame retardant in acc. to CSA FT4
- The materials used in manufacture are cadmium-free and contain no silicone and free from substances harmful to the wetting properties of lacquers

## Tests

- **UL (AWG 22 - AWG 18):** PLTC-ER, ITC-ER, CM, NFPA 79 2012, OIL RES I & II, Class I Div. 2, NEC Art. 501, 725, 760 & 800, AWM 2517
- **UL (AWG 24 - AWG 26):** CM, AWM 2517, rated OIL RES I & II, NEC Art. 725, 760 & 800, NFPA 79 2012
- **CSA:** CSA CMG FT4, AWM I/II A/B FT4

## Note

### Advantages

- Highly-flexible, easy to install
- Oil-resistant to OIL RES I & II

### Available on request

- PUR or TPE outer sheath
- Sheath colour to suit customer requirement

## Application

HELUKABEL® TRAYCONTROL® 300 is a screened, twisted pair data and control cable. Cross-sections with PLTC-ER and ITC-ER approval suitable for open, unprotected installation in cable trays to the machine; their outstanding oil resistance (OIL RES I & II) makes them ideally suited as connecting and joining cables and also for control, signal and measuring systems in industrial plants. The flexible cable structure facilitates installation inside and outside of machines and switch cabinets. The double-screening with aluminium foil (100% coverage) and copper braid (approx. 85% coverage) guarantee superior EMC protection. Applications: tool machines, control panels, measuring devices, production automation, cable ducts, renewable energies.

**EMC** = Electromagnetic compatibility

To optimize the EMC features we recommend a large round contact of the copper braiding on both ends.

CE = The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

Part no.	Cross-section mm <sup>2</sup>	No.pairs x Outer Ø No.cores x AWG-no.	Outer Ø app. mm	Cop. weight kg / km	Weight app. kg / km
61999	0,154	1 x 2 x 26	4,7	16,0	32,0
59760	0,154	2 x 2 x 26	5,7	20,0	39,0
59761	0,154	3 x 2 x 26	5,9	24,0	47,0
59762	0,154	4 x 2 x 26	6,4	27,0	55,0
59763	0,154	5 x 2 x 26	6,8	31,0	68,0
59764	0,154	6 x 2 x 26	7,4	50,0	86,0
59765	0,154	7 x 2 x 26	7,5	52,0	92,0
59766	0,154	8 x 2 x 26	7,9	54,0	97,0
59767	0,154	10 x 2 x 26	9,2	60,0	111,0
59768	0,154	12 x 2 x 26	9,8	67,0	141,0
59769	0,154	14 x 2 x 26	10,4	75,0	150,0
59770	0,154	15 x 2 x 26	10,8	77,0	154,0
59771	0,154	16 x 2 x 26	11,2	80,0	155,0
59772	0,154	18 x 2 x 26	11,8	84,0	170,0
59773	0,154	20 x 2 x 26	12,4	98,0	183,0
59774	0,154	22 x 2 x 26	13,1	104,0	207,0
59775	0,154	24 x 2 x 26	13,6	112,0	228,0
59776	0,154	25 x 2 x 26	15,1	114,0	239,0
59777	0,241	1 x 2 x 24	4,9	16,0	46,0
59778	0,241	2 x 2 x 24	6,6	27,0	53,0
59779	0,241	3 x 2 x 24	6,9	32,0	65,0
59780	0,241	4 x 2 x 24	7,8	37,0	79,0
59781	0,241	5 x 2 x 24	8,0	55,0	98,0
59782	0,241	6 x 2 x 24	8,4	66,0	114,0
59783	0,241	7 x 2 x 24	8,8	60,0	121,0
59784	0,241	8 x 2 x 24	9,5	74,0	129,0

Part no.	Cross-section mm <sup>2</sup>	No.pairs x Outer Ø No.cores x AWG-no.	Outer Ø app. mm	Cop. weight kg / km	Weight app. kg / km
59785	0,241	10 x 2 x 24	10,5	109,0	152,0
59786	0,241	12 x 2 x 24	10,8	116,0	189,0
59787	0,241	14 x 2 x 24	12,6	121,0	213,0
59788	0,241	15 x 2 x 24	12,4	132,0	225,0
59789	0,241	16 x 2 x 24	12,9	142,0	227,0
59790	0,241	18 x 2 x 24	13,8	147,0	238,0
59791	0,241	20 x 2 x 24	14,4	161,0	270,0
59792	0,241	22 x 2 x 24	15,3	171,0	300,0
59793	0,241	24 x 2 x 24	16,4	230,0	321,0
59794	0,241	25 x 2 x 24	16,7	231,0	340,0
59795	0,382	1 x 2 x 22	6,9	17,0	58,0
59796	0,382	2 x 2 x 22	9,3	37,0	65,0
59797	0,382	3 x 2 x 22	9,7	45,0	79,0
59798	0,382	4 x 2 x 22	10,5	54,0	88,0
59799	0,382	5 x 2 x 22	11,4	63,0	110,0
59800	0,382	6 x 2 x 22	12,1	73,0	126,0
59801	0,382	7 x 2 x 22	12,3	79,0	140,0
59802	0,382	8 x 2 x 22	13,2	88,0	148,0
59803	0,382	10 x 2 x 22	15,7	107,0	184,0
59804	0,382	12 x 2 x 22	16,0	122,0	210,0
59805	0,382	14 x 2 x 22	16,3	138,0	241,0
59806	0,382	15 x 2 x 22	16,6	154,0	245,0
59807	0,382	16 x 2 x 22	16,8	161,0	251,0
59808	0,382	18 x 2 x 22	17,8	198,0	275,0
59809	0,382	20 x 2 x 22	18,4	211,0	300,0
59810	0,382	22 x 2 x 22	19,3	218,0	320,0

Continuation ▶

# TRAYCONTROL® 300-C TP twisted pair, flexible, screened, oil-resistant, EMC-preferred type, NFPA 79 Edition 2012



Part no.	Cross-section mm <sup>2</sup>	No.pairs x Outer Ø No.cores app. mm x AWG-no.	Outer Ø app. mm	Cop. weight kg / km	Weight app. kg / km
59811	0,382	24 x 2 x 22	20,5	230,0	371,0
59812	0,382	25 x 2 x 22	20,8	239,0	402,0
59813	0,616	1 x 2 x 20	7,4	26,0	70,0
59814	0,616	2 x 2 x 20	10,0	56,0	89,0
59815	0,616	3 x 2 x 20	10,8	72,0	102,0
59816	0,616	4 x 2 x 20	11,5	92,0	119,0
59817	0,616	5 x 2 x 20	12,6	107,0	140,0
59818	0,616	6 x 2 x 20	13,4	122,0	162,0
59819	0,616	7 x 2 x 20	13,5	132,0	198,0
59820	0,616	8 x 2 x 20	16,9	144,0	272,0
59821	0,616	10 x 2 x 20	17,6	180,0	307,0
59822	0,616	12 x 2 x 20	18,1	202,0	318,0
59823	0,616	14 x 2 x 20	19,2	221,0	342,0

Part no.	Cross-section mm <sup>2</sup>	No.pairs x Outer Ø No.cores x AWG-no.	Outer Ø app. mm	Cop. weight kg / km	Weight app. kg / km
59824	0,616	15 x 2 x 20	19,5	232,0	381,0
59825	0,616	16 x 2 x 20	19,6	257,0	417,0
59826	0,616	18 x 2 x 20	20,6	282,0	494,0
59827	0,616	20 x 2 x 20	21,6	307,0	570,0
59828	0,616	22 x 2 x 20	22,7	322,0	643,0
59829	0,616	24 x 2 x 20	24,5	342,0	724,0
59830	0,616	25 x 2 x 20	24,9	361,0	740,0
59831	0,963	1 x 2 x 18	7,8	28,0	104,0
59832	0,963	2 x 2 x 18	10,3	57,0	121,0
59833	0,963	3 x 2 x 18	11,6	75,0	150,0
59834	0,963	6 x 2 x 18	14,7	139,0	328,0
59835	0,963	9 x 2 x 18	17,3	212,0	490,0
59836	0,963	15 x 2 x 18	21,4	358,0	811,0

Dimensions and specifications may be changed without prior notice. (RN02)

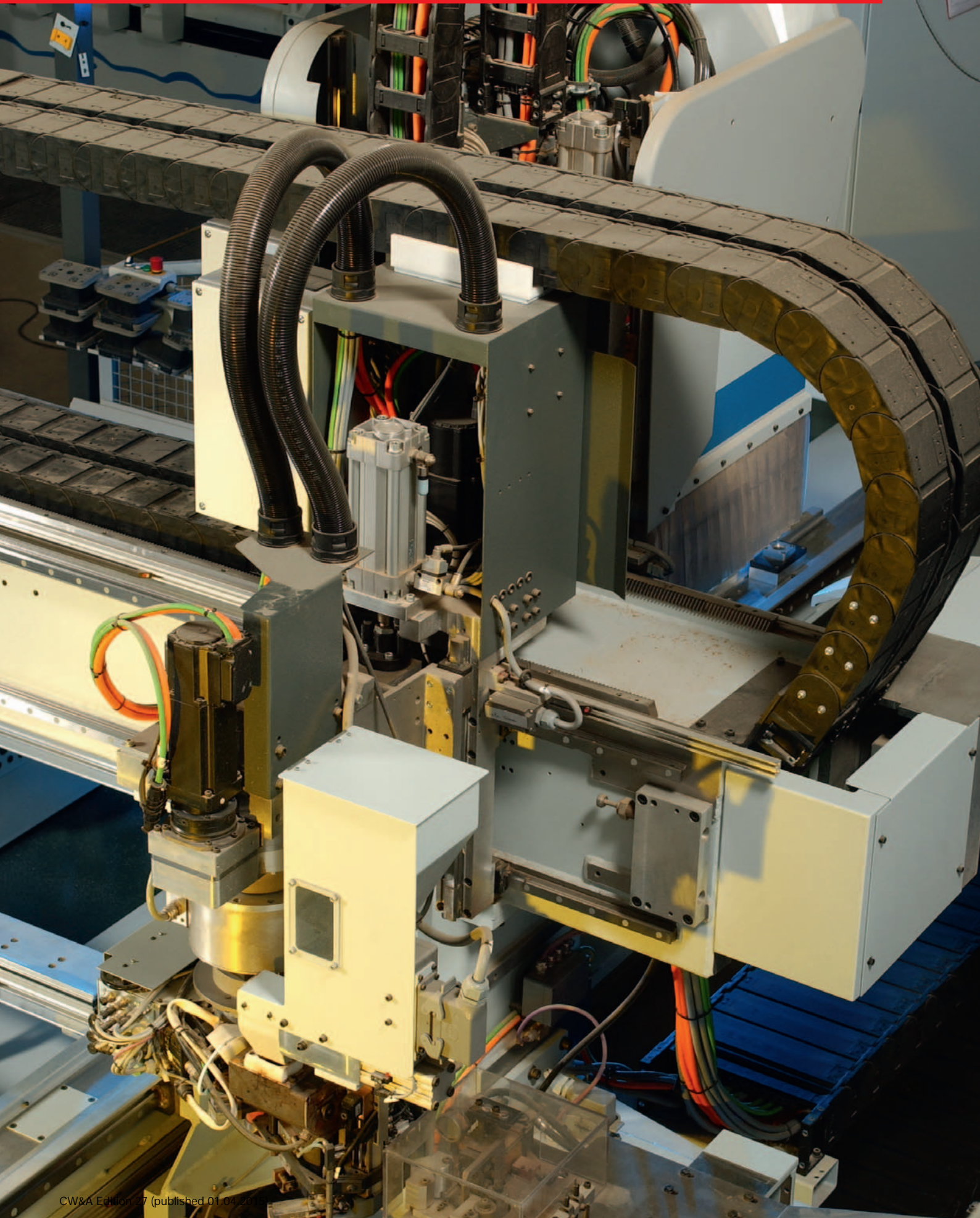


Suitable accessories can be found in Chapter X.

- Cable tie



# UL/CSA DRAG CHAIN CABLES





# JZ-602 RC cable for drag chains, 90°C, 600 V, two approval control

## cable, meter marking



### Technical data

- Control cable of special-PVC to UL AWM Style 10012 (core insulation) Style 2587 and CSA
- **Temperature range** flexing -5°C to +90°C fixed installation -40°C to +90°C
- **Nominal voltage** UL/CSA 600 V
- **Test voltage** 4000 V
- **Breakdown voltage** min. 8000 V
- **Insulation resistance** min 20 MOhm x km
- **Minimum bending radius** flexing 7,5x cable Ø fixed installation 4x cable Ø
- **Radiation resistance** up to 80x10<sup>6</sup> cJ/kg (up to 80 Mrad)

### Cable structure

- Bare copper, extra fine wire conductors, to DIN VDE 0295 cl.6 col. 4, BS 6360 cl.6 and IEC 60228 cl.6
- Core insulation special PVC compound type Y18 to DIN VDE 0207 part 4 and class 43 acc. to UL-Std. 1581
- Core identification to DIN VDE 0293 red cores with continuous white numbering
- GN-YE conductor in the outer layer
- Cores stranded in layers with optimal lay-length
- Wrapping with fleece over each layer
- Outer sheath of special PVC compound type YM5 to DIN VDE 0207 part 5, UL-Style 2587 and CSA C22.2 No 210
- Sheath colour black (RAL 9005)
- with meter marking

### Properties

- The materials used in manufacture are cadmium-free and contain no silicone and free from substances harmful to the wetting properties of lacquers

### Tests

- PVC self-extinguishing and flame retardant acc. to DIN VDE 0482-332-1-2, DIN EN 60332-1-2/IEC 60332-1 (equivalent DIN VDE 0472 part 804 test method B), UL VW-1, CSA FT1
- UV-resistant

### Note

- G = with green-yellow conductor
- AWG sizes are approximate equivalent values. The actual cross-section is in mm<sup>2</sup>.
- screened analogue type: **JZ-602 RC -CY**, confer page 427

### Application

For use in dry, damp and wet rooms with free movement without tensile stress or forced movements as highly flexible PVC control cable suitable for frequent lifting and bending stress in the machinery and tooling, robot technology and permanently moving machine parts. Convincingly proved in the standard use of drag chains. Interesting for the export-oriented machinery plant. For applications that go beyond standard solutions (e. g. composting facilities or high shelf conveyors with extremely high speed, etc.) we recommend you to our specially developed inquiry sheet for energy guiding systems, further technical details see selection table: Conductors for cable drag chains in the opening credits. For use in cable drag chains please note installation instruction.

RC = Robotics Cable

CE = The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

Part no.	No. cores x cross-sec. mm <sup>2</sup>	AWG-No.	Outer Ø app. mm	Cop. weight kg / km	Weight app. kg / km
89900	3 G 0,5	20	6,0	14,0	58,0
89901	4 G 0,5	20	6,5	19,0	69,0
89902	5 G 0,5	20	7,1	24,0	84,0
89903	7 G 0,5	20	8,2	34,0	123,0
89904	9 G 0,5	20	10,0	43,2	177,0
89905	12 G 0,5	20	10,5	58,2	192,0
89906	18 G 0,5	20	12,5	86,0	256,0
89907	25 G 0,5	20	15,2	120,0	358,0
89908	34 G 0,5	20	17,1	163,0	487,0
89909	3 G 1	18	6,6	23,8	88,0
89910	4 G 1	18	7,1	31,7	101,0
89911	5 G 1	18	7,8	39,6	126,0
89912	7 G 1	18	9,2	55,4	145,0
89913	9 G 1	18	11,0	71,2	168,0
89914	12 G 1	18	11,5	95,0	260,0
89915	15 G 1	18	13,2	119,0	300,0
89916	18 G 1	18	14,0	142,4	360,0
89917	25 G 1	18	17,2	197,8	640,0
89918	34 G 1	18	19,1	269,0	730,0
89919	3 G 1,5	16	7,4	44,0	94,0
89920	4 G 1,5	16	8,0	58,0	117,0
89921	5 G 1,5	16	8,8	72,0	140,0
89922	7 G 1,5	16	10,8	101,0	186,0
89923	9 G 1,5	16	12,8	129,7	244,0
89924	12 G 1,5	16	13,5	173,0	319,0
89925	18 G 1,5	16	16,0	260,0	451,0

Part no.	No. cores x cross-sec. mm <sup>2</sup>	AWG-No.	Outer Ø app. mm	Cop. weight kg / km	Weight app. kg / km
89926	25 G 1,5	16	19,8	360,0	625,0
89927	34 G 1,5	16	22,4	490,0	840,0
89932	3 G 2,5	14	8,9	72,0	150,0
89928	4 G 2,5	14	10,1	96,0	185,0
89933	5 G 2,5	14	11,3	120,0	242,0
89929	7 G 2,5	14	13,6	168,0	293,0
89934	12 G 2,5	14	16,8	288,0	498,0
89935	3 G 4	12	10,9	115,0	231,0
89930	4 G 4	12	12,4	154,0	298,0
89936	5 G 4	12	13,8	192,0	370,0
89931	7 G 4	12	16,6	269,0	460,0
89937	4 G 6	10	14,6	231,0	430,0
89938	4 G 10	8	18,2	384,0	720,0
89939	4 G 16	6	22,6	615,0	1060,0
89940	4 G 25	4	26,5	960,0	1590,0
89941	4 G 35	2	30,8	1344,0	2105,0

Dimensions and specifications may be changed without prior notice. (RN05)



**MULTIFLEX 600** highly flexible, oil-resistant, open installation

TC-ER, PLTC-ER, NFPA 79 Edition 2012



HELUKABEL MULTIFLEX 600 P/N 63136 14AWG 4C (UL) TC-ER 90°C DRY 75°C WET 600 V SUN RES DIR BUR OIL RES I/II  
E330430 OR MTW "HIGH FLEXIBLE" OR WTTC 1000 V OR c(UL)CIC TC FT4 LL257839 CSA AWM I/II 90°C 600 V FT4 CE ROHS

**Technical data**

- Highly-flexible PVC control cable according to UL-Std.1277
- **Temperature range**  
flexing -5°C to +90°C  
fixed installation -40°C to +90°C
- **Nominal voltage**  
TC 600 V  
TC Wind Turbine (WTTC) 1000 V
- **Test voltage** 3000 V
- **Minimum bending radius**  
flexing 7,5x cable Ø
- **Insulation resistance**  
min. 20 MOhm x km
- **Radiation resistance**  
up to 80x10<sup>6</sup> cJ/kg (up to 80 Mrad)

**Cable structure**

- Bare copper conductor, extra-fine wire stranded, with AWG measures
- Core insulation of special PVC with transparent nylon skin
- Core identification to DIN VDE 0293 black cores with continuous white numbering
- GN-YE conductor, 3 cores and above in the outer layer
- Cores stranded in layers with optimal lay-lengths
- Separator
- Outer sheath of special PVC
- Sheath colour black (RAL 9005)
- with length marking in feet

**Properties**

- Self-extinguishing and flame retardant in acc. to CSA FT4
- The materials used in manufacture are cadmium-free and contain no silicone and free from substances harmful to the wetting properties of lacquers
- UV-resistant
- **Tests**
- **UL:**  
TC-ER, PLTC-ER (AWG 18 - AWG 12), ITC-ER (AWG 18 - AWG 12), MTW, NFPA 79 2012, WTTC 1000 V, DP-1, OIL RES I&II, 90°C dry / 75°C wet, Class 1 Div. 2 per NEC Art 336, 392, 501, crush impact test in accordance with UL 1277
- **CSA:**  
c(UL) CIC-TC FT4, CSA AWM I/II A/B FT4

**Note****Advantages**

- Highly-flexible, simple installation

**Available on request**

- with blue cores (DC)
- with red cores (AC)
- Grey or TPE outer sheath

**Application**

HELUKABEL® MULTIFLEX 600 is a highly-flexible, oil-resistant control cable. The special combination of TC-ER, PLTC-ER and ITC-ER allows this cable to be used as a connecting cable for industrial plant and machinery in accordance with NFPA 79 edition 2012. Approved for open, unprotected installation in cable trays to the machine. Its outstanding oil resistance (OIL RES I & II) guarantees a long service life; for industrial applications in dry, damp and wet environments. Recommended applications: production lines, bottling plants, machine construction, switch cabinets, conveyor systems, packaging machines, automotive industry. Please observe applicable installation regulations for use in energy supply chains.

☞ The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

Part no.	No. cores x cross-sec. mm <sup>2</sup>	AWG-No.	Outer Ø app. mm	Cop. weight kg / km	Weight app. kg / km
62502	2 x 0,5	20	6,9	10,0	53,0
62503	3 G 0,5	20	7,3	14,0	61,0
62504	4 G 0,5	20	8,0	19,0	72,0
62505	5 G 0,5	20	8,6	24,0	85,0
62506	7 G 0,5	20	9,9	34,0	110,0
62507	12 G 0,5	20	11,4	58,0	158,0
62508	18 G 0,5	20	14,2	86,0	241,0
62509	25 G 0,5	20	17,0	120,0	316,0
62510	34 G 0,5	20	18,9	163,0	439,0
62511	3 G 0,75	18	7,8	22,0	75,0
62512	4 G 0,75	18	8,6	29,0	91,0
62513	5 G 0,75	18	9,3	36,0	103,0
62514	7 G 0,75	18	10,8	50,0	136,0
62515	12 G 0,75	18	12,4	86,0	228,0
62516	15 G 0,75	18	13,8	108,0	273,0
62517	18 G 0,75	18	15,4	130,0	311,0
62518	25 G 0,75	18	18,5	180,0	498,0
62519	34 G 0,75	18	20,5	245,0	550,0
62520	36 G 0,75	18	20,6	259,0	570,0
62521	42 G 0,75	18	22,3	302,0	600,0
62522	3 G 1,5	16	8,6	43,0	100,0
62523	4 G 1,5	16	9,5	58,0	122,0
62524	5 G 1,5	16	10,3	72,0	148,0
62525	7 G 1,5	16	12,0	101,0	197,0
62526	9 G 1,5	16	14,2	130,0	244,0
62527	12 G 1,5	16	14,7	173,0	328,0
62528	18 G 1,5	16	17,2	259,0	459,0

Part no.	No. cores x cross-sec. mm <sup>2</sup>	AWG-No.	Outer Ø app. mm	Cop. weight kg / km	Weight app. kg / km
62529	25 G 1,5	16	20,8	360,0	665,0
62530	34 G 1,5	16	23,0	490,0	1084,0
62531	41 G 1,5	16	25,1	590,0	1260,0
62532	50 G 1,5	16	27,7	720,0	1521,0
62533	60 G 1,5	16	29,5	864,0	1885,0
62534	3 G 2,5	14	9,8	72,0	160,0
63136	4 G 2,5	14	10,6	96,0	173,0
62535	5 G 2,5	14	11,9	120,0	268,0
62536	7 G 2,5	14	13,6	168,0	307,0
62537	9 G 2,5	14	16,1	216,0	437,0
62538	12 G 2,5	14	16,9	288,0	572,0
62539	18 G 2,5	14	20,1	432,0	800,0
62540	25 G 2,5	14	25,1	600,0	1100,0
62541	3 G 4	12	11,3	115,0	221,0
62542	4 G 4	12	12,4	154,0	247,0
62543	5 G 4	12	13,8	192,0	318,0
62544	7 G 4	12	16,9	269,0	438,0
62545	4 G 6	10	15,3	230,0	383,0
62546	5 G 6	10	16,6	288,0	481,0
62547	7 G 6	10	18,2	403,0	800,0
62548	4 G 10	8	19,7	384,0	671,0
62549	5 G 10	8	22,0	480,0	990,0
62550	4 G 16	6	23,7	614,0	951,0
62551	5 G 16	6	26,1	768,0	1500,0
62552	4 G 25	4	34,0	960,0	1700,0
62554	4 G 35	2	37,0	1344,0	2300,0

Dimensions and specifications may be changed without prior notice. (RN01)

# MULTISPEED® 500-PVC UL/CSA high flexible, safety against high bending in drag chain systems, oil-resistant, low torsion, meter marking



## Technical data

- Special drag chain cables for high mechanical stress in adapted to DIN VDE 0285-525-2-51 / DIN EN 50525-2-51 to UL-Std.758 AWM Style 21179
- **Temperature range**  
flexing -5°C to +80°C  
fixed installation -30°C to +80°C
- **Nominal voltage**  
VDE U<sub>0</sub>/U 300/500 V  
UL 600 V
- **Test voltage** 3000 V
- **Insulation resistance**  
min. 100 MOhm x km
- **Minimum bending radius**  
flexing 7,5x cable Ø  
fixed installation 4x cable Ø
- **Radiation resistance**  
up to 80x10<sup>6</sup> cJ/kg (up to 80 Mrad)

## Cable structure

- Bare copper, fine wire conductors, Unilay with short pitch length
- Core insulation of special PP
- Core identification to DIN VDE 0293 black cores with continuous white numbering
- GN-YE conductor, 3 cores and above
- Stranding:  
<7 cores: cores stranded in a layer with optimal lay-length around a filler as per construction  
≥7 cores: cores stranded with optimal lay-length to bunch-construction with low torsion strength, optimal selected short lay-length around a filler
- Outer sheath special PVC, especially resistant against fatigue strength, extruded as filler with pressure
- Sheath colour black (RAL 9005)
- with meter marking

## Properties

- The materials used in manufacture are cadmium-free and contain no silicone and free from substances harmful to the wetting properties of lacquers
- **Tests**
- PVC outer sheath self-extinguishing and flame retardant acc. to DIN VDE 0482-332-1-2, DIN EN 60332-1-2, IEC 60332-1 (equivalent DIN VDE 0472 part 804 test method B), UL VW-1, CSA FT1
- Low-adhesion
- Ozon and UV resistant
- High property of alternating bending strength
- longer service life due to low frictional resistance
- Better chemical resistance
- Oil resistance to DIN VDE 0473-811-404 / DIN EN 60811-404
- Reduced Ø, therefore low moving masses

## Note

- G = with green-yellow conductor  
x = without green-yellow conductor (OZ)
- AWG sizes are approximate equivalent values. The actual cross-section is in mm<sup>2</sup>.
- screened analogue type:  
**MULTISPEED® 500-C-PVC UL/CSA**, confer page 429

## Application

UL/CSA approved HELUKABEL® MULTISPEED® 500-PVC are installed there, where extreme requirements for the cables are necessary. Designed for the export-orientated machinery manufacturer, specifically for USA and Canada. Matched materials and stranding technique permit continuous use as a highly flexible cable for drag chains with long travel and high or slow speeds. For use in dry, damp rooms, and outdoors, with free movement without tensile stress or forced movements as a highly flexible PVC control cable suitable for frequent lifting and bending stress in engineering and tool manufacturing.

CE= The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

Part no.	No. cores x cross-sec. mm <sup>2</sup>	AWG-No.	Outer Ø app. mm	Cop. weight kg / km	Weight app. kg / km
24295	2 x 0,5	20	4,8	9,6	40,0
24296	3 G 0,5	20	5,1	14,4	45,0
24297	4 G 0,5	20	5,5	19,0	57,0
24298	5 G 0,5	20	6,0	24,0	66,0
24299	7 G 0,5	20	9,1	33,6	81,0
24300	12 G 0,5	20	10,0	58,0	133,0
24301	18 G 0,5	20	12,2	86,0	194,0
24302	25 G 0,5	20	14,3	120,0	274,0
24303	4 G 0,75	19	6,1	29,0	63,0
24304	5 G 0,75	19	6,6	36,0	79,0
24305	7 G 0,75	19	10,5	50,0	107,0
24306	12 G 0,75	19	11,4	86,0	169,0
24307	18 G 0,75	19	14,2	130,0	247,0
24308	25 G 0,75	19	16,3	180,0	366,0
24309	36 G 0,75	19	20,1	259,0	540,0
24310	42 G 0,75	19	22,2	302,0	630,0
24311	3 G 1	18	5,9	29,0	69,0
24312	4 G 1	18	6,4	38,4	86,0
24313	5 G 1	18	7,0	48,0	101,0
24314	7 G 1	18	11,2	67,0	140,0

Part no.	No. cores x cross-sec. mm <sup>2</sup>	AWG-No.	Outer Ø app. mm	Cop. weight kg / km	Weight app. kg / km
24315	12 G 1	18	12,3	115,0	227,0
24316	18 G 1	18	15,1	173,0	351,0
24317	25 G 1	18	17,6	240,0	489,0
24318	3 G 1,5	16	6,7	43,0	88,0
24319	4 G 1,5	16	7,3	58,0	110,0
24320	5 G 1,5	16	8,0	72,0	130,0
24321	7 G 1,5	16	13,2	101,0	182,0
24322	12 G 1,5	16	14,4	173,0	319,0
24323	18 G 1,5	16	17,7	259,0	420,0
24324	25 G 1,5	16	20,5	360,0	604,0
24325	4 G 2,5	14	8,9	96,0	172,0
24326	5 G 2,5	14	9,9	120,0	219,0
24327	7 G 2,5	14	16,1	168,0	303,0
24328	12 G 2,5	14	17,8	288,0	504,0
24329	18 G 2,5	14	21,8	432,0	754,0
24330	25 G 2,5	14	24,4	600,0	940,0

Dimensions and specifications may be changed without prior notice. (RN05)

# JZ-HF-FCY high flexible, cable for drag chains, oil resistant, EMC-preferred type, meter marking



HELUKABEL JZ-HF-FCY 7G2,5 QMM (14 AWG)7C E 170315 CSA AWM Style 2570 CE



## Technical data

- Special PVC drag chain cable, extreme flexibility acc. to UL/CSA AWM I/II A/B Style 2570
- **Temperature range**  
flexing -5°C to +80°C  
fixed installation -40°C to +80°C
- **Nominal voltage**  
VDE U<sub>0</sub>/U 300/500 V  
UL/CSA 1000 V
- **Test voltage** 4000 V
- **Breakdown voltage** min. 8000 V
- **Insulation resistance**  
min. 20 MOhm/km
- **Minimum bending radius**  
flexing 10x cable Ø  
fixed installation 5x cable Ø
- **Coupling resistance**  
max. 250 Ohm/km
- **Radiation resistance**  
up to 80x10<sup>6</sup> cJ/kg (up to 80 Mrad)

## Cable structure

- Bare copper, fine wire conductors, to DIN VDE 0295 cl.5, BS 6360 cl.5 and IEC 60228 cl.5
- Core insulation of special PVC acc. to UL-Std.1581
- Core identification to DIN VDE 0293 black cores with continuous white numbering
- GN-YE conductor, 3 cores and above in the outer layer
- Cores stranded in layers with optimal selected lay-length
- Separating foil over each layer
- construction with Cu-screening, tinned, approx. 85%
- Minimum coverage 85%
- Outer sheath of special PVC compound type TM5 to DIN VDE 0207-363-4-1/DIN EN 50363-4-1 acc. to UL-Std.1581
- Sheath colour grey (RAL 7001)
- with meter marking

## Properties

- The materials used in manufacture are cadmium-free and contain no silicone and free from substances harmful to the wetting properties of lacquers
- ### Tests
- PVC self-extinguishing and flame retardant acc. to DIN VDE 0482-332-1-2, DIN EN 60332-1-2 / IEC 60332-1 (equivalent DIN VDE 0472 part 804 test method B), UL VW-1, CSA FT1
  - low adhesion
  - oil resistant to DIN VDE 0473-811-404 / DIN EN 60811-404

## Note

- G = with green-yellow conductor  
x = without green-yellow conductor (OZ)
- AWG sizes are approximate equivalent values. The actual cross-section is in mm<sup>2</sup>.
- unscreened analogue type:  
**JZ-602 RC**, confer page 423  
**MULTISPEED® 500-PVC UL/CSA**, confer page 425

## Application

UL/CSA approved, highly flexible, screened PVC drag-chain cable for laying in dry, damp and wet rooms, with free movement and without tensile load or forced movements, suitable for frequent lifting and bending stresses in the sector of machine manufacture and tool making. Thanks to the high level of shielding density, a fault-free transmission of signals or impulses is ensured. The ideal control line, offering protection against interference, for the above applications. Of interest for those machinery manufacturers, who are export orientated. For applications which go beyond standard solutions (for example for composting appliances or high shelf conveyors with extremely high processing speeds etc.) we recommend for our especially developed enquiry sheet for energy guiding systems. Before installation in cable trays please read the instructions. Further technical details see selection table for drag chain cables, see lead text.

**EMC** = Electromagnetic compatibility

To optimize the EMC features we recommend a large round contact of the copper braiding on both ends.

CE = The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

Part no.	No. cores x cross-sec. mm <sup>2</sup>	AWG-No.	Outer Ø app. mm	Cop. weight kg / km	Weight app. kg / km
12908	2 x 0,5	20	6,0	35,0	46,0
12909	3 G 0,5	20	6,3	42,0	56,0
12910	4 G 0,5	20	6,8	47,0	64,0
12911	5 G 0,5	20	7,4	56,0	77,0
12912	7 G 0,5	20	8,5	69,0	104,0
12913	12 G 0,5	20	10,1	108,0	158,0
12914	18 G 0,5	20	11,7	145,0	229,0
12915	25 G 0,5	20	14,0	240,0	320,0
12916	2 x 0,75	19	6,4	40,0	59,0
12917	3 G 0,75	19	6,8	52,0	68,0
12918	4 G 0,75	19	7,3	60,0	82,0
12919	5 G 0,75	19	7,9	71,0	101,0
12920	7 G 0,75	19	9,2	91,0	150,0
12921	12 G 0,75	19	11,0	142,0	212,0
12922	18 G 0,75	19	13,0	212,0	305,0
12923	25 G 0,75	19	15,8	281,0	430,0
12924	2 x 1	18	6,8	50,0	71,0
12925	3 G 1	18	7,2	60,0	90,0

Part no.	No. cores x cross-sec. mm <sup>2</sup>	AWG-No.	Outer Ø app. mm	Cop. weight kg / km	Weight app. kg / km
12926	4 G 1	18	7,8	71,0	114,0
12927	5 G 1	18	8,4	88,0	136,0
12928	7 G 1	18	9,8	111,0	169,0
12929	12 G 1	18	12,0	184,0	270,0
12930	18 G 1	18	14,2	260,0	385,0
12931	25 G 1	18	16,8	349,0	530,0
12932	2 x 1,5	16	7,3	63,0	88,0
12933	3 G 1,5	16	7,7	80,0	104,0
12934	4 G 1,5	16	8,4	97,0	136,0
12935	5 G 1,5	16	9,1	119,0	170,0
12936	7 G 1,5	16	10,7	147,0	221,0
12937	12 G 1,5	16	13,0	267,0	348,0
12938	18 G 1,5	16	15,5	374,0	489,0
12939	25 G 1,5	16	18,7	526,0	710,0
12940	3 G 2,5	14	9,1	144,0	177,0
12941	4 G 2,5	14	9,9	148,0	204,0
12942	7 G 2,5	14	13,0	255,0	340,0
12943	4 G 4	12	11,2	230,0	310,0

Dimensions and specifications may be changed without prior notice. (RN05)

# JZ-602 RC-CY special cable for drag chains, 90°C, 600 V, two approval control cable, EMC-preferred type, meter marking



## Technical data

- Control cable of special-PVC to UL CSA AWM I/II A/B Style 2587 (sheath insulation) and CSA
- **Temperature range**  
flexing -5°C to +90°C  
fixed installation -40°C to +90°C  
(up to +105°C for short time)
- **Nominal voltage**  
UL/CSA 600 V
- **Test voltage** 4000 V
- **Breakdown voltage** min. 8000 V
- **Insulation resistance**  
min 20 MOhm x km
- **Minimum bending radius**  
flexing 10x cable Ø  
fixed installation 5x cable Ø
- **Radiation resistance**  
up to 80x10<sup>6</sup> cJ/kg (up to 80 Mrad)
- **Coupling resistance**  
max. 250 Ohm/km

## Cable structure

- Bare copper, extra fine wire conductors, to DIN VDE 0295 cl.6 col. 4, BS 6360 cl.5 and IEC 60228 cl.6
- Core insulation of special PVC compound type Y18 to DIN VDE 0207 part 4 and class 43 acc. to UL-Std.1581
- Core identification to DIN VDE 0293 red cores with continuous white numbering
- GN-YE conductor in the outer layer
- Cores stranded with optimal lay-length
- Core wrapping with fleece over each layer
- PVC-inner sheath
- Screening: braid coverage ca. 85% up to 17 mm Ø - layer of tinned copper wires  
>17 mm Ø - tinned copper wire
- Outer sheath of special PVC compound type YM5 to DIN VDE 0207 part 5, UL-Style 2587 and CSA C22.2 No 210
- Outer sheath black (RAL 9005)
- with meter marking

## Properties

- The materials used in manufacture are cadmium-free and contain no silicone and free from substances harmful to the wetting properties of lacquers

## Tests

- PVC self-extinguishing and flame retardant acc. to DIN VDE 0482-332-1-2, DIN EN 60332-1-2, IEC 60332-1 (equivalent DIN VDE 0472 part 804 test method B), UL VW-1, CSA FT1
- UV-resistant

## Note

- G = with green-yellow conductor
- AWG sizes are approximate equivalent values. The actual cross-section is in mm<sup>2</sup>.
- unscreened analogue type:  
**JZ-602 RC**, confer page 423

## Application

These cable are used for flexible use for medium mechanical stresses with free movement without tensile stress or forced movements in dry, moist and wet rooms. These special cables for drag chains are used for permanent flexible applications in machineries, machine tools, robot technics, for movable automated machinery parts. These cables have shown excellent performance in combination with standard cable trays. The dense screening assures disturbance-free transmission of all signals and impulses. An ideal disturbance-free control cable for the above applications. Interesting for the export-oriented machines and machinery plants. For applications which go beyond standard solutions we recommend for our especially developed enquiry sheet for energy guiding systems. Before installation in cable trays please read the instructions. Further technical details see selection table for drag chain cables, see lead text.

**EMC** = Electromagnetic compatibility

To optimize the EMC features we recommend a large round contact of the copper braiding on both ends.

**RC** = Robotics Cable

**CE** = The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

Part no.	No. cores x cross-sec. mm <sup>2</sup>	AWG-No.	Outer Ø app. mm	Cop. weight kg / km	Weight app. kg / km
89950	3 G 0,5	20	8,5	45,0	124,0
89951	4 G 0,5	20	9,0	52,0	135,0
89952	5 G 0,5	20	9,7	68,0	153,0
89953	7 G 0,5	20	11,0	93,0	191,0
89954	9 G 0,5	20	12,4	134,0	243,0
89955	12 G 0,5	20	13,5	163,0	322,0
89956	15 G 0,5	20	14,8	174,0	350,0
89957	18 G 0,5	20	16,0	191,0	374,0
89958	25 G 0,5	20	19,0	223,0	436,0
89959	3 G 1	18	8,9	56,0	130,0
89960	4 G 1	18	9,7	81,0	155,0
89961	5 G 1	18	10,4	90,0	181,0
89962	7 G 1	18	12,0	106,0	208,0
89963	9 G 1	18	14,1	161,0	321,0
89964	12 G 1	18	15,2	175,0	341,0
89965	15 G 1	18	16,7	204,0	396,0
89966	18 G 1	18	17,6	241,0	473,0
89967	25 G 1	18	20,7	342,0	650,0
89968	34 G 1	18	24,3	434,0	781,0
89969	3 G 1,5	16	10,2	89,0	165,0
89970	4 G 1,5	16	11,0	97,0	192,0
89971	5 G 1,5	16	11,8	111,0	224,0
89972	7 G 1,5	16	14,0	147,0	274,0
89973	9 G 1,5	16	16,4	193,0	340,0
89974	12 G 1,5	16	17,1	256,0	461,0
89975	18 G 1,5	16	20,2	360,0	674,0

Part no.	No. cores x cross-sec. mm <sup>2</sup>	AWG-No.	Outer Ø app. mm	Cop. weight kg / km	Weight app. kg / km
89976	25 G 1,5	16	25,2	544,0	950,0
89977	34 G 1,5	16	28,1	674,0	1203,0
89984	3 G 2,5	14	11,8	141,0	220,0
89978	4 G 2,5	14	13,2	170,0	270,0
89985	5 G 2,5	14	14,2	195,0	350,0
89979	7 G 2,5	14	17,4	251,0	428,0
89986	12 G 2,5	14	21,0	368,0	730,0
89980	18 G 2,5	14	25,4	639,0	1140,0
89987	3 G 4	12	14,0	180,0	296,0
89981	4 G 4	12	15,9	232,0	456,0
89988	5 G 4	12	17,7	330,0	450,0
89982	7 G 4	12	20,9	395,0	737,0
89983	4 G 6	10	18,3	316,0	572,0
89989	4 G 10	8	23,2	490,0	1012,0
89990	4 G 16	6	27,6	850,0	1400,0
89991	4 G 25	4	33,1	1450,0	2100,0
89992	4 G 35	2	37,8	1890,0	2550,0

Dimensions and specifications may be changed without prior notice. (RN05)

# MULTIFLEX 600-C highly-flexible, oil-resistant, screened, EMC-preferred type, control cable for open installation TC-ER, PLTC-ER, NFPA 79 Edition 2012



## Technical data

- Highly-flexible PVC control cable acc. to UL-Std. 1277
- **Temperature range**  
flexing -5°C to +90°C  
fixed installation -40°C to +90°C
- **Nominal voltage**  
TC 600 V  
TC Wind Turbine (WTTC) 1000 V
- **Test voltage** 3000 V
- **Coupling resistance**  
max. 250 Ohm/km
- **Minimum bending radius**  
flexing 10x cable Ø
- **Insulation resistance**  
min. 20 MOhm x km
- **Radiation resistance**  
up to 80x10<sup>6</sup> cJ/kg (up to 80 Mrad)

## Cable structure

- Bare copper conductor, extra-fine wire stranded, with AWG measures
- Core insulation of special PVC with transparent nylon skin
- Core identification to DIN VDE 0293 black cores with continuous white numbering
- GN-YE conductor, 3 cores and above in the outer layer
- Cores stranded in layers with optimal lay-lengths
- Separating foil
- Braided screening of tinned copper wires, coverage approx. 85%
- Separator
- Outer sheath of special PVC
- Sheath colour black (RAL 9005)
- with length marking in feet

## Properties

- Self-extinguishing and flame retardant in acc. to CSA FT4
  - The materials used in manufacture are cadmium-free and contain no silicone and free from substances harmful to the wetting properties of lacquers
  - UV-resistant
- ### Tests
- **UL:**  
TC-ER, PLTC-ER (AWG 18 - AWG 12), ITC-ER (AWG 18 - AWG 12), MTW, NFPA 79 2012, WTTC 1000 V, DP-1, OIL RES I&II, 90°C dry / 75°C wet, Class 1 Div. 2 per NEC Art 336, 392, 501, crush impact test in accordance with UL 1277
  - **CSA:**  
c(UL) CIC-TC FT4, CSA AWM I/II A/B FT4

## Note

### Advantages

- Highly-flexible, simple installation
- ### Available on request
- with blue cores (DC)
  - with red cores (AC)
  - Grey or TPE outer sheath

## Application

HELUKABEL® MULTIFLEX 600-C is a highly-flexible, oil-resistant control cable. The special combination of TC-ER, PLTC-ER and ITC-ER allows this cable to be used as a connecting cable for industrial plant and machinery in accordance with NFPA 79 edition 2012. Approved for open, unprotected installation in cable trays to the machine. Its outstanding oil resistance (OIL RES I & II) guarantees a long service life; for industrial applications in dry, damp and wet environments. Recommended applications: Production lines, bottling plants, machine construction, switch cabinets, conveyor systems, packaging machines, automotive industry. For the use in energy drag chains please note the installation guidelines.

**EMC** = Electromagnetic compatibility

To optimize the EMC features we recommend a large round contact of the copper braiding on both ends.

☑ = The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

Part no.	No. cores x cross-sec. mm <sup>2</sup>	AWG-No.	Outer Ø app. mm	Cop. weight kg / km	Weight app. kg / km
62556	2 x 0,5	20	7,7	30,0	80,0
62557	3 G 0,5	20	8,0	37,0	85,0
62558	4 G 0,5	20	8,7	46,0	100,0
62559	5 G 0,5	20	9,3	54,0	113,0
62560	7 G 0,5	20	10,7	70,0	152,0
62561	12 G 0,5	20	12,3	112,0	210,0
62562	18 G 0,5	20	15,1	153,0	304,0
62563	25 G 0,5	20	18,1	225,0	408,0
62564	34 G 0,5	20	19,8	267,0	530,0
62565	3 G 0,75	18	8,5	55,0	101,0
62566	4 G 0,75	18	9,3	69,0	127,0
62567	5 G 0,75	18	10,0	82,0	148,0
62568	7 G 0,75	18	11,6	119,0	186,0
62569	12 G 0,75	18	14,1	178,0	286,0
62570	15 G 0,75	18	15,2	175,0	455,0
62571	18 G 0,75	18	16,3	252,0	383,0
62572	25 G 0,75	18	19,6	362,0	514,0
62573	34 G 0,75	18	21,9	473,0	685,0
62574	3 G 1,5	16	9,3	75,0	131,0
62575	4 G 1,5	16	10,2	93,0	165,0
62576	5 G 1,5	16	11,0	113,0	195,0
62577	7 G 1,5	16	12,9	162,0	250,0
62578	9 G 1,5	16	15,2	193,0	340,0
62579	12 G 1,5	16	15,6	249,0	393,0

Part no.	No. cores x cross-sec. mm <sup>2</sup>	AWG-No.	Outer Ø app. mm	Cop. weight kg / km	Weight app. kg / km
62580	18 G 1,5	16	18,4	376,0	559,0
62581	25 G 1,5	16	23,1	510,0	788,0
62582	34 G 1,5	16	25,8	674,0	1203,0
62583	3 G 2,5	14	10,3	141,0	218,0
62584	4 G 2,5	14	11,5	149,0	222,0
62585	5 G 2,5	14	12,4	195,0	350,0
62586	7 G 2,5	14	15,4	243,0	373,0
62587	9 G 2,5	14	16,8	312,0	479,0
62588	12 G 2,5	14	18,5	368,0	730,0
62589	18 G 2,5	14	22,4	639,0	1140,0
62590	25 G 2,5	14	25,5	796,0	1530,0
62591	3 G 4	12	11,7	180,0	296,0
62592	4 G 4	12	13,3	221,0	305,0
62593	5 G 4	12	14,7	330,0	450,0
62594	7 G 4	12	17,8	363,0	536,0
62595	4 G 6	10	16,1	314,0	469,0
62596	5 G 6	10	17,5	441,0	772,0
62597	7 G 6	10	20,6	505,0	1028,0
62598	4 G 10	8	21,9	526,0	790,0
62599	5 G 10	8	24,1	610,0	1096,0
62600	4 G 16	6	24,8	730,0	1621,0
62602	5 G 16	6	27,2	1050,0	1759,0
62603	4 G 25	4	33,1	1450,0	2100,0
62605	4 G 35	2	37,8	1840,0	2550,0

Dimensions and specifications may be changed without prior notice. (RN01)



# MULTISPEED® 500-C-PVC UL/CSA oil resistant, high

flexible, safety against high bending in drag chain systems, low torsion, screened, EMC-preferred type, meter marking



## Technical data

- Special drag chain cables for high mechanical stress in accordance to DIN VDE 0285-525-2-51/DIN EN 50525-2-51 and UL-Std.758 AWM Style 21179
- **Temperature range**  
flexing -5°C to +80°C  
fixed installation -30°C to +80°C
- **Nominal voltage**  
VDE U<sub>0</sub>/U 300/500 V  
UL 600 V
- **Test voltage** 3000 V
- **Insulation resistance**  
min. 100 MOhm x km
- **Minimum bending radius**  
flexing 7,5x cable Ø  
fixed installation 4x cable Ø
- **Coupling resistance**  
max. 250 Ohm x km
- **Radiation resistance**  
up to 80x10<sup>6</sup> cJ/kg (up to 80 Mrad)

## Cable structure

- Bare copper, fine wire conductors, Unilay with short pitch length
- Core insulation of Special PP
- Core identification to DIN VDE 0293 black cores with continuous white numbering
- GN-YE conductor, 3 cores and above
- Stranding:  
<7 cores: with optimal lay length, construction due to a filling element, in a stranded position  
≥7 cores: cores stranded with optimal lay-length to bunch-construction with low torsion strength, optimal selected short lay-length around a filler
- Special PVC inner sheath YM2 gusset-filling extruded, grey (RAL 7001)
- Braid of tinned copper wires, minimum coverage 85% max. with optimal braiding pitch
- Outer sheath of special PVC especially fatigue resistant
- sheath colour black (RAL 9005)
- with meter marking

## Properties

- The materials used in manufacture are cadmium-free and contain no silicone and free from substances harmful to the wetting properties of lacquers
- **Tests**
- PVC self-extinguishing and flame retardant acc. to DIN VDE 0482-332-1-2, DIN EN 60332-1-2, IEC 60332-1 (equivalent DIN VDE 0472 part 804 test method B), UL VW-1, CSA FT1
- Low adhesion
- Ozon and UV resistant
- High property of alternating bending strength
- longer service life due to low friction resistance
- Better chemical resistance
- Oil resistance to DIN VDE 0473-811-404/DIN EN 60811-404
- Higher stability
- Higher economical solution
- Reduced Ø, therefore less moving masses

## Note

- G = with green-yellow conductor  
x = without green-yellow conductor (OZ)
- AWG sizes are approximate equivalent values. The actual cross-section is in mm<sup>2</sup>.
- unscreened analogue type:  
**MULTISPEED® 500-PVC UL/CSA**, confer page 425

## Application

For permanently use on long distances, and high or low speeds. These high flexible PVC control cables are suitable for shift- and bending stresses in machines and machine tool constructions. These are installed in dry, moist rooms and in open air with free movement without tensile stress or forced movements. These screened cables are particularly suitable for the interference-free transmission in instrumentation and control engineering applications. For applications which go beyond standard solutions we recommend for our especially developed enquiry sheet for energy guiding systems. Before installation in cable trays please read the instructions. Further technical details see selection table for drag chain cables, see lead text.

**EMC** = Electromagnetic compatibility

To optimize the EMC features we recommend a large round contact of the copper braiding on both ends.

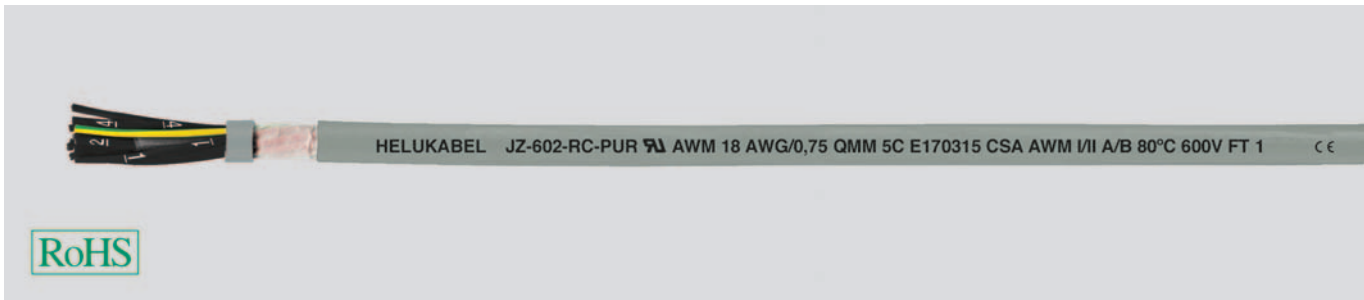
CE = The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

Part no.	No. cores x cross-sec. mm <sup>2</sup>	AWG-No.	Outer Ø app. mm	Cop. weight kg / km	Weight app. kg / km
24335	2 x 0,5	20	6,6	30,0	88,0
24336	3 G 0,5	20	6,9	36,0	101,0
24337	4 G 0,5	20	7,3	42,0	116,0
24338	5 G 0,5	20	7,8	48,0	146,0
24339	7 G 0,5	20	11,3	64,0	181,0
24340	9 G 0,5	20	11,4	80,0	219,0
24341	12 G 0,5	20	12,6	105,0	271,0
24342	18 G 0,5	20	15,0	137,0	374,0
24343	25 G 0,5	20	17,1	210,0	542,0
24344	2 x 0,75	19	6,8	40,0	96,0
24345	3 G 0,75	19	7,4	48,0	111,0
24346	4 G 0,75	19	8,0	55,0	140,0
24347	5 G 0,75	19	8,5	66,0	161,0
24348	7 G 0,75	19	12,9	85,0	227,0
24349	12 G 0,75	19	14,4	135,0	317,0
24350	18 G 0,75	19	17,5	190,0	486,0
24351	25 G 0,75	19	19,9	275,0	651,0

Part no.	No. cores x cross-sec. mm <sup>2</sup>	AWG-No.	Outer Ø app. mm	Cop. weight kg / km	Weight app. kg / km
24352	3 G 1	18	7,7	59,0	131,0
24353	4 G 1	18	8,3	70,0	164,0
24354	5 G 1	18	9,1	84,0	198,0
24355	7 G 1	18	14,0	106,0	252,0
24356	12 G 1	18	15,0	174,0	410,0
24357	18 G 1	18	18,7	240,0	550,0
24358	25 G 1	18	21,2	332,0	756,0
24359	3 G 1,5	16	8,6	75,0	166,0
24360	4 G 1,5	16	9,4	90,0	199,0
24361	5 G 1,5	16	10,4	108,0	229,0
24362	7 G 1,5	16	16,0	157,0	304,0
24363	12 G 1,5	16	17,6	240,0	502,0
24364	18 G 1,5	16	21,3	355,0	709,0
24365	25 G 1,5	16	24,8	448,0	939,0
24366	4 G 2,5	14	11,3	134,0	270,0
24367	5 G 2,5	14	12,3	175,0	335,0

Dimensions and specifications may be changed without prior notice. (RN05)

# JZ-602 RC-PUR special cable for drag chains, 80°C, 600 V, two approval control cable, meter marking



## Technical data

- Control cable of special-PUR to UL CSA AWM I/II A/B Style 20939 (sheath insulation) and CSA
- Temperature range**  
flexing -5°C to +80°C  
fixed installation -40°C to +80°C
- Nominal voltage** UL/CSA 600 V
- Test voltage** 4000 V
- Breakdown voltage** min. 8000 V
- Insulation resistance**  
min 20 MOhm x km
- Minimum bending radius**  
flexing 7,5x cable Ø  
fixed installation 4x cable Ø
- Radiation resistance**  
up to 100x10<sup>6</sup> cJ/kg (up to 100 Mrad)

## Cable structure

- Bare copper-conductor, to DIN VDE 0295 cl.6, extra fine-wire, BS 6360 cl.6, IEC 60228 cl.6
- Core insulation of special PVC compound type T12 to DIN VDE 0207-363-3 / DIN EN 50363-3 and class 43 to UL-Std.1581
- Core identification to DIN VDE 0293 black cores with continuous white numbering
- GN-YE conductor in the outer layer
- Cores stranded in layers with optimal selected lay-length
- Core wrapping with fleece over each layer
- Outer sheath of special **full-polyurethane**
- Sheath colour grey (RAL 7001)
- with meter marking

## Properties

- Resistant to mineral oils, synthetic oils and coolant, UV-radiation, oxygene, ozon and hydrolysis. Conditionally resistant to microbes.
- The materials used in manufacture are cadmium-free and contain no silicone and free from substances harmful to the wetting properties of lacquers

## Note

- G = with green-yellow conductor
- AWG sizes are approximate equivalent values. The actual cross-section is in mm<sup>2</sup>.
- screened analogue type: **JZ-602 RC -C-PUR**, confer page 436

## Application

These cables are used for flexible use for medium mechanical stresses with free movement without tensile stress or forced movements in dry, moist, wet rooms and outdoor. These special cables for drag chains are used for permanent flexible applications in machineries, machine tools, robot technics, for movable automated machinery parts. For applications which go beyond standard solutions (for example for composting appliances or high shelf conveyors with extremely high processing speeds etc.) we recommend for our especially developed enquiry sheet for energy guiding systems. Before installation in cable trays please read the instructions. Further technical details see selection table for drag chain cables, see lead text.

RC = Robotics Cable

CE = The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

Part no.	No.cores x cross-sec. mm <sup>2</sup>	AWG-No.	Outer Ø app. mm	Cop. weight kg / km	Weight app. kg / km
12630	3 G 0,5	20	6,0	14,0	58,0
12631	4 G 0,5	20	6,5	19,0	69,0
12632	5 G 0,5	20	7,1	24,0	84,0
12633	7 G 0,5	20	8,2	34,0	123,0
12634	9 G 0,5	20	10,0	43,2	177,0
12635	12 G 0,5	20	10,5	58,2	192,0
12636	18 G 0,5	20	12,5	86,0	256,0
12637	25 G 0,5	20	15,2	120,0	358,0
12638	34 G 0,5	20	17,1	163,0	487,0
12639	3 G 0,75	18	6,6	23,8	88,0
12640	4 G 0,75	18	7,1	31,7	101,0
12641	5 G 0,75	18	7,8	39,6	126,0
12642	7 G 0,75	18	9,2	55,4	145,0
12643	9 G 0,75	18	11,0	86,4	168,0
12644	12 G 0,75	18	11,5	95,0	260,0
12645	15 G 0,75	18	13,2	119,0	300,0
12646	18 G 0,75	18	14,0	142,4	360,0
12647	25 G 0,75	18	17,2	197,8	640,0
12648	34 G 0,75	18	19,1	269,0	730,0
12649	3 G 1,5	16	7,4	44,0	94,0
12650	4 G 1,5	16	8,0	58,0	117,0
12651	5 G 1,5	16	8,8	72,0	140,0
12652	7 G 1,5	16	10,8	101,0	186,0
12653	9 G 1,5	16	12,8	129,7	244,0
12654	12 G 1,5	16	13,5	173,0	319,0
12655	18 G 1,5	16	16,0	260,0	451,0

Part no.	No.cores x cross-sec. mm <sup>2</sup>	AWG-No.	Outer Ø app. mm	Cop. weight kg / km	Weight app. kg / km
12656	25 G 1,5	16	19,8	360,0	625,0
12657	34 G 1,5	16	22,4	490,0	840,0
12658	3 G 2,5	14	8,9	72,0	150,0
12659	4 G 2,5	14	10,1	96,0	185,0
12660	5 G 2,5	14	11,3	120,0	242,0
12661	7 G 2,5	14	13,6	168,0	293,0
12662	12 G 2,5	14	16,8	288,0	498,0
12663	3 G 4	12	10,9	115,0	231,0
12664	4 G 4	12	12,4	154,0	298,0
12665	5 G 4	12	13,8	192,0	370,0
12666	7 G 4	12	16,6	269,0	460,0
12667	4 G 6	10	14,6	231,0	430,0
12668	4 G 10	8	18,2	384,0	720,0
12669	4 G 16	6	22,6	615,0	1060,0
12670	4 G 25	4	26,5	960,0	1590,0
12671	4 G 35	2	30,8	1344,0	2105,0

Dimensions and specifications may be changed without prior notice. (RN05)

# MULTIFLEX 512<sup>®</sup>-PUR UL/CSA special cable for drag chains, 80°C, 600 V, two approval control cable, halogen-free



## Technical data

- Special drag chain cables for high mechanical stress, acc. to UL Style 20939
- **Temperature range**  
flexing -30°C to +80°C  
fixed installation -40°C to +80°C
- **Nominal voltage** UL/CSA 600 V
- **Test voltage** 3000 V
- **Insulation resistance**  
min. 100 MOhm x km
- **Minimum bending radius**  
flexing 5x cable Ø  
fixed installation 3x cable Ø
- **Alternating bending test**  
tested with approx. **10 million bending cycles**
- **Radiation resistance**  
up to 50x10<sup>6</sup> cJ/kg (up to 50 Mrad)

## Cable structure

- Bare copper, extra fine wire conductors, bunch stranded to DIN VDE 0295 cl.6, col. 4, BS 6360 cl.6 and IEC 60228 cl.6
- Core insulation of special PP
- Core identification to DIN VDE 0293 black cores with continuous white numbering
- GN-YE conductor, 3 cores and above in the outer layer
- Cores stranded in layers with optimal selected lay-length
- Special core wrapping over each layer (up to 4 mm<sup>2</sup> without core wrapping over the outer layer)
- Outer sheath of special **full-polyurethane** TMPU, to DIN VDE 0207-363-10-2/ DIN EN 50363-10-2
- Sheath colour grey (RAL 7001)
- with meter marking

## Properties

- Very good oil resistant
- Guaranteed permanent application in multi-shift operation under extreme high bending stress
- Adhesion-low
- High resistance to mechanical strain
- High property of alternating bending strength
- Long life durabilities through low friction-resistance by using the TP insulation
- High tensile strength-, abrasion- and impact resistant at öpw temperature
- Resistant to weather, ozone and UV-radiation, solvents, acids and alkalis, and hydrolysis
- PUR outer sheath self-extinguishing and flame retardant acc. to DIN VDE 0482-332-1-2, DIN EN 60332-1-2/ IEC 60332-1 (equivalent DIN VDE 0472 part 804 test method B) UL VW-1, CSA FT1

## Note

- G = with green-yellow conductor  
x = without green-yellow conductor (OZ)
- AWG sizes are approximate equivalent values. The actual cross-section is in mm<sup>2</sup>.
- Cleanroom qualification tested with analog type. Please note "cleanroom qualified" when ordering.
- screened analogue type:  
**MULTIFLEX 512<sup>®</sup> -C-PUR UL/CSA**, confer page 437

## Application

These special UL/CSA cables for drag chains are used for permanent flexible applications in machineries, machine tools, robot technics, for movable automated machinery parts and multi-shift operation. Those cables are developed according to the newest state of technology improvement. These high flexible control cables with sliding abilities guaranteed an optimum service life durabilities and also very economic by using the PP-core insulation and the PUR-outer sheath. The PUR material is adhesion-low and cut-resistant. For applications which go beyond standard solutions (for example for composting appliances or high shelf conveyors with extremely high processing speeds etc.) we recommend for our especially developed enquiry sheet for energy guiding systems. Before installation in cable trays please read the instructions. Further technical details see selection table for drag chain cables, see lead text.

CE= The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

Part no.	No. cores x cross-sec. mm <sup>2</sup>	AWG-No.	Outer Ø app. mm	Cop. weight kg / km	Weight app. kg / km	Part no.	No. cores x cross-sec. mm <sup>2</sup>	AWG-No.	Outer Ø app. mm	Cop. weight kg / km	Weight app. kg / km
21559	2 x 0,5	20	5,5	9,6	38,0	21570	2 x 0,75	19	6,2	14,4	47,0
21560	3 G 0,5	20	5,8	14,4	46,0	21571	3 G 0,75	19	6,5	21,6	58,0
21561	4 G 0,5	20	6,4	19,0	59,0	21572	4 G 0,75	19	7,0	29,0	69,0
21562	5 G 0,5	20	7,0	24,0	68,0	21573	5 G 0,75	19	7,8	36,0	85,0
21563	7 G 0,5	20	8,1	33,6	88,0	21574	7 G 0,75	19	9,0	50,0	118,0
21564	12 G 0,5	20	9,9	58,0	131,0	21575	12 G 0,75	19	11,0	86,0	183,0
21565	18 G 0,5	20	11,5	86,0	197,0	21576	18 G 0,75	19	13,0	130,0	270,0
21566	20 G 0,5	20	12,0	96,0	260,0	21577	20 G 0,75	19	13,5	144,0	290,0
21567	25 G 0,5	20	13,7	120,0	282,0	21578	25 G 0,75	19	15,4	180,0	374,0
21568	30 G 0,5	20	14,3	144,0	315,0	21579	30 G 0,75	19	16,2	216,0	420,0
21569	36 G 0,5	20	15,3	172,0	374,0	21580	36 G 0,75	19	17,6	259,0	498,0

Continuation ▶

# MULTIFLEX 512<sup>®</sup>-PUR UL/CSA special cable for drag chains, 80°C, 600 V, two approval control cable, halogen-free



Part no.	No. cores x cross-sec. mm <sup>2</sup>	AWG-No.	Outer Ø app. mm	Cop. weight kg / km	Weight app. kg / km
21581	2 x 1	18	6,9	19,2	55,0
21582	3 G 1	18	7,4	29,0	70,0
21583	4 G 1	18	8,0	38,0	86,0
21584	5 G 1	18	8,7	48,0	102,0
21585	7 G 1	18	10,2	67,0	143,0
21586	12 G 1	18	12,6	115,0	225,0
21587	18 G 1	18	14,8	173,0	334,0
21588	20 G 1	18	15,8	192,0	370,0
21589	25 G 1	18	18,1	240,0	460,0
21590	30 G 1	18	18,5	288,0	530,0
21591	36 G 1	18	20,1	346,0	625,0
21592	41 G 1	18	22,0	410,0	779,0
21593	50 G 1	18	24,0	498,0	953,0
21594	65 G 1	18	27,2	650,0	1205,0
21595	2 x 1,5	16	7,6	29,0	70,0
21596	3 G 1,5	16	8,1	43,0	90,0
21597	4 G 1,5	16	8,7	58,0	106,0
21598	5 G 1,5	16	9,7	72,0	145,0
21599	7 G 1,5	16	11,3	101,0	205,0
21600	12 G 1,5	16	13,8	173,0	320,0
21601	18 G 1,5	16	16,3	259,0	465,0
21602	20 G 1,5	16	17,3	288,0	510,0
21603	25 G 1,5	16	19,8	360,0	650,0
21604	30 G 1,5	16	20,3	432,0	750,0
21605	36 G 1,5	16	22,2	518,0	880,0
21606	42 G 1,5	16	24,0	628,0	1209,0
21607	50 G 1,5	16	26,2	749,0	1449,0
21608	61 G 1,5	16	28,9	912,0	1712,0

Part no.	No. cores x cross-sec. mm <sup>2</sup>	AWG-No.	Outer Ø app. mm	Cop. weight kg / km	Weight app. kg / km
21609	2 x 2,5	14	9,2	48,0	115,0
21610	3 G 2,5	14	9,7	72,0	162,0
21611	4 G 2,5	14	10,5	96,0	196,0
21612	5 G 2,5	14	11,6	120,0	230,0
21613	7 G 2,5	14	13,8	168,0	312,0
21614	12 G 2,5	14	16,9	288,0	532,0
21615	18 G 2,5	14	20,0	432,0	762,0
21616	20 G 2,5	14	21,2	480,0	858,0
21617	25 G 2,5	14	24,4	600,0	998,0
21618	4 G 4	12	13,2	154,0	283,0
21619	5 G 4	12	14,6	192,0	349,0
21620	7 G 4	12	17,6	79,0	498,0
21621	4 G 6	10	14,4	230,0	432,0
21622	5 G 6	10	15,9	288,0	529,0
21623	7 G 6	10	19,2	403,0	782,0
21624	4 G 10	8	18,4	384,0	685,0
21625	5 G 10	8	20,7	480,0	817,0
21626	7 G 10	8	24,7	672,0	1023,0
21627	4 G 16	6	21,3	614,0	1042,0
21628	5 G 16	6	23,8	768,0	1292,0
21629	7 G 16	6	28,6	1075,0	1709,0

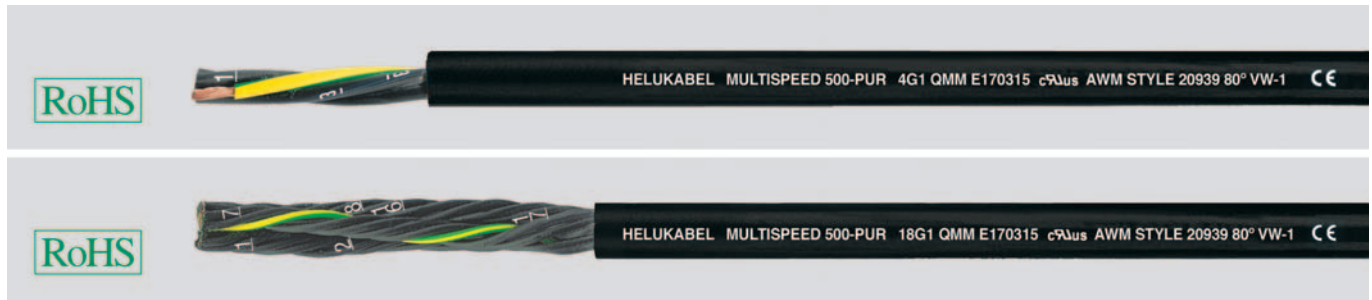
Dimensions and specifications may be changed without prior notice. (RN05)



Suitable Cable drag chains can be found in our Cable Accessories catalogue.

# MULTISPEED® 500-PUR UL/CSA safety against high

bending in drag chain systems, low torsion, halogen-free, meter marking



## Technical data

- Special drag chain cables for high mechanical stress in adapted to DIN VDE 0285-525-2-51 / DIN EN 50525-2-51, DIN VDE 0285-525-2-21 / DIN EN 50525-2-21 and UL-Std.758 AWM Style 20939
- **Temperature range**  
flexing -30°C to +80°C  
fixed installation -40°C to +80°C
- **Nominal voltage**  
DIN VDE U<sub>0</sub>/U 300/500 V  
UL 600 V
- **Test voltage** 3000 V
- **Insulation resistance**  
min. 100 MOhm x km
- **Minimum bending radius**  
flexing 7,5x cable Ø  
fixed installation 4x cable Ø
- **Radiation resistance**  
up to 100x10<sup>6</sup> cJ/kg (up to 100 Mrad)

## Cable structure

- Bare copper, fine wire conductors, unilay with short pitch length
- Core insulation of special PP
- Core identification to DIN VDE 0293 black cores with continuous white numbering
- GN-YE conductor, 3 cores and above
- Stranding:  
<7 cores: cores stranded in a layer with optimal lay-length around a filler as per construction
- ≥7 cores: cores stranded with optimal lay-length to bunch-construction with low torsion strength, optimal selected short lay-length around a filler
- Outer sheath of special-PUR
- extruded as filler with pressure
- Sheath colour black (RAL 9005)
- with meter marking

## Properties

- The materials used in manufacture are cadmium-free and contain no silicone and free from substances harmful to the wetting properties of lacquers
- **Tests**
- PUR-sheath flame retardant acc. to DIN VDE 0482-332-1-2, DIN EN 60332-1-2/IEC 60332-1 (equivalent DIN VDE 0472 part 804 test method B), UL VW-1, CSA FT1
- low adhesion
- halogen-free
- Higher economical solution
- High resistant to mechanical strain
- Long life durability due to low friction-resistance
- High tensile strength, abrasion- and impact resistance at low temperature
- Tear resistance
- High stability
- Oil resistance
- Better chemical resistance
- UV and ozone resistance
- Increased economic efficiency
- Reduced Ø, therefore less moving masses

## Note

- G = with green-yellow conductor
- x = without green-yellow conductor (OZ)
- AWG sizes are approximate equivalent values. The actual cross-section is in mm<sup>2</sup>.
- screened analogue type:  
**MULTISPEED® 500-C-PUR UL/CSA**, confer page 439

## Application

UL/CSA approved HELUKABEL® MULTISPEED® 500-PUR are installed there, where the extreme requirements for the cables are necessary. The selected materials and lay-up technique permit these high flexible cables for permanent application in drag chains for long distances, high an slow speed of movements. These cables are installed in dry, moist and wet rooms and in open air with free movement without tensile stress or forced movements. These robust and abrasion resistant special control cables are installed there, where the problems appear for the application in permanent stresses e. g. in energy drag chains, industry robotics, production lines, automatic control systems and permanent movable machinery parts for multi-shift operation. These cables are installed everywhere, where high requirements for the flexibility, abrasion, oxygen and chemical resistance are necessary. For applications which go beyond standard solutions (for example for composting appliances or high shelf conveyors with extremely high processing speeds etc.) we recommend for our especially developed enquiry sheet for energy guiding systems. Before installation in cable trays please read the instructions. Further technical details see selection table for drag chain cables, see lead text.

CE= The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

Part no.	No.cores x cross-sec. mm <sup>2</sup>	AWG-No.	Outer Ø app. mm	Cop. weight kg / km	Weight app. kg / km
24370	2 x 0,5	20	4,8	9,6	41,0
24371	3 G 0,5	20	5,1	14,4	48,0
24372	4 G 0,5	20	5,5	19,0	62,0
24373	5 G 0,5	20	6,0	24,0	70,0
24374	7 G 0,5	20	9,1	33,6	88,0
24375	12 G 0,5	20	10,0	58,0	131,0
24376	18 G 0,5	20	12,2	86,0	204,0
24377	25 G 0,5	20	14,3	120,0	266,0

Part no.	No.cores x cross-sec. mm <sup>2</sup>	AWG-No.	Outer Ø app. mm	Cop. weight kg / km	Weight app. kg / km
24378	3 G 0,75	19	5,2	21,6	51,0
24379	4 G 0,75	19	6,1	29,0	68,0
24380	5 G 0,75	19	6,6	36,0	73,0
24381	7 G 0,75	19	10,5	50,0	92,0
24382	12 G 0,75	19	11,4	86,0	170,0
24383	18 G 0,75	19	14,2	130,0	257,0
24384	25 G 0,75	19	16,3	180,0	280,0
24385	36 G 0,75	19	20,1	260,0	411,0
24386	42 G 0,75	19	22,2	302,0	608,0

Continuation ▶



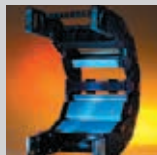
# MULTISPEED® 500-PUR UL/CSA safety against high bending in drag chain systems, low torsion, halogen-free, meter marking



Part no.	No. cores x cross-sec. mm <sup>2</sup>	AWG-No.	Outer Ø app. mm	Cop. weight kg / km	Weight app. kg / km
24387	3 G 1	18	5,9	29,0	59,0
24388	4 G 1	18	6,4	38,0	71,0
24389	5 G 1	18	7,0	48,0	84,0
24390	7 G 1	18	11,2	67,0	111,0
24391	12 G 1	18	12,3	115,0	200,0
24392	18 G 1	18	15,1	173,0	286,0
24393	25 G 1	18	17,6	240,0	370,0
24331	36 G 1	18	21,6	346,0	485,0
24394	3 G 1,5	16	6,7	43,0	81,0
24395	4 G 1,5	16	7,3	58,0	102,0
24396	5 G 1,5	16	8,0	72,0	121,0
24397	7 G 1,5	16	13,2	101,0	164,0
24398	12 G 1,5	16	15,0	173,0	293,0
24399	18 G 1,5	16	17,7	259,0	450,0
24400	25 G 1,5	16	20,5	360,0	631,0
24332	36 G 1,5	16	25,6	518,0	779,0

Part no.	No. cores x cross-sec. mm <sup>2</sup>	AWG-No.	Outer Ø app. mm	Cop. weight kg / km	Weight app. kg / km
24401	4 G 2,5	14	8,9	86,0	173,0
24402	5 G 2,5	14	9,8	120,0	220,0
24403	7 G 2,5	14	16,1	168,0	290,0
24404	12 G 2,5	14	17,8	288,0	504,0
24405	18 G 2,5	14	21,8	432,0	719,0
24406	25 G 2,5	14	24,4	600,0	940,0

Dimensions and specifications may be changed without prior notice. (RN05)



Suitable Cable drag chains can be found in our Cable Accessories catalogue.

# PURö-JZ-HF-FCP high flexible, cable for drag chains, oil resistant, EMC-preferred type, meter marking



NEW

## Technical data

- Special PUR drag chain cable, extreme flexibility acc. to UL/CSA AWM I/II A/B Style 21223
- **Temperature range**  
flexing -5°C to +80°C  
fixed installation -40°C to +80°C
- **Nominal voltage**  
VDE U<sub>0</sub>/U 300/500 V  
UL/CSA 1000 V
- **Test voltage** 4000 V
- **Breakdown voltage** min. 8000 V
- **Insulation resistance**  
min. 20 MOhm x km
- **Minimum bending radius**  
flexing 10x cable Ø  
fixed installation 5x cable Ø
- **Coupling resistance**  
max. 250 Ohm/km
- **Radiation resistance**  
up to 80x10<sup>6</sup> cJ/kg (up to 80 Mrad)

## Cable structure

- Bare copper, fine wire conductors, to DIN VDE 0295 cl.5, BS 6360 cl.5 and IEC 60228 cl.5
- Core insulation of special PVC acc. to UL-Std.1581
- Core identification to DIN VDE 0293 black cores with continuous white numbering
- GN-YE conductor, 3 cores and above in the outer layer
- Cores stranded in layers with optimal selected lay-length
- Separating foil over each layer
- construction with Cu-screening, tinned, approx. 85%
- Minimum coverage 85%
- Outer sheath of special full-polyurethane to DIN VDE 0207-363-10-2/ DIN EN 50363-10-12 acc. to UL-Std.1581
- Sheath colour grey (RAL 7001)
- with meter marking

## Properties

- self-extinguishing and flame retardant acc. to DIN VDE 0482-332-1-2, DIN EN 60332-1-2 / IEC 60332-1 (equivalent DIN VDE 0472 part 804 test method B), UL VW-1, CSA FT1
- Suitable for outdoor lying
- resistant to UV-radiation, oxygen, Ozone, Hydrolyze and microbes
- low adhesion
- The materials used in manufacture are cadmium-free and contain no silicone and free from substances harmful to the wetting properties of lacquers
- oil resistant to DIN VDE 0473-811-404 / DIN EN 60811-404

## Note

- G = with green-yellow conductor  
x = without green-yellow conductor (OZ)
- AWG sizes are approximate equivalent values. The actual cross-section is in mm<sup>2</sup>.
- analogue type:  
**JZ-602 RC-PUR**

## Application

UL/CSA approved, highly flexible, screened PUR drag-chain cable for laying in dry, damp, wet rooms and outside, with free movement and without tensile load or forced movements, suitable for frequent lifting and bending stresses in the sector of machine manufacture and tool making. Thanks to the high level of shielding density, a fault-free transmission of signals or impulses is ensured. The ideal control line, offering protection against interference, for the above applications. Of interest for those machinery manufacturers, who are export orientated. For applications which go beyond standard solutions (for example for composting appliances or high shelf conveyors with extremely high processing speeds etc.) we recommend for our especially developed enquiry sheet for energy guiding systems. Before installation in cable trays please read the instructions. Further technical details see selection table for drag chain cables, see lead text.

**EMC** = Electromagnetic compatibility

To optimize the EMC features we recommend a large round contact of the copper braiding on both ends.

CE = The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

Part no.	No. cores x cross-sec. mm <sup>2</sup>	AWG-No.	Outer Ø app. mm	Cop. weight kg / km	Weight app. kg / km
12944	2 x 0,5	20	6,0	35,0	46,0
12945	3 G 0,5	20	6,3	42,0	56,0
12946	4 G 0,5	20	6,8	47,0	64,0
12947	5 G 0,5	20	7,4	56,0	77,0
12948	7 G 0,5	20	8,5	69,0	104,0
12949	12 G 0,5	20	10,1	108,0	158,0
12950	18 G 0,5	20	11,7	145,0	229,0
12951	25 G 0,5	20	14,0	240,0	320,0
12952	2 x 0,75	19	6,4	40,0	59,0
12953	3 G 0,75	19	6,8	52,0	68,0
12954	4 G 0,75	19	7,3	60,0	82,0
12955	5 G 0,75	19	7,9	71,0	101,0
12956	7 G 0,75	19	9,2	91,0	150,0
12957	12 G 0,75	19	11,0	142,0	212,0
12958	18 G 0,75	19	13,0	212,0	305,0
12959	25 G 0,75	19	15,8	281,0	430,0
12960	2 x 1	18	6,8	50,0	71,0
12961	3 G 1	18	7,2	60,0	90,0

Part no.	No. cores x cross-sec. mm <sup>2</sup>	AWG-No.	Outer Ø app. mm	Cop. weight kg / km	Weight app. kg / km
12962	4 G 1	18	7,8	71,0	114,0
12963	5 G 1	18	8,4	88,0	136,0
12964	7 G 1	18	9,8	111,0	169,0
12965	12 G 1	18	12,0	184,0	270,0
12966	18 G 1	18	14,2	260,0	385,0
12967	25 G 1	18	16,8	349,0	530,0
12968	2 x 1,5	16	7,3	63,0	88,0
12969	3 G 1,5	16	7,7	80,0	104,0
12970	4 G 1,5	16	8,4	97,0	136,0
12971	5 G 1,5	16	9,1	119,0	170,0
12972	7 G 1,5	16	10,7	147,0	221,0
12973	12 G 1,5	16	13,0	267,0	348,0
12974	18 G 1,5	16	15,5	374,0	489,0
12975	25 G 1,5	16	18,7	526,0	710,0
12976	3 G 2,5	14	9,1	144,0	177,0
12977	4 G 2,5	14	9,9	148,0	204,0
12978	7 G 2,5	14	13,0	255,0	340,0
12979	4 G 4	12	11,2	230,0	310,0

Dimensions and specifications may be changed without prior notice. (RN05)

# JZ-602 RC-C-PUR special cable for drag chains, 80°C, 600 V, two approval control cable, EMC-preferred type, meter marking



## Technical data

- Control cable of special-PUR to UL CSA AWM I/II A/B Style 20939 (sheath insulation) and CSA
- **Temperature range**  
flexing -5°C to +80°C  
fixed installation -40°C to +80°C
- **Nominal voltage** UL/CSA 600 V
- **Test voltage** 4000 V
- **Breakdown voltage** min. 8000 V
- **Insulation resistance**  
min 20 MOhm x km
- **Minimum bending radius**  
flexing 10x cable Ø  
fixed installation 5x cable Ø
- **Coupling resistance**  
max. 250 Ohm/km
- **Radiation resistance**  
up 100x10<sup>6</sup> cJ/kg (up to 100 Mrad)

## Cable structure

- Bare copper, extra fine wire conductors, to DIN VDE 0295 cl.6, BS 6360 cl.6 and IEC 60228 cl.6
- Core insulation of special PVC compound type T12 to DIN VDE 0207-363-3/ DIN EN 50363-3 and class 43 acc. to UL-Std. 1581
- Core identification to DIN VDE 0293 black cores with continuous white numbering
- GN-YE conductor in the outer layer
- Cores stranded with optimal lay-length
- Wrapped of fleece over each layer
- PVC-inner sheath
- Screening:  
up to 17 mm Ø - layer of tinned copper wires  
>17 mm Ø - tinned copper wire braid coverage ca. 85%
- Outer sheath of special **Full-polyurethane**
- Sheath colour grey (RAL 7001)
- with meter marking

## Properties

- Resistant to mineral oils, synthetic oils and coolant, UV-radiation, oxygene, ozon and hydrolysis. Conditionally resistant to microbes.
- The materials used in manufacture are cadmium-free and contain no silicone and free from substances harmful to the wetting properties of lacquers

## Note

- G = with green-yellow conductor
- AWG sizes are approximate equivalent values. The actual cross-section is in mm<sup>2</sup>.
- unscreened analogue type: **JZ-602 RC PUR**, confer page 430

## Application

These cable are used for flexible use for medium mechanical stresses with free movement without tensile stress or forced movements in dry, moist, wet rooms and outdoor. These special cables for drag chains are used for permanent flexible applications in machineries, machine tools, robot technics, for movable automated machinery parts. The dense screening assures disturbance-free transmission of all signals and impulses. An ideal disturbance-free control cable for the above applications. For applications which go beyond standard solutions we recommend for our especially developed enquiry sheet for energy guiding systems. Before installation in cable trays please read the instructions. Further technical details see selection table for drag chain cables, see lead text.

**EMC** = Electromagnetic compatibility

To optimize the EMC features we recommend a large round contact of the copper braiding on both ends.

**RC** = Robotics Cable

**CE** = The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

Part no.	No. cores x cross-sec. mm <sup>2</sup>	AWG-No.	Outer Ø app. mm	Cop. weight kg / km	Weight app. kg / km
12680	3 G 0,5	20	8,5	45,0	124,0
12681	4 G 0,5	20	9,0	52,0	135,0
12682	5 G 0,5	20	9,7	68,0	153,0
12683	7 G 0,5	20	11,0	93,0	191,0
12684	9 G 0,5	20	12,4	134,0	243,0
12685	12 G 0,5	20	13,5	163,0	322,0
12686	15 G 0,5	20	14,8	174,0	350,0
12687	18 G 0,5	20	16,0	191,0	374,0
12688	25 G 0,5	20	19,0	223,0	436,0
12689	3 G 0,75	18	8,9	56,0	130,0
12690	4 G 0,75	18	9,7	81,0	155,0
12691	5 G 0,75	18	10,4	90,0	181,0
12692	7 G 0,75	18	12,0	106,0	208,0
12693	9 G 0,75	18	14,1	161,0	321,0
12694	12 G 0,75	18	15,2	175,0	341,0
12695	15 G 0,75	18	16,7	204,0	396,0
12696	18 G 0,75	18	17,6	241,0	473,0
12697	25 G 0,75	18	20,7	342,0	650,0
12698	34 G 0,75	18	24,3	434,0	781,0
12699	3 G 1,5	16	10,2	89,0	165,0
12700	4 G 1,5	16	11,0	97,0	192,0
12701	5 G 1,5	16	11,8	111,0	224,0
12702	7 G 1,5	16	14,0	147,0	274,0
12703	9 G 1,5	16	16,4	193,0	340,0
12704	12 G 1,5	16	17,1	256,0	461,0
12705	18 G 1,5	16	20,2	360,0	674,0

Part no.	No. cores x cross-sec. mm <sup>2</sup>	AWG-No.	Outer Ø app. mm	Cop. weight kg / km	Weight app. kg / km
12706	25 G 1,5	16	25,2	544,0	950,0
12707	34 G 1,5	16	28,1	674,0	1203,0
12708	3 G 2,5	14	11,8	141,0	220,0
12709	4 G 2,5	14	13,2	170,0	270,0
12710	5 G 2,5	14	14,2	195,0	350,0
12711	7 G 2,5	14	17,4	251,0	428,0
12712	12 G 2,5	14	21,0	368,0	730,0
12713	18 G 2,5	14	25,4	639,0	1140,0
12714	3 G 4	12	14,0	180,0	296,0
12715	4 G 4	12	15,9	232,0	456,0
12716	5 G 4	12	17,7	330,0	450,0
12717	7 G 4	12	20,9	395,0	737,0
12718	4 G 6	10	18,3	316,0	572,0
12719	4 G 10	8	23,2	490,0	1012,0
12720	4 G 16	6	27,6	850,0	1400,0
12721	4 G 25	4	33,1	1450,0	2100,0
12722	4 G 35	2	37,8	1890,0	2550,0

Dimensions and specifications may be changed without prior notice. (RN05)

**MULTIFLEX 512®-C-PUR UL/CSA** special cable for**drag chains, 80°C, 600 V, two approval control cable, EMC-preferred type, halogen-free, meter marking****Technical data**

- Special drag chain cables for extreme mechanical stress to UL-Style 20939
- **Temperature range**  
flexing -30°C to +80°C  
fixed installation -40°C to +80°C
- **Nominal voltage** UL/CSA 600 V
- **Test voltage** 3000 V
- **Insulation resistance**  
min. 100 MOhm x km
- **Minimum bending radius**  
flexing 7,5x cable Ø  
fixed installation 4x cable Ø
- **Alternating bending test**  
tested with approx. **10 million bending cycles**
- **Radiation resistance**  
up to 50x10<sup>6</sup> cJ/kg (up to 50 Mrad)
- **Coupling resistance**  
max. 250 Ohm/km

**Cable structure**

- Bare copper, extra fine wire conductors, bunch stranded to DIN VDE 0295 cl.6, col. 4, BS 6360 cl.6 and IEC 60228 cl.6
- Core insulation of special PP
- Core identification to DIN VDE 0293 black cores with continuous white numbering
- GN-YE conductor, 3 cores and above in the outer layer
- Cores stranded in layers with optimal selected lay-length
- Special core wrapping over each layers and an additional fleece over outer layer
- **TPE-inner sheath**, halogen-free
- Wrapping with special tapes
- Tinned copper braided screening, approx. 85% coverage
- Special core wrapping of fleece (up to 4 mm<sup>2</sup> without core wrapping over the outer layer)
- Outer sheath of special **full-polyurethane** TMPU, to DIN VDE 0207-363-10-2 / DIN EN 50363-10-2
- Sheath colour grey (RAL 7001)
- with meter marking

**Properties**

- Very good oil resistant
- Guaranteed permanent application in multi-shift operation under extreme high bending stress
- Adhesion-low
- High resistant to mechanical strain
- High property of alternating bending strength
- Long lifedurabilities through low friction-resistance by using the TPE insulation
- High tensile strength-, abrasion and impact resistant at low temperature
- Resistant to Weather, Ozone, UV-radiation, Solvents, Acids and Alkalis, Hydraulic liquidity and Hydrolysis
- The materials used in manufacture are cadmium-free and contain no silicone and free from substances harmful to the wetting properties of lacquers

**Tests**

- PUR-sheath flame retardant acc. to DIN VDE 0482-332-1-2, DIN EN 60332-1-2 / IEC 60332-1 (equivalent DIN VDE 0472 part 804 test method B), UL VW-1, CSA FT1

**Note**

- G = with green-yellow conductor  
x = without green-yellow conductor (OZ)
- AWG sizes are approximate equivalent values. The actual cross-section is in mm<sup>2</sup>.
- Please note the cleanroom qualification when ordering.
- unscreened analogue type:  
**MULTIFLEX 512® PUR UL/CSA**, confer page 431

**Application**

The special screened UL/CSA cables for drag chains are mainly applied for impulse transmission to prevent external interference effects and used for permanent flexible applications in machineries, machine tools, robot technics, for movable automated machinery parts and multi-shift operation. Those cables are developed according to the newest state of technology improvement. These high flexible control cables with sliding abilities guaranteed an optimum service life durabilities and also very economic by using the PP-core insulation and the PUR-outer sheath which is adhesive-free and cut-resistant.

**EMC** = Electromagnetic compatibility

To optimize the EMC features we recommend a large round contact of the copper braiding on both ends.

CE = The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

Part no.	No.cores x cross-sec. mm <sup>2</sup>	AWG-No.	Outer Ø app. mm	Cop. weight kg / km	Weight app. kg / km
21630	2 x 0,5	20	8,3	30,0	90,0
21631	3 G 0,5	20	8,5	38,0	105,0
21632	4 G 0,5	20	9,0	50,0	124,0
21633	5 G 0,5	20	9,7	65,0	132,0
21634	7 G 0,5	20	11,1	70,0	175,0
21635	12 G 0,5	20	12,7	100,0	250,0

Part no.	No.cores x cross-sec. mm <sup>2</sup>	AWG-No.	Outer Ø app. mm	Cop. weight kg / km	Weight app. kg / km
21636	18 G 0,5	20	14,7	157,0	325,0
21637	20 G 0,5	20	15,4	167,0	350,0
21638	25 G 0,5	20	17,1	240,0	450,0
21639	30 G 0,5	20	17,9	273,0	510,0
21640	36 G 0,5	20	19,2	306,0	580,0

Continuation ▶

# MULTIFLEX 512<sup>®</sup>-C-PUR UL/CSA special cable for

drag chains, 80°C, 600 V, two approval control cable, EMC-preferred type, halogen-free, meter marking



Part no.	No. cores x cross-sec. mm <sup>2</sup>	AWG-No.	Outer Ø app. mm	Cop. weight kg / km	Weight app. kg / km
21641	2 x 0,75	19	8,8	39,0	110,0
21642	3 G 0,75	19	9,3	49,0	120,0
21643	4 G 0,75	19	9,7	60,0	148,0
21644	5 G 0,75	19	10,5	70,0	160,0
21645	7 G 0,75	19	11,9	95,0	205,0
21646	12 G 0,75	19	14,2	140,0	308,0
21647	18 G 0,75	19	16,3	220,0	420,0
21648	20 G 0,75	19	16,9	249,0	450,0
21649	25 G 0,75	19	19,2	313,0	579,0
21650	30 G 0,75	19	19,7	470,0	630,0
21651	36 G 0,75	19	21,2	500,0	745,0
21652	2 x 1	18	9,7	50,0	120,0
21653	3 G 1	18	10,0	60,0	135,0
21654	4 G 1	18	10,8	73,0	173,0
21655	5 G 1	18	11,7	81,0	187,0
21656	7 G 1	18	13,4	114,0	240,0
21657	12 G 1	18	16,0	186,0	360,0
21658	18 G 1	18	18,5	254,0	498,0
21659	20 G 1	18	19,4	322,0	568,0
21660	25 G 1	18	21,7	377,0	670,0
21661	30 G 1	18	22,5	429,0	774,0
21662	36 G 1	18	24,3	516,0	895,0
21663	41 G 1	18	26,1	610,0	1032,0
21664	50 G 1	18	28,4	690,0	1160,0
21665	65 G 1	18	32,2	852,0	1660,0
21666	2 x 1,5	16	10,2	64,0	145,0
21667	3 G 1,5	16	11,0	84,0	168,0
21668	4 G 1,5	16	11,6	99,0	217,0
21669	5 G 1,5	16	12,6	129,0	235,0
21670	7 G 1,5	16	14,5	148,0	325,0
21671	12 G 1,5	16	17,4	279,0	481,0
21672	18 G 1,5	16	19,9	393,0	675,0
21673	25 G 1,5	16	23,7	584,0	927,0

Part no.	No. cores x cross-sec. mm <sup>2</sup>	AWG-No.	Outer Ø app. mm	Cop. weight kg / km	Weight app. kg / km
21674	30 G 1,5	16	24,6	607,0	1025,0
21675	36 G 1,5	16	26,4	702,0	1210,0
21676	42 G 1,5	16	28,4	829,0	1441,0
21677	50 G 1,5	16	31,2	1025,0	1709,0
21678	61 G 1,5	16	34,2	1190,0	2025,0
21679	2 x 2,5	14	11,9	104,0	198,0
21680	3 G 2,5	14	12,6	140,0	284,0
21681	4 G 2,5	14	13,6	164,0	378,0
21682	5 G 2,5	14	14,7	190,0	423,0
21683	7 G 2,5	14	17,4	236,0	486,0
21684	12 G 2,5	14	20,9	390,0	756,0
21685	18 G 2,5	14	24,2	607,0	1127,0
21686	20 G 2,5	14	25,6	661,0	1210,0
21687	25 G 2,5	14	29,1	796,0	1530,0
21688	4 G 4	12	16,8	222,0	448,0
21689	5 G 4	12	18,4	328,0	533,0
21690	7 G 4	12	21,6	360,0	678,0
21691	4 G 6	10	18,1	305,0	636,0
21692	5 G 6	10	19,6	441,0	772,0
21693	7 G 6	10	23,2	505,0	1028,0
21694	4 G 10	8	22,5	485,0	1052,0
21695	5 G 10	8	24,7	610,0	1096,0
21696	7 G 10	8	29,3	820,0	1530,0
21697	4 G 16	6	25,7	840,0	1386,0
21698	5 G 16	6	28,2	1050,0	1759,0
21699	7 G 16	6	33,6	1510,0	2087,0

Dimensions and specifications may be changed without prior notice. (RN05)



Suitable Cable drag chains can be found in our Cable Accessories catalogue.



# MULTISPEED® 500-C-PUR UL/CSA safety against

high bending in drag chain systems, low torsion, halogen-free, EMC-preferred type, meter marking



## Technical data

- Special drag chain cables for high mechanical stress in adapted to DIN VDE 0285-525-2-51 / DIN EN 50525-2-51, DIN VDE 0285-525-2-21 / DIN EN 50525-2-21 and UL-Std.758 AWM Style 20939
- **Temperature range**  
flexing -30°C to +80°C  
fixed installation -40°C to +80°C
- **Nominal voltage**  
VDE U<sub>0</sub>/U 300/500 V  
UL 600 V
- **Test voltage** 3000 V
- **Insulation resistance**  
min. 100 MOhm x km
- **Minimum bending radius**  
flexing 7,5x cable Ø  
fixed installation 4x cable Ø
- **Coupling resistant**  
max. 250 Ohm/km
- **Radiation resistance**  
up to 100x10<sup>6</sup> cJ/kg (up to 100 Mrad)

## Cable structure

- Bare copper, fine wire conductors, Unilay with short pitch length
- Core insulation of special PP
- Core identification to DIN VDE 0293 black cores with continuous white numbering
- GN-YE conductor, 3 cores and above
- Stranding:  
<7 cores: cores stranded in a layer with optimal lay-length around a filler as pe construction  
≥7 cores: cores stranded with optimal lay-length to bunch-construction with low torsion strength, optimal selected short lay-length around a filler
- Special-TPE-O inner sheath, extruded as filler with pressure, grey RAL 7001
- Tinned copper braided screen, coverage 85% max., with optimal pitch
- Outer sheath of special PUR
- Sheath colour black (RAL 9005)
- with meter marking

## Properties

- The materials used in manufacture are cadmium-free and contain no silicone and free from substances harmful to the wetting properties of lacquers
- **Tests**
- PUR-sheath flame retardant acc. to DIN VDE 0482-332-1-2, DIN EN 60332-1-2 / IEC 60332-1 (equivalent DIN VDE 0472 part 804 test method B), UL VW-1, CSA FT1
- Low adhesion
- High property of alternating bending strength
- Longer service life due to low frictional resistance
- High tensile, abrasion and impact resistance even at low temperatures
- Higher notch toughness
- Higher stability
- Oil resistance
- Better chemical resistance
- UV and ozone resistance
- Higher economical solution
- Reduced Ø, therefore less moving masses

## Note

- G = with green-yellow conductor  
x = without green-yellow conductor (OZ)
- AWG sizes are approximate equivalent values. The actual cross-section is in mm<sup>2</sup>.
- unscreened analogue type:  
**MULTISPEED® 500-PUR UL/CSA**, confer page 433

## Application

UL/CSA approved HELUKABEL® MULTISPEED® 500-C-PUR is used in applications where extreme requirements placed on the line. Designed for the export-orientated machinery manufacturer, specifically for USA and Canada. The selected materials and lay-up technique permit these high flexible cables for permanent application in drag chains for long distances, high a slow speed of movements. These cables are installed in dry, moist and wet rooms and in open air with free movement without tensile stress or forced movements. These robust and abrasion resistant special control cables are installed there, where the problems appear for the application in permanent stresses e. g. in energy drag chains, industry robotics, production lines, automatic control systems and permanent movable machinery parts for multi-shift operation. These cables are installed everywhere, where high requirements for the flexibility, abrasion, oxygen and chemical resistance are necessary. These screened cables are particularly suitable for the interference-free transmission in instrumentation and control engineering applications. Before installation in cable trays please read the instructions. Further technical details see selection table for drag chain cables, see lead text.

**EMC** = Electromagnetic compatibility

To optimize the EMC features we recommend a large round contact of the copper braiding on both ends.

CE = The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

Part no.	No. cores x cross-sec. mm <sup>2</sup>	AWG-No.	Outer Ø app. mm	Cop. weight kg / km	Weight app. kg / km	Part no.	No. cores x cross-sec. mm <sup>2</sup>	AWG-No.	Outer Ø app. mm	Cop. weight kg / km	Weight app. kg / km
24410	2 x 0,5	20	6,6	30,0	90,0	24419	2 x 0,75	19	6,8	40,0	100,0
24411	3 G 0,5	20	6,9	36,0	104,0	24420	3 G 0,75	19	7,4	48,0	117,0
24412	4 G 0,5	20	7,3	42,0	118,0	24421	4 G 0,75	19	8,0	55,0	143,0
24413	5 G 0,5	20	7,8	48,0	148,0	24422	5 G 0,75	19	8,5	66,0	167,0
24414	7 G 0,5	20	11,3	64,0	184,0	24423	7 G 0,75	19	12,9	85,0	229,0
24415	9 G 0,5	20	11,4	80,0	219,0	24424	12 G 0,75	19	14,4	135,0	319,0
24416	12 G 0,5	20	12,6	105,0	276,0	24425	18 G 0,75	19	17,5	190,0	492,0
24417	18 G 0,5	20	15,0	137,0	378,0	24426	25 G 0,75	19	19,9	275,0	659,0
24418	25 G 0,5	20	17,5	210,0	547,0						

Continuation ▶

# MULTISPEED® 500-C-PUR UL/CSA safety against high bending in drag chain systems, low torsion, halogen-free, EMC-preferred type, meter marking



Part no.	No. cores x cross-sec. mm <sup>2</sup>	AWG-No.	Outer Ø app. mm	Cop. weight kg / km	Weight app. kg / km
24427	2 x 1	18	7,1	50,0	120,0
24428	3 G 1	18	7,7	59,0	140,0
24429	4 G 1	18	8,3	70,0	167,0
24430	5 G 1	18	9,1	84,0	201,0
24431	7 G 1	18	14,0	106,0	256,0
24432	12 G 1	18	15,0	174,0	417,0
24433	18 G 1	18	18,7	240,0	557,0
24434	25 G 1	18	21,4	332,0	766,0
24333	36 G 1	18	26,1	436,0	840,0
24435	3 G 1,5	16	8,6	75,0	170,0

Part no.	No. cores x cross-sec. mm <sup>2</sup>	AWG-No.	Outer Ø app. mm	Cop. weight kg / km	Weight app. kg / km
24436	4 G 1,5	16	9,4	90,0	204,0
24437	5 G 1,5	16	10,4	108,0	236,0
24438	7 G 1,5	16	16,0	157,0	309,0
24439	12 G 1,5	16	17,6	240,0	509,0
24440	18 G 1,5	16	21,3	355,0	718,0
24441	25 G 1,5	16	24,8	448,0	944,0
24334	36 G 1,5	16	30,3	592,0	1070,0
24442	4 G 2,5	14	11,3	134,0	280,0
24443	5 G 2,5	14	12,3	175,0	346,0
24444	7 G 2,5	14	19,9	229,0	410,0

Dimensions and specifications may be changed without prior notice. (RN05)



Suitable Cable drag chains can be found in our Cable Accessories catalogue.

# MULTISPEED® 500-TPE UL/CSA high flexible,

safety against high bending in drag chain systems, low torsion, halogen-free, meter marking



## Technical data

- Special drag chain cables for high mechanical stress in acc. to DIN VDE 0285-525-2-51/ DIN EN 50525-2-51 and UL-Std.758 AWM Style 20841 and 21184
- **Temperature range**  
flexing -30°C to +80°C  
fixed installation -40°C to +80°C
- **Nominal voltage**  
VDE U<sub>0</sub>/U 300/500 V  
UL 600 V
- **Test voltage** 3000 V
- **Insulation resistance**  
min. 100 MOhm x km
- **Minimum bending radius**  
flexing 5x cable Ø  
fixed installation 3x cable Ø
- **Radiation resistance**  
up to 100x10<sup>6</sup> cJ/kg (up to 100 Mrad)

## Cable structure

- Tinned copper, fine wire conductors Unilay with short pitch length
- Core insulation of special PP
- Core identification to DIN VDE 0293 black cores with continuous white numbering
- GN-YE conductor, 3 cores and above
- Stranding:  
<7 cores: cores stranded in a layer with optimal lay-length around a filler as per construction  
≥7 cores: cores stranded with optimal lay-length to bunch-construction with low torsion strength, optimal selected short lay-length around a filler
- Outer sheath of special-TPE-O, extruded as filler with pressure
- Sheath colour ocean blue (RAL 5020)
- with meter marking
- **TPE:** The selected tinned copper wire conductor permits the installation in aggressive environments as well as hydrogen sulfide, ammonia and sulfur dioxide

## Properties

- Microbe-resistance - TPE
- High property of alternating bending strength
- Long life durability due to low friction-resistance
- High tensile strength, abrasion and impact resistance at low temperature
- Extremely high bending loads
- Low adhesion
- Halogen-free
- Higher notch toughness
- Oil resistance
- Better chemical resistance
- UV and ozone resistance
- Higher economical solution
- Reduced Ø, therefore less moving masses
- The materials used in manufacture are cadmium-free and contain no silicone and free from substances harmful to the wetting properties of lacquers

## Note

- G = with green-yellow conductor  
x = without green-yellow conductor (OZ)
- AWG sizes are approximate equivalent values. The actual cross-section is in mm<sup>2</sup>.
- Cleanroom qualification tested with analog type. Please note "cleanroom qualified" when ordering.
- screened analogue type:  
**MULTISPEED® 500-C-TPE UL/CSA**, confer page 443

## Application

The selected materials and lay-up technique permit these high flexible cables for permanent application in drag chains for long distances, high and slow speed of movements. These cables are installed in dry, moist and wet rooms and in open air with free movement without tensile stress or forced movements. These robust and abrasion resistant special control cables are installed there, where the problems appear for the application in permanent stresses e. g. in energy drag chains, industry robotics, production lines, automatic control systems and permanent movable machinery parts for multi-shift operation. These cables are installed everywhere, where high requirements for the flexibility, abrasion, oxygen and chemical resistance are necessary. For applications which go beyond standard solutions (for example for composting appliances or high shelf conveyors with extremely high processing speeds etc.) we recommend for our especially developed enquiry sheet for energy guiding systems. Before installation in cable trays please read the instructions. Further technical details see selection table for drag chain cables, see lead text.

CE= The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

Part no.	No. cores x cross-sec. mm <sup>2</sup>	AWG-No.	Outer Ø app. mm	Cop. weight kg / km	Weight app. kg / km
24450	2 x 0,5	20	4,7	9,6	42,0
24451	3 G 0,5	20	5,0	14,4	49,0
24452	4 G 0,5	20	5,4	19,0	63,0
24453	5 G 0,5	20	5,8	24,0	70,0
24454	7 G 0,5	20	8,9	33,6	90,0
24455	12 G 0,5	20	9,8	58,0	134,0
24456	18 G 0,5	20	11,9	86,0	209,0
24457	25 G 0,5	20	13,9	120,0	270,0

Part no.	No. cores x cross-sec. mm <sup>2</sup>	AWG-No.	Outer Ø app. mm	Cop. weight kg / km	Weight app. kg / km
24458	2 x 0,75	19	5,0	14,4	47,0
24459	3 G 0,75	19	5,2	21,6	55,0
24460	4 G 0,75	19	6,1	29,0	70,0
24461	5 G 0,75	19	6,6	36,0	74,0
24462	7 G 0,75	19	10,5	50,0	95,0
24463	12 G 0,75	19	11,4	86,0	174,0
24464	18 G 0,75	19	14,2	130,0	261,0
24465	25 G 0,75	19	16,3	180,0	290,0
24466	36 G 0,75	19	19,5	260,0	419,0
24467	42 G 0,75	19	21,3	302,0	614,0

Continuation ▶

# MULTISPEED® 500-TPE UL/CSA high flexible, safety against high bending in drag chain systems, low torsion, halogen-free, meter marking



Part no.	No. cores x cross-sec. mm <sup>2</sup>	AWG-No.	Outer Ø app. mm	Cop. weight kg / km	Weight app. kg / km
24468	2 x 1	18	5,2	19,2	50,0
24469	3 G 1	18	5,9	29,0	60,0
24470	4 G 1	18	6,4	38,0	74,0
24471	5 G 1	18	7,0	48,0	86,0
24472	7 G 1	18	11,2	67,0	114,0
24473	12 G 1	18	12,3	115,0	210,0
24474	18 G 1	18	15,1	173,0	291,0
24475	25 G 1	18	17,6	240,0	380,0
24476	3 G 1,5	16	6,7	43,0	84,0
24477	4 G 1,5	16	7,3	58,0	108,0
24478	5 G 1,5	16	8,0	72,0	126,0

Part no.	No. cores x cross-sec. mm <sup>2</sup>	AWG-No.	Outer Ø app. mm	Cop. weight kg / km	Weight app. kg / km
24479	7 G 1,5	16	13,2	101,0	169,0
24480	12 G 1,5	16	14,4	173,0	299,0
24481	18 G 1,5	16	17,7	259,0	460,0
24482	25 G 1,5	16	19,8	360,0	640,0
24483	4 G 2,5	14	8,9	96,0	179,0
24484	5 G 2,5	14	9,8	120,0	230,0
24485	7 G 2,5	14	16,1	168,0	294,0
24486	12 G 2,5	14	17,8	288,0	510,0
24487	18 G 2,5	14	21,8	432,0	722,0
24488	25 G 2,5	14	24,4	600,0	950,0

Dimensions and specifications may be changed without prior notice. (RN05)



Suitable Cable drag chains can be found in our Cable Accessories catalogue.

# MULTISPEED® 500-C-TPE UL/CSA safety against

high bending in drag chain systems, low torsion, halogen-free, EMC-preferred type, meter marking



## Technical data

- Special drag chain cables for high mechanical stress in adapted to DIN VDE 0285-525-2-51 / DIN EN 50525-2-51 and UL-Std.758 AWM Style 21184
- **Temperature range**  
flexing -30°C to +80°C  
fixed installation -40°C to +80°C
- **Nominal voltage**  
U<sub>0</sub>/U 300/500 V  
UL 600 V
- **Test voltage** 3000 V
- **Insulation resistance**  
min. 100 MOhm x km
- **Minimum bending radius**  
flexing 5x cable Ø  
fixed installation 3x cable Ø
- **Coupling resistance**  
max. 250 Ohm x km
- **Radiation resistance**  
up to 100x10<sup>6</sup> cJ/kg (up to 100 Mrad)

## Cable structure

- Tinned copper, fine wire conductors, Unilay with short pitch length
- Core insulation of special PP
- Core identification to DIN VDE 0293 black cores with continuous white numbering
- GN-YE conductor, 3 cores and above
- Stranding:  
<7 cores: cores stranded in a layer with optimal lay-length around a filler as per construction  
≥7 cores: cores stranded with optimal lay-length to bunch-construction with low torsion strength, optimal selected short lay-length around a filler
- Special-TPE-O inner sheath, extruded as filler with pressure, natural colour
- Screen of Cu braid tinned, coverage 85% max., with optimal pitch
- Outer sheath of special-TPE-O extruded as filler with pressure
- Sheath colour ocean blue (RAL 5020)
- with meter marking
- **TPE:** The selected tinned copper wire conductor and tinned copper wire braid permit the installation in aggressive environments as well as hydrogen sulfide, ammonia and sulfur dioxide.

## Properties

- Microbe-resistance - TPE
- High property of alternating bending strength
- Longer service life due to low friction resistance
- High tensile, abrasion and impact resistance even at low temperatures
- Extremely high bending loads
- Low adhesion
- Higher notch toughness
- Oil resistance
- Better chemical resistance
- UV and ozone resistance
- Higher economical solution
- Reduced Ø, therefore less moving masses
- The materials used in manufacture are cadmium-free and contain no silicone and free from substances harmful to the wetting properties of lacquers

## Note

- G = with green-yellow conductor  
x = without green-yellow conductor (OZ)
- AWG sizes are approximate equivalent values. The actual cross-section is in mm<sup>2</sup>.
- Please note the cleanroom qualification when ordering.
- unscreened analogue type:  
**MULTISPEED® 500-TPE UL/CSA**, confer page 441

## Application

The selected materials and lay-up technique permit these high flexible cables for permanent application in drag chains for long distances, high and slow speed of movements. These cables are installed in dry, moist and wet rooms and in open air with free movement without tensile stress or forced movements. These robust and abrasion resistant special control cables are installed there, where the problems appear for the application in permanent stresses e. g. in energy drag chains, industry robotics, production lines, automatic control systems and permanent movable machinery parts for multi-shift operation. These cables are installed everywhere, where high requirements for the flexibility, abrasion, oxygen and chemical resistance are necessary. For applications which go beyond standard solutions (for example for composting appliances or high shelf conveyors with extremely high processing speeds etc.) we recommend for our especially developed enquiry sheet for energy guiding systems. Before installation in cable trays please read the instructions. Further technical details see selection table for drag chain cables, see lead text.

**EMC** = Electromagnetic compatibility

To optimize the EMC features we recommend a large round contact of the copper braiding on both ends.

CE = The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

Part no.	No.cores x cross-sec. mm <sup>2</sup>	AWG-No.	Outer Ø app. mm	Cop. weight kg / km	Weight app. kg / km
23914	2 x 0,5	20	6,4	30,0	85,0
23915	3 G 0,5	20	6,7	36,0	99,0
23916	4 G 0,5	20	7,3	42,0	107,0
23917	5 G 0,5	20	7,7	48,0	140,0
23918	7 G 0,5	20	11,3	64,0	176,0
23919	10 G 0,5	20	10,1	80,0	204,0
23920	12 G 0,5	20	12,4	105,0	261,0
23921	18 G 0,5	20	14,7	137,0	360,0
23922	25 G 0,5	20	17,1	320,0	530,0

Part no.	No.cores x cross-sec. mm <sup>2</sup>	AWG-No.	Outer Ø app. mm	Cop. weight kg / km	Weight app. kg / km
23923	2 x 0,75	19	7,0	40,0	97,0
23924	3 G 0,75	19	7,4	48,0	110,0
23925	4 G 0,75	19	8,0	55,0	139,0
23926	5 G 0,75	19	8,5	66,0	160,0
23927	7 G 0,75	19	12,9	85,0	219,0
23928	12 G 0,75	19	14,4	135,0	307,0
23929	18 G 0,75	19	17,2	190,0	490,0
23930	25 G 0,75	19	19,9	275,0	640,0

Continuation ▶



# MULTISPEED® 500-C-TPE UL/CSA safety against

high bending in drag chain systems, low torsion, halogen-free, EMC-preferred type, meter marking



Part no.	No. cores x cross-sec. mm <sup>2</sup>	AWG-No.	Outer Ø app. mm	Cop. weight kg / km	Weight app. kg / km
23931	2 x 1	18	7,4	50,0	115,0
23932	3 G 1	18	7,7	59,0	131,0
23933	4 G 1	18	8,3	70,0	160,0
23934	5 G 1	18	9,1	84,0	195,0
23935	7 G 1	18	14,0	106,0	247,0
23936	12 G 1	18	15,0	174,0	411,0
23937	18 G 1	18	18,5	240,0	547,0
23938	25 G 1	18	21,4	332,0	754,0
23939	3 G 1,5	16	8,6	75,0	160,0
23940	4 G 1,5	16	9,4	90,0	194,0

Part no.	No. cores x cross-sec. mm <sup>2</sup>	AWG-No.	Outer Ø app. mm	Cop. weight kg / km	Weight app. kg / km
23941	5 G 1,5	16	10,4	108,0	220,0
23942	7 G 1,5	16	16,0	157,0	294,0
23943	12 G 1,5	16	17,6	240,0	490,0
23944	18 G 1,5	16	21,3	355,0	704,0
23945	25 G 1,5	16	24,8	448,0	930,0
23946	4 G 2,5	14	11,3	134,0	260,0
23947	5 G 2,5	14	12,3	175,0	330,0
23948	7 G 2,5	14	14,8	229,0	406,0
23949	12 G 2,5	14	21,5	390,0	990,0

Dimensions and specifications may be changed without prior notice. (RN05)



Suitable Cable drag chains can be found in our Cable Accessories catalogue.

# SUPERTRONIC®-310-PVC special cable for drag chains, meter marking



HELUKABEL SUPERTRONIC 310-PVC: AWM STYLE 2464 24 AWG / 0,25 QMM 4 C  
80°C 300V VW-1 LL 113926 CSA AWM I/II A/B 80° FT1



## Technical data

- Special PVC drag chain cable acc. to UL-Style 2464
- **Temperature range**  
flexing -5°C to +80°C  
fixed installation -40°C to +80°C
- **Nominal voltage** 300 V
- **Test voltage** 1500 V
- **Breakdown voltage** min. 3000 V
- **Insulation resistance**  
min. 20 MOhm x km
- **Minimum bending radius**  
flexing 5x cable Ø  
fixed installation 3x cable Ø
- **Radiation resistance**  
up to 80x10<sup>6</sup> cJ/kg (up to 80 Mrad)

## Cable structure

- Bare copper conductor, fine wire Unilay with short lay-lengths
- Core insulation of PVC class 43 acc. to UL-Std.1581
- Core identification to DIN 47100 coloured
- Cores stranded in layers with optimal lay-length
- Wrapping of fleece between the layers of stranding
- Outer sheath of special PVC, oil resistant compound type TM5 to DIN VDE 0207-363-4-1/DIN EN 50363-4-1 and class 43 acc. to UL-Std.1581
- Sheath colour grey (RAL 7001)
- with meter marking

## Properties

- The materials used in manufacture are cadmium-free and contain no silicone and free from substances harmful to the wetting properties of lacquers

## Tests

- PVC self-extinguishing and flame retardant acc. to DIN VDE 0482-332-1-2, DIN EN 60332-1-2, IEC 60332-1 (equivalent DIN VDE 0472 part 804 test method B)
- Low-adhesion

## Note

- Please observe applicable installation regulations for use in energy supply chains.
- AWG sizes are approximate equivalent values. The actual cross-section is in mm<sup>2</sup>.

## Application

A highly-flexible PVC control cable suitable for frequent and fast lifting and bending stresses in machines and tool building, robot systems and on constantly moving machine components. Long service lives guarantee reliable function and good cost efficiency. For applications which go beyond standard solutions (for example for composting appliances or high shelf conveyors with extremely high processing speeds etc.) we recommend for our especially developed enquiry sheet for energy guiding systems. Before installation in cable trays please read the instructions. Further technical details see selection table for drag chain cables, see lead text. Designed for machines intended for export, specifically USA and Canada.

CE= The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

Part no.	No. cores x cross-sec. mm <sup>2</sup>	AWG-No.	Outer Ø app. mm	Cop. weight kg / km	Weight app. kg / km
49885	2 x 0,14	26	3,7	2,8	24,0
49886	3 x 0,14	26	3,9	4,1	26,0
49887	4 x 0,14	26	4,1	5,6	31,0
49888	5 x 0,14	26	4,5	7,0	36,0
49889	7 x 0,14	26	5,1	9,8	50,0
49890	10 x 0,14	26	5,8	14,0	65,0
49891	12 x 0,14	26	6,0	16,8	72,0
49892	14 x 0,14	26	6,2	19,6	78,0
49893	18 x 0,14	26	6,9	25,2	91,0
49894	24 x 0,14	26	7,8	33,6	120,0
49895	25 x 0,14	26	8,3	35,0	125,0
49896	2 x 0,25	24	4,0	5,0	29,0
49897	3 x 0,25	24	4,2	7,5	34,0
49898	4 x 0,25	24	4,5	10,0	40,0
49899	5 x 0,25	24	4,9	12,5	51,0
49900	7 x 0,25	24	5,6	17,5	65,0
49901	10 x 0,25	24	6,4	25,0	85,0
49902	12 x 0,25	24	6,6	30,1	97,0

Part no.	No. cores x cross-sec. mm <sup>2</sup>	AWG-No.	Outer Ø app. mm	Cop. weight kg / km	Weight app. kg / km
49903	14 x 0,25	24	6,9	35,0	109,0
49904	18 x 0,25	24	7,6	45,0	132,0
49905	24 x 0,25	24	8,8	60,0	171,0
49906	25 x 0,25	24	9,4	62,5	178,0
49907	2 x 0,34	22	4,2	6,8	34,0
49908	3 x 0,34	22	4,4	10,2	43,0
49909	4 x 0,34	22	4,8	13,6	58,0
49910	5 x 0,34	22	5,1	17,0	65,0
49911	7 x 0,34	22	5,9	23,8	85,0
49912	10 x 0,34	22	6,8	34,0	117,0
49913	12 x 0,34	22	7,0	40,8	134,0
49914	14 x 0,34	22	7,4	47,6	152,0
49915	18 x 0,34	22	8,1	61,2	184,0
49916	24 x 0,34	22	9,6	81,5	242,0
49917	25 x 0,34	22	10,0	85,0	252,0

Dimensions and specifications may be changed without prior notice. (RN05)



Suitable Cable drag chains can be found in our Cable Accessories catalogue.

# SUPERTRONIC®-310-C-PVC special cable for drag chains,

EMC-preferred type, meter marking



HELUKABEL SUPERTRONIC 310-C-PVC AWM STYLE 2464 22 AWG / 0,34 QMM 5 C SHIELDED 80°C 300V VW-1 CE LL 113926 CSA AWM IIII A/B 80°C FT1



## Technical data

- Special PVC drag chain cable approved to UL-Style 2464
- **Temperature range**  
flexing -5°C to +80°C  
fixed installation -40°C to +80°C
- **Nominal voltage** 300 V
- **Test voltage**  
core/core 1500 V  
core/screen 1000 V
- **Breakdown voltage** min. 3000 V
- **Minimum bending radius**  
flexing 7,5x cable Ø  
fixed installation 4x cable Ø
- **Insulation resistance**  
min. 20 MOhm x km
- **Radiation resistance**  
up to 80x10<sup>6</sup> cJ/kg (up to 80 Mrad)
- **Coupling resistance**  
max. 250 Ohm/km

## Cable structure

- Bare copper conductor, fine wire Unilay with short lay-lengths
- Core insulation of PVC class 43 acc. to UL-Std.1581
- Core identification to DIN 47100 coloured
- Cores stranded in layers with optimal lay-length
- Wrapping of fleece between the layers of stranding
- Wrapping over the outer layer
- Braided screen of tinned Cu wires, coverage approx. 85%
- Core wrapping with fleece
- Outer sheath of oil resistant special PVC, compound type TM5 to DIN VDE 0281 Part 1 or class 43 acc. to UL-Std.1581
- Sheath colour grey (RAL 7001)
- with meter marking

## Properties

- Low-adhesion
  - The materials used in manufacture are cadmium-free and contain no silicone and free from substances harmful to the wetting properties of lacquers
- Tests**
- PVC self-extinguishing and flame retardant acc. to DIN VDE 0482-332-1-2, DIN EN 60332-1-2, IEC 60332-1 (equivalent DIN VDE 0472 part 804 test method B)

## Note

- Please observe applicable installation regulations for use in energy supply chains.
- AWG sizes are approximate equivalent values. The actual cross-section is in mm<sup>2</sup>.

## Application

A highly-flexible PVC control cable suitable for frequent and fast lifting and bending stresses in machines and tool building, robot systems and on constantly moving machine components. Long service lives guarantee reliable function and good cost efficiency. The copper screen effectively protects against internal and external interference. Designed for machines intended for export, specifically USA and Canada. For applications which go beyond standard solutions (for example for composting appliances or high shelf conveyors with extremely high processing speeds etc.) we recommend for our especially developed enquiry sheet for energy guiding systems. Before installation in cable trays please read the instructions. Further technical details see selection table for drag chain cables, see lead text.

**EMC** = Electromagnetic compatibility

To optimize the EMC features we recommend a large round contact of the copper braiding on both ends.

CE= The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

Part no.	No.cores x cross-sec. mm <sup>2</sup>	AWG-No.	Outer Ø app. mm	Cop. weight kg / km	Weight app. kg / km
49920	2 x 0,14	26	4,3	11,3	33,0
49921	3 x 0,14	26	4,5	14,2	36,0
49922	4 x 0,14	26	4,7	15,5	41,0
49923	5 x 0,14	26	5,0	18,4	46,0
49924	7 x 0,14	26	5,7	27,9	70,0
49925	10 x 0,14	26	6,4	39,1	88,0
49926	12 x 0,14	26	6,7	42,2	97,0
49927	14 x 0,14	26	6,9	45,4	105,0
49928	18 x 0,14	26	7,6	54,2	116,0
49929	24 x 0,14	26	8,6	66,5	150,0
49930	25 x 0,14	26	9,0	68,5	157,0
49931	2 x 0,25	24	4,6	14,8	39,0
49932	3 x 0,25	24	4,8	18,9	45,0
49933	4 x 0,25	24	5,1	21,4	52,0
49934	5 x 0,25	24	5,5	31,2	70,0
49935	7 x 0,25	24	6,2	39,8	80,0
49936	10 x 0,25	24	7,1	53,9	114,0
49937	12 x 0,25	24	7,3	59,2	123,0

Part no.	No.cores x cross-sec. mm <sup>2</sup>	AWG-No.	Outer Ø app. mm	Cop. weight kg / km	Weight app. kg / km
49938	14 x 0,25	24	7,6	64,3	138,0
49939	18 x 0,25	24	8,3	78,6	165,0
49940	24 x 0,25	24	9,7	89,8	200,0
49941	25 x 0,25	24	10,1	101,2	204,0
49942	2 x 0,34	22	4,8	18,2	44,0
49943	3 x 0,34	22	5,0	28,8	60,0
49944	4 x 0,34	22	5,4	35,8	76,0
49945	5 x 0,34	22	5,7	39,2	80,0
49946	7 x 0,34	22	6,6	52,8	104,0
49947	10 x 0,34	22	7,5	67,5	150,0
49948	12 x 0,34	22	7,7	76,5	160,0
49949	14 x 0,34	22	8,1	85,9	180,0
49950	18 x 0,34	22	8,9	99,9	211,0
49951	24 x 0,34	22	10,3	147,0	290,0
49952	25 x 0,34	22	10,9	155,0	304,0

Dimensions and specifications may be changed without prior notice. (RN05)



Suitable Cable drag chains can be found in our Cable Accessories catalogue.

# SUPERTRONIC®-330 PURö cable for drag chains,

halogen-free, meter marking



HELUKABEL SUPERTRONIC 330 PURö 4x0,34 QMM E 170315 AWM STYLE  
20233 22 AWG 4C WV-1c AWM I/II A/B 80°C 300V FT1/ 49788 001070789



## Technical data

- Special PUR sheathed cable
- **Temperature range**  
flexing -30°C to +80°C  
fixed installation -40°C to +80°C
- **Nominal voltage** 300 V
- **Test voltage**  
core/core 1500 V
- **Insulation resistance**  
min. 100 MOhm x km
- **Capacitance**  
core/core 60 nF/km
- **Minimum bending radius**  
flexing 5x cable Ø  
fixed 3x cable Ø
- **Radiation resistance**  
up to 100x10<sup>6</sup> cJ/kg (up to 100 Mrad)

## Cable structure

- Bare copper, extra fine-wire to  
DIN VDE 0295 cl.6, col. 4, BS 6360 cl.6
- Core insulation of PP
- Cores stranded in layers with optimally  
lay-lengths
- Core identification to DIN 47100  
coloured
- Wrapping over the outer layer
- Outer sheath of special **full-polyurethane**  
compound type TMPU to  
DIN VDE 0282 Part 10, Annex A  
and acc. to UL-Std.1581 Tab.50227
- Sheath colour grey (RAL 7001)
- with meter marking

## Properties

- The materials used in manufacture are  
cadmium-free and contain no silicone  
and free from substances harmful to  
the wetting properties of lacquers
- **Tests**
- PUR outer sheath, flame retardant acc. to  
DIN VDE 0482-332-1-2,  
DIN EN 60332-1-2/ IEC 60332-1 (equivalent  
DIN VDE 0472 part 804 test method B)
- Low adhesion
- High flexibility at low temperatures
- High abrasion resistance
- Tear and cut-resistant
- Notch resistant
- **Resistant to**  
UV-radiation, Oxygen, Ozone, Hydrolysis,  
Oil
- **Partially resistant to**  
Microbial attack, Hydraulic fluids, Coolant  
emulsion, Alkalis

## Note

- AWG sizes are approximate equivalent  
values. The actual cross-section is in mm<sup>2</sup>.

## Application

For installation in dry, moist and wet rooms and outdoors with free movement without tensile stress or forced movements, impressively proven in drag chain application. A highly flexible PUR control cable, suitable for frequent and quick lifting and bending stresses in machine engineering and construction, in robot technology and on permanently moving machine components. Long service life guarantees reliable function and high cost-efficiency. For applications which go beyond standard solutions (for example for composting appliances or high shelf conveyors with extremely high processing speeds etc.) we recommend for our especially developed enquiry sheet for energy guiding systems. Before installation in cable trays please read the instructions. Further technical details see selection table for drag chain cables, see lead text. Attractive for export-oriented mechanical engineering.

CE= The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

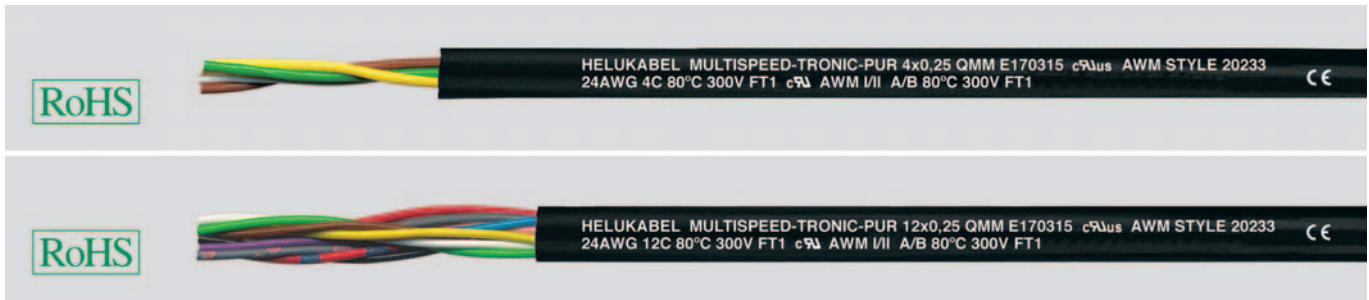
Part no.	No. cores x cross-sec. mm <sup>2</sup>	AWG-No.	Outer Ø app. mm	Cop. weight kg / km	Weight app. kg / km
49764	2 x 0,14	26	3,9	2,8	22,0
49765	3 x 0,14	26	4,0	4,1	24,0
49766	4 x 0,14	26	4,3	5,6	29,0
49767	5 x 0,14	26	4,7	7,0	33,0
49768	7 x 0,14	26	5,3	9,8	47,0
49769	10 x 0,14	26	6,1	14,0	57,0
49770	12 x 0,14	26	6,2	16,8	63,0
49771	14 x 0,14	26	6,5	19,6	72,0
49772	18 x 0,14	26	7,2	25,2	80,0
49773	24 x 0,14	26	8,2	33,6	110,0
49774	25 x 0,14	26	8,6	35,0	115,0
49775	2 x 0,25	24	4,3	5,0	26,0
49776	3 x 0,25	24	4,5	7,5	30,0
49777	4 x 0,25	24	4,8	10,0	39,0
49778	5 x 0,25	24	5,2	12,5	44,0
49779	7 x 0,25	24	6,0	17,5	52,0
49780	10 x 0,25	24	6,9	25,0	70,0
49781	12 x 0,25	24	7,1	30,1	84,0

Part no.	No. cores x cross-sec. mm <sup>2</sup>	AWG-No.	Outer Ø app. mm	Cop. weight kg / km	Weight app. kg / km
49782	14 x 0,25	24	7,4	35,0	97,0
49783	18 x 0,25	24	8,2	45,0	114,0
49784	24 x 0,25	24	9,6	60,0	157,0
49785	25 x 0,25	24	10,1	62,5	160,0
49786	2 x 0,34	22	4,6	6,8	31,0
49787	3 x 0,34	22	4,8	10,2	38,0
49788	4 x 0,34	22	5,2	13,6	51,0
49789	5 x 0,34	22	5,6	17,0	54,0
49790	7 x 0,34	22	6,5	23,8	77,0
49791	10 x 0,34	22	7,5	34,0	104,0
49792	12 x 0,34	22	7,7	40,8	122,0
49793	14 x 0,34	22	8,1	47,6	140,0
49794	18 x 0,34	22	9,2	61,2	162,0
49795	24 x 0,34	22	10,7	81,5	204,0
49796	25 x 0,34	22	11,2	85,0	229,0

Dimensions and specifications may be changed without prior notice. (RN05)

# MULTISPEED®-TRONIC-PUR safety against high bending

## in drag chain systems, halogen-free, meter marking



### Technical data

- Special drag chain cables for high mechanical stress in adapted to DIN VDE 0285-525-2-51 / DIN EN 50525-2-51, DIN VDE 0285-525-2-21 / DIN EN 50525-2-21 and acc. to UL-Std.758 AWM, Style 20233
- **Temperature range**  
flexing -30°C to +80°C  
fixed installation -40°C to +80°C
- **Nominal voltage**  
U<sub>0</sub>/U 300/300 V
- **Test voltage** 3000 V
- **Insulation resistance**  
min. 100 MOhm x km
- **Minimum bending radius**  
flexing 7,5x cable Ø  
fixed installation 4x cable Ø
- **Radiation resistance**  
up to 100x10<sup>6</sup> cJ/kg (up to 100 Mrad)

### Cable structure

- Bare copper, fine wire conductors, Unilay with short pitch length
- Core insulation of special PP
- Core identification to DIN 47100
- <7 cores: cores stranded in a layer with optimal lay-length around a filler as per construction  
≥7 cores: cores stranded with optimal lay-length to bunch-construction with low torsion strength, optimal selected short lay-length around a filler
- Outer sheath of special PUR extruded extruded as filler with presssurea
- Sheath colour black (RAL 9005)
- with meter marking

### Properties

- The materials used in manufacture are cadmium-free and contain no silicone and free from substances harmful to the wetting properties of lacquers
- #### Tests
- PUR outer sheath, flame retardant acc. to DIN VDE 0482-332-1-2, DIN EN 60332-1-2 / IEC 60332-1 (equivalent DIN VDE 0472 part 804 test method B) UL VW-1, CSA FT1
  - Low-adhesion
  - Halogen-free
  - High property of alternating bending strength
  - High tensile strength, abrasion- and impact resistance at low temperature
  - Use in multi-shift operations under extremely high continuous bending loads
  - Abrasion resistance
  - Tear resistance
  - High stability
  - Oil resistance
  - Better chemical resistance
  - UV and ozone resistance
  - Higher economical solution
  - Reduced diameter, therefore lower moving masses

### Note

- AWG sizes are approximate equivalent values. The actual cross-section is in mm<sup>2</sup>.
- screened analogue type: **MULTISPEED®-TRONIC-C-PUR**, confer page 450

### Application

Application HELUKABEL® MULTISPEED®-TRONIC-PUR installed there, where the extreme requirements for the cables are necessary. The selected materials and lay-up technique permit these high flexible cables for permanent application in drag chains for long distances, high and low speed of movements. These cables are installed in dry, moist and wet rooms and in open air with free movement without tensile stress or forced movements. These robust and abrasion resistant special control cables are installed there, where the problems appear for the application in permanent stresses e. g. in energy drag chains, industry robotics, production lines, automatic control systems and permanent movable machinery parts for multi-shift operation. These cables are installed everywhere, where high requirements for the flexibility, abrasion, oxygen and chemical resistance are necessary. For applications which go beyond standard solutions (for example for composting appliances or high shelf conveyors with extremely high processing speeds etc.) we recommend for our especially developed enquiry sheet for energy guiding systems. Before installation in cable trays please read the instructions. Further technical details see selection table for drag chain cables, see lead text.

CE= The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

Part no.	No.cores x cross-sec. mm <sup>2</sup>	AWG-No.	Outer Ø app. mm	Cop. weight kg / km	Weight app. kg / km
24567	2 x 0,25	24	3,9	5,0	27,0
24568	3 x 0,25	24	4,1	7,5	33,0
24569	4 x 0,25	24	4,4	10,0	40,0
24570	5 x 0,25	24	4,7	12,5	48,0
24571	7 x 0,25	24	6,9	17,5	60,0
24572	12 x 0,25	24	7,4	30,1	91,0
24573	18 x 0,25	24	8,9	45,0	125,0
24574	25 x 0,25	24	10,2	62,5	170,0

Part no.	No.cores x cross-sec. mm <sup>2</sup>	AWG-No.	Outer Ø app. mm	Cop. weight kg / km	Weight app. kg / km
24575	2 x 0,34	22	4,1	6,8	32,0
24576	3 x 0,34	22	4,3	10,2	40,0
24577	4 x 0,34	22	4,6	13,6	55,0
24578	5 x 0,34	22	5,0	17,0	60,0
24579	7 x 0,34	22	7,3	23,8	80,0
24580	12 x 0,34	22	7,9	40,8	127,0
24581	18 x 0,34	22	9,7	61,2	175,0
24582	25 x 0,34	22	10,0	85,0	238,0

Dimensions and specifications may be changed without prior notice. (RN05)



# SUPERTRONIC®-330 C-PURö cable for drag chains,

halogen-free, EMC-preferred type, meter marking



HELUKABEL SUPERTRONIC 330 C-PURö 7x0,25 QMM E 170315 AWM STYLE  
20233 24 AWG 7 C VW1 cUL AWM I/II A/B 80°C 300V FT/49812 00107344 CE



## Technical data

- Special PUR sheathed cable, screened
- **Temperature range**  
flexing -30°C to +80°C  
fixed installation -40°C to +80°C
- **Nominal voltage** 300 V
- **Test voltage**  
core/core 1500 V  
core/screen 1000 V
- **Insulation resistance**  
min. 100 MOhm x km
- **Capacitance**  
core/core 60 nF/km
- **Minimum bending radius**  
flexing 7,5x cable Ø  
fixed 4x cable Ø
- **Radiation resistance**  
up to 100x10<sup>6</sup> cJ/kg (up to 100 Mrad)
- **Coupling resistance**  
max. 250 Ohm/km

## Cable structure

- Bare copper conductor, extra fine wire to DIN VDE 0295 cl.6, col. 4, BS 6360 cl.6
- Core insulation of PP
- Core identification to DIN 47100 coloured
- Cores stranded in layers with optimal lay-length
- Wrapping over the outer layer
- Braided screen of tinned Cu wires, coverage approx. 85%
- Core wrapping with fleece
- Outer sheath of special **full polyurethane** compound type TMPU to DIN VDE 0207-363-10-2/ DIN EN 50363-10-2 and acc. to UL-Std.1581 tab.50227
- Sheath colour grey (RAL 7001)
- with meter marking

## Properties

- The materials used in manufacture are cadmium-free and contain no silicone and free from substances harmful to the wetting properties of lacquers
- **Tests**
- PUR outer sheath, flame retardant acc. to DIN VDE 0482-332-1-2, DIN EN 60332-1-2/ IEC 60332-1 (equivalent DIN VDE 0472 part 804 test method B)
- Low-adhesion
- High flexibility at low temperatures
- High abrasion resistance
- Tear and cut-resistant
- Notch resistant
- **Resistant to**  
UV-radiation, Oxygen, Ozone, Hydrolysis, Oil
- **Partially resistant to**  
Microbial attack, Hydraulic fluid, Coolant emulsion, Alkalies

## Note

- AWG sizes are approximate equivalent values. The actual cross-section is in mm<sup>2</sup>.

## Application

Especially suited for drag chain installation in dry, moist and wet environments and outdoors with flexible movement and without tensile stress or forced movements. A highly-flexible PVC control cable suitable for frequent and fast lifting and bending stresses in machines and tool building, robot systems and on constantly moving machine components. Long service lives guarantee reliable function and good cost efficiency. The dense screening assures interference-free transmission of all signals and impulses. An ideal interference-free control cable for the above applications. For applications which go beyond standard solutions (for example for composting appliances or high shelf conveyors with extremely high processing speeds etc.) we recommend for our especially developed enquiry sheet for energy guiding systems. Before installation in cable trays please read the instructions. Further technical details see selection table for drag chain cables, see lead text.

**EMC** = Electromagnetic compatibility

To optimize the EMC features we recommend a large round contact of the copper braiding on both ends.

CE= The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

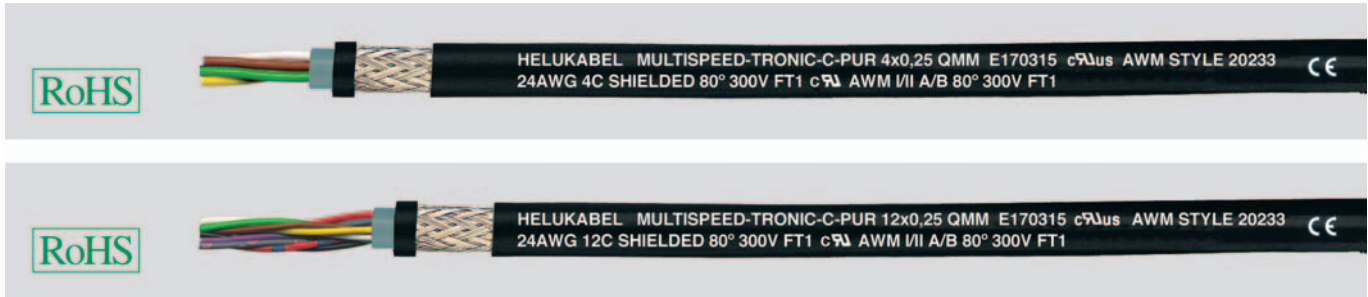
Part no.	No. cores x cross-sec. mm <sup>2</sup>	AWG-No.	Outer Ø app. mm	Cop. weight kg / km	Weight app. kg / km
49797	2 x 0,14	26	4,4	11,2	32,0
49798	3 x 0,14	26	4,5	14,1	35,0
49799	4 x 0,14	26	4,8	15,5	40,0
49800	5 x 0,14	26	5,0	18,3	45,0
49801	7 x 0,14	26	5,8	27,8	66,0
49802	10 x 0,14	26	6,7	39,3	86,0
49803	12 x 0,14	26	6,8	42,1	94,0
49804	14 x 0,14	26	7,1	45,3	102,0
49805	18 x 0,14	26	7,8	54,1	118,0
49806	24 x 0,14	26	8,8	66,3	149,0
49807	25 x 0,14	26	9,2	68,4	156,0
49808	2 x 0,25	24	4,8	14,9	38,0
49809	3 x 0,25	24	5,0	18,8	44,0
49810	4 x 0,25	24	5,3	21,3	51,0
49811	5 x 0,25	24	5,7	31,0	68,0
49812	7 x 0,25	24	6,6	39,6	82,0
49813	10 x 0,25	24	7,5	53,9	110,0
49814	12 x 0,25	24	7,7	59,1	124,0

Part no.	No. cores x cross-sec. mm <sup>2</sup>	AWG-No.	Outer Ø app. mm	Cop. weight kg / km	Weight app. kg / km
49815	14 x 0,25	24	8,0	64,2	135,0
49816	18 x 0,25	24	8,8	78,4	150,0
49817	24 x 0,25	24	10,2	89,9	194,0
49818	25 x 0,25	24	10,7	101,0	204,0
49819	2 x 0,34	22	5,1	18,1	45,0
49820	3 x 0,34	22	5,3	28,7	60,0
49821	4 x 0,34	22	5,7	35,7	76,0
49822	5 x 0,34	22	6,1	39,1	82,0
49823	7 x 0,34	22	7,1	52,7	110,0
49824	10 x 0,34	22	8,1	67,4	148,0
49825	12 x 0,34	22	8,3	76,4	166,0
49826	14 x 0,34	22	8,7	85,5	185,0
49827	18 x 0,34	22	9,8	99,7	216,0
49828	24 x 0,34	22	11,3	147,1	291,0
49829	25 x 0,34	22	11,8	155,0	305,0

Dimensions and specifications may be changed without prior notice. (RN05)

# MULTISPEED®-TRONIC-C-PUR safety against high

bending in drag chain systems, high flexible, halogen-free, screened, EMC-preferred type, meter marking



## Technical data

- Special drag chain cables for high mechanical stress in adapted to DIN VDE 0285-525-2-51 / DIN EN 50525-2-51, DIN VDE 0285-525-2-21 / DIN EN 50525-2-21 and acc. to UL-Std.758 AWM Style 20233
- **Temperature range**  
flexing -30°C to +80°C  
fixed installation -40°C to +80°C
- **Nominal voltage**  
U<sub>0</sub>/U 300/300 V
- **Test voltage** 3000 V
- **Insulation resistance**  
min. 100 MOhm x km
- **Minimum bending radius**  
flexing 7,5x cable Ø  
fixed installation 4x cable Ø
- **Coupling resistance**  
max. 250 Ohm/km
- **Radiation resistance**  
up to 100x10<sup>6</sup> cJ/kg (up to 100 Mrad)

## Cable structure

- Bare copper, fine wire conductors, Unilay with short pitch length
- Core insulation of special PP
- Core identification to DIN 47100
- <7 cores: cores stranded in a layer with optimal lay-length around a filler as per construction  
≥7 cores: cores stranded with optimal lay-length to bunch-construction with low torsion strength, optimal selected short lay-length around a filler
- Special-TPE extruded as filler with pressure, grey (RAL 7001)
- Screen of Cu braid bare, coverage 85% max., with optimal pitch
- Outer sheath of special-PUR
- Sheath colour black (RAL 9005)
- with meter marking

## Properties

- The materials used in manufacture are cadmium-free and contain no silicone and free from substances harmful to the wetting properties of lacquers
- ### Tests
- PUR outer sheath, flame retardant acc. to DIN VDE 0482-332-1-2, DIN EN 60332-1-2 / IEC 60332-1 (equivalent DIN VDE 0472 part 804 test method B) UL VW-1, CSA FT1
  - Low-Adhesion
  - Halogen-free
  - High property of alternating bending strength
  - High tensile strength, abrasion- and impact resistance at low temperature
  - Use in multi-shift operations under extremely high continuous bending loads
  - Abrasion resistance
  - Tear resistance
  - High stability
  - Oil resistance
  - Better chemical resistance
  - UV and ozone resistance
  - Higher economical solution
  - Reduced Ø, results low weight of moving materials

## Note

- AWG sizes are approximate equivalent values. The actual cross-section is in mm<sup>2</sup>.
- non screened analogue type: **MULTISPEED®-TRONIC-PUR**, confer page 448

## Application

For permanent application in drag chains for long distances, high and low speed of movements. These cables are installed in dry, moist and wet rooms and in open air with free movement without tensile stress or forced movements. These robust and abrasion resistant special control cables are installed there, where the problems appear for the application in permanent stresses. These cables are installed everywhere, where high requirements for the flexibility, abrasion, oxygen and chemical resistance are necessary. These screened cables are particularly suitable for the interference-free transmission in instrumentation and control engineering applications. For applications which go beyond standard solutions we recommend for our especially developed enquiry sheet for energy guiding systems. Before installation in cable trays please read the instructions. Further technical details see selection table for drag chain cables, see lead text.

**EMC** = Electromagnetic compatibility

To optimize the EMC features we recommend a large round contact of the copper braiding on both ends.

CE = The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

Part no.	No. cores x cross-sec. mm <sup>2</sup>	AWG-No.	Outer Ø app. mm	Cop. weight kg / km	Weight app. kg / km
24614	2 x 0,25	24	5,4	74,0	39,0
24615	3 x 0,25	24	5,6	19,0	45,0
24616	4 x 0,25	24	5,9	22,0	51,0
24617	5 x 0,25	24	6,2	26,0	68,0
24618	7 x 0,25	24	8,7	35,0	83,0
24619	12 x 0,25	24	9,4	58,0	122,0
24620	18 x 0,25	24	11,5	79,0	160,0
24621	25 x 0,25	24	13,0	99,0	210,0

Part no.	No. cores x cross-sec. mm <sup>2</sup>	AWG-No.	Outer Ø app. mm	Cop. weight kg / km	Weight app. kg / km
24622	2 x 0,34	22	5,6	18,0	45,0
24623	3 x 0,34	22	5,8	22,0	60,0
24624	4 x 0,34	22	6,1	28,0	76,0
24625	5 x 0,34	22	6,8	31,0	82,0
24626	7 x 0,34	22	9,3	51,0	110,0
24627	12 x 0,34	22	9,9	70,0	166,0
24628	18 x 0,34	22	12,3	103,0	216,0
24629	25 x 0,34	22	13,6	130,0	312,0

Dimensions and specifications may be changed without prior notice. (RN05)

# SUPER-PAAR-TRONIC 340-C-PUR cable for drag chains, halogen-free, EMC-preferred type, meter marking



## Technical data

- Special drag chain cable, stranded in pairs
- **Temperature range**  
flexing -30°C to +80°C  
fixed installation -40°C to +80°C
- **Nominal voltage** 300 V
- **Test voltage**  
core/core 1500 V  
core/screen 1000 V
- **Insulation resistance**  
min. 100 MOhm x km
- **Mutual capacitance**  
core/core approx. 60 nF/km
- **Minimum bending radius**  
for permanent bending at 0,25 mm<sup>2</sup>  
flexing 7,5x cable Ø  
fixed 4x cable Ø  
at 0,5-1,0 mm<sup>2</sup>  
flexing 10x cable Ø  
fixed 5x cable Ø
- **Coupling resistance**  
max. 250 Ohm/km
- **Radiation resistance**  
up to 100x10<sup>6</sup> cJ/kg (up to 100 Mrad)

## Cable structure

- Bare copper conductor, extra fine wire to DIN VDE 0295 cl.6, col. 4, BS 6360 cl.6 and IEC 60228 cl.6
- Core insulation of PP
- Core identification to DIN 47100
- Cores stranded in pairs, pairs stranded torsion-free in layers with optimal lay-length
- Wrapping over the outer layer
- Braided screen of tinned Cu wires, coverage approx. 85%
- Core wrapping with fleece
- Outer sheath of **full polyurethane** compound type TPU to DIN VDE 0207-363-10-2 / DIN EN 50363-10-2 and acc. to UL-Std.1581 tab.50.227
- Sheath colour grey (RAL 7001)
- with meter marking

## Properties

- The materials used in manufacture are cadmium-free and contain no silicone and free from substances harmful to the wetting properties of lacquers
- ### Tests
- PUR outer sheath, flame retardant acc. to DIN VDE 0482-332-1-2, DIN EN 60332-1-2/ IEC 60332-1 (equivalent DIN VDE 0472 part 804 test method B)
  - Oil resistance acc. to DIN VDE 0473-811-404/ DIN EN 60811-404
  - Halogen free
  - Weather, ozone and UV-resistant
  - Chemical resistance to solvents, acids, alkalis and hydraulic fluids
- ### Advantages
- Very high resistance to mechanical stresses
  - Very good alternating bending strength
  - High tear, abrasion and impact resistance, even at low temperatures

## Note

- AWG sizes are approximate equivalent values. The actual cross-section is in mm<sup>2</sup>.

## Application

Stranded in pairs, these fully-screened special drag chain cables can also be used where external, high-frequency interference influences pulse transfer. They are used for permanently flexible stresses in machine and tool building, in robot technology, on constantly moving machine components and for extended use in multi-shift operations. Developed to state-of-the-art technology, these highly-flexible data cable, with a cut resistant and low-adhesion PUR outer sheath guaranteeing optimal service life and extremely good cost efficiency. This two-approvals single-core cable is preferred for use in export-oriented mechanical engineering, in machine tools, production lines and systems engineering. Guaranteed extended use in multi-shift operations with extremely high bending stresses. For applications which go beyond standard solutions we recommend for our especially developed enquiry sheet for energy guiding systems. Before installation in cable trays please read the instructions. Further technical details see selection table for drag chain cables, see lead text.

**EMC** = Electromagnetic compatibility

To optimize the EMC features we recommend a large round contact of the copper braiding on both ends.

CE = The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

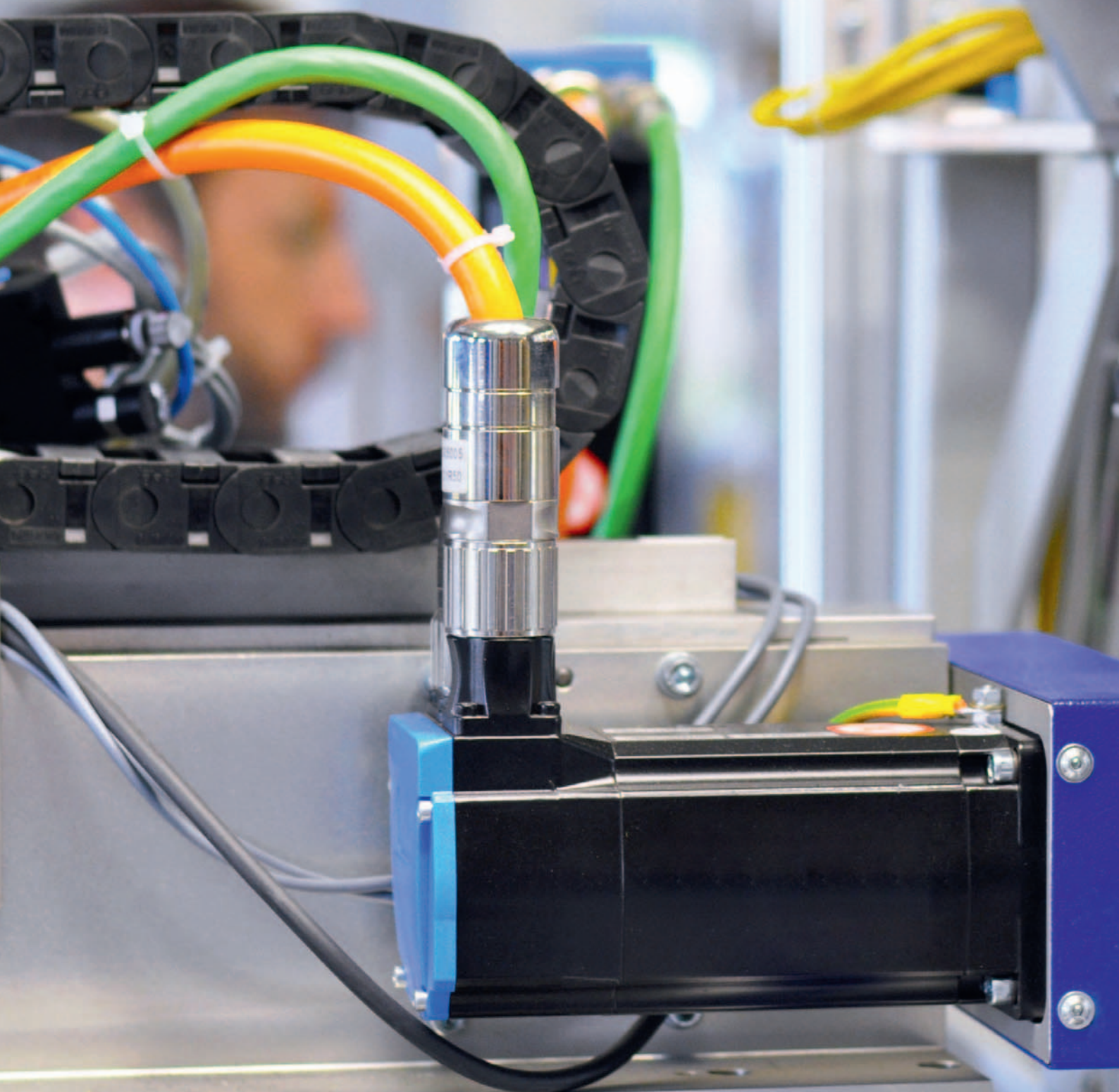
Part no.	No.pairs x no.cores x cross-sec. mm <sup>2</sup>	AWG-No.	Outer Ø app. mm	Cop. weight kg / km	Weight app. kg / km
49830	1 x 2 x 0,25	24	4,8	14,0	26,0
49831	2 x 2 x 0,25	24	6,7	32,0	61,0
49832	3 x 2 x 0,25	24	7,1	38,4	70,0
49833	4 x 2 x 0,25	24	7,6	43,2	82,0
49834	5 x 2 x 0,25	24	8,3	51,5	99,0
49835	6 x 2 x 0,25	24	9,0	71,8	126,0
49836	8 x 2 x 0,25	24	10,5	74,4	147,0
49837	10 x 2 x 0,25	24	11,9	90,0	179,0
49838	14 x 2 x 0,25	24	12,7	111,2	210,0
49839	1 x 2 x 0,34	22	5,1	20,0	35,0
49840	2 x 2 x 0,34	22	7,2	41,0	80,0
49841	3 x 2 x 0,34	22	7,6	52,2	100,0
49842	4 x 2 x 0,34	22	8,3	59,1	118,0
49843	5 x 2 x 0,34	22	9,0	67,0	134,0
49844	6 x 2 x 0,34	22	9,9	86,4	162,0
49845	8 x 2 x 0,34	22	11,9	107,5	214,0
49846	10 x 2 x 0,34	22	13,9	131,0	270,0
49847	14 x 2 x 0,34	22	14,1	150,0	304,0
49848	1 x 2 x 0,5	20	5,8	22,5	47,0
49849	2 x 2 x 0,5	20	8,4	53,0	100,0
49850	3 x 2 x 0,5	20	9,0	72,8	131,0
49851	4 x 2 x 0,5	20	10,0	75,6	149,0
49852	5 x 2 x 0,5	20	11,0	85,7	169,0

Part no.	No.pairs x no.cores x cross-sec. mm <sup>2</sup>	AWG-No.	Outer Ø app. mm	Cop. weight kg / km	Weight app. kg / km
49853	6 x 2 x 0,5	20	11,8	103,0	181,0
49854	8 x 2 x 0,5	20	14,2	148,4	274,0
49855	10 x 2 x 0,5	20	16,5	180,0	332,0
49856	14 x 2 x 0,5	20	16,9	218,3	390,0
49857	1 x 2 x 0,75	19	6,2	35,2	56,0
49858	2 x 2 x 0,75	19	9,2	61,4	102,0
49859	3 x 2 x 0,75	19	9,8	87,1	144,0
49860	4 x 2 x 0,75	19	11,2	95,2	160,0
49861	5 x 2 x 0,75	19	12,2	115,0	193,0
49862	6 x 2 x 0,75	19	13,2	137,1	216,0
49863	8 x 2 x 0,75	19	15,6	184,4	327,0
49864	10 x 2 x 0,75	19	18,4	259,8	451,0
49865	14 x 2 x 0,75	19	18,9	318,4	521,0
49866	1 x 2 x 1	18	6,7	42,0	64,0
49867	2 x 2 x 1	18	10,0	73,0	120,0
49868	3 x 2 x 1	18	10,8	93,6	160,0
49869	4 x 2 x 1	18	11,7	117,8	184,0
49870	5 x 2 x 1	18	13,2	139,0	217,0

Dimensions and specifications may be changed without prior notice. (RN05)



# UL/CSA MOTOR, SERVO & FEEDBACK CABLES



**TOPFLEX®-EMV-UV-2YSLCYK-J UL/CSA** Motorsupply

**cable 1000 V, for power supply connections to frequency converters, double screened, meter marking.**

**Technical data**

- Special motor power supply cable for frequency converters to Style 2570
- **Temperature range**  
flexing -5°C bis +80°C  
fixed installation -40°C bis +80°C
- **Nominal voltage**  
UL 1000 V
- **Test voltage** 4000 V
- **Insulation resistance**  
min. 200 MOhm x km
- **Coupling resistance**  
acc. to different cross-section  
max. 250 Ohm/km
- **Minimum bending radius**  
fixed installation for outer Ø:  
up to 12 mm: 5x cable Ø  
> 12-20 mm: 7,5x cable Ø  
> 20 mm: 10x cable Ø  
free-movement for outer Ø:  
up to 12 mm: 10x cable Ø  
> 12-20 mm: 15x cable Ø  
> 20 mm: 20x cable Ø
- **Radiation resistance**  
up to 80x10<sup>6</sup> cJ/kg (up to 80 Mrad)

**Cable structure**

- Bare copper-conductor, to DIN VDE 0295 cl.5, fine-wire, BS 6360 cl.5, IEC 60228 cl.5
- Core insulation of polyethylene (PE)
- Core identification BN, BK, GY
- GN-YE conductor
- Cores stranded in concentric layers
- 1. Screen with special aluminium film
- 2. Tinned copper braided screen, approx. 85% coverage
- Outer sheath of special PVC
- Sheath colour black (RAL 9005)
- with meter marking

**Properties**

- Low mutual capacitance
- Meets EMC requirements acc. to EN 55011 and DIN VDE 0875 part 1
- Low coupling resistance for high electromagnetic compatibility
- UV-resistant
- Outdoor application
- This screened motor supply cable with low mutual capacitance of the single cores because of the special PE core insulation and low screen capacitance enable a low-loss transmission of the power compared to PVC-sheathed connecting cables
- Due to the optimal screening an interference-free operation of frequency converters is obtained
- The materials used in manufacture are cadmium-free and contain no silicone and free from substances harmful to the wetting properties of lacquers

**Tests**

- PVC self-extinguishing and flame retardant acc. to DIN VDE 0482-332-1-2, DIN EN 60332-1-2, IEC 60332-1 (equivalent DIN VDE 0472 part 804 test method B)

**Note**

- \*\*) The current carrying capacity for permanent operation at ambient temperature of 30°C. For deviating ambient temperatures the conversion factors should be used and for further see the indication in DIN VDE 0298 part 4.
- AWG sizes are approximate equivalent values. The actual cross-section is in mm<sup>2</sup>.

**Application**

This TOPFLEX®-EMV-UV-2YSLCYK-J UL/CSA motor connection cable for the frequency converters secures the EMC in systems and buildings, equipment with devices and machineries, which can emit electromagnetic interference fields that can impact the environment in an illegal manner. It is used as a connection and connecting cable under average mechanical stress for fixed installations and sometimes for free movement in dry, moist and wet rooms and outside. It is used in the automotive industry, food processing industry, transfer streets, packaging industry, machine tools, handling equipment, in the industry it is used for pumps, fans, transport belts, etc. Used in explosion proof areas.

**EMC** = Electromagnetic compatibility

The screen must be connected at both ends and ensure large-area contact over the entire cable circumference for compliance with the functional interference requirements of EN 55011.

CE= The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer Ø app. mm	Mutual capacitance		Coupling resistance		Power ratings **) with 3 loaded cores in Amperes	Cop. weight kg / km	Weight app. kg / km	AWG-No.
			Core / Core app.nF / km	Core / Screen app.nF / km	at 1 MHz Ohm/km	at 30 MHz Ohm/km				
22320	4 G 1,5	10,4					0	95,0	140,0	16
22321	4 G 2,5	12,5	80	130	18	210	26	150,0	300,0	14
22322	4 G 4	14,2	90	150	11	210	34	235,0	485,0	12
22323	4 G 6	15,2	90	150	6	150	44	320,0	630,0	10
22324	4 G 10	19,5	120	200	7	180	61	533,0	860,0	8
22325	4 G 16	22,9	140	230	9	190	82	789,0	1290,0	6
22326	4 G 25	27,1	120	210	4	95	108	1236,0	1860,0	4
22327	4 G 35	29,6	150	260	3	85	135	1662,0	2610,0	2

Continuation ▶



**TOPFLEX®-EMV-UV-2YSLCYK-J UL/CSA** Motorsupply

**able 1000 V, for power supply connections to frequency converters, double screened, meter marking.**



Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer Ø app. mm	Mutual capacitance		Coupling resistance		Power ratings **) with 3 loaded cores in Amperes	Cop. weight kg / km	Weight app. kg / km	AWG-No.
			Core / Core app.nF / km	Core / Screen app.nF / km	at 1 MHz Ohm/km	at 30 MHz Ohm/km				
22328	4 G 50	35,2	190	320	2	40	168	2345,0	2950,0	1
22329	4 G 70	41,4	190	320	2	45	207	3196,0	3950,0	2/0
22330	4 G 95	46,0	250	410	1	50	250	4316,0	5300,0	3/0
22331	4 G 120	50,8					292	5435,0	6600,0	4/0
22332	4 G 150	58,3					335	6394,0	7040,0	300 kcmil
22333	4 G 185	65,5					382	7639,0	8380,0	350 kcmil

Dimensions and specifications may be changed without prior notice. (RN07)

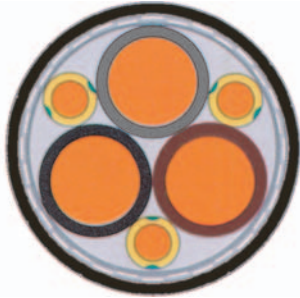


Suitable accessories can be found in Chapter X.

- Cable Gland - HELUTOP® HT-MS-EP4

# TOPFLEX®-EMV-UV-3 PLUS 2YSLCYK-J UL/CSA

Motor supply cable 1000 V, for power supply connections to frequency converters, double screened, meter marking.



## Technical data

- Special motor power supply cable for frequency converters to Style 2570
- **Temperature range**  
flexing -5°C bis +80°C  
fixed installation -40°C bis +80°C
- **Nominal voltage**  
UL 1000 V
- **Test voltage** 4000 V
- **Insulation resistance**  
min. 200 MOhm x km
- **Coupling resistance**  
acc. to different cross-section  
max. 250 Ohm/km
- **Minimum bending radius**  
fixed installation for outer Ø:  
up to 12 mm: 5x cable Ø  
> 12-20 mm: 7,5x cable Ø  
> 20 mm: 10x cable Ø  
free-movement for outer Ø:  
up to 12 mm: 10x cable Ø  
> 12-20 mm: 15x cable Ø  
> 20 mm: 20x cable Ø
- **Radiation resistance**  
up to 80x10<sup>6</sup> cJ/kg (up to 80 Mrad)

## Cable structure

- Bare copper, fine wire conductor to DIN VDE 0295 cl.5, BS 6360 cl.5 and IEC 60228 cl.5
- Core insulation of polyethylene (PE)
- Core identification BK, BN, GY
- GN-YE conductor (divided into 3)
- Cores stranded in concentric layers
- 3+3 core design
- 1. Screen with special aluminium film
- 2. Tinned copper braided screen, approx. 85% coverage
- Outer sheath of special PVC
- Sheath colour black (RAL 9005)
- with meter marking

## Properties

- Low mutual capacitance
- Meets EMC requirements acc. to EN 55011 and DIN VDE 0875 part 11
- Low coupling resistance for high electromagnetic compatibility
- Due to the optimal screening an interference-free operation of frequency converters is obtained
- The 3 Plus-construction of motor power supply cables features a symmetrical 3-core design, improved in terms of EMC characteristics comparing favorably with a 4-core version. The protective conductor PE, divided into 3 is uniformly stranded in the interstices. This enables an extremely concentric structure
- The minimum cross-section of 0,75<sup>2</sup> meets the requirements of DIN EN 60204 part 1
- uv-resistant
- Outdoor application
- This screened motor supply cable with low mutual capacitance of the single cores because of the special PE core insulation and low screen capacitance enable a low-loss transmission of the power compared to PVC-sheathed connecting cables
- The materials used in manufacture are cadmium-free and contain no silicone and free from substances harmful to the wetting properties of lacquers

## Tests

- PVC self-extinguishing and flame retardant acc. to DIN VDE 0482-332-1-2, DIN EN 60332-1-2, IEC 60332-1 (equivalent DIN VDE 0472 part 804 test method B)

## Note

- \*\*) The current carrying capacity for permanent operation at ambient temperature of 30°C. For deviating ambient temperatures the conversion factors should be used and for further see the indication in DIN VDE 0298 part 4.
- AWG sizes are approximate equivalent values. The actual cross-section is in mm<sup>2</sup>.

## Application

It is used as a connection and connecting cable under average mechanical stress for fixed installation and sometimes for free movement in dry, moist and wet rooms and outside. It is used in the automotive industry, food processing industry, transfer streets, packaging industry, machine tools, handling equipment, in the industry it is used for pumps, fans, transport belts and in air condition systems, etc. Used in explosion proof areas.

**EMC** = Electromagnetic compatibility

The screen must be connected at both ends and ensure large-area contact over the entire cable circumference for compliance with the functional interference requirements of EN 55011.

**CE** = The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

Continuation ►

**TOPFLEX®-EMV-UV-3 PLUS 2YSLCYK-J UL/CSA****Motor supply cable 1000 V, for power supply connections to frequency converters, double screened, meter marking.**

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer Ø app. mm	Coupling resistance		Power ratings **) with 3 loaded cores in Amperes	Cop. weight kg / km	Weight app. kg / km	AWG-No.
			at 1 MHz Ohm/km	at 30 MHz Ohm/km				
22193	3 x 1,5 + 3 G 0,25	10,0			18	86,0	140,0	16
22194	3 x 2,5 + 3 G 0,5	11,4	18	210	26	144,0	220,0	14
22195	3 x 4 + 3 G 0,75	13,0	11	210	34	224,0	323,0	12
22196	3 x 6 + 3 G 1,0	15,0	6	150	44	298,0	420,0	10
22197	3 x 10 + 3 G 1,5	18,4	7	180	61	491,0	615,0	8
22198	3 x 16 + 3 G 2,5	21,0	9	190	82	723,0	819,0	6
22199	3 x 25 + 3 G 4,0	25,3	4	95	108	1138,0	1325,0	4
22223	3 x 35 + 3 G 6,0	27,8	3	85	135	1535,0	1718,0	2
22224	3 x 50 + 3 G 10,0	32,6	2	40	168	2208,0	2399,0	1
22225	3 x 70 + 3 G 10,0	38,1	2	45	207	2871,0	3056,0	2/0
22226	3 x 95 + 3 G 16,0	41,0	1	50	250	3953,0	4162,0	3/0
22227	3 x 120 + 3 G 16,0	46,4			292	4836,0	5075,0	4/0
22228	3 x 150 + 3 G 25,0	53,5			335	5412,0	6128,0	300 kcmil
22229	3 x 185 + 3 G 35,0	59,5			382	6969,0	7189,0	350 kcmil
22230	3 x 240 + 3 G 42,5	65,1				8540,0	9540,0	500 kcmil

Dimensions and specifications may be changed without prior notice. (RN07)



Suitable accessories can be found in Chapter X.

- Cable Gland - HELUTOP® HT-MS-EP4

**TOPFLEX®-MOTOR-EMV 103** low capacitance power

supply cable 1000 V, increased ampacity, meter marking

**Technical data**

- Special motor power supply cable for frequency converters acc. to UL-AWM style 21179
- **Temperature range**  
flexing -5°C to +70°C  
fixed installation -40°C to +80°C
- Permissible **operating temperature** at conductor +90°C
- **Nominal voltage**  
VDE U<sub>0</sub>/U 600/1000 V  
UL 1000 V
- **Test voltage** 2500 V
- **Insulation resistance**  
min. 200 MOhm x km
- **Coupling resistance**  
acc. to different cross-sections  
max. 250 Ohm/km
- **Mutual capacitance**  
acc. to different cross-sections  
core/core 70 to 250 nF/km  
core/screen 110 to 410 nF/km
- **Minimum bending radius**  
fixed installation for outer Ø:  
up to 12 mm: 5x cable Ø  
> 12-20 mm: 7,5x cable Ø  
> 20 mm: 10x cable Ø  
free-movement for outer Ø:  
up to 12 mm: 10x cable Ø  
> 12-20 mm: 15x cable Ø  
> 20 mm: 20x cable Ø
- **Radiation-resistance**  
up to 80x10<sup>6</sup> cJ/kg (up to 80 Mrad)

**Cable structure**

- Bare copper, fine wire conductor to DIN VDE 0295 cl.5, BS 6360 cl.5 or IEC 60228 cl.5
- Core insulation of special-polymer
- Core identification to DIN VDE 0293-308  
- up to 5 cores coloured  
- from 7 cores, black with continuous white numbering
- GN-YE conductor
- Cores stranded in concentric layers
- 1. Screen with special aluminium film  
2. Tinned copper braided screen, coverage approx. 80%
- Outer sheath of special PVC
- Sheath colour orange (RAL 2003)
- with meter marking

**Properties****Tests**

- PVC self-extinguishing and flame retardant acc. to DIN VDE 0482-332-1-2, DIN EN 60332-1-2, IEC 60332-1 (equivalent DIN VDE 0472 part 804 test method B)
- Features Special-Polymer-insulation secures a lower dielectric loss, double potential strength, high longevity and low screen-interference currents to include increased current carrying capacity
- Meets EMC requirements according to EN 55011 and DIN VDE 0875 part 11
- Low coupling resistance for high electromagnetic compatibility
- This screened motor supply cable with low mutual capacitance of the single cores because of the special Polymer core insulation and low screen capacitance enable a low-loss transmission of the power compared to PVC-sheathed connecting cables
- Due to the optimal screening an interference-free operation of frequency converters is obtained
- Design acc. to the requirements of VdS 3501:2006-04
- The materials used in manufacture are cadmium-free and contain no silicone and free from substances harmful to the wetting properties of lacquers

**Note**

- AWG sizes are approximate equivalent values. The actual cross-section is in mm<sup>2</sup>.

**Application**

This UL/CSA motor power supply cable for the frequency converters assures electromagnetic compatibility in plants and buildings, facilities with units and operating equipment where the fields of electromagnetic interference might cause adverse effects on the surroundings. As a supply and connecting cable for medium mechanical stresses in fixed installations and forced movements in dry, moist and wet environments. Used in the automotive and food industries, environmental technology, packaging industry, machine tools. Handling equipment, for SIMOVERT drives, they are particularly suitable for use with industrial pumps, ventilators, conveyor belts and air-conditioning installations and similar applications. Installation in hazardous areas.

**EMC** = Electromagnetic compatibility

The screen must be connected at both ends and ensure large-area contact over the entire cable circumference for compliance with the functional interference requirements of EN 55011.

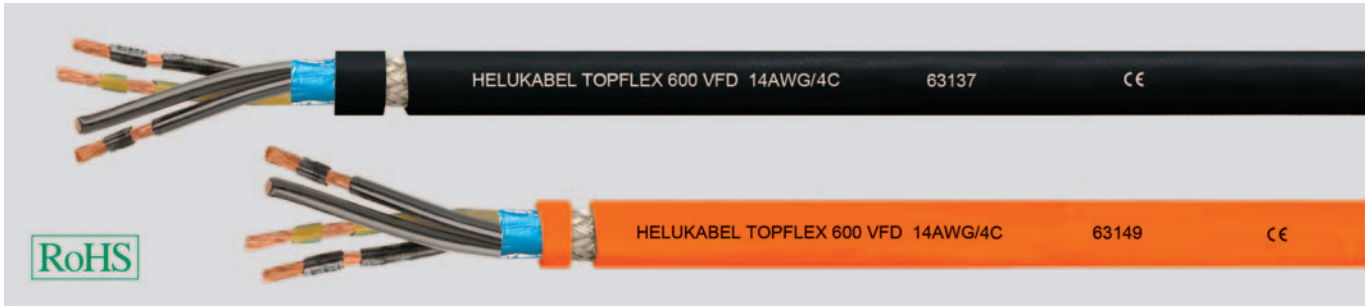
CE = The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer Ø app. mm	Cop. weight kg / km	Weight app. kg / km	AWG-No.
22689	3 G 1,5	9,4	72,0	200,0	16
22690	4 G 1,5	10,4	95,0	230,0	16
22691	5 G 1,5	11,2	117,0	258,0	16
22692	7 G 1,5	13,2	148,0	281,0	16
22693	3 G 2,5	11,2	137,0	270,0	14
22694	4 G 2,5	12,5	150,0	300,0	14
22695	5 G 2,5	13,5	200,0	352,0	14
22696	7 G 2,5	16,0	230,0	473,0	14
22697	4 G 4	14,2	235,0	485,0	12

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer Ø app. mm	Cop. weight kg / km	Weight app. kg / km	AWG-No.
22698	5 G 4	15,4	321,0	567,0	12
22699	7 G 4	18,2	352,0	603,0	12
22700	4 G 6	15,2	320,0	633,0	10
22701	5 G 6	16,8	439,0	679,0	10
22702	7 G 6	20,0	501,0	771,0	10
22703	4 G 10	19,5	533,0	860,0	8
22704	5 G 10	21,6	711,0	1029,0	8
22705	4 G 16	23,1	789,0	1290,0	6
22706	4 G 25	27,1	1236,0	1862,0	4

Dimensions and specifications may be changed without prior notice. (RN07)

# TOPFLEX® 600 VFD EMC-preferred type, flexible motor power supply cable, oil-resistant, NFPA 79 Edition 2012



## Technical data

- PVC motor supply cable acc. to UL-Std.1277 and UL-Std.2277
- **Temperature range**  
-25°C to +90°C
- **Nominal voltage**  
TC 600 V  
WTTTC 1000 V
- **Test voltage** 4000 V
- **Minimum bending radius**  
flexing 6x cable Ø
- **Coupling resistance**  
max. 250 Ohm/km

## Cable structure

- Tinned copper conductor, fine wire with AWG dimensions
- Core insulation of special PVC with transparent nylon skin
- Black cores with continuous white numbering
- GN-YE conductor in the outer layer
- Cores stranded in layers with optimal lay-length
- Fleece
- 1. Screening with special aluminium foil
- 2. Screening with braid of tinned copper wires, optimal coverage approx. 85%
- Separator
- Outer sheath of special PVC
- Sheath colour black (RAL 9005) or orange (RAL 2003)
- with length marking in feet

## Properties

- self-extinguishing and flame retardant acc. to CSA FT4
- The materials used in manufacture are cadmium-free and contain no silicone and free from substances harmful to the wetting properties of lacquers
- UV-resistant

## Tests

- **UL:**  
TC-ER, WTTTC 1000 V, MTW, NFPA 79 2012, PLTC-ER (AWG 18 - AWG 12), ITC-ER (AWG 18 - AWG 12) OIL RES I & II, 90°C dry / 75°C wet, Cold Bend Test -40°C Class 1 Div. 2 per NEC Art. 336, 392, 501
- **CSA:**  
c (UL) CIC-TC FT4  
AWM I/II A/B FT4

## Note

- VFD = Variable Frequency Drive

## Application

Flexible, extremely oil-resistant motor supply cable for modern servomotors; the double-screening with special aluminium foil (100% coverage) and tinned copper braid (approx. 85% coverage) provides effective protection against electrical disturbance and the resultant failures. Approved to NFPA 79 edition 2012 for open, unprotected installation on cable trays and from cable trays to the machine. The special PVC sheath is extremely resistant to oil, coolants and solvents and hence the perfect solution for industrial applications with open installation, installation in pipes and in the earth.

**EMC** = Electromagnetic compatibility

To optimize the EMC features we recommend a large round contact of the copper braiding on both ends.

CE = The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

## Sheath colour black

Part no.	No. cores x AWG-No.	Cross-section mm <sup>2</sup>	Outer Ø app. mm	Cop. weight kg / km	Weight app. kg / km
63139	4 x 18	0,963	9,9	52,0	164,0
63140	4 x 16	1,31	11,4	72,0	183,0
63137	4 x 14	2,08	12,5	118,0	197,0
63141	4 x 12	3,31	14,0	182,0	267,0
63142	4 x 10	5,26	17,1	256,0	402,0
63143	4 x 8	8,37	22,3	417,0	668,0
63144	4 x 6	13,31	25,4	651,0	918,0
63145	4 x 4	21,21	30,1	910,0	1363,0
63146	4 x 2	33,6	35,3	1411,0	1994,0

## Sheath colour orange

Part no.	No. cores x AWG-No.	Cross-section mm <sup>2</sup>	Outer Ø app. mm	Cop. weight kg / km	Weight app. kg / km
63147	4 x 18	0,963	9,9	52,0	164,0
63148	4 x 16	1,31	11,4	72,0	183,0
63149	4 x 14	2,08	12,5	118,0	197,0
63150	4 x 12	3,31	14,0	182,0	267,0
63151	4 x 10	5,26	17,1	256,0	402,0
63152	4 x 8	8,37	22,3	417,0	668,0
63153	4 x 6	13,31	25,4	651,0	918,0
63154	4 x 4	21,21	30,1	910,0	1363,0
63155	4 x 2	33,6	35,3	1411,0	1994,0

Dimensions and specifications may be changed without prior notice. (RN07)



Suitable accessories can be found in Chapter X.

- Cable Gland - HELUTOP® HT-MS-EP4



# TOPFLEX® 650 VFD EMC-preferred type, flexible motor power supply cable with control cores, oil-resistant, NFPA 79 Edition 2012



## Technical data

- TPE motor supply cable acc. to UL-Std.1277 and UL-Std.2277
- **Temperature range**  
flexing -25°C to +105°C
- **Nominal voltage**  
TC 600 V  
WTTC 1000 V
- **Test voltage**  
power supply cores 4000 V  
control cores 2000 V
- **Minimum bending radius**  
flexing 6x cable Ø
- **Coupling resistance**  
max. 250 Ohm/km

## Cable structure

- Tinned copper conductor, fine wire with AWG measures
- Core insulation of special PVC with transparent nylon skin
- Black supply cores with continuous white numbering
- 2 black control cores with number 5+6
- GN-YE conductor in the outer layer
- Control cores screened in pairs with plastic-coated aluminium foil, tinned drain wire
- Control cores stranded in pairs and laid up in layers with optimal lay-length with the power supply cores
- 1. Screening with plastic-coated aluminium foil
- 2. Screening from tinned Cu-braid, optimal coverage approx. 85%
- Separator
- Outer sheath of special TPE
- Sheath colour black (RAL 9005) or orange (RAL 2003)
- with length marking in feet

## Properties

- self-extinguishing and flame retardant acc. to CSA FT4
- The materials used in manufacture are cadmium-free and contain no silicone and free from substances harmful to the wetting properties of lacquers
- UV-resistant

## Tests

- **UL:**  
TC-ER, WTTC 1000 V, MTW, NFPA 79 2012, PLTC-ER (AWG 18 - AWG 12), ITC-ER (AWG 18 - AWG 12) OIL RES I & II, 90°C dry / 75°C wet, Cold Bend Test -40°C Class 1 Div. 2 per NEC Art. 336, 392, 501
- **CSA:**  
c (UL) CIC-TC FT4  
AWM I/II A/B FT4

## Note

- VFD = Variable Frequency Drive

## Application

Flexible, extremely oil-resistant motor supply cable for modern servomotors; the double-screening with special aluminium foil (100% coverage) and tinned copper braid (approx. 85% coverage) provides effective protection against electrical disturbance and the resultant failures. Approved to NFPA 79 edition 2012 for open, unprotected installation on cable trays and from cable trays to the machine. The special TPE sheath is extremely resistant to oil, coolants and solvents and hence the perfect solution for industrial applications with open installation, installation in pipes and in the earth.

**EMC** = Electromagnetic compatibility

To optimize the EMC features we recommend a large round contact of the copper braiding on both ends.

CE = The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

### Sheath colour black

Part no.	No. cores x AWG-No.	Cross-section mm <sup>2</sup>	Outer Ø app. mm	Cop. weight kg / km	Weight app. kg / km
63156	4x AWG 16 +2x AWG 18	1,31 / 0,963	13,0	88,0	259,0
63157	4x AWG 14 +2x AWG 18	2,08 / 0,963	14,0	133,0	370,0
63138	4x AWG 14 +2x AWG 14	2,08 / 2,08	14,0	159,0	399,0
63158	4x AWG 12 +2x AWG 18	3,31 / 0,963	15,3	197,0	435,0
63159	4x AWG 12 +2x AWG 14	3,31 / 2,08	15,7	224,0	466,0
63160	4x AWG 10 +2x AWG 14	5,26 / 2,08	18,2	301,0	703,0
63161	4x AWG 8 +2x AWG 14	8,37 / 2,08	24,1	457,0	901,0
63162	4x AWG 6 +2x AWG 14	13,31 / 2,08	27,4	615,0	1275,0
63163	4x AWG 4 +2x AWG 14	21,21 / 2,08	33,4	1450,0	1861,0

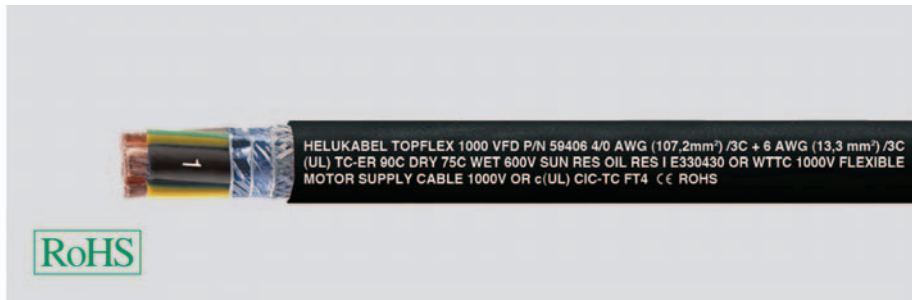
### Sheath colour orange

Part no.	No. cores x AWG-No.	Cross-section mm <sup>2</sup>	Outer Ø app. mm	Cop. weight kg / km	Weight app. kg / km
62876	4x AWG 16 +2x AWG 18	1,31 / 0,963	13,0	88,0	259,0
62877	4x AWG 14 +2x AWG 18	2,08 / 0,963	14,0	133,0	370,0
62878	4x AWG 14 +2x AWG 14	2,08 / 2,08	14,0	159,0	399,0
62879	4x AWG 12 +2x AWG 18	3,31 / 0,963	15,3	197,0	435,0
62880	4x AWG 12 +2x AWG 14	3,31 / 2,08	15,7	224,0	466,0
62881	4x AWG 10 +2x AWG 14	5,26 / 2,08	18,2	301,0	703,0
62882	4x AWG 8 +2x AWG 14	8,37 / 2,08	24,1	457,0	901,0
62883	4x AWG 6 +2x AWG 14	13,31 / 2,08	27,4	615,0	1275,0
62884	4x AWG 4 +2x AWG 14	21,21 / 2,08	33,4	1450,0	1861,0

Dimensions and specifications may be changed without prior notice. (RN07)

# TOPFLEX® 1000 VFD

EMC-preferred type, flexible motor power supply cable with control cores, oil-resistant, NFPA79 Edition 2012



## Technical data

- Motor power supply cable for VFDs acc. to UL-Std. 83, 1277 and 2277
- **Temperature range** flexing -25°C to +90°C
- **Nominal voltage** UL 1277 - TC 600 V  
UL 2277 - WTTTC 1000 V
- **Test voltage** 2500 V
- **Minimum bending radius** flexing 15x cable Ø  
fixed installation 7,5x cable Ø
- **Coupling resistance** max. 250 Ohm/km

## Cable structure

- Bare copper-conductor, fine-wire with AWG dimensions
- Core insulation of special PVC with clear nylon coating
- Core identification black cores with continuous white numbering
- GN-YE conductor (divided into 3)
- Cores stranded in concentric layers
- 3 power + 3 ground conductor design
- 1. Screen with special aluminium film  
2. Tinned copper braided screen, coverage approx. 80%
- Outer sheath of special TPE
- Sheath colour black (RAL 9005)
- with length marking in feet

## Properties

- Resistant to oil and sunlight
- Due the optimal screening an interference-free operation of frequency container is obtained
- The materials used in manufacture are cadmium-free and contain no silicone and free from substances harmful to the wetting properties of lacquers

## Tests

- Behavior in fire acc. to CIC FT4
- **UL**  
UL Type TC-ER, UL 83, 1277, 2277, WTTTC, Oil Res I, NFPA 2012
- **CSA**  
c(UL) Type CIC FT4, CSA C22.2 No. 230, CSA C22.2 No. 239

## Note

- VFD = Variable Frequency Drive

## Application

It is used as a power supply cable under average mechanical stress for fixed installation and sometimes for free movement in dry, moist wet rooms and outside. It is used in the automotive industry, food processing industry, transfer streets, packaging industry, machine tools, handling equipment, other industrial uses include pumps, fans, transport belts and in air conditioning systems, etc. Used in explosion proof areas.

**EMC** = Electromagnetic compatibility

The screen must be connected at both ends and ensure large-area contact over the entire cable circumference for compliance with the functional interference requirements of EN 55011.

☺= The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

Part no.	No. power cores x AWG-No.	No. ground cores x AWG-No.	No. cores x cross-section mm <sup>2</sup>	Outer Ø app. mm	Cop. weight kg / km	Weight app. kg / km
59398	3x AWG 8 +	3x AWG 16	(3x 8,37 + 3x 1,31)	17,1	372,0	573,0
59399	3x AWG 6 +	3x AWG 14	(3x 13,3 + 3x 2,08)	19,3	554,0	735,0
59400	3x AWG 4 +	3x AWG 12	(3x 21,2 + 3x 3,3)	24,5	831,0	1225,0
59401	3x AWG 2 +	3x AWG 10	(3x 33,6 + 3x 5,26)	27,8	1258,0	1737,0
59402	3x AWG 1 +	3x AWG 8	(3x 42,4 + 3x 8,37)	31,1	1615,0	2225,0
59403	3x AWG 1/0 +	3x AWG 8	(3x 53,4 + 3x 8,37)	33,1	1938,0	2604,0
59404	3x AWG 2/0 +	3x AWG 8	(3x 67,5 + 3x 8,37)	35,8	2344,0	3089,0
59405	3x AWG 3/0 +	3x AWG 6	(3x 85 + 3x 13,3)	38,6	2994,0	3823,0
59406	3x AWG 4/0 +	3x AWG 6	(3x 107,2 + 3x 13,3)	44,5	3590,0	4700,0
59407	3x AWG 250 kcmil +	3x AWG 6	(3x 127 + 3x 13,3)	48,4	4177,0	5487,0
59408	3x AWG 300 kcmil +	3x AWG 4	(3x 152 + 3x 21,2)	50,9	5104,0	6530,0
59409	3x AWG 350 kcmil +	3x AWG 2	(3x 178 + 3x 33,6)	54,0	6218,0	7768,0
59410	3x AWG 400 kcmil +	3x AWG 2	(3x 203 + 3x 33,6)	55,5	6875,0	8492,0
59411	3x AWG 500 kcmil +	3x AWG 2	(3x 254 + 3x 33,6)	60,5	8303,0	10130,0

Dimensions and specifications may be changed without prior notice. (RN07)

# TOPFLEX®-EMV-UV 2YSLC11Y-J UL/CSA<sup>Motor</sup>

supply cable 1000 V, for power supply connections to frequency converters, double screened, meter marking.



## Technical data

- Special PUR motor power supply cable for frequency converters to UL AWM style 20234 and CSA AWM adapted to DIN VDE 0250
- **Temperature range**  
flexing -5°C to +80°C  
fixed installation -40°C to +80°C
- **Nominal voltage**  
UL 1000 V
- **Test voltage** 4000 V
- **Insulation resistance**  
min. 200 MOhm x km
- **Minimum bending radius**  
fixed installation for outer Ø:  
up to 12 mm: 5x cable Ø  
> 12-20 mm: 7,5x cable Ø  
> 20 mm: 10x cable Ø  
free-movement for outer Ø:  
up to 12 mm: 10x cable Ø  
> 12-20 mm: 15x cable Ø  
> 20 mm: 20x cable Ø
- **Coupling resistance**  
acc. to different cross-section  
max. 250 Ohm/km
- **Radiation-resistance**  
up to 80x10<sup>6</sup> cJ/kg (up to 80 Mrad)

## Cable structure

- Bare copper, fine wire conductor to DIN VDE 0295 cl.5, BS 6360 cl.5 or IEC 60228 cl.5
- Core insulation of polyethylen (PE)
- Core identification BK, BN, GY
- GN-YE conductor
- Cores stranded in concentric layers
- 1. Screen with special aluminium film
- 2. Tinned copper braided screen, approx. 85% coverage
- Outer sheath of PUR
- Sheath colour black (RAL 9005)
- with meter marking

## Note

- **\*\***) The current carrying capacity for permanent operation at ambient temperature of 30°C. For deviating ambient temperatures the conversion factors should be used and for further see the indication in DIN VDE 0298 part 4.
- AWG sizes are approximate equivalent values. The actual cross-section is in mm<sup>2</sup>.

## Properties

- Meets EMC requirements acc. to EN 55011 and DIN VDE 0875 part 11
- PUR outer sheath: low adhesion, flame retardant, extremely abrasion resistant, halogen-free, resistant to UV, oil, hydrolysis and microbial attack
- Low mutual capacitance
- Low coupling resistance for high electromagnetic compatibility
- UV-resistant
- Outdoor application
- This screened motor supply cable with low mutual capacitance of the single cores because of the special PE core insulation and low screen capacitance enable a low-loss transmission of the power compared to PVC-sheathed connecting cables
- Due to the optimal screening an interference-free operation of frequency converters is obtained
- The materials used in manufacture are cadmium-free and contain no silicone and free from substances harmful to the wetting properties of lacquers

## Tests

- PUR outer sheath self-extinguishing and flame retardant to DIN VDE 0482-332-1-2, DIN EN 60332-1-2/IEC 60332-1 (equivalent DIN VDE 0472 part 804 test method B)

## Application

This TOPFLEX®-EMV-UV-2YSLC11Y-J UL/CSA motor power supply cable with PUR outer sheath for the frequency converters assures electromagnetic compatibility in plants and buildings, facilities with units and operating equipment where the fields of electromagnetic interference might cause adverse effects on the surroundings. As a supply and connecting cable for medium mechanical stresses in fixed installations and forced movements in dry, moist and wet environments and for outdoor applications. Used in the automotive and food industries, environmental technology, packaging industry, machine tools. Handling equipment, for SIMOVERT drives, they are particularly suitable for use with industrial pumps, ventilators, conveyor belts and air-conditioning installations and similar applications. Installation in hazardous areas.

**EMC** = Electromagnetic compatibility

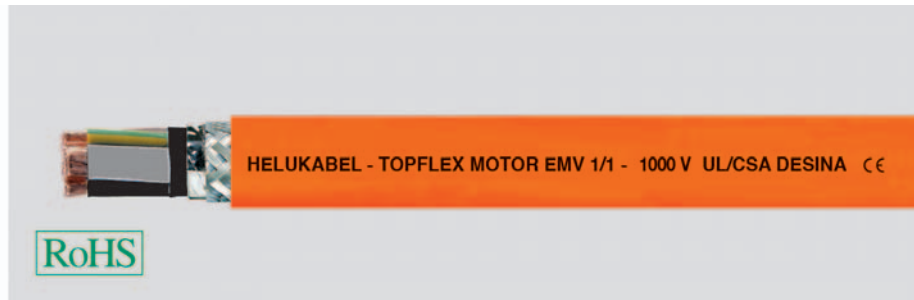
The screen must be connected at both ends and ensure large-area contact over the entire cable circumference for compliance with the functional interference requirements of EN 55011.

**CE** = The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer Ø app. mm	Mutual capacitance		Coupling resistance		Power ratings <sup>**</sup> ) with 3 loaded cores in Amperes	Cop. weight kg / km	Weight app. kg / km	AWG-No.
			Core / Core app.nF / km	Core / Screen app.nF / km	at 1 MHz Ohm/km	at 30 MHz Ohm/km				
22389	4 G 1,5	10,3					18	95,0	230,0	16
22390	4 G 2,5	12,3	80	130	18	210	26	150,0	300,0	14
22391	4 G 4	13,9	90	150	11	210	34	235,0	485,0	12
22392	4 G 6	15,3	90	150	6	150	44	320,0	630,0	10
22393	4 G 10	19,5	120	200	7	180	61	533,0	860,0	8
22394	4 G 16	23,3	140	230	9	190	82	789,0	1290,0	6
22395	4 G 25	27,4	120	211	4	95	108	1180,0	1800,0	4
22396	4 G 35	30,3	150	260	3	85	135	1662,0	2610,0	2
22397	4 G 50	35,5	190	320	2	40	168	2345,0	2950,0	1
22398	4 G 70	40,2	190	320	2	45	207	3196,0	3950,0	2/0
22399	4 G 95	44,5	250	410	1	50	250	4316,0	5300,0	3/0
22566	4 G 120	50,3					292	5435,0	6600,0	4/0
22567	4 G 150	56,1					335	6394,0	7040,0	300 kcmil
22568	4 G 185	58,0					382	7639,0	8380,0	350 kcmil

Dimensions and specifications may be changed without prior notice. (RN07)

# TOPFLEX® MOTOR EMV 1/1 triple-screened, low capacitance, 80°C, 1000 V, high flexible motor supply cable, meter marking



## Technical data

- Special PUR motor power supply cable for frequency converter to UL AWM Style 20234 and CSA AWM adapted to DIN VDE 0250
- **Temperature range**  
flexing -30°C to +80°C  
fixed installation -40°C to +80°C
- Permissible **operating temperature** at conductor +90°C
- **Nominal voltage**  
VDE U<sub>0</sub>/U 600/1000 V  
UL 1000 V
- **Test voltage** 3000 V
- **Mutual capacitance** at 4 kHz  
acc. to different cross-section  
core/core 70-250 nF/km  
core/screen 110-410 nF/km
- **Insulation resistance**  
min. 200 MOhm x km
- **Minimum bending radius**  
fixed installation, for outside Ø:  
up to 12 mm: 5x cable Ø  
> 12-20 mm: 7,5x cable Ø  
> 20 mm: 10x cable Ø  
free-movement, for outside Ø:  
up to 12 mm: 10x cable Ø  
> 12-20 mm: 15x cable Ø  
> 20 mm: 20x cable Ø
- **Coupling resistance**  
acc. to different cross-section  
max. 250 Ohm/km
- **Radiation resistance**  
up to 80x10<sup>6</sup> cJ/kg (up to 80 Mrad)

## Application

This TOPFLEX® MOTOR EMV 1/1 two-approvals, triple-screened motor power supply cable for frequency converters provides outstanding EMC in machines and systems. Suitable as a supply and connecting cable for high mechanical stresses, in fixed installations and occasional free movements in dry, moist and wet environments, as well as outdoors. Areas of application include machine tools, processing and manufacturing machinery, machining centres, industrial robots, transfer lines, handling equipment, etc.

**EMC** = Electromagnetic compatibility

To optimize the EMC features we recommend a large round contact of the copper braiding on both ends.

CE = The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

## Cable structure

- Bare copper-conductor, to DIN VDE 0295 cl.5, fine-wire, IEC 60228 cl.5
- Core insulation of special polyethylene (PE)
- Core identification BK, BN, GY
- GN-YE conductor
- Cores stranded in layers
- 1. Screen of semi-conductive fleece
- 2. Aluminium-coated polyester film
- 3. Tinned copper braided screen, coverage approx. 85%
- Outer sheath of PUR
- Sheath colour orange (RAL 2003)
- with meter marking

## Properties

- PUR outer sheath: low adhesion, flame retardant, extremely abrasion resistant, halogen-free, resistant to UV, oil, hydrolysis and microbial attack
- This screened motor power supply cable, with low mutual capacitance because of the special PE core insulation, enable low-loss transmission of power compared to PVC-sheathed power supply cables
- The optimal triple screening enables interference-free operation of frequency converters
- Optimum compliance with requirements for electromagnetic compatibility (EMC) due to the triple screening
- The materials used in manufacture are cadmium-free and contain no silicone and free from substances harmful to the wetting properties of lacquers

## Tests

- PUR outer sheath self-extinguishing and flame retardant to DIN VDE 0482-332-1-2, DIN EN 60332-1-2, IEC 60332-1 (equivalent DIN VDE 0472 part 804 test method B)

## Note

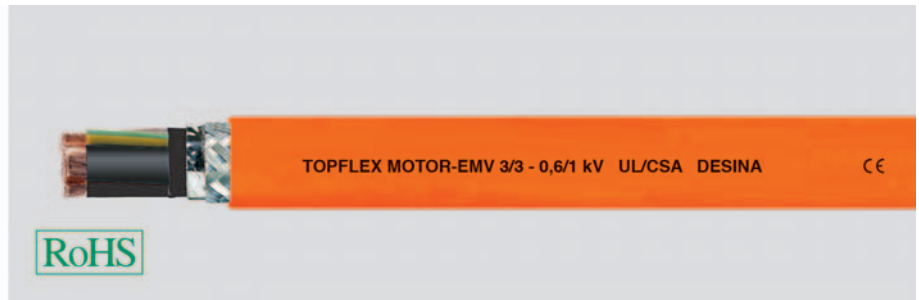
- \*\*) The current carrying capacity for permanent operation at ambient temperature of 30°C. For deviating ambient temperatures the conversion factors should be used and for further see the indication in DIN VDE 0298 part 4.
- AWG sizes are approximate equivalent values. The actual cross-section is in mm<sup>2</sup>.

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer Ø app. mm	Mutual capacitance		Coupling resistance		Power ratings **) with 3 loaded cores in Amperes	Cop. weight kg / km	Weight app. kg / km	AWG-No.
			Core / Core app.nF / km	Core / Screen app.nF / km	at 1 MHz Ohm/km	at 30 MHz Ohm/km				
78377	4 G 1,5	11,5	70	110			18	95,0	230,0	16
78378	4 G 2,5	13,5	80	130	18	210	26	150,0	300,0	14
78379	4 G 4	15,8	90	150	11	210	34	235,0	485,0	12
78380	4 G 6	17,8	90	150	6	150	44	320,0	630,0	10
708609	4 G 10	21,6	120	200	7	180	61	533,0	860,0	8
708610	4 G 16	25,4	120	210	9	190	82	789,0	1290,0	6
708611	4 G 25	31,0	140	230	4	95	108	1180,0	1800,0	4
708612	4 G 35	33,0	150	260	3	85	135	1662,0	2610,0	2
78384	4 G 50	39,0	190	320	2	40	168	2345,0	2950,0	1
78385	4 G 70	45,0	190	320	2	45	207	3196,0	3950,0	2/0
78386	4 G 95	50,1	250	410	1	50	250	4316,0	5300,0	3/0
78387	4 G 120	54,2					292	5435,0	6600,0	4/0
78388	4 G 150	61,3					335	6394,0	7040,0	300 kcmil
78479	4 G 185	64,2					382	7639,0	8380,0	350 kcmil

Dimensions and specifications may be changed without prior notice.



# TOPFLEX®-MOTOR-EMV 3/3 triple-screened, low capacitance, 80°C, 1000 V, PUR flexible motor supply cable, meter marking



## Technical data

- Special PUR motor power supply cable for frequency converter to UL AWM Style 20234 and CSA AWM adapted to DIN VDE 0250
- **Temperature range**  
flexing -30°C to +80°C  
fixed installation -40°C to +80°C
- Permissible **operating temperature** at conductor +90°C
- **Nominal voltage**  
VDE U<sub>0</sub>/U 600/1000 V  
UL 1000 V
- **Test voltage** 3000 V
- **Mutual capacitance** at 4 kHz  
acc. to different cross-section core/core 70-250 nF/km  
core/screen 110-410 nF/km
- **Insulation resistance**  
min. 200 MOhm x km
- **Minimum bending radius**  
fixed installation for outside Ø:  
up to 12 mm: 5x cable Ø  
> 12-20 mm: 7,5x cable Ø  
> 20 mm: 10x cable Ø  
free-movement for outside Ø:  
up to 12 mm: 10x cable Ø  
> 12-20 mm: 15x cable Ø  
> 20 mm: 20x cable Ø
- **Coupling resistance**  
acc. to different cross-section  
max. 250 Ohm/km
- **Radiation resistance**  
up to 80x10<sup>6</sup> cJ/kg (up to 80 Mrad)

## Cable structure

- Bare copper-conductor, to DIN VDE 0295 cl.5, fine-wire, BS 6360 cl.5, IEC 60228 cl.5
- Core insulation of special polyethylene (PE)
- Core identification black cores with imprint U1, V1, W3
- GN-YE conductor (divided into 3)
- Cores stranded in layers
- 1. Screen of semi-conductive fleece
- 2. Aluminium-coated polyester film
- 3. Tinned copper braided screen, coverage approx. 80%
- Outer sheath of PUR
- Sheath colour orange (RAL 2003) acc. to DESINA®
- with meter marking

## Properties

- PUR outer sheath: low adhesion, flame retardant, extremely abrasion resistant, halogen-free, resistant to UV, oil, hydrolysis and microbial attack
- This screened motor power supply cable, with low mutual capacitance because of the special PE core insulation, enables low-loss transmission of power compared to PVC-sheathed power supply cables
- The optimal triple screening enables interference-free operation of frequency converters
- Optimum compliance with requirements for electromagnetic compatibility (EMC) due to the triple screening
- The materials used in manufacture are cadmium-free and contain no silicone and free from substances harmful to the wetting properties of lacquers

## Special features

Here the earth core cross-section is divided into thirds, which lie in the interstices between the power supply cores. Due to this symmetrical construction, the PE insulation and the triple screening, very low capacitance and inductance are achieved. EMC compatibility is considerably enhanced.

## Tests

- PUR outer sheath self-extinguishing and flame retardant to DIN VDE 0482-332-1-2, DIN EN 60332-1-2, IEC 60332-1 (equivalent DIN VDE 0472 part 804 test method B)

## Note

- All cables are also available in JB with coloured cores acc. to DIN VDE 0295
- \*\*) The current carrying capacity for permanent operation at ambient temperature of 30°C. For deviating ambient temperatures the conversion factors should be used and for further see the indication in DIN VDE 0298 part 4.
- AWG sizes are approximate equivalent values. The actual cross-section is in mm<sup>2</sup>.

## Application

This TOPFLEX® MOTOR EMV 3/3 two-approvals, triple-screened motor power supply cable for frequency converters provides outstanding EMC in machines and systems. Suitable as a supply and connecting cable for high mechanical stresses, in fixed installations and occasional free movements in dry, moist and wet environments, as well as outdoors. Areas of application include machine tools, processing and manufacturing machinery, machining centres, industrial robots, transfer lines, handling equipment, etc. By dividing the earth core into thirds and dividing it evenly in the interstices between the power supply cores, a symmetrical structure has been achieved. This results in improved EMC, capacitance and inductance compared to the 4-core version.

**EMC** = Electromagnetic compatibility

To optimize the EMC features we recommend a large round contact of the copper braiding on both ends.

CE = The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

Continuation ▶



# TOPFLEX®-MOTOR-EMV 3/3 triple-screened, low capacitance, 80°C, 1000 V, PUR flexible motor supply cable, meter marking



Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer Ø app. mm	Coupling resistance		Power ratings **) with 3 loaded cores in Amperes	Cop. weight kg / km	Weight app. kg / km	AWG-No.
			at 1 MHz Ohm/km	at 30 MHz Ohm/km				
78614	3 x 1,5 + 3 G 0,25	10,4			18	86,0	150,0	16
78615	3 x 2,5 + 3 G 0,5	12,1	18	210	26	144,0	240,0	14
78616	3 x 4 + 3 G 0,75	13,9	11	210	34	224,0	345,0	12
78617	3 x 6 + 3 G 1,0	15,5	6	150	44	298,0	460,0	10
78618	3 x 10 + 3 G 1,5	19,5	7	180	61	491,0	840,0	8
78619	3 x 16 + 3 G 2,5	22,5	9	190	82	723,0	930,0	6
78620	3 x 25 + 3 G 4,0	28,6	4	95	108	1138,0	1425,0	4
78621	3 x 35 + 3 G 6,0	29,6	3	85	135	1535,0	1900,0	2
708613	3 x 50 + 3 G 10,0	35,7	2	40	168	2208,0	2812,0	1
708371	3 x 70 + 3 G 10,0	43,0	2	45	207	2871,0	3370,0	2/0
708372	3 x 95 + 3 G 16,0	47,0	1	50	250	3953,0	4320,0	3/0
708373	3 x 120 + 3 G 25,0	52,0			292	4836,0	6160,0	4/0
78626	3 x 150 + 3 G 25,0	58,0			335	5412,0	7200,0	300 kcmil

Dimensions and specifications may be changed without prior notice.



Suitable accessories can be found in Chapter X.

- Cable Gland - HELUTOP® HT-MS-EP4

# TOPSERV® PVC Motor and servo cables for fixed or not constantly movements 0,6/1 kV, according to Siemens 6FX5008, Lenze, Bosch Rexroth



## Technical data

- Special PVC Motorcable acc. to UL AWM Style 2570 CSA AWM VDE-recognized
- **Temperature range**  
flexing -0°C to +60°C  
fixed installation -20°C to +80°C
- **Nominal voltage**  
VDE U<sub>0</sub>/U 600/1000 V  
UL/CSA 1000 V
- **A.c. test voltage**, 50 Hz  
4000 V
- **Minimum bending radius**  
flexing 15x cable Ø  
fixed installation 5x cable Ø  
min. 100.000 cycles

## Cable structure

- Bare copper-conductor, acc. to DIN EN 60228 class 5: fine-wire class 6: extra fine-wire
- Core insulation to 6 mm<sup>2</sup> of halogen-free PP from 10 mm<sup>2</sup> of PVC
- Core identification  
**power supply cores**  
core 1: black with imprint U/L1/C/L+  
core 2: black with imprint V/L2  
core 3: black with imprint W/L3/D/L-  
**control cores**  
**TOPSERV® 108 PVC** without control cores  
**TOPSERV® 112 PVC** with 1 control cores  
[acc. to Siemens](#)  
core 1: black with imprint BR1  
core 2: white with imprint BR2  
[acc. to Lenze](#)  
core 1: brown with imprint BR1  
core 2: white with imprint BR2  
**TOPSERV® 119 PVC** with 2 control cores  
pair 1: black with number no. 5+6  
pair 2: black with number no. 7+8
- GN-YE conductor
- Screening of the control cores in pairs wrapped with tinned copper braid
- Power supply cores laid up with optimal lay length and stabilising filler
- Fleece wrapping facilitates sliding
- Overall screening from tinned copper braid, optimal coverage approx. 85%
- Outer sheath of PVC
- Sheath colour orange (RAL 2003)

## Properties

- low capacitance until 6mm<sup>2</sup> (included)
- oilresistant PVC outer sheath
- Optimum compliance with requirements for electromagnetic compatibility (EMC) by approx. 85% coverage from the braided screen
- These cables are produced to high quality specifications and conform to the DESINA®-standard
- The materials used in manufacture are cadmium-free and contain no silicone and free from substances harmful to the wetting properties of lacquers

## Tests

- PVC sheath flame retardant acc. to DIN EN 60332-1-1 to -1-3 (VDE 0482-332-1-1 to -1-3)

## Note

- For a corresponding encoder cables please check chapter **TOPGEBER 511 PVC**
- For highly flexible, drag chain capable servo cables please check chapter **TOPSERV® PUR**
- Brackets ( ) indicate screen
- DESINA® explanation see introduction
- SIEMENS product designations 6FX 5008-plus are registered trademarks of Siemens AG and are to be used only for purposes of comparison
- Lenze product designations are registered trademarks of Lenze AG and are to be used only for purposes of comparison
- Bosch Rexroth product designations INK are registered trademarks of Bosch Rexroth AG and are to be used only for purposes of comparison

## Application

The combination of supply cores with the control cores for the braking function and the thermal protection in these cables is ideal. Precision servomotors, as used today in many areas of highly-automated manufacturing processes, call for high-quality, reliable and long-lasting cables. These requirements are met to a high degree by these cables. The cables have an additional overall screen to ensure EMC compatibility, i.e. for protection against electromagnetic interference. Production is based on the specifications of established manufacturers of servo-drives and controls, as well as on various VDE, UL and CSA standards.

Applications include machine, plant and robot construction, automation, drive, control and production engineering. Attractive for export-oriented mechanical and system engineering.

**EMC** = Electromagnetic compatibility

To optimize the EMC features we recommend a large round contact of the copper braiding on both ends.

☑ = The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

Continuation ▶

**TOPSERV® PVC** Motor and servo cables for fixed or not constantly

movements 0,6/1 kV, according to Siemens 6FX5008, Lenze, Bosch Rexroth

**TOPSERV® 108 PVC, acc.to Siemens 6FX5008**

Part no.	No.cores x cross-sec. mm <sup>2</sup>	for system	OEM Part no.	Sheath colour	Outer Ø app. mm	Cop. weight kg / km	Weight app. kg / km	AWG-No.
707250	(4 G 1,5)	Siemens	6FX5008-1BB11	Orange RAL 2003	8,0	78,0	118,0	16
707251	(4 G 2,5)	Siemens	6FX5008-1BB21	Orange RAL 2003	9,6	130,0	180,0	14
707252	(4 G 4)	Siemens	6FX5008-1BB31	Orange RAL 2003	11,0	198,0	264,0	12
707253	(4 G 6)	Siemens	6FX5008-1BB41	Orange RAL 2003	13,1	288,0	382,0	10
707254	(4 G 10)	Siemens	6FX5008-1BB51	Orange RAL 2003	19,3	463,0	764,0	8
707255	(4 G 16)	Siemens	6FX5008-1BB61	Orange RAL 2003	23,3	701,0	1218,0	6
707256	(4 G 25)	Siemens	6FX5008-1BB25	Orange RAL 2003	26,9	1068,0	1670,0	4
707257	(4 G 35)	Siemens	6FX5008-1BB35	Orange RAL 2003	30,3	1449,0	2139,0	2
707258	(4 G 50)	Siemens	6FX5008-1BB50	Orange RAL 2003	34,5	2096,0	2991,0	1

**TOPSERV® 112 PVC, acc.to Siemens 6FX5008**

Part no.	No.cores x cross-sec. mm <sup>2</sup>	for system	OEM Part no.	Sheath colour	Outer Ø app. mm	Cop. weight kg / km	Weight app. kg / km	AWG-No.
707280	(4 G 1,5 + (2 x 1,5))	Siemens	6FX5008-1BA11	Orange RAL 2003	10,4	140,0	206,0	16
707281	(4 G 2,5 + (2 x 1,5))	Siemens	6FX5008-1BA21	Orange RAL 2003	12,0	185,0	269,0	14
707282	(4 G 4 + (2 x 1,5))	Siemens	6FX5008-1BA31	Orange RAL 2003	13,6	257,0	377,0	12
707283	(4 G 6 + (2 x 1,5))	Siemens	6FX5008-1BA41	Orange RAL 2003	15,6	348,0	485,0	10
707284	(4 G 10 + (2 x 1,5))	Siemens	6FX5008-1BA51	Orange RAL 2003	21,0	502,0	887,0	8
707285	(4 G 16 + (2 x 1,5))	Siemens	6FX5008-1BA61	Orange RAL 2003	24,1	741,0	1276,0	6
707286	(4 G 25 + (2 x 1,5))	Siemens	6FX5008-1BA25	Orange RAL 2003	28,3	1100,0	1716,0	4
707287	(4 G 35 + (2 x 1,5))	Siemens	6FX5008-1BA35	Orange RAL 2003	31,4	1498,0	2290,0	2
707288	(4 G 50 + (2 x 1,5))	Siemens	6FX5008-1BA50	Orange RAL 2003	34,5	2500,0	2934,0	1

**TOPSERV® 112 PVC, acc.to Lenze**

Part no.	No.cores x cross-sec. mm <sup>2</sup>	for system	OEM Part no.	Sheath colour	Outer Ø app. mm	Cop. weight kg / km	Weight app. kg / km	AWG-No.
707221	(4 G 1 + (2 x 0,5))	Lenze	-	Orange RAL 2003	9,5	88,0	143,0	17
707222	(4 G 1,5 + (2 x 0,5))	Lenze	-	Orange RAL 2003	11,0	106,0	187,0	16
707223	(4 G 2,5 + (2 x 0,5))	Lenze	-	Orange RAL 2003	12,3	152,0	233,0	14
707224	(4 G 4 + (2 x 1,0))	Lenze	-	Orange RAL 2003	14,6	229,0	382,0	12
707225	(4 G 6 + (2 x 1,0))	Lenze	-	Orange RAL 2003	16,7	312,0	491,0	10
710054	(4 G 10 + (2 x 1,0))	Lenze	-	Orange RAL 2003	19,8	484,0	731,0	8
710055	(4 G 16 + (2 x 1,0))	Lenze	-	Orange RAL 2003	23,3	729,0	1033,0	6

**TOPSERV® 119 PVC, acc.to Bosch Rexroth**

Part no.	No.cores x cross-sec. mm <sup>2</sup>	for system	OEM Part no.	Sheath colour	Outer Ø app. mm	Cop. weight kg / km	Weight app. kg / km	AWG-No.
707290	(4 G 1 + 2 x (2 x 0,75))	Bosch Rexroth	INK-0653	Orange RAL 2003	11,2	130,0	208,0	-
707291	(4 G 1,5 + 2 x (2 x 0,75))	Bosch Rexroth	INK-0650	Orange RAL 2003	11,5	155,0	229,0	-
707292	(4 G 2,5 + 2 x (2 x 1,0))	Bosch Rexroth	INK-0602	Orange RAL 2003	13,5	216,0	321,0	-
707293	(4 G 4 + (2 x 1,0) + (2 x 1,5))	Bosch Rexroth	INK-0603	Orange RAL 2003	15,5	297,0	432,0	-
707294	(4 G 6 + (2 x 1,0) + (2 x 1,5))	Bosch Rexroth	INK-0604	Orange RAL 2003	17,3	374,0	587,0	-
707295	(4 G 10 + (2 x 1,0) + (2 x 1,5))	Bosch Rexroth	INK-0605	Orange RAL 2003	21,2	545,0	910,0	-
707296	(4 G 16 + 2 x (2 x 1,5))	Bosch Rexroth	INK-0606	Orange RAL 2003	25,0	804,0	1334,0	-

Dimensions and specifications may be changed without prior notice. (RN07)



Suitable HELUTEC® Signal and power connectors can be found in our Cable Accessories catalogue.

# TOPGEBER 511 PVC Feedback cables according to Siemens-,

Lenze- or Bosch Rexroth Standard with PVC-sheath for fixed or not constantly movements



## Technical data

- Special PVC feedback cable acc. to UL AWM style 20233 and CSA
- **Temperature range**  
flexing -0°C to +60°C  
fixed installation -20°C to +80°C
- **Nominal voltage**  
acc. to Siemens 30 V  
acc. to Bosch Rexroth and Lenze 300 V
- **A.c. test voltage**, 50 Hz  
core/core 1500 V  
core/screen 1000 V
- **Minimum bending radius**  
flexing 15x cable Ø  
fixed installation 6x cable Ø  
min. 100.000 cycles

## Cable structure

- Copper-conductor bare or tinned to DIN VDE 0295 cl.6, extra fine-wire, IEC 60228 cl.6
- Core insulation of special polypropylene
- Core colours on request
- Overall screening of tinned copper wire braid with tinned drain wire, coverage approx. 85%
- Polyester foil
- Outer sheath of PVC
- Sheath colour green (RAL 6018) acc. to DESINA® or orange

## Properties

- Outer sheath of PVC, oilresistant
- Optimum compliance with requirements for elect romagnetic compatibility (EMC) by approx. 85% coverage from the braided screen
- These cables are produced to high quality specifications and conform to the DESINA®-standard
- The materials used in manufacture are cadmium-free and contain no silicone and free from substances harmful to the wetting properties of lacquers

## Tests

- PVC sheath flame retardant acc. to DIN EN 60332-1-1 bis -1-3 (VDE 0482-332-1-1 bis -1-3)

## Note

- For a corresponding motor- and servocables please check chapter **TOPSERV® PVC**
- For drag chain capable encoder cables please check chapter **TOPGEBER 512 PUR**
- Brackets ( ) indicate screen.
- SIEMENS product designations 6FX 5008-... are registered trademarks of Siemens AG and are to be used only for purposes of comparison.
- INDRAMAT product designations INK- are registered trademarks of Bosch-Rexroth AG and are to be used only for purposes of comparison.
- LENZE product designations are registered trademarks of LENZE AG, and are to be used only for purposes of comparison.
- DESINA®: Explanation: see introduction.

## Application

Low cost alternativ to Motorcables with PUR Sheath for fix instalation or occasional moving applications. These low-capacitance incremental encoder cables or position feedback cables transmit the control pulses for positioning and operating characteristics of servomotors. These cables are used as connecting cables for tachos, brakes and pulse generators in industrial equipment, machine tools, control and automation equipment.

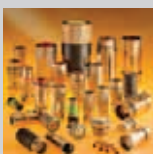
**EMC** = Electromagnetic compatibility

To optimize the EMC features we recommend a large round contact of the copper braiding on both ends.

**CE** = The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

Part no.	No. cores x cross-sec. mm²	for system	OEM Part no.	Sheath colour	Outer Ø app. mm	Cop. weight kg / km	Weight app. kg / km	AWG-No.
707417	( 4 x 2 x 0,34 + 4 x 0,5)	Siemens	6FX 5008-1BD21	Green	8,9	70,3	117,8	-
707389	( 3 x (2 x 0,14) + 4 x 0,14 + 2 x 0,5)	Siemens	6FX 5008-1BD41	Green	8,8	58,0	118,9	-
707390	( 3 x (2 x 0,14) + 4 x 0,14 + 4 x 0,25 + 2 x 0,5)	Siemens	6FX 5008-1BD51	Green	9,6	70,7	137,7	-
803672	( 2 x 2 x 0,22 + 1 x 2 x 0,34)	Siemens	6FX 5008-2DC00	Green	6,9	38,0	61,0	-
802471	( 2 x 2 x 0,22)	Siemens	6FX 5008-1DC00	Green	6,9	35,0	71,0	-
705461	( 4 x 2 x 0,25 + 2 x 0,5)	Bosch Rexroth	INK-0448	Orange	8,4	50,0	99,0	-
707392	( 4 x 2 x 0,25 + 2 x 1,0)	Bosch Rexroth	INK-0209	Orange	8,8	64,0	119,0	-
707394	( 4 x 2 x 0,14 + 4 x 1,0 + ( 4 x 0,14)	Bosch Rexroth	INK-0532	Orange	9,7	86,0	149,0	-
707077	3 x ( 2 x 0,14) + ( 2 x 0,5)	Lenze	-	Green	9,3	54,0	95,0	-
707397	4 x ( 2 x 0,14) + ( 2 x 1,0)	Lenze	-	Green	11,0	70,0	145,0	-
707398	3 x ( 2 x 0,14) + ( 3 x 0,14)	Lenze	-	Green	9,2	41,0	102,0	-

Dimensions and specifications may be changed without prior notice. (RN07)



Suitable HELUTEK® Signal and power connectors can be found in our Cable Accessories catalogue.

# TOPSERV® PUR high flexible motor and servo cable for drag chain 0,6/1 kV, for example according to Siemens 6FX8008PLUS, Lenze, Bosch Rexroth



## Technical data

- Special PUR drag chain cable acc. to UL AWM Style 21223 or 20234 CSA AWM VDE-recognized
- **Temperature range** flexing -30°C to +80°C fixed installation -40°C to +90°C
- **Nominal voltage** VDE U<sub>0</sub>/U 600/1000 V UL/CSA 1000 V
- **A.c. test voltage**, 50 Hz 4000 V
- **Insulation resistance** min. 20 MOhm x km
- **Coupling resistance** max. 250 Ohm/km
- **Minimum bending radius** flexing 7,5x cable Ø fixed installation 4x cable Ø

## Cable structure

- Bare copper-conductor, to DIN VDE 0295 cl.6, extra fine-wire, IEC 60228 cl.6
- Core insulation halogen-free PP
- Core identification
- **power supply cores** core 1: black with imprint U/L1/C/L+ core 2: black with imprint V/L2 core 3: black with imprint W/L3/D/L-
- **control cores** **TOPSERV® 109 PUR** without control cores **TOPSERV® 113 PUR** with 1 control cores acc. to Siemens core 1: black with imprint BR1 core 2: white with imprint BR2 acc. to Lenze core 1: brown with imprint BR1 core 2: white with imprint BR2 **TOPSERV® 121 PUR** with 2 control cores pair 1: black with number no. 5+6 pair 2: black with number no. 7+8
- GN-YE conductor
- Screening of the control cores in pairs wrapped with tinned copper braid
- Power supply cores laid up with optimal lay length and stabilising filler
- Fleece wrapping facilitates sliding
- Overall screening from tinned copper braid, optimal coverage approx. 85%
- Outer sheath of PUR
- Sheath colour orange (RAL 2003)

## Properties

- Low adhesion, flame retardant, extremely abrasion resistant, halogen-free, resistant to UV, oil, hydrolysis and microbial attack PUR sheath
- Optimized insulation materials ensure resistance to oils (including mineral oils), greases, coolants, hydraulic fluids as well as many alkalis and solvents.
- Optimum compliance with requirements for electromagnetic compatibility (EMC) by approx. 85% coverage from the braided screen
- These cables are produced to high quality specifications and conform to the DESINA® standard.
- The materials used in manufacture are cadmium-free and contain no silicone and free from substances harmful to the wetting properties of lacquers
- Resistant to cleaning and disinfecting agents acc. to



## Tests

- PUR outer sheath self-extinguishing and flame retardant to DIN VDE 0482-332-1-2, DIN EN 60332-1-2, IEC 60332-1 (equivalent DIN VDE 0472 part 804 test method B)

## Note

- For a corresponding encoder cables please check chapter **TOPGEBER 512 PUR**
- For servo cables with non or only slight drag chain application please check chapter **TOPSERV® PVC**
- Brackets ( ) indicate screen
- DESINA® explanation see introduction
- SIEMENS product designations 6FX 5008-plus are registered trademarks of Siemens AG and are to be used only for purposes of comparison
- Lenze product designations are registered trademarks of Lenze AG and are to be used only for purposes of comparison
- Bosch Rexroth product designations INK are registered trademarks of Bosch Rexroth AG and are to be used only for purposes of comparison

## Application

The combination of supply cores with the control cores for the braking function and the thermal protection in these cables is ideal. Precision servomotors, as used today in many areas of highly-automated manufacturing processes, call for high-quality, reliable and long-lasting cables. These requirements are met to a high degree by these cables. The cables have an additional overall screen to ensure EMC compatibility, i. e. for protection against electromagnetic interference. Production is based on the specifications of established manufacturers of servo-drives and controls, as well as on various VDE, UL and CSA standards. Applications include machine, plant and robot construction, automation, drive, control and production engineering. Attractive for export-oriented mechanical and system engineering. Please observe applicable installation regulations for use in energy supply chains.

**EMC** = Electromagnetic compatibility

To optimize the EMC features we recommend a large round contact of the copper braiding on both ends.

CE = The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

Continuation ►



**TOPSERV® PUR** high flexible motor and servo cable fordrag chain 0,6/1 kV, for example according to Siemens 6FX8008PLUS,  
Lenze, Bosch Rexroth**TOPSERV® 109 PUR, acc.to Siemens 6FX8008PLUS**

Part no.	No.cores x cross-sec. mm <sup>2</sup>	for system	OEM Part no.	Sheath colour	Outer Ø app. mm	Cop. weight kg / km	Weight app. kg / km	AWG-No.
75943	(4 G 1,5)	Siemens	6FX8008-1BB11	Orange RAL 2003	8,9	90,0	142,0	16
75944	(4 G 2,5)	Siemens	6FX8008-1BB21	Orange RAL 2003	10,7	132,0	206,0	14
75945	(4 G 4)	Siemens	6FX8008-1BB31	Orange RAL 2003	12,2	204,0	290,0	12
75946	(4 G 6)	Siemens	6FX8008-1BB41	Orange RAL 2003	14,5	315,0	423,0	10
75947	(4 G 10)	Siemens	6FX8008-1BB51	Orange RAL 2003	17,5	488,0	672,0	8
75948	(4 G 16)	Siemens	6FX8008-1BB61	Orange RAL 2003	21,6	769,0	1038,0	6
75949	(4 G 25)	Siemens	6FX8008-1BB25	Orange RAL 2003	25,2	1100,0	1495,0	4
75950	(4 G 35)	Siemens	6FX8008-1BB35	Orange RAL 2003	28,6	1510,0	1936,0	2
75951	(4 G 50)	Siemens	6FX8008-1BB50	Orange RAL 2003	33,4	2133,0	2774,0	1
700437	(4 G 70)	Siemens	6FX8008-1BB70	Orange RAL 2003	39,9	3029,0	3803,0	2/0
700897	(4 G 95)	Siemens	-	Orange RAL 2003	49,5	4606,0	5102,0	3/0

**TOPSERV® 113 PUR, acc.to Siemens 6FX8008PLUS**

Part no.	No.cores x cross-sec. mm <sup>2</sup>	for system	OEM Part no.	Sheath colour	Outer Ø app. mm	Cop. weight kg / km	Weight app. kg / km	AWG-No.
78948	(4 G 1,5 + (2 x 1,5))	Siemens	6FX8008-1BA11	Orange RAL 2003	11,6	148,0	233,0	16
78949	(4 G 2,5 + (2 x 1,5))	Siemens	6FX8008-1BA21	Orange RAL 2003	13,2	187,0	315,0	14
78950	(4 G 4 + (2 x 1,5))	Siemens	6FX8008-1BA31	Orange RAL 2003	14,8	268,0	403,0	12
78951	(4 G 6 + (2 x 1,5))	Siemens	6FX8008-1BA41	Orange RAL 2003	16,3	358,0	555,0	10
78952	(4 G 10 + (2 x 1,5))	Siemens	6FX8008-1BA51	Orange RAL 2003	19,5	584,0	769,0	8
75956	(4 G 16 + (2 x 1,5))	Siemens	6FX8008-1BA61	Orange RAL 2003	23,1	825,0	1207,0	6
75957	(4 G 25 + (2 x 1,5))	Siemens	6FX8008-1BA25	Orange RAL 2003	26,8	1283,0	1642,0	4
75958	(4 G 35 + (2 x 1,5))	Siemens	6FX8008-1BA35	Orange RAL 2003	30,9	1850,0	2120,0	2
75959	(4 G 50 + (2 x 1,5))	Siemens	6FX8008-1BA50	Orange RAL 2003	34,2	2540,0	2918,0	1

**TOPSERV® 113 PUR, acc.to Lenze**

Part no.	No.cores x cross-sec. mm <sup>2</sup>	for system	OEM Part no.	Sheath colour	Outer Ø app. mm	Cop. weight kg / km	Weight app. kg / km	AWG-No.
707228	(4 G 1 + (2 x 0,5))	Lenze	-	Orange RAL 2003	10,5	88,0	166,0	16
707229	(4 G 1,5 + (2 x 0,5))	Lenze	-	Orange RAL 2003	11,5	106,0	206,0	16
707230	(4 G 2,5 + (2 x 0,5))	Lenze	-	Orange RAL 2003	13,2	152,0	268,0	14
707231	(4 G 4 + (2 x 1,0))	Lenze	-	Orange RAL 2003	14,6	229,0	387,0	12
707232	(4 G 6 + (2 x 1,0))	Lenze	-	Orange RAL 2003	17,6	333,0	523,0	10
707746	(4 G 10 + (2 x 1,0))	Lenze	-	Orange RAL 2003	20,1	508,0	766,0	8
707747	(4 G 16 + (2 x 1,0))	Lenze	-	Orange RAL 2003	23,8	751,0	1174,0	6

**TOPSERV® 113 PUR**

Part no.	No.cores x cross-sec. mm <sup>2</sup>	for system	OEM Part no.	Sheath colour	Outer Ø app. mm	Cop. weight kg / km	Weight app. kg / km	AWG-No.
77376	(4 G 1 + (2 x 0,75))	-	-	Orange RAL 2003	11,5	134,0	250,0	17
700199	(4 G 1,5 + (2 x 0,5))	-	-	Orange RAL 2003	11,5	127,0	240,0	16
74506	(4 G 1,5 + (2 x 1,0))	-	-	Orange RAL 2003	11,1	138,0	212,0	16
74507	(4 G 2,5 + (2 x 1,0))	-	-	Orange RAL 2003	12,5	177,0	274,0	14
74508	(4 G 4 + (2 x 1,0))	-	-	Orange RAL 2003	14,3	258,0	378,0	12
74514	(4 G 6 + (2 x 1,0))	-	-	Orange RAL 2003	16,2	348,0	493,0	10
74509	(4 G 10 + (2 x 1,0))	-	-	Orange RAL 2003	19,0	574,0	736,0	8
74510	(4 G 16 + (2 x 1,0))	-	-	Orange RAL 2003	22,2	815,0	1071,0	6
74511	(4 G 25 + (2 x 1,0))	-	-	Orange RAL 2003	26,2	1273,0	1616,0	4
74512	(4 G 35 + (2 x 1,0))	-	-	Orange RAL 2003	29,8	1840,0	2080,0	2
74513	(4 G 50 + (2 x 1,0))	-	-	Orange RAL 2003	33,7	2530,0	2854,0	1

**TOPSERV® 121 PUR, acc.to Bosch Rexroth**

Part no.	No.cores x cross-sec. mm <sup>2</sup>	for system	OEM Part no.	Sheath colour	Outer Ø app. mm	Cop. weight kg / km	Weight app. kg / km	AWG-No.
706003	(4 G 0,75 + (2 x 0,5))	Bosch Rexroth	INK-0670	Orange RAL 2003	9,2	77,0	138,0	17
73774	(4 G 1 + 2 x (2 x 0,75))	Bosch Rexroth	INK-0653	Orange RAL 2003	11,5	148,0	254,0	17
76103	(4 G 1,5 + 2 x (2 x 0,5))	-	-	Orange RAL 2003	12,4	145,0	250,0	17
73579	(4 G 1,5 + 2 x (2 x 1,0))	-	-	Orange RAL 2003	12,6	182,0	262,0	16
700561	(4 G 1,5 + 2 x (2 x 0,75))	Bosch Rexroth	INK-0650	Orange RAL 2003	12,2	170,0	290,0	16
73580	(4 G 2,5 + 2 x (2 x 1,0))	Bosch Rexroth	INK-0602	Orange RAL 2003	14,6	229,0	336,0	14
78955	(4 G 2,5 + 2 x (2 x 1,5))	-	-	Orange RAL 2003	15,6	241,0	350,0	14
74094	(4 G 4 + 2 x (2 x 1,0))	-	-	Orange RAL 2003	16,2	312,0	475,0	12
700562	(4 G 4 + (2 x 1,0) + (2 x 1,5))	Bosch Rexroth	INK-0603	Orange RAL 2003	16,0	318,0	485,0	12
78956	(4 G 4 + 2 x (2 x 1,5))	-	-	Orange RAL 2003	16,7	324,0	490,0	12
74095	(4 G 6 + 2 x (2 x 1,0))	-	-	Orange RAL 2003	18,2	376,0	606,0	10
700563	(4 G 6 + (2 x 1,0) + (2 x 1,5))	Bosch Rexroth	INK-0604	Orange RAL 2003	18,8	398,0	615,0	10
78957	(4 G 6 + 2 x (2 x 1,5))	-	-	Orange RAL 2003	19,0	450,0	621,0	10
74096	(4 G 10 + 2 x (2 x 1,0))	-	-	Orange RAL 2003	21,5	609,0	905,0	8
700564	(4 G 10 + (2 x 1,0) + (2 x 1,5))	Bosch Rexroth	INK-0605	Orange RAL 2003	22,4	610,0	915,0	8
78958	(4 G 10 + 2 x (2 x 1,5))	-	-	Orange RAL 2003	22,4	625,0	925,0	8
75978	(4 G 16 + 2 x (2 x 1,5))	Bosch Rexroth	INK-0606	Orange RAL 2003	26,9	904,0	1226,0	6
75979	(4 G 25 + 2 x (2 x 1,5))	Bosch Rexroth	INK-0607	Orange RAL 2003	28,0	1323,0	1595,0	4
75980	(4 G 35 + 2 x (2 x 1,5))	Bosch Rexroth	INK-0667	Orange RAL 2003	32,5	1621,0	2196,0	2
700565	(4 G 50 + 2 x (2 x 2,5))	Bosch Rexroth	INK-0668	Orange RAL 2003	37,0	2600,0	3000,0	1

Dimensions and specifications may be changed without prior notice. (RN07)

# TOPGEBER 512 PUR high flexible Feedback cable for

drag chain according to Siemens, Bosch Rexroth, Lenze and other Standards



## Technical data

- Special PUR drag chain feedback cable acc. to UL AWM style 20233 and 20236 and CSA
- **Temperature range**  
flexing -30°C to +80°C  
fixed installation -40°C to +80°C
- **Nominal voltage**  
acc. to Siemens 30 V  
acc. to Bosch Rexroth and Lenze 300 V  
further details on request
- **A.c. test voltage**, 50 Hz  
core/core 2000 V  
core/screen 1000 V
- **Mutual capacitance** at 800 Hz  
core/core approx. 70 nF/km  
core/screen approx. 110 nF/km
- **Insulation resistance**  
min. 20 MOhm x km
- **Coupling resistance**  
max. 250 Ohm
- **Minimum bending radius**  
flexing 10x cable Ø  
fixed installation 6x cable Ø

## Cable structure

- tinned copper, to  
DIN VDE 0295 cl.6, extra fine-wire,  
BS 6360 cl.6, IEC 60228 cl.6
- Core insulation of special polypropylene
- Core colours on demand
- Fleece wrapping facilitates sliding
- Overall screening of tinned copper wire braid with tinned drain wire, coverage approx. 85%
- Polyester foil
- Outer sheath of PUR
- Sheath colour green (RAL 6018)  
acc. to DESINA® or orange

## Properties

- PUR outer sheath, low adhesion, extremely abrasion resistant, halogen-free, resistant to UV-, oil-, hydrolysis and microbial attack
- Special feature: These cables are produced to high quality specifications and conform to the DESINA®-standard
- Due to the high grade special core insulation, the PUR sheath and the highly flexible conductor, these cables are ideally suitable for use in drag chains and provide high functional reliability
- Optimum compliance with requirements for electromagnetic compatibility (EMC) by approx. 85% coverage from the braided screen
- Particularly attractive for export-oriented markets due to UL/CSA approval
- The materials used in manufacture are cadmium-free and contain no silicone and free from substances harmful to the wetting properties of lacquers
- Resistant to cleaning and disinfecting agents acc. to



## Note

- For a corresponding motor- and servocables please check chapter **TOPSERV® PUR**
- Encoder cables for static application please check chapter **TOPGEBER 511 PVC**
- Brackets ( ) indicate screen.
- SIEMENS product designations 6FX 8008-... are registered trademarks of Siemens AG and are to be used only for purposes of comparison.
- Bosch Rexroth product designations INK- are registered trademarks of Bosch-Rexroth AG and are to be used only for purposes of comparison.
- DESINA®: Explanation: see introduction.

## Application

These low-capacitance incremental encoder cables or position feedback cables transmit the control pulses for positioning and operating characteristics of servomotors. These cables are used as connecting cables for tachos, brakes and pulse generators in applications subjected to heavy mechanical stresses in industrial equipment, machine tools, control and automation equipment. Please observe applicable installation regulations for use in energy supply chains.

**EMC** = Electromagnetic compatibility

To optimize the EMC features we recommend a large round contact of the copper braiding on both ends.

**CE** = The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

Continuation ►

**TOPGEBER 512 PUR** high flexible Feedback cable for

drag chain according to Siemens, Bosch Rexroth, Lenze and other Standards



Part no.	No. cores x cross-sec. mm <sup>2</sup>	for system	OEM Part no.	Sheath colour	Outer Ø app. mm	Cop. weight kg / km	Weight app. kg / km	AWG-No.
700655	( 8 x 2 x 0,18)	Siemens	6FX 8008-1BD11	Green	7,8	54,0	79,0	24
78081	( 4 x 2 x 0,34 + 4 x 0,5)	Siemens	6FX 8008-1BD21	Green	9,8	83,0	135,0	21
707400	( 3 x (2 x 0,14) + 2 x 0,5)	Siemens	6FX 8008-1BD31	Green	9,0	74,0	119,0	21
700657	( 3 x (2 x 0,14) + 4 x 0,14 + 2 x 0,5)	Siemens	6FX 8008-1BD41	Green	8,9	66,0	120,0	26
700540	( 3 x (2 x 0,14) + 4 x 0,14 + 4 x 0,25 + 2 x 0,5)	Siemens	6FX 8008-1BD51	Green	9,6	75,0	138,0	-
700654	( 4 x 2 x 0,18)	Siemens	6FX 8008-1BD61	Green	6,4	35,0	57,0	-
700653	( 2 x 2 x 0,18)	Siemens	6FX 8008-1BD71	Green	5,0	24,0	42,0	-
78079	( 12 x 0,22)	Siemens	6FX 8008-1BD81	Green	7,5	65,0	74,0	24
804767	( 2 x 2 x 0,2 + 2 x 0,38)	Siemens	6FX 8008-2DC00	Green	7,0	40,0	74,0	-
706333	( 5 x 2 x 0,25 + 2 x 0,5)	Berger Lahr	-	Green	8,8	69,0	127,0	24
705413	( 3 x 2 x 0,25 + 2 x 0,5)	Elau	-	Green	7,4	43,0	82,0	24
707403	( 3 x 2 x 0,25)	B+R	-	Green	6,5	31,0	60,0	24
707404	( 5 x 2 x 0,14 + 2 x 0,5)	B+R	-	Green	8,7	48,0	98,0	24
707405	3 x (2 x 0,14) + (2 x 0,5)	Lenze	-	Green	9,8	42,0	98,0	24
707406	4 x (2 x 0,14) + (2 x 1,0)	Lenze	-	Green	11,3	66,0	144,0	24
707407	3 x (2 x 0,14) + (3 x 0,14)	Lenze	-	Green	10,3	41,0	127,0	24
702050	( 4 x 2 x 0,25 + 2 x 1,0)	Bosch Rexroth	INK-0209 grün	Green	8,8	64,0	99,0	24
78080	( 4 x 2 x 0,25 + 2 x 0,5)	Bosch Rexroth	INK-0448 grün	Green	8,5	51,0	106,0	24
77741	( 9 x 0,5)	Bosch Rexroth	INK-0208 grün	Green	8,8	69,0	124,0	20
707738	( 4 x 2 x 0,25 + 2 x 1,0)	Bosch Rexroth	INK-0209	Orange	8,8	64,0	99,0	20
707739	( 4 x 2 x 0,25 + 2 x 0,5)	Bosch Rexroth	INK-0448	Orange	8,5	51,0	106,0	20
707740	( 9 x 0,5)	Bosch Rexroth	INK-0208	Orange	8,8	69,0	124,0	20
707408	( 4 x 2 x 0,14 + 4 x 1,0 + (4 x 0,14))	Bosch Rexroth	INK-0532	Orange	9,7	81,0	142,0	20
707418	( 3 x (2 x 0,25) + 3 x 0,25 + 2 x 1,0)	Bosch Rexroth	INK-0280	Orange	9,0	84,0	134,7	20
707409	( 2 x 2 x 0,25 + 2 x 0,5)	Bosch Rexroth	INK-0750	Orange	7,2	38,0	79,0	20
77743	( 3 x (2 x 0,14) + 2 x (1 x 0,5))	Heidenhain	-	Green	8,4	81,0	109,0	-
79513	( 4 x 2 x 0,14 + 4 x 0,5)	Heidenhain	-	Green	8,5	52,0	100,0	26
707410	( 3 x 2 x 0,14 + 2 x 1,0)	Heidenhain	-	Green	9,1	72,0	132,0	26
700560	( 4 x 2 x 0,14 + (4 x 0,14) + 4 x 0,5)	Heidenhain	-	Green	8,3	67,0	104,0	-
77753	( 10 x 0,14 + 2 x 0,5)	Heidenhain	-	Green	7,2	43,0	83,0	26
78963	( 5 x 2 x 0,14 + 2 x 0,5)	Baumüller	-	Green	9,0	72,0	98,0	26
78828	( 3 x 2 x 0,25)	-	-	Green	7,2	55,0	83,0	24
79613	( 5 x 2 x 0,38 + 2 x 0,5)	-	-	Green	8,6	69,0	130,0	21
77744	( 3 x (2 x 0,14) + 2 x 1,0)	-	-	Green	8,2	71,0	107,0	26
78372	( 3 x 2 x 0,14 + 2 x 0,5)	-	-	Green	7,2	35,0	67,0	26
77750	( 4 x (2 x 0,25) + 2 x 1,0)	-	-	Green	10,5	93,0	175,0	24
705221	( 4 x 2 x 0,25)	-	-	Green	7,5	39,0	88,0	24

Dimensions and specifications may be changed without prior notice. (RN07)



Suitable HELUTEC® Signal and power connectors can be found in our Cable Accessories catalogue.

# TOPSERV® 600 VFD EMC-preferred type, high flexible motor power supply cable, oil-resistant, NFPA 79 Edition 2012



## Technical data

- TPE motor supply cable acc. to UL-Std.1277 and UL-Std.2277
- **Temperature range**  
-25°C to +90°C
- **Nominal voltage**  
TC 600 V  
WTTC 1000 V
- **Test voltage** 4000 V
- **Minimum bending radius**  
flexing 5x cable Ø  
permanently flexing 7,5 cable Ø
- **Coupling resistance**  
max. 250 Ohm/km

## Cable structure

- Tinned copper conductor, extra fine wire with AWG dimensions
- Core insulation of special PVC with transparent nylon skin
- Black cores with continuous white numbering
- GN-YE conductor in the outer layer
- Cores stranded in layers with optimal lay-length
- Fleece
- 1. Screening with special aluminium foil
- 2. Screening with braid of tinned copper wires, optimal coverage approx. 85%
- Separator
- Outer sheath of special TPE
- Sheath colour black (RAL 9005) or orange (RAL 2003)
- with length marking in feet

## Properties

- self-extinguishing and flame retardant acc. to CSA FT4
- The materials used in manufacture are cadmium-free and contain no silicone and free from substances harmful to the wetting properties of lacquers
- UV-resistant

## Tests

- **UL:**  
TC-ER, WTTC 1000 V, MTW, NFPA 79 2012, PLTC-ER (AWG 18 - AWG 12), ITC-ER (AWG 18 - AWG 12) OIL RES I & II, 90°C dry / 75°C wet, Cold Bend Test -40°C Class 1 Div. 2 per NEC Art. 336, 392, 501
- **CSA:**  
c (UL) CIC-TC FT4  
AWM I/II A/B FT4

## Note

- VFD = Variable Frequency Drive

## Application

Highly-flexible, extremely oil-resistant motor supply cable for modern servomotors; the double-screening with special aluminium foil (100% coverage) and tinned copper braid (approx. 85% coverage) provides effective protection against electrical disturbance and the resultant failures. Approved to NFPA 79 edition 2012 for open, unprotected installation on cable trays and from cable trays to the machine. The special TPE sheath is extremely resistant to oil, coolants and solvents and hence the perfect solution for industrial applications with open installation, installation in pipes and in the earth.

**EMC** = Electromagnetic compatibility

To optimize the EMC features we recommend a large round contact of the copper braiding on both ends.

CE = The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

### Sheath colour black

Part no.	No. cores x AWG-No.	Cross-section mm <sup>2</sup>	Outer Ø app. mm	Cop. weight kg / km	Weight app. kg / km
62607	4 x 18	0,963	9,9	38,0	163,0
62608	4 x 16	1,31	11,4	51,0	184,0
62609	4 x 14	2,08	12,5	80,0	197,0
62610	4 x 12	3,31	14,0	127,0	266,0
62611	4 x 10	5,26	17,1	230,0	401,0
62612	4 x 8	8,37	22,3	384,0	669,0
62613	4 x 6	13,31	25,4	614,0	917,0
62614	4 x 4	21,21	30,1	960,0	1364,0
62615	4 x 2	33,6	35,3	1344,0	1990,0

### Sheath colour orange

Part no.	No. cores x AWG-No.	Cross-section mm <sup>2</sup>	Outer Ø app. mm	Cop. weight kg / km	Weight app. kg / km
62616	4 x 18	0,963	9,9	38,0	163,0
62617	4 x 16	1,31	11,4	51,0	184,0
62618	4 x 14	2,08	12,5	80,0	197,0
62619	4 x 12	3,31	14,0	127,0	266,0
62620	4 x 10	5,26	17,1	230,0	401,0
62621	4 x 8	8,37	22,3	384,0	669,0
62622	4 x 6	13,31	25,4	614,0	917,0
62623	4 x 4	21,21	30,1	960,0	1364,0
62624	4 x 2	33,6	35,3	1344,0	1990,0

Dimensions and specifications may be changed without prior notice. (RN01)



Suitable accessories can be found in Chapter X.

- Cable Gland - HELUTOP® HT-MS-EP4

# TOPSERV® 650 VFD EMC-preferred type, high flexible motor power supply cable with control cores, oil-resistant, NFPA 79 Edition 2012



## Technical data

- TPE motor supply cable acc. to UL-Std.1277 and UL-Std.2277
- **Temperature range**  
flexing -25°C to +105°C
- **Nominal voltage**  
TC 600 V  
WTTC 1000 V
- **Test voltage**  
power supply cores 4000 V  
control cores 2000 V
- **Minimum bending radius**  
flexing 5x cable Ø  
permanently flexing 7,5x cable Ø
- **Coupling resistance**  
max. 250 Ohm/km

## Cable structure

- Tinned copper-conductor, extra fine-wire with AWG dimensions
- Core insulation of special PVC with transparent nylon skin
- Core identification black cores with continuous white numbering  
- power supply cores no. 1-4  
- control cores no. 5+6
- GN-YE conductor in the outer layer
- Control cores screened in pairs with plastic-coated aluminium foil, tinned drain wire
- Control cores stranded in pairs and laid up in layers with optimal lay-length with the power supply cores
- 1. Screen with plastic-coated aluminium foil  
2. Tinned copper braided screen, approx. 85% coverage
- Separator
- Outer sheath of special TPE
- Sheath colour black (RAL 9005) or orange (RAL 2003)
- with length marking in feet

## Properties

- The materials used in manufacture are cadmium-free and contain no silicone and free from substances harmful to the wetting properties of lacquers
- UV-resistant

## Tests

- self-extinguishing and flame retardant acc. to CSA FT4
- **UL:**  
TC-ER, WTTC 1000 V, MTW, NFPA 79 2012, PLTC-ER (AWG 18 - AWG 12), ITC-ER (AWG 18 - AWG 12) OIL RES I & II, 90°C dry / 75°C wet, Cold Bend Test -40°C Class 1 Div. 2 per NEC Art. 336, 392, 501
- **CSA:**  
c (UL) CIC-TC FT4  
AWM I/II A/B FT4

## Note

- VFD = Variable Frequency Drive

## Application

Highly flexible, extremely oil-resistant motor supply cable for modern servomotors; the double-screening with special aluminium foil (100% coverage) and tinned copper braid (approx. 85% coverage) provides effective protection against electrical disturbance and the resultant failures. Approved to NFPA 79 edition 2012 for open, unprotected installation on cable trays and from cable trays to the machine. The special TPE sheath is extremely resistant to oil, coolants and solvents and hence the perfect solution for industrial applications with open installation, installation in pipes and in the earth.

**EMC** = Electromagnetic compatibility

To optimize the EMC features we recommend a large round contact of the copper braiding on both ends.

**CE** = The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

## Sheath colour black

Part no.	No. cores x AWG-No.	Cross-section mm²	Outer Ø app. mm	Cop. weight kg / km	Weight app. kg / km
59837	4x AWG 16 +2x AWG 18	1,31 / 0,824	13,0	88,0	259,0
59838	4x AWG 14 +2x AWG 18	2,08 / 0,824	14,0	133,0	370,0
59839	4x AWG 14 +2x AWG 14	2,08 / 2,08	14,6	159,0	399,0
59840	4x AWG 12 +2x AWG 18	3,31 / 0,824	15,3	197,0	435,0
59841	4x AWG 12 +2x AWG 14	3,31 / 2,08	15,7	224,0	466,0
59842	4x AWG 10 +2x AWG 14	5,26 / 2,08	18,2	301,0	703,0
59843	4x AWG 8 +2x AWG 14	8,37 / 2,08	24,1	457,0	901,0
59844	4x AWG 6 +2x AWG 14	13,31 / 2,08	27,4	615,0	1275,0
59845	4x AWG 4 +2x AWG 14	21,21 / 2,08	33,4	1450,0	1861,0

## Sheath colour orange

Part no.	No. cores x AWG-No.	Cross-section mm²	Outer Ø app. mm	Cop. weight kg / km	Weight app. kg / km
59846	4x AWG 16 +2x AWG 18	1,31 / 0,824	13,0	88,0	259,0
59847	4x AWG 14 +2x AWG 18	2,08 / 0,824	14,0	133,0	370,0
59848	4x AWG 14 +2x AWG 14	2,08 / 2,08	14,6	159,0	399,0
59849	4x AWG 12 +2x AWG 18	3,31 / 0,824	15,3	197,0	435,0
59850	4x AWG 12 +2x AWG 14	3,31 / 2,08	15,7	224,0	466,0
59851	4x AWG 10 +2x AWG 14	5,26 / 2,08	18,2	301,0	703,0
59852	4x AWG 8 +2x AWG 14	8,37 / 2,08	24,1	457,0	901,0
59853	4x AWG 6 +2x AWG 14	13,31 / 2,08	27,4	615,0	1275,0
59854	4x AWG 4 +2x AWG 14	21,21 / 2,08	33,4	1450,0	1861,0

Dimensions and specifications may be changed without prior notice. (RN01)



# TOPSERV® Hybrid hybrid cable for SICK Hiperface DSL® motor

feedback systems



NEW



## Technical data

- **TOPSERV® PUR**
- Special PUR drag chain cable acc. to UL AWM Style 21223 CSA AWM
- **Temperature range**  
flexing -30°C to +80°C  
fixed installation -40°C to +90°C
- **Nominal voltage**  
VDE  
power supply cores  $U_0/U$  600/1000 V  
control cores  $U_0/U$  300/500 V  
UL/CSA 1000 V
- **A.c. test voltage**, 50 Hz  
power supply cores 4000 V  
control cores 1000 V
- **Insulation resistance**  
min. 20 MOhm x km
- **Coupling resistance**  
max. 250 Ohm/km
- **Minimum bending radius**  
flexing 7,5x cable Ø  
fixed installation 4x cable Ø  
min. 5 mio. cycles

## Cable structure

- Bare copper-conductor, to DIN VDE 0295 cl.6, extra fine-wire, IEC 60228 cl.6
- Core insulation halogen-free PP
- Core identification  
**power supply cores**  
core 1: black with imprint U/L1/C/L+  
core 2: black with imprint V/L2  
core 3: black with imprint W/L3/D/L-  
**control cores**  
pair 1: black with number no. 5+6  
pair 2: white and blue
- GN-YE conductor
- Screening of the control cores in pairs wrapped with tinned copper braid
- Power supply cores laid up with optimal lay length and stabilising filler
- Overall screening from tinned copper braid, optimal coverage approx. 85%
- Outer sheath of PVC or PUR
- Sheath colour orange (RAL 2003) acc. to DESINA®

## Properties

- low capacitance
- PUR outer sheath: low adhesion, extremely abrasion resistant, halogen-free, resistant to UV-, oil-, hydrolysis and microbial attack
- Optimum compliance with requirements for electromagnetic compatibility (EMC) by approx. 85% coverage from the braided screen
- These cables are produced to high quality specifications and conform to the DESINA® standard.
- The materials used in manufacture are cadmium-free and contain no silicone and free from substances harmful to the wetting properties of lacquers

## Tests

- PUR outer sheath self-extinguishing and flame retardant to DIN VDE 0482-332-1-2, DIN EN 60332-1-2, IEC 60332-1 (equivalent DIN VDE 0472 part 804 test method B)

## Note

- The technical data for **TOPSERV® Hybrid PVC** cables are available on request.

## Application

The supply conductors for these cables are ideally combined with the control conductors for the brake function and the transmission of the Sick Hiperface DSL protocols. Applications include machine, plant and robot construction. Please observe applicable installation regulations for use in energy supply chains.

**EMC** = Electromagnetic compatibility

To optimize the EMC features we recommend a large round contact of the copper braiding on both ends.

☑= The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

### TOPSERV® Hybrid PVC for fixed or not constantly movements

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Sheath colour	Outer Ø app. mm	Cop. weight kg / km	Weight app. kg / km	AWG-No.
709930	(4G0,5 + (2x0,34) C + (2x26 AWG)) C	Orange RAL 2003	9,3	72,0	123,0	26
709932	(4G1 + (2x0,75) C + (2x22 AWG)) C	Orange RAL 2003	11,6	130,0	208,0	22
709933	(4G1,5 + (2x0,75) C + (2x22 AWG)) C	Orange RAL 2003	12,2	152,0	248,0	22
709934	(4G2,5 + (2x1) C + (2x22 AWG)) C	Orange RAL 2003	13,8	207,0	326,0	22
709935	(4G4 + (2x1) C + (2x22 AWG)) C	Orange RAL 2003	15,3	273,0	415,0	22
709936	(4G6 + (2x1) C + (2x22 AWG)) C	Orange RAL 2003	17,2	357,0	538,0	22
709937	(4G10 + (2x1,5) C + (2x22 AWG)) C	Orange RAL 2003	20,3	530,0	752,0	22
709938	(4G16 + (2x1,5) C + (2x22 AWG)) C	Orange RAL 2003	22,6	768,0	1005,0	22

### TOPSERV® Hybrid PUR, high flexible for drag chain

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Sheath colour	Outer Ø app. mm	Cop. weight kg / km	Weight app. kg / km	AWG-No.
709703	(4G0,5 + (2x0,34) C + (2x26 AWG)) C	Orange RAL 2003	9,3	76,0	127,0	26
708543	(4G1 + (2x0,75) C + (2x22 AWG)) C	Orange RAL 2003	11,6	133,0	212,0	22
710081	(4G1,5 + (2x0,75) C + (2x24 AWG)) C	Orange RAL 2003	11,7	146,0	229,0	24
708544	(4G1,5 + (2x0,75) C + (2x22 AWG)) C	Orange RAL 2003	12,7	155,0	269,0	22
708545	(4G2,5 + (2x1) C + (2x22 AWG)) C	Orange RAL 2003	13,9	205,0	310,0	22
708546	(4G4 + (2x1) C + (2x22 AWG)) C	Orange RAL 2003	15,7	280,0	420,0	22
708547	(4G6 + (2x1) C + (2x22 AWG)) C	Orange RAL 2003	18,0	363,0	540,0	22
708548	(4G10 + (2x1,5) C + (2x22 AWG)) C	Orange RAL 2003	21,0	538,0	760,0	22
709705	(4G16 + (2x1,5) C + (2x22 AWG)) C	Orange RAL 2003	23,4	775,0	1020,0	22

Dimensions and specifications may be changed without prior notice.



# UL/CSA HEAT-RESISTANT CABLES





**SiHF UL/CSA** halogen-free, 150°C/ 600 V, two-approvals silicon multicore cable

HELUKABEL SiHF UL/CSA 3G1,5 QMM / 23180 300/500 V UL STYLE 4476 CSA AWM II A/B 001042365

**Technical data**

- Special silicone multicore cable with higher heat-resistance range to UL Style 4476 and CSA AWM II A/B
- **Temperature range**  
VDE -60°C to +180°C  
(up to +220°C for short time)  
UL/CSA -50°C to +150°C
- **Nominal voltage**  
VDE U<sub>0</sub>/U 300/500 V  
UL/CSA 600 V
- **Test voltage** 2000 V
- **Breakdown voltage** min. 5000 V
- **Insulation resistance**  
min. 200 MOhm x km
- **Minimum bending radius**  
flexing 7,5x cable Ø  
fixed installation 4x cable Ø
- **Radiation resistance**  
up to 20x10<sup>6</sup> cJ/kg (up to 20 Mrad)

**Cable structure**

- Tinned copper conductors to DIN VDE 0295 cl.5, BS 6360 cl.5 and IEC 60228 cl.5
- Core insulation of silicone
- Core identification to DIN VDE 0293-308 colour coded or black cores with continuous white numbering
- For 2-cores brown, blue
- Cores stranded in layers with optimal lay-length
- GN-YE conductor, 3 cores and above
- Outer sheath of silicone
- Sheath colour black

**Properties**

- **Advantages**  
Hardly changes of dielectric strength and the insulation resistance also at high temperatures, high ignition or flash point, in case of fire, forms an insulating layer of SiO<sub>2</sub>
- **Resistant to**  
High molecular oils, fats from vegetables and animals, alcohols, plasticizers and clophenes, diluted acids, lyes and salt dissolution, oxidation substances, tropical influences and weather, lake water, oxygen and UV
- Halogen-free  
acc. to DIN VDE 0482 part 267 / DIN EN 50267-2-1 / IEC 60754-1 (equivalent DIN VDE 0472 part 815)
- Behaviour in fire no flame propagation  
acc. to DIN VDE 0482-332-1-2, DIN EN 60332-1-2, IEC 60332-1 (equivalent DIN VDE 0472 part 804 test method B), CSA FT1
- For laying as a fixed installation only in open or ventilated pipe systems as well as in ducts. Otherwise the mechanical properties of the silicon are reduced by the enclosed air at temperatures exceeding 90°C.

**Note**

- G = with green-yellow conductor  
x = without green-yellow conductor
- screened analogue type:  
**SiHF-C-Si UL/CSA**, confer page 478

**Application**

UL-CSA approved Silicone cables were evolved for use wherever insulation is subjected to extreme temperature changes. They are heat-resistant for permanent temperature up to +180°C, for short time operation up to +220°C. The good performance of the environmental resistant properties means that silicone cables can be used at temperatures down to -60°C. Silicone cables are halogen-free cables and are especially suited for installation in power stations. They have also found their uses in the steel producing industries, aviation industry, ship building as well as in ceramic, glass and cement factories. Due to elastics characteristic of core insulations, these are used as flexible connection cable.

CE= The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

Part no.	No. cores x cross-sec. mm <sup>2</sup>	AWG-No.	Outer Ø app. mm	Cop. weight kg / km	Weight app. kg / km
23214	2 x 0,5	20	7,7	9,6	73,0
23215	3 G 0,5	20	8,1	14,4	82,0
23216	4 G 0,5	20	8,8	19,2	98,0
23217	5 G 0,5	20	9,4	24,0	120,0
23218	6 G 0,5	20	10,4	28,8	131,0
23219	7 G 0,5	20	10,4	33,6	140,0
23220	8 G 0,5	20	10,8	38,4	183,0
23221	10 G 0,5	20	12,8	48,0	201,0
23222	12 G 0,5	20	13,4	57,6	241,0
23223	16 G 0,5	20	13,9	76,8	269,0
23224	18 G 0,5	20	14,4	86,4	311,0
23225	25 G 0,5	20	16,8	120,0	401,0

Part no.	No. cores x cross-sec. mm <sup>2</sup>	AWG-No.	Outer Ø app. mm	Cop. weight kg / km	Weight app. kg / km
23226	2 x 1	18	8,2	19,2	88,0
23227	3 G 1	18	9,0	28,2	111,0
23228	4 G 1	18	10,0	38,4	130,0
23229	5 G 1	18	10,6	48,0	161,0
23230	6 G 1	18	11,4	57,6	182,0
23231	7 G 1	18	11,4	67,2	198,0
23232	8 G 1	18	12,4	76,8	251,0
24010	9 G 1	18	13,2	86,0	277,0
23233	10 G 1	18	13,2	96,0	304,0
23234	12 G 1	18	14,4	115,2	343,0
23235	16 G 1	18	15,7	153,6	441,0
23236	18 G 1	18	16,6	172,8	492,0
23237	25 G 1	18	19,1	240,0	617,0

Continuation ▶

**SiHF UL/CSA** halogen-free, 150°C/ 600V, two-approvals silicon multicore cable

Part no.	No. cores x cross-sec. mm <sup>2</sup>	AWG-No.	Outer Ø app. mm	Cop. weight kg / km	Weight app. kg / km
23238	2 x 1,5	16	9,1	28,8	117,0
23239	3 G 1,5	16	9,6	43,2	131,0
23240	4 G 1,5	16	10,6	57,6	166,0
23241	5 G 1,5	16	11,4	72,0	198,0
23242	6 G 1,5	16	12,4	86,4	240,0
23243	7 G 1,5	16	12,4	100,8	261,0
23244	8 G 1,5	16	13,9	115,2	298,0
23245	10 G 1,5	16	16,1	144,0	359,0
23246	12 G 1,5	16	16,6	172,6	431,0
23247	14 G 1,5	16	18,0	201,6	520,0
23248	16 G 1,5	16	20,0	230,4	569,0
23249	18 G 1,5	16	20,9	259,2	652,0
23250	20 G 1,5	16	21,8	288,0	724,0
23251	25 G 1,5	16	24,0	345,6	925,0
23252	41 G 1,5	16	29,2	590,4	1440,0
23253	2 x 2,5	14	9,8	48,0	141,0
23254	3 G 2,5	14	10,4	72,0	174,0
23255	4 G 2,5	14	11,6	96,0	217,0
23256	5 G 2,5	14	12,4	120,0	271,0
23257	6 G 2,5	14	13,6	144,0	314,0
23258	7 G 2,5	14	13,6	168,0	331,0
23259	8 G 2,5	14	14,9	192,0	404,0
23260	10 G 2,5	14	17,2	240,0	495,0
23261	12 G 2,5	14	21,0	288,0	554,0
23262	16 G 2,5	14	22,6	384,0	725,0
23263	18 G 2,5	14	24,0	432,0	838,0
23264	25 G 2,5	14	28,8	600,0	1108,0
23265	2 x 4	12	10,9	76,8	190,0
23266	3 G 4	12	11,8	115,2	241,0
23267	4 G 4	12	12,9	153,6	304,0
23268	5 G 4	12	14,5	192,0	384,0
23269	7 G 4	12	17,8	268,8	527,0

Part no.	No. cores x cross-sec. mm <sup>2</sup>	AWG-No.	Outer Ø app. mm	Cop. weight kg / km	Weight app. kg / km
23270	2 x 6	10	14,4	115,2	284,0
23271	3 G 6	10	15,1	172,8	392,0
23272	4 G 6	10	16,4	230,4	492,0
23273	5 G 6	10	18,2	288,0	610,0
23274	7 G 6	10	21,1	403,2	681,0
23275	2 x 10	8	18,0	192,0	405,0
23276	3 G 10	8	18,9	288,0	620,0
23277	4 G 10	8	20,0	384,0	741,0
23278	5 G 10	8	22,1	480,0	914,0
23279	7 G 10	8	24,9	672,0	1164,0
23280	2 x 16	6	20,9	307,2	441,0
23281	3 G 16	6	22,8	460,8	501,0
23282	4 G 16	6	24,9	614,4	623,0
23283	5 G 16	6	26,9	768,0	971,0
23284	7 G 16	6	28,1	1075,3	1690,0
23285	2 x 25	4	25,1	480,0	711,0
23286	3 G 25	4	27,0	720,0	1210,0
23287	4 G 25	4	32,1	960,0	1524,0
23288	2 x 35	2	28,7	672,0	1140,0
23289	3 G 35	2	30,6	1008,0	1523,0
23290	4 G 35	2	32,9	1344,0	2217,0

Dimensions and specifications may be changed without prior notice. (RN03)



Suitable accessories can be found in Chapter X.

- Cable protection tube - HTP

# SiHF-C-Si UL/CSA halogen-free, 150°C/ 600 V, two-approvals silicon multicore cable, Cu-screened, EMC-preferred type



## Technical data

- Special silicone multicore cable with higher heat-resistance range to UL Style 4476 and CSA AWM II A/B
- **Temperature range**  
VDE -60°C to +180°C  
(up to +220°C for short time)  
UL/CSA -50°C to +150°C
- **Nominal voltage**  
VDE U<sub>0</sub>/U 300/500 V  
UL/CSA 600 V
- **Test voltage** 2000 V
- **Breakdown voltage** min. 5000 V
- **Insulation resistance**  
min. 200 MOhm x km
- **Minimum bending radius**  
flexing 10x cable Ø  
fixed installation 5x cable Ø
- **Coupling resistance**  
max. 250 Ohm/km
- **Radiation resistance**  
up to 20x10<sup>6</sup> cJ/kg (up to 20 Mrad)

## Cable structure

- Tinned copper conductors to DIN VDE 0295 cl.5, BS 6360 cl.5 and IEC 60228 cl.5
- Core insulation of silicone
- Core identification to DIN VDE 0293-308 colour coded or black cores with continuous white numbers
- For 2-cores brown, blue
- Cores stranded in layers with optimal lay-length
- GN-YE conductor, 3 cores and above
- Foil separator
- Tinned copper braided screening, approx. 85% coverage
- Outer sheath of silicone
- Sheath colour black
- **Tests**
  - Halogen-free acc. to DIN VDE 0482 part 267, DIN EN 50267-2-1, IEC 60754-1 (equivalent DIN VDE 0472 part 815)
  - Behaviour in fire no flame propagation acc. to DIN VDE 0482-332-1-2, DIN EN 60332-1-2, IEC 60332-1 (equivalent DIN VDE 0472 part 804 test method B), CSA FT1.

## Properties

### Advantages

- Hardly changes of dielectric strength and the insulation resistance, also at high temperatures high ignition or flash point, in case of fire, forms an insulating layer of SiO<sub>2</sub>

### Resistant to

- High molecular oils, fats from vegetables and animals, alcohols, plasticizers and clophenes, diluted acids, lyes and salt dissolution, oxidation substances, tropical influences and weather, lake water, oxygen and UV
- For laying as a fixed installation only in open or ventilated pipe systems as well as in ducts. Otherwise the mechanical properties of the silicon are reduced by the enclosed air at temperatures exceeding 90°C.

### Note

- G = with green-yellow conductor  
x = without green-yellow conductor
- AWG sizes are approximate equivalent values. The actual cross-section is in mm<sup>2</sup>.
- non-screened analogue type: **SiHF UL/CSA**, confer page 476

## Application

UL-CSA approved Silicone cables were evolved for use wherever insulation is subjected to extreme temperature changes. The good performance of the environmental resistant properties means that silicone cables can be used at temperatures down to -60°C. Silicone cables are halogen-free cables and are especially suited for installation in power stations. They have also found their uses in the steel producing industries, aviation industry, ship building as well as in ceramic, glass and cement factories. Due to elastical characteristic of core insulations, these are used as flexible connection cable. An interference-free transmission of signals and pulse is assured by the high screening density. The ideal interference-protected silicone multicore flexible cable for such applications as given above.

**EMC** = Electromagnetic compatibility

To optimize the EMC features we recommend a large round contact of the copper braiding on both ends.

**CE** = The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

Part no.	No. cores x cross-sec. mm <sup>2</sup>	AWG-No.	Outer Ø app. mm	Cop. weight kg / km	Weight app. kg / km
22637	2 x 0,5	20	9,0	55,5	94,0
22638	3 G 0,5	20	9,3	60,8	104,0
22639	4 G 0,5	20	9,7	66,5	125,0
22640	5 G 0,5	18	10,1	81,6	149,0
22641	7 G 0,5	20	10,5	92,2	168,0
22642	10 G 0,5	20	13,2	124,0	237,0
22643	12 G 0,5	20	13,4	134,4	260,0
22644	2 x 1	18	9,5	66,7	130,0
22645	3 G 1	18	9,6	86,2	151,0
22646	4 G 1	18	10,6	96,8	169,0
22647	5 G 1	18	11,6	108,3	198,0
22648	7 G 1	18	12,1	141,2	236,0
22649	10 G 1	18	14,7	190,0	248,0
22650	12 G 1	18	15,1	209,8	364,0
22651	2 x 1,5	16	10,6	87,7	169,0
22652	3 G 1,5	16	11,0	103,5	191,0
22653	4 G 1,5	16	11,6	131,7	230,0
22654	5 G 1,5	16	13,1	148,5	272,0
22655	7 G 1,5	16	14,1	193,4	341,0

Part no.	No. cores x cross-sec. mm <sup>2</sup>	AWG-No.	Outer Ø app. mm	Cop. weight kg / km	Weight app. kg / km
22656	10 G 1,5	16	17,3	268,5	478,0
22657	12 G 1,5	16	17,9	298,4	521,0
22658	2 x 2,5	14	12,0	122,3	226,0
22659	3 G 2,5	14	12,7	147,7	271,0
22660	4 G 2,5	14	14,0	188,6	332,0
22661	5 G 2,5	14	15,1	214,9	384,0
22662	7 G 2,5	14	16,9	265,7	478,0
22663	4 G 4	12	17,0	294,0	516,0
22664	5 G 4	12	19,1	374,0	641,0
22665	4 G 6	10	18,6	449,0	773,0
22666	5 G 6	10	21,3	563,0	980,0
22667	4 G 10	8	25,5	759,0	1284,0

Dimensions and specifications may be changed without prior notice. (RN03)



# UL/CSA ALLWEATHER CABLES & RUBBER CABLES





# Rubber / Neoprene Control Cable type SJO and SO



## Technical data

- UL+CSA approved rubber/neoprene flexible cables
- **Temperature range**  
-40°C to +90°C
- **Nominal voltage**  
**SJO** 300 V  
**SO** 600 V
- **Approvals**  
UL-Std.62  
CSA C22.2-49

## Cable structure

- Bare copper conductor to ASTM B-174
- Core insulation of synthetic rubber, EPDM
- Core identification coloured
- **Colour code**  
2 cores black, white  
3 cores black, white, green  
4 cores black, white, green, red
- Cores stranded in layers with optimal lay-length
- Hemp or cotton filler
- Outer sheath of neoprene (oil resistant)
- Sheath colour black

## Properties

- **Resistant**  
Oil  
Wetness  
UV-radiation

## Note

- **Note: SJO-18/2**  
**18** = AWG 18  
**2** = No. of cores
- Supply lengths are on original reels of 76 m or 152 m or on drums of 305 m lengths.
- Further Types also available: PVC control cables SJT, SJTO, ST, STO.

## Application

As a flexible cord for mobile equipment for use in rougher conditions in the engines and mechanical engineering, dockyards, in agriculture, in cabins and steel rolling mills and for export overseas.

CE= The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

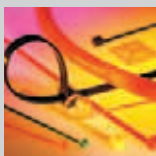
### Nominal voltage 300 Volt, type SJO (90°C)

Part no.	No. cores x AWG-No.	Current carrying capacity in Amp.	Cond. make-up n x wire Ø	Outer Ø app. mm	Weight app. kg / km
63010	2 x 18	7	16 x 0,3	7,8	65,0
63011	3 x 18	7	16 x 0,3	8,4	80,0
63012	4 x 18	7	16 x 0,3	9,2	95,0
63013	2 x 16	10	26 x 0,3	8,3	130,0
63014	3 x 16	10	26 x 0,3	9,0	148,0
63015	4 x 16	10	26 x 0,3	10,0	180,0
63016	2 x 14	15	41 x 0,3	9,4	195,0
63017	3 x 14	15	41 x 0,3	10,0	225,0
63018	4 x 14	15	41 x 0,3	10,7	288,0

### Nominal voltage 600 Volt, type SO (90°C)

Part no.	No. cores x AWG-No.	Current carrying capacity in Amp.	Cond. make-up n x wire Ø	Outer Ø app. mm	Weight app. kg / km
63034	2 x 18	7	16 x 0,3	10,0	70,0
63035	3 x 18	7	16 x 0,3	10,4	86,0
63036	4 x 18	7	16 x 0,3	11,0	110,0
63037	2 x 16	10	26 x 0,3	10,4	140,0
63038	3 x 16	10	26 x 0,3	11,0	155,0
63039	4 x 16	10	26 x 0,3	12,3	200,0
63040	2 x 14	15	41 x 0,3	13,5	200,0
63041	3 x 14	15	41 x 0,3	14,3	235,0
63042	4 x 14	15	41 x 0,3	15,3	300,0
63043	2 x 12	20	65 x 0,3	15,3	280,0
63044	3 x 12	20	65 x 0,3	16,2	310,0
63045	4 x 12	20	65 x 0,3	18,9	330,0
63046	2 x 10	25	105 x 0,3	16,4	305,0
63047	3 x 10	25	105 x 0,3	17,5	325,0
63048	4 x 10	25	105 x 0,3	19,0	365,0

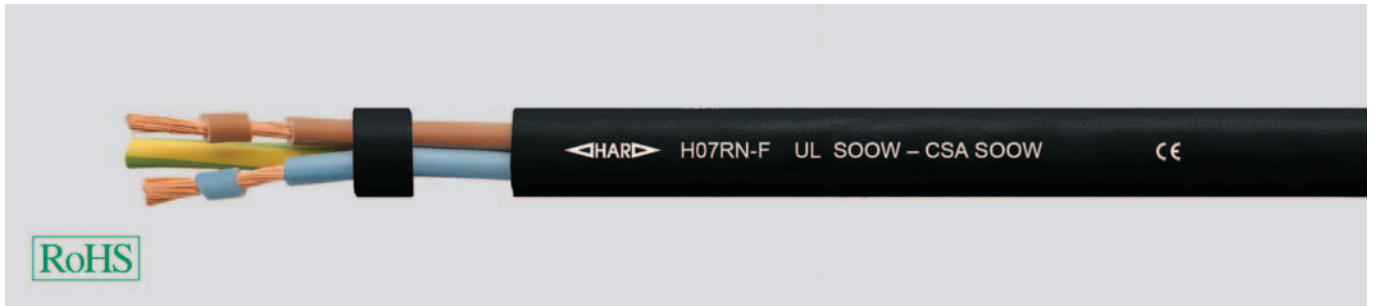
Dimensions and specifications may be changed without prior notice. (RN04)



Suitable accessories can be found in Chapter X.

- Cable tie - T-WS

# H07RN-F/SOOW rubber-sheathed cable, harmonized type



## Technical data

- Rubber-sheathed cable H07RN-F acc. to DIN VDE 0285-525-2-21 / DIN EN 50525-2-21 and UL-Std.62
- UL - SOOW  
CSA - SOOW
- **Temperature rang**  
HAR -25°C to +60°C  
UL/CSA -40°C to +90°C
- Permissible **operating temperature** at the conductor +60°C
- **Nominal voltage**  
HAR U<sub>0</sub>/U 450/750 V  
UL/CSA 600 V
- **Test voltage** 2500 V
- **Minimum bending radius**  
flexing 10x cable Ø  
fixed installation 7,5x cable Ø

## Cable structure

- Bare copper conductor, fine wire with AWG dimensions
- Core insulation of rubber (EPR)
- Core identification  
3 cores: BU, BN  
4 cores: BN, BK, GY  
5 cores: BU, BN, BK, GY
- Cores stranded in layers with optimal lay-length
- GN-YE conductor
- Outer sheath of rubber (CPE)
- Sheath colour black

## Properties

- Ozone-resistant
- Weather and UV-resistant
- Resistant to oils and greases

## Application

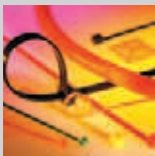
Highly-standardised, heavy-duty rubber-sheathed cable for use in practically all machines destined for export markets, in dry, damp, wet environments and outdoors. As a feeder to transportable motors or machines, cranes, hoists, hand lamps and drilling machines.

CE= The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

Part no.	Cross-section mm <sup>2</sup>	No.cores x AWG-No.	Current carrying capacity in ampere at 30°C ambient temperature	Outer Ø app. mm	Cop. weight kg / km	Weight app. kg / km
39025	1	3 x 17	10	9,6	29,0	130,0
39026	1,5	3 x 15	13	10,2	43,0	165,0
39027	1,5	4 x 15	10	11,4	58,0	200,0
39028	1,5	5 x 15	8	13,1	72,0	240,0
39029	2,5	3 x 13	18	14,0	72,0	235,0
39030	2,5	4 x 13	15	15,1	96,0	290,0
39031	2,5	5 x 13	12	16,9	120,0	345,0
39032	4	3 x 11	25	16,0	115,0	320,0

Part no.	Cross-section mm <sup>2</sup>	No.cores x AWG-No.	Current carrying capacity in ampere at 30°C ambient temperature	Outer Ø app. mm	Cop. weight kg / km	Weight app. kg / km
39033	4	4 x 11	20	17,3	154,0	395,0
39034	4	5 x 11	16	18,7	192,0	485,0
39035	6	3 x 9	30	17,1	173,0	420,0
39036	6	4 x 9	25	18,4	230,0	540,0
39037	6	5 x 9	24	20,1	288,0	650,0
39038	10	3 x 7	40	22,9	288,0	810,0
39039	10	4 x 7	35	25,0	384,0	950,0

Dimensions and specifications may be changed without prior notice. (RF01)



Suitable accessories can be found in Chapter X.

- Cable tie - T-WS





# UL/CSA REELING CABLES





**TROMMPUR®-H** trailing, halogen-free**Technical data**

- Trailing cable acc. to UL AWM Style 20235 CSA/AWM
- **Temperature range**  
flexing -40°C to +80°C  
fixed installation -50°C to +80°C
- **Nominal voltage**  
DIN VDE 600/1000 V  
UL 1000 V
- **A.c. test voltage**, 50 Hz  
core/core 4000 V
- **Insulation resistance**  
min. 20 MOhm x km
- **Speed of motion**  
up to 250 m/min
- **Minimum bending radius**  
6x cable Ø

**Cable structure**

- Bare copper-conductor, to DIN VDE 0295 cl.6, extra fine-wire, BS 6360 cl.6, IEC 60228 cl.6
- Core insulation of TPE
- Core identification to DIN VDE 0293  
- up to 5 cores coloured  
- from 6 cores, black with continuous white numbering
- GN-YE conductor
- Cores stranded around support element
- Polyester fleece wrapping
- Outer sheath of PUR with integrated support braiding
- Sheath colour yellow

**Properties**

- PUR outer sheath, low adhesion, abrasion resistant, halogen-free, resistant to UV, oil, hydrolysis and microbial attack
- Due to the PUR outer sheath, the cable is resistant against ozone and radiation, as well as oils, greases and petrol

**Note**

- AWG sizes are approximate equivalent values. The actual cross-section is in mm<sup>2</sup>.

**Application**

Significantly smaller external diameters, smaller bending radii and reduced weights compared to NSHTÖU cables enable the use of smaller drive motors and drums, thus providing significant cost savings. Trailing cables are used for high mechanical stress, especially for applications with frequent winding and unwinding with simultaneous tensile and torsional stress, for building machinery, conveyors and lifting systems, and cranes. They are used as robust and all-weather resistant cables in the harshest operating environments in mining and in flexible handling equipment and railway motors. The cables are suitable for installation in dry, damp and wet environments, as well as outdoors.

**Notes**

- During installation and operation the tensile stress on the cable must not exceed 25 N/mm<sup>2</sup>
- Acceleration must not exceed 0,4 m/s<sup>2</sup>
- 1 to 2 turns should remain on the drum during operation

CE= The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer Ø app. mm	Cop. weight kg / km	Weight app. kg / km	AWG-No.	Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer Ø app. mm	Cop. weight kg / km	Weight app. kg / km	AWG-No.
77144	4 G 1,5	10,2	58,0	157,0	16	77161	4 G 4	12,5	154,0	270,0	12
77145	5 G 1,5	10,8	72,0	176,0	16	77172	5 G 4	14,3	192,0	362,0	12
77146	7 G 1,5	12,9	101,0	245,0	16	77162	4 G 6	16,9	230,0	409,0	10
77147	12 G 1,5	18,4	173,0	337,0	16	77173	5 G 6	17,8	288,0	511,0	10
77148	18 G 1,5	18,6	259,0	526,0	16	77163	4 G 10	19,6	384,0	633,0	8
77149	24 G 1,5	21,3	345,6	662,0	16	77174	5 G 10	20,9	480,0	766,0	8
77150	30 G 1,5	24,6	432,0	901,0	16	77164	4 G 16	23,8	614,0	936,0	6
77151	42 G 1,5	26,5	604,8	1056,0	16	77175	5 G 16	25,3	768,0	1170,0	6
77152	4 G 2,5	11,7	96,0	208,0	14	77165	4 G 25	27,7	960,0	1485,0	4
77153	5 G 2,5	12,7	120,0	263,0	14	77166	4 G 35	30,1	1344,0	2115,0	2
77154	7 G 2,5	14,8	168,0	327,0	14	77167	4 G 50	35,2	1920,0	2600,0	1
77155	12 G 2,5	20,4	288,0	533,0	14	77168	4 G 70	40,3	2688,0	3700,0	2/0
77156	18 G 2,5	21,1	432,0	725,0	14	77169	4 G 95	50,6	3648,0	4800,0	3/0
77157	24 G 2,5	24,8	576,0	988,0	14	77170	4 G 120	53,0	4608,0	5900,0	4/0
77158	30 G 2,5	27,6	720,0	1242,0	14	77171	4 G 150	56,0	5760,0	7100,0	300 kcmil
77159	40 G 2,5	30,0	960,0	1500,0	14						
77160	50 G 2,5	34,3	1200,0	1800,0	14						

Dimensions and specifications may be changed without prior notice.



# UL/CSA SINGLE CORES





**UL-Style 1007, CSA TR 64** PVC single cores, 80°C, 300 V**Technical data**

- PVC-single core to UL-Style and CSA-AWM UL-Style 1007  
CSA-AWM I A/B or TR 64
- **Temperature range**  
flexible -5°C bis +80°C  
fixed installation -30°C bis +80°C  
CSA-AWM I A/B or TR 64 +90°C
- **Nominal voltage** 300 V
- **Test voltage** 2000 V
- **Test voltage** (Spark test)  
AWG 26-20 = 4 kV  
AWG 10-18 = 5 kV
- **Minimum bending radius**  
fixed installation 5x core Ø  
flexible 10x core Ø

**Cable structure**

- Stranded copper conductor, tinned to UL-Std.758 with AWG dimensions
- Core insulation of PVC  
heat and damp resistant acc. to class 43  
tab.50.182 acc. to UL-Std.1581

**Properties**

- **Conditionally resistant to**  
Oils  
Solvents  
Acids  
Lyes
- The materials used in manufacture are cadmium-free and contain no silicone and free from substances harmful to the wetting properties of lacquers

**Tests**

- PVC self-extinguishing and flame retardant, test method to UL VW-1, CSA FT1

**Note**

- Please complete the part number for these cables by adding the suffix for the colour required as per the list:  
00 = green  
01 = black  
02 = blue  
03 = brown  
04 = red  
05 = white  
06 = grey  
07 = violet  
08 = yellow  
09 = orange  
10 = transparent  
11 = pink  
12 = beige  
13 = green-yellow
- Due to design the constructional alternations may be possible.
- AWG 14 - AWG 10 to UL-Style 1569

**Application**

For the internal wiring of switchboards, electrical equipment, e. g. households, radio or televisions and control desks. Connecting wires in machines laid in protective tubes and flexible pipes and also for motors and transformers.

**AWM = Appliance Wiring Material**

For internal wirings for electrical equipment and control apparatus e. g. electronic assembly components.

**UL = Underwriters Laboratories Inc. (USA)**

**CSA = Canadian Standards Association (Canada)**

**CE** = The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

Part no.	No. cores x cross-sec. mm <sup>2</sup>	AWG-No.	Outer Ø app. mm	Cop. weight kg / km	Weight app. kg / km
635xx	1 x 0,13	26	1,4	1,6	3,2
620xx	1 x 0,21	24	1,5	2,3	4,3
621xx	1 x 0,33	22	1,6	3,4	6,0
622xx	1 x 0,52	20	1,8	5,3	8,5
623xx	1 x 0,82	18	2,1	8,2	12,5

Part no.	No. cores x cross-sec. mm <sup>2</sup>	AWG-No.	Outer Ø app. mm	Cop. weight kg / km	Weight app. kg / km
624xx	1 x 1,32	16	2,4	13,0	18,5
636xx	1 x 2,08	14	3,0	20,0	29,0
637xx	1 x 3,31	12	3,9	33,0	40,0
638xx	1 x 5,26	10	4,1	51,6	61,0

Dimensions and specifications may be changed without prior notice. (RN06)



Suitable accessories can be found in Chapter X.

- Cable Gland - HELUcond PA6-L
- Cable Gland - HELUcond PA6-UL

# UL-Style 1569, CSA TR 64 PVC single cores, 105°C, 300 V



## Technical data

- PVC-single core to UL-Style and CSA-AWM UL-Style 1569  
CSA-AWM I A/B or TR 64
- **Temperature range**  
flexible -5°C bis +105°C  
fixed installation -30°C bis +105°C  
CSA-AWM I A/B or TR 64 +90°C
- **Nominal voltage** 300 V
- **Test voltage** 2000 V
- **Test voltage** (Spark test)  
AWG 26-20 = 4 kV  
AWG 10-18 = 5 kV
- **Minimum bending radius**  
fixed installation 5x core Ø  
flexing 10x core Ø

## Cable structure

- Stranded copper conductor, tinned to UL-Std.758 with AWG dimensions
- Core insulation of special PVC heat and damp resistant  
class 43 tab.50.182 acc. to UL-Std.1581

## Properties

- **Conditionally resistant to**  
Oils  
Solvents  
Acids  
Lyes
- The materials used in manufacture are cadmium-free and contain no silicone and free from substances harmful to the wetting properties of lacquers
- **Tests**  
PVC self-extinguishing and flame retardant, test method to UL VW-1, CSA FT1

## Note

- Please complete the part number for these cables by adding the suffix for the colour required as per the list:  
00 = green  
01 = black  
02 = blue  
03 = brown  
04 = red  
05 = white  
06 = grey  
07 = violet  
08 = yellow  
09 = orange  
10 = transparent  
11 = pink  
12 = beige  
13 = green-yellow
- Due to design the constructional alternations may be possible.

## Application

For the internal wiring of switchboards, electrical equipment, e. g. households, radio or televisions and control desks. Connecting wires in machines laid in protective tubes and flexible pipes and also for motors and transformers.

**AWM** = **A**ppliance **W**iring **M**aterial

For internal wirings for electrical equipment and control apparatus e. g. electronic assembly components.

**UL** = Underwriters Laboratories Inc. (USA)

**CSA** = **C**anadian **S**tandards **A**ssociation (Canada)

**CE** = The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

Part no.	No. cores x cross-sec. mm <sup>2</sup>	AWG-No.	Outer Ø app. mm	Cop. weight kg / km	Weight app. kg / km
660xx	1 x 0,13	26	1,4	1,6	3,2
661xx	1 x 0,21	24	1,5	2,3	4,3
662xx	1 x 0,33	22	1,6	3,4	6,0
663xx	1 x 0,52	20	1,8	5,3	8,5
664xx	1 x 0,82	18	2,1	8,2	12,5

Part no.	No. cores x cross-sec. mm <sup>2</sup>	AWG-No.	Outer Ø app. mm	Cop. weight kg / km	Weight app. kg / km
665xx	1 x 1,32	16	2,4	13,0	18,5
666xx	1 x 2,08	14	2,9	20,0	29,0
667xx	1 x 3,31	12	3,6	33,0	40,0
668xx	1 x 5,26	10	4,3	51,6	61,0

Dimensions and specifications may be changed without prior notice. (RN06)



Suitable accessories can be found in Chapter X.

- Cable Gland - HELUcond PA6-L
- Cable Gland - HELUcond PA6-UL

# UL-Style 1015 PVC single core, 600 V



## Technical data

- PVC-single core as per UL AWM Style 1015/ MTW and CSA-AWM/TEW
- **Temperature range**  
flexible -5°C to +105°C  
fixed installation -30°C to +105°C
- **Temperature at conductor**  
UL/CSA max. +105°C
- **Nominal voltage** 600 V
- **Test voltage** (Spark test)  
AWG 24 = 4 kV  
AWG 22 and 20 = 5 kV  
AWG 18 and 10 = 6 kV  
AWG 8 = 7,5 kV
- UL-type **AWM+MTW** 105°C 600 V
- CSA-type **AWM+TEW** 105°C 600 V
- **Minimum bending radius**  
fixed installation 5x core Ø  
flexible 10x core Ø

## Cable structure

- Stranded copper conductor, tinned to UL-Std.758 with AWG dimensions
- AWG-sizes as per table below
- Core insulation of PVC  
heat and damp resistant to class 43 and CSA-C22.2 No. 210 UL VW-1 and CSA FT1, acc. to UL-Std.1581
- For structural reasons, constructive changes are possible

## Properties

- **Conditionally resistant to**  
Oils  
Solvents  
Acids  
Lyes
- The materials used in manufacture are cadmium-free and contain no silicone and free from substances harmful to the wetting properties of lacquers

## Tests

- PVC self-extinguishing and flame retardant, test method to UL VW-1, CSA FT1

## Note

- Please complete the part number for these cables by adding the suffix for the colour required as per the list:  
00 = green, 01 = black, 02 = blue, 03 = brown, 04 = red, 05 = white, 06 = grey, 07 = violet, 08 = yellow, 09 = orange, 10 = transparent, 11 = pink, 12 = beige, 13 = green-yellow, 14 = blue/white, 15 = dark blue, 27 = white/blue  
(supply up to AWG 8)

## Application

For the internal wiring of switchboards, electrical equipment, e. g. households, radio or televisions and control desks. Connecting wires in machines laid in predictive tubes and flexible pipes and also for motors and transformers. UL bzw. CSA:

**AWM** = **A**pliance **W**iring **M**aterial

For internal wirings for electrical equipment and control apparatus e. g. electronic assembly components.

UL-MTW: Machine Tool Wires

CSA-TEW: Equipment Lead Wires

**MTW** = **M**achine **T**ool **W**ire

For the electrical installation of machine tools and the relative control.

**UL** = **U**nderwriters **L**aboratories Inc. (USA)

**CSA** = **C**anadian **S**tandards **A**ssociation (Canada)

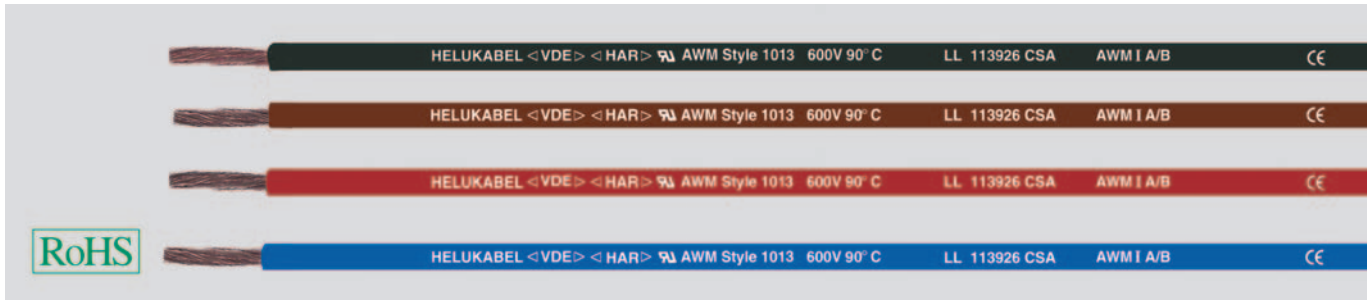
**CE** = The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

Part no.	No. cores x cross-sec. mm <sup>2</sup>	AWG-No.	Outer Ø app. mm	Cop. weight kg / km	Weight app. kg / km
601xx	1 x 0,21	24	2,2	2,3	8,0
602xx	1 x 0,33	22	2,4	3,2	10,0
603xx	1 x 0,52	20	2,5	5,0	12,0
604xx	1 x 0,81	18	2,8	7,9	16,0
605xx	1 x 1,31	16	3,1	12,6	22,0
606xx	1 x 2,08	14	3,5	20,7	31,0
607xx	1 x 3,32	12	4,0	33,0	45,0
608xx	1 x 5,26	10	4,6	51,6	65,0
609xx	1 x 8,35	8	6,5	80,6	110,0
610xx	1 x 13,29	6	8,0	125,0	175,0
611xx	1 x 21,14	4	9,5	201,0	260,0
612xx	1 x 26,65	3	10,4	253,0	340,0

Part no.	No. cores x cross-sec. mm <sup>2</sup>	AWG-No.	Outer Ø app. mm	Cop. weight kg / km	Weight app. kg / km
613xx	1 x 33,61	2	11,3	317,0	380,0
614xx	1 x 42,38	1	13,3	399,0	500,0
615xx	1 x 53,47	1/0	13,6	500,0	615,0
616xx	1 x 67,4	2/0	15,5	631,0	750,0
617xx	1 x 84,97	3/0	17,5	792,0	900,0
618xx	1 x 107,17	4/0	19,0	996,0	1070,0
62501	1 x 127	250 kcmil	21,2	1178,0	1280,0
62601	1 x 152	300 kcmil	22,4	1410,0	1518,0
62701	1 x 178	350 kcmil	25,3	1645,0	1756,0
62801	1 x 203	400 kcmil	26,0	1902,0	2002,0
62901	1 x 254	500 kcmil	28,0	2345,0	2475,0

Dimensions and specifications may be changed without prior notice. (RN06)

# THREENORM PVC single core, UL-Style 1013 and CSA 600 V



## Technical data

- PVC-single cores acc. to DIN VDE 0285-525-2-31, DIN EN 50525-2-31, UL-Style 1013 and CSA, CSA-AWM I/A/B
- **Temperature range**  
H05V-K/H07V-K  
flexing +5°C to +70°C  
fixed installation -10°C to +70°C  
UL/CSA +90°C
- **Nominal voltage**  
up to 1 mm<sup>2</sup> H05V-K: U<sub>0</sub>/U 300/500 V  
from 1,5 mm<sup>2</sup> H07V-K: U<sub>0</sub>/U 450/750 V  
UL/CSA 600 V AC
- **Test voltage**  
H05V-K/H07V-K 2000 V
- **Test voltage** (Spark Test)  
AWG 20 = 5 kV  
> AWG 20 = 6 kV
- **Insulation resistance**  
min. 20 MOhm x km
- **Minimum bending radius**  
fixed installation for core Ø:  
≤ 8 mm: 4x core Ø  
> 8-12 mm: 5x core Ø  
> 12 mm: 6x core Ø

## Cable structure

- Bare copper fine wire stranded to DIN VDE 0295 cl.5, BS 6360 cl.5, IEC 60228 cl.5, acc. to UL-Std.758 resp. ASTM B 174
- Core insulation of PVC compound type T11 to DIN VDE 0207-363-3/ DIN EN 50363-3 acc. to UL-Std.1581, class 43, CSA-C 22.2 No. 210 tab.12 class H
- Core identification to DIN VDE 0293 coloured

## Properties

- The materials used in manufacture are cadmium-free and contain no silicone and free from substances harmful to the wetting properties of lacquers

## Tests

- PVC self-extinguishing and flame retardant acc. to DIN VDE 0482-332-1-2, DIN EN 60332-1-2/IEC 60332-1 (equivalent DIN VDE 0472 part 804 test method B) UL-VW-1, CSA FT1

## Note

- Tinned conductor on request.
- AWG sizes are approximate equivalent values. The actual cross-section is in mm<sup>2</sup>.
- The cross-sections 0,5 mm<sup>2</sup>, 0,75 mm<sup>2</sup> and 1,0 mm<sup>2</sup> are acc. to H05 V-K, the cross-sections 1,5 up to 120 mm<sup>2</sup> acc. to H07 V-K.
- **Type H05 V:**  
approved one-colour mark:  
black, blue, brown, grey, orange, pink, red, turquoise, violet, white, green and yellow.  
Two-coloured mark in any combination of the above individual colours.
- **Type H07 V:**  
approved mark: black, blue, brown, grey, orange, pink, red, turquoise, violet, white and green-yellow.  
Other marks are available as (H).

## Application

Three norms approved connecting jumper wire primarily designed for exportes, used in machine tools. This wire is used for internal wiring of switchboards and electrical equipment. The approbation of HAR-UL-CSA AWM make possible an economical storekeeping and simplification of parts list.

CE= The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

### H05V-K

Cross-sec. mm <sup>2</sup> / AWG-no. app. RAL	Outer Ø app. mm	Cop. weight kg / km	BK	GN-YE	BU	BN	RD	WH	GY	VT	YE	PK	GN	TRANS	D-BU	OG	o.col.	2-col.
Part no. 0,5 / 20	2,5	4,8	9005	-	5015	8003	3000	1013	7000	4005	1021	3015	6018	-	5010	2003	-	-
Part no. 0,75 / 19	2,65	7,2	63815	63816	63817	63818	63819	63820	63821	63822	63823	63824	63825	63826	63827	63828	63829	63830
Part no. 1 / 18	2,8	9,6	63831	63832	63833	63834	63835	63836	63837	63838	63839	63840	63841	63842	63843	63844	63845	63846
			63847	63848	63849	63850	63851	63852	63853	63854	63855	63856	63857	63858	63859	63860	63861	63862

Continuation ▶



# THREENORM PVC single core, UL-Style 1013 and CSA 600 V



## H07V-K

Cross-sec. mm <sup>2</sup> / AWG-no. app. RAL	Outer Ø app. mm	Cop. weight kg / km	BK	GN-YE	BU	BN	RD	WH	GY	VT	YE	PK	GN	TRANS	D-BU	OG	o.col.	2-col.
Part no. 1,5 / 16	3,05	14,4	63863	63864	63865	63866	63867	63868	63869	63870	63871	63872	63873	63874	63875	63876	63877	63878
Part no. 2,5 / 14	3,6	24,0	63879	63880	63881	63882	63883	63884	63885	63886	63887	63888	63889	63890	63891	63892	63893	63894
Part no. 4 / 12	4,1	38,0	63895	63896	63897	63898	63899	63900	63901	63902	63903	63904	63905	63906	63907	63908	63909	63910
Part no. 6 / 10	4,8	58,0	63911	63912	63913	63914	63915	63916	63917	63918	63919	63920	63921	63922	63923	63924	63925	63926
Part no. 10 / 8	6,4	96,0	63927	63928	63929	63930	63931	63932	63933	63934	63935	63936	63937	63938	63939	63940	63941	63942
Part no. 16 / 6	8,1	154,0	63943	63944	63945	63946	63947	63948	63949	63950	63951	63952	63953	63954	63955	63956	63957	63958
Part no. 25 / 4	9,6	240,0	63959	63960	63961	63962	63963	63964	63965	63966	63967	63968	63969	63970	63971	63972	63973	63974
Part no. 35 / 2	10,8	336,0	63975	63976	63977	63978	63979	63980	63981	63982	63983	63984	63985	63986	63987	63988	63989	63990
Part no. 50 / 1	13,6	480,0	63991	63992	63993	63994	63995	63996	63997	63998	63999	64000	64001	64002	64003	64004	64005	64006
Part no. 70 / 2/0	15,2	672,0	64007	64008	64009	64010	64011	64012	64013	64014	64015	64016	64017	64018	64019	64020	64021	64022
Part no. 95 / 3/0	16,8	912,0	64023	64024	64025	64026	64027	64028	64029	64030	64031	64032	64033	64034	64035	64036	64037	64038
Part no. 120 / 4/0	19,5	1152,0	64039	64040	64041	64042	64043	64044	64045	64046	64047	64048	64049	64050	64051	64052	64053	64054
Part no. 150 / 300 kcmil	22,2	1440,0	64055	64056	64057	64058	64059	64060	64061	64062	64063	64064	64065	64066	64067	64068	64069	64070

Dimensions and specifications may be changed without prior notice. (RN06)



Suitable accessories can be found in Chapter X.

- Cable Gland - HELUcond PA6-L
- Cable Gland - HELUcond PA6-UL

# FIVENORM HAR-UL-CSA-AWM-MTW, PVC single core, UL-Style

10269/UL-Standard 1063, 600 V, 105°C



## Technical data

- PVC-single cores acc. to DIN VDE 0285-525-2-31 / DIN EN 50525-2-31, UL-Std.1063, UL-Style 10269 and CSA-TEW and CSA-AWM I/A/B
- **Temperature range**  
H05V2-K / H07V2-K  
flexing +5°C to +90°C  
fixed installation -40°C to +90°C  
UL (AWM) -40°C to +105°C  
UL (MTW) -40°C to +90°C  
CSA (TEW) -40°C to +105°C
- **Nominal voltage**  
up to 1 mm<sup>2</sup> H05V2-K: U<sub>0</sub>/U 300/500 V  
from 1,5 mm<sup>2</sup> H07V2-K: U<sub>0</sub>/U 450/750 V  
UL (AWM) 1000 V (ac)  
UL (AWM) 1250 V (dc)  
UL (MTW) 600 V  
CSA (TEW) 600 V
- **Test voltage**  
H05V2-K / H07V2-K 2000 V
- **Test voltage** (Spark Test)  
AWG 22 = 5 kV  
> AWG 20 = 6 kV
- **Insulation resistance**  
min. 20 MΩ x km
- **Minimum bending radius**  
fixed installation for core Ø:  
≤ 8 mm: 4x core Ø  
> 8-12 mm: 5x core Ø  
> 12 mm: 6x core Ø

## Cable structure

- Bare copper fine wire stranded to DIN VDE 0295 cl.5, BS 6360 cl.5 and IEC 60228 cl.5, acc. to UL-Std.758
- Core insulation of PVC compound type T13 to DIN VDE 0207-363-3/DIN EN 50363-3 CSA-C 22.2 No. 210 tab.12 class H and class 43 acc. to UL-Std.1581
- Core identification to DIN VDE 0293

## Properties

- The materials used in manufacture are cadmium-free and contain no silicone and free from substances harmful to the wetting properties of lacquers
- Tests**
- PVC self-extinguishing and flame retardant acc. to VDE 0482-332-1-2, DIN EN 60332-1-2/IEC 60332-1 (equivalent DIN VDE 0472 part 804 test method B), UL VW-1, CSA FT1

## Note

- Tinned conductor on request.
- up to = 1,0 mm<sup>2</sup> = H05V2-K, from 1,5 mm<sup>2</sup> up to 35 mm<sup>2</sup> = H07V2-K. Cross-sections up to 35 mm<sup>2</sup> is acc. to DIN VDE 0285-525-2-31. Due to this cross-section >35 mm<sup>2</sup> is the type H07V-K but with an increased heat-resistant PVC-compound T13.
- **Type H05V:**  
approved one-colour mark: black, blue, brown, grey, orange, pink, red, turquoise, violet, white, green and yellow.  
Two-coloured mark in any combination of the above individual colours.
- **Type H07V:**  
approved mark: black, blue, brown, grey, orange, pink, red, turquoise, violet, white and green-yellow.  
Other marks are available as (H).

## Application

Five norms approved connecting jumper wire primarily designed for exportes, used in machine tools. The approbation of HAR, UL-AWM, UL-MTW, CSA-AWM, CSA-Equipment-wire make possible an economical storekeeping and simplification of parts list.

CE= The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

### H05V2-K

Cross-sec. mm <sup>2</sup> / AWG-no.	Outer Ø app. mm	Cop. weight kg / km	BK	GN-YE	BU	BN	RD	WH	GY	VT	YE	PK	GN	TRANS	D-BU	OG	o.col.	2-col.
app. RAL			9005	-	5015	8003	3000	1013	7000	4005	1021	3015	6018	-	5010	2003	-	-
Part no.			64075	64076	64077	64078	64079	64080	64081	64082	64083	64084	64085	64086	64087	64088	64089	64090
0,5 / 22	2,65	5,2																
Part no.			64091	64092	64093	64094	64095	64096	64097	64098	64099	64100	64101	64102	64103	64104	64105	64106
0,75 / 20	2,6	7,2																
Part no.			64107	64108	64109	64110	64111	64112	64113	64114	64115	64116	64117	64118	64119	64120	64121	64122
1 / 18	2,8	9,6																

Continuation ▶

# FIVENORM HAR-UL-CSA-AWM-MTW, PVC single core, UL-Style



10269/UL-Standard 1063, 600 V, 105°C

## H07V2-K

Cross-sec. mm <sup>2</sup> / AWG-no.	Outer Ø app. mm	Cop. weight kg / km	BK	GN-YE	BU	BN	RD	WH	GY	VT	YE	PK	GN	TRANS	D-BU	OG	o.col.	2-col.
<b>app. RAL</b>			9005	-	5015	8003	3000	1013	7000	4005	1021	3015	6018	-	5010	2003	-	-
Part no. 1,5 / 16	3,0	14,4	64123	64124	64125	64126	64127	64128	64129	64130	64131	64132	64133	64134	64135	64136	64137	64138
Part no. 2,5 / 14	3,6	24,0	64139	64140	64141	64142	64143	64144	64145	64146	64147	64148	64149	64150	64151	64152	64153	64154
Part no. 4 / 12	4,1	38,0	64155	64156	64157	64158	64159	64160	64161	64162	64163	64164	64165	64166	64167	64168	64169	64170
Part no. 6 / 10	4,8	58,0	64171	64172	64173	64174	64175	64176	64177	64178	64179	64180	64181	64182	64183	64184	64185	64186
Part no. 10 / 8	6,4	96,0	64187	64188	64189	64190	64191	64192	64193	64194	64195	64196	64197	64198	64199	64200	64201	64202
Part no. 16 / 6	8,1	154,0	64203	64204	64205	64206	64207	64208	64209	64210	64211	64212	64213	64214	64215	64216	64217	64218
Part no. 25 / 4	9,6	240,0	64219	64220	64221	64222	64223	64224	64225	64226	64227	64228	64229	64230	64231	64232	64233	64234
Part no. 35 / 2	10,8	336,0	64235	64236	64237	64238	64239	64240	64241	64242	64243	64244	64245	64246	64247	64248	64249	64250
Part no. 50 / 1	13,6	480,0	64251	64252	64253	64254	64255	64256	64257	64258	64259	64260	64261	64262	64263	64264	64265	64266
Part no. 70 / 2/0	15,2	672,0	64267	64268	64269	64270	64271	64272	64273	64274	64275	64276	64277	64278	64279	64280	64281	64282
Part no. 95 / 3/0	16,8	912,0	64283	64284	64285	64286	64287	64288	64289	64290	64291	64292	64293	64294	64295	64296	64297	64298
Part no. 120 / 4/0	19,5	1152,0	64299	64300	64301	64302	64303	64304	64305	64306	64307	64308	64309	64310	64311	64312	64313	64314
Part no. 150 / 300 kcmil	22,2	1440,0	64315	64316	64317	64318	64319	64320	64321	64322	64323	64324	64325	64326	64327	64328	64329	64330

## H05V2-K, barrel (with various capacity)

Cross-sec. mm <sup>2</sup> / AWG-no.	Outer Ø app. mm	Cop. weight kg / km	BK	GN-YE	BU	BN	RD	WH	GY	VT	YE	PK	GN	TRANS	D-BU	OG	o.col.	2-col.
<b>app. RAL</b>			9005	-	5015	8003	3000	1013	7000	4005	1021	3015	6018	-	5010	2003	-	-
Part no. 0,5 / 22	2,5	5,2	65402	65403	65404	65405	65406	65407	65408	65409	65413	65410	65412	-	65414	65411	-	-
Part no. 0,75 / 20	2,65	7,2	65415	65416	65417	65418	65419	65420	65421	65422	65426	65423	65425	-	65427	65424	-	-
Part no. 1 / 18	2,8	9,6	65428	65429	65430	65431	65432	65433	65434	65435	65439	65436	65438	-	65440	65437	-	-

## H07V2-K, barrel (with various capacity)

Cross-sec. mm <sup>2</sup> / AWG-no.	Outer Ø app. mm	Cop. weight kg / km	BK	GN-YE	BU	BN	RD	WH	GY	VT	YE	PK	GN	TRANS	D-BU	OG	o.col.	2-col.
<b>app. RAL</b>			9005	-	5015	8003	3000	1013	7000	4005	1021	3015	6018	-	5010	2003	-	-
Part no. 1,5 / 16	3,05	14,4	65441	65442	65443	65444	65445	65446	65447	65448	65452	65449	65451	-	65453	65450	-	-
Part no. 2,5 / 14	3,6	24,0	65454	65455	65456	65457	65458	65459	65460	65461	65465	65462	65464	-	65466	65463	-	-
Part no. 4 / 12	4,1	38,0	65467	65468	65469	65470	65471	65472	65473	65474	65478	65475	65477	-	65549	65476	-	-

## H05V2-K two colour

Cross-sec. mm <sup>2</sup> / AWG-no.	Outer Ø app. mm	Cop. weight kg / km	BU/WH	WH/BU	D-BU/WH	WH/OG	WH/RD	BK/OG	D-BU/OG	RD/WH	WH/D-BU	YE/BN	OG/BU					
<b>app. RAL</b>			-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Part no. 0,5 / 22	2,5	5,2	63402	63403	63404	63405	63406	63482	63332	63352	63372	65386	69625	-	-	-	-	-
Part no. 0,75 / 20	2,65	7,2	63407	63408	63409	63410	63411	63483	63333	63353	63373	65387	69626	-	-	-	-	-
Part no. 1 / 18	2,8	9,6	63412	63413	63414	63415	63416	63484	63334	63354	63374	65388	69627	-	-	-	-	-

## H05V2-K two colour

Cross-sec. mm <sup>2</sup> / AWG-no.	Outer Ø app. mm	Cop. weight kg / km	WH/YE	OG/D-BU	YE/BU	BU/OG	OG/RD	OG/BK	OG/WH	YE/RD	BK/YE							
<b>app. RAL</b>			-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Part no. 0,5 / 22	2,5	5,2	69827	69828	69829	69830	69831	69832	69833	69834	69835	-	-	-	-	-	-	-
Part no. 0,75 / 20	2,65	7,2	69836	69837	69838	69839	69840	69841	69842	69843	69844	-	-	-	-	-	-	-
Part no. 1 / 18	2,8	9,6	69845	69846	69847	69848	69849	69850	69851	69852	69853	-	-	-	-	-	-	-

Continuation ▶



# FIVENORM HAR-UL-CSA-AWM-MTW, PVC single core, UL-Style



10269/UL-Standard 1063, 600 V, 105°C

## (H)07V2-K two colour

Cross-sec. mm <sup>2</sup> / AWG-no. app. RAL	Outer Ø app. mm	Cop. weight kg / km	BU/WH	WH/BU	D-BU/WH	WH/OG	WH/RD	BK/OG	D-BU/OG	RD/WH	WH/D-BU	YE/BN	OG/BU
Part no. 1,5 / 16	3,05	14,4	63417	63418	63419	63420	63421	63485	63335	63355	63375	65389	69628
Part no. 2,5 / 14	3,6	24,0	63422	63423	63424	63425	63426	63486	63336	63356	63376	65390	69629
Part no. 4 / 12	4,1	38,0	63427	63428	63429	63430	63431	63487	63337	63357	63377	65391	69630
Part no. 6 / 10	4,8	58,0	63432	63433	63434	63435	63436	63488	63338	63358	63378	65392	69655
Part no. 10 / 8	6,4	96,0	63437	63438	63439	63440	63441	63489	63339	63359	63379	65393	69656
Part no. 16 / 6	8,1	154,0	63442	63443	63444	63445	63446	63490	63340	63360	63380	65394	69657
Part no. 25 / 4	9,6	240,0	63447	63448	63449	63450	63451	63491	63342	63362	63382	65395	69658
Part no. 35 / 2	10,8	336,0	63452	63453	63454	63455	63456	63492	63343	63363	63383	65396	69659
Part no. 50 / 1	13,6	480,0	63457	63458	63459	63460	63461	63493	63344	63364	63384	65397	69660
Part no. 70 / 2/0	15,2	627,0	63462	63463	63464	63465	63466	63494	63345	63365	63385	65398	69738
Part no. 95 / 3/0	16,8	912,0	63467	63468	63469	63470	63471	63495	63346	63366	63386	65499	69739
Part no. 120 / 4/0	19,5	1152,0	63472	63473	63474	63475	63476	63496	63347	63367	63387	65400	69740
Part no. 150 / 300 kcmil	22,2	1440,0	63477	63478	63479	63480	63481	63497	63348	63368	63388	65401	69741

## (H)07V2-K two colour

Cross-sec. mm <sup>2</sup> / AWG-no. app. RAL	Outer Ø app. mm	Cop. weight kg / km	WH/YE	OG/D-BU	YE/BU	BU/OG	OG/RD	OG/BK	OG/WH	YE/RD	BK/YE
Part no. 1,5 / 16	3,05	14,4	69854	69855	69856	69857	69858	69859	69860	69861	69862
Part no. 2,5 / 14	3,6	24,0	69863	69864	69865	69866	69867	69868	69869	69870	69871
Part no. 4 / 12	4,1	38,0	69872	69873	69874	69875	69876	69877	69878	69879	69880
Part no. 6 / 10	4,8	58,0	69881	69882	69883	69884	69885	69886	69887	69888	69889
Part no. 10 / 8	6,4	96,0	69890	69891	69892	69893	69894	69895	69896	69897	69898
Part no. 16 / 6	8,1	154,0	69899	69900	69901	69902	69903	69904	69905	69906	69907

## H05V2-K two colour, barrel (with various capacity)

Cross-sec. mm <sup>2</sup> / AWG-no. app. RAL	Outer Ø app. mm	Cop. weight kg / km	BU/WH	WH/BU	D-BU/WH	WH/OG	WH/RD	BK/OG	D-BU/OG	RD/WH	WH/D-BU	YE/BN	OG/BU
Part no. 0,5 / 22	2,5	5,2	65479	65480	65481	65482	65483	65484	65485	65486	65487	65488	65489
Part no. 0,75 / 20	2,65	7,2	65490	65491	65492	65493	65494	65495	65496	65497	65498	65502	65503
Part no. 1 / 18	2,8	9,6	65504	65505	65506	65507	65508	65509	65510	65511	65512	65514	65515

## (H)07V2-K two colour, barrel (with various capacity)

Cross-sec. mm <sup>2</sup> / AWG-no. app. RAL	Outer Ø app. mm	Cop. weight kg / km	BU/WH	WH/BU	D-BU/WH	WH/OG	WH/RD	BK/OG	D-BU/OG	RD/WH	WH/D-BU	YE/BN	OG/BU
Part no. 1,5 / 16	3,05	14,4	65516	65517	65518	65519	65520	65521	65522	65523	65524	65525	65526
Part no. 2,5 / 14	3,6	24,0	65527	65528	65529	65530	65531	65532	65533	65534	65535	65536	65537
Part no. 4 / 12	4,1	38,0	65538	65539	65540	65541	65542	65543	65544	65545	65546	65547	65548

Dimensions and specifications may be changed without prior notice. (RN06)



Suitable accessories can be found in Chapter X.

- Cable Gland - HELUcond PA6-L
- Cable Gland - HELUcond PA6-UL

**THHN/THWN 90°C, 600 V, UL listed, PVC + nylon single core****Technical data**

- PVC + Nylon insulated single cores as per UL-Styles and NEC standard
- **Temperature range** as per Styles  
**THHN:** 90°C dry - NEC standard  
**THWN:** 75°C wet - NEC standard  
**AWM:** UL-Styles 1316 to 1321  
 105°C dry  
 80°C in oil  
**AWM:** UL-Styles 1452, 1453  
 90°C dry  
 80°C in oil 1000 V  
**MTW:** UL-Styles 1408 to 1414  
 90°C dry  
 80°C in oil 600 V
- **Nominal voltage** 600 V
- **Minimum bending radius**  
 8x core Ø
- **Test voltage** (Spark test)  
 AWG 14 to AWG 10 = 7,5 kV  
 AWG 8 to AWG 2/0 = 10 kV  
 AWG 3/0 to AWG 4/0 = 12,5 kV  
 kcmil 250 to kcmil 500 = 15 kV  
 kcmil 600 to kcmil 1000 = 17,5 kV

**Cable structure**

- Bare copper conductor, AWG-sizes as per given table below and ASTM B-3 and ASTM B-8
- Core insulation of PVC and Nylon-outer-sheath
- Cores colour coded, colour identification see below
- Surface of sheath printed with markings:  
 14 to 1000 MCM THHN (stranded) - (size) AWG Type MTW OR THHN OR THWN 600 V OR GASOLINE AND OIL RESTTANT II (UL) OR AWM W-5 1554  
 14 to 10 AWG THHN (solid) - (size) AWG TYPE THHN OR THWN 600 V OR GASOLINE AND OIL RESISTANT II (UL) OR AWM

**Properties****Resistant against**

- Oils
- Gasoline
- Water
- Acids
- Ozone
- Lyes
- Sunlight
- Abrasion

**Note**

- 1 kcmil = 1000 circ mils = 0,5067 mm<sup>2</sup>.
- Please complete the part number for these cables by adding the suffix for the colour required as per the list:  
 0 = green  
 1 = black  
 2 = blue  
 3 = brown  
 4 = red  
 5 = white  
 6 = grey  
 7 = yellow  
 8 = orange  
 9 = pink

**Application**

As flexible connecting cable in machines, switch and distribution cabinets, cable assemblies and for fixed indoor installation, in tubes and in cable conduits.

**AWM** = **A**ppliance **W**iring **M**aterial

For internal wrings for electrical equipment and control apparatus e. g. radio and televisions, electronic assembly component.

**MTW** = **M**achine **T**ool **W**ire

For the electrical installation of machine tools and the relative control. THW = Thermoplastic PVC-insulated building wire, Heat resistant 75°C, for Wet and dry locations, flame retardant. THHN = Thermoplastic PVC-insulated building wire, Nylon sheathed, 90°C 600 V, for dry and damp locations.

☑ The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

Part no.	Cross-section mm <sup>2</sup>	AWG-No.	Cond. make-up n x wire Ø	Outer Ø app. mm	Cop. weight kg / km	Weight app. kg / km
6320x	2,08	14	19 x 0,38	3,0	20,7	25,0
6321x	3,32	12	19 x 0,48	3,4	33,0	37,0
6322x	5,26	10	19 x 0,6	4,3	51,6	60,0
6323x	8,35	8	19 x 0,75	5,5	80,6	95,0
6324x	13,39	6	19 x 0,96	6,6	125,0	143,0
6325x	21,14	4	19 x 1,19	8,4	201,0	229,0
6326x	26,65	3	19 x 1,336	9,1	253,0	282,0
6327x	33,61	2	19 x 1,5	10,0	317,0	349,0
6328x	42,38	1	19 x 1,686	11,4	399,0	449,0
6329x	53,47	1/0	19 x 1,89	12,4	500,0	557,0
6330x	67,4	2/0	19 x 2,126	13,7	631,0	691,0
6331x	84,97	3/0	19 x 2,387	15,0	792,0	861,0
6332x	107,17	4/0	19 x 2,68	16,5	996,0	1069,0

Part no.	Cross-section mm <sup>2</sup>	AWG-No.	Cond. make-up n x wire Ø	Outer Ø app. mm	Cop. weight kg / km	Weight app. kg / km
63331	127	250 kcmil	37 x 2,088	18,29	1178,0	1277,0
63341	152	300 kcmil	37 x 2,286	19,56	1410,0	1515,0
63351	178	350 kcmil	37 x 2,47	21,08	1645,0	1753,0
63361	203	400 kcmil	37 x 2,7	22,35	1902,0	1998,0
63371	254	500 kcmil	37 x 2,95	24,13	2345,0	2466,0
63381	304	600 kcmil	61 x 2,52	26,75	2920,0	3000,0
63391	380	750 kcmil	61 x 2,82	29,36	3658,0	3713,0
63401	507	1000 kcmil	61 x 3,25	33,27	4858,0	4796,0

Dimensions and specifications may be changed without prior notice. (RN06)



# PVC single cores according to CEI-20-22 II



## Technical data

- PVC-Single Cores as per Italian standard CEI 20-22 II
- **Temperature range**  
flexing -5°C to +80°C  
fixed installation -30°C to +80°C
- **Nominal voltage**  
up to 0,35 mm<sup>2</sup> U<sub>0</sub>/U 300/300 V  
0,5 and 0,75 mm<sup>2</sup> U<sub>0</sub>/U 300/500 V  
from 1 mm<sup>2</sup> U<sub>0</sub>/U 450/750 V
- **Test voltage** 2500 V
- **Minimum bending radius**  
fixed installation for core Ø:  
≤ 8 mm: 4x core Ø  
> 8-12 mm: 5x core Ø  
> 12 mm: 6x core Ø

## Cable structure

- Bare fine wire stranded copper conductor to CEI 20-29 cl.5
- Core insulation of PVC  
R 2 up to CEI 20 II, cap. VI cl. 3

## Properties

- Low smoke
- **Resistant to**  
Oil  
Solvents  
Acids  
Lyes
- The materials used in manufacture are cadmium-free and contain no silicone and free from substances harmful to the wetting properties of lacquers

## Tests

- PVC self-extinguishing and flame retardant acc. to DIN VDE 0482-332-1-2, DIN EN 60332-1-2, IEC 60332-1 (equivalent DIN VDE 0472 part 804 test method B)

## Note

- AWG sizes are approximate equivalent values. The actual cross-section is in mm<sup>2</sup>.

## Application

As hook up wire, control cabinet building, in cable assembly manufacturing as well as in electronic applications.

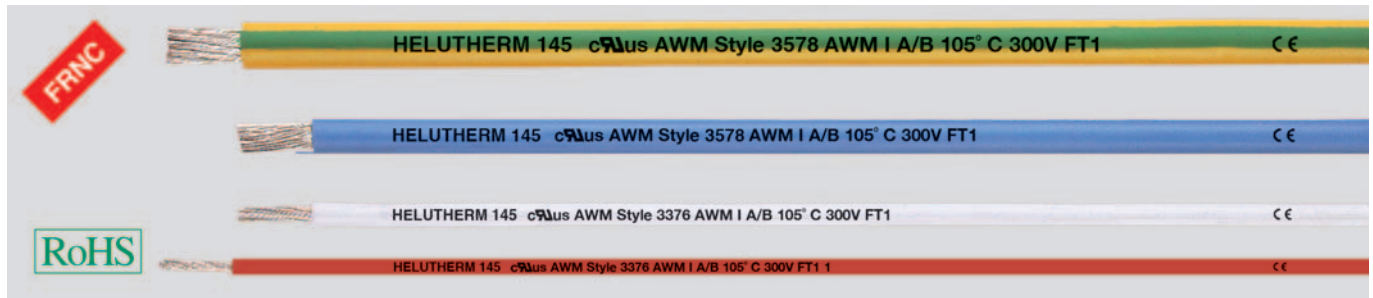
CE= The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

Cross-section mm <sup>2</sup>	Outer Ø app. mm	Cop. weight kg / km	Weight app. kg / km	BK	GN-YE	BU	BN	RD	WH	D-BU	o.col.
<b>app. RAL</b>				9005	-	5015	8003	3000	1013	5010	-
Part no. 0,35	1,5	2,5	3,6	29600	29601	29602	29603	29604	29605	29606	29607
Part no. 0,5	2,6	4,8	6,0	29608	29609	29610	29611	29612	29613	29614	29615
Part no. 0,75	2,8	7,2	10,0	29616	29617	29618	29619	29620	29621	29622	29623
Part no. 1	3,2	9,6	16,0	29624	29625	29626	29627	29628	29629	29630	29631
Part no. 1,5	3,5	14,4	21,0	29632	29633	29634	29635	29636	29637	29638	29639
Part no. 2,5	4,2	24,0	32,0	29640	29641	29642	29643	29644	29645	29646	29647
Part no. 4	4,6	38,0	48,0	29648	29649	29650	29651	29652	29653	29654	29655
Part no. 6	6,3	58,0	69,0	29656	29657	29658	29659	29660	29661	29662	29663
Part no. 10	7,6	96,0	117,0	29664	29665	29666	29667	29668	29669	29670	29671
Part no. 16	8,8	154,0	180,0	29672	29673	29674	29675	29676	29677	29678	29679
Part no. 25	11,0	240,0	266,0	29680	29681	29682	29683	29684	29685	29686	29687
Part no. 35	12,5	336,0	366,0	29688	29689	29690	29691	29692	29693	29694	29695
Part no. 50	14,5	480,0	515,0	29696	29697	29698	29699	29700	29701	29702	29703
Part no. 70	16,5	672,0	741,0	29704	29705	29706	29707	29708	29709	29710	29711
Part no. 95	18,5	912,0	950,0	29712	29713	29714	29715	29716	29717	29718	29719
Part no. 120	21,0	1152,0	1230,0	29720	29721	29722	29723	29724	29725	29726	29727
Part no. 150	23,0	1440,0	1500,0	29728	29729	29730	29731	29732	29733	29734	29735
				300 kcmil	300 kcmil	300 kcmil	300 kcmil	300 kcmil	300 kcmil	300 kcmil	300 kcmil

Dimensions and specifications may be changed without prior notice. (RN06)

# HELUTHERM® 145 300 V, flexible single core, cross-linked,

halogen-free



## Technical data

- Halogen-free single cores with increased heat resistance acc. to  
UL-Style 3376 (AWG 24 - AWG 16)  
UL-Style 3578 (AWG 14 - AWG 10)  
CSA C22.2 No. 210
- **Temperature range**  
flexing -35°C to +120°C  
fixed installation -55°C to +145°C  
UL/CSA  
flexing -35°C to +105°C  
fixed installation - 55°C to +105°C
- **Nominal voltage** 300 V
- **Test voltage** 2000 V
- **Minimum bending radius**  
flexing 12,5x core Ø  
fixed installation 4x core Ø
- **Caloric load values**  
see Technical Informations
- **Power ratings table**  
see Technical Informations
- **Approval**  
Germanischer Lloyd

## Cable structure

- Tinned Cu wires, acc. to AWG-sizes  
Conductor make-up:  
AWG 24 to AWG 14 = 19-wires  
AWG 12 = 65-wires  
AWG 10 = 105-wires
  - Core insulation of polyolefin-copolymer, cross-linked
  - Core colours see table below
- ### Tests
- Flame test acc. to  
DIN VDE 0482-332-3, BS 4066 part 3,  
DIN EN 60332-3, IEC 60332-3 (previously  
DIN VDE 0472 part 804 test method C)
  - Corrosiveness of combustion gases  
acc. to DIN VDE 0482 part 267,  
DIN EN 50267-2-2, IEC 60754-2  
(equivalent DIN VDE 0472 part 813)
  - Halogen-free acc. to  
DIN VDE 0482 part 267,  
DIN EN 50267-2-1, IEC 60754-1  
(equivalent DIN VDE 0472 part 815)
  - Smoke density acc. to DIN VDE 0482  
part 1034-1+2, DIN EN 61034-1+2,  
IEC 61034-1+2, BS 7622 part 1+2  
(previously DIN VDE 0472 part 816)

## Properties

- Halogen-free
- Lower propagation of fire
- Low development of smoke and fumes
- Good abrasion and notch resistance
- Good resistance to oils and weathering
- Resistant to UV radiation and ozone
- Resistant to soldering temperatures
- Thermal class B
- These single-core cables are resistant to melting, even when in contact with a soldering iron at temperatures of between 300°C and 380°C, because of the electron-beam cross-linking for the insulation material
- Due to the high temperature profile the cross-section of conductor can under certain circumstances be reduced, hereby enabling a saving in space requirement and weight
- The materials used in manufacture are cadmium-free and contain no silicone and free from substances harmful to the wetting properties of lacquers

## Application

These temperature resistant single-core cables are used for the internal wiring of lighting fixtures, heaters, electrical machinery, switching systems and distributors in equipment and plant and machinery, suitable for installation on, in and beneath plaster, in closed installation ducts, as well as for traffic systems and outdoor applications. These cables are not approved for direct routing on racks, gutters or tanks. These halogen-free single core cables are characterised by their amazingly high long-time resistance to temperature and feature among the leading halogen-free. Flame resistant products in the world.

CE= The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

AWG-No.	Outer Ø app. mm	Cop. weight kg / km	Weight app. kg / km	BK	GN-YE	BU	BN	RD	WH	GY	VT	YE	PK	GN	OG	BEIGE	2-col.
Part no. 24	1,5	2,3	4,0	61817	61816	61818	61819	61820	61821	61822	61823	61824	59339	61826	61825	61828	61829
Part no. 22	1,6	3,2	6,0	61831	61830	61832	61833	61834	61835	61836	61837	61838	61841	61840	61839	61842	61843
Part no. 20	1,9	5,0	9,0	61845	61844	61846	61847	61848	61849	61850	61851	61852	61855	61854	61853	61856	61857
Part no. 18	2,1	7,9	12,0	61859	61858	61860	61861	61862	61863	61864	61865	61866	61869	61868	61867	61870	61871
Part no. 16	2,4	12,6	16,0	61873	61872	61874	61875	61876	61877	61878	61879	61880	61883	61882	61881	61884	61885
Part no. 14	3,5	20,7	27,0	61887	61886	61888	61889	61890	61891	61892	61893	61894	61897	61896	61895	61898	61899
Part no. 12	4,2	33,0	36,0	61901	61900	61902	61903	61904	61905	61906	61907	61908	61911	61910	61909	61912	61913
Part no. 10	4,8	51,6	58,0	61915	61914	61916	61917	61918	61919	61920	61921	61922	61925	61924	61923	61926	61927

Dimensions and specifications may be changed without prior notice. (RN06)



Suitable accessories can be found in Chapter X.

- Cable Gland - HELUcond PA6-L
- Cable Gland - HELUcond PA6-UL

# HELUTHERM® 145 600 V, flexible single core, cross-linked, halogen-free



## Technical data

- Halogen-free single cores with increased heat resistance acc. to **UL Style 3578 CSA C22.2 No. 210**
- **Temperature range**  
flexing -35°C to +120°C  
fixed installation -55°C to +145°C  
UL/CSA  
flexing -35°C to +105°C  
fixed installation -55°C to +105°C
- **Nominal voltage** 600 V
- **Test voltage** 3000 V
- **Minimum bending radius**  
flexing 12,5x core Ø  
fixed installation 4x core Ø
- **Caloric load values**  
see Technical Informations
- **Power ratings table**  
see Technical Informations
- **Approval**  
Germanischer Lloyd

## Cable structure

- Tinned Cu wires, acc. to DIN VDE 0295 cl.5, BS 6360 cl.5 and IEC 60228 cl.5
  - Core insulation of cross-linked polyolefin-copolymer
  - Core colours see table below
- ### Tests
- Flame test acc. to DIN VDE 0482-332-3-22, BS 4066 part 3, DIN EN 60332-3-22, IEC 60332-3-22 (previously DIN VDE 0472 part 804 test method C)
  - Corrosiveness of combustion gases acc. to DIN VDE 0482 part 267, DIN EN 50267-2-2, IEC 60754-2 (equivalent DIN VDE 0472 part 813)
  - Halogen-free acc. to DIN VDE 0482 part 267, DIN EN 50267-2-1, IEC 60754-1 (equivalent DIN VDE 0472 part 815)
  - Smoke density acc. to DIN VDE 0482 part 1034-1+2, DIN EN 61034-1+2, IEC 61034-1+2, BS 7622 part 1+2 (previously DIN VDE 0472 part 816)

## Properties

- Halogen-free
- Lower propagation of fire
- Low development of smoke and fumes
- Good abrasion and notch resistance
- Good resistance to oils and weathering
- Resistant to UV radiation and ozone
- Resistant to soldering temperatures
- Resistant to melting, even when in contact with a soldering iron at temperatures of between 300°C and 380°C, because of the cross-linking for the insulation material
- Due to the high temperature profile the cross-section of conductor can under certain circumstances be reduced, hereby enabling a saving in space requirement and weight
- The materials used in manufacture are cadmium-free and contain no silicone and free from substances harmful to the wetting properties of lacquers

## Application

These temperature resistant single-core cables are used for the internal wiring of lighting fixtures, heaters, electrical machinery, switching systems and distributors in equipment and plant and machinery, suitable for installation on, in and beneath plaster, in closed installation ducts, as well as for traffic systems and outdoor applications. These cables are not approved for direct routing on racks, gutters or tanks. These halogen-free single core cables are characterised by their amazingly high long-time resistance to temperature and feature among the leading halogen-free, flame resistant products in the world.

CE= The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

Cross-sec. mm²	Outer Ø app. mm	Cop. weight kg / km	Weight app. kg / km	BK	GN-YE	BU	BN	RD	WH	GY	VT	YE	PK	GN	OG	BEIGE	2-col.
Part no. 0,25	2,3	2,4	7,0	59473	59472	59474	59475	59476	59477	59478	59479	59480	59483	59482	59481	59484	59485
Part no. 0,5	2,6	4,8	11,0	59487	59486	59488	59489	59490	59491	59492	59493	59494	59497	59496	59495	59498	59499
Part no. 0,75	2,8	7,2	14,0	59501	59500	59502	59503	59504	59505	59506	59507	59508	59511	59510	59509	59512	59513
Part no. 1	2,9	9,6	17,0	59515	59514	59516	59517	59518	59519	59520	59521	59522	59525	59524	59523	59526	59527
Part no. 1,5	3,2	14,4	22,0	59529	59528	59530	59531	59532	59533	59534	59535	59536	59539	59538	59537	59540	59541
Part no. 2,5	3,7	24,0	33,0	59543	59542	59544	59545	59546	59547	59548	59549	59550	59553	59552	59551	59554	59555
Part no. 4	4,2	38,4	53,0	59557	59556	59558	59559	59560	59561	59562	59563	59564	59567	59566	59565	59568	59569
Part no. 6	5,0	57,6	78,0	59571	59570	59572	59573	59574	59575	59576	59577	59578	59581	59580	59579	59582	59583
Part no. 10	6,4	96,0	136,0	59585	59584	59586	59587	59588	59589	59590	59591	59592	59595	59594	59593	59596	59597
Part no. 16	8,5	154,0	203,0	59599	59598	59600	59601	59602	59603	59604	59605	59606	59609	59608	59607	59610	59611
Part no. 25	10,4	240,0	300,0	59613	59612	59614	59615	59616	59617	59618	59619	59620	59623	59622	59621	59624	59625
Part no. 35	11,5	336,0	405,0	59627	59626	59628	59629	59630	59631	59632	59633	59634	59637	59636	59635	59638	59639
Part no. 50	14,4	480,0	580,0	59641	59640	59642	59643	59644	59645	59646	59647	59648	59651	59650	59649	59652	59653

Dimensions and specifications may be changed without prior notice. (RN06)

# UL-Style 3135 silicone single core, 600 V / 200°C, halogen-free



### Technical data

- Silicon single cores acc. to UL-Std. 758 Style 3135
- **Temperature range** -60°C to +200°C
- **Nominal voltage** 600 V
- **Test voltage** 2000 V
- **Breakdown voltage** min. 5000 V
- **Minimum bending radius** 15x core Ø

### Cable structure

- Tinned copper conductors
- Stranded see table below
- Core insulation of Silicon
- Core colours see below

### Properties

- Halogen-free acc. to VDE 0482 part 267/ DIN EN 50267-2-1/IEC 60754-1 (equivalent DIN VDE 0472 part 815)
- **Resistant to** High molecular oils  
fats from vegetables and animals  
alcohols  
plasticizers and clophenes  
diluted acids  
lyes and salt dissolution  
oxidation substances  
tropical influences and weather  
lake water  
oxygen  
ozone

### Note

- Additional sizes on request.

### Application

UL-approved single cores for use in high, temperature areas. They are used mainly in the steel producing industries, in aviation industries as well as in ship building, cement, glass and ceramic factories

**AWM = Appliance Wiring Material**

For internal wirings for electrical equipment and control apparatus e. g. electronic assembly components

CE= The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

AWG-No.	Conductor construction	Outer Ø app. mm	Cop. weight kg / km	Weight app. kg / km	BK	BU	BN	RD	WH	GY	VT	GN
Part no. 24	1 x 0,5	2,1	1,9	6,3	47021	47022	47023	47024	47025	47026	47027	47076
Part no. 22	3 x 0,4	2,4	3,6	9,2	47028	47029	47030	47031	47032	47033	47034	47071
Part no. 20	5 x 0,4	2,6	6,0	12,3	47035	47036	47037	47038	47039	47040	47041	47072
Part no. 18	7 x 0,4	2,8	8,6	15,5	47042	47043	47044	47045	47046	47047	47048	47073
Part no. 16	11 x 0,4	3,0	13,3	21,0	47049	47050	47051	47052	47053	47054	47055	47074
Part no. 14	17 x 0,4	3,4	20,5	29,7	47056	47057	47058	47059	47060	47061	47062	47075
Part no. 12	27 x 0,4	3,8	32,6	43,2	47063	47064	47065	47066	47067	47068	47069	47070

Dimensions and specifications may be changed without prior notice. (RN06)



Suitable accessories can be found in Chapter X.

- Cable Gland - HELUcond PA6-L
- Cable Gland - HELUcond PA6-UL

# Single 600-J/-O special single core cable, 600 V, meter marking



## Technical data

- Special PVC single core acc. to UL-Style 10107 and CSA AWM I/II A/B, adapted to DIN VDE 0285-525-2-31/ DIN EN 50525-2-31, DIN VDE 0285-525-2-51/ DIN EN 50525-2-51, acc. to UL-Std.758
- **Temperature range**  
flexing -5°C bis +90°C  
fixed installation -40°C bis +90°C
- **Permissible operating temperature**  
max. +90°C at conductor
- **Nominal voltage**  
VDE U<sub>0</sub>/U 600/1000 V  
UL/CSA 600 V
- **Test voltage** 4000 V
- **Breakdown voltage** min. 8000 V
- **Insulation resistance**  
min. 20 MOhm x km
- **Minimum bending radius**  
flexing 7,5x cable Ø  
fixed installation 4x cable Ø
- **Radiation resistance**  
up to 80x10<sup>6</sup> cJ/kg (up to 80 Mrad)

## Cable structure

- Bare copper, fine wire conductors to DIN VDE 0295 cl.5, BS 6360 cl.5 and IEC 60228 cl.5
- Core insulation of special PVC compound type TM2 to DIN VDE 0207-363-3/ DIN EN 50363-3 and class 43 acc. to UL-Std. 1581 colour black or green-yellow
- Outer sheath of special PVC compound type TM2 to DIN VDE 0207-363-4-1/ DIN EN 50363-4-1 and class 43 acc. to UL-Std. 1581
- Sheath colour black (RAL 9005)
- with meter marking

## Properties

- Chemical Resistance - see table Technical informations
- ### Tests
- PVC self-extinguishing and flame retardant acc. to DIN VDE 0482-332-1-2, DIN EN 60332-1-2, IEC 60332-1 (equivalent DIN VDE 0472 part 804 test method B), UL VW-1, CSA FT1
  - UV-resistant

## Note

- G = with green-yellow conductor  
x = without green-yellow conductor
- AWG sizes are approximate equivalent values. The actual cross-section is in mm<sup>2</sup>.
- screened analogue type:  
**Single 600-CY -J/-O**, confer page 499
- also as 1000 V Style 10678 deliverable

## Application

PVC Single cores suitable for installation for flexible use for medium mechanical stresses with free movement without tensile stress or forced movements in dry, moist and wet rooms as well as outside (fixed installation). Is not suitable to be used as direct burial- or as underwater cable. These two norms approved single cores designed for exportorientated machinery manufacturer for machine tools, conveyor belts and production lines.

CE= The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

Part no.	No. cores x cross-sec. mm <sup>2</sup>	AWG-No.	Core colour	Outer Ø app. mm	Cop. weight kg / km	Weight app. kg / km
10881	1 G 6	10	green-yellow	7,8	58,0	118,0
10882	1 x 6	10	black	7,8	58,0	118,0
10883	1 G 10	8	green-yellow	9,0	96,0	180,0
10884	1 x 10	8	black	9,0	96,0	180,0
10885	1 G 16	6	green-yellow	10,0	154,0	250,0
10886	1 x 16	6	black	10,0	154,0	250,0
10887	1 G 25	4	green-yellow	11,5	240,0	370,0
10888	1 x 25	4	black	11,5	240,0	370,0
10889	1 G 35	2	green-yellow	13,0	336,0	490,0
10890	1 x 35	2	black	13,0	336,0	490,0
10891	1 G 50	1	green-yellow	15,6	480,0	665,0
10892	1 x 50	1	black	15,6	480,0	665,0

Part no.	No. cores x cross-sec. mm <sup>2</sup>	AWG-No.	Core colour	Outer Ø app. mm	Cop. weight kg / km	Weight app. kg / km
10893	1 G 70	2/0	green-yellow	17,9	672,0	910,0
10894	1 x 70	2/0	black	17,9	672,0	910,0
10895	1 G 95	3/0	green-yellow	19,5	912,0	1195,0
10896	1 x 95	3/0	black	19,5	912,0	1195,0
10897	1 G 120	4/0	green-yellow	22,3	1152,0	1545,0
10898	1 x 120	4/0	black	22,3	1152,0	1545,0
10899	1 G 150	250 kcmil	green-yellow	25,0	1440,0	1750,0
10900	1 x 150	250 kcmil	black	25,0	1440,0	1750,0
10901	1 G 185	350 kcmil	green-yellow	28,6	1776,0	2320,0
10902	1 x 185	350 kcmil	black	28,6	1776,0	2320,0
10903	1 G 240	450 kcmil	green-yellow	31,4	2304,0	2960,0
10904	1 x 240	450 kcmil	black	31,4	2304,0	2960,0

Dimensions and specifications may be changed without prior notice. (RN06)



Suitable accessories can be found in Chapter X.

- Cable Gland - HELUcond PA6-L
- Cable Gland - HELUcond PA6-UL



# Single 600-CY -J/-O special single core cable, 600 V, Cu-screened, EMC-preferred type, meter marking



## Technical data

- Special PVC single cores acc. to UL-Style 10107 and CSA AWM I/II A/B, adapted to DIN VDE 0285-525-2-31/ DIN EN 50525-2-31, DIN VDE 0285-525-2-51/ DIN EN 50525-2-51, acc. to UL-Std.758
- **Temperature range**  
flexing -5°C bis +90°C  
fixed installation -40°C bis +90°C
- **Permissible operating temperature**  
max. +90°C at conductor
- **Nominal voltage**  
VDE U<sub>0</sub>/U 600/1000 V  
UL/CSA 600 V
- **Test voltage** 4000 V
- **Breakdown voltage** min. 8000 V
- **Insulation resistance**  
min. 20 MOhm x km
- **Minimum bending radius**  
flexing 7,5x cable Ø  
fixed installation 4x cable Ø
- **Coupling resistance**  
max. 250 Ohm/km
- **Radiation resistance**  
up to 80x10<sup>6</sup> cJ/kg (up to 80 Mrad)

## Cable structure

- Bare copper, fine wire conductors, to DIN VDE 0295 cl.5, BS 6360 cl.5 and IEC 60228 cl.5
- Core insulation of special PVC compound type T12 to DIN VDE 0207-363-3 / DIN EN 50363-3 and class 43 acc. to UL-Std.1581 colour black or green-yellow
- Tinned copper braided screening, coverage approx. 85%
- Outer sheath special PVC compound type TM2 to DIN VDE 0207-363-4-1 / DIN EN 50363-4-1 and class 43 acc. to UL-Std.1581
- Sheath colour black (RAL 9005)
- with meter marking

## Properties

- Chemical Resistance - see table Technical Informations
- The materials used in manufacture are cadmium-free and contain no silicone and free from substances harmful to the wetting properties of lacquers
- **Tests**
- PVC self-extinguishing and flame retardant acc. to DIN VDE 0482-332-1-2, DIN EN 60332-1-2, IEC 60332-1 (equivalent DIN VDE 0472 part 804 test method B), UL VW-1, CSA FT1
- UV-resistant

## Note

- G = with green-yellow conductor  
x = without green-yellow conductor
- AWG sizes are approximate equivalent values. The actual cross-section is in mm<sup>2</sup>.
- unscreened analogue type:  
**Single 600-J/-O**, confer page 498
- also as 1000 V Style 10678 deliverable

## Application

PVC single cores suitable for installation for flexible use for medium mechanical stresses with free movement without tensile stress or forced movements in dry, moist and wet rooms as well as outside (fixed installation). Is not suitable to be used as direct burial-or as underwater cable. These two norms approved single cores designed for exportorientated machinery manufacturer for machine tools, conveyor belts and production lines. These screened cables are particularly suitable for the interference-free transmission in instrumentation and control engineering applications (electromagnetic compatibility).

**EMC** = Electromagnetic compatibility

To optimize the EMC features we recommend a large round contact of the copper braiding on both ends.

**CE** = The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

Part no.	No. cores x cross-sec. mm <sup>2</sup>	AWG-No.	Core colour	Outer Ø app. mm	Cop. weight kg / km	Weight app. kg / km
10910	1 G 6	10	green-yellow	7,6	72,0	140,0
10911	1 x 6	10	black	7,6	72,0	140,0
10912	1 G 10	8	green-yellow	9,4	130,0	230,0
10913	1 x 10	8	black	9,4	130,0	230,0
10914	1 G 16	6	green-yellow	10,4	190,0	300,0
10915	1 x 16	6	black	10,4	190,0	300,0
10916	1 G 25	4	green-yellow	12,0	260,0	420,0
10917	1 x 25	4	black	12,0	260,0	420,0
10918	1 G 35	2	green-yellow	14,4	405,0	615,0
10919	1 x 35	2	black	14,4	405,0	615,0
10920	1 G 50	1	green-yellow	16,4	560,0	825,0
10921	1 x 50	1	black	16,4	560,0	825,0

Part no.	No. cores x cross-sec. mm <sup>2</sup>	AWG-No.	Core colour	Outer Ø app. mm	Cop. weight kg / km	Weight app. kg / km
10922	1 G 70	2/0	green-yellow	17,4	780,0	1090,0
10923	1 x 70	2/0	black	17,4	780,0	1090,0
10924	1 G 95	3/0	green-yellow	20,1	1030,0	1395,0
10925	1 x 95	3/0	black	20,1	1030,0	1395,0
10926	1 G 120	4/0	green-yellow	23,0	1285,0	1770,0
10927	1 x 120	4/0	black	23,0	1285,0	1770,0
10928	1 G 150	250 kcmil	green-yellow	26,1	1570,0	1930,0
10929	1 x 150	250 kcmil	black	26,1	1570,0	1930,0
10930	1 G 185	350 kcmil	green-yellow	29,3	1940,0	2635,0
10931	1 x 185	350 kcmil	black	29,3	1940,0	2635,0
10932	1 G 240	450 kcmil	green-yellow	32,2	2530,0	3380,0
10933	1 x 240	450 kcmil	black	32,2	2530,0	3380,0

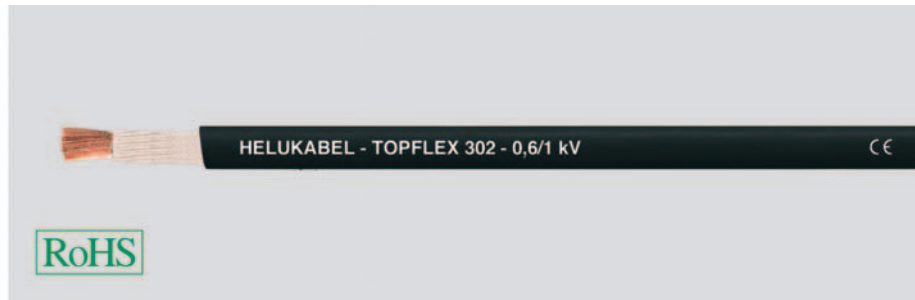
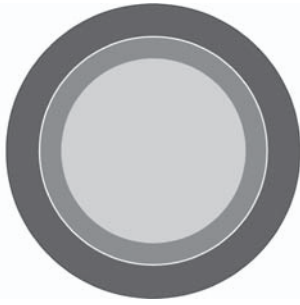
Dimensions and specifications may be changed without prior notice. (RN06)



Suitable accessories can be found in Chapter X.

- Cable Gland - HELUcond PA6-L
- Cable Gland - HELUcond PA6-UL

# TOPFLEX® 302 / 302-UL very high flexible PVC single core double insulated 0,6/1kV



## Technical data

### TOPFLEX® 302

- Special PVC single-core cable with double insulation flexible at low temperatures
- **Temperature range**  
flexing -15°C to +80°C  
fixed installation -40°C to +80°C
- **Nominal voltage**  
U<sub>0</sub>/U 600/1000 V
- **A.C. test voltage**, 50 Hz  
3000 V
- **Insulation resistance**  
min. 20 MOhm x km
- **Minimum bending radius**  
for flexible installation  
5x cable Ø

### TOPFLEX® 302-UL

- Technical data as above, but
- with additional UL Approval Style 10107
- **Nominal voltage**  
UL 600 V

## Application

These cables are specially designed for use as connecting cables on sliding contacts for current collectors, and also for use in energy supply chains, automatic handling devices, robots, machine tools, machining and processing equipment, and nearly any area requiring flexible used and free motion.

CE= The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

### TOPFLEX® 302 without UL-approval

Part no.	No. cores x cross-sec. mm <sup>2</sup>	AWG-No.	Outer Ø app. mm	Cop. weight kg / km	Weight app. kg / km
72946	1 x 1,5	16	4,0	14,4	25,0
73924	1 x 2,5	14	4,5	24,0	42,0
72950	1 x 4	12	5,6	38,4	58,0
72945	1 x 6	10	6,1	57,6	85,0
75450	1 x 10	8	8,0	96,0	130,0
72947	1 x 16	6	9,8	153,6	190,0
75451	1 x 25	4	11,8	240,0	280,0
75452	1 x 35	2	12,9	336,0	400,0
75453	1 x 50	1	14,6	480,0	520,0
72944	1 x 70	2/0	17,5	672,0	720,0
75454	1 x 95	3/0	20,2	912,0	1050,0
75455	1 x 120	4/0	21,6	1152,0	1220,0
75456	1 x 150	300 kcmil	23,5	1440,0	1500,0
75457	1 x 185	350 kcmil	25,7	1776,0	1940,0
75458	1 x 240	500 kcmil	29,5	2304,0	2675,0

### TOPFLEX® 302 with UL-approval

Part no.	No. cores x cross-sec. mm <sup>2</sup>	AWG-No.	Outer Ø app. mm	Cop. weight kg / km	Weight app. kg / km
700231	1 x 1,5	16	5,2	14,4	25,0
700232	1 x 2,5	14	6,4	24,0	42,0
700233	1 x 4	12	7,0	38,4	58,0
700234	1 x 6	10	7,5	57,6	85,0
701351	1 x 10	8	9,1	96,0	130,0
700114	1 x 16	6	10,8	153,6	190,0
701352	1 x 25	4	13,1	240,0	280,0
701353	1 x 35	2	14,1	336,0	400,0
701354	1 x 50	1	15,8	480,0	520,0
700235	1 x 70	2/0	19,0	672,0	720,0
701355	1 x 95	3/0	21,5	912,0	1050,0
701356	1 x 120	4/0	23,2	1152,0	1220,0
701357	1 x 150	300 kcmil	25,2	1440,0	1500,0
701358	1 x 185	350 kcmil	27,0	1776,0	1940,0
701359	1 x 240	500 kcmil	31,5	2304,0	2675,0

Dimensions and specifications may be changed without prior notice.

# Single 602-RC -J/O special single core cable for drag chains, 90°C, 600 V, meter marking



## Technical data

- Special PVC single core acc. to UL-Style 10107 and CSA AWM I/II AB, core acc. to DIN VDE 0285-525-2-31/ DIN EN 50525-2-31 (except 300 mm<sup>2</sup>)
- **Temperature range** flexing -5°C to +90°C fixed installation -40°C to +90°C
- **Permissible operating temperature** max. +90°C at conductor
- **Nominal voltage** VDE U<sub>0</sub>/U 600/1000 V UL/CSA 600 V
- **Test voltage** 4000 V
- **Breakdown voltage** min. 8000 V
- **Insulation resistance** min. 20 MOhm x km
- **Minimum bending radius** flexing 7,5x cable Ø fixed installation 3x cable Ø
- **Radiation resistance** up to 80x10<sup>6</sup> cJ/kg (up to 80 Mrad)

## Cable structure

- Bare copper, extra fine wire conductors, to DIN VDE 0295 cl.6, col. 4, BS 6360 cl.6 and IEC 60228 cl.6, however by 185 mm<sup>2</sup> up to 300 mm<sup>2</sup> with reduced single wire-Ø, max. 0,30 mm
- Core insulation of special PVC compound type T13 to DIN VDE 0207-363-3 / DIN EN 50363-3 and class 43, 90°C acc. to UL-Std.1581 colour black or green-yellow
- Outer sheath special PVC compound type YM5 to DIN VDE 0207 part 5 and class 43, 90°C acc. to UL-Std.1581
- Sheath colour black (RAL 9005)
- with meter marking

## Properties

- Chemical Resistance - see table Technical Informations
- Resistant to mineral oils, synthetic oils and lubricating coolants.
- The materials used in manufacture are cadmium-free and contain no silicone and free from substances harmful to the wetting properties of lacquers

## Tests

- PVC self-extinguishing and flame retardant acc. to DIN VDE 0482-332-1-2, DIN EN 60332-1-2, IEC 60332-1 (equivalent DIN VDE 0472 part 804 test method B) UL VW-1, CSA FT1
- Acc.to UL-Style 10107/ UL-Std.1581, CSA C22.2 No 210

## Note

- G = with green-yellow conductor x = without green-yellow conductor (OZ)
- 300 mm<sup>2</sup> in adaption
- AWG sizes are approximate equivalent values. The actual cross-section is in mm<sup>2</sup>.
- screened analogue type: **Single 602-RC-CY-J/O**, confer page 502

## Application

High flexible special single core cable for drag chains are used for flexible use for medium mechanical stresses with free movement without tensile stress or forced movements in dry, moist and wet rooms. These two-norm cables primarily designed for exportorientated machinery manufacturer for flexible applications in machineries, machine tools, robot technics, for movable automated machinery parts. For applications which go beyond standard solutions (for example for composting appliances or high shelf conveyors with extremely high processing speeds etc.) we recommend for our especially developed enquiry sheet for energy guiding systems. Before installation in cable trays please read the instructions. Further technical details see selection table for drag chain cables, see lead text.

RC = Robotics Cable

CE = The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

Part no.	No. cores x cross-sec. mm <sup>2</sup>	AWG-No.	Core colour	Outer Ø app. mm	Cop. weight kg / km	Weight app. kg / km
69601	1 G 10	8	green-yellow	9,4	96,0	180,0
69602	1 x 10	8	black	9,4	96,0	180,0
69603	1 G 16	6	green-yellow	10,5	154,0	250,0
69604	1 x 16	6	black	10,5	154,0	250,0
69605	1 G 25	4	green-yellow	11,6	240,0	370,0
69606	1 x 25	4	black	11,6	240,0	370,0
69607	1 G 35	2	green-yellow	14,5	336,0	490,0
69608	1 x 35	2	black	14,5	336,0	490,0
69609	1 G 50	1	green-yellow	16,6	480,0	665,0
69610	1 x 50	1	black	16,6	480,0	665,0
69611	1 G 70	2/0	green-yellow	18,4	672,0	910,0
69612	1 x 70	2/0	black	18,4	672,0	910,0

Part no.	No. cores x cross-sec. mm <sup>2</sup>	AWG-No.	Core colour	Outer Ø app. mm	Cop. weight kg / km	Weight app. kg / km
69613	1 G 95	3/0	green-yellow	20,5	912,0	1195,0
69614	1 x 95	3/0	black	20,5	912,0	1195,0
69615	1 G 120	4/0	green-yellow	23,0	1152,0	1545,0
69616	1 x 120	4/0	black	23,0	1152,0	1545,0
69617	1 G 150	250 kcmil	green-yellow	25,2	1440,0	1750,0
69618	1 x 150	250 kcmil	black	25,2	1440,0	1750,0
69619	1 G 185	350 kcmil	green-yellow	29,0	1776,0	2320,0
69620	1 x 185	350 kcmil	black	29,0	1776,0	2320,0
69621	1 G 240	450 kcmil	green-yellow	32,5	2304,0	2960,0
69622	1 x 240	450 kcmil	black	32,5	2304,0	2960,0
69623	1 G 300	550 kcmil	green-yellow	35,4	2880,0	3550,0
69624	1 x 300	550 kcmil	black	35,4	2880,0	3550,0

Dimensions and specifications may be changed without prior notice. (RN06)

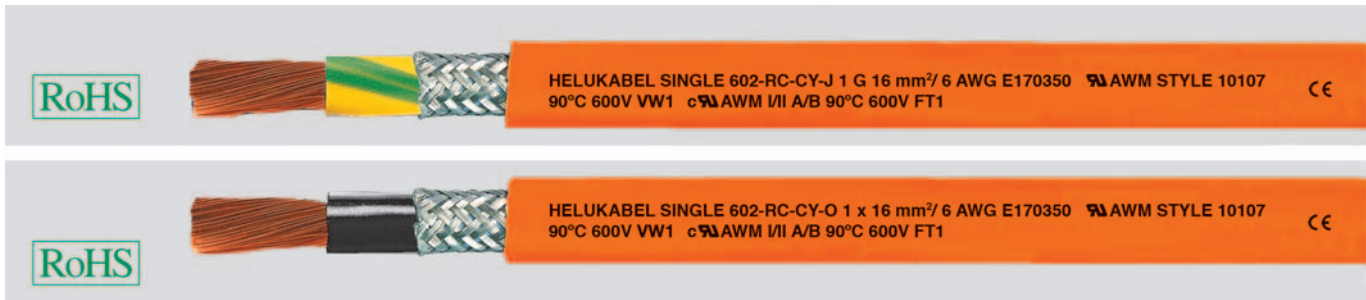


Suitable accessories can be found in Chapter X.

- Cable Gland - HELUcond PA6-L
- Cable Gland - HELUcond PA6-UL

# Single 602-RC-CY-J/O special single core cable

for drag chains, 90°C, 600 V, EMC-preferred type, meter marking



## Technical data

- Special PVC single core cable acc. to UL-Style 10107 and CSA AWM I/II A/B, core acc. to DIN VDE 0285-525-2-31 / DIN EN 50525-2-31 (except 300 mm<sup>2</sup>)
- **Temperature range**  
flexing -5°C to +90°C  
fixed installation -40°C to +90°C
- **Permissible operating temperature**  
max. +90°C at conductor
- **Nominal voltage**  
VDE U<sub>0</sub>/U 600/1000 V  
UL/CSA 600 V
- **Test voltage** 4000 V
- **Breakdown voltage** min. 8000 V
- **Insulation resistance**  
min. 20 MOhm x km
- **Minimum bending radius**  
flexing 7,5x cable Ø  
fixed installation 3x cable Ø
- **Coupling resistance**  
max. 250 Ohm/km
- **Radiation resistance**  
up to 80x10<sup>6</sup> cJ/kg (up to 80 Mrad)

## Cable structure

- Bare copper, extra fine wire conductors, to DIN VDE 0295 cl.6, col. 4, BS 6360 cl.6 and IEC 60228 cl.6, however by 185 mm<sup>2</sup> up to 300 mm<sup>2</sup> with reduced single wire-Ø, max. 0,30 mm
- Core insulation of special PVC compound type T13 to DIN VDE 0207-363-3 / DIN EN 50363-3 and class 43, 90°C acc. to UL-Std.1581 colour black or green-yellow
- Tinned copper braided screening, coverage approx. 80%
- Outer sheath special PVC compound type YM5 to DIN VDE 0207 part 5 and class 43, 90°C acc. to UL-Std.1581
- Sheath colour black (RAL 9005)
- with meter marking

## Properties

- Chemical Resistance - see table Technical Informations
- Resistant to mineral oils, synthetic oils and lubricating coolants.
- The materials used in manufacture are cadmium-free and contain no silicone and free from substances harmful to the wetting properties of lacquers

## Tests

- PVC self-extinguishing and flame retardant acc. to DIN VDE 0482-332-1-2, DIN EN 60332-1-2, IEC 60332-1 (equivalent DIN VDE 0472 part 804 test method B), UL VW-1, CSA FT1
- Acc.to UL-Style 10107/ UL-Std.1581, CSA C22.2 No 210

## Note

- G = with green-yellow conductor  
x = without green-yellow conductor (OZ)
- 300 mm<sup>2</sup> in adaption
- AWG sizes are approximate equivalent values. The actual cross-section is in mm<sup>2</sup>.
- non screened analogue type:  
**Single 602-RC-J/O**, confer page 501

## Application

High flexible special single core screened cables for drag chains are used for flexible use for medium mechanical stresses with free movement without tensile stress or forced movements in dry, moist and wet rooms. These two-norm cables primarily designed for exportorientated machinery manufacturer for flexible applications in machineries, machine tools, robot technics, for movable automated machinery parts. These screened cables are particularly suitable for the interference-free transmission in instrumentation and control engineering applications (electromagnetic compatibility). For applications which go beyond standard solutions we recommend for our especially developed enquiry sheet for energy guiding systems. Before installation in cable trays please read the instructions. Further technical details see selection table for drag chain cables, see lead text.

**EMC** = Electromagnetic compatibility

To optimize the EMC features we recommend a large round contact of the copper braiding on both ends.

**RC** = Robotics Cable

CE = The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

Part no.	No. cores x cross-sec. mm <sup>2</sup>	AWG-No.	Outer Ø app. mm	Cop. weight kg / km	Weight app. kg / km
69631	1 G 10	8	10,0	130,0	230,0
69632	1 x 10	8	10,0	130,0	230,0
69633	1 G 16	6	11,1	190,0	300,0
69634	1 x 16	6	11,1	190,0	300,0
69635	1 G 25	4	12,3	260,0	420,0
69636	1 x 25	4	12,3	260,0	420,0
69637	1 G 35	2	15,1	405,0	615,0
69638	1 x 35	2	15,1	405,0	615,0
69639	1 G 50	1	17,2	560,0	825,0
69640	1 x 50	1	17,2	560,0	825,0
69641	1 G 70	2/0	19,0	780,0	1090,0
69642	1 x 70	2/0	19,0	780,0	1090,0

Part no.	No. cores x cross-sec. mm <sup>2</sup>	AWG-No.	Outer Ø app. mm	Cop. weight kg / km	Weight app. kg / km
69643	1 G 95	3/0	22,0	1030,0	1395,0
69644	1 x 95	3/0	22,0	1030,0	1395,0
69645	1 G 120	4/0	23,6	1285,0	1770,0
69646	1 x 120	4/0	23,6	1285,0	1770,0
69647	1 G 150	250 kcmil	25,8	1570,0	1930,0
69648	1 x 150	250 kcmil	25,8	1570,0	1930,0
69649	1 G 185	350 kcmil	29,8	1940,0	2635,0
69650	1 x 185	350 kcmil	29,8	1940,0	2635,0
69651	1 G 240	450 kcmil	33,5	2530,0	3380,0
69652	1 x 240	450 kcmil	33,5	2530,0	3380,0
69653	1 G 300	550 kcmil	36,2	3140,0	4120,0
69654	1 x 300	550 kcmil	36,2	3140,0	4120,0

Dimensions and specifications may be changed without prior notice. (RN06)

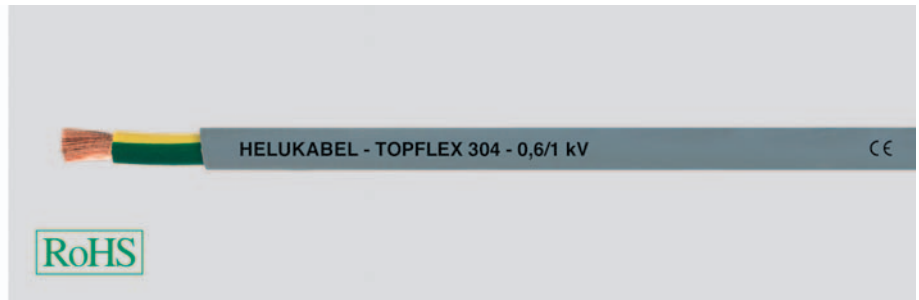
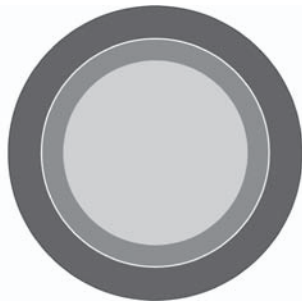


Suitable accessories can be found in Chapter X.

- Cable Gland - HELUcond PA6-L
- Cable Gland - HELUcond PA6-UL

**TOPFLEX® 304 / 304-C** unscreened (double insulated)/ screened

high flexible PVC single core 0,6/1kV for drag chain application

**Technical data**

- Special PVC single-core cable
- **Temperature range**  
flexing -5°C to +80°C  
fixed installation -40°C to +80°C
- **Nominal voltage**  
U<sub>0</sub>/U 600/1000 V
- **A.c. test voltage**, 50 Hz  
3000 V
- **Insulation resistance**  
min. 20 MOhm x km
- **Minimum bending radius**  
for flexible installation  
5x cable Ø

**Cable structure****TOPFLEX® 304**

- Bare copper, extra fine wire conductor to DIN VDE 0295 cl.6 and IEC 60228 cl.6
- PVC insulation, green-yellow
- PVC sheath compound TM2
- Sheath colour grey

**TOPFLEX® 304-C**

- Construction as above, but
- Tinned copper braid, coverage approx. 85%

**Properties**

- PVC self-extinguishing and flame retardant acc. to DIN VDE 0482-332-1-2, DIN EN 60332-1-2, IEC 60332-1 (equivalent DIN VDE 0472 part 804 test method B)
- Chemical resistance see table Technical Information

**Application**

Thanks to their outstanding alternating bending stress characteristics, these cables are ideally suited for use in drag chains, and also for use in handling devices, robots, and nearly any area requiring flexible used and free motion.

**TOPFLEX® 304-C** Optimum compliance with requirements for electromagnetic compatibility (EMC) by approx. 85% coverage from the braided screen.

**EMC** = Electromagnetic compatibility

To optimize the EMC features we recommend a large round contact of the copper braiding on both ends.

CE = The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

**TOPFLEX® 304**

Part no.	No. cores x cross-sec. mm <sup>2</sup>	AWG-No.	Outer Ø app. mm	Cop. weight kg / km	Weight app. kg / km
79639	1 G 2,5	14	4,5	24,0	42,0
79640	1 G 4	12	5,6	38,4	58,0
79641	1 G 6	10	6,1	57,6	85,0
71544	1 G 10	8	8,0	96,0	130,0
79642	1 G 16	6	9,8	154,0	190,0
79643	1 G 25	4	11,8	240,0	280,0
79644	1 G 35	2	12,9	336,0	400,0
79645	1 G 50	1	14,6	480,0	520,0
79646	1 G 70	2/0	17,5	672,0	720,0
79647	1 G 95	3/0	20,0	912,0	1050,0
79648	1 G 120	4/0	21,6	1152,0	1220,0
79649	1 G 150	300 kcmil	23,5	1440,0	1500,0
79650	1 G 185	350 kcmil	25,7	1776,0	1940,0
79651	1 G 240	500 kcmil	29,5	2304,0	2675,0
79652	1 G 300	600 kcmil	32,5	2880,0	3300,0

**TOPFLEX® 304C**

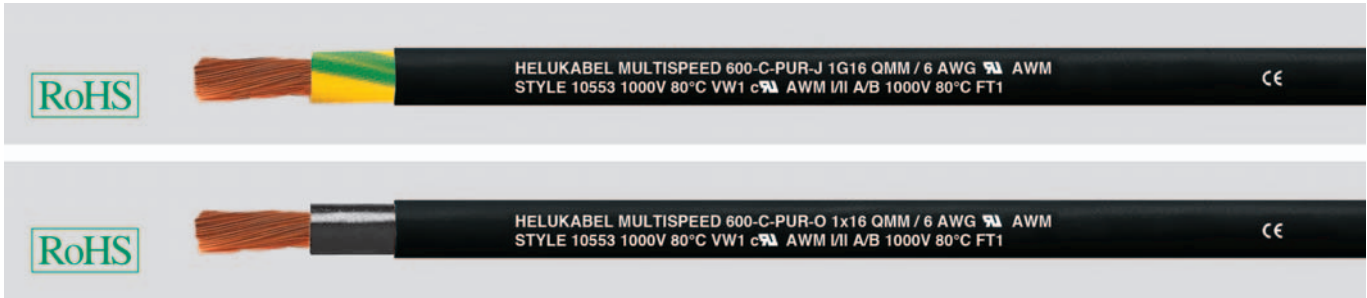
Part no.	No. cores x cross-sec. mm <sup>2</sup>	AWG-No.	Outer Ø app. mm	Cop. weight kg / km	Weight app. kg / km
79653	1 G 2,5	14	5,9	40,0	55,0
79654	1 G 4	12	6,5	50,0	75,0
79655	1 G 6	10	8,3	88,0	125,0
79656	1 G 10	8	8,7	124,0	170,0
79657	1 G 16	6	10,3	190,0	300,0
79658	1 G 25	4	12,4	260,0	420,0
79659	1 G 35	2	13,7	405,0	620,0
79660	1 G 50	1	15,4	560,0	825,0
79661	1 G 70	2/0	17,5	780,0	1090,0
79662	1 G 95	3/0	21,0	1030,0	1395,0
79685	1 G 120	4/0	22,4	1311,0	1770,0
79663	1 G 150	300 kcmil	24,3	1527,0	1930,0
79664	1 G 185	350 kcmil	26,5	1940,0	2635,0
79665	1 G 240	500 kcmil	30,3	2530,0	3380,0
79666	1 G 300	600 kcmil	35,0	3050,0	3500,0

Dimensions and specifications may be changed without prior notice.

N



# MULTISPEED® 600-PUR -J/-O special single cores for drag chains, 1000 V, halogen-free, meter marking



## Technical data

- Special drag chain core line for extreme mechanical stresses adapted to DIN VDE 0285-525-2-31 / DIN EN 50525-2-31 and UL style 10553
- **Temperature range**  
flexing -30°C to +80°C  
fixed installation -40°C to +80°C
- **Nominal voltage**  
VDE U<sub>0</sub>/U 600/1000 V  
UL/CSA 1000 V
- **Test voltage** 3000 V
- **Insulation resistance**  
min. 100 MOhm x km
- **Minimum bending radius**  
flexing 5x core Ø  
fixed installation 3x core Ø

## Cable structure

- Bare copper conductor, ultra-fine wire to DIN VDE 0295 cl.6, column 4, BS 6360 cl.6 and/or IEC 60228 cl.6
- Core insulation of thermoplastic polymer in either black or green/yellow
- Outer sheath of special polyurethane, TMPU adapted to DIN VDE 0207-363-10-2 / DIN EN 50363-10-2
- Sheath colour black (RAL 9005)
- with meter marking

## Properties

- Flame retardant, UL VW-1, CSA FT1
- Halogen-free
- Abrasion resistant
- Very good oil resistance
- Very good alternating bending strength
- Very high resistance to mechanical stresses
- Higher notch resistance
- Ozone and UV-resistant
- Coolant resistant
- The materials used in manufacture are cadmium-free and contain no silicone and free from substances harmful to the wetting properties of lacquers

## Note

- G = with green-yellow conductor  
x = without green-yellow conductor (OZ)
- AWG sizes are approximate equivalent values. The actual cross-section is in mm<sup>2</sup>.
- screened analogue type:  
**MULTISPEED® 600-C-PUR-J/O**, confer page 505

## Application

These special drag chain core cables permit extended use with extreme requirements, with free movement, without tensile stresses or forced movements. Suitable for installation in long traverse paths and high speeds in dry, high temperature influence in dry, moist and wet environments and in the open air. These cables can be used for all applications demanding the highest requirements in flexibility, abrasion resistance, ozone and chemical resistance. For applications extending beyond standard solutions (e. g. composting plants or high-lift conveyor systems working at extremely low speeds), we recommend that you request our questionnaire, which has been especially designed for energy supply systems. Before installation in cable trays please read the instructions.

CE= The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

Part no.	No. cores x cross-sec. mm <sup>2</sup>	AWG-No.	Outer Ø app. mm	Cop. weight kg / km	Weight app. kg / km
25888	1 G 6	10	7,2	58,0	80,0
25269	1 x 6	10	7,2	58,0	80,0
25889	1 G 10	8	8,4	96,0	130,0
25270	1 x 10	8	8,4	96,0	130,0
25890	1 G 16	6	9,5	154,0	181,0
25271	1 x 16	6	9,5	154,0	181,0
25891	1 G 25	4	11,0	240,0	274,0
25272	1 x 25	4	11,0	240,0	274,0
25892	1 G 35	2	13,0	336,0	398,0
25273	1 x 35	2	13,0	336,0	398,0
25893	1 G 50	1	15,4	480,0	529,0
25274	1 x 50	1	15,4	480,0	529,0
25894	1 G 70	2/0	17,2	672,0	717,0
25275	1 x 70	2/0	17,2	672,0	717,0

Part no.	No. cores x cross-sec. mm <sup>2</sup>	AWG-No.	Outer Ø app. mm	Cop. weight kg / km	Weight app. kg / km
25895	1 G 95	3/0	20,0	912,0	1050,0
25276	1 x 95	3/0	20,0	912,0	1050,0
25896	1 G 120	4/0	21,0	1152,0	1240,0
25277	1 x 120	4/0	21,0	1152,0	1240,0
25897	1 G 150	250 kcmil	23,8	1440,0	1524,0
25278	1 x 150	250 kcmil	23,8	1440,0	1524,0
25898	1 G 185	350 kcmil	26,2	1776,0	1932,0
25279	1 x 185	350 kcmil	26,2	1776,0	1932,0
25899	1 G 240	450 kcmil	29,8	2304,0	2467,0
25280	1 x 240	450 kcmil	29,8	2304,0	2467,0
25900	1 G 300	550 kcmil	33,1	2880,0	3140,0
25281	1 x 300	550 kcmil	33,1	2880,0	3140,0

Dimensions and specifications may be changed without prior notice. (RN06)



Suitable accessories can be found in Chapter X.

- Cable Gland - HELUcond PA6-L
- Cable Gland - HELUcond PA6-UL

# MULTISPEED® 600-C-PUR -J/-O special cable for drag chains, 1000 V, screened, halogen-free, EMC-preferred type, meter marking



## Technical data

- Special drag chain core cable for mechanical stresses adapted to DIN VDE 0285-525-2-31/ DIN EN 50525-2-31 and UL-Style 10553
- **Temperature range**  
flexing -30°C to +80°C  
fixed installation -40°C to +80°C
- **Nominal voltage**  
VDE U<sub>0</sub>/U 600/1000 V  
UL/CSA 1000 V
- **Test voltage** 3000 V
- **Insulation resistance**  
min. 100 MOhm x km
- **Minimum bending radius**  
flexing 5x core Ø  
fixed installation 3x core Ø

## Cable structure

- Bare copper conductor, ultra-fine wire to DIN VDE 0295 cl.6, column 4, BS 6360 cl.6 and/or IEC 60228 cl.6
- Core insulation of thermoplastic polymer in either black or green/yellow
- Braided screen of tinned Cu wires, coverage approx. 85%
- Core wrapping with fleece
- Outer sheath of special polyurethane TMPU adapted to DIN VDE 0207-363-10-2 / DIN EN 50363-10-2
- Sheath colour black (RAL 9005)
- with meter marking

## Properties

- Flame retardant, UL VW-1, CSA FT1
- Halogen-free
- Abrasion resistant
- Very good oil resistance
- Very good alternating bending strength
- Very high resistance to mechanical stresses
- Improved notch resistance
- Ozone and UV-resistant
- Coolant-resistant
- The materials used in manufacture are cadmium-free and contain no silicone and free from substances harmful to the wetting properties of lacquers

## Note

- G = with green-yellow conductor  
x = without green-yellow conductor (OZ)
- Please observe applicable installation regulations for use in energy supply chains.
- AWG sizes are approximate equivalent values. The actual cross-section is in mm<sup>2</sup>.
- unscreened analogue type:  
**MULTISPEED® 600-PUR -J/-O**,  
confer page 504

## Application

These special drag chain core cables permit extended use with extreme requirements, with free movement, without tensile stresses or forced movements. Suitable for installation in long traverse paths and high speeds in dry, high temperature influence in dry, moist and wet environments and in the open air. These cables can be used for all applications demanding the highest requirements in flexibility, abrasion resistance, ozone and chemical resistance. The copper screening assures a disturbance-free data and signal transmission for measuring and control systems. For applications extending beyond standard solutions (e. g. composting plants or high-lift conveyor systems working at extremely low speeds), we recommend that you request our questionnaire, which has been especially designed for energy supply systems. Before installation in cable trays please read the instructions.

**EMC** = Electromagnetic compatibility

To optimize the EMC features we recommend a large round contact of the copper braiding on both ends.

CE = The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

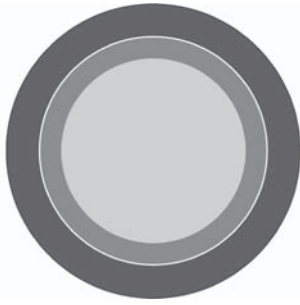
Part no.	No. cores x cross-sec. mm <sup>2</sup>	AWG-No.	Outer Ø app. mm	Cop. weight kg / km	Weight app. kg / km
25901	1 G 6	10	7,8	71,0	101,0
25282	1 x 6	10	7,8	71,0	101,0
25902	1 G 10	8	9,7	122,0	168,0
25283	1 x 10	8	9,7	122,0	168,0
25903	1 G 16	6	11,7	180,0	217,0
25284	1 x 16	6	11,7	180,0	217,0
25904	1 G 25	4	13,2	282,0	342,0
25285	1 x 25	4	13,2	282,0	342,0
25905	1 G 35	2	15,2	386,0	468,0
25286	1 x 35	2	15,2	386,0	468,0
25906	1 G 50	1	18,7	535,0	584,0
25287	1 x 50	1	18,7	535,0	584,0
25907	1 G 70	2/0	21,2	750,0	822,0
25288	1 x 70	2/0	21,2	750,0	822,0

Part no.	No. cores x cross-sec. mm <sup>2</sup>	AWG-No.	Outer Ø app. mm	Cop. weight kg / km	Weight app. kg / km
25908	1 G 95	3/0	23,4	1004,0	1190,0
25289	1 x 95	3/0	23,4	1004,0	1190,0
25909	1 G 120	4/0	24,5	1260,0	1400,0
25290	1 x 120	4/0	24,5	1260,0	1400,0
25910	1 G 150	250 kcmil	27,8	1570,0	1710,0
25291	1 x 150	250 kcmil	27,8	1570,0	1710,0
25911	1 G 185	350 kcmil	29,4	1911,0	2021,0
25292	1 x 185	350 kcmil	29,4	1911,0	2021,0
25912	1 G 240	450 kcmil	34,2	2451,0	2601,0
25293	1 x 240	450 kcmil	34,2	2451,0	2601,0
25913	1 G 300	550 kcmil	37,4	2997,0	3257,0
25294	1 x 300	550 kcmil	37,4	2997,0	3257,0

Dimensions and specifications may be changed without prior notice. (RN06)

# TOPFLEX® 301 / 301-C unshielded (double insulated)/ screened

## high flexible PUR single core 0,6/1kV for drag chain application



### Technical data

#### TOPFLEX® 301 (unscreened)

- Special PUR single-core cable acc. to UL AWM Style 10553
- **Temperature range**  
flexing -15°C to +80°C
- **Nominal voltage**  
acc. to VDE U<sub>0</sub>/U 600/1000 V  
acc. to UL 1000 V
- **A.C. test voltage** 3000 V
- **Insulation resistance**  
min. 20 MOhm x km
- **Minimum bending radius**  
7,5 cable Ø

#### TOPFLEX® 301-C (screened)

- Tech. data as per TOPFLEX® 301
- **Coupling resistance**  
max. 250 Ohm/km

### Cable structure

#### TOPFLEX® 301 (unscreened)

- Bare copper, extra fine wire conductor to DIN VDE 0295 cl.6 and IEC 60228 cl.6
- Cold resistant PVC core insulation, grey
- PUR outer sheath
- Sheath colour black or green yellow

#### TOPFLEX® 301-C (screened)

- Structure as per TOPFLEX 301, but additionally
- Fleece wrapping between screen and sheath
- Tinned copper braided screening, approx. 85% coverage
- Sheath colour black

### Properties

- PUR outer sheath: low adhesion, flame retardant, extremely abrasion resistant, resistant to UV, oil, hydrolysis and microbial attack
- Optimised insulation materials ensure resistance to oils (including mineral oils), greases, coolants, hydraulic fluids as well as many alkalis and solvents
- The optimised external diameter and the reduced weight facilitate use in multi-shift operation with extreme alternating bending stress cycles
- Thanks to its excellent mechanical characteristics, the wear-resistant, notch-resistant, flame-retardant PUR sheath provides high functional reliability over long periods

### Application

**TOPFLEX® 301 (unscreened)** These cables are specially designed for use in energy supply chains, automated handling equipment, robots, machine tools, processing and manufacturing machinery.

**TOPFLEX® 301-C (screened)** Applications as described above, additionally optimal compliance with electromagnetic compatibility (EMC) requirements on account of the approx. 85% coverage by the braided screening.

**EMC** = Electromagnetic compatibility

To optimize the EMC features we recommend a large round contact of the copper braiding on both ends.

CE = The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

#### TOPFLEX® 301 double insulated, black unscreened

Part no.	No. cores x cross-sec. mm <sup>2</sup>	AWG-No.	Outer Ø app. mm	Cop. weight kg / km	Weight app. kg / km
75375	1 x 6	10	7,1	58,0	85,0
75376	1 x 10	8	8,8	96,0	130,0
75377	1 x 16	6	10,5	154,0	190,0
75378	1 x 25	4	11,2	240,0	280,0
75379	1 x 35	2	13,5	336,0	400,0
75380	1 x 50	1	15,8	480,0	520,0
75381	1 x 70	2/0	18,0	672,0	720,0
75382	1 x 95	3/0	20,4	912,0	1050,0
75383	1 x 120	4/0	22,2	1152,0	1220,0
75384	1 x 150	300 kcmil	25,0	1440,0	1500,0
75385	1 x 185	350 kcmil	28,0	1776,0	1940,0
75386	1 x 240	500 kcmil	32,5	2304,0	2645,0

#### TOPFLEX® 301-C black screened EMC

Part no.	No. cores x cross-sec. mm <sup>2</sup>	AWG-No.	Outer Ø app. mm	Cop. weight kg / km	Weight app. kg / km
75399	1 x 6	10	7,8	95,0	144,0
75400	1 x 10	8	9,5	124,0	170,0
75401	1 x 16	6	10,8	186,0	220,0
75402	1 x 25	4	12,2	278,0	340,0
75403	1 x 35	2	13,7	384,0	460,0
75404	1 x 50	1	15,4	530,0	580,0
75405	1 x 70	2/0	17,6	753,0	820,0
75406	1 x 95	3/0	21,7	1006,0	1200,0
75407	1 x 120	4/0	22,4	1257,0	1350,0
75408	1 x 150	300 kcmil	24,3	1562,0	1680,0
75409	1 x 185	350 kcmil	26,5	1895,0	2100,0
75410	1 x 240	500 kcmil	30,3	2704,0	3100,0

#### TOPFLEX® 301 double insulated, green-yellow unscreened

Part no.	No. cores x cross-sec. mm <sup>2</sup>	AWG-No.	Outer Ø app. mm	Cop. weight kg / km	Weight app. kg / km
75387	1 G 6	10	7,1	58,0	85,0
75388	1 G 10	8	8,8	96,0	130,0
75389	1 G 16	6	10,5	154,0	190,0
75390	1 G 25	4	11,2	240,0	280,0
75391	1 G 35	2	13,5	336,0	400,0
75392	1 G 50	1	15,8	480,0	520,0
75393	1 G 70	2/0	18,0	672,0	720,0
75394	1 G 95	3/0	20,4	912,0	1050,0
75395	1 G 120	4/0	22,2	1152,0	1220,0
75396	1 G 150	300 kcmil	25,0	1440,0	1500,0
75397	1 G 185	350 kcmil	28,0	1776,0	1940,0
75398	1 G 240	500 kcmil	32,5	2304,0	2645,0

Dimensions and specifications may be changed without prior notice.



# BRITISH STANDARD CABLES



# HELUKABEL® BS 5308 Part 1 Instruments cable,

core insulation PE or XLPE



## Technical data

- Instrument cable acc. to British Standard 5308 Part 1
- **Temperature range**  
fixed installation -20°C to +65°C
- **Nominal voltage**  
U<sub>0</sub>/U 300/500 V
- **Minimum bending radius**  
fixed installation  
5x outer Ø (type 1)  
6x outer Ø (type 2+3)

## Cable structure

- Copper conductor, single-, multiple-, or fine-wire acc. to BS 6360  
Conductor cross-sections from 0,5 mm<sup>2</sup> to 1,5 mm<sup>2</sup>
- Core insulation  
- Polyethylene acc. to BS 6234 Type 03 or  
- XLPE (cross-linked polyethylene for LSZH cable)
- Cores stranded in pairs with optimal lay-length,  
Lay-length smaller than 100 mm  
Number of pairs: 1,2,5,10,15,20,30,50
- Pairs individually not screened or screened
- Pairs stranded in layers
- Wrapping with aluminium/polyester foil, on request
- **Type 1**  
Flame retardant PVC outer sheath or LSZH
- **Type 2**  
Extruded polyethylene inner sheath,  
steel wire armouring,  
Flame retardant PVC outer sheath or LSZH
- **Type 3**  
PVC inner sheath,  
steel wire armouring,  
PVC outer sheath
- Sheath colour black or blue

## Note

As a result of a wide range of cables and wires acc. to British Standard, you can find following only a small selection of types.  
For request about British Standard cables please contact us under  
Ph. 0049 7150 9209-786  
E-Mail: spezialkabel@helukabel.de

## Application

As measurement and control cables in power plants and industrial plants, and in the petrochemical industry. **Example** BS 5308 P1 T1 CU / PE / CAM / PVC = Overall screening, sheath PVC BS 5308 P1 T2 CU / XLPE / IAM / CAM / LSZH / SWA / LSZH = Pair screened, Overall screening, galvanic round steel wire, halogen free

Dimensions and specifications may be changed without prior notice.



**HELUKABEL® BS 5308 Part 2** Instruments cable, core insulation PVC **Technical data**

- Instrument cable acc. to British Standard 5308 Part 2
- **Temperature range**  
fixed installation -20°C to +65°C
- **Nominal voltage**  
U<sub>0</sub>/U 300/500 V
- **Minimum bending radius**  
fixed installation  
5x outer Ø (type 1)  
6x outer Ø (type 2)

**Cable structure**

- Copper conductor, single-, multiple-, or fine-wire acc. to BS 6360
- Conductor cross-sections from 0,5 mm<sup>2</sup> to 1,5 mm<sup>2</sup>
- Core insulation PVC acc. to BS 6746
- Cores stranded in pairs with optimal lay-length  
Lay-length smaller than 100 mm
- Number of pairs: 1,2,5,10,20,30,50
- Pairs individually screened with aluminium-foil or unscreened
- Pairs stranded in layers
- Wrapping with aluminium/polyester foil, on request
- **Type 1**  
Flame retardant PVC outer sheath
- **Type 2**  
Extruded PVC inner sheath,  
steel wire armouring,  
Flame retardant PVC outer sheath
- Sheath colour black or blue

**Note**

As a result of a wide range of cables and wires acc. to British Standard, you can find following only a small selection of types. For request about British Standard cables please contact us under  
Ph. 0049 7150 9209-786  
E-Mail: [spezialkabel@helukabel.de](mailto:spezialkabel@helukabel.de)

**Application**

As measurement and control cables in power plants and industrial plants, and in the petrochemical industry. **Example** BS 5308 P2 T2 CU / PVC / CAM / PVC / SWA / PVC = Overall screening, steel wire armouring

Dimensions and specifications may be changed without prior notice.

**HELUKABEL® BS 5467** High voltage cable 0,6/1kV, armoured, sheath PVC **Technical data**

- Special power cable acc. to British Standard 5467
- **Temperature range**  
flexing 0°C to +90°C  
fixed installation -15°C to +90°C
- **Nominal voltage**  
U<sub>0</sub>/U 600/1000 V
- **Minimum bending radius**  
fixed installation  
up to 16 mm<sup>2</sup> 6x outer Ø  
> 25 mm<sup>2</sup> 8x outer Ø

**Cable structure**

- Bare copper conductor acc. to BS 6360 cl.2
- Core insulation of cross-linked polyethylene
- Core identification
  - 1-core - brown
  - 2-core - brown, blue
  - 3-core - brown, blue, grey
  - 4-core - brown, black, grey, blue
  - 5-core and up with numbering
- Cores stranded layers
- PVC-Inner sheath
- Armouring of galvanized steel wire
- PVC-Outer sheath
- Sheath colour black

**Properties**

- Reaction to fire tested acc. to IEC 60332-1, BS 4066-1

**Note**

As a result of a wide range of cables and wires acc. to British Standard, you can find following only a small selection of types. For request about British Standard cables please contact us under  
Ph. 0049 7150 9209-786  
E-Mail: spezialkabel@helukabel.de

**Application**

As a control and power cable in industrial environments. Thanks to the armouring of galvanized steel wire, can be used anywhere that a high level of mechanical protection is required. Suitable for use outdoors and in the earth.

**Example**

BS 5467 CU / XLPE / PVC / AWA / PVC = Singlecore  
BS 5467 CU / XLPE / PVC / SWA / PVC = Multicore

Dimensions and specifications may be changed without prior notice.

**HELUKABEL® BS 6724** High voltage cable 0,6/1kV, armoured, halogen-free **Technical data**

- Special power cable acc. to British Standard 6724
- **Temperature range**  
flexing 0°C to +90°C  
fixed installation -20°C to +90°C
- Permissible **operating temperature**  
at conductor +90°C
- **Nominal voltage**  
U<sub>0</sub>/U 600/1000 V
- **Minimum bending radius**  
fixed installation  
up to 16 mm<sup>2</sup> 6x outer Ø  
> 25 mm<sup>2</sup> 8x outer Ø

**Cable structure**

- Bare copper conductor acc. to BS 6360 cl.2
- Core insulation of cross-linked polyethylene
- Core identification
  - 1-core - brown
  - 2-core - brown, blue
  - 3-core - brown, black, grey
  - 4-core - brown, black, grey, blue
  - 5-core and up with numbering
- Cores stranded layers
- Inner sheath LSHF mix
- Armouring of galvanized steel wire
- Outer sheath LSHF mix
- Sheath colour black

**Properties**

- Reaction to fire tested acc. to IEC 60332-3, BS 4066-1

**Note**

As a result of a wide range of cables and wires acc. to British Standard, you can find following only a small selection of types. For request about British Standard cables please contact us under  
Ph. 0049 7150 9209-786  
E-Mail: [spezialkabel@helukabel.de](mailto:spezialkabel@helukabel.de)

**Application**

Unlike power cables acc. to BS 5467, these are LSHF (Low Smoke Halogen Free). Used anywhere where in case of fire damage to human life and material assets must be prevented, e.g. in industrial plants, airports, underground railways and tunnels.

**Example**

BS 6724 CU / XLPE / LSZH / AWA / LSZH = Singelcore  
BS 6724 CU / XLPE / LSZH / SWA / LSZH = Multicore

Dimensions and specifications may be changed without prior notice.







## ■ INFRASTRUCTURE CABLES & WIRES

Installation cables 514

---

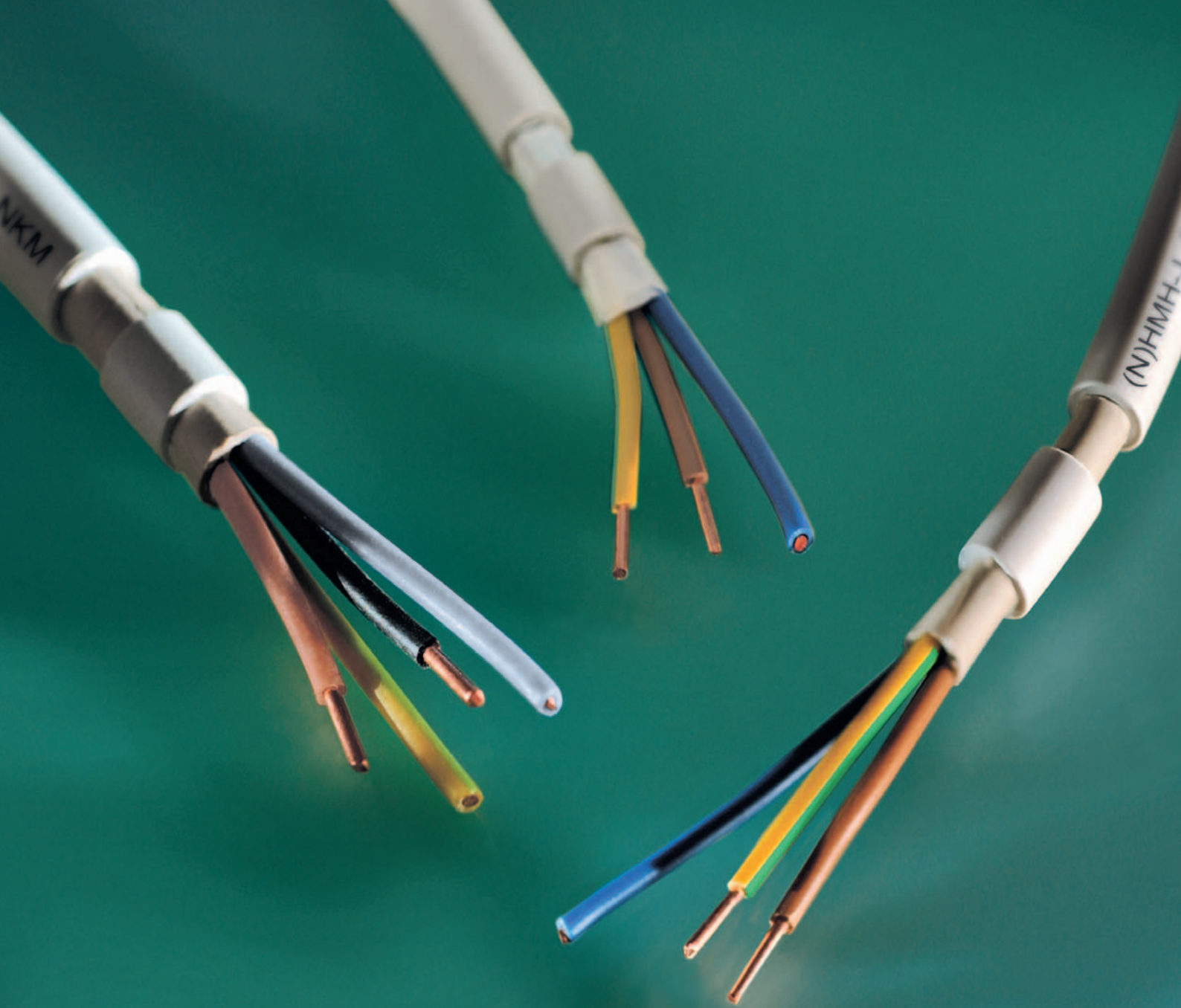
Telephone & fire warning cables 522

---

Power, security & medium voltage cables 534

---





(N)YM(St)-J PVC-sheathed cable






**NYM-J/-O PVC-Sheathed Cable**

NHXHM-O/-J

**NHMH-O**

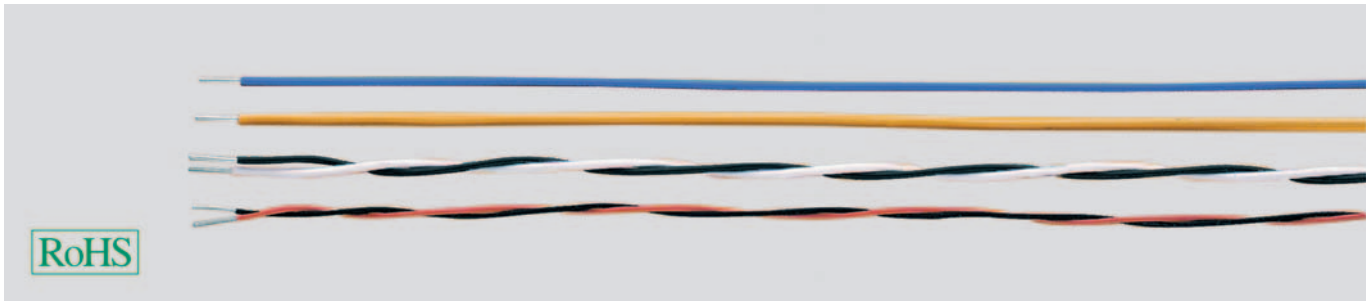
**YV-Equipment Wires / YR-Bell Sheathed Cables**

## ■ INSTALLATION CABLES

Designation	Properties	Approvals	Page
YV patch cable / YR bell sheathed cable	in accordance with VDE 0812		<b>516</b>
NYM-J/-O PVC sheathed cable	VDE approved	ERC 	<b>517</b>
(N) YM (St)-J PVC sheathed cable	screened		<b>518</b>
NHMH-O	halogen-free, i.e. free of harmful substances, sheathed cable 300/500V		<b>519</b>
NHMH-J	halogen-free, i.e. free of harmful substances, sheathed cable 300/500V		<b>520</b>
NHXHM-O/-J	halogen-free sheathed cable 300/500 V, VDE approved	ERC 	<b>521</b>

# YV-Equipment Wires / YR-Bell Sheathed Cables

according to VDE 0812



## Technical data

### YV-Equipment Wires

- Equipment wires with PVC core insulation to DIN VDE 0812
- **Temperature range**  
flexing -5°C to +70°C  
fixed installation -30°C to +70°C
- **Electrical characteristics**  
Operating voltage (peak voltage) to DIN VDE 0812

### YR-Bell Sheathed Cables

- adapted to DIN VDE 0812
- **Minimum bending radius**  
15x cable Ø

## Cable structure

### YV-Equipment Wires

- Tinned copper-conductor, solid 0,3 to 1,8 mm Ø
- Core insulation of PVC compound type Y13 to DIN VDE 0207 part 4
- Mono or twin colour wires, twin colour wires have a base colour with the second colour superimposed in ring form
- Core identification to DIN 47002

### YR-Bell Sheathed Cables

- Bare copper conductor, solid 0,8 mm
- Cores stranded in layer
- Core identification see Technical Informations
- Outer sheath of PVC
- Sheath colour white

## Properties

### YV-Equipment Wires

#### Tests

- PVC self-extinguishing and flame retardant acc. to IEC 60332-2 (equivalent DIN VDE 0472 part 804 test method A)

#### Installation notes

- The equipment wires are to be so uncoiled from drums or coils so that no kinks or twisting torsional stress can be occurred. Those are allowed to install as self-supporting shaped wires independently ensuring the free-movements so as to gain a compensating bending. These are used without any mechanical stress, pull, pressure, abrasion and notch. Several equipment wires are used together in form of a bunch. The insulating coverings are not be cut through the binding materials. The binding materials must be nonconductive and not allowed to swell or shrink in humidity. During the soldering process without jointing clamp, the soldering period is to be shortened so that the insulating covering should not be shrunk or injured.

## Application

**YV-Equipment Wires** Single core cables for use in small apparatus, switching and intercom system and for data transmission. These cables are not allowed for the installation of heavy current operation. Equipment wire are used for wiring to the switchboards, amplifiers and dial intercommunicating systems, measuring instruments, telephone exchange, clock centrals and data processing apparatus etc. These wires are not permitted to apply outside of equipment for high power ratings.

**YR-Bell Sheathed Cables** For different applications up to max. 100 V operating voltage, for fixed installation above and beneath plaster.

☑= The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

### YV-Equipment Wires

Part no.	No. cores x cond. Ø / core Ø mm	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	
28900	1 x 0,3 / 0,7	0,7	0,7	1,2	-
28901	2 x 0,3 / 0,7	1,4	1,4	2,4	-
28902	3 x 0,3 / 0,7	1,6	2,1	3,6	-
28903	1 x 0,4 / 0,8	0,8	1,3	1,8	-
28904	2 x 0,4 / 0,8	1,6	2,5	3,6	-
28905	3 x 0,4 / 0,8	1,8	3,8	5,4	-
28906	1 x 0,5 / 0,9	0,9	2,0	2,5	-
28907	2 x 0,5 / 0,9	1,8	3,9	5,0	-
28908	3 x 0,5 / 0,9	2,0	5,9	7,5	-
28909	4 x 0,5 / 0,9	2,2	7,9	10,0	-
28910	1 x 0,8 / 1,4	1,4	5,0	6,0	-
28911	2 x 0,8 / 1,4	2,8	10,0	12,0	-
28912	3 x 0,8 / 1,4	3,0	15,0	18,0	-
28913	4 x 0,8 / 1,4	3,4	20,0	24,0	-
28914	1 x 1 / 1,8	1,8	7,9	10,0	-
28915	2 x 1 / 1,8	3,6	16,0	20,0	-
28916	3 x 1 / 1,8	4,0	24,0	30,0	-
28917	1 x 1,4 / 2,2	2,2	15,0	17,0	-
28918	1 x 1,8 / 2,8	2,8	25,0	27,5	-

### YR-Bell Sheathed Cables

Part no.	No. cores x cond. Ø / core Ø mm	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	
28919	2 x 0,8 / 1,4	4,0	9,6	27,0	-
28920	3 x 0,8 / 1,4	4,4	14,4	33,0	-
28921	4 x 0,8 / 1,4	4,9	19,2	41,0	-
28922	5 x 0,8 / 1,4	5,3	24,0	48,0	-
28923	6 x 0,8 / 1,4	5,8	28,8	56,0	-
28924	8 x 0,8 / 1,4	6,5	38,0	70,0	-
28925	10 x 0,8 / 1,4	7,6	48,0	84,0	-
28926	12 x 0,8 / 1,4	7,7	58,0	98,0	-
28927	16 x 0,8 / 1,4	8,6	77,0	124,0	-
28928	24 x 0,8 / 1,4	10,5	115,0	188,0	-

Dimensions and specifications may be changed without prior notice. (RO01)

# NYM-J/-O PVC-Sheathed Cable VDE approved



## Technical data

- PVC-sheathed cable to DIN VDE 0250 part 204
- **Temperature range**  
flexing +5°C to +70°C  
fixed installation -40°C to +70°C
- **Nominal voltage**  
 $U_0/U$  300/500 V
- **Test voltage** 2000 V
- **Minimum bending radius**  
fixed installation 4x cable  $\varnothing$
- **Radiation resistance**  
up to  $80 \times 10^6$  cJ/kg (up to 80 Mrad)
- **Caloric load values**  
see Technical Informations

## Cable structure

- Solid or stranded, plain copper conductor to DIN VDE 0295 cl.1 or cl.2, BS 6360 cl.1 or cl.2 and IEC 60228 cl.1 or cl.2
- Core insulation of PVC compound type T11 to DIN VDE 0207-363-3 / DIN EN 50363-3
- Core identification to DIN VDE 0293-308
- Cores stranded in layers with optimal lay-length
- Filler
- Outer sheath of PVC compound type TM1 to DIN VDE 0207-363-4-1 / DIN EN 50363-4-1
- Sheath colour grey (RAL 7035)

## Properties

### Tests

- PVC self-extinguishing and flame retardant acc. to DIN VDE 0482-332-1-2, DIN EN 60332-1-2, IEC 60332-1 (equivalent DIN VDE 0472 part 804 test method B)

### Note

- re = round conductor, single-wire
- rm = round conductor, multi-wire
- G = with green-yellow conductor
- x = without green-yellow conductor (OZ)
- AWG sizes are approximate equivalent values. The actual cross-section is in  $\text{mm}^2$ .

## Application

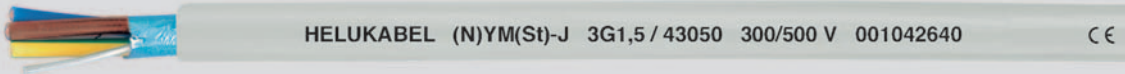
For industrial- and wiring purposes. Usable in the open, in dry, damp and wet environments in the open and concealed, as well as in masonry and in beton, not suitable for imbedding in solidified- or compressed-concrete. Outdoor usage is only possible, as long as the cable is protected against direct sunlight.

CE= The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

Part no.	No. cores x cross-sec. $\text{mm}^2$		Outer $\varnothing$ approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
39050	1 G 1,5	re	5,4	14,4	40,0	16
39001	1 x 1,5	re	5,4	14,4	40,0	16
39006	2 x 1,5	re	8,7	29,0	170,0	16
39056	3 G 1,5	re	9,1	43,0	135,0	16
39007	3 x 1,5	re	9,1	43,0	135,0	16
39058	4 G 1,5	re	9,8	58,0	160,0	16
39009	4 x 1,5	re	9,8	58,0	160,0	16
39066	5 G 1,5	re	10,3	72,0	190,0	16
39017	5 x 1,5	re	10,3	72,0	190,0	16
39072	7 G 1,5	re	11,5	101,0	235,0	16
39023	7 x 1,5	re	11,5	101,0	235,0	16
39076	10 G 1,5	re	13,8	144,0	330,0	16
39077	12 G 1,5	re	14,4	173,0	405,0	16
39055	1 G 2,5	re	6,0	24,0	70,0	14
39024	1 x 2,5	re	6,0	24,0	70,0	14
39057	3 G 2,5	re	10,4	72,0	190,0	14
39008	3 x 2,5	re	10,4	72,0	190,0	14
39059	4 G 2,5	re	11,3	96,0	230,0	14
39010	4 x 2,5	re	11,3	96,0	230,0	14
39067	5 G 2,5	re	12,0	120,0	270,0	14
39018	5 x 2,5	re	12,0	120,0	270,0	14
39075	7 G 2,5	re	13,2	168,0	342,0	14
39051	1 G 4	re	6,6	38,0	80,0	12
39002	1 x 4	re	6,6	38,0	80,0	12
39074	3 G 4	re	12,0	115,0	258,0	12
39060	4 G 4	re	13,0	154,0	330,0	12
39011	4 x 4	re	13,0	154,0	330,0	12
39068	5 G 4	re	14,5	192,0	410,0	12
39019	5 x 4	re	14,5	192,0	410,0	12
39052	1 G 6	re	7,2	58,0	105,0	10
39003	1 x 6	re	7,2	58,0	105,0	10
39078	3 G 6	re	13,0	173,0	320,0	10
39061	4 G 6	re	15,1	230,0	460,0	10
39012	4 x 6	re	15,1	230,0	460,0	10
39069	5 G 6	re	16,1	288,0	540,0	10
39020	5 x 6	re	16,1	288,0	540,0	10
39053	1 G 10	re	8,4	96,0	155,0	8
39004	1 x 10	re	8,4	96,0	155,0	8
39062	4 G 10	re	17,6	384,0	680,0	8
39013	4 x 10	re	17,6	384,0	680,0	8
39070	5 G 10	re	19,2	480,0	850,0	8
39021	5 x 10	re	19,2	480,0	850,0	8
39054	1 G 16	rm	9,9	154,0	230,0	6
39005	1 x 16	rm	9,9	154,0	230,0	6
39063	4 G 16	rm	21,3	614,0	1048,0	6
39014	4 x 16	rm	21,3	614,0	1048,0	6
39071	5 G 16	rm	23,4	768,0	1280,0	6
39022	5 x 16	rm	23,4	768,0	1280,0	6
39079	1 G 25	rm	12,0	240,0	325,0	4
39064	4 G 25	rm	25,8	960,0	1649,0	4
39015	4 x 25	rm	25,8	960,0	1649,0	4
39073	5 G 25	rm	28,7	1200,0	1970,0	4
39065	4 G 35	rm	28,5	1344,0	2000,0	2
39016	4 x 35	rm	28,5	1344,0	2000,0	2

Dimensions and specifications may be changed without prior notice. (R001)

# (N)YM(St)-J PVC-sheathed cable screened



## Technical data

- screened PVC-sheathed cable adapted to DIN VDE 0250 part 204
- **Temperature range**  
flexing +5°C to +70°C  
fixed installation -40°C to +70°C
- Permissible **working temperature** at the conductor +70°C
- **Nominal voltage**  
U<sub>0</sub>/U 300/500 V
- **Test voltage** 2000 V
- **Minimum bending radius**  
fixed installation 4x cable Ø
- **Radiation resistance**  
up to 80x10<sup>6</sup> cJ/kg (up to 80 Mrad)

## Cable structure

- Bare copper-conductor, to DIN VDE 0295 cl.1 or cl.2, single-wire or multi-wire, BS 6360 cl.1 or cl.2, IEC 60228 cl.1 or cl.2
- Core insulation of PVC compound type T11 to DIN VDE 0207-363-4-1/DIN EN 50363-4-1
- Core identification to DIN VDE 0293-308
- Cores stranded in layers with optimal lay-length
- Solid copper drain-wire, tinned
- Coated aluminium foil screening
- Outer sheath of PVC compound type TM1 to DIN VDE 0207-363-4-1/DIN EN 50363-4-1
- Sheath colour grey (RAL 7035)

## Properties

### Tests

- PVC self-extinguishing and flame retardant acc. to DIN VDE 0482-332-1-2, DIN EN 60332-1-2, IEC 60332-1 (equivalent DIN VDE 0472 part 804 test method B)

### Note

- re = round conductor, single-wire
- rm = round conductor, multi-wire
- Also available in an halogen-free version
- AWG sizes are approximate equivalent values. The actual cross-section is in mm<sup>2</sup>.

## Application

These installation cables are made for an effective range of electromagnetic interference alternating fields by a static screen. This screening is specially used for the installation in computer sector, hospitals or industry measuring observation points with measuring instruments which are sensitive to interferences. These cables are also ideal for installations in the living rooms of those peoples who are extreme sensitive to radiation. The cable is suitable for laying on, in and under plaster in dry and damp places as well as in concrete and masonry (a direct laying in shaken or stamped concrete is excluded). Outdoor laying only is possible if the cable is not exposed to direct sunlight or if the cable is laid in cable conduits. Use in dangerous areas is not allowed.

CE= The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Drain-wire mm <sup>2</sup>	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.	
43050	3 G 1,5	re	1,5	10,5	51,0	154,0	16
43051	4 G 1,5	re	1,5	11,5	63,0	184,0	16
43052	5 G 1,5	re	1,5	12,0	80,0	208,0	16
43053	7 G 1,5	re	1,5	13,0	106,0	250,0	16
43054	3 G 2,5	re	1,5	12,0	80,0	217,0	14
43055	4 G 2,5	re	1,5	13,0	104,0	256,0	14
43056	5 G 2,5	re	1,5	13,5	128,0	280,0	14
43057	3 G 4	re	1,5	13,5	123,0	228,0	12
43058	4 G 4	re	1,5	14,5	159,0	359,0	12
43059	5 G 4	re	1,5	16,5	200,0	440,0	12
43060	3 G 6	re	1,5	15,0	187,0	378,0	10
43061	4 G 6	re	1,5	16,5	235,0	477,0	10
43062	5 G 6	re	1,5	17,5	293,0	565,0	10

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Drain-wire mm <sup>2</sup>	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.	
43063	5 G 10	re	1,5	21,5	485,0	840,0	8
43064	5 G 16	rm	2,5	26,0	773,0	1353,0	6
43065	5 G 25	rm	2,5	31,5	1205,0	2017,0	4

Dimensions and specifications may be changed without prior notice. (R001)

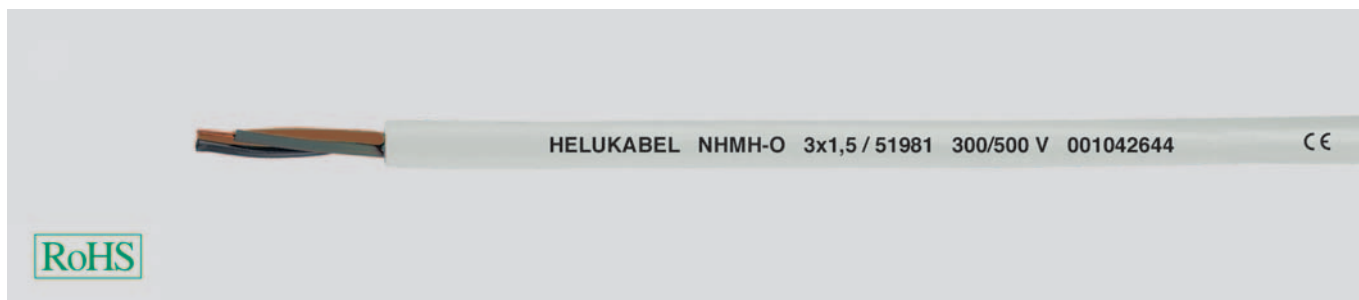


Suitable accessories can be found in Chapter X.

- Tool - DUO Stripper 200



# NHMH-O halogen-free for fixed installation, emission-free, 300/500 V



## Technical data

- Plastic-sheathed cable, halogen-free, for fixed installation to DIN VDE 0250 part 215
- Permissible **working temperature** at the conductor +70°C
- **Nominal voltage** U<sub>0</sub>/U 300/500 V
- **Minimum bending radius** fixed installation 4x cable Ø
- **Caloric load values** see Technical Informations

## Cable structure

- Bare copper-conductor, single-wire or multi-wire
- Core insulation of halogen-free thermoplastic polymer compound with optimum wall thickness
- Core identification to DIN VDE 0293-308 1-core version - core colour BK
- Cores stranded in layer
- Outer sheath of non-cross-linked, halogen-free thermoplastic polymer compound
- Sheath colour grey (RAL 7035)

## Properties

### Tests

- **Corrosive nature of combustion gases (halogen-free verification)** testing acc. to DIN VDE 0482 part 267, DIN EN 50267-2-2, IEC 60754-2, HD 602 (equivalent DIN VDE 0472 part 813)
- **Behaviour in fire** self-extinguishing and flame retardant to DIN VDE 0482-332-1-2, DIN EN 60332-1-2, IEC 60332-1 (equivalent DIN VDE 0472 part 804 test method B)
- **Low smoke** testing acc. to DIN VDE 0472 part 818

### Note

- re = round conductor, single-wire
- rm = round conductor, multi-wire
- x = without green-yellow conductor
- O-version: single-core conductor with black core insulation. Cables between two and seven cores are without gn-ye core.
- AWG sizes are approximate equivalent values. The actual cross-section is in mm<sup>2</sup>.

## Application

This plastic-sheathed cable of defined behaviour in case of fire is used for installations in residential dwellings, public buildings as well as in industrial constructions. Suitable for applications in dry, damp or wet environments for installation above, on, in and beneath plaster, as well as in masonry and concrete walls, not however for embedding in vibration, compacted or tamped concrete. The cable is also approved for outdoor applications provided these are not exposed to direct sunlight radiation. Installation of this cable in earth or in water is not permitted.

CE= The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
51970	1 x 1,5 re	8,3	14,4	39,0	16
51976	2 x 1,5 re	8,9	29,0	82,0	16
51981	3 x 1,5 re	9,2	43,0	92,0	16
51983	4 x 1,5 re	9,9	58,0	115,0	16
51991	7 x 1,5 re	11,5	101,0	167,0	16
51971	1 x 2,5 re	9,0	24,0	47,0	14
51977	2 x 2,5 re	10,0	48,0	110,0	14
51982	3 x 2,5 re	10,6	72,0	128,0	14
51984	4 x 2,5 re	11,0	96,0	152,0	14
51972	1 x 4 re	9,5	38,0	62,0	12
51978	2 x 4 re	11,5	77,0	160,0	12
51985	4 x 4 re	13,4	154,0	244,0	12
51973	1 x 6 re	10,0	58,0	83,0	10
51979	2 x 6 re	12,4	115,0	208,0	10
51986	4 x 6 re	15,9	230,0	345,0	10

Dimensions and specifications may be changed without prior notice. (R001)



Suitable accessories can be found in Chapter X.

- Tool - DUO Stripper 200

# NHMH-J halogen-free for fixed installation, emission-free, 300/500 V



HELUKABEL NHMH-J 3G1,5 / 51996 300/500 V 001042645

CE



## Technical data

- Plastic-sheathed cable, halogen-free, for fixed installation to DIN VDE 0250 part 215
- Permissible **working temperature** at the conductor +70°C
- **Nominal voltage**  
U<sub>0</sub>/U 300/500 V
- **Minimum bending radius**  
fixed installation 4x cable Ø
- **Caloric load values**  
see Technical Informations

## Cable structure

- Bare copper-conductor, single-wire or multi-wire
- Core insulation of halogen-free thermoplastic polymer compound with optimum wall thickness
- Core identification to DIN VDE 0293-308  
1-core version - core colour GN-YE
- GN-YE conductor, 3 cores and above
- Cores stranded in layer
- Outer sheath of non-cross-linked, halogen-free thermoplastic polymer compound
- Sheath colour grey (RAL 7035)

## Properties

- **Corrosive nature of combustion gases (halogen-free verification)**  
testing acc. to DIN VDE 0482 part 267, DIN EN 50267-2-2, IEC 60754-2, HD 602 (equivalent DIN VDE 0472 part 813)
- **Behaviour in fire** self-extinguishing and flame retardant to DIN VDE 0482-332-1-2, DIN EN 60332-1-2, IEC 60332-1 (equivalent DIN VDE 0472 part 804 test method B)
- **Low smoke**  
testing acc. to DIN VDE 0472 part 818

## Note

- re = round conductor, single-wire  
rm = round conductor, multi-wire
- G = with green-yellow conductor
- J-version: with green-yellow core insulation.
- AWG sizes are approximate equivalent values. The actual cross-section is in mm<sup>2</sup>.

## Application

This plastic-sheathed cable of defined behaviour in case of fire is used for installations in residential dwellings, public buildings as well as in industrial constructions. Suitable for applications in dry, damp or wet environments for installation above, on, in and beneath plaster, as well as in masonry and concrete walls, not however for embedding in vibration, compacted or tamped concrete. The cable is also approved for outdoor applications provided these are not exposed to direct sunlight radiation. Installation of this cable in earth or in water is not permitted.

CE= The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

Part no.	No. cores x cross-sec. mm <sup>2</sup>		Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
51996	3 G 1,5	re	9,4	43,0	92,0	16
52001	4 G 1,5	re	10,2	58,0	115,0	16
52009	5 G 1,5	re	10,8	72,0	133,0	16
52016	7 G 1,5	re	11,4	101,0	168,0	16
51997	3 G 2,5	re	10,4	72,0	128,0	14
52002	4 G 2,5	re	11,3	96,0	152,0	14
52010	5 G 2,5	re	11,9	120,0	182,0	14
52017	7 G 2,5	re	13,5	158,0	250,0	14
51992	1 G 4	re	8,6	38,0	62,0	12
51998	3 G 4	re	11,8	115,0	192,0	12
52003	4 G 4	re	13,3	154,0	244,0	12
52011	5 G 4	re	14,8	192,0	300,0	12
51993	1 G 6	re	9,9	58,0	83,0	10
51999	3 G 6	re	13,4	173,0	267,0	10
52004	4 G 6	re	14,8	230,0	345,0	10
52012	5 G 6	re	16,0	288,0	400,0	10
51994	1 G 10	re	11,2	96,0	125,0	8
52000	3 G 10	re	16,0	288,0	628,0	8
52005	4 G 10	re	17,4	384,0	522,0	8
52013	5 G 10	re	18,9	480,0	620,0	8
51995	1 G 16	rm	11,9	154,0	188,0	6
52006	4 G 16	rm	21,6	614,0	815,0	6

Part no.	No. cores x cross-sec. mm <sup>2</sup>		Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
52014	5 G 16	rm	23,8	768,0	995,0	6
52007	4 G 25	rm	27,0	960,0	1305,0	4
52015	5 G 25	rm	29,0	1200,0	1580,0	4
52008	4 G 35	rm	29,9	1344,0	1750,0	2

Dimensions and specifications may be changed without prior notice. (RO01)



Suitable accessories can be found in Chapter X.

- Tool - DUO Stripper 200

# NHXMH-O/-J halogen-free plastic sheathed cable 300/500 V, VDE approved



## Technical data

- Halogen-free plastic-sheathed cable with enhanced characteristics in case of fire, acc. to DIN VDE 0250 part 2 14
- **Conductor resistance** (at 20°C) acc. to DIN VDE 0295 and IEC 60228
- **Max. temperature at the conductor** during operation +70°C in case of short circuit +250°C
- **Temperature range** during installation -5°C to +50°C fixed installation -30°C to +70°C
- **Nominal voltage** U<sub>0</sub>/U 300/500 V
- **Test voltage** 2000 V
- **Minimum bending radius** fixed installation 4x cable Ø
- **Caloric load values** see Technical Informations

## Cable structure

- Bare copper-conductor to DIN VDE 0295, BS 6360, IEC 60228 up to 10 mm<sup>2</sup> cl.1: single-wire 16-35 mm<sup>2</sup> cl.2: multi-wire
- Core insulation of cross-linked **polymer**, compound type 2X11 to DIN VDE 0207 part 22
- Core identification to DIN VDE 0293-308 1-core version - core colour BK or GN-YE
- Cores stranded in layers with optimal lay-length
- Overall core sheath of halogen-free filling compound (may be omitted for single-core cables)
- Outer sheath of flame-retardant, halogen-free polymer compound type HM2 to DIN VDE 0207 part 24
- Sheath colour grey (RAL 7035)

## Properties

- Flame-retardant
  - Halogen-free, no liberation of corrosive or toxic gases
  - Limited propagation of fire
  - Low smoke development
  - Ozone resistant
- ### Tests
- Flame test acc. to DIN VDE 0482-332-3, BS 4066 part 3, DIN EN 60332-3, IEC 60332-3 (previously DIN VDE 0472 part 804 test method C)
  - Corrosiveness of combustion gases acc. to DIN VDE 0482 part 267, DIN EN 50267-2-2, IEC 60754-2 (equivalent DIN VDE 0472 part 813)
  - Halogen-free acc. to DIN VDE 0482 part 267, DIN EN 50267-2-1, IEC 60754-1 (equivalent DIN VDE 0472 part 815)
  - Smoke density acc. to DIN VDE 0482 part 268, HD 606, EN 50268-1+2, IEC 61034-1+2, BS 7622 part 1+2 (equivalent DIN VDE 0472 part 816)
  - Ozone resistance acc. to DIN VDE 0472 part 805
  - Also deliverable in screened (St) version

## Note

- re = round conductor, single-wire
- rm = round conductor, multi-wire
- **LSOH** = Low Smoke Zero Halogen
- AWG sizes are approximate equivalent values. The actual cross-section is in mm<sup>2</sup>.

## Application

Halogen-free plastic-sheathed cables with enhanced characteristics in case of fire are used for applications where harm to human life and damage to property must be prevented in the event of fire, e. g. in industrial installations, communal establishments, hotels, airports, underground stations, railway stations, hospitals, departmental stores, banks, schools, theatres, multi-storey buildings, process control centres etc. Suitable for installation in dry, damp or wet environments, for installation above, on, in and beneath plaster as well as in masonry walls and in concrete, not however for direct embedding in vibration, compacted or tamped concrete. These cables are also suitable for outdoor applications.

CE = The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

### NHXMH-O

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer Ø min. - max. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
53300	1 x 1,5 re	5,0 - 8,4	15,0	49,0	16
53306	2 x 1,5 re	7,6 - 9,2	29,0	110,0	16
53301	1 x 2,5 re	5,4 - 8,8	24,0	60,0	14
53307	2 x 2,5 re	8,4 - 10,1	48,0	136,0	14
53302	1 x 4 re	6,0 - 9,5	39,0	80,0	12
53308	2 x 4 re	9,6 - 11,6	77,0	202,0	12
53303	1 x 6 re	6,4 - 10,0	58,0	111,0	10
53304	1 x 10 re	7,4 - 11,3	96,0	160,0	8
53305	1 x 16 rm	8,5 - 12,4	154,0	232,0	6

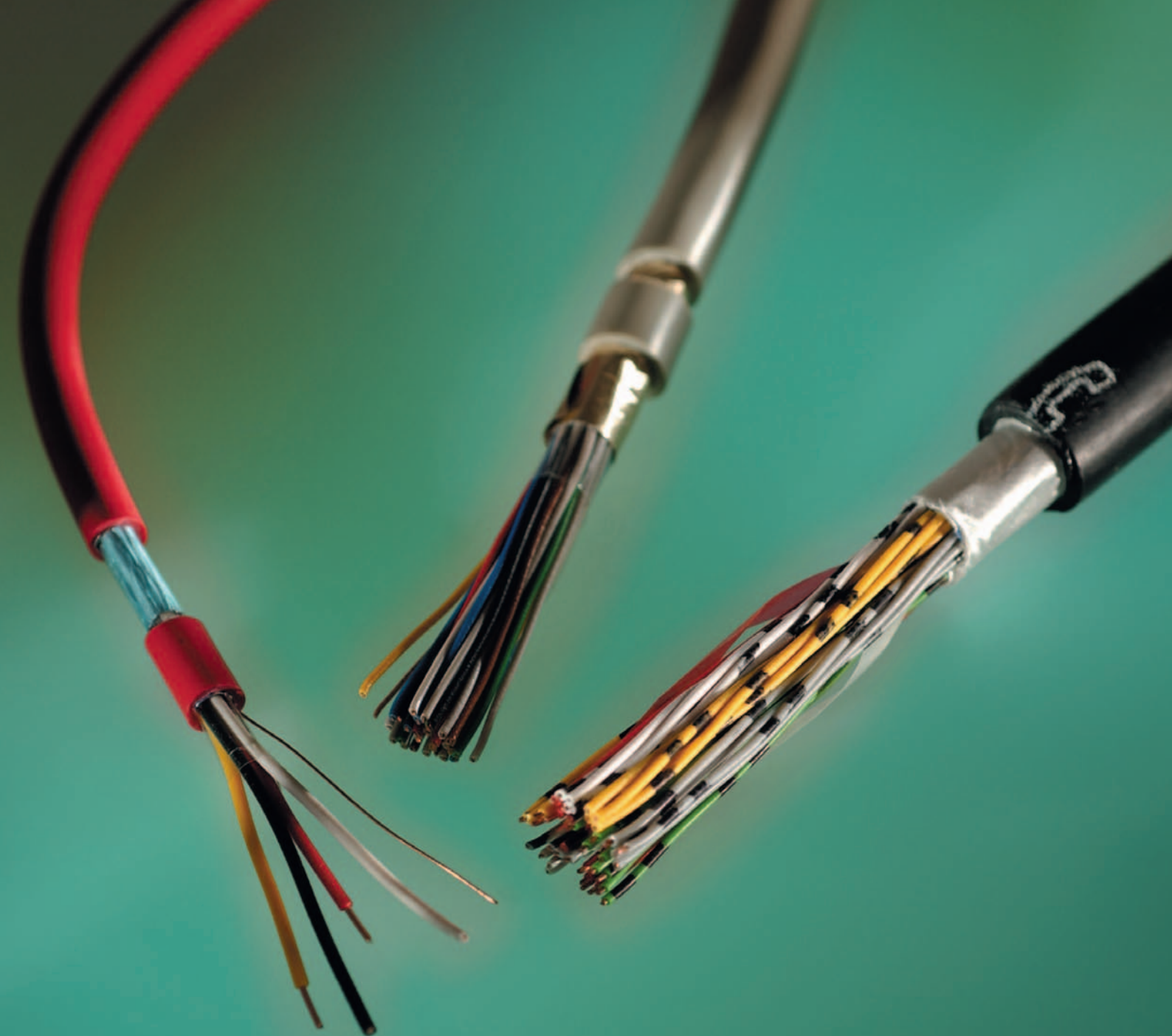
### NHXMH-J

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer Ø min. - max. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
53350	3 G 1,5 re	8,0 - 9,6	43,0	130,0	16
53358	4 G 1,5 re	8,5 - 10,3	58,0	151,0	16
53366	5 G 1,5 re	9,1 - 11,0	72,0	177,0	16
53374	7 G 1,5 re	9,9 - 11,9	101,0	209,0	16
53351	3 G 2,5 re	8,7 - 10,6	72,0	163,0	14
53359	4 G 2,5 re	9,5 - 11,5	96,0	200,0	14
53367	5 G 2,5 re	10,4 - 12,3	120,0	238,0	14
53375	7 G 2,5 re	11,4 - 13,8	168,0	300,0	14

### NHXMH-J

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer Ø min. - max. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
53192	1 G 4 re	6,0 - 9,5	39,0	80,0	12
53352	3 G 4 re	10,1 - 12,2	115,0	235,0	12
53360	4 G 4 re	11,3 - 13,7	154,0	300,0	12
53368	5 G 4 re	12,5 - 15,1	192,0	345,0	12
53193	1 G 6 re	6,4 - 10,0	58,0	111,0	10
53353	3 G 6 re	11,5 - 13,9	173,0	323,0	10
53361	4 G 6 re	12,7 - 15,3	230,0	400,0	10
53369	5 G 6 re	13,7 - 16,6	288,0	475,0	10
53194	1 G 10 re	7,4 - 11,3	96,0	160,0	8
53354	3 G 10 re	13,8 - 16,7	288,0	485,0	8
53362	4 G 10 re	15,1 - 18,2	384,0	603,0	8
53370	5 G 10 re	16,3 - 19,7	480,0	720,0	8
53195	1 G 16 rm	8,5 - 12,4	154,0	232,0	6
53355	3 G 16 rm	16,5 - 20,0	461,0	850,0	6
53363	4 G 16 rm	18,0 - 21,8	615,0	940,0	6
53371	5 G 16 rm	19,7 - 23,8	768,0	1142,0	6
53356	3 G 25 rm	20,4 - 24,6	720,0	1152,0	4
53364	4 G 25 rm	22,6 - 27,3	960,0	1432,0	4
53372	5 G 25 rm	24,7 - 29,8	1200,0	1800,0	4
53357	3 G 35 rm	22,7 - 27,4	1008,0	1503,0	2
53365	4 G 35 rm	24,9 - 30,0	1344,0	1930,0	2
53373	5 G 35 rm	27,5 - 33,2	1680,0	2490,0	2

Dimensions and specifications may be changed without prior notice. (R001)



**A-2Y(L)2Y**

**J-YY Bd**











**J-Y(St)Y Lg**

**S-YY Lg**

**A-2YF(L)2Y**

**J-H(St)H**

## ■ TELEPHONE & FIRE WARNING CABLES

Designation	Properties	Approvals	Page
A-2Y(L)2Y	Bd telephone outdoor cable, in accordance with VDE 0816, laminated sheath, unfilled		524
A-2YF(L)2Y	Bd telephone outdoor cable, in accordance with VDE 0816, laminated sheath filled, longitudinally water-tight		525
J-YY Bd	Telephone indoor cable, in accordance with VDE 0815		526
J-Y(St)Y Lg	Telephone indoor cable, in accordance with VDE 0815		527
J-Y(St)Y Lg	Fire warning indoor cable		528
J-2Y(St)Y	St III Bd 16 Mbits/s (Cat. 3) ISDN/EDV (Z=100 ohm), meter marking		529
S-YY Lg	Patch cable in accordance with VDE 0813		530
J-H(St)H	Bd installation cable, halogen-free, in accordance with VDE 0815		531
J-H(St)H	Bd fire warning indoor cable, halogen-free		532
J-2Y(St)H	St III Bd 16 Mbits/s (Cat.3) ISDN/EDV (Z = 100 ohm), halogen-free		533



# A-2Y(L)2Y Bd telephone-outdoor cable, according to DIN VDE 0816, laminated sheath, unfilled



## Technical data

- acc. to DIN VDE 0816
- **Temperature range**  
flexible -20°C to +50°C  
fixed installation to +70°C
- **Loop resistance** at 20°C  
0,6 mm = max. 130 Ohm/km  
0,8 mm = max. 73,2 Ohm/km
- **Operating peak voltage** max. 225 V  
(not for purposes of high current and power installation)
- **Test voltage**  
core/core U eff. 500<sup>2)</sup> V  
core/screen U eff. 2000 V
- **Insulation resistance**  
min. 5 GOhm x km
- **Line attenuation**  
of side circuits at 800 Hz  
0,6 mm = 1,04 dB/km  
0,8 mm = 0,78 dB/km
- **Impedance**  
of side circuits at 800 Hz  
0,6 mm = 720 Ohm  
0,8 mm = 520 Ohm
- **Minimum bending radius**  
10x cable Ø
- **Radiation resistance**  
up to 80x10<sup>6</sup> cJ/kg (up to 80 Mrad)
- **Caloric load values**  
see Technical Informations

## Cable structure

- Bare copper-conductor, single-wire
- Core insulation of PE (2Y)
- Core identification of quads marked with black rings
- 4 cores twisted to a star quad
- 5 star quads stranded to sub units, each 5 or 10 sub units stranded to main units and the sub or main units stranded to cable core
- Core wrapping with several plastic tapes
- Outer sheath, as laminated sheath (L)2Y, PE-coated aluminium tape spliced with PE (2Y) sheath
- Sheath colour black
- Sheath marking continuously with telephone-receiver, meter marking in white colour

## Properties

- These cables are not allowed for power installation or applications requiring high current levels. Due to their PE outer sheath, these cables are also not permitted for fire and hazardous areas without any protective measures.
- **Mutual capacitance** at 800 Hz  
of all values 100%  
0,6 mm - max. 52 nF/km  
0,8 mm - max. 55 nF/km  
of all values 95%  
0,6 mm - max. 50<sup>3)</sup> nF/km  
0,8 mm - max. 53<sup>3)</sup> nF/km  
of all values 80%  
0,6 mm - max. 48 nF/km  
0,8 mm - max. 50 nF/km
- **Capacitance unbalances** at 800 Hz  
of all values k<sub>1</sub> 100% -max. 800<sup>1)</sup> pF/300 m  
of all values k<sub>1</sub> 98% -max. 400 pF/300 m  
of all values k<sub>9-12</sub> 100% -max. 300<sup>1)</sup> pF/300 m  
of all values k<sub>9-12</sub> 98% -max. 100 pF/300 m

## Note

- <sup>1)</sup> But at least for 2 quads.
- <sup>2)</sup> Local cables with more than 100 pairs the test conductor/conductor is emitted.
- <sup>3)</sup> For cables up to 10 double cores is the 100 % value valid
- Conductor Ø 0,4 mm on request.

## Application

These external subscriber telephone cables are installed as telecommunication connection cable for connecting the telephone extension to the telephone exchange or central offices and as well as for industrial plants. These subscriber connecting cables are suitable for laying in under ground, in cable ducts and cable conduits - and also for indoor-laying. Both sides of PE-copolymere coated aluminium type (L), which is spliced with the outer PE-sheath ensures a **barrier against water vapour** and diagonally water-proof. Black coloured PE-sheath is **UV-resistant**. The Polyethelene material (PE 2Y) is **halogen-free**.

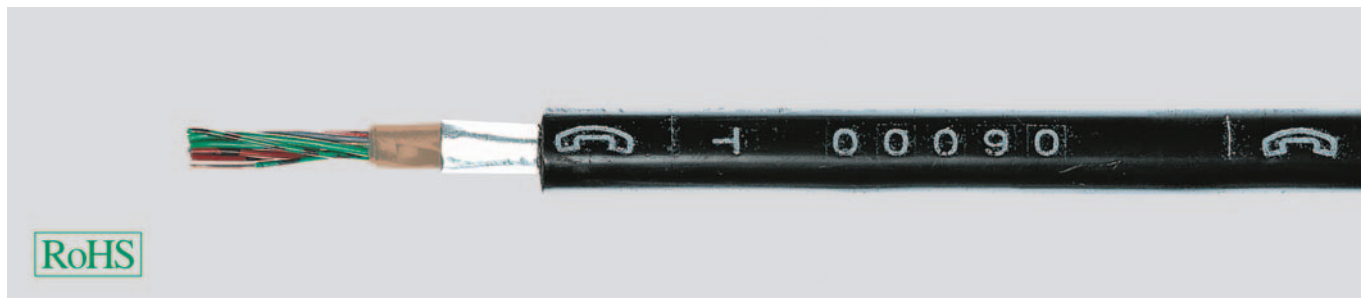
CE= The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

Part no.	No.pairs x cross-sec. mm	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	
34100	2 x 2 x 0,6	8,0	11,0	82,0	-
34101	4 x 2 x 0,6	10,0	23,0	127,0	-
34102	6 x 2 x 0,6	11,5	34,0	132,0	-
34103	10 x 2 x 0,6	12,5	57,0	171,0	-
34104	20 x 2 x 0,6	15,5	113,0	268,0	-
34105	30 x 2 x 0,6	17,5	170,0	358,0	-
34106	40 x 2 x 0,6	19,5	226,0	438,0	-
34107	50 x 2 x 0,6	21,0	283,0	531,0	-
34108	70 x 2 x 0,6	24,5	396,0	712,0	-
34109	100 x 2 x 0,6	28,0	565,0	950,0	-
34110	150 x 2 x 0,6	33,0	848,0	1348,0	-
34111	200 x 2 x 0,6	37,0	1131,0	1758,0	-
34112	250 x 2 x 0,6	40,5	1414,0	2137,0	-
34113	300 x 2 x 0,6	44,0	1696,0	2533,0	-
34114	350 x 2 x 0,6	47,5	1979,0	2954,0	-
34115	400 x 2 x 0,6	50,0	2262,0	3342,0	-

Part no.	No.pairs x cross-sec. mm	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	
34130	2 x 2 x 0,8	11,0	20,0	102,0	-
34131	4 x 2 x 0,8	12,0	40,0	158,0	-
34132	6 x 2 x 0,8	13,0	60,0	179,0	-
34133	10 x 2 x 0,8	14,5	101,0	241,0	-
34134	20 x 2 x 0,8	18,0	201,0	393,0	-
34135	30 x 2 x 0,8	21,0	302,0	540,0	-
34136	40 x 2 x 0,8	23,0	402,0	675,0	-
34137	50 x 2 x 0,8	25,5	503,0	842,0	-
34138	70 x 2 x 0,8	29,0	704,0	1105,0	-
34139	100 x 2 x 0,8	34,0	1005,0	1524,0	-
34140	150 x 2 x 0,8	40,0	1508,0	2208,0	-
34141	200 x 2 x 0,8	46,5	2011,0	2915,0	-
34142	250 x 2 x 0,8	51,0	2514,0	3575,0	-
34143	300 x 2 x 0,8	53,0	3016,0	4232,0	-
34144	350 x 2 x 0,8	56,5	3519,0	4940,0	-
34145	400 x 2 x 0,8	60,0	4022,0	5565,0	-
34146	500 x 2 x 0,8	68,0	5027,0	6955,0	-
34147	600 x 2 x 0,8	73,0	6032,0	8240,0	-

Dimensions and specifications may be changed without prior notice. (RP01)

# A-2YF(L)2Y Bd telephone-outdoor cable, according to DIN VDE 0816, laminated sheath, filled cable core, longitudinally water-proof



## Technical data

- acc. to DIN VDE 0816
- **Temperature range**  
flexible -20°C to +50°C  
fixed installation to +70°C
- **Loop resistance** at 20°C  
0,6 mm = max. 130 Ohm/km  
0,8 mm = max. 73,2 Ohm/km
- **Operating peak voltage** max. 225 V  
(not for purposes of high current and power installation)
- **Test voltage**  
core/core U eff. 500<sup>2)</sup> V  
core/screen U eff. 2000 V
- **Insulation resistance**  
min. 1,5 GOhm x km
- **Line attenuation**  
of side circuits at 800 Hz  
0,6 mm = 1,04 dB/km  
0,8 mm = 0,78 dB/km
- **Impedance** of side circuits at 800 Hz  
0,6 mm = 720 Ohm  
0,8 mm = 520 Ohm
- **Minimum bending radius**  
10x cable Ø
- **Radiation resistance**  
up to 80x10<sup>6</sup> cJ/kg (up to 80 Mrad)
- **Caloric load values**  
see Technical Informations

## Cable structure

- Bare copper-conductor, single-wire
- Core insulation of PE (2Y)
- Core identification of quads marked with black rings
- 4 cores twisted to a star quad
- 5 star quads stranded to sub units, each 5 or 10 sub units stranded to main units and the sub or main units stranded to cable core
- Core cavities continuously filled with petrol-jelly
- Core wrapping with paper tape
- Outer sheath, as laminated sheath (L)2Y, PE-coated aluminium tape spliced with PE (2Y) sheath
- Sheath colour black
- Sheath marking continuously with telephone-receiver, meter marking in white colour

## Properties

- These cables are not allowed for power installation or applications requiring high current levels. Due to their PE outer sheath, these cables are also not permitted for fire and hazardous areas without any protective measures.
- **Mutual capacitance** at 800 Hz of all values 100%  
0,6 mm - max. 52 nF/km  
0,8 mm - max. 55 nF/km  
of all values 95%  
0,6 mm - max. 50<sup>3)</sup> nF/km  
0,8 mm - max. 53<sup>3)</sup> nF/km  
of all values 80%  
0,6 mm - max. 48 nF/km  
0,8 mm - max. 50 nF/km
- **Capacitance unbalances** at 800 Hz of all values k<sub>1</sub> 100% -max. 800<sup>1)</sup> pF/300 m of all values k<sub>1</sub> 98% -max. 400 pF/300 m of all values k<sub>9-12</sub> 100% -max. 300<sup>1)</sup> pF/300 m of all values k<sub>9-12</sub> 98% -max. 100 pF/300 m

## Note

- <sup>1)</sup> But at least for 2 quads.
- <sup>2)</sup> Local cables with more than 100 pairs the test conductor/conductor is emitted.
- <sup>3)</sup> For cables up to 10 double cores is the 100 % value valid
- Conductor Ø 0,4 mm on request.

## Application

These external subscriber telephone cables are installed as telecommunication connection cable for connecting the telephone extension to the telephone exchange for transmitting signals. These subscriber connecting cables are suitable for laying in under ground, in cable ducts and cable conduits. According to DIN VDE 0800 part 1, these cables are allowed in all types of installation plants. The cavities of the cable core, filled continuously with viscous compound (F). Both sides of PE-copolymere coated aluminium type (L), which is spliced with the outer PE-sheath, ensures a barrier against water vapour and **crosswise and longitudinal water tightness**. Black coloured PE-sheath is **UV-resistant**. The Polyethelene material (PE 2Y) is **halogen-free**.

☑= The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

Part no.	No.pairs x cross-sec. mm	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km
34007	2 x 2 x 0,6	7,5	11,0	80,0
34008	4 x 2 x 0,6	9,0	23,0	140,0
34009	6 x 2 x 0,6	12,0	34,0	150,0
34010	10 x 2 x 0,6	13,5	57,0	190,0
34011	20 x 2 x 0,6	16,0	113,0	310,0
34012	30 x 2 x 0,6	19,0	170,0	430,0
34013	40 x 2 x 0,6	20,5	226,0	545,0
34014	50 x 2 x 0,6	23,0	283,0	660,0
34015	70 x 2 x 0,6	26,0	396,0	895,0
34016	100 x 2 x 0,6	31,5	565,0	1230,0
34017	150 x 2 x 0,6	37,5	848,0	1780,0
34018	200 x 2 x 0,6	42,5	1131,0	2320,0
34036	250 x 2 x 0,6	47,5	1414,0	2910,0
34037	300 x 2 x 0,6	51,5	1696,0	3490,0
34038	350 x 2 x 0,6	55,0	1979,0	3970,0
34039	400 x 2 x 0,6	60,5	2262,0	4480,0
34040	500 x 2 x 0,6	66,0	2827,0	5460,0

Part no.	No.pairs x cross-sec. mm	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km
34029	2 x 2 x 0,8	8,5	20,0	100,0
34030	4 x 2 x 0,8	10,0	40,0	180,0
34019	6 x 2 x 0,8	8,5	60,0	190,0
34020	10 x 2 x 0,8	15,0	101,0	280,0
34021	20 x 2 x 0,8	19,0	201,0	480,0
34022	30 x 2 x 0,8	23,0	302,0	670,0
34023	40 x 2 x 0,8	26,0	402,0	860,0
34024	50 x 2 x 0,8	29,0	503,0	1060,0
34025	70 x 2 x 0,8	33,0	704,0	1420,0
34026	100 x 2 x 0,8	39,0	1005,0	1980,0
34027	150 x 2 x 0,8	47,0	1508,0	2940,0
34028	200 x 2 x 0,8	51,0	2011,0	3780,0
34031	250 x 2 x 0,8	58,0	2514,0	4660,0
34032	300 x 2 x 0,8	62,5	3016,0	5570,0
34033	350 x 2 x 0,8	68,0	3519,0	6750,0
34034	400 x 2 x 0,8	73,0	4022,0	7630,0
34035	500 x 2 x 0,8	81,5	5027,0	9540,0

Dimensions and specifications may be changed without prior notice. (RP01)

**J-YY Bd** telephone installation cable, according to DIN VDE 0815**Technical data**

- Installation cable acc. to DIN VDE 0815
- **Temperature range**  
during operation -5°C to +50°C  
fixed installation -30°C to +70°C
- **Loop resistance**  
at 20°C max. 130 Ohm/km
- **Operating peak voltage** max. 300 V  
(not for purposes of high current and power installation)
- **Test voltage** (50 Hz)  
core/core U eff. 800 V
- **Insulation resistance**  
min. 100 MOhm x km
- **Mutual capacitance**  
at 800 Hz max. 100<sup>1)</sup> nF/km
- **Capacitance unbalances** at 800 Hz  
k<sub>1</sub> - max. 300<sup>2)</sup> pF/100 m  
k<sub>9-12</sub> - 100<sup>3)</sup> pF/100 m
- **Line attenuation**  
at 800 Hz 1,48 dB/km
- **Minimum bending radius**  
to DIN VDE 0891 part 5  
during delivery 7,5x cable Ø  
single bending without tension  
2,5x cable Ø  
repeated bending under tension  
7,5x cable Ø
- **Radiation resistance**  
up to 80x10<sup>6</sup> cJ/kg (up to 80 Mrad)
- **Caloric load values**  
see Technical Informations

**Cable structure**

- Bare copper-conductor, single-wire
- Core insulation of PVC, compound type Y11 to DIN VDE 0207 part 4
- Core and star quad identification to DIN VDE 0815
- The cores to a quad and each 5 quads to a unit and several units are stranded in layer
- Foil wrapping
- Outer sheath of PVC, flame retardant, compound type YM1 to DIN VDE 0207 part 5
- Sheath colour grey

**Properties**

- PVC self-extinguishing and flame retardant acc. to DIN VDE 0482-332-1-2, DIN EN 60332-1-2, IEC 60332-1 (equivalent DIN VDE 0472 part 804 test method B)
- The materials used in manufacture are cadmium-free and contain no silicone and free from substances harmful to the wetting properties of lacquers

**Note**

- <sup>1)</sup> This value may be extended by 20% with a make-up to 4 pairs.
- <sup>2)</sup> 20% of the values, but one value up to 500 pF is allowed.
- <sup>3)</sup> 10% of the values, but four values (relationship) up to 300 pF are allowed.

**Application**

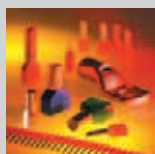
J-YY installation cables are preferably used as telephone cables in telephone stations and sub-extensions, in dry and damp premises, and in or under plaster, in the open air for fixed installation. Telephone-Installation cables are not allowed for purposes of high current and power installation.

CE= The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

Part no.	No.pairs x cross-sec. mm	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	
33100	2 x 2 x 0,6	4,5	11,0	34,0	-
33101	4 x 2 x 0,6	6,5	23,0	59,0	-
33102	6 x 2 x 0,6	7,0	34,0	74,0	-
33103	10 x 2 x 0,6	8,5	57,0	111,0	-
33104	16 x 2 x 0,6	10,0	90,0	160,0	-
33105	20 x 2 x 0,6	11,0	113,0	200,0	-
33106	24 x 2 x 0,6	11,5	136,0	224,0	-

Part no.	No.pairs x cross-sec. mm	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	
33107	30 x 2 x 0,6	13,0	170,0	284,0	-
33108	40 x 2 x 0,6	15,0	226,0	364,0	-
33109	50 x 2 x 0,6	16,5	283,0	451,0	-
33110	60 x 2 x 0,6	17,5	339,0	529,0	-
33111	80 x 2 x 0,6	20,3	452,0	700,0	-
33112	100 x 2 x 0,6	22,3	565,0	850,0	-

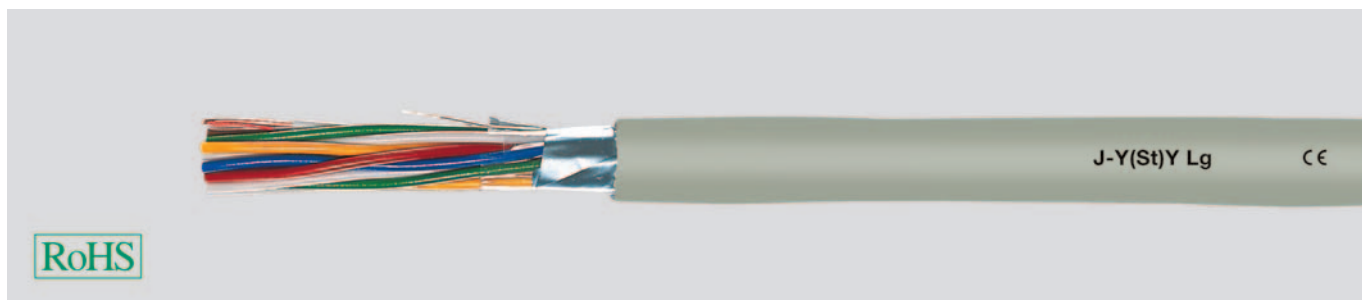
Dimensions and specifications may be changed without prior notice. (RP01)



Suitable accessories can be found in Chapter X.

- Core end sleeve - AV

# J-Y(St)Y Lg telephone installation cable, according to DIN VDE 0815



## Technical data

- Installation cable acc. to DIN VDE 0815
- **Temperature range**  
during operation -5°C to +50°C  
fixed installation -30°C to +70°C
- **Loop resistance** at 20°C  
0,6 mm - max. 130 Ohm/km  
0,8 mm - max. 73,2 Ohm/km
- **Operating peak voltage**  
(not for purposes of high current and power installation)  
0,6 mm - 300 V  
0,8 mm - 300<sup>3)</sup> V
- **Test voltage**  
core/core U eff. 800 V  
core/screen 800 V
- **Insulation resistance**  
min. 100 MOhm x km
- **Mutual capacitance** at 800 Hz  
max. 100<sup>1)</sup> nF/km
- **Capacitance unbalances** at 800 Hz  
k- max. 300<sup>2)</sup> pF/100 m
- **Line attenuation** at 800 Hz  
0,6 mm - 1,7 dB/km  
0,8 mm - 1,1 dB/km
- **Minimum bending radius**  
to DIN VDE 0891 part 5  
during delivery 7,5x cable Ø  
single bending without tension  
5x cable Ø  
repeated bending under tension  
7,5x cable Ø
- **Radiation resistance**  
up to 80x10<sup>6</sup> cJ/kg (up to 80 Mrad)
- **Caloric load values**  
see Technical Informations

## Cable structure

- Bare copper-conductor, single-wire
- Core insulation of PVC, compound type Y11 to DIN VDE 0207 part 4
- Core and pair identification to DIN VDE 0815
- Cores twisted to pairs and the pairs are stranded in layers
- Foil wrapping
- Electrostatic screen (St) of plastic coated aluminium foil and drain wire
- Outer sheath of PVC, flame retardant, compound type YM1 to DIN VDE 0207 part 5
- Sheath colour grey

## Properties

- PVC self-extinguishing and flame retardant acc. to DIN VDE 0482-332-1-2, DIN EN 60332-1-2, IEC 60332-1 (equivalent DIN VDE 0472 part 804 test method B)
- The materials used in manufacture are cadmium-free and contain no silicone and free from substances harmful to the wetting properties of lacquers

## Note

- <sup>1)</sup> This value may be extended by 20% with a make-up to 4 pairs.
- <sup>2)</sup> 20% of the values, but one value up to 500 pF is allowed.
- <sup>3)</sup> Short time operation (6 s/min) up to 600 V permitted.
- 2-paired cables:  
cores are stranded to a star quad.

## Application

This cable type with electrostatic screening (St) protects the transmission circuits against external electrical interferences. Installation cables laid up in pairs are preferably used for telecommunications installations, in dry and damp premises, and in or under plaster, in the open air for fixed installation. These cables are suitable for telephone stations and sub-extensions, for signal and data transmission. Telephone-Installation cables are not allowed for purposes of high current and power installation.

CE= The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

Part no.	No. pairs x cross-sec. mm	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	
33001	2 x 2 x 0,6	5,0	13,0	40,0	-
33002	3 x 2 x 0,6	6,3	18,0	50,0	-
33003	4 x 2 x 0,6	6,5	24,0	60,0	-
33004	5 x 2 x 0,6	7,2	30,0	70,0	-
33005	6 x 2 x 0,6	7,5	35,0	80,0	-
33006	8 x 2 x 0,6	8,0	46,0	90,0	-
33007	10 x 2 x 0,6	10,0	58,0	110,0	-
33008	12 x 2 x 0,6	10,2	71,0	130,0	-
33009	16 x 2 x 0,6	11,0	93,0	160,0	-
33010	20 x 2 x 0,6	12,0	116,0	190,0	-
33011	24 x 2 x 0,6	13,0	139,0	220,0	-
33012	30 x 2 x 0,6	14,0	172,0	280,0	-
33013	40 x 2 x 0,6	15,0	220,0	350,0	-
33014	50 x 2 x 0,6	17,0	286,0	430,0	-
33015	60 x 2 x 0,6	19,0	342,0	500,0	-
33016	80 x 2 x 0,6	21,0	455,0	640,0	-
33017	100 x 2 x 0,6	24,0	568,0	850,0	-

Part no.	No. pairs x cross-sec. mm	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	
33018	2 x 2 x 0,8	7,0	21,0	60,0	-
33019	3 x 2 x 0,8	8,5	31,0	80,0	-
33020	4 x 2 x 0,8	9,0	41,0	100,0	-
33021	5 x 2 x 0,8	9,5	52,0	120,0	-
33022	6 x 2 x 0,8	11,0	62,0	140,0	-
33023	8 x 2 x 0,8	11,5	82,0	170,0	-
33024	10 x 2 x 0,8	13,2	102,0	220,0	-
33025	12 x 2 x 0,8	14,2	123,0	250,0	-
33026	16 x 2 x 0,8	16,0	164,0	320,0	-
33027	20 x 2 x 0,8	17,0	204,0	380,0	-
33028	24 x 2 x 0,8	19,0	244,0	460,0	-
33029	30 x 2 x 0,8	20,8	304,0	560,0	-
33030	40 x 2 x 0,8	23,0	405,0	710,0	-
33031	50 x 2 x 0,8	26,0	505,0	900,0	-
33032	60 x 2 x 0,8	28,0	606,0	1050,0	-
33033	80 x 2 x 0,8	31,5	807,0	1400,0	-
33034	100 x 2 x 0,8	33,0	1008,0	1750,0	-

Dimensions and specifications may be changed without prior notice. (RP01)

# J-Y(St)Y Lg fire warning installation cable



## Technical data

- Installation cable adapted to DIN VDE 0815
- **Temperature range**  
during operation -5°C to +50°C  
fixed installation -30°C to +70°C
- **Loop resistance**  
at 20°C max. 73,2 Ohm/km
- **Operating peak voltage** 300<sup>3)</sup> V  
(not for purposes of high current and power installation)
- **Test voltage** (50 Hz)  
core/core U eff. 800 V  
core/screen 800 V
- **Insulation resistance**  
min. 100 MOhm x km
- **Mutual capacitance**  
at 800 Hz max. 100<sup>1)</sup> nF/km
- **Capacitance unbalances**  
at 800 Hz k - max. 300<sup>2)</sup> pF/100 m
- **Line attenuation**  
at 800 Hz 1,1 dB/km
- **Minimum bending radius**  
to DIN VDE 0891 part 5  
during delivery 7,5x cable Ø  
single bending without tension  
5x cable Ø  
repeated bending under tension  
7,5x cable Ø
- **Radiation resistance**  
up to 80x10<sup>6</sup> cJ/kg (up to 80 Mrad)

## Cable structure

- Bare copper-conductor, single-wire
- Core insulation of PVC, compound type Y11 to DIN VDE 0207 part 4
- Core and pair identification to DIN VDE 0815
- Cores twisted in pairs Pairs stranded in layer
- Foil wrapping
- Plastic coated aluminium foil static screening (St)
- Outer sheath of PVC, flame retardant, compound type YM1 to DIN VDE 0207 part 5
- Sheath colour red, with imprint "Brandmelde-Kabel"

## Properties

- PVC self-extinguishing and flame retardant acc. to DIN VDE 0482-332-1-2, DIN EN 60332-1-2, IEC 60332-1 (equivalent DIN VDE 0472 part 804 test method B)
- The materials used in manufacture are cadmium-free and contain no silicone and free from substances harmful to the wetting properties of lacquers

## Note

- <sup>1)</sup> This value may be extended by 20% with a make-up to 4 pairs.
- <sup>2)</sup> 20% of the values, but one value up to 500 pF is allowed.
- <sup>3)</sup> Short time operation (6 s/min) up to 600 V permitted.
- 2-paired cables:  
cores are stranded to a star quad.

## Application

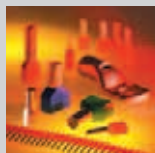
This cable type with electrostatic screening (St) protects the transmission circuits against external electrical interferences. Installation cables laid up in pairs are preferably used for telecommunication installation in dry and damp premises, and in or under plaster, in the open air for fixed installation. These cables are suitable for telephone stations and sub-extensions, for signal and data transmission. Telephone-Installation cables are not allowed for purposes of high current and power installation.

☑= The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

Part no.	No.pairs x cross-sec. mm	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km
33035	1 x 2 x 0,8	4,5	11,0	38,0
33036	2 x 2 x 0,8	7,0	21,0	60,0
33037	3 x 2 x 0,8	8,5	31,0	80,0
33038	4 x 2 x 0,8	9,0	41,0	100,0
33039	5 x 2 x 0,8	9,5	52,0	120,0
33040	6 x 2 x 0,8	11,0	62,0	140,0
33041	8 x 2 x 0,8	11,5	82,0	170,0
33042	10 x 2 x 0,8	13,2	102,0	220,0
33043	12 x 2 x 0,8	14,2	123,0	250,0
33044	14 x 2 x 0,8	14,6	145,0	280,0

Part no.	No.pairs x cross-sec. mm	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km
33045	16 x 2 x 0,8	16,0	164,0	320,0
33046	20 x 2 x 0,8	17,0	204,0	380,0
33047	24 x 2 x 0,8	19,0	244,0	460,0
33048	30 x 2 x 0,8	20,8	304,0	560,0
33049	40 x 2 x 0,8	23,0	405,0	710,0
33050	50 x 2 x 0,8	26,0	505,0	900,0
33051	60 x 2 x 0,8	28,0	606,0	1050,0
33052	80 x 2 x 0,8	31,5	807,0	1400,0
33053	100 x 2 x 0,8	33,0	1008,0	1750,0

Dimensions and specifications may be changed without prior notice. (RP01)



Suitable accessories can be found in Chapter X.

- Core end sleeve - AV



# J-2Y(St)Y St III Bd 16 Mbits/s (Kat. 3) ISDN/EDV (Z = 100 Ohm), meter marking



## Technical data

- Special core insulation of PE adapted to DIN VDE 0815 and 0816
- **Conductor loop-resistance**  
max. 130 Ohm/km
- **Temperature range**  
flexing -5°C to +70°C  
fixed installation -40°C to +70°C
- **Operating peak voltage** 300 V  
(not for heavy current installation purposes)
- **Test voltage** 800 V
- **Insulation resistance**  
min. 5 GOhm x km
- **Mutual capacitance** 48 nF/km
- **Characteristic impedance (Z)**  
at 4-16 MHz: 100 Ohm 15%
- **Capacitance unbalance**  
K<sub>1</sub> max. 400 pF/300 m  
K<sub>9</sub>-K<sub>12</sub> max. 100 pF/300 m
- **Rel. velocity ratio**  
approx. 0,66
- **Attenuation** at  
1 MHz: 28 dB/km  
4 MHz: 47 dB/km  
5 MHz: 51 dB/km  
10 MHz: 65 dB/km  
15 MHz: 76 dB/km  
16 MHz: 78 dB/km  
20 MHz: 89 dB/km
- **Cross-talk attenuation**  
from 4 MHz up to 16 MHz  
for 2 pairs: min. 40 dB  
4 pairs and above: min. 25 dB
- **Minimum bending radius**  
stationary 10x cable Ø

## Cable structure

- Bare copper-conductor, single-wire
- Core insulation of PE
- Colour coding to DIN VDE 0815
- Conductors twisted to quads
- 5 quads twisted to units
- Static screen of plastics coated alu foil with drain wire 0,6 mm Ø
- Outer sheath of PVC, flame retardant, compound type YM1 to DIN VDE 0207 part 5
- Sheath colour grey (RAL 7032)
- with meter marking

## Properties

- PVC outer sheath: self-extinguishing and flame retardant to DIN VDE 0482-332-1-2, DIN EN 60332-1-2/IEC 60332-1 (equivalent DIN VDE 0472 part 804 test method B)
- The materials used in manufacture are cadmium-free and contain no silicone and free from substances harmful to the wetting properties of lacquers

## Application

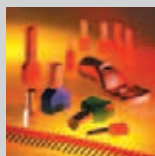
Used as data transmission and connection cable suitable for fixed installation in and under plaster, for data transmission applications, for periphery instrument data processing computers. Suitable for transmission of analog- and digital signals up to 16 Mbit/s. High cross-talk attenuation values. Suitable as connecting cable for periphery equipment, data processing systems, monitors, printers and cash register systems. The static screen (St) screen assures a disturbance-free data and signal transmission for measuring and control systems. These cables are not allowed for purposes of high current and power installation.

CE= The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

Part no.	No.pairs x cross-sec. mm	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km
33200	2 x 2 x 0,6	6,1	13,0	44,0
33201	4 x 2 x 0,6	7,5	24,0	80,0
33202	6 x 2 x 0,6	7,6	35,0	86,0
33203	8 x 2 x 0,6	8,8	46,0	105,0
33204	10 x 2 x 0,6	8,8	58,0	112,0
33205	20 x 2 x 0,6	12,9	116,0	218,0

Part no.	No.pairs x cross-sec. mm	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km
33206	30 x 2 x 0,6	14,0	172,0	302,0
33207	40 x 2 x 0,6	15,5	229,0	376,0
33208	50 x 2 x 0,6	17,3	266,0	480,0
33209	60 x 2 x 0,6	18,1	342,0	560,0
33210	80 x 2 x 0,6	22,0	455,0	748,0
33211	100 x 2 x 0,6	25,2	588,0	940,0

Dimensions and specifications may be changed without prior notice. (RB01)



Suitable accessories can be found in Chapter X.

- Core end sleeve - AV

**S-YY Lg** switchboard cable according to DIN VDE 0813**Technical data**

- Switchboard cable acc. to DIN VDE 0813
- **Temperature range**  
during operation -5°C to +50°C  
fixed installation -30°C to +70°C
- **Electrical characteristics**  
acc. to VDE 0813 at 20°C
- **Conductor resistance**  
0,5 mm - max. 96 Ohm/km  
0,6 mm - max. 65 Ohm/km  
1,0 mm - max. 23,4 Ohm/km
- **Operating peak voltage**  
(not for purposes of high current and power installation)  
0,5 mm - max. 375 V  
0,6 mm - max. 375 V  
1,0 mm - max. 600 V
- **Test voltage** core/core  
0,5 mm - 2000 V  
0,6 mm - 2500 V  
1,0 mm - 2500 V
- **Insulation resistance**  
min. 100 MOhm x km
- Min. permissible **bending radius**  
acc. to DIN VDE 0891 part 3  
during operation max. 7,5x cable Ø

**Cable structure**

- Bare copper-conductor, single-wire
- Core insulation of PVC, compound type Y11 to DIN VDE 0207 part 4
- Core identification to DIN VDE 0813
- Cores stranded in layers
- Foil wrapping
- Outer sheath of PVC, flame retardant, compound type YM1 to DIN VDE 0207 part 5
- Sheath colour grey (RAL 7032)

**Properties**

- PVC self-extinguishing and flame retardant acc. to DIN VDE 0482-332-1-2, DIN EN 60332-1-2, IEC 60332-1 (equivalent DIN VDE 0472 part 804 test method B)
- The materials used in manufacture are cadmium-free and contain no silicone and free from substances harmful to the wetting properties of lacquers

**Application**

In DIN VDE 0800 the operational areas are defined, where the application of switchboard cables permit. These are preferred for the transmission of data signals of telecommunication and control processings i. e. in interlocking installations, to connect the outdoor cables with relay groups as well as for fixed installation to interconnect the racks and distributor frames. This type is not allowed for the installation of heavy current operation.

CE= The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

Part no.	No. cores x cond. Ø mm	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km
34300	30 x 1 x 0,5	9,6	59,0	128,0
34301	60 x 1 x 0,5	11,9	118,0	233,0
34302	10 x 1 x 0,6	7,9	28,0	98,0
34303	20 x 1 x 0,6	9,6	57,0	132,0
34304	30 x 1 x 0,6	11,1	85,0	183,0
34305	60 x 1 x 0,6	15,4	170,0	344,0
34306	80 x 1 x 0,6	18,3	226,0	445,0
34307	20 x 1 x 1	14,5	157,0	292,0
34308	24 x 1 x 1	15,2	188,0	328,0
34309	32 x 1 x 1	16,3	251,0	430,0
34310	40 x 1 x 1	17,8	314,0	515,0
34311	60 x 1 x 1	22,2	471,0	710,0

Dimensions and specifications may be changed without prior notice. (RP01)



Suitable accessories can be found in Chapter X.

- Core end sleeve - AV

# J-H(St)H Bd installation cable, halogen-free, according to DIN VDE 0816



## Technical data

- Flame retardant, halogen-free installation cable acc. to DIN VDE 0815
- **Temperature range**  
flexing -5°C to +50°C  
fixed installation -30°C to +70°C
- **Loop resistance** at 20°C  
max. 130 Ohm/km at 0,6 mm  
max. 73,2 Ohm/km at 0,8 mm
- **Operating peak voltage** 300 V  
(not for purposes of high current and power installation)
- **Test voltage**  
core/core U eff. 800 V  
core/screen 800 V
- **Insulation resistance**  
min. 100 MOhm x km
- **Mutual capacitance** at 800 Hz  
max. 120<sup>1)</sup> nF/km
- **Capacitance unbalances** at 800 Hz  
K<sub>1</sub> max. 300<sup>2)</sup> pF/100 m  
K<sub>9</sub>-K<sub>12</sub> max. 100<sup>3)</sup> pF/100 m
- **Line attenuation** at 800 Hz  
approx. 1,5 dB/km
- **Minimum bending radius**  
during delivery 7,5x cable Ø  
single bending without tension  
2,5x cable Ø  
repeated bending under tension  
7,5x cable Ø
- **Radiation resistance**  
up to 100x10<sup>6</sup> cJ/kg (up to 100 Mrad)
- **Caloric load values**  
see technical informations

## Cable structure

- Bare copper-conductor, single-wire
- Core insulation, halogen-free, compound type HI2 to DIN VDE 0207 part 23
- Core and star-quad identification to DIN VDE 0815
- Cores twisted in quads
- The cores to quads and the quads are stranded to units
- Foil wrapping
- Drain wire solid
- Electrostatic screen (St) of plastic coated aluminium foil
- Outer sheath, halogen-free, flame retardant, compound type HM2 to DIN VDE 0207 part 24
- Sheath colour grey

## Properties

- Not for purposes of high current and power installation as well as underground laying.
- The materials used in manufacture are cadmium-free and contain no silicone and free from substances harmful to the wetting properties of lacquers

## Tests

- Flame test acc. to DIN VDE 0482-332-3-24, BS 4066 part 3, DIN EN 60332-3-24, IEC 60332-3-24 (previously DIN VDE 0472 part 804 test method C)
- Corrosiveness of combustion gases acc. to DIN VDE 0482 part 267, DIN EN 50267-2-2, IEC 60754-2 (equivalent DIN VDE 0472 part 813)
- Smoke density acc. to DIN VDE 0482 part 1034-1+2, DIN EN 61034-1+2, IEC 61034-1+2, BS 7622 part 1+2 (previously DIN VDE 0472 part 816)

## Note

- <sup>1)</sup> This value may be extended by 20% with make-up up to 4 pairs.
- <sup>2)</sup> 20% of the values, but one value up to 500 pF is allowed.
- <sup>3)</sup> 10% of the values, but four values (relationship) up to 300 pF are allowed.
- **LSOH** = Low Smoke Zero Halogen

## Application

The halogen-free installation cables with improved characteristics in the case of fire are used for the telephone transmission, measurement and control technology. The static screen protects the transmission circuits against outer electrical interferences. A fire propagation is prevented through high oxygen index of the insulation material and produce no corrosive gases in case of fire. Those cables are preferably used for telecommunication installations in dry and damp premises, and in or under plaster.

CE= The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

Part no.	No.pairs x cross-sec. mm	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	
34050	2 x 2 x 0,6	5,4	14,0	50,0	-
34051	4 x 2 x 0,6	7,3	25,0	91,0	-
34052	6 x 2 x 0,6	7,7	37,0	100,0	-
34053	10 x 2 x 0,6	9,1	59,0	147,0	-
34054	20 x 2 x 0,6	13,5	116,0	308,0	-
34055	30 x 2 x 0,6	15,1	172,0	350,0	-
34056	40 x 2 x 0,6	16,5	229,0	465,0	-
34057	50 x 2 x 0,6	18,6	286,0	571,0	-
34058	60 x 2 x 0,6	19,3	342,0	662,0	-
34059	80 x 2 x 0,6	24,6	455,0	877,0	-
34060	100 x 2 x 0,6	27,2	568,0	1055,0	-

Part no.	No.pairs x cross-sec. mm	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	
34061	2 x 2 x 0,8	6,5	25,0	70,0	-
34062	4 x 2 x 0,8	9,0	45,0	135,0	-
34063	6 x 2 x 0,8	10,0	65,0	151,0	-
34064	10 x 2 x 0,8	11,5	106,0	230,0	-
34065	20 x 2 x 0,8	20,4	206,0	507,0	-
34066	30 x 2 x 0,8	21,5	307,0	600,0	-
34067	40 x 2 x 0,8	23,0	407,0	788,0	-
34068	50 x 2 x 0,8	25,0	508,0	972,0	-
34069	60 x 2 x 0,8	28,0	608,0	1120,0	-
34070	80 x 2 x 0,8	31,5	809,0	1475,0	-
34071	100 x 2 x 0,8	32,3	1010,0	1804,0	-

Dimensions and specifications may be changed without prior notice. (RP01)



Suitable accessories can be found in Chapter X.

- Core end sleeve - AV

# J-H(St)H Bd fire warning installation cable, halogen-free



## Technical data

- Flame retardant, halogen-free installation cable adapted to DIN VDE 0815
- **Temperature range**  
flexing -5°C to +50°C  
fixed installation -30°C to +70°C
- **Loop resistance** at 20°C  
max. 73,2 Ohm/km
- **Operating peak voltage** 300 V  
(not for purposes of high current and power installation)
- **Test voltage**  
core/core U eff. 800 V  
core/screen 800 V
- **Insulation resistance**  
min. 100 MOhm x km
- **Mutual capacitance** at 800 Hz  
max. 120<sup>1)</sup> nF/km
- **Capacitance unbalances** at 800 Hz  
K<sub>1</sub> max. 300<sup>2)</sup> pF/100 m  
K<sub>9</sub>-K<sub>12</sub> max. 100<sup>3)</sup> pF/100 m
- **Line attenuation** at 800 Hz  
approx. 1,5 dB/km
- **Minimum bending radius**  
during delivery 7,5x cable Ø  
single bending without tension  
2,5x cable Ø  
repeated bending under tension  
7,5x cable Ø
- **Radiation resistance**  
up to 100x10<sup>6</sup> cJ/kg (up to 100 Mrad)
- **Caloric load values**  
see Technical Informations

## Cable structure

- Bare copper-conductor, single-wire
- Core insulation, halogen-free, compound type HI2 to DIN VDE 0207 part 23
- Core and star-quad identification to DIN VDE 0815
- Cores twisted in quads
- The cores to quads and the quads are stranded to units
- Foil wrapping
- Drain wire solid
- Electrostatic screen (St) of plastic coated aluminium foil
- Outer sheath, halogen-free, flame retardant, compound type HM2 to DIN VDE 0207 part 24
- Sheath colour red with imprint "BRANDMELDEKABEL"

## Properties

- Not for purposes of high current and power installation as well as underground laying
- The materials used in manufacture are cadmium-free and contain no silicone and free from substances harmful to the wetting properties of lacquers

## Tests

- Flame test acc. to DIN VDE 0482-332-3-24, BS 4066 part 3, DIN EN 60332-3-24, IEC 60332-3-24 (previously DIN VDE 0472 part 804 test method C)
- Corrosiveness of combustion gases acc. to DIN VDE 0482 part 267, DIN EN 50267-2-2, IEC 60754-2 (equivalent DIN VDE 0472 part 813)
- Smoke density acc. to DIN VDE 0482 part 1034-1+2, DIN EN 61034-1+2, IEC 61034-1+2, BS 7622 part 1+2 (previously DIN VDE 0472 part 816)

## Note

- <sup>1)</sup> This value may be extended by 20% with make-up up to 4 pairs.
- <sup>2)</sup> 20% of the values, but one value up to 500 pF is allowed.
- <sup>3)</sup> 10% of the values, but four values (relationship) up to 300 pF are allowed.
- **LSOH** = Low Smoke Zero Halogen

## Application

The halogen-free installation cables with improved characteristics in the case of fire are used for the telephone transmission, measurement and control technology. The static screen protects the transmission circuits against outer electrical interferences. A fire propagation is prevented through high oxygen index of the insulation material and produce no corrosive gases in case of fire. Those cables are preferably used for telecommunication installations in dry and damp premises, and in or under plaster.

☑= The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

Part no.	No.pairs x cross-sec. mm	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	
34116	2 x 2 x 0,8	6,8	25,0	70,0	-
34117	4 x 2 x 0,8	10,5	45,0	135,0	-
34118	6 x 2 x 0,8	10,9	65,0	151,0	-
34119	10 x 2 x 0,8	13,1	106,0	230,0	-
34120	20 x 2 x 0,8	20,4	206,0	507,0	-
34121	30 x 2 x 0,8	21,5	307,0	600,0	-

Part no.	No.pairs x cross-sec. mm	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	
34122	40 x 2 x 0,8	24,5	407,0	788,0	-
34123	50 x 2 x 0,8	27,1	508,0	972,0	-
34124	60 x 2 x 0,8	29,4	608,0	1120,0	-
34125	80 x 2 x 0,8	33,2	809,0	1475,0	-
34126	100 x 2 x 0,8	37,2	1010,0	1804,0	-

Dimensions and specifications may be changed without prior notice. (RP01)



Suitable accessories can be found in Chapter X.

- Core end sleeve - AV

# J-2Y(St)H St III Bd 16 Mbits/s (Kat.3) ISDN/EDV (Z = 100 Ohm), halogen-free



## Technical data

- Special core insulation of PE adapted to DIN VDE 0815 and 0816
- **Conductor loop-resistance**  
max. 130 Ohm/km
- **Temperature range**  
flexing -5°C to +70°C  
fixed installation -30°C to +70°C
- **Operating peak voltage** 300 V  
(not for purposes of high current and power installation)
- **Test voltage** 800 V
- **Insulation resistance**  
min. 5 GOhm x km
- **Mutual capacitance** 48 nF/km
- **Characteristic impedance (Z)**  
at 4-16 MHz: 100 Ohm ±15%
- **Capacitance unbalance**  
K<sub>1</sub> max. 400 pF/300 m  
K<sub>9</sub>-K<sub>12</sub> max. 100 pF/300 m
- **Rel. velocity ratio** approx. 0,66
- **Attenuation** at  
1 MHz: 28 dB/km  
4 MHz: 47 dB/km  
5 MHz: 51 dB/km  
10 MHz: 65 dB/km  
15 MHz: 76 dB/km  
16 MHz: 78 dB/km  
20 MHz: 89 dB/km
- **Cross-talk attenuation**  
from 4 MHz up to 16 MHz  
for 2 pairs: min. 40 dB  
4 pairs and above: min. 25 dB
- **Minimum bending radius**  
stationary 10x cable Ø

## Cable structure

- Bare copper-conductor, single-wire
- Core insulation of PE (2Y)
- Colour coding to DIN VDE 0815
- Conductors twisted to quads
- 5 quads twisted to units
- Static screen of plastics coated alu foil with drain wire 0,6 mm Ø
- Outer sheath, halogen-free, flame retardant, polymer-compound
- Sheath colour grey

## Properties

- Outer sheath  
Flame test acc. to  
DIN VDE 0482-332-3, BS 4066 part 3,  
DIN EN 60332-3, IEC 60332-3 (previously  
DIN VDE 0472 part 804 test method C)
- These cables are not allowed for purposes of high current and power installation
- The materials used in manufacture are cadmium-free and contain no silicone and free from substances harmful to the wetting properties of lacquers

## Application

Used as data transmission and connection cable suitable for fixed installation in and under plaster, for data transmission applications, for periphery instrument data processing computers. Suitable for transmission of analog- and digital signals up to 16 Mbit/s. High cross-talk attenuation values. Suitable as connecting cable for periphery equipment, data processing systems, monitors, Printers and cash register systems. The static screen (St) screen assures a disturbance-free data and signal transmission for measuring and control systems.

CE= The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

Part no.	No.pairs x cross-sec. mm	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km
34166	2 x 2 x 0,6	5,8	13,0	44,0
34167	4 x 2 x 0,6	9,2	24,0	80,0
34168	6 x 2 x 0,6	9,3	35,0	86,0
34169	8 x 2 x 0,6	9,5	46,0	105,0
34170	10 x 2 x 0,6	9,8	58,0	112,0
34171	20 x 2 x 0,6	12,7	116,0	218,0

Part no.	No.pairs x cross-sec. mm	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km
34172	30 x 2 x 0,6	15,0	172,0	302,0
34173	40 x 2 x 0,6	16,8	229,0	376,0
34174	50 x 2 x 0,6	18,5	266,0	480,0
34175	60 x 2 x 0,6	20,2	342,0	560,0
34176	80 x 2 x 0,6	23,0	455,0	748,0
34177	100 x 2 x 0,6	25,2	588,0	940,0

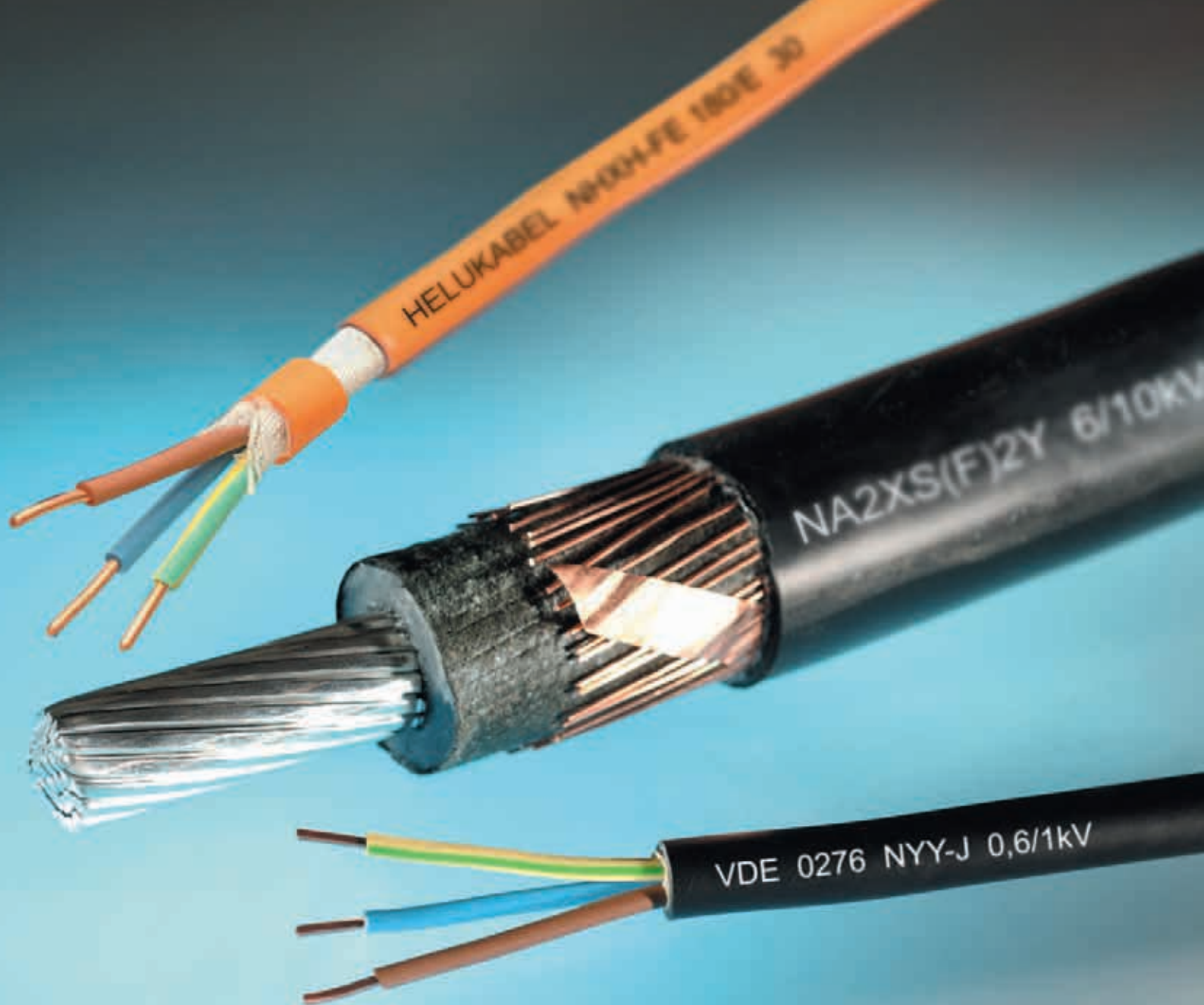
Dimensions and specifications may be changed without prior notice. (RP01)



Suitable accessories can be found in Chapter X.

- Core end sleeve - AV





**NY Y**

**(N)A2XH**

**NA2XY**
























**JE-H(St)H**

**N2XCH-FE 180/E 30**

**N2XS(FL)2Y 6/10KV**

**NYFGY 3X**

# POWER, SECURITY & MEDIUM VOLTAGE CABLES

Designation	Properties	Approvals	Page
<b>Underground cables &amp; power distribution cables</b>			
NYN	Underground cable 0.6/1 kV, VDE approved	ERC 	538
NYCY	Underground cable 0.6/1 kV, with concentric conductor VDE approved	ERC 	540
NYCWY	Underground cable 0.6/1 kV, with concentric conductor VDE approved	ERC 	542
NAYY	Underground cable 0.6/1 kV, VDE approved	ERC 	544
NAYZY	Power cable 0.6/1 kV, with PE outer sheath		546
NAYCWY	Underground cable 0.6/1 kV, with concentric conductor VDE approved	ERC 	547
N2XY	Underground cable 0.6/1 kV, VDE approved, increased current load		548
N2XCY	Underground cable 0.6/1 kV, with concentric conductor, VDE approved, increased current load		549
NA2XY	Underground cable 0.6/1 kV, VDE approved, increased current load	ERC 	551
A-LiY(StE)YÖ	Data transmission cable for gas stations and refineries with BAM certificate		552
Petrol station cable	(N)YYÖ-J 0.6/1 kV		553
NYKY-J 0.6/1 kV	with lead sheath, VDE approval		554
<b>Low-voltage &amp; safety cables</b>			
N2HX	Power cable 0.6/1 kV, halogen-free without functionality	ERC 	557
N2XCH	Power cable 0.6/1 kV, halogen-free, with concentric conductor, without functionality	ERC 	559
(N)A2XH	Power cable 0.6/1 kV, halogen-free without functionality	ERC	561
N2XH-FE 180/E 30	Security cable, halogen-free, 0.6/1 kV, with improved fire behavior	ERC	563
N2XCH-FE 180/E 30	Security cable, halogen-free, 0.6/1 kV, with improved fire behavior	ERC	565
(N)HXH-FE 180/E 30	Security cable, halogen-free, 0.6/1 kV, with improved fire behavior	ERC	567
(N)HXCH-FE 180/E 30	Security cable, halogen-free, 0.6/1 kV, with improved fire behavior	ERC	569
N2XH-FE 180/E 90	Security cable, halogen-free, 0.6/1 kV, with improved fire behavior		571
N2XCH-FE 180/E 90	Security cable, halogen-free, 0.6/1 kV, with improved fire behavior		573
(N)HXH-FE 180/E 90	Security cable, halogen-free, 0.6/1 kV, with improved fire behavior	ERC	575
(N)HXCH-FE 180/E 90	Security cable, halogen-free, 0.6/1 kV, with improved fire behavior	ERC	577
JE-H(St)H	Bd FE 180/E 30 to E 90 (orange), halogen-free		579
JE-H(St)H	Bd fire alarm cable, FE 180/E 30 to E 90 (red), halogen-free		580
JE-H(St)HRH	Bd fire alarm cable, FE 180/E 30 to E 90, halogen-free		581
<b>Medium-voltage cables</b>			
N2XS <sub>Y</sub> 6/10kV, 12/20kV, 18/30kV	VPE-insulated Cu-conductor, single core, screened, PVC jacket		585
N2XS <sub>2Y</sub> 6/10kV, 12/20kV, 18/30kV	VPE-insulated Cu-conductor, single core, screened, PE jacket		587
N2XS(F)2Y 6/10kV, 12/20kV, 18/30kV	VPE-insulated Cu-conductor, single core, screened, longitudinally water-tight, PE jacket		589
N2XS(FL)2Y 6/10kV	VPE-insulated Cu-conductor, single core, screened, longitudinally and transversely water-tight PE jacket		591
NA2XS <sub>Y</sub> 6/10kV, 12/20kV, 18/30kV	VPE-insulated alu-conductor, single core, screened, PVC jacket		593
NA2XS <sub>2Y</sub> 6/10kV, 12/20kV, 18/30kV	VPE-insulated Al-conductor, single core, screened, PE jacket		595
NA2XS(F)2Y 6/10kV, 12/20kV, 18/30kV	VPE-insulated Al-conductor, single core, screened, longitudinally water-tight, PE jacket		597
NA2XS(FL)2Y 6/10kV, 12/20kV, 18/30kV	VPE-insulated Al-conductor, single core, screened, longitudinally and transversely water-tight PE jacket		599
NYFGY 3 x ... 3.6/6kV	Ribbon cable armor, PVC jacket		601
N2XSEY 3 x ... 6/10kV	VPE-insulated, screened, Cu-conductor, PVC jacket		602
N2XSEH 3x ... 6/10kV	Power cable 0.6/1 kV, with PE outer sheath		603



# ■ CODE-DESIGNATION FOR POWER CABLES WITH PVC OR XLPE INSULATION

<b>Design</b>	<b>Identification of design</b>	<b>Explanations</b>
<b>Core</b>	<b>N</b>	According to VDE standard (no abbreviation for copper conductor)
	<b>A</b>	Aluminium conductors
	<b>Y</b>	Insulation of thermoplastic Polyvinylchloride (PVC)
	<b>2X</b>	Insulation cross-linked Polyethylene (XLPE)
<b>Concentric conductor, screen</b>	<b>C</b>	Concentric conductors of copper wires and copper tape, helically wounded
	<b>CW</b>	Concentric conductor of copper wires in waveconal formation and copper tape, helically wounded
	<b>CE</b>	Concentric conductor of copper wires and copper tape over each individual core, helically wounded
<b>Screen</b>	<b>S</b>	Screen of copper wires and copper tape, helically wounded
	<b>SE</b>	Screen of copper wires and copper tape over each individual core, helically wounded
	<b>(F)</b>	Longitudinally water-proof screen
<b>Armour</b>	<b>B</b>	Armour of steel tape
	<b>F</b>	Armour of galvanized flat steel wires
	<b>G</b>	Counter helix of galvanized steel tape
<b>Sheath</b>	<b>K</b>	Lead sheath
<b>Outer sheath</b>	<b>Y</b>	PVC sheath
	<b>2Y</b>	PE sheath

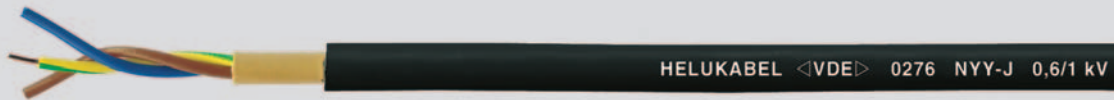
**Cable for  $U_0/U 0,6/1$  kV** are additionally designated with

<b>-J</b>	Cables with green-yellow (green-natural) core are marked with protective conductor
<b>-O</b>	able without green-yellow (green-natural) core are marked without protective conductor



# UNDERGROUND CABLES & POWER DISTRIBUTION CABLES



**NYY power cable, 0,6/1kV, VDE approved****Technical data**

- Power and control cable to DIN VDE 0276 part 603, HD 603 S1 and IEC 60502, 7 core and above to DIN VDE 0276 part 627, HD 627 S1 and IEC 60502
- **Temperature range**  
flexing -5°C to +50°C  
fixed installation -40°C to +70°C
- Permissible **operating temperature** at conductor +70°C
- Permissible **short circuit temperature** (short circuit duration max. 5 s)  
≤ 300 mm<sup>2</sup> +160°C  
> 300 mm<sup>2</sup> +140°C
- **Nominal voltage** U<sub>0</sub>/U 0,6/1 kV
- **Test voltage** 4 kV
- Max. permissible **tensile stress** with cable grip at conductor 50 N/mm<sup>2</sup>
- **Minimum bending radius**  
single-core 15x cable Ø  
multi-core 12x cable Ø
- **Caloric load values**  
see Technical Informations

**Cable structure**

- Bare copper-conductor, to DIN VDE 0295 cl.1 or cl.2, single-wire or multi-wire, BS 6360 cl.1 or cl.2, IEC 60228 cl.1 or cl.2
- Core insulation of PVC compound type DIV4 to HD 603 S1
- Core identification to DIN VDE 0293-308, 0276 part 603
- Core colour for 3+½ conductor  
J-version: GN-YE (½), BN, BK, GY  
O-version: BU (½), BN, BK, GY
- Cores stranded in concentric layers
- Outer sheath of PVC compound type DMV5 to HD 603 S1
- Sheath colour black

**Properties**

- The materials used in manufacture are cadmium-free and contain no silicone and free from substances harmful to the wetting properties of lacquers

**Tests**

- PVC self-extinguishing and flame retardant acc. to DIN VDE 0482-332-1-2, DIN EN 60332-1-2, IEC 60332-1 (equivalent DIN VDE 0472 part 804 test method B)

**Highest permissible voltage**

- Direct current systems 1,8 kV
- Alternating current systems
  - Single-phase systems  
both outer conductors insulated 1,4 kV
  - Single-phase systems  
one outer conductor earthed 0,7 kV
- Three-phase systems 1,2 kV

**Note**

- re = round conductor, single-wire  
rm = round conductor, multi-wire  
sm = sectional conductor, multi-wire
- J-version = with GN-YE conductor  
O-version = without GN-YE conductor
- In respect to 3+½ conductors  
Whereby only one conductor is allowed to contain a smaller cross-section (as per DIN VDE 0276 part 603 table 5) and permitted to place as insulated core (green-yellow and blue as ½-conductor), stranded in layer.
- AWG sizes are approximate equivalent values. The actual cross-section is in mm<sup>2</sup>.

**Application**

Power cables for energy supply are installed in open air, in underground, in water, in concrete, indoors, in cable ducts, power stations, for industry and distribution boards as well as in subscriber networks, where mechanical damages are not to be expected.

☑= The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

No. cores x cross-sec. mm <sup>2</sup>		Outer Ø app. mm	Cop. weight kg / km	Weight app. kg / km	J type Part no.	AWG-No.		O type Part no.	AWG-No.	
1 x 4	re	9,0	38,0	115,0	32001	12	-	32089	12	-
1 x 6	re	9,5	58,0	135,0	32002	10	-	32090	10	-
1 x 10	re	10,0	96,0	179,0	32003	8	-	32091	8	-
1 x 16	re	11,0	154,0	245,0	32004	6	-	32092	6	-
1 x 25	rm	12,0	240,0	360,0	32005	4	-	32093	4	-
1 x 35	rm	13,0	336,0	470,0	32006	2	-	32094	2	-
1 x 50	rm	15,0	480,0	620,0	32007	1	-	32095	1	-
1 x 70	rm	16,5	672,0	810,0	32008	2/0	-	32096	2/0	-
1 x 95	rm	19,0	912,0	1110,0	32009	3/0	-	32097	3/0	-
1 x 120	rm	20,5	1152,0	1360,0	32010	4/0	-	32098	4/0	-
1 x 150	rm	22,5	1440,0	1670,0	32011	300 kcmil	-	32099	300 kcmil	-
1 x 185	rm	25,0	1776,0	2050,0	32012	350 kcmil	-	32100	350 kcmil	-
1 x 240	rm	28,0	2304,0	2630,0	32013	500 kcmil	-	32101	500 kcmil	-
1 x 300	rm	30,0	2880,0	3200,0	32014	600 kcmil	-	32102	600 kcmil	-
1 x 400	rm	34,0	3840,0	4150,0	32015	750 kcmil	-	32103	750 kcmil	-
1 x 500	rm	38,0	4800,0	5200,0	32556	1000 kcmil	-	32558	1000 kcmil	-
1 x 630	rm	43,0	6048,0	6650,0	32557	1250 kcmil	-	32559	1250 kcmil	-

Continuation ▶



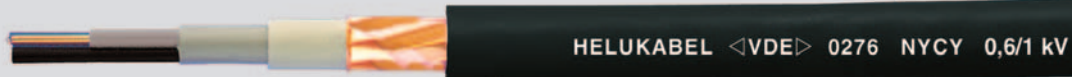
**NYN** power cable, 0,6/1kV, VDE approved

No. cores x cross-sec. mm²	Outer Ø app. mm	Cop. weight kg / km	Weight app. kg / km	J type Part no.	AWG-No.	O type Part no.	AWG-No.
2 x 1,5 re	11,0	29,0	175,0	32016	16	32104	16
2 x 2,5 re	12,0	48,0	215,0	32017	14	32105	14
2 x 4 re	14,0	77,0	295,0	32018	12	32106	12
2 x 6 re	15,0	115,0	370,0	32019	10	32107	10
2 x 10 re	16,5	192,0	495,0	32020	8	32108	8
2 x 16 re	18,5	307,0	670,0	32021	6	32109	6
2 x 25 rm	23,5	480,0	960,0	32022	4	32110	4
3 x 1,5 re	11,5	43,0	195,0	32023	16	32111	16
3 x 2,5 re	12,5	72,0	250,0	32024	14	32112	14
3 x 4 re	14,0	115,0	340,0	32025	12	32113	12
3 x 6 re	15,0	173,0	430,0	32026	10	32114	10
3 x 10 re	17,0	288,0	590,0	32027	8	32115	8
3 x 16 re	19,0	461,0	820,0	32028	6	32116	6
3 x 25 rm	24,0	720,0	1320,0	32029	4	32117	4
3 x 35 sm	25,0	1008,0	1450,0	32030	2	32118	2
3 x 50 sm	26,5	1440,0	1850,0	32031	1	32119	1
3 x 70 sm	30,0	2016,0	2450,0	32032	2/0	32120	2/0
3 x 95 sm	34,5	2736,0	3300,0	32033	3/0	32121	3/0
3 x 120 sm	37,0	3456,0	4100,0	32034	4/0	32122	4/0
3 x 150 sm	40,0	4320,0	4900,0	32293	300 kcmil	32296	300 kcmil
3 x 185 sm	46,0	5328,0	6500,0	32294	350 kcmil	32297	350 kcmil
3 x 240 sm	51,0	6912,0	8300,0	32295	500 kcmil	32298	500 kcmil
4 x 1,5 re	12,0	58,0	230,0	32044	16	32132	16
4 x 2,5 re	13,5	96,0	300,0	32045	14	32133	14
4 x 4 re	15,0	154,0	410,0	32046	12	32134	12
4 x 6 re	16,5	230,0	520,0	32047	10	32135	10
4 x 10 re	18,5	384,0	730,0	32048	8	32136	8
4 x 16 re	21,5	614,0	1045,0	32049	6	32137	6
4 x 25 rm	26,0	960,0	1640,0	32050	4	32138	4
4 x 35 sm	27,5	1344,0	1760,0	32051	2	32139	2
4 x 50 sm	30,0	1920,0	2350,0	32052	1	32140	1
4 x 70 sm	34,0	2688,0	3100,0	32053	2/0	32141	2/0
4 x 95 sm	39,0	3648,0	4250,0	32054	3/0	32142	3/0
4 x 120 sm	42,5	4608,0	5300,0	32055	4/0	32143	4/0
4 x 150 sm	47,5	5760,0	6400,0	32056	300 kcmil	32144	300 kcmil
4 x 185 sm	52,0	7104,0	8500,0	32057	350 kcmil	32145	350 kcmil
4 x 240 sm	58,0	9216,0	11000,0	32058	500 kcmil	32146	500 kcmil
5 x 1,5 re	13,0	72,0	270,0	32059	16	32147	16
5 x 2,5 re	14,5	120,0	360,0	32060	14	32148	14
5 x 4 re	16,5	192,0	490,0	32061	12	32149	12
5 x 6 re	18,0	288,0	600,0	32062	10	32150	10
5 x 10 re	20,0	480,0	890,0	32063	8	32151	8
5 x 16 re	22,5	768,0	1255,0	32064	6	32152	6
5 x 25 rm	28,0	1200,0	1960,0	32065	4	-	-
5 x 35 rm	34,0	1680,0	2400,0	32300	2	-	-
5 x 50 rm	40,0	2400,0	3500,0	32257	1	-	-
5 x 70 rm	42,7	3360,0	4470,0	79608	2/0	-	-
5 x 95 rm	50,3	4560,0	6149,0	700939	3/0	-	-
7 x 1,5 re	15,5	101,0	310,0	32066	16	32153	16
7 x 2,5 re	16,5	168,0	450,0	32076	14	32163	14
7 x 4 re	18,5	269,0	640,0	32086	12	32173	12
7 x 6 re	20,0	403,0	850,0	32087	10	32174	10
7 x 10 re	23,5	672,0	1200,0	32088	8	32175	8
10 x 1,5 re	18,0	144,0	380,0	32067	16	32154	16
10 x 2,5 re	19,5	240,0	520,0	32077	14	32164	14
12 x 1,5 re	19,0	173,0	420,0	32068	16	32155	16
12 x 2,5 re	20,5	288,0	600,0	32078	14	32165	14
14 x 1,5 re	20,0	202,0	470,0	32069	16	32156	16
14 x 2,5 re	21,0	336,0	680,0	32079	14	32166	14
16 x 1,5 re	21,0	230,0	520,0	32070	16	32157	16
16 x 2,5 re	22,0	384,0	750,0	32080	14	32167	14
19 x 1,5 re	22,0	274,0	570,0	32071	16	32158	16
19 x 2,5 re	23,0	456,0	850,0	32081	14	32168	14
21 x 1,5 re	23,0	302,0	650,0	32072	16	32159	16
21 x 2,5 re	24,5	504,0	980,0	32082	14	-	-
24 x 1,5 re	25,0	346,0	750,0	32073	16	32160	16
24 x 2,5 re	27,0	576,0	1100,0	32083	14	32170	14
30 x 1,5 re	26,0	432,0	860,0	32074	16	32161	16
30 x 2,5 re	28,0	720,0	1280,0	32084	14	32171	14
40 x 1,5 re	29,0	576,0	1070,0	32075	16	32162	16
40 x 2,5 re	31,5	960,0	1700,0	32085	14	32172	14
52 x 2,5 re	35,0	1248,0	2150,0	32169	14	-	-
61 x 1,5 re	34,0	878,0	1680,0	32176	16	-	-

**3+1/2-conductors**

No. cores x cross-sec. mm²	Outer Ø app. mm	Cop. weight kg / km	Weight app. kg / km	J type Part no.	AWG-No.	O type Part no.	AWG-No.
3 x 25 / 16 rm/re	24,5	874,0	1530,0	32035	4	32123	4
3 x 35 / 16 sm/re	26,0	1162,0	1750,0	32036	2	32124	2
3 x 50 / 25 sm	29,0	1680,0	2350,0	32037	1	32125	1
3 x 70 / 35 sm/rm	32,0	2352,0	2850,0	32038	2/0	32126	2/0
3 x 95 / 50 sm	38,0	3216,0	3850,0	32039	3/0	32127	3/0
3 x 120 / 70 sm	41,0	4128,0	4780,0	32040	4/0	32128	4/0
3 x 150 / 70 sm	46,0	4992,0	5800,0	32041	300 kcmil	32129	300 kcmil
3 x 185 / 95 sm	51,0	6240,0	7600,0	32042	350 kcmil	32130	350 kcmil
3 x 240 / 120 sm	58,0	8064,0	9800,0	32043	500 kcmil	32131	500 kcmil
3 x 300 / 150 sm	64,0	10080,0	11500,0	32256	600 kcmil	-	-

Dimensions and specifications may be changed without prior notice. (RQ01)

**NYCY** power cable, 0,6/1kV, VDE approved, with concentric copper conductor**Technical data**

- Power and control cable to DIN VDE 0276 part 603, HD 603 S1 and IEC 60502  
7 cores and above to DIN VDE 0276 part 627, HD 627 S1 and IEC 60502
- **Temperature range**  
flexing -5°C to +50°C  
fixed installation -40°C to +70°C
- Permissible **operating temperature** at conductor +70°C
- Permissible **short circuit temperature** (short circuit duration max. 5 s) +160°C
- **Nominal voltage**  $U_0/U$  0,6/1 kV
- **Test voltage** 4 kV
- Max. permissible **tensile stress** with cable grip at conductor 50 N/mm<sup>2</sup>
- **Minimum bending radius**  
single-core 15x cable Ø  
multi-core 12x cable Ø
- **Caloric load values**  
see Technical Informations

**Cable structure**

- Bare copper-conductor, to DIN VDE 0295 cl.1, single-wire, BS 6360 cl.1, IEC 60228 cl.1
- Core insulation of PVC compound type DIV4 to HD 603 S1
- Core identification to DIN VDE 0293-308
- Cores stranded in concentric layers
- Filling compound
- Concentric conductor in inner layer of round copper wires, outer layer with copper tape
- Outer sheath of PVC compound type DMV5 to HD 603 S1
- Sheath colour black

**Properties**

- The materials used in manufacture are cadmium-free and contain no silicone and free from substances harmful to the wetting properties of lacquers

**Tests**

- PVC self-extinguishing and flame retardant acc. to DIN VDE 0482-332-1-2, DIN EN 60332-1-2, IEC 60332-1 (equivalent DIN VDE 0472 part 804 test method B)

**Highest permissible voltage**

- Direct current systems 1,8 kV
- Alternating current systems
  - Single-phase systems 1,4 kV both outer conductors insulated
  - Single-phase systems 0,7 kV one outer conductor earthed
- Three-phase systems 1,2 kV with concentric conductor and a cross-section of 240 mm<sup>2</sup> and above 3,6 kV

**Note**

- re = round conductor, single-wire
- Available with outer sheath in alternative colours on request.
- AWG sizes are approximate equivalent values. The actual cross-section is in mm<sup>2</sup>.

**Application**

Power cables for energy supply are used for industry and distribution boards, power stations, house connecting boxes and street lighting as well as control cable for the transmission of control impulses and test datas. Overall, where increased electrical and also mechanical protection are required. Those cables are installed in open air, in underground, in water, in concrete, indoors and in cable ducts. The concentric conductor (C) is allowed to use as PE-, PEN-conductor or as screen.

☑ = The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer Ø app. mm	Cop. weight kg / km	Weight app. kg / km	AWG-No.
32200	1 x 10 re / 10	11,0	216,0	280,0	8
32201	1 x 16 re / 16	12,0	336,0	440,0	6
32202	2 x 1,5 re / 1,5	13,0	52,0	205,0	16
32203	2 x 2,5 re / 2,5	13,5	80,0	270,0	14
32204	2 x 4 re / 4	15,5	123,0	360,0	12
32205	2 x 6 re / 6	17,0	182,0	435,0	10
32206	2 x 10 re / 10	19,5	312,0	590,0	8
32207	2 x 16 re / 16	20,5	489,0	820,0	6
32208	3 x 1,5 re / 1,5	13,5	66,0	225,0	16
32209	3 x 2,5 re / 2,5	14,5	104,0	290,0	14
32210	3 x 4 re / 4	16,5	161,0	400,0	12
32211	3 x 6 re / 6	17,5	240,0	510,0	10
32212	3 x 10 re / 10	20,0	408,0	850,0	8
32213	3 x 16 re / 16	23,0	643,0	1080,0	6
32214	4 x 1,5 re / 1,5	14,5	81,0	260,0	16
32215	4 x 2,5 re / 2,5	15,5	128,0	350,0	14
32216	4 x 4 re / 4	17,0	200,0	470,0	12
32217	4 x 6 re / 6	18,5	297,0	590,0	10
32218	4 x 10 re / 10	21,0	504,0	900,0	8
32219	4 x 16 re / 16	23,0	796,0	1250,0	6
32220	5 x 1,5 re / 1,5	15,0	95,0	330,0	16
32221	5 x 2,5 re / 2,5	16,0	152,0	400,0	14
32222	5 x 4 re / 4	19,0	238,0	560,0	12
32223	5 x 6 re / 6	21,0	355,0	710,0	10

Continuation ▶

**NYCY** power cable, 0,6/1kV, VDE approved, with concentric copper conductor

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer Ø app. mm	Cop. weight kg / km	Weight app. kg / km	AWG-No.
32224	5 x 10 re / 10	23,0	600,0	1000,0	8
32226	7 x 1,5 re / 1,5	16,0	124,0	320,0	16
32227	7 x 1,5 re / 2,5	16,0	133,0	350,0	16
32241	7 x 2,5 re / 2,5	17,5	200,0	450,0	14
32225	7 x 4 re / 4	21,0	315,0	670,0	12
32255	7 x 6 re / 6	24,0	470,0	790,0	10
32228	8 x 1,5 re / 1,5	17,0	138,0	380,0	16
32229	8 x 1,5 re / 2,5	17,0	147,0	400,0	16
32242	8 x 2,5 re / 2,5	18,0	224,0	510,0	14
32230	10 x 1,5 re / 2,5	19,0	176,0	440,0	16
32243	10 x 2,5 re / 4	20,5	286,0	600,0	14
32231	12 x 1,5 re / 2,5	20,0	205,0	500,0	16
32244	12 x 2,5 re / 4	21,0	334,0	660,0	14
32232	14 x 1,5 re / 2,5	20,5	234,0	540,0	16
32245	14 x 2,5 re / 4	22,0	382,0	760,0	14
32246	14 x 2,5 re / 6	22,5	403,0	800,0	14
32233	16 x 1,5 re / 4	22,0	276,0	600,0	16
32247	16 x 2,5 re / 6	23,0	451,0	910,0	14
32234	19 x 1,5 re / 4	23,0	320,0	690,0	16
32248	19 x 2,5 re / 6	23,5	523,0	950,0	14
32235	21 x 1,5 re / 6	24,0	369,0	810,0	16
32249	21 x 2,5 re / 10	26,0	571,0	1100,0	14
32236	24 x 1,5 re / 6	26,0	413,0	860,0	16
32250	24 x 2,5 re / 10	28,0	696,0	1300,0	14
32237	30 x 1,5 re / 6	27,0	499,0	1230,0	16
32251	30 x 2,5 re / 10	30,0	840,0	1610,0	14
32238	40 x 1,5 re / 10	30,0	696,0	1590,0	16
32252	40 x 2,5 re / 10	35,0	1080,0	2100,0	14
32239	52 x 1,5 re / 10	32,0	869,0	1820,0	16
32253	52 x 2,5 re / 10	38,0	1368,0	2500,0	14
32240	61 x 1,5 re / 10	33,0	998,0	2000,0	16
32254	61 x 2,5 re / 10	40,0	1584,0	2850,0	14

Dimensions and specifications may be changed without prior notice. (RQ01)



Suitable accessories can be found in Chapter X.

- Cable lug - copper
- Cable lug - aluminium

**NYCWY** power cable, 0,6/1kV, with concentric copper conductor, VDE approved**Technical data**

- Power and control cable to DIN VDE 0276 part 603, HD 603 S1 and IEC 60502
- **Temperature range**  
flexing -5°C to +50°C  
fixed installation -40°C to +70°C
- Permissible **operating temperature** at conductor +70°C
- Permissible **short circuit temperature** (short circuit duration max. 5 s) +160°C
- **Nominal voltage**  $U_0/U$  0,6/1 kV
- **Test voltage** 4 kV
- Max. permissible **tensile stress** with cable grip at conductor 50 N/mm<sup>2</sup>
- **Minimum bending radius** 12x cable Ø
- **Power ratings table** see Technical Informations
- **Caloric load values** see Technical Informations

**Cable structure**

- Bare copper-conductor, to DIN VDE 0295 cl.1 or cl.2, single-wire or multi-wire, BS 6360 cl.1 or cl.2, IEC 60228 cl.1 or cl.2
- Core insulation of PVC compound type DIV4 to HD 603 S1
- Core identification to DIN VDE 0293-308
- Cores concentrically stranded
- Filling compound
- Concentric conductor (Ceander), inner layer of corrugated copper wires, outer layer with copper tape
- Outer sheath of PVC compound type DMV5 to HD 603 S1
- Sheath colour black

**Properties**

- The materials used in manufacture are cadmium-free and contain no silicone and free from substances harmful to the wetting properties of lacquers

**Tests**

- PVC self-extinguishing and flame retardant acc. to DIN VDE 0482-332-1-2, DIN EN 60332-1-2, IEC 60332-1 (equivalent DIN VDE 0472 part 804 test method B)

**Highest permissible voltage**

- Direct current systems 1,8 kV
- Alternating current systems
  - Single-phase systems both outer conductors insulated 1,4 kV
  - Single-phase systems one outer conductor earthed 0,7 kV
- Three-phase systems 1,2 kV with concentric conductor and a cross-section of 240 mm<sup>2</sup> and above 3,6 kV

**Note**

- re = round conductor, single-wire  
rm = round conductor, multi-wire  
sm = sectional conductor, multi-wire
- Available with outer sheath in alternative colours on request
- AWG sizes are approximate equivalent values. The actual cross-section is in mm<sup>2</sup>.

**Application**

Power cables for energy supply are used for industry and distribution boards, power stations, house connecting boxes and street lighting as well as control cable for the transmission of control impulses and test datas. Overall, where increased electrical and also mechanical protection are required. Those cables are installed in open air, in underground, in water, in concrete, indoors and in cable ducts. The concentric conductor (C) is allowed to use as PE-, PEN-conductor or as screen. The corrugated design (Ceander) of the concentric conductor permits any number of cable junctions during assembly, without any conductors having to be cut. This ensures a optimal reliability.

☑ = The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer Ø app. mm	Cop. weight kg / km	Weight app. kg / km	AWG-No.
32260	2 x 10 re / 10	19,0	312,0	650,0	8
32261	2 x 16 re / 16	21,0	489,0	850,0	6
32262	2 x 25 rm / 25	24,0	763,0	1210,0	4
32263	3 x 10 re / 10	19,5	408,0	730,0	8
32264	3 x 16 re / 16	22,0	643,0	1000,0	6
32265	3 x 25 rm / 16	26,0	902,0	1550,0	4
32274	3 x 25 rm / 25	26,0	1003,0	1600,0	4
32266	3 x 35 sm / 16	27,0	1190,0	1750,0	2
32275	3 x 35 sm / 35	27,5	1402,0	1850,0	2
32267	3 x 50 sm / 25	29,5	1723,0	2250,0	1
32276	3 x 50 sm / 50	29,5	2000,0	2450,0	1
32268	3 x 70 sm / 35	33,0	2410,0	2950,0	2/0
32277	3 x 70 sm / 70	34,0	2796,0	3350,0	2/0
32269	3 x 95 sm / 50	38,0	3296,0	4100,0	3/0
32278	3 x 95 sm / 95	38,5	3791,0	4550,0	3/0
32270	3 x 120 sm / 70	41,0	4236,0	5050,0	4/0
32279	3 x 120 sm / 120	42,0	4786,0	5550,0	4/0
32271	3 x 150 sm / 70	45,0	5100,0	6000,0	300 kcmil
32280	3 x 150 sm / 150	46,0	5970,0	6900,0	300 kcmil
32272	3 x 185 sm / 95	50,0	6383,0	7550,0	350 kcmil
32281	3 x 185 sm / 185	51,0	7363,0	8500,0	350 kcmil
32273	3 x 240 sm / 120	57,0	8242,0	9950,0	500 kcmil
32282	4 x 10 re / 10	20,5	504,0	890,0	8
32283	4 x 16 re / 16	23,5	796,0	1250,0	6

Continuation ▶

**NYCWY power cable, 0,6/ 1kV, with concentric copper conductor, VDE approved**

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer Ø app. mm	Cop. weight kg / km	Weight app. kg / km	AWG-No.
32284	4 x 25 rm / 16	28,0	1142,0	1800,0	4
32285	4 x 35 sm / 16	29,0	1526,0	2050,0	2
32286	4 x 50 sm / 25	33,0	2203,0	2700,0	1
32287	4 x 70 sm / 35	37,0	3082,0	3750,0	2/0
32288	4 x 95 sm / 50	43,5	4208,0	5000,0	3/0
32289	4 x 120 sm / 70	47,0	5388,0	6350,0	4/0
32290	4 x 150 sm / 70	51,0	6540,0	7650,0	300 kcmil
32291	4 x 185 sm / 95	56,0	8159,0	9350,0	350 kcmil
32292	4 x 240 sm / 120	62,5	10546,0	11600,0	500 kcmil

Dimensions and specifications may be changed without prior notice. (RQ01)



Passendes Kabelzubehör finden Sie in Kapitel X.

- Kabelschuhe - Kupfer
- Kabelschuhe - Aluminium



**NAYY** power cable, 0,6/1 kV, VDE approved**Technical data**

- Power and control cable to DIN VDE 0276 part 603, HD 603 S1 and IEC 60502
- Insulation and sheath-compound of thermoplastic PVC
- **Temperature range**  
flexing -5°C to +50°C  
fixed installation -40°C to +70°C
- Permissible **operating temperature** at conductor +70°C
- Permissible **short circuit temperature** (short circuit duration max. 5 s)  
≤ 300 mm<sup>2</sup> +160°C  
> 300 mm<sup>2</sup> +140°C
- **Nominal voltage** U<sub>0</sub>/U 0,6/1 kV
- **Test voltage** 4 kV
- Max. permissible **tensile stress** with cable grip at conductor  
30 N/mm<sup>2</sup>
- **Current carrying capacity** to DIN VDE 0276 part 603, in normal operation table 14 and 15, under short circuit conditions table 17
- **Minimum bending radius**  
single-core 15x cable Ø  
multi-core 12x cable Ø
- **Caloric load values**  
see Technical Informations

**Cable structure**

- Aluminium-conductor, to DIN VDE 0295 cl.1 or cl.2, single-wire or multi-wire, BS 6360 cl.1 or cl.2, IEC 60228 cl.1 or cl.2
- Core insulation of PVC compound type DIV4 to HD 603 S1
- Core identification to DIN VDE 0293-308, 0276 part 603
- Cores stranded in concentric layers
- Common core sheath
- Outer sheath of PVC compound type DMV5 to HD 603 S1
- Sheath colour black

**Properties**

- The materials used in manufacture are cadmium-free and contain no silicone and free from substances harmful to the wetting properties of lacquers

**Tests**

- PVC self-extinguishing and flame retardant acc. to DIN VDE 0482-332-1-2, DIN EN 60332-1-2, IEC 60332-1 (equivalent DIN VDE 0472 part 804 test method B)

**Highest permissible voltage**

- Direct current systems 1,8 kV
- Alternating current systems
  - Single-phase systems  
both outer conductors insulated 1,4 kV
  - Single-phase systems  
one outer conductor earthed 0,7 kV
- Three-phase systems 1,2 kV

**Note**

- re = round conductor, single-wire
- rm = round conductor, multi-wire
- se = sectional conductor, single-wire
- sm = sectional conductor, multi-wire
- J-version = with GN-YE conductor
- O-version = without GN-YE conductor
- AWG sizes are approximate equivalent values. The actual cross-section is in mm<sup>2</sup>.

**Application**

Power cables for energy supply are installed in open air, in underground, in water, in concrete, indoors, in cable ducts, power stations, for industry and distribution boards as well as in subscriber networks, where mechanical damages are not be expected.

CE= The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

No. cores x cross-sec. mm <sup>2</sup>		Outer Ø app. mm	Alu weight kg / km	Weight app. kg / km	J type Part no.	AWG-No.		O type Part no.	AWG-No.	
4 x 16	re	23,0	186,0	750,0	32301	6	-	32184	6	-
4 x 25	re	26,0	290,0	950,0	32302	4	-	32185	4	-
4 x 35	re	28,5	406,0	1120,0	32303	2	-	32186	2	-
4 x 50	se	30,0	580,0	1151,0	32304	1	-	32187	1	-
4 x 70	se	35,0	812,0	1549,0	32305	2/0	-	32188	2/0	-
4 x 95	se	39,5	1102,0	2030,0	32306	3/0	-	32189	3/0	-
4 x 95	sm	39,5	1102,0	2030,0	32177	3/0	-	32190	3/0	-
4 x 120	se	44,0	1392,0	2400,0	32307	4/0	-	32191	4/0	-
4 x 120	sm	44,0	1392,0	2400,0	32178	4/0	-	32192	4/0	-
4 x 150	se	46,0	1740,0	3030,0	32308	300 kcmil	-	32193	300 kcmil	-
4 x 150	sm	46,0	1740,0	3030,0	32179	300 kcmil	-	32194	300 kcmil	-
4 x 185	se	51,0	2146,0	3650,0	32309	350 kcmil	-	32195	350 kcmil	-
4 x 185	sm	51,0	2146,0	3650,0	32180	350 kcmil	-	32196	350 kcmil	-
4 x 240	se	56,0	2784,0	4800,0	32310	500 kcmil	-	32197	500 kcmil	-
4 x 240	sm	56,0	2784,0	4800,0	32181	500 kcmil	-	32198	500 kcmil	-
4 x 300	se	64,0	3480,0	5596,0	32182	600 kcmil	-	32199	600 kcmil	-
4 x 300	sm	64,0	3480,0	5596,0	32183	600 kcmil	-	32258	600 kcmil	-

Continuation ►

**NAYY** power cable, 0,6/1 kV, VDE approved

No. cores x cross-sec. mm <sup>2</sup>		Outer Ø app. mm	Alu weight kg / km	Weight app. kg / km	J type Part no.	AWG-No.		O type Part no.	AWG-No.	
5 x 10	re	22,0	145,0	637,0	33275	8	-	33283	8	-
5 x 16	re	25,0	232,0	832,0	33276	6	-	33284	6	-
5 x 25	re	28,0	363,0	1175,0	33277	4	-	33285	4	-
5 x 35	re	31,0	508,0	1399,0	33278	2	-	33286	2	-
5 x 50	rm	35,0	725,0	1855,0	33279	1	-	33287	1	-
5 x 70	rm	40,0	1015,0	2351,0	33280	2/0	-	33288	2/0	-
5 x 95	rm	45,0	1378,0	3071,0	33281	3/0	-	33289	3/0	-
5 x 120	rm	49,0	1740,0	3631,0	33282	4/0	-	33290	4/0	-
5 x 150	rm	57,8	2175,0	4405,0	34041	300 kcmil	-	34042	300 kcmil	-
5 x 185	rm	61,5	2683,0	5420,0	34043	350 kcmil	-	34044	350 kcmil	-
5 x 240	rm	70,0	3480,0	6860,0	34045	500 kcmil	-	34046	500 kcmil	-

No. cores x cross-sec. mm <sup>2</sup>		Outer Ø app. mm	Alu weight kg / km	Weight app. kg / km	J type Part no.	AWG-No.		O type Part no.	AWG-No.	
1 x 35	re	13,0	102,0	240,0	32328	2	-	32311	2	-
1 x 50	re	15,0	145,0	360,0	32329	1	-	32312	1	-
1 x 70	rm	16,5	203,0	410,0	32390	2/0	-	32313	2/0	-
1 x 95	rm	19,0	276,0	570,0	32391	3/0	-	32314	3/0	-
1 x 120	rm	20,5	348,0	691,0	32392	4/0	-	32315	4/0	-
1 x 150	rm	22,5	435,0	804,0	32393	300 kcmil	-	32321	300 kcmil	-
1 x 185	rm	25,0	537,0	979,0	32394	350 kcmil	-	32322	350 kcmil	-
1 x 240	rm	28,0	696,0	1253,0	32395	500 kcmil	-	32323	500 kcmil	-
1 x 300	rm	30,0	870,0	1395,0	32396	600 kcmil	-	32324	600 kcmil	-
1 x 400	rm	34,0	1160,0	1890,0	32397	750 kcmil	-	32325	750 kcmil	-
1 x 500	rm	38,0	1450,0	2600,0	32398	1000 kcmil	-	32326	1000 kcmil	-
1 x 630	rm	43,0	1827,0	2780,0	32399	1250 kcmil	-	32327	1250 kcmil	-

Dimensions and specifications may be changed without prior notice. (RQ01)



Passendes Kabelzubehör finden Sie in Kapitel X.

- Kabelschuhe - Kupfer
- Kabelschuhe - Aluminium

**NAY2Y** power cable, 0,6/1kV, with PE-outer sheath**NEW****Technical data**

- Power and control cable to DIN VDE 0276 part 603, HD 603 S1 and IEC 60502
- **Temperature range**  
flexing -5°C to +50°C  
fixed installation -40°C to +70°C
- Permissible **operating temperature** at conductor +70°C
- Permissible **short circuit temperature** (short circuit duration max. 5 s) +160°C
- **Nominal voltage**  $U_0/U$  0,6/1 kV
- **Test voltage** 4 kV
- Max. permissible **tensile stress** with cable grip at conductor 30 N/mm<sup>2</sup>
- **Minimum bending radius** 12x cable Ø

**Cable structure**

- Aluminium-conductor, to DIN VDE 0295 cl.1, single-wire, BS 6360 cl.1, IEC 60228 cl.1
- Core insulation of PVC
- Core identification GN-YE, BN, BK, GY
- Cores stranded in concentric layers
- Common core sheath
- Outer sheath of PE
- Sheath colour black

**Properties**

- outer sheath PE of not self-extinguishing and flame retardant
- The materials used in manufacture are cadmium-free and contain no silicone and free from substances harmful to the wetting properties of lacquers

**Highest permissible voltage**

- Direct current systems 1,8 kV
- Alternating current systems
  - Single-phase systems both outer conductors insulated 1,4 kV
  - Single-phase systems one outer conductor earthed 0,7 kV
- Three-phase systems 1,2 kV

**Note**

- re = round conductor, single-wire
- se = sectional conductor, single-wire
- AWG sizes are approximate equivalent values. The actual cross-section is in mm<sup>2</sup>.

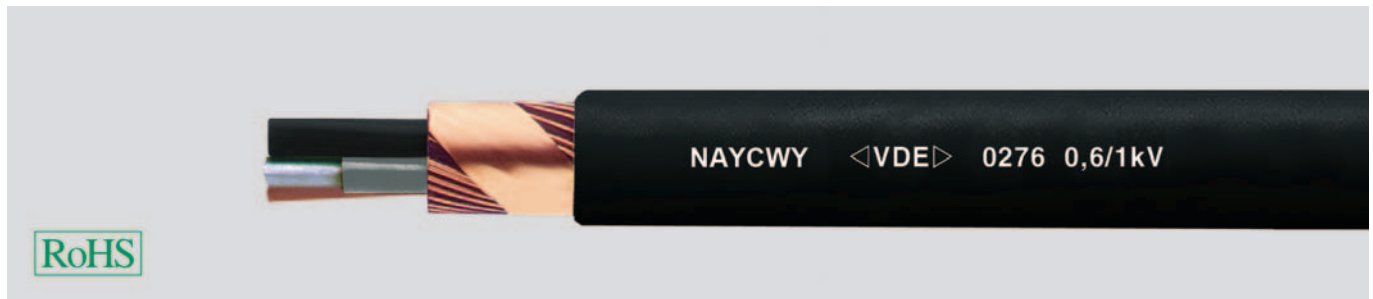
**Application**

Power cables for energy supply are installed in open air, in underground, in water, in concrete, indoors, in cable ducts, power stations, for industry and distribution boards as well as in subscriber networks. Usable in extreme working conditions due to the robust PE outer sheath.

☞ The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer Ø app. mm	Alu weight kg / km	Weight app. kg / km	AWG-No.
31129	4 x 25 re	26,0	290,0	970,0	4
31139	4 x 35 re	28,0	406,0	1145,0	2
31149	4 x 50 se	30,0	580,0	1184,0	1
31159	4 x 70 se	33,0	812,0	1578,0	2/0
31169	4 x 95 se	38,0	1102,0	2186,0	3/0
31179	4 x 120 se	42,0	1382,0	2501,0	4/0
31189	4 x 150 se	45,0	1740,0	3180,0	300 kcmil
31199	4 x 185 se	51,0	2146,0	3807,0	350 kcmil
31209	4 x 240 se	55,0	2784,0	4996,0	500 kcmil

Dimensions and specifications may be changed without prior notice. (RQ01)

**NAYCWY** power cable, 0,6/1kV, with concentric copper conductor, VDE approved**Technical data**

- Power and control cable to DIN VDE 0276 part 603, HD 603 S1 and IEC 60502
- **Temperature range**  
flexing -5°C to +50°C  
fixed installation -40°C to +70°C
- Permissible **operating temperature** at conductor +70°C
- Permissible **short circuit temperature** (short circuit duration max. 5 s) +160°C
- **Nominal voltage** U<sub>0</sub>/U 0,6/1 kV
- **Test voltage** 4 kV
- Max. permissible **tensile stress** with cable grip at conductor 30 N/mm<sup>2</sup>
- **Minimum bending radius** 12x cable Ø

**Cable structure**

- Aluminium-conductor, to DIN VDE 0295 cl.1 or cl.2, single-wire or multi-wire, BS 6360 cl.1 or cl.2, IEC 60228 cl.1 or cl.2
- Core insulation of PVC compound type DIV4 to HD 603 S1
- Core identification DIN VDE 0293-308
- Cores stranded concentrically
- Filling compound
- Concentric conductor (Ceander), inner layer of corrugated copper wires, outer layer with copper tape
- Outer sheath of PVC compound type DMV5 to HD 603 S1
- Sheath colour black

**Properties**

- The materials used in manufacture are cadmium-free and contain no silicone and free from substances harmful to the wetting properties of lacquers

**Tests**

- PVC self-extinguishing and flame retardant acc. to DIN VDE 0482-332-1-2, DIN EN 60332-1-2, IEC 60332-1 (equivalent DIN VDE 0472 part 804 test method B)

**Highest permissible voltage**

- Direct current systems 1,8 kV
- Alternating current systems
  - Single-phase systems both outer conductors insulated 1,4 kV
  - Single-phase systems one outer conductor earthed 0,7 kV
- Three-phase systems 1,2 kV with concentric conductor and a cross-section from 240 mm<sup>2</sup> 3,6 kV

**Note**

- re = round conductor, single-wire
- rm = round conductor, multi-wire
- sm = sectional conductor, multi-wire
- AWG sizes are approximate equivalent values. The actual cross-section is in mm<sup>2</sup>.

**Application**

Power distribution cables, preferably used for underground installation, primarily in local networks, for industrial applications and switching systems, power stations. Wherever increased electrical and mechanical protection are required. Installation in water, outdoors, in concrete, indoors and in cable ducts. The concentric conductor (C) can be used as a PE or PEN conductor or as a screen. The corrugated design (Ceander) of the concentric conductor permits any number of cable junctions during assembly, without any conductors having to be cut. This ensures an optimal reliability.

☞ The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer Ø app. mm	Cop. weight kg / km	Alu weight kg / km	Weight app. kg / km	AWG-No.
36009	3 x 10 re / 10	20,2	88,0	87,0	603,0	8
36010	3 x 16 re / 16	22,3	125,0	139,0	754,0	6
36011	3 x 25 re / 25	25,5	170,0	218,0	1043,0	4
36012	3 x 25 rm / 16	26,6	125,0	218,0	1046,0	4
36013	3 x 25 rm / 25	26,6	170,0	218,0	1101,0	4
36014	3 x 35 re / 35	27,6	240,0	305,0	1243,0	2
36015	3 x 35 sm / 16	26,4	125,0	305,0	1002,0	2
36016	3 x 35 sm / 35	26,4	240,0	305,0	1107,0	2
36017	3 x 50 sm / 25	29,4	170,0	435,0	1283,0	1
36018	3 x 70 sm / 35	32,6	240,0	609,0	1633,0	2/0
36019	3 x 70 sm / 70	33,4	475,0	609,0	1838,0	2/0
36020	3 x 95 sm / 50	38,1	340,0	827,0	2136,0	3/0
36021	3 x 95 sm / 95	38,1	640,0	827,0	2449,0	3/0
36022	3 x 120 sm / 50	40,8	340,0	1044,0	2517,0	4/0
36023	3 x 120 sm / 70	40,8	475,0	1044,0	2612,0	4/0
36024	3 x 150 sm / 70	44,9	475,0	1305,0	3019,0	300 kcmil
36025	3 x 150 sm / 150	45,5	1000,0	1305,0	3517,0	300 kcmil
36026	3 x 185 sm / 70	49,8	475,0	1610,0	3741,0	350 kcmil
36027	3 x 185 sm / 95	49,8	640,0	1610,0	3895,0	350 kcmil
36028	3 x 240 sm / 70	55,4	475,0	2088,0	4539,0	500 kcmil
36029	3 x 240 sm / 120	55,8	800,0	2088,0	4838,0	500 kcmil
36030	3 x 240 sm / 240	56,0	1665,0	2088,0	5611,0	500 kcmil
32840	4 x 16 re / 16	23,9	125,0	186,0	801,0	6
32841	4 x 25 re / 16	28,9	125,0	290,0	1243,0	4
32842	4 x 35 re / 16	30,3	125,0	406,0	1282,0	2
32843	4 x 50 sm / 25	34,8	170,0	580,0	1689,0	1
32844	4 x 70 sm / 35	38,6	240,0	814,0	2074,0	2/0
32845	4 x 95 sm / 50	44,4	340,0	1102,0	2779,0	3/0
32846	4 x 120 sm / 70	48,7	475,0	1392,0	3365,0	4/0
32847	4 x 150 sm / 70	53,3	475,0	1740,0	3813,0	300 kcmil
32848	4 x 185 sm / 95	59,1	640,0	2146,0	4877,0	350 kcmil
32849	4 x 240 sm / 120	66,0	800,0	2784,0	6017,0	500 kcmil

Dimensions and specifications may be changed without prior notice.

**N2XY power cable, 0,6/1kV, VDE approved, higher current carrying capacity****Technical data**

- Power and control cable to DIN VDE 0276 part 603, HD 603 S1 and IEC 60502
- **Temperature range**  
flexing -5°C to +50°C  
fixed installation -40°C to +70°C
- Permissible **operating temperature**  
at conductor +90°C
- Permissible **short circuit temperature**  
(short circuit duration max. 5 s)  
+250°C
- **Nominal voltage**  $U_0/U$  0,6/1 kV
- **Test voltage** 4 kV  
Max. permissible **tensile stress**  
with cable grip at conductor  
50 N/mm<sup>2</sup>
- **Minimum bending radius**  
single-core 15x cable  $\varnothing$   
multi-core 12x cable  $\varnothing$

**Cable structure**

- Bare copper-conductor, to DIN VDE 0295 cl.1 or cl.2, single-wire or multi-wire, BS 6360 cl.1 or cl.2, IEC 60228 cl.1 or cl.2
- Core insulation of cross-linked polyethylene (XLPE) compound type DIX3 to HD 603 S1
- Core identification to DIN VDE 0293-308, 0276 part 603
- Cores stranded in concentric layers
- Outer sheath of PVC compound type DMV6/DMP2 to HD 603 S1
- Sheath colour black

**Properties**

- The materials used in manufacture are cadmium-free and contain no silicone and free from substances harmful to the wetting properties of lacquers

**Tests**

- self-extinguishing and flame retardant acc. to DIN VDE 0482-332-1-2, DIN EN 60332-1-2, IEC 60332-1 (equivalent DIN VDE 0472 part 804 Test method B)

**Highest permissible voltage**

- Direct current systems 1,8 kV
- Alternating current systems
  - Single-phase systems  
both outer conductors insulated 1,4 kV
  - Single-phase systems  
one outer conductor earthed 0,7 kV
- Three-phase systems 1,2 kV

**Note**

- re = round conductor, single-wire  
rm = round conductor, multi-wire  
sm = sectional conductor, multi-wire
- J-version = with GN-YE conductor  
O-version = without GN-YE conductor
- AWG sizes are approximate equivalent values. The actual cross-section is in mm<sup>2</sup>.

**Application**

Power distribution cables for use in underground, in water, outdoors, in concrete, indoors, in cable ducts, for power stations, industrial applications and switching systems, as well as in local networks if no mechanical damage is expected. Respecting the permissible operating temperature at the conductor of +90°C permits a higher current carrying capacity than PVC insulated power distribution cables.

☑= The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

No. cores x cross-sec. mm <sup>2</sup>		Outer $\varnothing$ app. mm	Cop. weight kg / km	Weight app. kg / km	J type Part no.	AWG-No.		O type Part no.	AWG-No.	
1 x 16	re	11,5	154,0	242,0	32850	6	-	32862	6	-
1 x 25	rm	12,5	240,0	362,0	32851	4	-	32863	4	-
1 x 35	rm	13,5	336,0	470,0	32852	2	-	32864	2	-
1 x 50	rm	15,5	480,0	620,0	32853	1	-	32865	1	-
1 x 70	rm	17,0	672,0	805,0	32854	2/0	-	32866	2/0	-
1 x 95	rm	19,0	912,0	1108,0	32855	3/0	-	32867	3/0	-
1 x 120	rm	20,5	1152,0	1360,0	32856	4/0	-	32868	4/0	-
1 x 150	rm	23,0	1440,0	1670,0	32857	300 kcmil	-	32869	300 kcmil	-
1 x 185	rm	25,5	1776,0	2050,0	32858	350 kcmil	-	32870	350 kcmil	-
1 x 240	rm	28,5	2304,0	2635,0	32859	500 kcmil	-	32871	500 kcmil	-
1 x 300	rm	30,0	2880,0	3200,0	32860	600 kcmil	-	32872	600 kcmil	-
1 x 400	rm	34,0	3840,0	4150,0	32861	750 kcmil	-	32873	750 kcmil	-
4 x 16	rm	21,5	614,0	1042,0	32874	6	-	32884	6	-
4 x 25	rm	26,0	960,0	1640,0	32875	4	-	32885	4	-
4 x 35	rm	27,5	1344,0	1760,0	32876	2	-	32886	2	-
4 x 50	sm	30,0	1920,0	2350,0	32877	1	-	32887	1	-
4 x 70	sm	34,0	2688,0	3100,0	32878	2/0	-	32888	2/0	-
4 x 95	sm	39,0	3648,0	4250,0	32879	3/0	-	32889	3/0	-
4 x 120	sm	42,5	4608,0	5300,0	32880	4/0	-	32890	4/0	-
4 x 150	sm	47,5	5760,0	6400,0	32881	300 kcmil	-	32891	300 kcmil	-
4 x 185	sm	52,0	7104,0	8500,0	32882	350 kcmil	-	32892	350 kcmil	-
4 x 240	sm	58,0	9216,0	11000,0	32883	500 kcmil	-	32893	500 kcmil	-

Dimensions and specifications may be changed without prior notice. (RQ02)



**N2XCY** power cable, 0,6/1kV, VDE approved, higher current carrying capacity**Technical data**

- Power and control cable to DIN VDE 0276 part 603, HD 603 S1 and IEC 60502, 7 cores and above to DIN VDE 0276 part 627, HD 627 S1 and IEC 60502
- **Temperature range**  
flexing -5°C to +50°C  
fixed installation -40°C to +70°C
- Permissible **operating temperature** at conductor +90°C
- Permissible **short circuit temperature** (short circuit duration max. 5 s) +250°C
- **Nominal voltage** U<sub>0</sub>/U 0,6/1 kV
- **Test voltage** 4 kV
- Max. permissible **tensile stress** with cable grip at conductor 50 N/mm<sup>2</sup>
- **Minimum bending radius** 12x cable Ø

**Cable structure**

- Bare copper-conductor, to DIN VDE 0295 cl.1 or cl.2, single-wire or multi-wire, BS 6360 cl.1 or cl.2, IEC 60228 cl.1 or cl.2
- Core insulation of cross-linked polyethylene (XLPE) compound type DIX3 to HD 603 S1
- Core identification to DIN VDE 0293-308
- Cores stranded in concentric layers
- Filling compound
- Concentric conductor, inner layer of round bare copper wires, outer layer of copper tape as counter helix
- Outer sheath of PVC compound type DMV6 to HD 603 S1
- Sheath colour black

**Properties**

- The materials used in manufacture are cadmium-free and contain no silicone and free from substances harmful to the wetting properties of lacquers

**Tests**

- self-extinguishing and flame retardant acc. to DIN VDE 0482-332-1-2, DIN EN 60332-1-2, IEC 60332-1 (equivalent DIN VDE 0472 part 804 test method B)

**Highest permissible voltage**

- Direct current systems 1,8 kV
- Alternating current systems
  - Single-phase systems both outer conductors insulated 1,4 kV
  - Single-phase systems one outer conductor earthed 0,7 kV
- Three-phase systems 1,2 kV

**Note**

- re = round conductor, single-wire
- rm = round conductor, multi-wire
- sm = sectional conductor, multi-wire
- AWG sizes are approximate equivalent values. The actual cross-section is in mm<sup>2</sup>.

**Application**

Power distribution cables for industrial applications and switching systems, power stations, residential connections and street lighting, as well as control cables for transmitting control pulses and measurements. Wherever increased electrical and mechanical protection are required. For installation in underground, in water, outdoors, in concrete and cable ducts. Respecting the permissible operating temperature at the conductor of +90°C permits a higher current carrying capacity than PVC insulated power distribution cables. The concentric conductor (C) can be used as a PE or PEN-conductor or as a screen.

CE= The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

Part no.	No.cores x cross-sec. mm <sup>2</sup>	Outer Ø app. mm	Cop. weight kg / km	Weight app. kg / km	AWG-No.
33212	2 x 1,5 re / 1,5	13,0	53,0	205,0	16
33213	2 x 2,5 re / 2,5	13,5	80,0	270,0	14
33214	2 x 4 re / 4	15,5	123,0	360,0	12
33215	2 x 6 re / 6	17,0	182,0	435,0	10
33216	2 x 10 re / 10	19,5	312,0	590,0	8
33217	2 x 16 re / 16	20,5	489,0	820,0	6
33218	3 x 1,5 re / 1,5	13,5	66,0	225,0	16
33219	3 x 2,5 re / 2,5	14,5	104,0	290,0	14
33220	3 x 4 re / 4	16,5	161,0	400,0	12
33221	3 x 6 re / 6	17,5	240,0	510,0	10
33222	3 x 10 re / 10	20,0	408,0	850,0	8
33223	3 x 16 re / 16	23,0	643,0	1080,0	6
33224	3 x 25 rm / 16	25,1	902,0	1295,0	4
33225	3 x 25 rm / 25	25,0	1003,0	1375,0	4
33226	3 x 35 sm / 16	25,1	1190,0	1441,0	2
33227	3 x 35 sm / 35	25,4	1402,0	1619,0	2
33228	3 x 50 sm / 25	27,3	1723,0	1902,0	1
33229	3 x 50 sm / 50	27,7	2000,0	2107,0	1
33230	3 x 70 sm / 35	32,2	2410,0	2700,0	2/0
33231	3 x 70 sm / 70	32,7	2796,0	3005,0	2/0
33232	3 x 95 sm / 50	35,3	3296,0	3588,0	3/0
33233	3 x 95 sm / 95	35,8	3791,0	4017,0	3/0
33234	3 x 120 sm / 120	38,9	4786,0	4998,0	4/0
33235	3 x 120 sm / 70	38,9	4236,0	4534,0	4/0
33236	3 x 150 sm / 120	43,4	5970,0	5937,0	300 kcmil
33237	3 x 150 sm / 70	43,4	5100,0	5473,0	300 kcmil
33238	3 x 185 sm / 95	47,4	6383,0	6831,0	350 kcmil
33239	3 x 240 sm / 120	52,5	8242,0	8809,0	500 kcmil

Continuation ▶

**N2XCY** power cable, 0,6/1kV, VDE approved, higher current carrying capacity

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer Ø app. mm	Cop. weight kg / km	Weight app. kg / km	AWG-No.
33240	4 x 1,5 re / 1,5	14,5	81,0	260,0	16
33241	4 x 2,5 re / 2,5	15,5	128,0	350,0	14
33242	4 x 4 re / 4	17,0	200,0	470,0	12
33243	4 x 6 re / 6	18,5	297,0	590,0	10
33244	4 x 10 re / 10	21,0	504,0	900,0	8
33245	4 x 16 re / 16	23,0	796,0	1250,0	6
33246	4 x 25 re / 16	27,2	1142,0	1559,0	4
33247	4 x 35 sm / 16	27,2	1526,0	1812,0	2
33248	4 x 50 sm / 25	30,6	2203,0	2413,0	1
33249	4 x 70 sm / 35	35,9	3082,0	3420,0	2/0
33250	4 x 95 sm / 50	39,5	4208,0	4561,0	3/0
33251	4 x 120 sm / 16	44,5	5388,0	5819,0	4/0
33252	4 x 150 sm / 70	48,6	6540,0	6972,0	300 kcmil
33253	5 x 1,5 re / 1,5	15,0	95,0	330,0	16
33254	5 x 2,5 re / 2,5	16,0	152,0	400,0	14
33255	5 x 4 re / 4	19,0	238,0	560,0	12
33256	5 x 6 re / 6	21,0	355,0	710,0	10
33257	5 x 10 re / 10	23,0	600,0	1000,0	8
33258	5 x 16 re / 16	24,3	931,0	1233,0	6
33259	7 x 1,5 re / 1,5	16,0	133,0	350,0	16
33260	7 x 2,5 re / 2,5	17,5	200,0	450,0	14
33261	7 x 4 re / 4	21,0	315,0	670,0	12
33262	7 x 6 re / 6	24,0	470,0	790,0	10
33263	10 x 1,5 re / 2,5	19,0	176,0	440,0	16
33264	10 x 2,5 re / 4	20,5	286,0	600,0	14
33265	12 x 1,5 re / 2,5	20,0	205,0	500,0	16
33266	12 x 2,5 re / 4	21,0	334,0	660,0	14
33267	14 x 1,5 re / 2,5	20,5	234,0	540,0	16
33268	14 x 2,5 re / 6	22,5	403,0	800,0	14
33269	19 x 1,5 re / 2,5	23,0	320,0	690,0	16
33270	19 x 2,5 re / 6	23,5	523,0	950,0	14
33271	30 x 1,5 re / 2,5	27,0	499,0	1230,0	16
33272	30 x 2,5 re / 10	30,0	840,0	1610,0	14
33273	40 x 1,5 re / 2,5	30,0	696,0	1590,0	16
33274	40 x 2,5 re / 10	35,0	1080,0	2100,0	14

Dimensions and specifications may be changed without prior notice. (RQ01)



Passendes Kabelzubehör finden Sie in Kapitel X.

- Kabelschuhe - Kupfer
- Kabelschuhe - Aluminium

**NA2XY** power cable, 0,6/1kV, VDE approved, higher current carrying capacity**Technical data**

- Power and control cable to DIN VDE 0276 Part 603, HD 603 S1 and IEC 60502
- **Temperature range**  
flexing -5°C to +50°C  
fixed installation -40°C to +70°C
- Permissible **operating temperature**  
at conductor +90°C
- Permissible **short circuit temperature**  
(short circuit duration max. 5 s)  
+250°C
- **Nominal voltage**  $U_0/U$  0,6/1 kV
- **Test voltage** 4 kV
- Max. permissible **tensile stress**  
with cable grip at conductor  
30 N/mm<sup>2</sup>
- **Minimum bending radius**  
single-core 15x cable  $\varnothing$   
multi-core 12x cable  $\varnothing$

**Cable structure**

- Aluminium-conductor to DIN VDE 0295 cl.1 or cl.2, single-wire or multi-wire, BS 6360 cl.1 or cl.2, IEC 60228 cl.1 or cl.2
- Core insulation of cross-linked polyethylene (XLPE) compound type DIX3 to HD 603 S1
- Core identification to DIN VDE 0293-308, 0276 part 603
- Cores stranded in concentric layers
- Outer sheath of PVC compound type DMV6/DMP2 to HD 603 S1
- Sheath colour black

**Properties**

- The materials used in manufacture are cadmium-free and contain no silicone and free from substances harmful to the wetting properties of lacquers

**Tests**

- self-extinguishing and flame retardant acc. to DIN VDE 0482-332-1-2, DIN EN 60332-1-2, IEC 60332-1 (equivalent DIN VDE 0472 part 804 test method B)

**Highest permissible voltage**

- Direct current systems 1,8 kV
- Alternating current systems
  - Single-phase systems  
both outer conductors insulated 1,4 kV
  - Single-phase systems  
one outer conductor earthed 0,7 kV
- Three-phase systems 1,2 kV

**Note**

- re = round conductor, single-wire
- rm = round conductor, multi-wire
- se = sectional conductor, single-wire
- J-version = with GN-YE conductor
- O-version = without GN-YE conductor
- AWG sizes are approximate equivalent values. The actual cross-section is in mm<sup>2</sup>.

**Application**

Power distribution cables for use in underground, in water, outdoors, in concrete, indoors, in cable ducts, for power stations, industrial applications and switching systems, as well as in local networks if no mechanical damage is expected. Respecting the permissible operating temperature at the conductor of +90°C permits a higher current carrying capacity than PVC insulated power distribution cables.

☑ = The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

No. cores x cross-sec. mm <sup>2</sup>		Outer $\varnothing$ app. mm	Alu weight kg / km	Weight app. kg / km	J type Part no.	AWG-No.		O type Part no.	AWG-No.	
1 x 16	re	11,5	47,0	98,0	33113	6	-	33125	6	-
1 x 25	re	12,5	73,0	150,0	33114	4	-	33126	4	-
1 x 35	re	13,5	102,0	241,0	33115	2	-	33127	2	-
1 x 50	rm	15,5	145,0	357,0	33116	1	-	33128	1	-
1 x 70	rm	17,0	203,0	409,0	33117	2/0	-	33129	2/0	-
1 x 95	rm	19,0	276,0	570,0	33118	3/0	-	33130	3/0	-
1 x 120	rm	20,5	348,0	590,0	33119	4/0	-	33131	4/0	-
1 x 150	rm	23,0	435,0	804,0	33120	300 kcmil	-	33132	300 kcmil	-
1 x 185	rm	25,5	537,0	978,0	33121	350 kcmil	-	33133	350 kcmil	-
1 x 240	rm	28,5	696,0	1253,0	33122	500 kcmil	-	33134	500 kcmil	-
1 x 300	rm	30,0	870,0	1394,0	33123	600 kcmil	-	33135	600 kcmil	-
1 x 400	rm	34,0	1160,0	1890,0	33124	750 kcmil	-	33136	750 kcmil	-
4 x 16	re	21,5	186,0	750,0	33137	6	-	33147	6	-
4 x 25	re	26,0	290,0	950,0	33138	4	-	33148	4	-
4 x 35	re	27,5	406,0	1120,0	33139	2	-	33149	2	-
4 x 50	se	30,0	580,0	1251,0	33140	1	-	33150	1	-
4 x 70	se	34,0	812,0	1548,0	33141	2/0	-	33151	2/0	-
4 x 95	se	39,0	1102,0	2030,0	33142	3/0	-	33152	3/0	-
4 x 120	se	42,5	1392,0	2400,0	33143	4/0	-	33153	4/0	-
4 x 150	se	47,5	1740,0	3030,0	33144	300 kcmil	-	33154	300 kcmil	-
4 x 185	se	52,0	2146,0	3650,0	33145	350 kcmil	-	33155	350 kcmil	-
4 x 240	se	58,0	2784,0	4800,0	33146	500 kcmil	-	33156	500 kcmil	-

Dimensions and specifications may be changed without prior notice. (RQ02)

# A-LiY(StE)YÖ Data transmission cables for petrol stations and refineries with BAM\*-test report



## Technical data

- Oil- and fuel-resistant data transmission cables
- **Temperature range**  
flexing -5°C to +70°C  
fixed installation -40°C to +70°C
- **Nominal voltage** 200 V
- **Insulation resistance**  
min. 100 MOhm x km
- **Minimum bending radius**  
20x cable Ø
- **Radiation resistance**  
up to 80x10<sup>6</sup> cJ/kg (up to 80 Mrad)

## Cable structure

- Bare copper-conductor, fine-wire Part.-No. 32597, 32599  
Tinned copper-conductor, single-wire Part.-No. 32633
- Core insulation of special PVC to DIN VDE 0207
- Core identification black cores with continuous white numbering
- Each single core screened with aluminium/ polyester foil, metal layer at outside
- Screened cores in layers with optimal lay-length screenings of each core make contact mutually
- Solid copper drain-wire Part.-No. 32633  
copper drain-wire Part.-No. 32597, 32599
- Common core sheath
- Outer sheath of special PVC
- Sheath colour black

## Properties

### Tests

- Compound characteristic acc. to DIN VDE 0207
- Oil- and fuel resistance of sheath: acc. to BAM-Specification
- Oil-resistance of sheath: DIN ISO 6722 part 1, 4.11, DIN EN 60811-404
- Fuel-resistance of sheath: DIN ISO 6722 part 1, 4.12
- PVC self-extinguishing and flame retardant acc. to DIN VDE 0482-332-1-2, DIN EN 60332-1-2, IEC 60332-1 (equivalent DIN VDE 0472 part 804 test method B)

### Note

- **BAM** = Federal Institute for Materials Research and Testing
- AWG sizes are approximate equivalent values. The actual cross-section is in mm<sup>2</sup>.

## Application

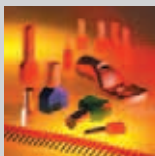
These data transmission cables, oil- and fuel-resistant, are used for internal and external wiring applications at petrol pumps, for data transmission from the pumps to the cash desk and in the installation of video surveillance systems. These cables are also installed directly in the ground and are resistant to UV radiation. Special screens over individual cores guarantee good overall screening and ensure an interference-free transmission of control pulses.

CE = The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer Ø app. mm	Cop. weight kg / km	Weight app. kg / km	AWG-No.
32597	4 x 0,75	9,0	38,0	105,0	18
32633	7 x 0,75	10,3	60,0	150,0	18

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer Ø app. mm	Cop. weight kg / km	Weight app. kg / km	AWG-No.
32599	8 x 0,75	11,0	68,0	169,0	18

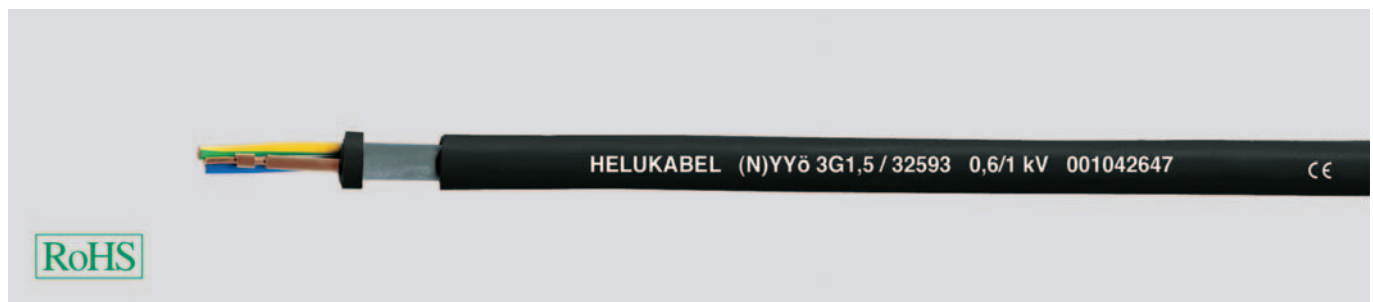
Dimensions and specifications may be changed without prior notice. (RQ01)



Passendes Kabelzubehör finden Sie in Kapitel X.

- Kabelschuhe - Kupfer
- Kabelschuhe - Aluminium

# Petrol Station Cables (N)YYÖ-J 0,6/1 kV



## Technical data

- Power and data transmission cable adapted to DIN VDE 0271
- **Temperature range**  
flexing -5°C to +50°C  
fixed installation -30°C to +70°C
- Permissible **operating temperature** at conductor +70°C
- **Nominal voltage**  $U_0/U$  0,6/1 kV
- **Test voltage** 4 kV
- Max. permissible **tensile stress** with cable grip at conductor 50 N/mm<sup>2</sup>
- **Minimum bending radius** 12x cable Ø

## Cable structure

- Bare copper-conductor, to DIN VDE 0295 cl.1, single-wire, BS 6360 cl.1, IEC 60228 cl.1
- Core insulation of PVC
- Core identification to DIN VDE 0293-308
- Concentric lay-up of cores
- Outer sheath of PVC
- Sheath colour black <sup>1)</sup>

## Properties

### Tests

- Oil and fuel-resistant acc. to DIN ISO 6722
- PVC self-extinguishing and flame retardant acc. to DIN VDE 0482-332-1-2, DIN EN 60332-1-2, IEC 60332-1 (equivalent DIN VDE 0472 part 804 test method B)
- DIN VDE 0298 part 1 is shall be observed.

### Note

- <sup>1)</sup> Version with blue outer sheath on request.
- AWG sizes are approximate equivalent values. The actual cross-section is in mm<sup>2</sup>.

## Application

Energy and data transmission cables for outdoor use, in the soil, water and concrete, where mechanical damage is excluded. For installations in applications such as gas stations and refineries, where resistance to oils and fuels is required.

CE= The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer Ø app. mm	Cop. weight kg / km	Weight app. kg / km	AWG-No.
32592	2 x 1,5	11,0	29,0	180,0	16
32593	3 x 1,5	11,5	43,0	225,0	16
32594	4 x 1,5	12,0	58,0	260,0	16

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer Ø app. mm	Cop. weight kg / km	Weight app. kg / km	AWG-No.
32595	5 x 1,5	13,0	72,0	280,0	16
32596	7 x 1,5	15,5	101,0	370,0	16

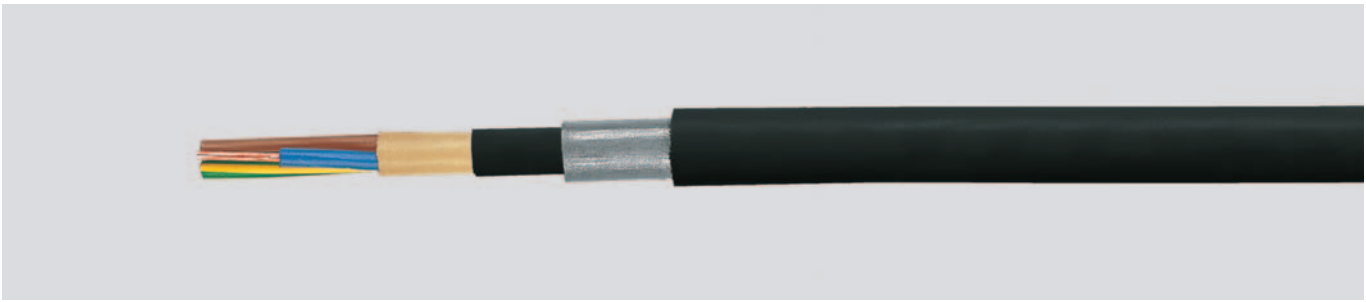
Dimensions and specifications may be changed without prior notice. (RQ01)



Passendes Kabelzubehör finden Sie in Kapitel X.

- Kabelschuhe - Kupfer
- Kabelschuhe - Aluminium



**NYKY-J 0,6/1kV** with lead sheath, VDE approved**Technical data**

- Power and control cable, PVC insulation and lead inner-sheath to DIN VDE 0265
- **Temperature range**  
flexing -5°C to +50°C  
fixed installation -30°C to +70°C
- Permissible **operating temperature** at conductor +70°C
- Permissible **short circuit temperature** (short circuit duration max. 5 s) +160°C
- **Nominal voltage** U<sub>0</sub>/U 0,6/1 kV
- **Test voltage** 6 kV
- **Minimum bending radius**  
12x cable Ø
- **Power ratings table**  
see Technical Informations

**Cable structure**

- Bare copper-conductor, to DIN VDE 0295 cl.1 or cl.2, single-wire or multi-wire, BS 6360 cl.1 or cl.2, IEC 60228 cl.1 or cl.2
- Core insulation of PVC compound type DIV4 to DIN VDE 0276 part 603
- Core identification to DIN VDE 0293-308  
- up to 5 cores coloured  
- from 7 cores, black with continuous white numbering
- GN-YE conductor
- Cores stranded concentrically
- Overall sheath of soft plastics material, if exists, ermits also as extrusion or taping or a combination of both
- Lead inner sheath, jointless and enclosed
- Outer sheath of PVC compound type DMV5 to DIN VDE 0276 part 603
- Sheath colour black

**Properties**

- **Advantage**  
Good coupling resistance due to enclosed lead sheath is suitable for special **EMC-requirements** (Electromagnetic Compatibility)
- **Resistant to**  
Turpentine substitute  
Xylol  
Fuels  
Trichlor  
Oils  
Petroleum  
Toluene  
Hydrocarbon
- The lead sheath is **not** permitted to use as neutral-conductor (N)
- If drain-wire exists, only for use as earthing of lead sheath in a grounding system e.g. in hazardous areas to DIN VDE 0165. This drain-wire is **not** allowed to install as protective, neutral or earth conductor

**Note**

- re = round conductor, single-wire  
sm = sectional conductor, multi-wire
- AWG sizes are approximate equivalent values. The actual cross-section is in mm<sup>2</sup>.

**Application**

These cables of PVC insulation and lead inner-sheath are installed everywhere, where the danger of chemical reaction of solvents, energy fuels, oils, gasolines or of that kind in filling stations particularly in petrol pump areas for carburetor propellants, in refining plants and in chemical industries are to be caused. Suitable for installation under ground, in water, indoor areas and cable conduits.

☑= The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer Ø app. mm	Cop. weight kg / km	Lead weight kg / km	Weight app. kg / km	AWG-No.
32640	3 x 1,5 re	13,5	43,0	427,0	598,0	16
32686	3 x 1,5 re / 1,5	14,5	57,0	427,0	610,0	16
32641	3 x 2,5 re	14,8	72,0	487,0	690,0	14
32642	3 x 4 re	16,2	115,0	555,0	840,0	12
32643	3 x 6 re	17,3	173,0	610,0	990,0	10
32644	3 x 25 rm / 16	27,8	874,0	1290,0	2550,0	4
32645	3 x 35 sm / 16	29,2	1162,0	1340,0	3080,0	2
32646	3 x 50 sm / 25	32,7	1680,0	1670,0	3850,0	1
32647	3 x 70 sm / 35	35,8	2352,0	2020,0	5360,0	2/0
32648	3 x 95 sm / 50	40,3	3216,0	2440,0	6950,0	3/0
32649	3 x 120 sm / 70	43,2	4128,0	2770,0	8235,0	4/0
32650	3 x 150 sm / 70	48,8	4992,0	3530,0	9620,0	300 kcmil
32651	3 x 185 sm / 95	53,4	6240,0	4230,0	11940,0	350 kcmil
32652	3 x 240 sm / 120	59,8	8064,0	5230,0	15380,0	500 kcmil

Continuation ▶

**NYKY-J 0,6/1kV** with lead sheath, VDE approved

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer Ø app. mm	Cop. weight kg / km	Lead weight kg / km	Weight app. kg / km	AWG-No.
32653	4 x 1,5 re	14,5	58,0	464,0	650,0	16
32687	4 x 1,5 re / 1,5	15,3	72,0	464,0	650,0	16
32654	4 x 2,5 re	15,5	96,0	530,0	760,0	14
32655	4 x 4 re	17,5	154,0	605,0	960,0	12
32656	4 x 6 re	18,5	230,0	665,0	1100,0	10
32657	4 x 10 re	21,3	384,0	750,0	1400,0	8
32658	4 x 16 re	24,2	614,0	975,0	1910,0	6
32659	4 x 25 rm	28,5	960,0	1290,0	2750,0	4
32660	4 x 35 rm	30,5	1344,0	1340,0	3630,0	2
32661	4 x 50 sm	33,3	1920,0	1680,0	4580,0	1
32662	4 x 70 sm	37,5	2688,0	2020,0	5340,0	2/0
32663	4 x 95 sm	42,3	3648,0	2440,0	7120,0	3/0
32664	5 x 1,5 re	15,3	72,0	505,0	710,0	16
32688	5 x 1,5 re / 1,5	16,4	86,0	505,0	780,0	16
32665	5 x 2,5 re	17,2	120,0	580,0	910,0	14
32666	5 x 4 re	19,4	192,0	665,0	1090,0	12
32667	5 x 6 re	20,2	288,0	730,0	1270,0	10
32668	5 x 10 re	22,8	480,0	930,0	1700,0	8
32669	5 x 16 re	26,4	768,0	1070,0	2231,0	6
32670	7 x 1,5 re	17,2	101,0	545,0	810,0	16
32689	7 x 1,5 re / 1,5	17,2	115,0	545,0	970,0	16
32678	7 x 2,5 re	18,0	168,0	625,0	1070,0	14
32671	10 x 1,5 re	21,3	144,0	680,0	918,0	16
32679	10 x 2,5 re	22,4	240,0	865,0	1330,0	14
32672	12 x 1,5 re	21,3	173,0	710,0	988,0	16
32680	12 x 2,5 re	23,2	288,0	940,0	1440,0	14
32673	14 x 1,5 re	21,3	202,0	735,0	1100,0	16
32681	14 x 2,5 re	24,5	336,0	980,0	1530,0	14
32674	19 x 1,5 re	23,0	274,0	900,0	1440,0	16
32682	19 x 2,5 re	26,0	456,0	1170,0	1680,0	14
32675	24 x 1,5 re	27,3	346,0	1170,0	1610,0	16
32683	24 x 2,5 re	31,0	576,0	1370,0	2160,0	14
32676	30 x 1,5 re	28,2	432,0	1240,0	1830,0	16
32684	30 x 2,5 re	32,3	720,0	1550,0	2530,0	14
32677	40 x 1,5 re	31,4	576,0	1390,0	2300,0	16
32685	40 x 2,5 re	36,4	960,0	1770,0	3310,0	14

Dimensions and specifications may be changed without prior notice. (RQ01)



Passendes Kabelzubehör finden Sie in Kapitel X.

- Kabelschuhe - Kupfer
- Kabelschuhe - Aluminium



# LOW-VOLTAGE & SAFETY CABLES



**N2XH power cable, 0,6/1 kV, halogen-free, without functionality****Technical data**

- Power and control cable acc. to DIN VDE 0276 part 604, HD 604 S1 part 1 and part 5G
- **Temperature range**  
during installation -5°C to +50°C  
fixed installation -30°C to +90°C
- Permissible **operating temperature** at conductor +90°C
- **Nominal voltage**  $U_0/U$  0,6/1 kV
- **Test voltage** 4 kV
- **Minimum bending radius**  
single-core 15x cable  $\varnothing$   
multi-core 12x cable  $\varnothing$
- **Radiation resistance**  
up to  $100 \times 10^6$  cJ/kg (up to 100 Mrad)
- **Caloric load values**  
see Technical Informations

**Cable structure**

- Bare copper-conductor, to DIN VDE 0295 cl.1 or cl.2, single-wire or multi-wire, BS 6360 cl.1 or cl.2, IEC 60228 cl.1 or cl.2
- Core insulation of cross-linked polyethylene (XLPE) compound type 2X11 to HD 604 S1
- Core identification to DIN VDE 0293-308
- Core identification for 3+½ conductor  
J-type: GN-YE (½), BN, BK, GY  
O-type: BU (½), BN, BK, GY
- Cores stranded in layers (for multi-core cables)
- Overall filled inner sheath
- Covered by filling compound or taping
- Outer sheath of thermoplastic polyolefine, compound type HM4 to HD 604 S1
- Sheath colour black

**Properties**

- Halogen-free, no separation of corrosive or toxic gases
- Limited propagation of fire
- Low smoke development
- The materials used in manufacture are cadmium-free and contain no silicone and free from substances harmful to the wetting properties of lacquers

**Tests**

- Flame test acc. to DIN VDE 0482-332-3-24, BS 4066 part 3, DIN EN 60332-3-24, IEC 60332-3-24 (previously DIN VDE 0472 part 804 test method C)
- Corrosiveness of combustion gases acc. to DIN VDE 0482 part 267, DIN EN 50267-2-2, IEC 60754-2 (equivalent DIN VDE 0472 part 813)
- Halogen-free acc. to DIN VDE 0482 part 267, DIN EN 50267-2-1, IEC 60754-1 (equivalent DIN VDE 0472 part 815)
- Smoke density acc. to DIN VDE 0482 part 1034-1+2, DIN EN 61034-1+2, IEC 61034-1+2, BS 7622 part 1+2 (previously DIN VDE 0472 part 816)

**Note**

- re = round conductor, single-wire  
rm = round conductor, multi-wire  
sm = sectional conductor, multi-wire
- J-version = with GN-YE conductor  
O-version = without GN-YE conductor
- AWG sizes are approximate equivalent values. The actual cross-section is in mm<sup>2</sup>.
- **LSOH** = Low Smoke Zero Halogen

**Application**

Halogen-free power cables with enhanced characteristics in case of fire are used for applications where harm to human life and damage to property must be prevented in the event of fire, e. g. in power stations, industrial installations, communal establishments, hotels, airports, underground stations, railway stations, hospitals department stores, banks, schools theaters, multi-storey buildings, process control centres etc. Suitable for fixed installation in dry, damp or wet environments, in, above, on and beneath plaster as well as in masonry walls and in concrete. These cables are suitable for outdoor applications and in underground by using in conduits or tubes. For the installation in conduit all precautions must be taken that no accumulation of water can occur in the pipes.

CE= The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

Part no. J type	O type	No. cores x cross-sec. mm <sup>2</sup>	Outer Ø app. mm	Cop. weight kg / km	Weight app. kg / km	AWG-No.
	53558	1 x 1,5 rm	6,0	14,4	41,0	16
	53559	1 x 2,5 rm	6,5	24,0	53,0	14
53100	53248	1 x 4 re	8,0	39,0	68,0	12
53101	53249	1 x 6 re	9,0	58,0	90,0	10
53102	53250	1 x 10 re	9,0	96,0	140,0	8
53103	53251	1 x 16 re	10,0	154,0	190,0	6
53104	53252	1 x 25 rm	11,0	240,0	290,0	4
53105	53253	1 x 35 rm	12,0	336,0	390,0	2
53106	53254	1 x 50 rm	15,0	480,0	510,0	1
53107	53255	1 x 70 rm	17,0	672,0	710,0	2/0
53108	53256	1 x 95 rm	19,0	912,0	960,0	3/0
53109	53257	1 x 120 rm	21,0	1152,0	1200,0	4/0
53110	53258	1 x 150 rm	23,0	1440,0	1480,0	300 kcmil
53111	53259	1 x 185 rm	25,0	1776,0	1910,0	350 kcmil
53112	53260	1 x 240 rm	28,0	2304,0	2370,0	500 kcmil
53113	53261	1 x 300 rm	30,0	2880,0	2970,0	600 kcmil
52485	52486	1 x 400 rm	32,9	3840,0	3957,0	750 kcmil

Part no. J type	O type	No. cores x cross-sec. mm <sup>2</sup>	Outer Ø app. mm	Cop. weight kg / km	Weight app. kg / km	AWG-No.
53114	53262	2 x 1,5 re	12,0	29,0	185,0	16
53115	53263	2 x 2,5 re	12,2	48,0	220,0	14
53116	53264	2 x 4 re	13,2	77,0	275,0	12
53117	53265	2 x 6 re	14,1	115,0	335,0	10
53118	53266	2 x 10 re	16,2	192,0	450,0	8
53119	53267	2 x 16 re	17,8	307,0	620,0	6
53120	53268	2 x 25 rm	21,0	480,0	930,0	4

Continuation ▶

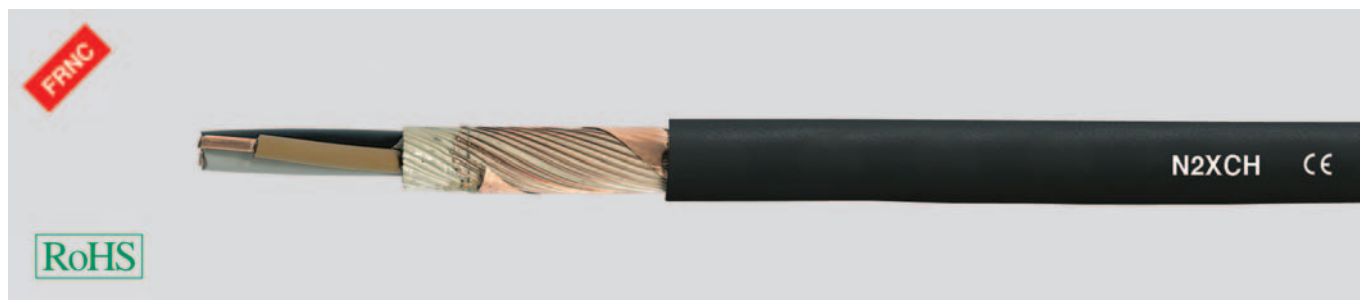
**N2XH** power cable, 0,6/1 kV, halogen-free, without functionality

Part no. J type	O type	No.cores x cross-sec. mm <sup>2</sup>	Outer Ø app. mm	Cop. weight kg / km	Weight app. kg / km	AWG-No.	Part no. J type	O type	No.cores x cross-sec. mm <sup>2</sup>	Outer Ø app. mm	Cop. weight kg / km	Weight app. kg / km	AWG-No.
53121	53269	3 x 1,5 re	13,0	43,0	220,0	16	53136	53330	3 x 50 / 25 sm	28,5	1680,0	2100,0	1
53122	53270	3 x 2,5 re	14,0	72,0	280,0	14	53137	53331	3 x 70 / 35 sm	31,4	2352,0	2800,0	2/0
53123	53271	3 x 4 re	15,0	115,0	350,0	12	53138	53332	3 x 95 / 50 sm	34,9	3216,0	3750,0	3/0
53124	53272	3 x 6 re	16,0	173,0	420,0	10	53139	53333	3 x 120 / 70 sm	38,0	4128,0	4750,0	4/0
53125	53273	3 x 10 re	18,0	288,0	600,0	8	53140	53334	3 x 150 / 70 sm	43,3	4992,0	5750,0	300 kcmil
53126	53274	3 x 16 re	20,0	461,0	770,0	6	53141	53335	3 x 185 / 95 sm	47,2	6240,0	7200,0	350 kcmil
53127	53275	3 x 25 rm	21,8	720,0	1120,0	4	53142	53336	3 x 240 / 120 sm	53,4	8064,0	9300,0	500 kcmil
53128	53276	3 x 35 sm	24,9	1008,0	1550,0	2							
53129	53277	3 x 50 sm	25,2	1440,0	1750,0	1							
53130	53278	3 x 70 sm	29,2	2016,0	2450,0	2/0							
53131	53279	3 x 95 sm	32,0	2736,0	3250,0	3/0							
53132	53280	3 x 120 sm	34,9	3456,0	4000,0	4/0							
53133	53281	3 x 150 sm	39,2	4320,0	5000,0	300 kcmil							
53134	53282	3 x 185 sm	44,1	5328,0	6150,0	350 kcmil							
53135	53283	3 x 240 sm	49,2	6912,0	8000,0	500 kcmil							
53143	53284	4 x 1,5 re	13,0	58,0	235,0	16							
53144	53285	4 x 2,5 re	14,0	96,0	290,0	14							
53145	53286	4 x 4 re	15,0	154,0	370,0	12							
53146	53287	4 x 6 re	16,0	230,0	470,0	10							
53147	53288	4 x 10 re	18,0	384,0	670,0	8							
53148	53289	4 x 16 re	20,0	614,0	930,0	6							
53149	53290	4 x 25 rm	25,0	960,0	1440,0	4							
53150	53291	4 x 35 sm	27,0	1344,0	1890,0	2							
53151	53292	4 x 50 sm	28,0	1920,0	2300,0	1							
53152	53293	4 x 70 sm	32,0	2688,0	3200,0	2/0							
53153	53294	4 x 95 sm	36,0	3648,0	4250,0	3/0							
53154	53295	4 x 120 sm	40,2	4608,0	5350,0	4/0							
53155	53296	4 x 150 sm	45,8	5760,0	6550,0	300 kcmil							
53156	53297	4 x 185 sm	49,5	7104,0	8100,0	350 kcmil							
53157	53298	4 x 240 sm	56,0	9216,0	10550,0	500 kcmil							
53158	53299	5 x 1,5 re	14,5	72,0	280,0	16							
53159	53309	5 x 2,5 re	16,0	120,0	350,0	14							
53160	53310	5 x 4 re	17,0	192,0	450,0	12							
53161	53311	5 x 6 re	18,5	288,0	600,0	10							
53162	53312	5 x 10 re	21,0	480,0	850,0	8							
53163	53313	5 x 16 re	24,0	768,0	1200,0	6							
53557		5 x 25 rm	28,0	1200,0	1539,0	4							
53164	53314	7 x 1,5 re	15,5	101,0	350,0	16							
53171	53315	7 x 2,5 re	17,0	168,0	370,0	14							
53178	53316	7 x 4 re	17,2	269,0	530,0	12							
53165	53317	10 x 1,5 re	18,5	144,0	480,0	16							
53172	53318	10 x 2,5 re	20,0	240,0	500,0	14							
53166	53319	12 x 1,5 re	19,0	173,0	520,0	16							
53173	53320	12 x 2,5 re	21,0	288,0	560,0	14							
53179	53321	12 x 4 re	21,2	461,0	800,0	12							
53167	53322	14 x 1,5 re	20,0	202,0	550,0	16							
53174	53323	14 x 2,5 re	22,0	336,0	630,0	14							
53168	53324	19 x 1,5 re	22,0	274,0	700,0	16							
53175	53325	19 x 2,5 re	24,0	456,0	800,0	14							
53169	53326	24 x 1,5 re	25,0	346,0	850,0	16							
53176	53327	24 x 2,5 re	27,0	576,0	990,0	14							
53170	53328	30 x 1,5 re	26,0	432,0	950,0	16							
53177	53329	30 x 2,5 re	28,0	720,0	1180,0	14							

Dimensions and specifications may be changed without prior notice. (RQ02)



# N2XCH power cable, 0,6/1kV, halogen-free, with concentric conductor, without functionality



## Technical data

- Power and control cable acc. to DIN VDE 0276 part 604, HD 604 S1 part 1 and part 5G
- **Temperature range** during installation -5°C to +50°C fixed installation -30°C to +90°C
- Permissible **operating temperature** at conductor +90°C
- **Nominal voltage**  $U_0/U$  0,6/1 kV
- **Test voltage** 4 kV
- **Minimum bending radius** 12x cable Ø
- **Radiation resistance** up to  $100 \times 10^6$  cJ/kg (up to 100 Mrad)
- **Caloric load values** see Technical Informations

## Cable structure

- Bare copper-conductor, to DIN VDE 0295 cl.1 or cl.2, single-wire or multi-wire, BS 6360 cl.1 or cl.2, IEC 60228 cl.1 or cl.2
- Core insulation of cross-linked polyethylene (XLPE) compound type 2X11 to HD 604 S1
- Core identification to DIN VDE 0293-308
- Cores stranded in layers (for multi-core cables)
- Overall filled inner sheat
- Covered by filling compound or taping
- Concentric conductor of bare Cu-wires
- Outer sheath of thermoplastic polyolefine, compound type HM4 to HD 604 S1
- Sheath colour black

## Properties

- Halogen-free, no liberation of corrosive or toxic gases
- Limited propagation of fire
- Low smoke development
- The materials used in manufacture are cadmium-free and contain no silicone and free from substances harmful to the wetting properties of lacquers

## Tests

- Flame test acc. to DIN VDE 0482-332-3-24, BS 4066 part 3, DIN EN 60332-3-24, IEC 60332-3-24 (previously DIN VDE 0472 part 804 test method C)
- Corrosiveness of combustion gases acc. to DIN VDE 0482 part 267, DIN EN 50267-2-2, IEC 60754-2 (equivalent DIN VDE 0472 part 813)
- Halogen-free acc. to DIN VDE 0482 part 267, DIN EN 50267-2-1, IEC 60754-1 (equivalent DIN VDE 0472 part 815)
- Smoke density acc. to DIN VDE 0482 part 1034-1+2, DIN EN 61034-1+2, IEC 61034-1+2, BS 7622 part 1+2 (previously DIN VDE 0472 part 816)

## Note

- re = round conductor, single-wire
- rm = round conductor, multi-wire
- sm = sectional conductor, multi-wire
- AWG sizes are approximate equivalent values. The actual cross-section is in mm<sup>2</sup>.
- **LS0H** = Low Smoke Zero Halogen

## Application

The power cables with enhanced characteristics in case of fire are used in power stations.

The concentric conductor can be used as a PE or PEN conductor or as screen. Suitable for fixed installation in dry, damp or wet environments, in, above, on and beneath plaster as well as in masonry walls and in concrete. These cables are suitable for outdoor applications and in underground by using in conduits or tubes. For the installation in conduit all precautions must be taken that no accumulation of water can occur in the pipes

CE = The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer Ø app. mm	Cop. weight kg / km	Weight app. kg / km	AWG-No.	Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer Ø app. mm	Cop. weight kg / km	Weight app. kg / km	AWG-No.
53200	2 x 1,5 / 1,5 re	12,0	53,0	250,0	16	53223	4 x 4 / 4 re	17,5	202,0	480,0	12
53201	2 x 2,5 / 2,5 re	13,0	81,0	280,0	14	53224	4 x 6 / 6 re	19,0	297,0	600,0	10
53202	2 x 4 / 4 re	14,0	122,0	320,0	12	53225	4 x 10 / 10 re	21,5	504,0	850,0	8
53203	2 x 6 / 6 re	15,0	183,0	400,0	10	53226	4 x 16 / 16 re	24,5	797,0	1200,0	6
53204	2 x 10 / 10 re	16,0	311,0	560,0	8	53227	4 x 25 / 16 rm	29,0	1142,0	1800,0	4
53205	2 x 16 / 16 re	19,1	490,0	780,0	6	53228	4 x 35 / 16 rm	29,5	1528,0	2100,0	2
53206	3 x 1,5 / 1,5 re	13,0	67,0	250,0	16	53229	4 x 50 / 25 sm	32,5	2203,0	2800,0	1
53207	3 x 2,5 / 2,5 re	14,0	104,0	320,0	14	53230	4 x 70 / 35 sm	38,0	3082,0	3800,0	2/0
53208	3 x 4 / 4 re	16,5	161,0	400,0	12	53231	4 x 95 / 50 sm	43,5	4208,0	5100,0	3/0
53209	3 x 6 / 6 re	18,0	242,0	500,0	10	53758	4 x 120 / 70 sm	50,5	5388,0	6556,0	4/0
53210	3 x 10 / 10 re	20,0	408,0	750,0	8	53759	4 x 150 / 70 sm	52,1	6540,0	7600,0	300 kcmil
53211	3 x 16 / 16 re	22,5	643,0	1000,0	6	53760	4 x 185 / 95 sm	57,2	8159,0	9370,0	350 kcmil
53212	3 x 25 / 2,5 rm	27,0	902,0	1600,0	4	53761	4 x 240 / 120 sm	62,6	10546,0	11611,0	500 kcmil
53213	3 x 35 / 16 rm	27,5	1190,0	1900,0	2	53232	7 x 1,5 / 2,5 re	15,0	132,0	320,0	16
53214	3 x 50 / 25 rm	32,3	1723,0	2400,0	1	53239	7 x 2,5 / 2,5 re	15,5	200,0	400,0	14
53215	3 x 70 / 35 sm	35,6	2410,0	3060,0	2/0	53246	7 x 4 / 4 re	18,1	316,0	580,0	12
53216	3 x 95 / 50 sm	39,0	3296,0	4200,0	3/0	53233	10 x 1,5 / 2,5 re	17,2	177,0	420,0	16
53217	3 x 120 / 70 sm	42,0	4236,0	5207,0	4/0	53240	10 x 2,5 / 4 re	18,9	287,0	550,0	14
53218	3 x 150 / 70 sm	43,5	5100,0	5700,0	300 kcmil	53234	12 x 1,5 / 2,5 re	18,4	204,0	460,0	16
53219	3 x 185 / 95 sm	47,4	6383,0	7150,0	350 kcmil	53241	12 x 2,5 / 4 re	19,2	335,0	610,0	14
53220	3 x 240 / 120 sm	53,5	8240,0	9250,0	500 kcmil	53247	12 x 4 / 6 re	22,6	528,0	910,0	12
53221	4 x 1,5 / 1,5 re	13,5	81,0	300,0	16	53235	16 x 1,5 / 4 re	20,0	275,0	686,0	16
53222	4 x 2,5 / 2,5 re	14,5	129,0	380,0	14	53242	16 x 2,5 / 6 re	20,9	450,0	805,0	14

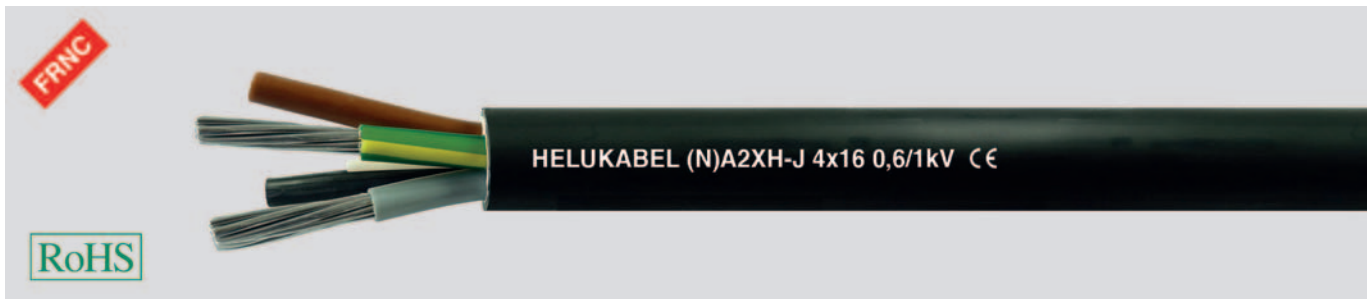
Continuation ▶

# N2XCH power cable, 0,6/1kV, halogen-free, with concentric conductor, without functionality



Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer Ø app. mm	Cop. weight kg / km	Weight app. kg / km	AWG-No.
53236	21 x 1,5 / 6 re	22,6	370,0	766,0	16
53243	21 x 2,5 / 6 re	25,2	572,0	1015,0	14
53237	24 x 1,5 / 6 re	23,2	412,0	800,0	16
53244	24 x 2,5 / 10 re	26,1	695,0	1100,0	14
53238	30 x 1,5 / 6 re	24,3	500,0	930,0	16
53245	30 x 2,5 / 10 re	28,0	842,0	1290,0	14

Dimensions and specifications may be changed without prior notice. (RQ02)

**(N)A2XH** power cable, 0,6/1 kV, halogen-free, without functionality**Technical data**

- Power and control cable adapted to DIN VDE 0276 part 604, HD 604 S1 part 1 and part 5G
- **Temperature range**  
during installation -5°C to +50°C  
fixed installation -30°C to +90°C
- Permissible **operating temperature** at conductor +90°C
- **Nominal voltage**  $U_0/U$  0,6/1 kV
- **Test voltage** 4 kV
- **Minimum bending radius**  
single-core 15x cable  $\varnothing$   
multi-core 12x cable  $\varnothing$
- **Radiation resistance**  
up to  $100 \times 10^6$  cJ/kg (up to 100 Mrad)

**Cable structure**

- Aluminium-conductor, to DIN VDE 0295 cl.1 or cl.2, single-wire or multi-wire, BS 6360 cl.1 or cl.2, IEC 60228 cl.1 or cl.2
- Core insulation of cross-linked polyethylene (XLPE)  
compound type 2X11 to HD 604 S1
- Core identification to DIN VDE 0293-308
- Core identification for 3+½ conductor  
J-type: GN-YE (½), BN, BK, GY  
O-type: BU (½), BN, BK, GY
- Cores stranded in layers (for multi-core cables)
- Overall filled inner sheath
- Covered by filling compound or taping
- Outer sheath of thermoplastic polyolefine, ompound type HM4 to HD 604 S1
- Sheath colour black

**Properties**

- Halogen-free, no separation of corrosive or toxic gases
- Limited propagation of fire
- Low smoke development
- The materials used in manufacture are cadmium-free and contain no silicone and free from substances harmful to the wetting properties of lacquers

**Tests**

- Flame test acc. to DIN VDE 0482-332-3-24, BS 4066 part 3, DIN EN 60332-3-24, IEC 60332-3-24 (previously DIN VDE 0472 part 804 test method C)
- Corrosiveness of combustion gases acc. to DIN VDE 0482 part 267, DIN EN 50267-2-2, IEC 60754-2 (equivalent DIN VDE 0472 part 813)
- Halogen-free acc. to DIN VDE 0482 part 267, DIN EN 50267-2-1, IEC 60754-1 (equivalent DIN VDE 0472 part 815)
- Smoke density acc. to DIN VDE 0482 part 1034-1+2, DIN EN 61034-1+2, IEC 61034-1+2, BS 7622 part 1+2 (previously DIN VDE 0472 part 816)

**Note**

- rm = round conductor, multi-wire;  
se = sector-shaped conductor, single-wire;  
sm = sector-shaped conductor, multi-wire
- AWG sizes are approximate equivalent values. The actual cross-section is in mm<sup>2</sup>.
- **LSOH** = Low Smoke Zero Halogen

**Application**

Halogen-free power cables for energy with enhanced characteristics in case of fire are used for applications where harm to human life and damage to property must be prevented in the event of fire, e. g. in power stations, industrial installations, communal establishments, hotels, airports, underground stations, railway stations, hospitals department stores, banks, schools theaters, multi-storey buildings, process control centres etc. Suitable for fixed installation in dry, damp or wet environments, in, above, on and beneath plaster as well as in masonry walls and in concrete. These cables are suitable for outdoor applications and in underground by using in conduits or tubes. For the installation in conduit all precautions must be taken that no accumulation of water can occur in the pipes.

CE = The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

Part no. J type	O type	No. cores x cross-sec. mm <sup>2</sup>	Outer Ø app. mm	Alu weight kg / km	Weight app. kg / km	AWG-No.
50073	50128	1 x 25 rm	9,9	73,0	132,0	4
50074	50129	1 x 35 rm	11,0	102,0	166,0	2
50075	50130	1 x 50 rm	12,5	145,0	211,0	1
50076	50131	1 x 70 rm	14,1	203,0	283,0	2/0
50077	50132	1 x 95 rm	16,1	276,0	376,0	3/0
50078	50133	1 x 120 rm	17,5	348,0	456,0	4/0
53562	53553	1 x 150 rm	19,6	435,0	560,0	300 kcmil
50079	50134	1 x 185 rm	21,8	537,0	697,0	350 kcmil
53561	50135	1 x 240 rm	24,0	696,0	878,0	500 kcmil
50080	53554	1 x 300 rm	26,7	870,0	1073,0	600 kcmil
50081	50136	1 x 400 rm	29,7	1160,0	1347,0	750 kcmil
50082	53555	1 x 500 rm	33,1	1450,0	1705,0	1000 kcmil

Part no. J type	O type	No. cores x cross-sec. mm <sup>2</sup>	Outer Ø app. mm	Alu weight kg / km	Weight app. kg / km	AWG-No.
50083	50137	3 x 16 rm	16,3	139,0	364,0	6
50084	50138	3 x 25 rm	19,6	218,0	530,0	4
50085	50139	3 x 35 rm	22,1	305,0	684,0	2
50086	50140	3 x 35 se	19,0	305,0	486,0	2
50087	50141	3 x 50 sm	22,4	435,0	655,0	1
50088	50142	3 x 50 se	21,2	435,0	622,0	1
50089	50143	3 x 70 sm	26,1	609,0	903,0	2/0
50090	50144	3 x 70 se	25,2	609,0	859,0	2/0
50091	50145	3 x 95 sm	29,1	827,0	1174,0	3/0
50092	50146	3 x 95 se	27,8	827,0	1115,0	3/0
50093	50147	3 x 120 sm	32,2	1044,0	1446,0	4/0
50094	50148	3 x 120 se	30,8	1044,0	1379,0	4/0

Continuation ▶

**(N)A2XH** power cable, 0,6/1 kV, halogen-free, without functionality

Part no. J type	O type	No.cores x cross-sec. mm <sup>2</sup>	Outer Ø app. mm	Alu weight kg / km	Weight app. kg / km	AWG-No.
50095	50149	3 x 150 sm	36,2	1305,0	1780,0	300 kcmil
50096	50150	3 x 150 se	33,9	1305,0	1685,0	300 kcmil
50097	50154	3 x 185 sm	40,1	1610,0	2197,0	350 kcmil
50098	50155	3 x 185 se	37,6	1610,0	2089,0	350 kcmil
50099	50156	3 x 240 sm	44,9	2088,0	2782,0	500 kcmil
50100	50157	3 x 240 se	41,8	2088,0	2634,0	500 kcmil
50101	50158	3 x 70 / 35 sm	28,3	711,0	1044,0	2/0
50102	50159	3 x 120 / 70 sm	35,1	1247,0	1704,0	4/0
53550	50160	3 x 150 / 70 sm	39,7	1508,0	2065,0	300 kcmil
50103	50161	3 x 185 / 95 sm	43,7	1885,0	2563,0	350 kcmil
53551	50162	3 x 240 / 120 sm	49,1	2436,0	3237,0	500 kcmil
53560	50163	4 x 16 rm	19,0	186,0	460,0	6
50104	50164	4 x 25 rm	21,7	290,0	636,0	4
50105	50165	4 x 35 sm	22,4	406,0	649,0	2
50106	50166	4 x 35 se	21,6	406,0	623,0	2
50107	50167	4 x 50 sm	25,4	580,0	845,0	1
53556	50168	4 x 50 se	24,6	580,0	810,0	1
50108	50169	4 x 70 sm	29,7	812,0	1178,0	2/0
53552	50170	4 x 70 se	28,8	812,0	1126,0	2/0

Part no. J type	O type	No.cores x cross-sec. mm <sup>2</sup>	Outer Ø app. mm	Alu weight kg / km	Weight app. kg / km	AWG-No.
50109	50171	4 x 95 sm	33,3	1102,0	1538,0	3/0
50110	50172	4 x 95 se	32,1	1102,0	1467,0	3/0
50111	50173	4 x 120 sm	37,2	1392,0	1903,0	4/0
50112	50174	4 x 120 se	35,5	1392,0	1817,0	4/0
50113	50175	4 x 150 sm	41,3	1740,0	2328,0	300 kcmil
50114	50176	4 x 150 se	39,4	1740,0	2223,0	300 kcmil
50115	50177	4 x 185 sm	45,7	2146,0	2874,0	350 kcmil
50116	50178	4 x 185 se	43,4	2146,0	2750,0	350 kcmil
50117	50179	4 x 240 sm	51,2	2784,0	3646,0	500 kcmil
50118	50180	4 x 240 se	48,0	2784,0	3465,0	500 kcmil
50119	50181	5 x 25 rm	23,9	362,0	763,0	4
50120	50182	5 x 35 rm	27,0	508,0	986,0	2
50121	50183	5 x 50 rm	31,3	725,0	1309,0	1
50122	50184	5 x 70 rm	35,8	1015,0	1771,0	2/0
50123	50185	5 x 95 sm	36,5	1378,0	1891,0	3/0
50124	50186	5 x 120 sm	39,2	1740,0	2306,0	4/0
50125	50187	5 x 150 sm	45,4	2175,0	2865,0	300 kcmil
50126	50188	5 x 185 sm	50,1	2683,0	3534,0	350 kcmil
50127	50189	5 x 240 sm	55,2	3480,0	4482,0	500 kcmil

Dimensions and specifications may be changed without prior notice. (RQ02)

# N2XH-FE 180/E 30 security cable, halogen-free, 0,6/1 kV, with improved fire characteristics

EAC



## Technical data

- Halogen-free security cable with improved characteristics in the case of fire to DIN VDE 0266
- **Temperature range**  
-30°C to +70°C
- Permissible **operating temperature** at conductor +90°C
- **Nominal voltage**  $U_0/U$  0,6/1 kV
- **Test voltage** 4000 V
- **Minimum bending radius**  
15x cable  $\varnothing$
- **Radiation resistance**  
up to  $200 \times 10^6$  cJ/kg (up to 200 Mrad)
- **Caloric load values**  
see Technical Informations

## Cable structure

- Bare copper-conductor, to DIN VDE 0295 cl.1 or cl.2, single-wire or multi-wire, BS 6360 cl.1 or cl.2, IEC 60228 cl.1 or cl.2
- Core insulation of cross-linked polyethylene, compound type 2X11 to DIN VDE 0276 part 604
- Core identification to DIN VDE 0293-308 and 0276 part 604
- GN-YE conductor, 3 cores and above
- Cores stranded in layers
- Overall core covering, halogen-free filling compound, pressed
- Outer sheath of thermoplastic halogen-free polyolefine, flame retardant
- Sheath colour orange

## Tests

- Flame test acc. to DIN VDE 0482-332-3, BS 4066 part 3, DIN EN 60332-3, IEC 60332-3 (previously DIN VDE 0472 part 804 test method C)
- Corrosiveness of combustion gases acc. to DIN VDE 0482 part 267, DIN EN 50267-2-2, IEC 60754-2 (equivalent DIN VDE 0472 part 813)
- Halogen-free acc. to DIN VDE 0482 part 267, DIN EN 50267-2-1, IEC 60754-1 (equivalent DIN VDE 0472 part 815)
- Smoke density acc. to DIN VDE 0482 part 1034-1+2, DIN EN 61034-1+2, IEC 61034-1+2, BS 7622 part 1+2 (previously DIN VDE 0472 part 816)

## Properties

- Halogen free, no separation of corrosive and toxic gases
- Flame retardant and hardly flammable
- Self-extinguished and fire resistant
- No flame propagation, therefore security from fire
- low smoke density, low impairment of escape routes and fire extinguishing activities
- Toxicological harmless
- No self-ignition
- Maintenance of functionality during the increased current load
- **FE 180: Insulation integrity** for 180 minutes. Tests acc.to DIN VDE 0472 part 814  $\Delta$  IEC 60331. **Insulation integrity** under direct flame propagation for the test period of 180 minutes.
- **E 30: Functionality** of electrical cable systems for minimum 30 minutes. Test to DIN 4102 part 12. This fulfils the demands of technical guide lines for fire protection (supplement 1 to DIN VDE 0108 part 1). The **functionality** for 30 minutes assures when persons and animals are to be saved from a burning building. 30 minutes secures the functional performance of the fire warning and alarm systems, safety and spare lighting, passenger lifts with evacuation circuits, except the cables which are installed within the ladder shafts and engine rooms.

## Note

- re = round conductor, single-wire  
rm = round conductor, multi-wire
- AWG sizes are approximate equivalent values. The actual cross-section is in mm<sup>2</sup>.
- **LS0H** = Low Smoke Zero Halogen

## Application

Security cables are ideal for use everywhere, where in case of fire human life and material assets are to be protected and safety consciousness take a special significance, e. g. in industrial complexes, power stations, communal establishment, hotels, airports, underground railway networks, hospitals and outpatients clinic (DIN VDE 0107), department stores, data processing centres, theaters, cinemas, in multi-storey buildings, public gatherings, schools etc. (DIN VDE 0108), mining works, offshore plants, leading centres, traffic communication, emergency power supply and alarm systems. The cables are suitable for fixed installation in dry and moist rooms, in, above, on and beneath plaster as well as in masonry walls and in concrete. For the installation in conduit all precautions must be taken that no accumulation of water can occur in the pipes.

CE= The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer $\varnothing$ app. mm	Cop. weight kg / km	Weight app. kg / km	AWG-No.	Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer $\varnothing$ app. mm	Cop. weight kg / km	Weight app. kg / km	AWG-No.
52058	1 x 4 re	8,0	38,0	155,0	12	52063	1 x 35 rm	14,0	336,0	460,0	2
52059	1 x 6 re	9,0	58,0	190,0	10	52064	1 x 50 rm	15,5	480,0	590,0	1
52060	1 x 10 re	10,0	96,0	215,0	8	52065	1 x 70 rm	17,5	672,0	820,0	2/0
52061	1 x 16 re	10,5	154,0	240,0	6	52066	1 x 95 rm	19,5	912,0	1090,0	3/0
52062	1 x 25 rm	13,0	240,0	380,0	4	52067	1 x 120 rm	21,0	1152,0	1350,0	4/0

Continuation ▶



# N2XH-FE 180/E 30 security cable, halogen-free, 0,6/1 kV, with improved fire characteristics



Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer Ø app. mm	Cop. weight kg / km	Weight app. kg / km	AWG-No.
52068	1 x 150 rm	23,0	1440,0	1650,0	300 kcmil
52069	1 x 185 rm	25,0	1776,0	2030,0	350 kcmil
52070	1 x 240 rm	29,0	2304,0	2590,0	500 kcmil
52071	2 x 1,5 re	11,5	29,0	170,0	16
52072	2 x 2,5 re	12,0	48,0	190,0	14
52073	2 x 4 re	13,0	77,0	260,0	12
52074	2 x 6 re	14,0	115,0	310,0	10
52075	2 x 10 re	15,5	192,0	430,0	8
52076	2 x 16 re	17,5	307,0	600,0	6
52077	2 x 25 rm	22,0	480,0	930,0	4
52078	3 x 1,5 re	12,0	43,0	170,0	16
52079	3 x 2,5 re	12,5	72,0	220,0	14
52080	3 x 4 re	13,5	115,0	290,0	12
52081	3 x 6 re	14,5	173,0	370,0	10
52082	3 x 10 re	16,5	288,0	530,0	8
52083	3 x 16 re	18,5	461,0	760,0	6
52084	3 x 25 rm	23,5	720,0	1160,0	4
52088	3 x 25 / 16 rm	22,5	874,0	1430,0	4
52085	3 x 35 rm	26,0	1080,0	1560,0	2
52089	3 x 35 / 16 rm	28,0	1162,0	1810,0	2
52086	3 x 50 rm	29,0	1440,0	2030,0	1
52090	3 x 50 / 25 rm	32,0	1680,0	2340,0	1
52087	3 x 70 rm	34,0	2016,0	2890,0	2/0
52091	3 x 70 / 35 rm	35,0	2352,0	3190,0	2/0
52092	3 x 95 / 50 rm	40,0	3216,0	4350,0	3/0

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer Ø app. mm	Cop. weight kg / km	Weight app. kg / km	AWG-No.
52093	3 x 120 / 70 rm	45,0	4128,0	5550,0	4/0
52094	3 x 150 / 70 rm	48,5	4992,0	6560,0	300 kcmil
52095	3 x 185 / 95 rm	54,0	6240,0	8240,0	350 kcmil
52096	4 x 1,5 re	12,5	58,0	210,0	16
52097	4 x 2,5 re	13,0	96,0	260,0	14
52614	4 x 4 re	13,0	154,0	310,0	12
52615	4 x 6 re	14,5	230,0	410,0	10
52616	4 x 10 re	16,0	384,0	620,0	8
52617	4 x 16 re	18,0	614,0	900,0	6
52628	4 x 25 rm	23,6	960,0	1600,0	4
52629	4 x 35 rm	26,4	1344,0	2050,0	2
52383	4 x 50 rm	29,5	1920,0	2761,0	1
52432	4 x 70 rm	34,6	2688,0	3785,0	2/0
52433	4 x 95 rm	39,0	3648,0	5010,0	3/0
52434	4 x 120 rm	43,5	4608,0	6135,0	4/0
52618	5 x 1,5 re	12,0	72,0	210,0	16
52619	5 x 2,5 re	13,0	120,0	280,0	14
52620	5 x 4 re	14,5	192,0	380,0	12
52621	5 x 6 re	15,5	288,0	510,0	10
52622	5 x 10 re	18,0	480,0	760,0	8
52623	5 x 16 re	20,0	768,0	1120,0	6
52626	5 x 25 rm	24,5	1200,0	1840,0	4
52627	5 x 35 rm	33,5	1680,0	2510,0	2
52624	7 x 1,5 re	13,0	101,0	250,0	16
52625	12 x 1,5 re	16,5	173,0	390,0	16

Dimensions and specifications may be changed without prior notice. (RQ02)

# N2XCH-FE 180/E 30 security cable, halogen-free, 0,6/1 kV, with improved fire characteristics

EAC



## Technical data

- Halogen-free security cable with improved characteristics in the case of fire to DIN VDE 0266
- **Temperature range**  
-30°C to +70°C
- Permissible **operating temperature** at conductor +90°C
- **Nominal voltage**  $U_0/U$  0,6/1 kV
- **Test voltage** 4000 V
- **Minimum bending radius**  
15x cable Ø
- **Radiation resistance**  
up to 200x106 cJ/kg (up to 200 Mrad)
- **Caloric load values**  
see Technical Informations

## Cable structure

- Bare copper-conductor, to DIN VDE 0295 cl.1 or cl.2, single-wire or multi-wire, BS 6360 cl.1 or cl.2, IEC 60228 cl.1 or cl.2
- Core insulation of cross-linked polyethylene, compound type 2X11 to DIN VDE 0276 part 604
- Core identification to DIN VDE 0293-308 and 0276 part 604
- Cores stranded in layers
- Overall core covering, halogen-free filling compound, pressed
- Concentric conductor of Cu-bare wires with helix of copper tape
- Outer sheath of thermoplastic halogen-free polyolefine, flame retardant
- Sheath colour orange

## Tests

- Flame test acc. to DIN VDE 0482-332-3, BS 4066 part 3, DIN EN 60332-3, IEC 60332-3 (previously DIN VDE 0472 part 804 test method C)
- Corrosiveness of combustion gases acc. to DIN VDE 0482 part 267, DIN EN 50267-2-2, IEC 60754-2 (equivalent DIN VDE 0472 part 813)
- Halogen-free acc. to DIN VDE 0482 part 267, DIN EN 50267-2-1, IEC 60754-1 (equivalent DIN VDE 0472 part 815)
- Smoke density acc. to DIN VDE 0482 part 1034-1+2, DIN EN 61034-1+2, IEC 61034-1+2, BS 7622 part 1+2 (previously DIN VDE 0472 part 816)

## Properties

- Halogen-free; no evolution of corrosive and toxic gases
- Flame retardant and hardly flammable
- Self-extinguished and fire resistant
- No flame propagation, therefore security from fire
- Low smoke density, no darkening of emergency exits without hindering the fire extinguishing works
- Toxicological harmless
- No self-ignition
- Maintenance of functionality during the increased current load
- **FE 180: Insulation integrity** for 180 minutes. Tests acc.to DIN VDE 0472 part 814  $\Delta$  IEC 60331. **Insulation integrity** under direct flame propagation for the test period of 180 minutes.
- **E 30: Functionality** of electrical cable systems for minimum 30 minutes. Test method to DIN 4102 part 12. This fulfils the demands of technical guide lines for fire protection (supplement 1 to DIN VDE 0108 part 1). The **functionality** for 30 minutes assures when persons and animals are to be saved from a burning building. 30 minutes secures the functional performance of the fire warning and alarm systems, safety and spare lighting, passenger lifts with evacuation circuits, except the cables which are installed within the ladder shafts and engine rooms.

## Note

- re = round conductor, single-wire
- rm = round conductor, multi-wire
- AWG sizes are approximate equivalent values. The actual cross-section is in mm<sup>2</sup>.
- **LS0H** = Low Smoke Zero Halogen

## Application

Everywhere, where in case of fire human life and material assets are to be protected and safety consciousness take a special significance, e. g. in industrial complexes, power stations, communal establishment, hotels, airports, underground railway networks, hospitals and outpatients clinic (DIN VDE 0107), department stores, data processing centres, theaters, cinemas, in multi-storey buildings, public gatherings, schools etc. (DIN VDE 0108), mining works, offshore plants, leading centres, traffic communication, emergency power supply and alarm systems. Suitable for fixed installation in dry and moist rooms, in, above, on and beneath plaster as well as in masonry walls and in concrete. These cables are suitable for outdoor applications and in underground by using in conduits or tubes. For the installation in conduit all precautions must be taken that no accumulation of water can occur in the pipes.

CE= The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

Part no.	No.cores x cross-sec. mm <sup>2</sup>	Outer Ø app. mm	Cop. weight kg / km	Weight app. kg / km	AWG-No.
52098	2 x 1,5 / 1,5 re	13,0	52,0	200,0	16
52099	2 x 2,5 / 2,5 re	14,0	80,0	250,0	14
52100	2 x 4 / 4 re	15,0	123,0	310,0	12

Part no.	No.cores x cross-sec. mm <sup>2</sup>	Outer Ø app. mm	Cop. weight kg / km	Weight app. kg / km	AWG-No.
52101	2 x 6 / 6 re	16,0	182,0	400,0	10
52102	2 x 10 / 10 re	17,5	312,0	570,0	8
52103	3 x 1,5 / 1,5 re	13,0	66,0	220,0	16

Continuation ▶

# N2XCH-FE 180/E 30 security cable, halogen-free, 0,6/1 kV, with improved fire characteristics



Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer Ø app. mm	Cop. weight kg / km	Weight app. kg / km	AWG-No.
52104	3 x 2,5 / 2,5 re	14,0	104,0	270,0	14
52105	3 x 4 / 4 re	15,5	161,0	360,0	12
52106	3 x 6 / 6 re	16,5	240,0	470,0	10
52107	3 x 10 / 10 re	18,5	408,0	680,0	8
52108	3 x 16 / 16 re	21,0	643,0	960,0	6
52109	3 x 25 / 16 rm	25,5	902,0	1390,0	4
52110	3 x 35 / 16 rm	29,0	1190,0	1720,0	2
52111	3 x 50 / 25 rm	31,5	1723,0	2320,0	1
52112	3 x 70 / 35 rm	36,5	2410,0	3260,0	2/0
52113	3 x 95 / 50 rm	40,0	3296,0	4310,0	3/0
52114	3 x 120 / 70 rm	46,0	4236,0	5520,0	4/0
52115	3 x 150 / 70 rm	50,5	5100,0	6620,0	300 kcmil
52116	3 x 185 / 95 rm	55,0	6383,0	8180,0	350 kcmil
52117	3 x 240 / 120 rm	61,5	8242,0	10620,0	500 kcmil
52118	4 x 1,5 / 1,5 re	15,0	81,0	260,0	16
52119	4 x 2,5 / 2,5 re	16,0	128,0	310,0	14

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer Ø app. mm	Cop. weight kg / km	Weight app. kg / km	AWG-No.
52120	4 x 4 / 4 re	17,0	200,0	420,0	12
52121	4 x 6 / 6 re	18,0	297,0	540,0	10
52122	4 x 10 / 10 re	20,0	504,0	800,0	8
52123	4 x 16 / 16 re	22,5	796,0	1150,0	6
52124	4 x 25 / 16 rm	28,0	1142,0	1670,0	4
52125	4 x 35 / 16 rm	30,5	1526,0	2160,0	2
52126	4 x 50 / 25 rm	32,0	2203,0	2860,0	1
52127	4 x 70 / 35 rm	39,5	3082,0	3980,0	2/0
52128	4 x 95 / 50 rm	43,5	4208,0	5300,0	3/0
52129	4 x 120 / 70 rm	49,5	5388,0	6740,0	4/0
52130	4 x 150 / 70 rm	55,5	6558,0	8210,0	300 kcmil
52131	4 x 185 / 95 rm	60,0	8159,0	10200,0	350 kcmil
52132	4 x 240 / 120 rm	68,0	10546,0	12900,0	500 kcmil
52133	7 x 1,5 / 2,5 re	16,5	133,0	360,0	16
52134	30 x 1,5 / 6 re	29,0	499,0	1070,0	16

Dimensions and specifications may be changed without prior notice. (RQ02)

# (N)HXH-FE 180/E 30 security cable, halogen-free, 0,6/1 kV, with improved fire characteristics



## Technical data

- Halogen-free security cable with improved characteristics in the case of fire adapted to DIN VDE 0266
- **Temperature range**  
-30°C to +70°C
- Permissible **operating temperature** at conductor +90°C
- **Nominal voltage**  $U_0/U 0,6/1$  kV
- **Test voltage** 4000 V
- **Minimum bending radius**  
15x cable Ø
- **Radiation resistance**  
up to  $200 \times 10^6$  cJ/kg (up to 200 Mrad)
- **Caloric load values**  
see Technical Informations

## Cable structure

- Bare copper-conductor, to DIN VDE 0295 cl.1 or cl.2, single-wire or multi-wire, BS 6360 cl.1 or cl.2, IEC 60228 cl.1 or cl.2
  - Core insulation of polymer
  - Core identification to DIN VDE 0293-308
  - GN-YE conductor, 3 cores and above
  - Cores stranded in layer
  - Overall core covering
  - Outer sheath of polyolefin-compound, flame retardant
  - Sheath colour orange
- ### Tests
- Flame test acc. to DIN VDE 0482-332-3, BS 4066 part 3, DIN EN 60332-3, IEC 60332-3 (previously DIN VDE 0472 part 804 test method C)
  - Corrosiveness of combustion gases acc. to DIN VDE 0482 part 267, DIN EN 50267-2-2, IEC 60754-2 (equivalent DIN VDE 0472 part 813)
  - Halogen-free acc. to DIN VDE 0482 part 267, DIN EN 50267-2-1, IEC 60754-1 (equivalent DIN VDE 0472 part 815)
  - Smoke density acc. to DIN VDE 0482 part 1034-1+2, DIN EN 61034-1+2, IEC 61034-1+2, BS 7622 part 1+2 (previously DIN VDE 0472 part 816)

## Properties

- Halogen-free; no evolution of corrosive and toxic gases
- Flame retardant and hardly flammable
- Self-extinguished and fire resistant
- No flame propagation, therefore security from fire
- Low smoke density, no darkening of emergency exits without hindering the fire extinguishing works
- Toxicological harmless
- No self-ignition
- Maintenance of functionality during the increased current load
- **FE 180: Insulation integrity** for 180 minutes. Tests acc. to DIN VDE 0472 part 814  $\Delta$  IEC 60331. **Insulation integrity** under direct flame propagation for the test period of 180 minutes.
- **E 30: Functionality** of electrical cable systems for minimum 30 minutes. Test to DIN 4102 part 12. This fulfils the demands of technical guide lines for fire protection (supplement 1 to DIN VDE 0108 part 1). The **functionality** for 30 minutes assures when persons and animals are to be saved from a burning building. 30 minutes secures the functional performance of the fire warning and alarm systems, safety and spare lighting, passenger lifts with evacuation circuits, except the cables which are installed within the ladder shafts and engine rooms.

## Note

- re = round conductor, single-wire  
rm = round conductor, multi-wire
- AWG sizes are approximate equivalent values. The actual cross-section is in mm<sup>2</sup>.
- **LSOH** = Low Smoke Zero Halogen

## Application

Security cables are ideal for use everywhere, where in case of fire human life and material assets are to be protected and safety consciousness take a special significance, e. g. in industrial complexes, power stations, communal establishment, hotels, airports, underground railway networks, hospitals and outpatients clinic (DIN VDE 0107), department stores, data processing centres, theaters, cinemas, in multi-storey buildings, public gatherings, schools etc. (DIN VDE 0108), mining works, offshore plants, leading centres, traffic communication, emergency power supply and alarm systems. The cables are suitable for fixed installation in dry and moist rooms, in, above, on and beneath plaster as well as in masonry walls and in concrete. These cables are suitable for outdoor applications and in underground by using in conduits or tubes. For the installation in conduit all precautions must be taken that no accumulation of water can occur in the pipes.

CE= The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer Ø app. mm	Cop. weight kg / km	Weight app. kg / km	AWG-No.
52700	1 x 4 re	7,0	38,0	98,0	12
52701	1 x 6 re	7,5	58,0	125,0	10
52702	1 x 10 re	8,0	96,0	165,0	8
52703	1 x 16 rm	9,0	154,0	230,0	6
52704	1 x 25 rm	10,5	240,0	345,0	4
52705	1 x 35 rm	11,5	336,0	450,0	2
52706	1 x 50 rm	12,0	480,0	590,0	1

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer Ø app. mm	Cop. weight kg / km	Weight app. kg / km	AWG-No.
52707	1 x 70 rm	15,0	672,0	800,0	2/0
52708	1 x 95 rm	16,5	912,0	1100,0	3/0
52709	1 x 120 rm	18,5	1152,0	1350,0	4/0
52710	1 x 150 rm	20,5	1440,0	1650,0	300 kcmil
52711	1 x 185 rm	23,0	1776,0	2000,0	350 kcmil
52712	1 x 240 rm	25,5	2304,0	2650,0	500 kcmil
52713	1 x 300 rm	31,8	2880,0	3200,0	600 kcmil

Continuation ▶

**(N)HXH-FE 180/E 30** security cable, halogen-free, 0,6/1 kV, with improved fire characteristics

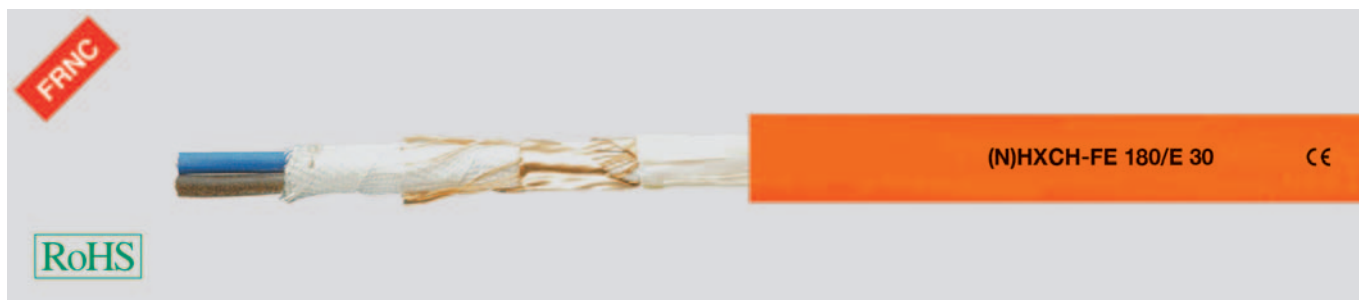
Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer Ø app. mm	Cop. weight kg / km	Weight app. kg / km	AWG-No.
52714	2 x 2,5 re	12,5	48,0	290,0	14
52715	2 x 4 re	13,5	77,0	345,0	12
52716	2 x 6 re	14,5	115,0	410,0	10
52717	2 x 10 re	16,0	192,0	540,0	8
52718	2 x 16 rm	18,0	307,0	720,0	6
52719	2 x 25 rm	21,0	480,0	1100,0	4
52720	2 x 35 rm	24,0	672,0	1120,0	2
52721	3 x 1,5 re	12,5	43,0	280,0	16
52722	3 x 2,5 re	13,5	72,0	330,0	14
52723	3 x 4 re	14,5	115,0	400,0	12
52724	3 x 6 re	15,5	173,0	480,0	10
52725	3 x 10 re	17,0	288,0	650,0	8
52726	3 x 16 rm	19,0	461,0	850,0	6
52727	3 x 25 rm	22,5	720,0	1300,0	4
52728	3 x 35 rm	24,5	1080,0	1700,0	2
52729	3 x 50 rm	27,5	1440,0	2200,0	1
52730	3 x 70 rm	32,0	2016,0	3000,0	2/0
52731	3 x 95 rm	35,5	2736,0	4000,0	3/0
52732	3 x 120 rm	39,5	3456,0	4850,0	4/0
52733	3 x 150 rm	44,0	4320,0	5950,0	300 kcmil
52734	3 x 185 rm	49,5	5328,0	7450,0	350 kcmil
52735	3 x 240 rm	60,0	6910,0	8600,0	500 kcmil
52736	4 x 1,5 re	13,5	58,0	325,0	16
52737	4 x 2,5 re	14,0	96,0	385,0	14
52738	4 x 4 re	15,5	154,0	470,0	12
52739	4 x 6 re	16,5	230,0	580,0	10
52740	4 x 10 re	18,5	384,0	790,0	8
52741	4 x 16 rm	20,5	614,0	1100,0	6
52742	4 x 25 rm	24,5	960,0	1650,0	4
52743	4 x 35 rm	27,0	1344,0	2150,0	2
52744	4 x 50 rm	30,0	1920,0	2800,0	1
52745	4 x 70 rm	35,0	2688,0	3800,0	2/0
52746	4 x 95 rm	39,5	3648,0	5050,0	3/0
52747	4 x 120 rm	43,5	4608,0	6150,0	4/0

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer Ø app. mm	Cop. weight kg / km	Weight app. kg / km	AWG-No.
52748	4 x 150 rm	49,0	5760,0	7650,0	300 kcmil
52749	5 x 1,5 re	14,0	72,0	375,0	16
52750	5 x 2,5 re	15,0	120,0	445,0	14
52751	5 x 4 re	16,5	192,0	560,0	12
52752	5 x 6 re	18,0	288,0	690,0	10
52753	5 x 10 re	20,0	480,0	950,0	8
52754	5 x 16 rm	22,5	768,0	1300,0	6
52755	5 x 25 rm	26,5	1200,0	1980,0	4
52756	5 x 35 rm	36,0	1680,0	2600,0	2
52757	7 x 1,5 re	15,0	101,0	365,0	16
52758	7 x 2,5 re	16,5	168,0	540,0	14
52759	10 x 1,5 re	18,0	144,0	580,0	16
52760	10 x 2,5 re	20,0	240,0	710,0	14
52761	12 x 1,5 re	19,0	173,0	640,0	16
52762	12 x 2,5 re	20,5	288,0	790,0	14
52763	14 x 1,5 re	20,0	202,0	740,0	16
52764	14 x 2,5 re	21,5	336,0	880,0	14
52765	19 x 1,5 re	21,5	274,0	880,0	16
52766	19 x 2,5 re	23,5	456,0	1150,0	14
52767	24 x 1,5 re	25,0	346,0	1100,0	16
52768	24 x 2,5 re	27,0	576,0	1400,0	14
52769	30 x 1,5 re	26,0	432,0	1300,0	16
52770	30 x 2,5 re	28,5	720,0	1650,0	14

Dimensions and specifications may be changed without prior notice. (RQ02)



# (N)HXCH-FE 180/E 30 security cable, halogen-free, 0,6/1 kV, with improved fire characteristics



## Technical data

- Halogen-free security cable with improved characteristics in the case of fire adapted to DIN VDE 0266
- **Temperature range**  
-30°C to +70°C
- Permissible **operating temperature** at conductor +90°C
- **Nominal voltage**  $U_0/U$  0,6/1 kV
- **Test voltage** 4000 V
- **Minimum bending radius**  
15xcable Ø
- **Radiation resistance**  
up to  $200 \times 10^6$  cJ/kg (up to 200 Mrad)
- **Caloric load values**  
see Technical Informations

## Cable structure

- Bare copper-conductor, to DIN VDE 0295 cl.1 or cl.2, single-wire or multi-wire, BS 6360 cl.1 or cl.2, IEC 60228 cl.1 or cl.2
- Core insulation of polymer
- Core identification to DIN VDE 0293-308
- Core stranded in layer
- Overall core covering
- Copper wire screening with helix of copper tape
- Separator of special tape
- Outer sheath of polyolefin-compound, flame retardant
- Sheath colour orange

## Tests

- Flame test acc. to DIN VDE 0482-332-3, BS 4066 part 3, DIN EN 60332-3, IEC 60332-3 (previously DIN VDE 0472 part 804 test method C)
- Corrosiveness of combustion gases acc. to DIN VDE 0482 part 267, DIN EN 50267-2-2, IEC 60754-2 (equivalent DIN VDE 0472 part 813)
- Halogen-free acc. to DIN VDE 0482 part 267, DIN EN 50267-2-1, IEC 60754-1 (equivalent DIN VDE 0472 part 815)
- Smoke density acc. to DIN VDE 0482 part 1034-1+2, DIN EN 61034-1+2, IEC 61034-1+2, BS 7622 part 1+2 (previously DIN VDE 0472 part 816)

## Properties

- Halogen-free; no evolution of corrosive and toxic gases
- Flame retardant and hardly flammable
- Self-extinguished and fire resistant
- No flame propagation, therefore security from fire
- Low smoke density, no darkening
- Toxicological harmless
- No self-ignition
- Maintenance of functionality during the increased current load
- **FE 180: Insulation integrity** for 180 minutes. Tests acc. to DIN VDE 0472 part 814  $\Delta$  IEC 60331. **Insulation integrity** under direct flame propagation for the test period of 180 minutes.
- **E 30: Functionality** of electrical cable systems for minimum 30 minutes. Test method to DIN 4102 part 12. This fulfils the demands of technical guide lines for fire protection (supplement 1 to DIN VDE 0108 part 1). The **functionality** for 30 minutes assures when persons and animals are to be saved from a burning building. 30 minutes secures the functional performance of the fire warning and alarm systems, safety and spare lighting, passenger lifts with evacuation circuits, except the cables which are installed within the ladder shafts and engine rooms.

## Note

- re = round conductor, single-wire
- rm = round conductor, multi-wire
- AWG sizes are approximate equivalent values. The actual cross-section is in mm<sup>2</sup>.
- **LSOH** = Low Smoke Zero Halogen

## Application

Everywhere, where in case of fire human life and material assets are to be protected and safety consciousness take a special significance, e. g. in industrial complexes, power stations, communal establishment, hotels, airports, underground railway networks, hospitals and outpatients clinic (DIN VDE 0107), department stores, data processing centres, theaters, cinemas, in multi-storey buildings, public gatherings, schools etc. (DIN VDE 0108), mining works, offshore plants, leading centres, traffic communication, emergency power supply and alarm systems. Suitable for fixed installation in dry and moist rooms, in, above, on and beneath plaster as well as in masonry walls and in concrete. These cables are suitable for outdoor applications and in underground by using in conduits or tubes. For the installation in conduit all precautions must be taken that no accumulation of water can occur in the pipes.

CE = The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer Ø app. mm	Cop. weight kg / km	Weight app. kg / km	AWG-No.	Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer Ø app. mm	Cop. weight kg / km	Weight app. kg / km	AWG-No.
52900	2 x 1,5 / 1,5 re	13,0	52,0	220,0	16	52907	3 x 4 / 4 re	15,5	161,0	530,0	12
52901	2 x 2,5 / 2,5 re	13,5	80,0	385,0	14	52908	3 x 6 / 6 re	16,5	240,0	630,0	10
52902	2 x 4 / 4 re	14,5	123,0	470,0	10	52909	3 x 10 / 10 re	18,5	408,0	850,0	8
52903	2 x 6 / 6 re	16,0	182,0	550,0	10	52910	3 x 16 / 16 rm	20,5	643,0	1150,0	6
52904	2 x 10 / 10 re	18,0	312,0	730,0	8	52911	3 x 25 / 16 rm	24,0	902,0	1700,0	4
52905	3 x 1,5 / 1,5 re	13,5	66,0	380,0	16	52912	3 x 35 / 16 rm	26,5	1190,0	2150,0	2
52906	3 x 2,5 / 2,5 re	14,5	104,0	430,0	14	52913	3 x 50 / 25 rm	29,5	1723,0	2800,0	1

Continuation ▶

# (N)HXCH-FE 180/E 30 security cable, halogen-free, 0,6/1 kV, with improved fire characteristics

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer Ø app. mm	Cop. weight kg / km	Weight app. kg / km	AWG-No.
52914	3 x 70 / 35 rm	33,0	2410,0	3800,0	2/0
52915	3 x 95 / 50 rm	37,5	3296,0	5100,0	3/0
52916	3 x 120 / 70 rm	42,5	4236,0	6250,0	4/0
52917	3 x 150 / 70 rm	47,0	5100,0	6900,0	300 kcmil
52918	3 x 185 / 95 rm	52,5	6383,0	8550,0	350 kcmil
52919	3 x 240 / 120 rm	58,5	8242,0	11150,0	500 kcmil
52920	4 x 1,5 / 1,5 re	14,5	81,0	435,0	16
52921	4 x 2,5 / 2,5 re	15,5	128,0	500,0	14
52922	4 x 4 / 4 re	16,5	200,0	610,0	12
52923	4 x 6 / 6 re	17,5	297,0	740,0	10
52924	4 x 10 / 10 re	20,0	504,0	1050,0	8
52925	4 x 16 / 16 re	22,0	796,0	1350,0	6
52926	4 x 25 / 16 rm	26,0	1142,0	1950,0	4
52927	4 x 35 / 16 rm	28,5	1526,0	2400,0	2
52928	4 x 50 / 25 rm	32,0	2203,0	3200,0	1
52929	4 x 70 / 35 rm	37,0	3082,0	4300,0	2/0

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer Ø app. mm	Cop. weight kg / km	Weight app. kg / km	AWG-No.
52930	4 x 95 / 50 rm	41,5	4208,0	5750,0	3/0
52931	4 x 120 / 70 rm	47,0	5388,0	7100,0	4/0
52932	4 x 150 / 70 rm	52,0	6558,0	8550,0	300 kcmil
52933	4 x 185 / 95 rm	58,0	8159,0	10700,0	350 kcmil
52934	4 x 240 / 120 rm	64,0	10546,0	13930,0	500 kcmil
52935	7 x 1,5 / 2,5 re	16,5	133,0	635,0	16
52936	7 x 2,5 / 2,5 re	17,5	200,0	680,0	14
52937	10 x 1,5 / 2,5 re	19,5	176,0	870,0	16
52938	10 x 2,5 / 4 re	21,0	286,0	980,0	14
52939	12 x 1,5 / 2,5 re	20,0	205,0	1050,0	16
52940	12 x 2,5 / 4 re	21,5	334,0	1050,0	14
52941	24 x 1,5 / 6 re	26,0	413,0	1900,0	16
52942	24 x 2,5 / 10 re	28,5	696,0	1900,0	14
52943	30 x 1,5 / 6 re	27,0	499,0	2200,0	16
52944	30 x 2,5 / 10 re	30,0	840,0	2200,0	14

Dimensions and specifications may be changed without prior notice. (RQ02)

# N2XH-FE 180/E 90 security cable, halogen-free, 0,6/1 kV, with improved fire characteristics



## Technical data

- Halogen-free security cable with improved characteristics in the case of fire to DIN VDE 0266
- **Temperature range**  
-30°C to +70°C
- Permissible **operating temperature** at conductor +90°C
- **Nominal voltage**  $U_0/U$  0,6/1 kV
- **Test voltage** 4000 V
- **Minimum bending radius**  
12x cable Ø
- **Radiation resistance**  
up to 200x10<sup>6</sup> J/kg (up to 200 Mrad)
- **Caloric load values**  
see Technical Informations

## Cable structure

- Bare copper-conductor, to DIN VDE 0295 cl.1 or cl.2, single-wire or multi-wire, BS 6360 cl.1 or cl.2, IEC 60228 cl.1 or cl.2
- Core insulation with cross-linked polyethylene, compound type 2X11 to DIN VDE 0276 part 604
- Core identification to DIN VDE 0293-308 and 0276 part 604
- GN-YE conductor, 3 cores and above
- Cores stranded in layers
- Overall core covering, halogen-free filling compound, pressed
- Outer sheath of thermoplastic halogen-free polyolefine, flame retardant
- Sheath colour orange

## Tests

- Flame test acc. to DIN VDE 0482-332-3, BS 4066 part 3, DIN EN 60332-3, IEC 60332-3 (previously DIN VDE 0472 part 804 test method C)
- Corrosiveness of combustion gases acc. to DIN VDE 0482 part 267, DIN EN 50267-2-2, IEC 60754-2 (equivalent DIN VDE 0472 part 813)
- Halogen-free acc. to DIN VDE 0482 part 267, DIN EN 50267-2-1, IEC 60754-1 (equivalent DIN VDE 0472 part 815)
- Smoke density acc. to DIN VDE 0482 part 1034-1+2, DIN EN 61034-1+2, IEC 61034-1+2, BS 7622 part 1+2 (previously DIN VDE 0472 part 816)

## Properties

- Halogen-free; no evolution of corrosive and toxic gases
- Flame retardant and hardly flammable
- Self-extinguished and fire resistant
- No flame propagation, therefore security from fire
- Low smoke density, no darkening of emergency exits without hindering the fire extinguishing works
- Toxicological harmless
- No self-ignition
- Maintenance of functionality during the increased current load
- **FE 180: Insulation integrity** for 180 minutes. Tests acc. to DIN VDE 0472 part 814  $\Delta$  IEC 60331. **Insulation integrity** under direct flame propagation for the test period of 180 minutes.
- **E 90: Functionality** of electrical cable systems for minimum 90 minutes. Test method to DIN 4102 part 12. This fulfils the demands of technical guide lines for fire protection (supplement 1 to DIN VDE 0108 part 1). The **functionality** for 90 minutes assures the functional performance of water-pressure-rising stations for the supply to avoid smoke and heat in safety-stairs and inner rooms, ladder shafts and engine rooms for fire brigade lifts, emergency lifts for sickbeds in hospitals and the fire brigade lifts.

## Note

- re = round conductor, single-wire
- rm = round conductor, multi-wire
- AWG sizes are approximate equivalent values. The actual cross-section is in mm<sup>2</sup>.
- **LSOH** = Low Smoke Zero Halogen

## Application

Everywhere, where in case of fire human life and material assets are to be protected and safety consciousness take a special significance, e. g. in industrial complexes, power stations, communal establishment, hotels, airports, underground railway networks, hospitals and outpatients clinic (DIN VDE 0107), department stores, data processing centres, theaters, cinemas, in multi-storey buildings, public gatherings, schools etc. (DIN VDE 0108), mining works, offshore plants, leading centres, traffic communication, emergency power supply and alarm systems. Suitable for fixed installation in dry and moist rooms, in, above, on and beneath plaster as well as in masonry walls and in concrete. These cables are suitable for outdoor applications and in underground by using in conduits or tubes. For the installation in conduit all precautions must be taken that no accumulation of water can occur in the pipes.

CE= The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer Ø app. mm	Cop. weight kg / km	Weight app. kg / km	AWG-No.
52534	1 x 16 rm	11,5	154,0	250,0	6
52535	1 x 25 rm	13,0	240,0	360,0	4
52536	1 x 35 rm	14,0	336,0	460,0	2
52537	1 x 50 rm	15,5	480,0	610,0	1

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer Ø app. mm	Cop. weight kg / km	Weight app. kg / km	AWG-No.
52538	1 x 70 rm	17,5	672,0	840,0	2/0
52539	1 x 95 rm	19,5	912,0	1120,0	3/0
52540	1 x 120 rm	21,5	1152,0	1390,0	4/0
52541	1 x 150 rm	23,5	1440,0	1690,0	300 kcmil

Continuation ▶

# N2XH-FE 180/E 90 security cable, halogen-free, 0,6/1 kV, with improved fire characteristics

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer Ø app. mm	Cop. weight kg / km	Weight app. kg / km	AWG-No.
52542	1 x 185 rm	25,5	1776,0	2090,0	350 kcmil
52899	1 x 240 rm	28,5	2304,0	2660,0	500 kcmil
52543	1 x 300 rm	31,0	2880,0	3350,0	600 kcmil
52544	1 x 400 rm	34,5	3840,0	4230,0	750 kcmil
52545	2 x 1,5 re	14,5	29,0	270,0	16
52546	2 x 2,5 re	15,5	48,0	310,0	14
52547	2 x 4 re	16,5	77,0	370,0	12
52548	2 x 6 re	17,5	115,0	440,0	10
52549	2 x 10 rm	19,5	192,0	600,0	8
52550	2 x 16 rm	21,0	307,0	780,0	6
52551	2 x 25 rm	23,5	480,0	1100,0	4
52552	2 x 35 rm	26,5	672,0	1400,0	2
52553	2 x 50 rm	30,0	960,0	1830,0	1
52554	2 x 70 rm	33,0	1344,0	2420,0	2/0
52555	2 x 95 rm	37,5	1824,0	3240,0	3/0
52556	2 x 120 rm	41,0	2304,0	3940,0	4/0
52557	3 x 1,5 re	15,0	43,0	260,0	16
52558	3 x 2,5 re	16,0	72,0	350,0	14
52559	3 x 4 re	17,0	115,0	420,0	12
52560	3 x 6 re	18,0	173,0	520,0	10
52561	3 x 10 rm	20,5	288,0	710,0	8
52562	3 x 16 rm	22,5	461,0	950,0	6
52563	3 x 25 rm	26,0	720,0	1370,0	4
52564	3 x 35 rm	28,0	1008,0	1750,0	2
52572	3 x 35 / 16 rm	29,5	1162,0	1950,0	2
52565	3 x 50 rm	32,0	1440,0	2310,0	1
52573	3 x 50 / 25 rm	33,5	1680,0	2640,0	1
52566	3 x 70 rm	35,5	2016,0	3100,0	2/0
52574	3 x 70 / 35 rm	37,0	2352,0	3520,0	2/0
52567	3 x 95 rm	40,5	2736,0	4180,0	3/0
52575	3 x 95 / 50 rm	42,0	3216,0	4710,0	3/0
52568	3 x 120 rm	44,0	3456,0	5130,0	4/0
52576	3 x 120 / 70 rm	46,5	4128,0	5910,0	4/0
52569	3 x 150 rm	48,5	4320,0	6260,0	300 kcmil
52577	3 x 150 / 70 rm	50,0	4992,0	6970,0	300 kcmil
52570	3 x 185 rm	53,0	5328,0	7720,0	350 kcmil
52578	3 x 185 / 95 rm	55,5	6240,0	8750,0	350 kcmil
52571	3 x 240 rm	59,5	6912,0	9990,0	500 kcmil
52579	3 x 240 / 120 rm	61,5	8064,0	11180,0	500 kcmil
52580	4 x 1,5 re	16,5	58,0	350,0	16
52581	4 x 2,5 re	17,5	96,0	420,0	14
52582	4 x 4 re	18,5	154,0	510,0	12

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer Ø app. mm	Cop. weight kg / km	Weight app. kg / km	AWG-No.
52583	4 x 6 re	19,5	230,0	630,0	10
52584	4 x 10 rm	22,5	384,0	880,0	8
52585	4 x 16 rm	24,5	614,0	1180,0	6
52586	4 x 25 rm	28,5	960,0	1730,0	4
52587	4 x 35 rm	31,0	1344,0	2220,0	2
52588	4 x 50 rm	35,0	1920,0	2940,0	1
52589	4 x 70 rm	39,0	2688,0	3960,0	2/0
52590	4 x 95 rm	45,0	3648,0	5360,0	3/0
52591	4 x 120 rm	48,5	4608,0	6550,0	4/0
52592	4 x 150 rm	54,0	5760,0	8070,0	300 kcmil
52593	4 x 185 rm	59,0	7104,0	9970,0	350 kcmil
52594	4 x 240 rm	66,0	9216,0	12830,0	500 kcmil
52595	5 x 1,5 re	18,0	72,0	420,0	16
52596	5 x 2,5 re	19,0	120,0	500,0	14
52597	5 x 4 re	20,0	192,0	610,0	12
52598	5 x 6 re	21,5	288,0	760,0	10
52599	5 x 10 rm	24,5	480,0	1070,0	8
52600	5 x 16 rm	27,0	768,0	1450,0	6
52601	5 x 25 rm	31,0	1200,0	2120,0	4
52602	5 x 35 rm	34,0	1680,0	2730,0	2
52603	5 x 50 rm	38,5	2400,0	3620,0	1
52604	5 x 70 rm	43,5	3360,0	4940,0	2/0
52605	7 x 1,5 re	19,5	101,0	480,0	16
52606	7 x 2,5 re	20,5	168,0	580,0	14
52607	7 x 4 re	22,0	269,0	730,0	12
52608	10 x 1,5 re	24,0	144,0	650,0	16
52609	10 x 2,5 re	25,5	240,0	790,0	14
52610	12 x 1,5 re	24,5	173,0	720,0	16
52611	12 x 2,5 re	26,0	288,0	890,0	14
52612	24 x 1,5 re	33,0	346,0	1270,0	16

Dimensions and specifications may be changed without prior notice. (RQ02)

# N2XCH-FE 180/E 90 security cable, halogen-free, 0,6/1 kV, with improved fire characteristics



## Technical data

- Halogen-free security cable with improved characteristics in the case of fire to DIN VDE 0266
- **Temperature range**  
-30°C to +70°C
- Permissible **operating temperature** at conductor +90°C
- **Nominal voltage**  $U_0/U$  0,6/1 kV
- **Test voltage** 4000 V
- **Minimum bending radius**  
12x cable Ø
- **Radiation resistance**  
up to 200x10<sup>6</sup> J/kg (up to 200 Mrad)
- **Caloric load values**  
see Technical Informations

## Cable structure

- Bare copper-conductor, to DIN VDE 0295 cl.1 or cl.2, single-wire or multi-wire, BS 6360 cl.1 or cl.2, IEC 60228 cl.1 or cl.2
- Core insulation with cross-linked polyethylene, compound type 2X11 to DIN VDE 0276 part 604
- Core identification to DIN VDE 0293-308 and 0276 part 604
- Cores stranded in layers
- Overall core covering, halogen-free filling compound, pressed
- Concentric conductor of Cu-bare wires with helix of copper tape
- Outer sheath of thermoplastic halogen-free polyolefine, flame retardant
- Sheath colour orange

## Tests

- Flame test acc. to DIN VDE 0482-332-3, BS 4066 part 3, DIN EN 60332-3, IEC 60332-3 (previously DIN VDE 0472 part 804 test method C)
- Corrosiveness of combustion gases acc. to DIN VDE 0482 part 267, DIN EN 50267-2-2, IEC 60754-2 (equivalent DIN VDE 0472 part 813)
- Halogen-free acc. to DIN VDE 0482 part 267, DIN EN 50267-2-1, IEC 60754-1 (equivalent DIN VDE 0472 part 815)
- Smoke density acc. to DIN VDE 0482 part 1034-1+2, DIN EN 61034-1+2, IEC 61034-1+2, BS 7622 part 1+2 (previously DIN VDE 0472 part 816)

## Properties

- Halogen-free; no evolution of corrosive and toxic gases
- Flame retardant and hardly flammable
- Self-extinguished and fire resistant
- No flame propagation, therefore security from fire
- Low smoke density, no darkening of emergency exits without hindering the fire extinguishing works
- Toxicological harmless
- No self-ignition
- Maintenance of functionality during the increased current load
- **FE 180: Insulation integrity** for 180 minutes. Tests acc.to DIN VDE 0472 part 814 Δ IEC 60331. **Insulation integrity** under direct flame propagation for the test period of 180 minutes.
- **E 90: Functionality** of electrical cable systems for minimum 90 minutes. Test method to DIN 4102 part 12. This fulfils the demands of technical guide lines for fire protection (supplement 1 to DIN VDE 0108 part 1). The **functionality** for 90 minutes assures the functional performance of water-pressure-rising stations for the supply to avoid smoke and heat in safety-stairs and inner rooms, ladder shafts and engine rooms for fire brigade lifts, emergency lifts for sickbeds in hospitals and the fire brigade lifts.

## Note

- re = round conductor, single-wire  
rm = round conductor, multi-wire
- AWG sizes are approximate equivalent values. The actual cross-section is in mm<sup>2</sup>.
- **LSOH** = Low Smoke Zero Halogen

## Application

Everywhere, where in case of fire human life and material assets are to be protected and safety consciousness take a special significance, e. g. in industrial complexes, power stations, communal establishment, hotels, airports, underground railway networks, hospitals and outpatients clinic (DIN VDE 0107), department stores, data processing centres, theaters, cinemas, in multi-storey buildings, public gatherings, schools etc. (DIN VDE 0108), mining works, offshore plants, leading centres, traffic communication, emergency power supply and alarm systems. Suitable for fixed installation in dry and moist rooms, in, above, on and beneath plaster as well as in masonry walls and in concrete. These cables are suitable for outdoor applications and in underground by using in conduits or tubes. For the installation in conduit all precautions must be taken that no accumulation of water can occur in the pipes.

CE= The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer Ø app. mm	Cop. weight kg / km	Weight app. kg / km	AWG-No.	Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer Ø app. mm	Cop. weight kg / km	Weight app. kg / km	AWG-No.
52771	3 x 1,5 / 1,5 re	16,5	66,0	330,0	16	52776	3 x 16 / 16 rm	24,5	643,0	1130,0	6
52772	3 x 2,5 / 2,5 re	17,5	104,0	400,0	14	52777	3 x 25 / 16 rm	28,0	902,0	1560,0	4
52773	3 x 4 / 4 re	18,5	161,0	480,0	12	52778	3 x 35 / 16 rm	30,5	1190,0	1960,0	2
52774	3 x 6 / 6 re	20,0	240,0	600,0	10	52779	3 x 50 / 25 rm	34,0	1723,0	2610,0	2
52775	3 x 10 / 10 rm	22,0	408,0	840,0	8	52780	3 x 70 / 35 rm	37,5	2410,0	3500,0	2/0

Continuation ▶



# N2XCH-FE 180/E 90 security cable, halogen-free, 0,6/1 kV, with improved fire characteristics

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer Ø app. mm	Cop. weight kg / km	Weight app. kg / km	AWG-No.
52781	3 x 95 / 50 rm	43,0	3296,0	4700,0	3/0
52782	3 x 120 / 70 rm	48,0	4236,0	5880,0	4/0
52783	3 x 150 / 70 rm	52,0	4992,0	7300,0	300 kcmil
52784	3 x 185 / 95 rm	57,5	6383,0	8760,0	350 kcmil
52785	3 x 240 / 120 rm	63,5	8242,0	11280,0	500 kcmil
52786	4 x 1,5 / 1,5 re	17,5	81,0	390,0	16
52787	4 x 2,5 / 2,5 re	19,0	128,0	470,0	14
52788	4 x 4 / 4 re	20,0	200,0	570,0	12
52789	4 x 6 / 6 re	21,5	297,0	720,0	10
52790	4 x 10 / 10 rm	24,0	504,0	1010,0	8
52791	4 x 16 / 16 rm	26,5	796,0	1370,0	6
52792	4 x 25 / 16 rm	30,5	1142,0	1940,0	4
52793	4 x 35 / 16 rm	33,0	1526,0	2420,0	2
52794	4 x 50 / 25 rm	37,5	2203,0	3240,0	1

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer Ø app. mm	Cop. weight kg / km	Weight app. kg / km	AWG-No.
52795	4 x 70 / 35 rm	41,5	3082,0	4360,0	2/0
52796	4 x 95 / 50 rm	47,5	4208,0	5900,0	3/0
52797	4 x 120 / 70 rm	52,5	5388,0	7340,0	4/0
52798	4 x 150 / 70 rm	57,5	6540,0	8840,0	300 kcmil
52799	4 x 185 / 95 rm	63,5	8159,0	11020,0	350 kcmil
52800	4 x 240 / 120 rm	70,0	10546,0	14140,0	500 kcmil
52801	7 x 1,5 / 2,5 re	20,5	133,0	520,0	16
52805	7 x 2,5 / 2,5 re	22,0	200,0	630,0	14
52802	12 x 1,5 / 2,5 re	26,0	205,0	770,0	16
52806	12 x 2,5 / 4 re	28,0	334,0	950,0	14
52803	24 x 1,5 / 6 re	35,0	413,0	1380,0	16
52807	24 x 2,5 / 10 re	37,5	696,0	1750,0	14
52804	30 x 1,5 / 6 re	37,0	499,0	1630,0	16
52808	30 x 2,5 / 10 re	39,5	840,0	2080,0	14

Dimensions and specifications may be changed without prior notice. (RQ02)

# (N)HXH-FE 180/E 90 security cable, halogen-free, 0,6/1 kV, with improved fire characteristics

EAC



## Technical data

- Halogen-free security cable with improved characteristics in the case of fire adapted to DIN VDE 0266
- **Temperature range**  
-30°C to +70°C
- Permissible **operating temperature** at conductor +90°C
- **Nominal voltage**  $U_0/U$  0,6/1 kV
- **Test voltage** 4000 V
- **Minimum bending radius**  
12x cable Ø
- **Radiation resistance**  
up to  $200 \times 10^6$  cJ/kg (up to 200 Mrad)
- **Caloric load values**  
see Technical Informations

## Cable structure

- Bare copper-conductor, to DIN VDE 0295 cl.1 or cl.2, single-wire or multi-wire, BS 6360 cl.1 or cl.2, IEC 60228 cl.1 or cl.2
  - Core insulation of polymer
  - Core identification to DIN VDE 0293-308
  - GN-YE conductor, 3 cores and above
  - Cores stranded in layer
  - Core wrapping with glass-fibre tape as flame-protection
  - Outer sheath of polyolefin-compound, flame retardant
  - Sheath colour orange
- ### Tests
- Flame test acc. to DIN VDE 0482-332-3, BS 4066 part 3, DIN EN 60332-3, IEC 60332-3 (previously DIN VDE 0472 part 804 test method C)
  - Corrosiveness of combustion gases acc. to DIN VDE 0482 part 267, DIN EN 50267-2-2, IEC 60754-2 (equivalent DIN VDE 0472 part 813)
  - Halogen-free acc. to DIN VDE 0482 part 267, DIN EN 50267-2-1, IEC 60754-1 (equivalent DIN VDE 0472 part 815)
  - Smoke density acc. to DIN VDE 0482 part 1034-1+2, DIN EN 61034-1+2, IEC 61034-1+2, BS 7622 part 1+2 (previously DIN VDE 0472 part 816)

## Properties

- Halogen-free; no evolution of corrosive and toxic gases
- Flame retardant and hardly flammable
- Self-extinguished and fire resistant
- No flame propagation, therefore security from fire
- Low smoke density, no darkening of emergency exits without hindering the fire extinguishing works
- Toxicological harmless
- No self-ignition
- Maintenance of functionality during the increased current load
- **FE 180: Insulation integrity** for 180 minutes. Tests acc.to DIN VDE 0472 part 814  $\Delta$  IEC 60331. **Insulation integrity** under direct flame propagation for the test period of 180 minutes.
- **E 90: Functionality** of electrical cable systems for minimum 90 minutes. Test method to DIN 4102 part 12. This fulfils the demands of technical guide lines for fire protection (supplement 1 to DIN VDE 0108 part 1). The **functionality** for 90 minutes assures the functional performance of water-pressure-rising stations for the supply to avoid smoke and heat in safety-stairs and inner rooms, ladder shafts and engine rooms for fire brigade lifts, emergency lifts for sickbeds in hospitals and the fire brigade lifts.

## Note

- re = round conductor, single-wire  
rm = round conductor, multi-wire
- AWG sizes are approximate equivalent values. The actual cross-section is in mm<sup>2</sup>.
- **LSOH** = Low Smoke Zero Halogen

## Application

Everywhere, where in case of fire human life and material assets are to be protected and safety consciousness take a special significance, e. g. in industrial complexes, power stations, communal establishment, hotels, airports, underground railway networks, hospitals and outpatients clinic (DIN VDE 0107), department stores, data processing centres, theaters, cinemas, in multi-storey buildings, public gatherings, schools etc. (DIN VDE 0108), mining works, offshore plants, leading centres, traffic communication, emergency power supply and alarm systems. Suitable for fixed installation in dry and moist rooms, in, above, on and beneath plaster as well as in masonry walls and in concrete. These cables are suitable for outdoor applications and in underground by using in conduits or tubes. For the installation in conduit all precautions must be taken that no accumulation of water can occur in the pipes.

CE= The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer Ø app. mm	Cop. weight kg / km	Weight app. kg / km	AWG-No.	Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer Ø app. mm	Cop. weight kg / km	Weight app. kg / km	AWG-No.
53180	1 x 16 rm	11,0	154,0	255,0	6	53188	1 x 185 rm	24,5	1776,0	2140,0	350 kcmil
53181	1 x 25 rm	12,5	240,0	375,0	4	53189	1 x 240 rm	27,0	2304,0	2700,0	500 kcmil
53182	1 x 35 rm	13,5	336,0	475,0	2	53190	1 x 300 rm	30,0	2880,0	3420,0	600 kcmil
53183	1 x 50 rm	15,0	480,0	625,0	1	53191	1 x 400 rm	33,5	3840,0	4310,0	750 kcmil
53184	1 x 70 rm	16,5	672,0	855,0	2/0	53000	3 x 1,5 re	14,0	43,0	280,0	16
53185	1 x 95 rm	18,0	912,0	1140,0	3/0	53001	3 x 2,5 re	15,0	72,0	330,0	14
53186	1 x 120 rm	20,5	1152,0	1410,0	4/0	53002	3 x 4 re	16,0	115,0	400,0	12
53187	1 x 150 rm	22,5	1440,0	1730,0	300 kcmil	53003	3 x 6 re	17,0	173,0	480,0	10

Continuation ▶

# (N)HXH-FE 180/E 90 security cable, halogen-free, 0,6/1 kV, with improved fire characteristics



Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer Ø app. mm	Cop. weight kg / km	Weight app. kg / km	AWG-No.
53004	3 x 10 re	19,0	288,0	650,0	8
53005	3 x 16 re	21,0	461,0	850,0	6
52990	3 x 25 rm	25,0	720,0	1300,0	4
52991	3 x 35 rm	28,0	1008,0	1700,0	2
52992	3 x 35 / 16 rm	28,0	1162,0	1850,0	2
52993	3 x 50 / 25 rm	32,0	1680,0	2500,0	1
52994	3 x 70 / 35 rm	36,0	2352,0	3350,0	2/0
52995	3 x 95 / 50 rm	42,0	3216,0	4500,0	3/0
52996	3 x 120 / 70 rm	45,0	4128,0	5600,0	4/0
52997	3 x 150 / 70 rm	49,0	4992,0	6700,0	300 kcmil
52998	3 x 185 / 95 rm	55,0	6240,0	8350,0	350 kcmil
52999	3 x 240 / 120 rm	63,0	8064,0	10000,0	500 kcmil
53006	4 x 1,5 re	15,0	58,0	325,0	16
53007	4 x 2,5 re	16,0	96,0	385,0	14
53008	4 x 4 re	17,0	154,0	470,0	12
53009	4 x 6 re	18,0	230,0	580,0	10
53010	4 x 10 re	20,0	384,0	790,0	8
53011	4 x 16 re	22,0	614,0	1100,0	6
53012	4 x 25 rm	27,0	960,0	1650,0	4
53013	4 x 35 rm	30,0	1344,0	2150,0	2
53014	4 x 50 rm	34,0	1920,0	2800,0	1
53030	4 x 70 rm	39,0	2688,0	3800,0	2/0
53031	4 x 95 rm	44,0	3648,0	5050,0	3/0

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer Ø app. mm	Cop. weight kg / km	Weight app. kg / km	AWG-No.
53070	4 x 120 rm	47,0	4608,0	6150,0	4/0
53390	4 x 150 rm	51,2	5760,0	7662,0	4/0
53015	5 x 1,5 re	16,0	72,0	375,0	16
53016	5 x 2,5 re	17,0	120,0	445,0	14
53017	5 x 4 re	18,0	192,0	560,0	12
53018	5 x 6 re	20,0	288,0	690,0	10
53019	5 x 10 re	22,0	480,0	950,0	8
53020	5 x 16 rm	24,0	768,0	1300,0	6
53021	5 x 25 rm	29,0	1200,0	1980,0	4
53028	5 x 35 rm	33,0	1680,0	2350,0	2
53029	5 x 50 rm	38,0	2500,0	3100,0	1
53022	7 x 1,5 re	19,0	101,0	560,0	16
53027	7 x 2,5 re	21,0	168,0	650,0	14
53025	10 x 1,5 re	23,0	144,0	750,0	16
53026	10 x 2,5 re	25,0	240,0	910,0	14
53023	12 x 1,5 re	25,0	173,0	850,0	16
53024	12 x 2,5 re	26,0	288,0	1000,0	14

Dimensions and specifications may be changed without prior notice. (RQ02)

# (N)HXCH-FE 180/E 90 security cable, halogen-free, 0,6/1 kV, with improved fire characteristics

EAC



## Technical data

- Halogen-free security cable with improved characteristics in the case of fire adapted to DIN VDE 0266
- **Temperature range**  
-30°C to +70°C
- Permissible **operating temperature** at conductor +90°C
- **Nominal voltage**  $U_0/U$  0,6/1 kV
- **Test voltage** 4000 V
- **Minimum bending radius**  
12x cable Ø
- **Radiation resistance**  
up to  $200 \times 10^6$  cJ/kg (up to 200 Mrad)
- **Caloric load values**  
see Technical Informations

## Cable structure

- Bare copper-conductor, to DIN VDE 0295 cl.1 or cl.2, single-wire or multi-wire, BS 6360 cl.1 or cl.2, IEC 60228 cl.1 or cl.2
- Core insulation of polymer
- Each single core covering with flame resistant glass-fibre tape
- Core identification to DIN VDE 0293-308
- Cores stranded in layer
- Core wire screening with helix of copper tape
- Bare copper wire screening with helix of copper tape
- Outer sheath of polyolefin-compound, flame retardant
- Sheath colour orange

## Tests

- Flame test acc. to DIN VDE 0482-332-3, BS 4066 part 3, DIN EN 60332-3, IEC 60332-3 (previously DIN VDE 0472 part 804 test method C)
- Corrosiveness of combustion gases acc. to DIN VDE 0482 part 267, DIN EN 50267-2-2, IEC 60754-2 (equivalent DIN VDE 0472 part 813)
- Halogen-free acc. to DIN VDE 0482 part 267, DIN EN 50267-2-1, IEC 60754-1 (equivalent DIN VDE 0472 part 815)
- Smoke density acc. to DIN VDE 0482 part 1034-1+2, DIN EN 61034-1+2, IEC 61034-1+2, BS 7622 part 1+2 (previously DIN VDE 0472 part 816)

## Properties

- Halogen-free; no evolution of corrosive and toxic gases
- Flame retardant and hardly flammable
- Self-extinguished and fire resistant
- No flame propagation, therefore security from fire
- Low smoke density, no darkening of emergency exits without hindering the fire extinguishing works
- Toxicological harmless
- No self-ignition
- Maintenance of functionality during the increased current load
- **FE 180: Insulation integrity** for 180 minutes. Tests acc. to DIN VDE 0472 part 814  $\Delta$  IEC 60331. **Insulation integrity** under direct flame propagation for the test period of 180 minutes.
- **E 90: Functionality** of electrical cable systems for minimum 90 minutes. Test method to DIN 4102 part 12. This fulfils the demands of technical guide lines for fire protection (supplement 1 to DIN VDE 0108 part 1). The **functionality** for 90 minutes assures the functional performance of water-pressure-rising stations for the supply to avoid smoke and heat in safety-stairs and inner rooms, ladder shafts and engine rooms for fire brigade lifts, emergency lifts for sickbeds in hospitals and the fire brigade lifts.

## Note

- re = round conductor, single-wire  
rm = round conductor, multi-wire
- AWG sizes are approximate equivalent values. The actual cross-section is in mm<sup>2</sup>.
- **LSOH** = Low Smoke Zero Halogen

## Application

Everywhere, where in case of fire human life and material assets are to be protected and safety consciousness take a special significance, e. g. in industrial complexes, power stations, communal establishment, hotels, airports, underground railway networks, hospitals and outpatients clinic (DIN VDE 0107), department stores, data processing centres, theaters, cinemas, in multi-storey buildings, public gatherings, schools etc. (DIN VDE 0108), mining works, offshore plants, leading centres, traffic communication, emergency power supply and alarm systems. Suitable for fixed installation in dry and moist rooms, in, above, on and beneath plaster as well as in masonry walls and in concrete. For the installation in conduit all precautions must be taken that no accumulation of water can occur in the pipes.

CE = The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer Ø app. mm	Cop. weight kg / km	Weight app. kg / km	AWG-No.	Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer Ø app. mm	Cop. weight kg / km	Weight app. kg / km	AWG-No.
59028	2 x 2,5 / 2,5 re	16,0	80,0	390,0	14	53041	3 x 70 / 35 rm	38,0	2410,0	3800,0	2/0
53032	3 x 1,5 / 1,5 re	16,9	66,0	380,0	16	53042	3 x 95 / 50 rm	44,0	3296,0	5100,0	3/0
53033	3 x 2,5 / 2,5 re	18,0	104,0	430,0	14	53043	3 x 120 / 70 rm	47,0	4236,0	6250,0	4/0
53034	3 x 4 / 4 re	19,0	161,0	530,0	12	53044	3 x 150 / 70 rm	51,0	4992,0	6900,0	300 kcmil
53035	3 x 6 / 6 re	20,1	240,0	640,0	10	53045	3 x 185 / 95 rm	56,0	6383,0	8550,0	350 kcmil
53036	3 x 10 / 10 re	22,0	408,0	850,0	8	53046	3 x 240 / 120 rm	65,0	8242,0	11150,0	500 kcmil
53037	3 x 16 / 16 rm	24,0	643,0	1150,0	6						
53038	3 x 25 / 16 rm	28,0	902,0	1700,0	4						
53039	3 x 35 / 16 rm	30,0	1190,0	2150,0	2						
53040	3 x 50 / 25 rm	34,0	1723,0	2800,0	1						

Continuation ▶

# (N)HXCH-FE 180/E 90 security cable, halogen-free, 0,6/1 kV, with improved fire characteristics



Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer Ø app. mm	Cop. weight kg / km	Weight app. kg / km	AWG-No.
53047	4 x 1,5 / 1,5 re	18,0	81,0	435,0	16
53048	4 x 2,5 / 2,5 re	18,9	128,0	500,0	14
53049	4 x 4 / 4 re	20,0	200,0	610,0	12
53050	4 x 6 / 6 re	21,0	297,0	740,0	10
53051	4 x 10 / 10 re	23,0	504,0	1050,0	8
53052	4 x 16 / 16 rm	25,0	796,0	1350,0	6
53053	4 x 25 / 16 rm	30,0	1142,0	1950,0	4
53054	4 x 35 / 16 rm	33,0	1526,0	2400,0	2
53055	4 x 50 / 25 rm	37,0	2203,0	3200,0	1
53056	4 x 70 / 35 rm	42,0	3082,0	4300,0	2/0
53057	4 x 95 / 50 rm	47,0	4208,0	5750,0	3/0
53058	4 x 120 / 70 rm	51,0	5388,0	7100,0	4/0
53059	4 x 150 / 70 rm	56,0	6540,0	8550,0	300 kcmil
53060	4 x 185 / 95 rm	68,0	8159,0	10700,0	350 kcmil
53061	4 x 240 / 120 rm	70,0	10546,0	13930,0	500 kcmil
53062	7 x 1,5 / 2,5 re	21,0	133,0	680,0	16

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer Ø app. mm	Cop. weight kg / km	Weight app. kg / km	AWG-No.
53066	7 x 2,5 / 2,5 re	21,0	200,0	680,0	14
53063	12 x 1,5 / 2,5 re	27,0	205,0	1050,0	16
53067	12 x 2,5 / 4 re	28,0	334,0	1050,0	14
53064	24 x 1,5 / 6 re	37,0	413,0	1900,0	16
53068	24 x 2,5 / 10 re	37,5	696,0	1900,0	14
53065	30 x 1,5 / 6 re	39,0	499,0	2200,0	16
53069	30 x 2,5 / 10 re	39,5	840,0	2200,0	14

Dimensions and specifications may be changed without prior notice. (RQ02)



# JE-H(St)H Bd FE 180/E 30 up to E 90 (orange), halogen-free



## Technical data

- Flame retardant, halogen-free installation cable adapted to DIN VDE 0815
- **Loop resistance**  
max. 73,2 Ohm/km
- **Temperature range**  
flexing -5°C to +50°C  
fixed installation -30°C to +70°C
- **Operating peak voltage**  
225 V (not for purposes of high current and power installation)
- **Test voltage**  
core/core 500 V  
core/screen 2000 V
- **Insulation resistance**  
min. 100 MOhm x km
- **Mutual capacitance**  
max. 120 nF/km at 800 Hz (this values may be extended at 20% with a make-up up to 4 pairs)
- **Capacitance unbalance**  
max. 200 pF/100 m (20% of the values, but one value up to 400 pF is allowed)
- **Minimum bending radius**  
6x cable Ø
- **Radiation resistance**  
up to 100x10<sup>6</sup> cJ/kg (up to 100 Mrad)
- **Caloric load values**  
see Technical Informations

## Cable structure

- Bare copper-conductor, single-wire
- Core insulation halogen-free, cross-linked polymer, compound type HI1 flame retardant (E90 with special foil wrapping over conductor)
- Core identification with colour rings and ring-groups to DIN VDE 0815
- Cores twisted to pairs, 4 pairs consist to unit, several units stranded to layers
- Units identified by numbered tape
- Core wrapping with special polyester and glass-fibre tape
- Screening with alu-laminated polyester tape and solid tinned copper drain wire 0,8 mm Ø
- Outer sheath halogen-free, flame retardant to DIN VDE 0207 part 24 HM2
- Sheath colour orange

## Tests

- Flame test acc. to DIN VDE 0482-332-3, BS 4066 part 3, DIN EN 60332-3, IEC 60332-3 (previously DIN VDE 0472 part 804 test method C)
- Corrosiveness of combustion gases acc. to DIN VDE 0482 part 267, DIN EN 50267-2-2, IEC 60754-2 (equivalent DIN VDE 0472 part 813)
- Smoke density acc. to DIN VDE 0482 part 1034-1+2, DIN EN 61034-1+2, IEC 61034-1+2, BS 7622 part 1+2 (previously DIN VDE 0472 part 816)

## Note

- **E 30 to E 90**  
Functionality (burning behaviour) is dependant on corresponding installation technique.
- **LSOH** = Low Smoke Zero Halogen

## Properties

- No fire propagation
- Low smoke density
- Not for purposes of high current and power installation as well as underground laying.
- **FE 180: Insulation integrity** for 180 minutes. Tests acc. to DIN VDE 0472 part 814  $\Delta$  IEC 60331. **Insulation integrity** under direct flame propagation for the test period of 180 minutes.
- **E 30: Functionality** of electrical cable systems for minimum 30 minutes. Test to DIN 4102 part 12. The **functionality** for 30 minutes assures when persons and animals are to be saved from a burning building. 30 minutes secures the functional performance of the fire warning and alarm systems, safety and spare lighting, passenger lifts with evacuation circuits, except the cables which are installed within the ladder shafts and engine rooms.
- **E 90: Functionality** of electrical cable systems for minimum 90 minutes. Test method to DIN 4102 part 12. The **functionality** for 90 minutes assures the functional performance of water-pressure-rising stations for the supply to avoid smoke and heat in safety-stairs and inner rooms, ladder shafts and engine rooms for fire brigade lifts, emergency lifts for sickbeds in hospitals and the fire brigade lifts.

## Application

Flame resistant, halogen-free, static screened installation cables for telecommunication purpose. The static screen prevents strong interference impulse. Suitable for fixed installation everywhere, where in case of fire human life and material assets are to be protected and a safety consciousness take a special significance, e. g. in industrial complexes, public buildings, hotels, airports, under ground railway networks, hospitals.

CE = The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

### Functionality E 30 to E 90

Part no.	No. pairs x cross-sec. mm	Outer Ø app. mm	Cop. weight kg / km	Weight app. kg / km	
34081	2 x 2 x 0,8	7,4	25,0	74,0	-
34082	4 x 2 x 0,8	10,8	45,0	127,0	-
34083	8 x 2 x 0,8	16,9	85,0	300,0	-
34084	12 x 2 x 0,8	18,5	126,0	336,0	-
34085	16 x 2 x 0,8	20,1	166,0	426,0	-
34086	20 x 2 x 0,8	22,2	206,0	529,0	-
34087	32 x 2 x 0,8	29,1	326,0	859,0	-
34088	40 x 2 x 0,8	34,2	407,0	1094,0	-
34089	52 x 2 x 0,8	37,3	529,0	1280,0	-

### Functionality E 30

Part no.	No. pairs x cross-sec. mm	Outer Ø app. mm	Cop. weight kg / km	Weight app. kg / km	
34148	2 x 2 x 0,8	7,5	25,0	74,0	-
34149	4 x 2 x 0,8	9,3	45,0	127,0	-
34150	8 x 2 x 0,8	11,4	85,0	300,0	-
34151	12 x 2 x 0,8	13,0	126,0	336,0	-
34152	16 x 2 x 0,8	15,7	166,0	426,0	-
34153	20 x 2 x 0,8	16,5	206,0	529,0	-
34154	32 x 2 x 0,8	20,3	326,0	859,0	-
34155	40 x 2 x 0,8	23,4	407,0	1094,0	-
34156	52 x 2 x 0,8	25,2	529,0	1280,0	-

Dimensions and specifications may be changed without prior notice. (RQ02)

# JE-H(St)H Bd fire warning cable, FE 180/E 30 to E 90 (red), halogen-free



## Technical data

- Flame retardant, halogen-free installation cable, adapted to DIN VDE 0815
- **Loop resistance**  
max. 73,2 Ohm/km
- **Temperature range**  
flexing -5°C to +50°C  
fixed installation -30°C to +70°C
- **Operating peak voltage**  
225 V (not for purposes of high current and power installation)
- **Test voltage**  
core/core 500 V  
core/screen 2000 V
- **Insulation resistance**  
min. 100 MOhm x km
- **Mutual capacitance**  
max. 120 nF/km at 800 Hz  
(this values may be extended at 20% with a make-up up to 4 pairs)
- **Capacitance unbalance**  
max. 200 pF/100 m (20% of the values, but one value up to 400 pF is allowed)
- **Minimum bending radius**  
6x cable Ø
- **Radiation resistance**  
up to 100x10<sup>6</sup> cJ/kg (up to 100 Mrad)
- **Caloric load values**  
see Technical Informations

## Cable structure

- Bare copper-conductor, single-wire
- Core insulation halogen-free, cross-linked polymer HI1, flame retardant (E90 with special foil wrapping over conductor)
- Core identification with colour rings and ring-groups to DIN VDE 0815
- Cores twisted to pairs, each 4 pairs consist to unit, several units stranded to layers
- Units identified with numbered tape
- Core wrapping with special polyester and glass-fibre tape
- Screening with alu-laminated polyester tape and solid copper drain wire 0,8 mm Ø
- Outer sheath halogen-free, flame retardant to DIN VDE 0207 part 24, HM2
- Sheath colour red, RAL 3000 with imprint "BRANDMELDEKABEL"

## Tests

- Flame test acc. to DIN VDE 0482-332-3, BS 4066 part 3, DIN EN 60332-3, IEC 60332-3 (previously DIN VDE 0472 part 804 test method C)
- Corrosiveness of combustion gases acc. to DIN VDE 0482 part 267, DIN EN 50267-2-2, IEC 60754-2 (equivalent DIN VDE 0472 part 813)
- Smoke density acc. to DIN VDE 0482 part 1034-1+2, DIN EN 61034-1+2, IEC 61034-1+2, BS 7622 part 1+2 (previously DIN VDE 0472 part 816)

## Note

- **E 30 to E 90**  
Functionality (burning behaviour) is dependant on corresponding installation technique.
- **LSOH** = Low Smoke Zero Halogen

## Properties

- No fire propagation
- Low smoke density
- Not for purposes of high current and power installation as well as underground laying
- **FE 180: Insulation integrity** for 180 minutes. Tests acc. to DIN VDE 0472 part 814 ± IEC 60331. **Insulation integrity** under direct flame propagation for the test period of 180 minutes.
- **E 30: Functionality** of electrical cable systems for minimum 30 minutes. Test to DIN 4102 part 12. The **functionality** for 30 minutes assures when persons and animals are to be saved from a burning building. 30 minutes secures the functional performance of the fire warning and alarm systems, safety and spare lighting, passenger lifts with evacuation circuits, except the cables which are installed within the ladder shafts and engine rooms.
- **E 90: Functionality** of electrical cable systems for minimum 90 minutes. Test method to DIN 4102 part 12. The **functionality** for 90 minutes assures the functional performance of water-pressure-rising stations for the supply to avoid smoke and heat in safety-stairs and inner rooms, ladder shafts and engine rooms for fire brigade lifts, emergency lifts for sickbeds in hospitals and the fire brigade lifts.

## Application

Static screened installation cables for telecommunication purposes. The static screen prevents strong interference impulse. Suitable for fixed installation everywhere, where in case of fire human life and material assets are to be protected and a safety consciousness take a special significance, e. g. in industrial complexes, public buildings, hotels, airports, under ground railway networks, hospitals.

CE= The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

### Functionality E 30 to E 90

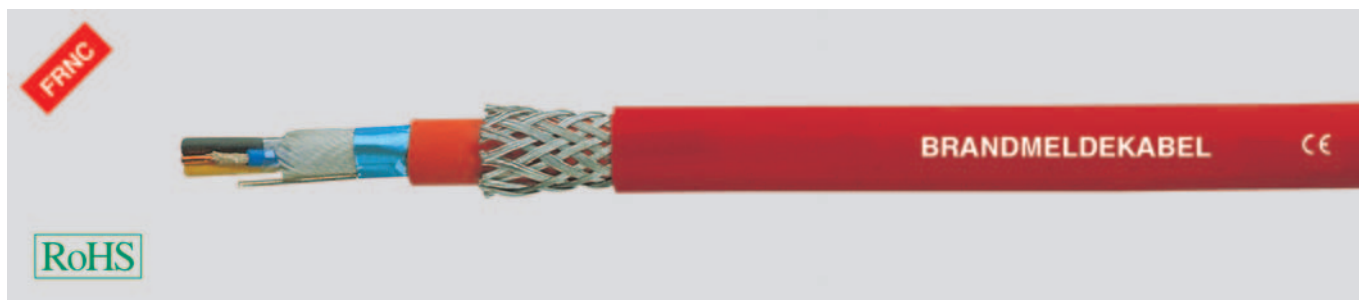
Part no.	No.pairs x cross-sec. mm	Outer Ø app. mm	Cop. weight kg / km	Weight app. kg / km	
34091	2 x 2 x 0,8	7,4	25,0	74,0	-
34092	4 x 2 x 0,8	10,8	45,0	127,0	-
34093	8 x 2 x 0,8	16,9	85,0	300,0	-
34094	12 x 2 x 0,8	18,5	126,0	336,0	-
34095	16 x 2 x 0,8	20,1	166,0	426,0	-
34096	20 x 2 x 0,8	22,2	206,0	529,0	-
34097	32 x 2 x 0,8	29,1	326,0	859,0	-
34098	40 x 2 x 0,8	34,2	407,0	1094,0	-
34099	52 x 2 x 0,8	37,3	529,0	1280,0	-

### Functionality E 30

Part no.	No.pairs x cross-sec. mm	Outer Ø app. mm	Cop. weight kg / km	Weight app. kg / km	
34157	2 x 2 x 0,8	7,5	25,0	67,0	-
34158	4 x 2 x 0,8	9,3	45,0	103,0	-
34159	8 x 2 x 0,8	11,4	85,0	168,0	-
34160	12 x 2 x 0,8	13,0	126,0	237,0	-
34161	16 x 2 x 0,8	15,7	166,0	303,0	-
34162	20 x 2 x 0,8	16,5	206,0	361,0	-
34163	32 x 2 x 0,8	20,3	326,0	553,0	-
34164	40 x 2 x 0,8	23,4	407,0	699,0	-
34165	52 x 2 x 0,8	25,2	529,0	865,0	-

Dimensions and specifications may be changed without prior notice. (RQ02)

# JE-H(St)HRH Bd fire warning cable, FE 180/E 30 to E 90, halogen-free



## Technical data

- Special insulation for cores and outer sheath adapted to DIN VDE 0815.
- **Loop resistance**  
max. 73,2 Ohm/km
- **Temperature range**  
flexing -5°C to +50°C  
fixed installation -30°C to +70°C
- **Operating peakvoltage**  
max. 225 V (not for purposes of high current and power installation)
- **Test voltage**  
core/core 500 V  
core/screen 2000 V
- **Insulation resistance**  
min. 100 MOhm x km
- **Mutual capacitance**  
max. 120 nF/km at 800 Hz
- **Minimum bending radius**  
6x cable Ø
- **Caloric load values**  
see Technical Informations

## Cable structure

- Bare copper-conductor, single-wire
- Core insulation of cross-linked polymer, compound type HI1 with mica tape, flame retardant
- Core identification with colour rings and ring-groups to DIN VDE 0815
- Cores twisted to pairs, each 4 pairs consist to unit, several units stranded to layers
- Units identified with numbered tape
- Glass-fibre taped
- Screening with alu-laminated polyester tape
- solid copper drain wire 0,8 mm Ø
- Inner sheath, flame retardant polyolefin compound to DIN VDE 0207 part 24 HM3
- Galvanized steel wire braided screen
- Outer sheath of polyolefin compound type HM2 to DIN VDE 0207 part 24
- Outer sheath red (RAL 3000) with imprint "BRANDMELDEKABEL"

## Tests

- Flame test acc. to  
DIN VDE 0482-332-3, BS 4066 part 3,  
DIN EN 60332-3, IEC 60332-3 (previously  
DIN VDE 0472 part 804 test method C)
- Corrosiveness of combustion gases  
acc. to DIN VDE 0482 part 267,  
DIN EN 50267-2-2, IEC 60754-2  
(equivalent DIN VDE 0472 part 813)
- Smoke density acc. to DIN VDE 0482  
part 1034-1+2, DIN EN 61034-1+2,  
IEC 61034-1+2, BS 7622 part 1+2  
(previously DIN VDE 0472 part 816)

## Note

- **E 30 to E 90**  
Functionality is dependant on installation technique.
- **LSOH** = Low Smoke Zero Halogen

## Properties

- No fire propagation
- Low smoke density
- Not for purposes of high current and power installation as well as underground laying
- **FE 180: Insulation integrity** for 180 minutes. Tests acc.to DIN VDE 0472 part 814  $\Delta$  IEC 60331.  
**Insulation integrity** under direct flame propagation for the test period of 180 minutes.
- **E 30: Functionality** of electrical cable systems for minimum 30 minutes. Test to DIN 4102 part 12.  
The **functionality** for 30 minutes assures when persons and animals are to be saved from a burning building. 30 minutes secures the functional performance of the fire warning and alarm systems, safety and spare lighting, passenger lifts with evacuation circuits, except the cables which are installed within the ladder shafts and engine rooms.
- **E 90: Functionality** of electrical cable systems for minimum 90 minutes. Test method to DIN 4102 part 12.  
The **functionality** for 90 minutes assures the functional performance of water-pressure-rising stations for the supply to avoid smoke and heat in safety-stairs and inner rooms, ladder shafts and engine rooms for fire brigade lifts, emergency lifts for sickbeds in hospitals and the fire brigade lifts.

## Application

Wherever necessary to prevent high property value in case of fire damage to human and material. The static screen prevents strong interference impulse. Suitable for fixed installation everywhere, where in case of fire human life and material assets are to be protected and a safety consciousness take a special significance, e. g. in industrial complexes, public buildings, hotels, airports, under ground railway networks, hospitals.

CE= The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

Part no.	No.pairs x cross-sec. mm	Outer Ø app. mm	Cop. weight kg / km	Weight app. kg / km
34075	2 x 2 x 0,8	11,7	25,0	150,0
34076	4 x 2 x 0,8	15,7	45,0	275,0
34077	8 x 2 x 0,8	21,6	85,0	545,0
34078	12 x 2 x 0,8	23,8	126,0	602,0
34079	16 x 2 x 0,8	27,7	166,0	734,0

Part no.	No.pairs x cross-sec. mm	Outer Ø app. mm	Cop. weight kg / km	Weight app. kg / km
34080	20 x 2 x 0,8	28,9	206,0	870,0
34072	32 x 2 x 0,8	41,1	326,0	1360,0
34073	40 x 2 x 0,8	42,3	407,0	1800,0
34074	52 x 2 x 0,8	45,2	529,0	2038,0

Dimensions and specifications may be changed without prior notice. (RQ02)



# MEDIUM-VOLTAGE CABLES





# MEDIUM VOLTAGE POWER CABLES

XLPE-insulated 6/10 kV, 12/20 kV, 18/30 kV

Since about 1970 the cross-linked polyethylene (XLPE)-insulated power cables have been used in Germany. The XLPE-insulation possesses very good electrical, mechanical and thermal characteristics in medium voltage networks. This type of insulation is very chemically resistant and also resistant to cold. Due to various advantages, the XLPE-insulated type has vastly displaced the traditional classical paper-insulated types in many sectors.

In order to prevent the penetration of moisture and also to extend the duration of life, the XLPE-insulated medium voltage cables are designed with longitudinally water-proof screen including an additional swell tape and a PE outer sheath.

The manufacture of this sheath is based on high density polyethylene (HDPE), in which an additive organic peroxide is mixed. Due to the heating and pressure the molecule chains are joined to each other, assuring the transition from thermoplastic to elastic condition.

In comparison to PVC and paper-insulated cables, the advantage of XLPE-insulated medium voltage power cables is that they possess a low dielectric factor, such as it is 100 times smaller than of PVC-insulated cables.

Moreover, a better dielectric constant value has an effect on the low mutual capacitance, the short-circuit to ground and the charging current of XLPE-insulated cables.

The good properties of XLPE-insulated cables remain constant through a wide temperature range.

## Characteristics of XLPE

• permissible operating temperature	
– For permanent (normal) operation	+ 90°C
– In short circuit	+250°C
– In overload operation and damage by sea	up to +130°C
• Specific heat resistance	3,5 K · m/W
• Dielectric constant	2,4
• Specific resistance (20°C)	min. $10^{16}$ Ohm · cm
• Loss factor (tan δ) (20°C)	max. $0,5 \cdot 10^{-3}$
• Density	0,92 g/cm <sup>3</sup>
• Breaking strength	min. 200%
• Tensile strength	min. 12,5 N/mm <sup>2</sup>

## Conductor

– Copper or aluminium, round, multiwire stranded and compact, according to VDE 0295.

## Inner semi-conducting layer

– Semi-conducting compound, cross-linked, mini-mum wall-thickness 0,3 mm.

## Insulation

- Cross-linked polyethylene (XLPE), compound type DIX8 according to HD 620 S2.
- Insulation nominal wall-thickness for
  - 6/10 kV = 3,4 mm
  - 12/20 kV = 5,5 mm
  - 18/30 kV = 8,0 mm

## Outer semi-conducting layer

- Outer semi-conducting layer is extruded together with the inner semi-conducting layer and the insulation in one working process and are spliced with each other.
- Semi-conducting compound, cross-linked, wall-thickness 0,3 to 0,6 mm.

## Concentricity of conductor

- The difference between the maximum and mini-mum value of 0,5 mm should not be exceeded.

## Semi-conducting type

- Over the outer semi-conducting layer, a semi-conducting tape must be used.

## Screen

- Screening of copper wires must have a minimum diameter of 0,5 mm and over that a copper tape applied helically with a minimum thickness of 0,1 mm.
- Copper cross-section according to HD 620 S2.

## Separator

- Over the screen as well as under outer sheath, a separating layer must be used (e. g. taping).

## Outer sheath

- PE compound DMP2 according to HD 620 S2 black or
- PVC compound DMV6 according to HD 620 S2 red
- Wall-thickness = 2,5 mm, for 1x 500 mm<sup>2</sup> /30 kV = 2,6 mm

Continuation ►



# ■ MEDIUM VOLTAGE POWER CABLES

XLPE-insulated 6/10 kV, 12/20 kV, 18/30 kV

## Laying of Cable

In order to avoid any damage, the XLPE-insulated medium voltage cables should carefully laid and installed. It must be ensured that the cables should not be pulled over the hard or sharp edges.

The cable ends must be water-tight-sealed.

After cutting the length both ends must be sealed immediately.

A laying depth of 60 to 80 cm is recommended. Single conductor cables are normally arranged in a trefoil touching or triangular shape.

For laying in conduits, the influence of thermal insulation of air space between the cable and the inner wall of conduit should be specially considered. The inner diameter of the conduit should be at least 1,5 times that of the diameter of the cable.

## Bending radius

During the laying of XLPE cables, the bending radius should not be below of the following values:

- Cable without metal sheath = 15 x cable Ø
- Cable with Alu-laminated sheath = 30 x cable Ø

## Temperature range

During the installation, the temperature should not be below the following values:

- for XLPE-insulation + PVC sheath = -5°C
- for XLPE-insulation + PE sheath = -20°C

## Max. permissible tensile strength

By pulling the conductors with a pulling head (not for armoured cables)

$$P = \text{No. of cores} \times \text{conductor cross-section} \times \delta$$

$\delta$  = permissible pulling tension N/mm<sup>2</sup>  
 – For Cu-conductor: 50 N/mm<sup>2</sup>  
 – For Alu-conductor: 30 N/mm<sup>2</sup>

## Current carrying capacity

according to VDE 0276 part 620 or HD 620 S2

## Laying in earth (ground)

- Laying depth 0,7 – 0,8 m
- Earth temperature in the laying depth 20°C
- Specific heat resistance 1,0 K · m/W
- Load factor 0,7 (EVU-Load)

## Laying in air

- Air temperature 30°C
- Load factor (permanent load) 1,0

## Laying in conduits

Cables for conduit systems laying in earth, a reduction of the current carrying capacity with a factor of 0,85 is recommended.

## Test voltages

Kind of voltage test	Voltage test in kV		
	U <sub>0</sub> /U = 6/10 kV	U <sub>0</sub> /U = 12/20 kV	U <sub>0</sub> /U = 18/30 kV
Voltage test a. c. in kV	15	30	45
Voltage test d. c. in kV	48	96	144
Voltage test a. c. (voltage test = 1000 h)	18	36	54

## Voltage test to cable system

During the operation or after laying the medium voltage power cables, the dielectric can be tested with alternating or direct current. The test duration continues 30 minutes.

Kind of voltage test	U <sub>0</sub> /U = 6/10 kV	U <sub>0</sub> /U = 12/20 kV	U <sub>0</sub> /U = 18/30 kV
Voltage test a. c. in kV	12	24	36
Voltage test d. c. in kV	34 up to 48	67 up to 96	76 up to 108

**N2XSy 6/10kV, 12/20kV, 18/30kV** XLPE-insulated,

Cu-conductor, single core, screened, PVC-sheath

**Technical data**

- XLPE-insulated power cables to DIN VDE 0276 part 620, HD 620 S2 and IEC 60502
- **Temperature range** during installation up to -5°C
- **Operating temperature** max. +90°C
- **Short circuit temperature** +250°C (short circuit duration max. 5 s)
- **Nominal voltages** U<sub>0</sub>/U 6/10 kV, 12/20 kV, 18/30 kV
- **Operating voltages** for 6/10 kV = max. 12 kV for 12/20 kV = max. 24 kV for 18/30 kV = max. 36 kV
- **Test voltages** for 6/10 kV = 15 kV for 12/20 kV = 30 kV for 18/30 kV = 45 kV
- **Minimum bending radius** 15x cable Ø
- **Power ratings table** see Technical Informations

**Cable structure**

- Bare copper-conductor, to DIN VDE 0295 cl.2, multi-wire, BS 6360 cl.2, IEC 60228 cl.2
- Inner semi-conducting coating
- Core insulation of cross-linked polyethylene (XLPE), compound type DIX8 to HD 620 S2
- Outer conductive layer extruded and welded with core insulation
- Conductive taping
- Screen: Braiding of copper wires with one or two tape(s) applied helically
- Wrapping
- Outer sheath of PVC compound type DMV6 to HD 620 S2
- Sheath colour red

**Properties**

- The materials used in manufacture are cadmium-free and contain no silicone and free from substances harmful to the wetting properties of lacquers

**Tests**

- self-extinguishing and flame retardant acc. to DIN VDE 0482-332-1-2, DIN EN 60332-1-2, IEC 60332-1 (equivalent DIN VDE 0472 part 804 test method B)

**Installation notes**

- To guarantee an optimum on operating reliability the extruded semi-conductive layer is spliced with the insulation for long duration. For this reason we recommend a peeling tool for installation.

**Note**

- rm = round conductor, multi-wire
- Further dimensions available on request.
- AWG sizes are approximate equivalent values. The actual cross-section is in mm<sup>2</sup>.

**Application**

Suitable for installation mostly for power supply stations, in indoors and in cable ducts, outdoor with protected laying, underground and in water as well as for installation on cable trays for industries, switch-boards and power stations. Due to the good laying characteristic, this can also be laid easily in difficult line guideways. The inner conducting layer between the conductor and the XLPE insulation and the firmly bonded outer conducting layer on the XLPE insulation assures a construction free of partial discharges with high operational reliability.

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Operation voltage max.	Nominal voltage kV	Insulation thickness mm	Sheath thickness Nominal value mm	Outer Ø min. - max. mm	Cop. weight kg / km	Weight app. kg / km	AWG-No.
32400	1 x 35 rm / 16	12	6 / 10	3,4	2,5	23,0 - 28,0	518,0	905,0	2
32401	1 x 50 rm / 16	12	6 / 10	3,4	2,5	24,0 - 29,0	662,0	1080,0	1
32402	1 x 70 rm / 16	12	6 / 10	3,4	2,5	26,0 - 31,0	854,0	1310,0	2/0
32403	1 x 95 rm / 16	12	6 / 10	3,4	2,5	26,0 - 32,0	1094,0	1580,0	3/0
32404	1 x 120 rm / 16	12	6 / 10	3,4	2,5	28,0 - 34,0	1334,0	1860,0	4/0
32405	1 x 150 rm / 16	12	6 / 10	3,4	2,5	29,0 - 35,0	1622,0	2040,0	300 kcmil
32406	1 x 150 rm / 25	12	6 / 10	3,4	2,5	29,0 - 35,0	1723,0	2210,0	300 kcmil
32407	1 x 185 rm / 16	12	6 / 10	3,4	2,5	31,0 - 37,0	1958,0	2450,0	350 kcmil
32408	1 x 185 rm / 25	12	6 / 10	3,4	2,5	31,0 - 37,0	2059,0	2580,0	350 kcmil
32409	1 x 240 rm / 16	12	6 / 10	3,4	2,5	33,0 - 39,0	2486,0	3000,0	500 kcmil
32410	1 x 240 rm / 25	12	6 / 10	3,4	2,5	33,0 - 39,0	2587,0	3130,0	500 kcmil
32411	1 x 300 rm / 25	12	6 / 10	3,4	2,5	36,0 - 41,0	3163,0	3780,0	600 kcmil
32412	1 x 400 rm / 35	12	6 / 10	3,4	2,5	40,0 - 45,0	4234,0	4670,0	750 kcmil
32413	1 x 500 rm / 35	12	6 / 10	3,4	2,5	43,0 - 48,0	5194,0	5750,0	1000 kcmil
33099	1 x 630 rm / 35	12	6 / 10	3,4	2,5	44,0 - 49,0	6442,0	7180,0	1250 kcmil
32414	1 x 35 rm / 16	24	12 / 20	5,5	2,5	27,0 - 32,0	518,0	1110,0	2
32415	1 x 50 rm / 16	24	12 / 20	5,5	2,5	28,0 - 33,0	662,0	1250,0	1
32416	1 x 70 rm / 16	24	12 / 20	5,5	2,5	30,0 - 35,0	854,0	1510,0	2/0
32417	1 x 95 rm / 16	24	12 / 20	5,5	2,5	31,0 - 36,0	1094,0	1780,0	3/0
32418	1 x 120 rm / 16	24	12 / 20	5,5	2,5	32,0 - 38,0	1334,0	2070,0	4/0
32419	1 x 150 rm / 16	24	12 / 20	5,5	2,5	33,0 - 39,0	1622,0	2310,0	300 kcmil
32420	1 x 150 rm / 25	24	12 / 20	5,5	2,5	33,0 - 39,0	1723,0	2420,0	300 kcmil
32421	1 x 185 rm / 16	24	12 / 20	5,5	2,5	35,0 - 41,0	1958,0	2650,0	350 kcmil
32422	1 x 185 rm / 25	24	12 / 20	5,5	2,5	35,0 - 41,0	2059,0	2810,0	350 kcmil
32423	1 x 240 rm / 16	24	12 / 20	5,5	2,5	38,0 - 44,0	2486,0	3260,0	500 kcmil
32424	1 x 240 rm / 25	24	12 / 20	5,5	2,5	38,0 - 44,0	2587,0	3360,0	500 kcmil
32425	1 x 300 rm / 25	24	12 / 20	5,5	2,5	40,0 - 46,0	3163,0	4020,0	600 kcmil
32426	1 x 400 rm / 35	24	12 / 20	5,5	2,5	43,0 - 49,0	4234,0	4930,0	750 kcmil
32427	1 x 500 rm / 35	24	12 / 20	5,5	2,5	46,0 - 52,0	5194,0	6050,0	1000 kcmil
33096	1 x 630 rm / 35	24	12 / 20	5,5	2,5	47,0 - 53,0	6442,0	7510,0	1250 kcmil

Continuation ▶

# N2XS<sub>Y</sub> 6/10kV, 12/20kV, 18/30kV XLPE-insulated, Cu-conductor, single core, screened, PVC-sheath



Part no.	No. cores x cross-sec. mm <sup>2</sup>	Operation voltage max.	Nominal voltage kV	Insulation thickness mm	Sheath thickness Nominal value mm	Outer Ø min. - max. mm	Cop. weight kg / km	Weight app. kg / km	AWG-No.
32428	1 x 50 rm / 16	36	18 / 30	8	2,5	32,0 - 38,0	662,0	1480,0	1
32429	1 x 70 rm / 16	36	18 / 30	8	2,5	34,0 - 40,0	854,0	1730,0	2/0
32430	1 x 95 rm / 16	36	18 / 30	8	2,5	35,0 - 41,0	1094,0	2060,0	3/0
32431	1 x 120 rm / 16	36	18 / 30	8	2,5	37,0 - 43,0	1334,0	2330,0	4/0
32432	1 x 150 rm / 25	36	18 / 30	8	2,5	38,0 - 44,0	1723,0	2720,0	300 kcmil
32433	1 x 185 rm / 25	36	18 / 30	8	2,5	40,0 - 46,0	2059,0	3100,0	350 kcmil
32434	1 x 240 rm / 25	36	18 / 30	8	2,5	42,0 - 48,0	2587,0	3730,0	500 kcmil
32435	1 x 300 rm / 25	36	18 / 30	8	2,5	45,0 - 51,0	3163,0	4000,0	600 kcmil
32436	1 x 400 rm / 35	36	18 / 30	8	2,5	48,0 - 54,0	4234,0	5330,0	750 kcmil
32437	1 x 500 rm / 35	36	18 / 30	8	2,5	51,0 - 57,0	5194,0	6480,0	1000 kcmil
33098	1 x 630 rm / 35	36	18 / 30	8	2,5	52,0 - 59,0	6442,0	7970,0	1250 kcmil

Dimensions and specifications may be changed without prior notice. (RQ03)



Suitable medium voltage connection sleeves can be found in our Cable Accessories catalogue.

**N2XS2Y 6/10kV, 12/20kV, 18/30kV XLPE-insulated,****Cu-conductor, single core, screened, PE-sheath****Technical data**

- XLPE-insulated power cables to IEC 60502, DIN VDE 0276 part 620, HD 620 S2
- **Temperature range**  
during installation up to -20°C
- **Operating temperature**  
max. +90°C
- **Short circuit temperature**  
+250°C (short circuit duration max. 5 s)
- **Nominal voltages**  
U<sub>0</sub>/U 6/10 kV, 12/20 kV, 18/30 kV
- **Operating voltages**  
for 6/10 kV = max. 12 kV  
for 12/20 kV = max. 24 kV  
for 18/30 kV = max. 36 kV
- **Test voltages**  
for 6/10 kV = 15 kV  
for 12/20 kV = 30 kV  
for 18/30 kV = 45 kV
- **Minimum bending radius**  
15x cable Ø
- **Power ratings**  
see Technical Informations

**Cable structure**

- Bare copper-conductor, to DIN VDE 0295 cl.2, multi-wire, BS 6360 cl.2, IEC 60228 cl.2
- Inner semi-conducting coating
- Core insulation of cross-linked polyethylene (XLPE), compound type DIX8 to HD 620 S2
- Outer extrusion of semi-conducting coating spliced with the insulation
- Wrapping of conductive material
- Screen: Braiding of copper wires with one or two tapes applied helically
- Wrapping
- Outer sheath of PE compound type DMP2 to HD 620 S2
- Sheath colour black

**Properties**

- The materials used in manufacture are cadmium-free and contain no silicone and free from substances harmful to the wetting properties of lacquers
- **Installation notes**  
To guarantee an optimum on operating reliability the extruded semi-conductive layer is spliced with the insulation for long duration. For this reason we recommend a peeling tool for installation.

**Note**

- rm = round conductor, multi-wire
- Further dimensions available on request.
- AWG sizes are approximate equivalent values. The actual cross-section is in mm<sup>2</sup>.

**Application**

Suitable for indoor installation and in cable ducts, outdoors, underground and in water as well as for installation on cable trays for industries, switch-boards and power stations. The PE-outer sheath is resistant to high mechanical stress for laying the cables. This PE-sheath is not flame retardant acc. to DIN EN 60332-1-2.

The inner conducting layer between the conductor and the XLPE insulation and the firmly bonded outer conducting layer on the XLPE insulation assures a construction free of partial discharges with high operational reliability.

Part no.	No.cores x cross-sec. mm <sup>2</sup>	Operation voltage max.	Nominal voltage kV	Insulation thickness mm	Sheath thickness Nominal value mm	Outer Ø min. - max. mm	Cop. weight kg / km	Weight app. kg / km	AWG-No.
32480	1 x 35 rm / 16	12	6 / 10	3,4	2,5	23,0 - 28,0	518,0	910,0	2
32481	1 x 50 rm / 16	12	6 / 10	3,4	2,5	24,0 - 29,0	662,0	990,0	1
32482	1 x 70 rm / 16	12	6 / 10	3,4	2,5	26,0 - 31,0	854,0	1205,0	2/0
32483	1 x 95 rm / 16	12	6 / 10	3,4	2,5	26,0 - 32,0	1098,0	1520,0	3/0
32484	1 x 120 rm / 16	12	6 / 10	3,4	2,5	28,0 - 34,0	1334,0	1760,0	4/0
32485	1 x 150 rm / 16	12	6 / 10	3,4	2,5	29,0 - 35,0	1622,0	2020,0	300 kcmil
32486	1 x 150 rm / 25	12	6 / 10	3,4	2,5	29,0 - 35,0	1725,0	2130,0	300 kcmil
32487	1 x 185 rm / 16	12	6 / 10	3,4	2,5	31,0 - 37,0	1958,0	2360,0	350 kcmil
32488	1 x 185 rm / 25	12	6 / 10	3,4	2,5	31,0 - 37,0	2059,0	2470,0	350 kcmil
32489	1 x 240 rm / 16	12	6 / 10	3,4	2,5	33,0 - 39,0	2486,0	2960,0	500 kcmil
32490	1 x 240 rm / 25	12	6 / 10	3,4	2,5	33,0 - 39,0	2587,0	3020,0	500 kcmil
32491	1 x 300 rm / 25	12	6 / 10	3,4	2,5	36,0 - 41,0	3163,0	3630,0	600 kcmil
32492	1 x 400 rm / 35	12	6 / 10	3,4	2,5	40,0 - 45,0	4234,0	4560,0	750 kcmil
32493	1 x 500 rm / 35	12	6 / 10	3,4	2,5	43,0 - 48,0	5194,0	5580,0	1000 kcmil
32494	1 x 35 rm / 16	24	12 / 20	5,5	2,5	27,0 - 32,0	518,0	960,0	2
32495	1 x 50 rm / 16	24	12 / 20	5,5	2,5	28,0 - 33,0	662,0	1160,0	1
32496	1 x 70 rm / 16	24	12 / 20	5,5	2,5	30,0 - 35,0	854,0	1410,0	2/0
32497	1 x 95 rm / 16	24	12 / 20	5,5	2,5	31,0 - 36,0	1094,0	1670,0	3/0
32498	1 x 120 rm / 16	24	12 / 20	5,5	2,5	33,0 - 38,0	1334,0	1960,0	4/0
32499	1 x 150 rm / 16	24	12 / 20	5,5	2,5	34,0 - 39,0	1622,0	2220,0	300 kcmil
32500	1 x 150 rm / 25	24	12 / 20	5,5	2,5	34,0 - 39,0	1723,0	2310,0	300 kcmil
32501	1 x 185 rm / 16	24	12 / 20	5,5	2,5	36,0 - 41,0	1958,0	2620,0	350 kcmil
32502	1 x 185 rm / 25	24	12 / 20	5,5	2,5	36,0 - 41,0	2059,0	2670,0	350 kcmil
32503	1 x 240 rm / 16	24	12 / 20	5,5	2,5	39,0 - 44,0	2486,0	3160,0	500 kcmil
32504	1 x 240 rm / 25	24	12 / 20	5,5	2,5	39,0 - 44,0	2587,0	3270,0	500 kcmil
32505	1 x 300 rm / 25	24	12 / 20	5,5	2,5	41,0 - 46,0	3163,0	3880,0	600 kcmil
32506	1 x 400 rm / 35	24	12 / 20	5,5	2,5	44,0 - 49,0	4234,0	4820,0	750 kcmil
32507	1 x 500 rm / 35	24	12 / 20	5,5	2,5	47,0 - 52,0	5194,0	5860,0	1000 kcmil
32508	1 x 50 rm / 16	36	18 / 30	8	2,5	32,0 - 38,0	662,0	1410,0	1
32509	1 x 70 rm / 16	36	18 / 30	8	2,5	34,0 - 40,0	854,0	1660,0	2/0

Continuation ▶

# N2XS2Y 6/10kV, 12/20kV, 18/30kV XLPE-insulated, Cu-conductor, single core, screened, PE-sheath



Part no.	No. cores x cross-sec. mm <sup>2</sup>	Operation voltage max.	Nominal voltage kV	Insulation thickness mm	Sheath thickness Nominal value mm	Outer Ø min. - max. mm	Cop. weight kg / km	Weight app. kg / km	AWG-No.
32510	1 x 95 rm / 16	36	18 / 30	8	2,5	35,0 - 41,0	1094,0	1970,0	3/0
32511	1 x 120 rm / 16	36	18 / 30	8	2,5	37,0 - 43,0	1334,0	2220,0	4/0
32512	1 x 150 rm / 25	36	18 / 30	8	2,5	38,0 - 44,0	1723,0	2650,0	300 kcmil
32513	1 x 185 rm / 25	36	18 / 30	8	2,5	40,0 - 46,0	2059,0	2980,0	350 kcmil
32514	1 x 240 rm / 25	36	18 / 30	8	2,5	42,0 - 48,0	2587,0	3570,0	500 kcmil
32515	1 x 300 rm / 25	36	18 / 30	8	2,5	45,0 - 51,0	3163,0	4220,0	600 kcmil
32516	1 x 400 rm / 35	36	18 / 30	8	2,5	48,0 - 54,0	4234,0	5170,0	750 kcmil
32517	1 x 500 rm / 35	36	18 / 30	8	2,5	51,0 - 57,0	5194,0	6260,0	1000 kcmil

Dimensions and specifications may be changed without prior notice. (RQ03)

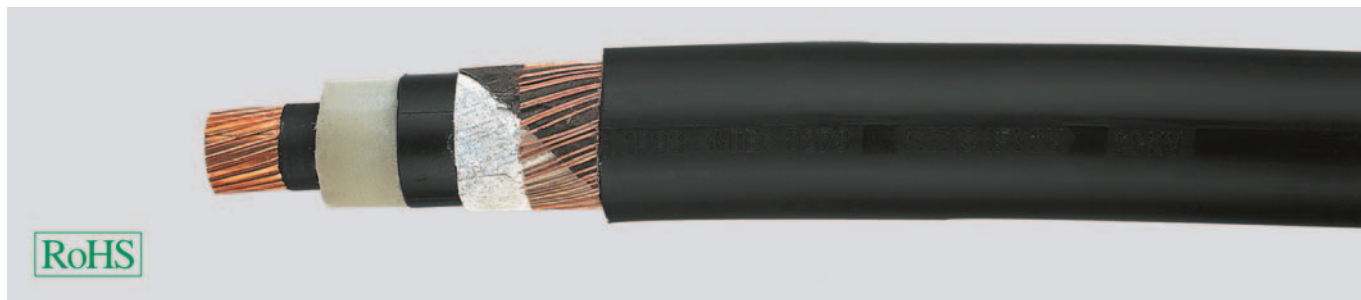


Suitable medium voltage connection sleeves can be found in our Cable Accessories catalogue.



**N2XS(F)2Y 6/10kV, 12/20kV, 18/30kV** XLPE-insulated,

Cu-conductor, single core, longitudinally water-tight, screened, PE-sheath

**Technical data**

- XLPE-insulated power cables to DIN VDE 0276 part 620, HD 620 S2 and IEC 60502
- **Temperature range** during installation up to -20°C
- **Operating temperature** max. +90°C
- **Short circuit temperature** +250°C (short circuit duration max. 5 s)
- **Nominal voltages** U<sub>0</sub>/U 6/10 kV, 12/20 kV, 18/30 kV
- **Operating voltages** for 6/10 kV = max. 12 kV for 12/20 kV = max. 24 kV for 18/30 kV = max. 36 kV
- **Test voltages** for 6/10 kV = 15 kV for 12/20 kV = 30 kV for 18/30 kV = 45 kV
- **Minimum bending radius** 15x cable Ø
- **Power ratings** see Technical Informations

**Cable structure**

- Bare copper-conductor, to DIN VDE 0295 cl.2, multi-wire, BS 6360 cl.2, IEC 60228 cl.2
- Inner semi-conducting coating
- Core insulation of cross-linked polyethylene (XLPE), compound type DIX8 to HD 620 S2
- Outer extrusion of semi-conducting coating spliced with the XLPE insulation
- Longitudinally water-tight, conductive wrapping
- Screen: Braiding of copper wires with one or two tapes applied helically
- Longitudinally water-tight wrapping
- Outer sheath of PE compound type DMP2 to HD 620 S2
- Sheath colour black

**Properties**

- The materials used in manufacture are cadmium-free and contain no silicone and free from substances harmful to the wetting properties of lacquers
- **Installation notes** To guarantee an optimum on operating reliability the extruded semi-conductive layer is spliced with the insulation for long duration. For this reason we recommend a peeling tool for installation

**Note**

- rm = round conductor, multi-wire
- Further types and dimensions on request.
- AWG sizes are approximate equivalent values. The actual cross-section is in mm<sup>2</sup>.

**Application**

Suitable for indoor installation and in cable ducts, outdoors, underground and in water as well as for installation on cable trays for industries, switch-boards and power stations. The PE-outer sheath is resistant to high mechanical stress for laying the cables. This PE sheath is not flame retardant acc. to DIN EN 60332-1-2.

The inner conducting layer between the conductor and the XLPE insulation and the firmly bonded outer conducting layer on the XLPE insulation assures a construction free of partial discharges with high operational reliability.

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Operation voltage max.	Nominal voltage kV	Insulation thickness mm	Screen cross-sec. mm <sup>2</sup>	Sheath thickness Nominal value mm	Outer Ø app. mm	Cop. weight kg / km	Weight app. kg / km	AWG-No.
32560	1 x 35 rm / 16	12	6 / 10	3,4	16	2,5	26,0	518,0	1050,0	2
32561	1 x 50 rm / 16	12	6 / 10	3,4	16	2,5	28,0	662,0	1150,0	1
32562	1 x 70 rm / 16	12	6 / 10	3,4	16	2,5	30,0	854,0	1460,0	2/0
32563	1 x 95 rm / 16	12	6 / 10	3,4	16	2,5	31,0	1094,0	1700,0	3/0
32564	1 x 120 rm / 16	12	6 / 10	3,4	16	2,5	32,0	1334,0	2030,0	4/0
32565	1 x 150 rm / 25	12	6 / 10	3,4	25	2,5	34,0	1723,0	2350,0	300 kcmil
32566	1 x 185 rm / 25	12	6 / 10	3,4	25	2,5	36,0	2059,0	2700,0	350 kcmil
32567	1 x 240 rm / 25	12	6 / 10	3,4	25	2,5	38,0	2587,0	3300,0	500 kcmil
32568	1 x 300 rm / 25	12	6 / 10	3,4	25	2,5	40,0	3163,0	3900,0	600 kcmil
32569	1 x 400 rm / 35	12	6 / 10	3,4	35	2,5	44,0	4234,0	4850,0	750 kcmil
32570	1 x 500 rm / 35	12	6 / 10	3,4	35	2,5	47,0	5194,0	6000,0	1000 kcmil
79954	1 x 630 rm / 35	12	6 / 10	3,4	35	2,5	49,0	6442,0	7020,0	1250 kcmil
32571	1 x 35 rm / 16	24	12 / 20	5,5	16	2,5	31,0	518,0	1210,0	2
32572	1 x 50 rm / 16	24	12 / 20	5,5	16	2,5	33,0	662,0	1400,0	1
32573	1 x 70 rm / 16	24	12 / 20	5,5	16	2,5	34,0	854,0	1550,0	2/0
32574	1 x 95 rm / 16	24	12 / 20	5,5	16	2,5	36,0	1094,0	1800,0	3/0
32575	1 x 120 rm / 16	24	12 / 20	5,5	16	2,5	37,0	1334,0	2150,0	4/0
32576	1 x 150 rm / 25	24	12 / 20	5,5	25	2,5	39,0	1723,0	2400,0	300 kcmil
32577	1 x 185 rm / 25	24	12 / 20	5,5	25	2,5	41,0	2059,0	2850,0	350 kcmil
32578	1 x 240 rm / 25	24	12 / 20	5,5	25	2,5	43,0	2587,0	3250,0	500 kcmil
32579	1 x 300 rm / 25	24	12 / 20	5,5	25	2,5	45,0	3163,0	3850,0	600 kcmil
32580	1 x 400 rm / 35	24	12 / 20	5,5	35	2,5	48,0	4234,0	4900,0	750 kcmil
32581	1 x 500 rm / 35	24	12 / 20	5,5	35	2,5	52,0	5194,0	6100,0	1000 kcmil
33092	1 x 630 rm / 35	24	12 / 20	5,5	35	2,5	54,0	6442,0	7340,0	1250 kcmil

Continuation ▶

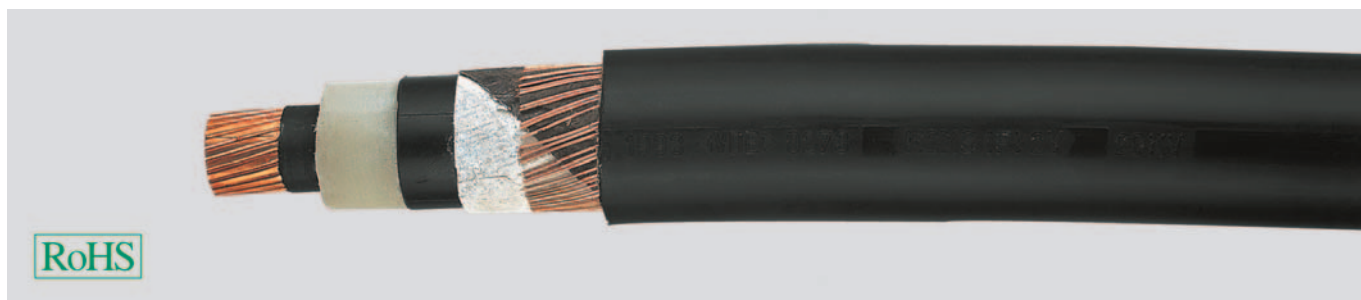
**N2XS(F)2Y 6/10kV, 12/20kV, 18/30kV XLPE-insulated,****Cu-conductor, single core, longitudinally water-tight, screened, PE-sheath**

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Operation voltage max.	Nominal voltage kV	Insulation thickness mm	Screen cross-sec. mm <sup>2</sup>	Sheath thickness Nominal value mm	Outer Ø app. mm	Cop. weight kg / km	Weight app. kg / km	AWG-No.
32582	1 x 50 rm / 16	36	18 / 30	8	16	2,5	37,0	662,0	1700,0	1
32583	1 x 70 rm / 16	36	18 / 30	8	16	2,5	38,0	854,0	1950,0	2/0
32584	1 x 95 rm / 16	36	18 / 30	8	16	2,5	40,0	1094,0	2300,0	3/0
32585	1 x 120 rm / 16	36	18 / 30	8	16	2,5	42,0	1334,0	2600,0	4/0
32586	1 x 150 rm / 25	36	18 / 30	8	25	2,5	43,0	1723,0	3000,0	300 kcmil
32587	1 x 185 rm / 25	36	18 / 30	8	25	2,5	45,0	2059,0	3350,0	350 kcmil
32588	1 x 240 rm / 25	36	18 / 30	8	25	2,5	47,0	2587,0	4100,0	500 kcmil
32589	1 x 300 rm / 25	36	18 / 30	8	25	2,5	50,0	3163,0	4800,0	600 kcmil
32590	1 x 400 rm / 35	36	18 / 30	8	35	2,5	53,0	4234,0	5750,0	750 kcmil
32591	1 x 500 rm / 35	36	18 / 30	8	35	2,5	56,0	5194,0	6700,0	1000 kcmil
708487	1 x 630 rm / 35	36	18 / 30	8	35	2,5	59,0	6442,0	7760,0	1250 kcmil

Dimensions and specifications may be changed without prior notice. (RQ03)

**N2XS(FL)2Y 6/10kV, 12/20kV, 18/30kV** XLPE-insulated,

Cu-conductor, single core, longitudinally and crosswise water-tight, screened, PE-sheath

**NEW****Technical data**

- XLPE-insulated power cables to DIN VDE 0276 part 620, HD 620 S2 and IEC 60502
- **Temperature range** during installation up to -20°C
- **Operating temperature** max. +90°C
- **Short circuit temperature** +250°C (short circuit duration max. 5 s)
- **Nominal voltages** U<sub>0</sub>/U 6/10 kV, 12/20 kV, 18/30 kV
- **Operating voltages** for 6/10 kV = max. 12 kV for 12/20 kV = max. 24 kV for 18/30 kV = max. 36 kV
- **Test voltages** for 6/10 kV = 15 kV for 12/20 kV = 30 kV for 18/30 kV = 45 kV
- **Minimum bending radius** 15x cable Ø
- **Power ratings** see Technical Informations

**Cable structure**

- Bare copper-conductor, to DIN VDE 0295 cl.2, multi-wire, BS 6360 cl.2, IEC 60228 cl.2
- Inner semi-conducting coating
- Core insulation of cross-linked polyethylene (XLPE), compound type DIX8 to HD 620 S2
- Outer extrusion of semi-conducting coating spliced with the XLPE-insulation
- Longitudinally water-tight, conductive wrapping
- Screen: Braiding of copper wires with one or two tapes applied helically
- Longitudinally water-tight wrapping
- Aluminium tape spliced with PE sheath
- Outer sheath of PE compound type DMP2 to HD 620 S2
- Sheath colour black

**Properties**

- The materials used in manufacture are cadmium-free and contain no silicone and free from substances harmful to the wetting properties of lacquers
- **Installation notes** To guarantee an optimum on operating reliability the extruded semi-conductive layer is spliced with the insulation for long duration. For this reason we recommend a peeling tool for installation

**Note**

- rm = round conductor, multi-wire
- Further types and dimensions on request.
- AWG sizes are approximate equivalent values. The actual cross-section is in mm<sup>2</sup>.

**Application**

Installation primarily for power utility grids and in cable ducts, outdoors, underground and in water, and also on pallets for manufacturing plants, switchgear and power stations. The resistant Al/PE-laminated sheathing acts as a cross water barrier. It inhibits the diffusion of water. In case of sheathing damage, water impact is contained at the flaw. The cable can be severely mechanically stressed during installation and operation. The PE sheathing is not flame-retardant to DIN EN 60332-1-2. The internal conductive layer between conductor and VPE insulation and the adherent external conductive layer on the VPE insulation guarantees a design with high operational safety and no partial discharge.

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Operation voltage max.	Nominal voltage kV	Insulation thickness mm	Screen cross-sec. mm <sup>2</sup>	Sheath thickness Nominal value mm	Outer Ø app. mm	Cop. weight kg / km	Weight app. kg / km	AWG-No.
33054	1 x 35 rm / 16	12	6 / 10	3,4	16	2,5	28,0	518,0	860,0	2
33055	1 x 50 rm / 16	12	6 / 10	3,4	16	2,5	30,0	662,0	1000,0	1
33056	1 x 70 rm / 16	12	6 / 10	3,4	16	2,5	32,0	854,0	1350,0	2/0
33057	1 x 95 rm / 16	12	6 / 10	3,4	16	2,5	33,0	1094,0	1680,0	3/0
33058	1 x 120 rm / 16	12	6 / 10	3,4	16	2,5	34,0	1334,0	2070,0	4/0
33059	1 x 150 rm / 25	12	6 / 10	3,4	25	2,5	36,0	1723,0	2350,0	300 kcmil
33060	1 x 185 rm / 25	12	6 / 10	3,4	25	2,5	38,0	2059,0	2710,0	350 kcmil
33061	1 x 240 rm / 25	12	6 / 10	3,4	25	2,5	40,0	2587,0	3260,0	500 kcmil
38049	1 x 300 rm / 25	12	6 / 10	3,4	25	2,5	42,0	3163,0	3850,0	600 kcmil
38050	1 x 400 rm / 35	12	6 / 10	3,4	35	2,5	46,0	4234,0	4740,0	750 kcmil
38051	1 x 500 rm / 35	12	6 / 10	3,4	35	2,5	49,0	5194,0	5800,0	1000 kcmil
38052	1 x 630 rm / 35	12	6 / 10	3,4	35	2,5	51,0	6442,0	7120,0	1250 kcmil
38053	1 x 35 rm / 16	24	12 / 20	5,5	16	2,5	33,0	518,0	1020,0	2
33066	1 x 50 rm / 16	24	12 / 20	5,5	16	2,5	35,0	662,0	1170,0	1
33067	1 x 70 rm / 16	24	12 / 20	5,5	16	2,5	36,0	854,0	1470,0	2/0
33083	1 x 95 rm / 16	24	12 / 20	5,5	16	2,5	38,0	1094,0	1860,0	3/0
33069	1 x 120 rm / 16	24	12 / 20	5,5	16	2,5	39,0	1334,0	2260,0	4/0
33070	1 x 150 rm / 25	24	12 / 20	5,5	25	2,5	41,0	1723,0	2550,0	300 kcmil
33071	1 x 185 rm / 25	24	12 / 20	5,5	25	2,5	43,0	2059,0	2920,0	350 kcmil
33072	1 x 240 rm / 25	24	12 / 20	5,5	25	2,5	45,0	2587,0	3490,0	500 kcmil
33073	1 x 300 rm / 25	24	12 / 20	5,5	25	2,5	47,0	3163,0	4090,0	600 kcmil
33074	1 x 400 rm / 35	24	12 / 20	5,5	35	2,5	50,0	4234,0	5010,0	750 kcmil
33075	1 x 500 rm / 35	24	12 / 20	5,5	35	2,5	54,0	5194,0	6090,0	1000 kcmil
38054	1 x 630 rm / 35	24	12 / 20	5,5	35	2,5	55,0	6442,0	7440,0	1250 kcmil

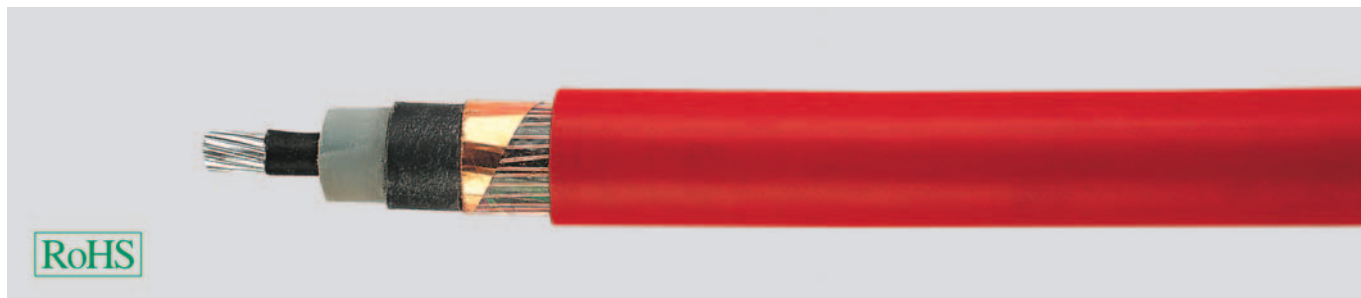
Continuation ▶

**N2XS(FL)2Y 6/10kV, 12/20kV, 18/30kV** XLPE-insulated,**Cu-conductor, single core, longitudinally and crosswise water-tight, screened, PE-sheath**

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Operation voltage max.	Nominal voltage kV	Insulation thickness mm	Screen cross-sec. mm <sup>2</sup>	Sheath thickness Nominal value mm	Outer Ø app. mm	Cop. weight kg / km	Weight app. kg / km	AWG-No.
34312	1 x 50 rm / 16	36	18 / 30	8	16	2,5	36,0	662,0	1400,0	1
38055	1 x 70 rm / 16	36	18 / 30	8	16	2,5	40,0	854,0	1710,0	2/0
38056	1 x 95 rm / 16	36	18 / 30	8	16	2,5	42,0	1094,0	2110,0	3/0
38057	1 x 120 rm / 16	36	18 / 30	8	16	2,5	44,0	1334,0	2520,0	4/0
38058	1 x 150 rm / 25	36	18 / 30	8	25	2,5	45,0	1723,0	2830,0	300 kcmil
34313	1 x 185 rm / 25	36	18 / 30	8	25	2,5	47,0	2059,0	3210,0	350 kcmil
38059	1 x 240 rm / 25	36	18 / 30	8	25	2,5	49,0	2587,0	3790,0	500 kcmil
34314	1 x 300 rm / 25	36	18 / 30	8	25	2,5	52,0	3163,0	4430,0	600 kcmil
34315	1 x 400 rm / 35	36	18 / 30	8	35	2,5	55,0	4234,0	5390,0	750 kcmil
38060	1 x 500 rm / 35	36	18 / 30	8	35	2,5	58,0	5194,0	6500,0	1000 kcmil
38061	1 x 630 rm / 35	36	18 / 30	8	35	2,5	60,0	6442,0	7870,0	1250 kcmil

Dimensions and specifications may be changed without prior notice. (RQ03)

# NA2XS<sub>Y</sub> 6/10kV, 12/20kV, 18/30kV XLPE-insulated, alu-conductor, single core, screened, PVC-sheath



## Technical data

- XLPE-insulated power cables to DIN VDE 0276 part 620, HD 620 S2 and IEC 60502
- **Temperature range** during installation up to -5°C
- **Operating temperature** max. +90°C
- **Short circuit temperature** +250°C (short circuit duration max. 5 s)
- **Nominal voltages** U<sub>0</sub>/U 6/10 kV, 12/20 kV, 18/30 kV
- **Operating voltages** for 6/10 kV = max. 12 kV for 12/20 kV = max. 24 kV for 18/30 kV = max. 36 kV
- **Test voltages** for 6/10 kV = 15 kV for 12/20 kV = 30 kV for 18/30 kV = 45 kV
- **Minimum bending radius** 15x cable Ø
- **Power ratings** see Technical Informations

## Cable structure

- Aluminium-conductor, to DIN VDE 0295 cl.2, multi-wire, BS 6360 cl.2, IEC 60228 cl.2
- Inner semi-conducting coating
- Core insulation of cross-linked polyethylene (XLPE), compound type DIX8 to HD 620 S2
- Outer extrusion of semi-conducting coating spliced with the insulation
- Wrapping of conductive material
- Screen: Braiding of copper wires with one or two tapes applied helically
- Wrapping
- Outer sheath of PVC compound type DMV6 to HD 620 S2
- Sheath colour red

## Properties

- The materials used in manufacture are cadmium-free and contain no silicone and free from substances harmful to the wetting properties of lacquers
- ### Tests
- self-extinguishing and flame retardant acc. to DIN VDE 0482-332-1-2, DIN EN 60332-1-2, IEC 60332-1 (equivalent DIN VDE 0472 part 804 test method B)
- ### Installation notes
- To guarantee an optimum on operating reliability the extruded semi-conductive layer is spliced with the insulation for long duration. For this reason we recommend a peeling tool for installation

## Note

- rm = round conductor, multi-wire
- Further dimensions available on request.
- AWG sizes are approximate equivalent values. The actual cross-section is in mm<sup>2</sup>.

## Application

Suitable for installation mostly for power supply stations, in indoors and in cable ducts, outdoor with protected laying, underground and in water as well as for installation on cable trays for industries, switch-boards and power stations. Due to the good laying characteristic, this can also be laid easily in difficult line guideways.

The inner conducting layer between the conductor and the XLPE insulation and the firmly bonded outer conducting layer on the XLPE insulation assures a construction free of partial discharges with high operational reliability.

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Operation voltage max.	Nominal voltage kV	Insulation thickness mm	Sheath thickness Nominal value mm	Outer Ø min. - max. mm	Cop. weight kg / km	Alu weight kg / km	Weight app. kg / km	AWG-No.
32440	1 x 50 rm / 16	12	6 / 10	3,4	2,5	24,0 - 29,0	182,0	145,0	780,0	1
32441	1 x 70 rm / 16	12	6 / 10	3,4	2,5	26,0 - 31,0	182,0	203,0	875,0	2/0
32442	1 x 95 rm / 16	12	6 / 10	3,4	2,5	26,0 - 32,0	182,0	276,0	990,0	3/0
32443	1 x 120 rm / 16	12	6 / 10	3,4	2,5	28,0 - 34,0	182,0	348,0	1110,0	4/0
32444	1 x 150 rm / 16	12	6 / 10	3,4	2,5	29,0 - 35,0	182,0	435,0	1240,0	300 kcmil
32445	1 x 150 rm / 25	12	6 / 10	3,4	2,5	29,0 - 35,0	283,0	435,0	1310,0	300 kcmil
32446	1 x 185 rm / 16	12	6 / 10	3,4	2,5	31,0 - 37,0	182,0	537,0	1405,0	350 kcmil
32447	1 x 185 rm / 25	12	6 / 10	3,4	2,5	31,0 - 37,0	283,0	537,0	1460,0	350 kcmil
32448	1 x 240 rm / 16	12	6 / 10	3,4	2,5	33,0 - 39,0	182,0	696,0	1615,0	500 kcmil
32449	1 x 240 rm / 25	12	6 / 10	3,4	2,5	33,0 - 39,0	283,0	696,0	1660,0	500 kcmil
32450	1 x 300 rm / 25	12	6 / 10	3,4	2,5	36,0 - 41,0	283,0	870,0	1910,0	600 kcmil
32451	1 x 400 rm / 35	12	6 / 10	3,4	2,5	40,0 - 45,0	394,0	1160,0	2315,0	750 kcmil
32452	1 x 500 rm / 35	12	6 / 10	3,4	2,5	43,0 - 48,0	394,0	1450,0	2750,0	1000 kcmil
32453	1 x 50 rm / 16	24	12 / 20	5,5	2,5	28,0 - 33,0	182,0	145,0	950,0	1
32454	1 x 70 rm / 16	24	12 / 20	5,5	2,5	30,0 - 35,0	182,0	203,0	1110,0	2/0
32455	1 x 95 rm / 16	24	12 / 20	5,5	2,5	31,0 - 36,0	182,0	276,0	1220,0	3/0
32456	1 x 120 rm / 16	24	12 / 20	5,5	2,5	32,0 - 38,0	182,0	348,0	1310,0	4/0
32457	1 x 150 rm / 16	24	12 / 20	5,5	2,5	33,0 - 39,0	182,0	435,0	1460,0	300 kcmil
32458	1 x 150 rm / 25	24	12 / 20	5,5	2,5	33,0 - 39,0	283,0	435,0	1520,0	300 kcmil
32459	1 x 185 rm / 16	24	12 / 20	5,5	2,5	35,0 - 41,0	182,0	537,0	1660,0	350 kcmil
32460	1 x 185 rm / 25	24	12 / 20	5,5	2,5	35,0 - 41,0	283,0	537,0	1720,0	350 kcmil
32461	1 x 240 rm / 16	24	12 / 20	5,5	2,5	38,0 - 44,0	182,0	696,0	1860,0	500 kcmil
32462	1 x 240 rm / 25	24	12 / 20	5,5	2,5	38,0 - 44,0	283,0	696,0	1910,0	500 kcmil
32463	1 x 300 rm / 25	24	12 / 20	5,5	2,5	40,0 - 46,0	283,0	870,0	2220,0	600 kcmil
32464	1 x 400 rm / 35	24	12 / 20	5,5	2,5	43,0 - 49,0	394,0	1160,0	2620,0	750 kcmil
32465	1 x 500 rm / 35	24	12 / 20	5,5	2,5	46,0 - 52,0	394,0	1450,0	3030,0	1000 kcmil
32466	1 x 50 rm / 16	36	18 / 30	8	2,5	32,0 - 38,0	182,0	145,0	1260,0	1
32467	1 x 70 rm / 16	36	18 / 30	8	2,5	34,0 - 40,0	182,0	203,0	1360,0	2/0

Continuation ▶



# NA2XS<sub>Y</sub> 6/10kV, 12/20kV, 18/30kV XLPE-insulated, alu-conductor, single core, screened, PVC-sheath



Part no.	No. cores x cross-sec. mm <sup>2</sup>	Operation voltage max.	Nominal voltage kV	Insulation thickness mm	Sheath thickness Nominal value mm	Outer Ø min. - max. mm	Cop. weight kg / km	Alu weight kg / km	Weight app. kg / km	AWG-No.
32468	1 x 95 rm / 16	36	18 / 30	8	2,5	35,0 - 41,0	182,0	276,0	1510,0	3/0
32469	1 x 120 rm / 16	36	18 / 30	8	2,5	37,0 - 43,0	182,0	348,0	1610,0	4/0
32470	1 x 150 rm / 16	36	18 / 30	8	2,5	38,0 - 44,0	182,0	435,0	1760,0	300 kcmil
32471	1 x 150 rm / 25	36	18 / 30	8	2,5	38,0 - 44,0	283,0	435,0	1810,0	300 kcmil
32472	1 x 185 rm / 16	36	18 / 30	8	2,5	40,0 - 46,0	182,0	537,0	1960,0	350 kcmil
32473	1 x 185 rm / 25	36	18 / 30	8	2,5	40,0 - 46,0	283,0	537,0	2020,0	350 kcmil
32474	1 x 240 rm / 16	36	18 / 30	8	2,5	42,0 - 48,0	182,0	696,0	2210,0	500 kcmil
32475	1 x 240 rm / 25	36	18 / 30	8	2,5	42,0 - 48,0	283,0	696,0	2260,0	500 kcmil
32476	1 x 300 rm / 25	36	18 / 30	8	2,5	45,0 - 51,0	283,0	870,0	2560,0	600 kcmil
32477	1 x 400 rm / 35	36	18 / 30	8	2,5	48,0 - 54,0	394,0	1160,0	2960,0	750 kcmil
32478	1 x 500 rm / 35	36	18 / 30	8	2,5	51,0 - 57,0	394,0	1450,0	3460,0	1000 kcmil

Dimensions and specifications may be changed without prior notice. (RQ03)



Suitable medium voltage connection sleeves can be found in our Cable Accessories catalogue.

**NA2XS2Y 6/10kV, 12/20kV, 18/30kV** XLPE-insulated,

Alu-conductor, single core, screened, PE-sheath

**Technical data**

- XLPE-insulated power cables to DIN VDE 0276 part 620, HD 620 S2 and IEC 60502
- **Temperature range** during installation up to -20°C
- **Operating temperature** max. +90°C
- **Short circuit temperature** +250°C (short circuit duration max. 5 s)
- **Nominal voltages** U<sub>0</sub>/U 6/10 kV, 12/20 kV, 18/30 kV
- **Operating voltages** for 6/10 kV = max. 12 kV for 12/20 kV = max. 24 kV for 18/30 kV = max. 36 kV
- **Test voltages** for 6/10 kV = 15 kV for 12/20 kV = 30 kV for 18/30 kV = 45 kV
- **Minimum bending radius** 15x cable Ø
- **Power ratings** see Technical Informations

**Cable structure**

- Aluminium-conductor, to DIN VDE 0295 cl.2, multi-wire, BS 6360 cl.2, IEC 60228 cl.2
- Inner semi-conducting coating
- Core insulation of cross-linked polyethylene (XLPE), compound type DIX8 to HD 620 S2
- Outer extrusion of semi-conducting coating spliced with the insulation
- Wrapping of conductive material
- Screen: Braiding of copper wires with one or two tapes applied helically
- Wrapping
- Outer sheath of PE compound type DMP2 to HD 620 S2
- Sheath colour black

**Properties**

- The materials used in manufacture are cadmium-free and contain no silicone and free from substances harmful to the wetting properties of lacquers
- **Installation notes** To guarantee an optimum on operating reliability the extruded semi-conductive layer is spliced with the insulation for long duration. For this reason we recommend a peeling tool for installation.

**Note**

- rm = round conductor, multi-wire
- Further dimensions available on request.
- AWG sizes are approximate equivalent values. The actual cross-section is in mm<sup>2</sup>.

**Application**

Suitable for indoor installation and in cable ducts, outdoors, underground and in water as well as for installation on cable trays for industries, switch-boards and power stations. The PE-outer sheath is resistant to high mechanical stress for laying the cables. This PE sheath is not flame retardant acc. to DIN EN 60332-1-2.

The inner conducting layer between the conductor and the XLPE insulation and the firmly bonded outer conducting layer on the XLPE insulation assures a construction free of partial discharges with high operational reliability.

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Operation voltage max.	Nominal voltage kV	Insulation thickness mm	Sheath thickness Nominal value mm	Outer Ø min. - max. mm	Cop. weight kg / km	Alu weight kg / km	Weight app. kg / km	AWG-No.
32520	1 x 50 rm / 16	12	6 / 10	3,4	2,5	24,0 - 29,0	182,0	145,0	710,0	1
32521	1 x 70 rm / 16	12	6 / 10	3,4	2,5	26,0 - 31,0	182,0	203,0	790,0	2/0
32522	1 x 95 rm / 16	12	6 / 10	3,4	2,5	26,0 - 32,0	182,0	276,0	920,0	3/0
32523	1 x 120 rm / 16	12	6 / 10	3,4	2,5	28,0 - 34,0	182,0	348,0	990,0	4/0
32524	1 x 150 rm / 16	12	6 / 10	3,4	2,5	29,0 - 35,0	182,0	435,0	1110,0	300 kcmil
32525	1 x 150 rm / 25	12	6 / 10	3,4	2,5	29,0 - 35,0	283,0	435,0	1220,0	300 kcmil
32526	1 x 185 rm / 16	12	6 / 10	3,4	2,5	31,0 - 37,0	182,0	537,0	1260,0	350 kcmil
32527	1 x 185 rm / 25	12	6 / 10	3,4	2,5	33,0 - 39,0	283,0	537,0	1370,0	350 kcmil
32528	1 x 240 rm / 16	12	6 / 10	3,4	2,5	33,0 - 39,0	182,0	696,0	1480,0	500 kcmil
32529	1 x 240 rm / 25	12	6 / 10	3,4	2,5	33,0 - 39,0	283,0	696,0	1530,0	500 kcmil
32530	1 x 300 rm / 25	12	6 / 10	3,4	2,5	36,0 - 41,0	283,0	870,0	1820,0	600 kcmil
32531	1 x 400 rm / 35	12	6 / 10	3,4	2,5	40,0 - 45,0	394,0	1160,0	2220,0	750 kcmil
32532	1 x 500 rm / 35	12	6 / 10	3,4	2,5	43,0 - 48,0	394,0	1450,0	2570,0	1000 kcmil
32533	1 x 50 rm / 16	24	12 / 20	5,5	2,5	28,0 - 33,0	182,0	145,0	890,0	1
32534	1 x 70 rm / 16	24	12 / 20	5,5	2,5	30,0 - 35,0	182,0	203,0	970,0	2/0
32535	1 x 95 rm / 16	24	12 / 20	5,5	2,5	31,0 - 36,0	182,0	276,0	1120,0	3/0
32536	1 x 120 rm / 16	24	12 / 20	5,5	2,5	32,0 - 38,0	182,0	348,0	1210,0	4/0
32537	1 x 150 rm / 16	24	12 / 20	5,5	2,5	33,0 - 39,0	182,0	435,0	1370,0	300 kcmil
32538	1 x 150 rm / 25	24	12 / 20	5,5	2,5	33,0 - 39,0	283,0	435,0	1420,0	300 kcmil
32539	1 x 185 rm / 16	24	12 / 20	5,5	2,5	35,0 - 41,0	182,0	537,0	1530,0	350 kcmil
32540	1 x 185 rm / 25	24	12 / 20	5,5	2,5	35,0 - 41,0	283,0	537,0	1570,0	350 kcmil
32541	1 x 240 rm / 16	24	12 / 20	5,5	2,5	38,0 - 44,0	182,0	696,0	1720,0	500 kcmil
32542	1 x 240 rm / 25	24	12 / 20	5,5	2,5	38,0 - 44,0	283,0	696,0	1830,0	500 kcmil
32543	1 x 300 rm / 25	24	12 / 20	5,5	2,5	40,0 - 46,0	283,0	870,0	2070,0	600 kcmil
32544	1 x 400 rm / 35	24	12 / 20	5,5	2,5	43,0 - 49,0	394,0	1160,0	2460,0	750 kcmil
32545	1 x 500 rm / 35	24	12 / 20	5,5	2,5	46,0 - 52,0	394,0	1450,0	2890,0	1000 kcmil
33078	1 x 630 rm / 35	24	12 / 20	5,5	2,5	47,0 - 53,0	394,0	1827,0	3370,0	1250 kcmil
32546	1 x 50 rm / 16	36	18 / 30	8	2,5	32,0 - 38,0	182,0	145,0	1120,0	1

Continuation ▶

# NA2XS2Y 6/10kV, 12/20kV, 18/30kV XLPE-insulated, Alu-conductor, single core, screened, PE-sheath



Part no.	No. cores x cross-sec. mm <sup>2</sup>	Operation voltage max.	Nominal voltage kV	Insulation thickness mm	Sheath thickness Nominal value mm	Outer Ø min. - max. mm	Cop. weight kg / km	Alu weight kg / km	Weight app. kg / km	AWG-No.
32547	1 x 70	36	18 / 30	8	2,5	34,0 - 40,0	182,0	203,0	1270,0	2/0
32548	1 x 95	36	18 / 30	8	2,5	35,0 - 41,0	182,0	276,0	1380,0	3/0
32549	1 x 120	36	18 / 30	8	2,5	37,0 - 43,0	182,0	348,0	1530,0	4/0
32550	1 x 150	36	18 / 30	8	2,5	38,0 - 44,0	283,0	435,0	1720,0	300 kcmil
32551	1 x 185	36	18 / 30	8	2,5	40,0 - 46,0	283,0	537,0	1860,0	350 kcmil
32552	1 x 240	36	18 / 30	8	2,5	42,0 - 48,0	283,0	696,0	2110,0	500 kcmil
32553	1 x 300	36	18 / 30	8	2,5	45,0 - 51,0	283,0	870,0	2370,0	600 kcmil
32554	1 x 400	36	18 / 30	8	2,5	48,0 - 54,0	394,0	1160,0	2820,0	750 kcmil
32555	1 x 500	36	18 / 30	8	2,5	51,0 - 57,0	394,0	1450,0	3280,0	1000 kcmil
32999	1 x 630	36	18 / 30	8	2,5	52,0 - 59,0	394,0	1827,0	3770,0	1250 kcmil

Dimensions and specifications may be changed without prior notice. (RQ03)



Suitable medium voltage connection sleeves can be found in our Cable Accessories catalogue.

# NA2XS(F)2Y 6/10kV, 12/20kV, 18/30kV XLPE-insulated, alu-conductor, single core, longitudinally water-tight, screened, PE-sheath



## Technical data

- XLPE-insulated power cables to DIN VDE 0276 part 620, HD 620 S2 and IEC 60502
- **Temperature range** during installation up to -20°C
- **Operating temperature** max. +90°C
- **Short circuit temperature** +250°C (short circuit duration max. 5 s)
- **Nominal voltages** U<sub>0</sub>/U 6/10 kV, 12/20 kV, 18/30 kV
- **Operating voltages** for 6/10 kV = max. 12 kV for 12/20 kV = max. 24 kV for 18/30 kV = max. 36 kV
- **Test voltages** for 6/10 kV = 15 kV for 12/20 kV = 30 kV for 18/30 kV = 45 kV
- **Minimum bending radius** 15x cable Ø
- **Power ratings** see Technical Informations

## Cable structure

- Aluminium-conductor, to DIN VDE 0295 cl.2, multi-wire, BS 6360 cl.2, IEC 60228 cl.2
- Inner semi-conducting coating
- Core insulation of cross-linked polyethylene (XLPE), compound type DIX8 to HD 620 S2
- Outer extrusion of semi-conducting coating spliced with the XLPE-insulation
- Longitudinally water-tight, conductive wrapping
- Screen: Braiding of copper wires with one or two tapes applied helically
- Longitudinally water-tight wrapping
- Outer sheath of PE compound type DMP2 to HD 620 S2
- Sheath colour black
- Sheath thickness voltage 2,5 mm

## Properties

- The materials used in manufacture are cadmium-free and contain no silicone and free from substances harmful to the wetting properties of lacquers
- **Installation notes** To guarantee an optimum on operating reliability the extruded semi-conductive layer is spliced with the insulation for long duration. For this reason we recommend a peeling tool for installation.

## Note

- rm = round conductor, multi-wire
- Further types and dimensions on request.
- AWG sizes are approximate equivalent values. The actual cross-section is in mm<sup>2</sup>.

## Application

Suitable for indoor installation and in cable ducts, outdoors, underground and in water as well as for installation on cable trays for industries, switch-boards and power stations. The PE-outer sheath is resistant to high mechanical stress for laying the cables. This PE sheath is not flame retardant acc. to DIN EN 60332-1-2.

The inner conducting layer between the conductor and the XLPE insulation and the firmly bonded outer conducting layer on the XLPE insulation assures a construction free of partial discharges with high operational reliability.

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Operation voltage max.	Nominal voltage kV	Insulation thickness mm	Screen cross-sec. mm <sup>2</sup>	Outer Ø app. mm	Cop. weight kg / km	Alu weight kg / km	Weight app. kg / km	AWG-No.
32600	1 x 35 rm / 16	12	6 / 10	3,4	16	26,0	182,0	102,0	780,0	2
32601	1 x 50 rm / 16	12	6 / 10	3,4	16	28,0	182,0	145,0	850,0	1
32602	1 x 70 rm / 16	12	6 / 10	3,4	16	30,0	182,0	203,0	980,0	2/0
32603	1 x 95 rm / 16	12	6 / 10	3,4	16	31,0	182,0	276,0	1080,0	3/0
32604	1 x 120 rm / 16	12	6 / 10	3,4	16	32,0	182,0	348,0	1150,0	4/0
32605	1 x 150 rm / 25	12	6 / 10	3,4	25	34,0	283,0	435,0	1280,0	300 kcmil
32606	1 x 185 rm / 25	12	6 / 10	3,4	25	36,0	283,0	537,0	1420,0	350 kcmil
32607	1 x 240 rm / 25	12	6 / 10	3,4	25	38,0	283,0	696,0	1630,0	500 kcmil
32608	1 x 300 rm / 25	12	6 / 10	3,4	25	40,0	283,0	870,0	1950,0	600 kcmil
32609	1 x 400 rm / 35	12	6 / 10	3,4	35	44,0	394,0	1160,0	2350,0	750 kcmil
32610	1 x 500 rm / 35	12	6 / 10	3,4	35	47,0	394,0	1450,0	2780,0	1000 kcmil
32611	1 x 50 rm / 16	24	12 / 20	5,5	16	33,0	182,0	145,0	920,0	1
32612	1 x 70 rm / 16	24	12 / 20	5,5	16	34,0	182,0	203,0	1030,0	2/0
32613	1 x 95 rm / 16	24	12 / 20	5,5	16	36,0	182,0	276,0	1140,0	3/0
32614	1 x 120 rm / 16	24	12 / 20	5,5	16	37,0	182,0	348,0	1250,0	4/0
32615	1 x 150 rm / 25	24	12 / 20	5,5	25	39,0	283,0	435,0	1320,0	300 kcmil
32616	1 x 185 rm / 25	24	12 / 20	5,5	25	41,0	283,0	537,0	1570,0	350 kcmil
32617	1 x 240 rm / 25	24	12 / 20	5,5	25	43,0	283,0	696,0	1780,0	500 kcmil
32618	1 x 300 rm / 25	24	12 / 20	5,5	25	45,0	283,0	870,0	2100,0	600 kcmil
32619	1 x 400 rm / 35	24	12 / 20	5,5	35	48,0	394,0	1160,0	2480,0	750 kcmil
32620	1 x 500 rm / 35	24	12 / 20	5,5	35	50,0	394,0	1450,0	2900,0	1000 kcmil
33090	1 x 630 rm / 35	24	12 / 20	5,5	35	52,0	394,0	1827,0	3380,0	1250 kcmil
33091	1 x 800 rm / 35	24	12 / 20	5,5	35	57,0	394,0	2320,0	4400,0	1500 kcmil
33097	1 x 1000 rm / 35	24	12 / 20	5,5	35	62,0	394,0	2900,0	4780,0	2000 kcmil

Continuation ▶

# NA2XS(F)2Y 6/10kV, 12/20kV, 18/30kV XLPE-insulated, alu-conductor, single core, longitudinally water-tight, screened, PE-sheath



Part no.	No. cores x cross-sec. mm <sup>2</sup>	Operation voltage max.	Nominal voltage kV	Insulation thickness mm	Screen cross-sec. mm <sup>2</sup>	Outer Ø app. mm	Cop. weight kg / km	Alu weight kg / km	Weight app. kg / km	AWG-No.
32621	1 x 50 rm / 16	36	18 / 30	8	16	37,0	182,0	145,0	1250,0	1
32622	1 x 70 rm / 16	36	18 / 30	8	16	38,0	182,0	203,0	1500,0	2/0
32623	1 x 95 rm / 16	36	18 / 30	8	16	40,0	182,0	276,0	1700,0	3/0
32624	1 x 120 rm / 16	36	18 / 30	8	16	42,0	182,0	348,0	1800,0	4/0
32625	1 x 150 rm / 25	36	18 / 30	8	25	43,0	283,0	435,0	2050,0	300 kcmil
32626	1 x 185 rm / 25	36	18 / 30	8	25	45,0	283,0	537,0	2150,0	350 kcmil
32627	1 x 240 rm / 25	36	18 / 30	8	25	47,0	283,0	696,0	2400,0	500 kcmil
32628	1 x 300 rm / 25	36	18 / 30	8	25	50,0	283,0	870,0	2700,0	600 kcmil
32629	1 x 400 rm / 35	36	18 / 30	8	35	53,0	394,0	1160,0	3200,0	750 kcmil
32630	1 x 500 rm / 35	36	18 / 30	8	35	56,0	394,0	1450,0	3555,0	1000 kcmil
31219	1 x 630 rm / 35	36	18 / 30	8	35	58,0	394,0	1827,0	3790,0	1250 kcmil

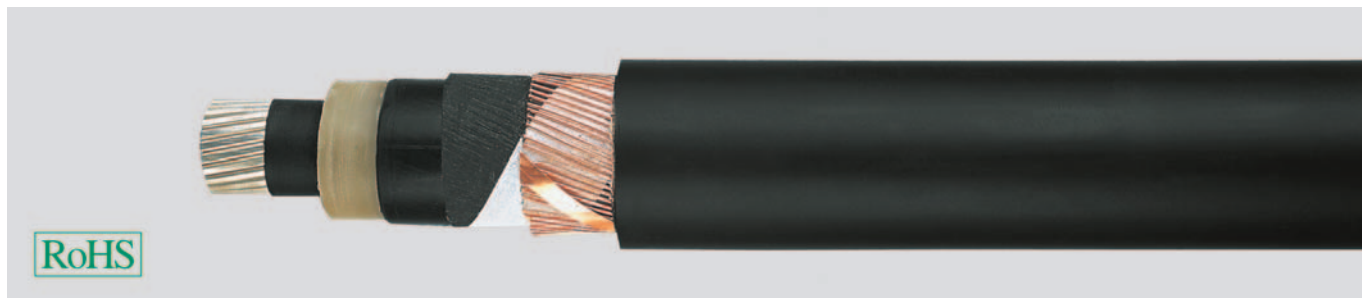
Dimensions and specifications may be changed without prior notice. (RQ03)



Suitable medium voltage connection sleeves can be found in our Cable Accessories catalogue.



# NA2XS(FL)2Y 6/10kV, 12/20kV, 18/30kV XLPE-insulated, alu-conductor, single core, longitudinally and crosswise water-tight, screened, PE-sheath



NEW

## Technical data

- XLPE-insulated power cables to DIN VDE 0276 part 620, HD 620 S2 and IEC 60502
- **Temperature range** during installation up to -20°C
- **Operating temperature** max. +90°C
- **Short circuit temperature** 250°C (short circuit duration max. 5 s)
- **Nominal voltages** U<sub>0</sub>/U 6/10 kV, 12/20 kV, 18/30 kV
- **Operating voltages** for 6/10 kV = max. 12 kV for 12/20 kV = max. 24 kV for 18/30 kV = max. 36 kV
- **Test voltages** for 6/10 kV = 15 kV for 12/20 kV = 30 kV for 18/30 kV = 45 kV
- **Minimum bending radius** 15x cable Ø
- **Power ratings** see Technical Informations

## Cable structure

- Aluminium-conductor, to DIN VDE 0295 cl.2, multi-wire, BS 6360 cl.2, IEC 60228 cl.2
- Inner semi-conducting coating
- Core insulation of cross-linked polyethylene (XLPE), compound type DIX8 to HD 620 S2
- Outer extrusion of semi-conducting coating spliced with the XLPE-insulation
- Longitudinally water-tight, conductive wrapping
- Screen: Braiding of copper wires with one or two tapes applied helically
- Longitudinally water-tight wrapping
- Aluminium tape spliced with PE sheath
- Outer sheath of PE compound type DMP2 to HD 620 S2
- Sheath colour black
- Sheath wall thickness nominal value 2,5 mm

## Properties

- The materials used in manufacture are cadmium-free and contain no silicone and free from substances harmful to the wetting properties of lacquers
- **Installation notes** To guarantee an optimum on operating reliability the extruded semi-conductive layer is spliced with the insulation for long duration. For this reason we recommend a peeling tool for installation.

## Note

- rm = round conductor, multi-wire
- Further types and dimensions on request.
- AWG sizes are approximate equivalent values. The actual cross-section is in mm<sup>2</sup>.

## Application

Installation primarily for power utility grids and in cable ducts, outdoors, underground and in water, and also on pallets for manufacturing plants, switchgear and power stations. The resistant Al/PE-laminated sheathing acts as a cross water barrier. It inhibits the diffusion of water. In case of sheathing damage, water impact is contained at the flaw. The cable can be severely mechanically stressed during installation and operation. The PE sheathing is not flame-retardant to DIN EN 60332-1-2. The internal conductive layer between conductor and VPE insulation and the adherent external conductive layer on the VPE insulation guarantees a design with high operational safety and no partial discharge.

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Operation voltage max.	Nominal voltage kV	Insulation thickness mm	Screen cross-sec. mm <sup>2</sup>	Outer Ø app. mm	Cop. weight kg / km	Alu weight kg / km	Weight app. kg / km	AWG-No.
38062	1 x 50 rm / 16	12	6 / 10	3,4	16	30,0	182,0	145,0	710,0	1
38063	1 x 70 rm / 16	12	6 / 10	3,4	16	32,0	182,0	203,0	890,0	2/0
38064	1 x 95 rm / 16	12	6 / 10	3,4	16	33,0	182,0	276,0	1100,0	3/0
38065	1 x 120 rm / 16	12	6 / 10	3,4	16	34,0	182,0	348,0	1330,0	4/0
38066	1 x 150 rm / 25	12	6 / 10	3,4	25	36,0	283,0	435,0	1450,0	300 kcmil
38067	1 x 185 rm / 25	12	6 / 10	3,4	25	38,0	283,0	537,0	1580,0	350 kcmil
38068	1 x 240 rm / 25	12	6 / 10	3,4	25	40,0	283,0	696,0	1780,0	500 kcmil
38069	1 x 300 rm / 25	12	6 / 10	3,4	25	42,0	283,0	870,0	1990,0	600 kcmil
38070	1 x 400 rm / 35	12	6 / 10	3,4	35	46,0	394,0	1160,0	2320,0	750 kcmil
38071	1 x 500 rm / 35	12	6 / 10	3,4	35	49,0	394,0	1450,0	2690,0	1000 kcmil
38072	1 x 630 rm / 35	12	6 / 10	3,4	35	51,0	394,0	1827,0	3160,0	1250 kcmil
38073	1 x 50 rm / 16	24	12 / 20	5,5	16	35,0	182,0	145,0	870,0	1
38074	1 x 70 rm / 16	12	12 / 20	5,5	16	36,0	182,0	203,0	1060,0	2/0
38075	1 x 95 rm / 16	24	12 / 20	5,5	16	38,0	182,0	276,0	1280,0	3/0
38076	1 x 120 rm / 16	24	12 / 20	5,5	16	39,0	182,0	348,0	1520,0	4/0
38077	1 x 150 rm / 25	24	12 / 20	5,5	25	41,0	283,0	435,0	1650,0	300 kcmil
38077	1 x 185 rm / 25	24	12 / 20	5,5	25	43,0	283,0	537,0	1800,0	350 kcmil
38078	1 x 240 rm / 25	24	12 / 20	5,5	25	45,0	283,0	696,0	2000,0	500 kcmil
38079	1 x 300 rm / 25	24	12 / 20	5,5	25	47,0	283,0	870,0	2230,0	600 kcmil
38080	1 x 400 rm / 35	24	12 / 20	5,5	35	50,0	394,0	1160,0	2580,0	750 kcmil
38081	1 x 500 rm / 35	24	12 / 20	5,5	35	54,0	394,0	1450,0	2980,0	1000 kcmil
38082	1 x 630 rm / 35	24	6 / 10	5,5	35	55,0	394,0	1827,0	3480,0	1250 kcmil

Continuation ▶

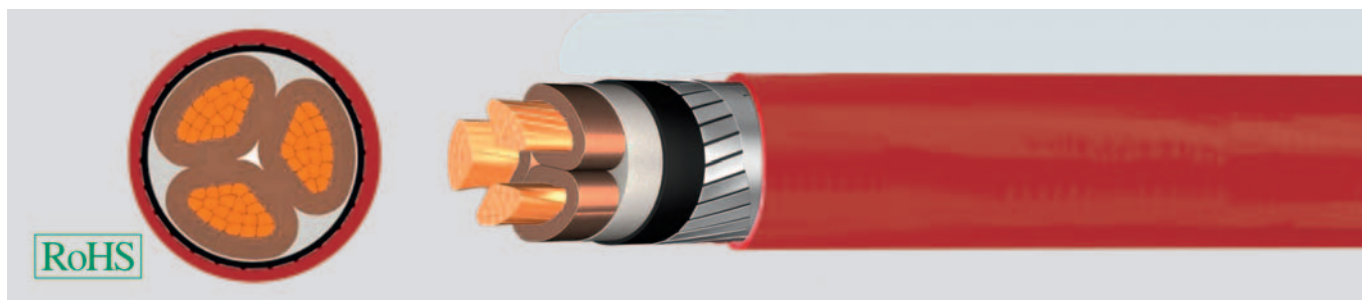
# NA2XS(FL)2Y 6/10kV, 12/20kV, 18/30kV XLPE-insulated, alu-conductor, single core, longitudinally and crosswise water-tight, screened, PE-sheath



Part no.	No. cores x cross-sec. mm <sup>2</sup>	Operation voltage max.	Nominal voltage kV	Insulation thickness mm	Screen cross-sec. mm <sup>2</sup>	Outer Ø app. mm	Cop. weight kg / km	Alu weight kg / km	Weight app. kg / km	AWG-No.
33084	1 x 50 rm / 16	36	18 / 30	8	16	39,0	182,0	145,0	1100,0	1
33085	1 x 70 rm / 16	36	18 / 30	8	16	40,0	182,0	203,0	1300,0	2/0
38083	1 x 95 rm / 16	36	18 / 30	8	16	42,0	182,0	276,0	1530,0	3/0
38084	1 x 120 rm / 16	36	18 / 30	8	16	44,0	182,0	348,0	1780,0	4/0
38085	1 x 150 rm / 25	36	18 / 30	8	25	45,0	283,0	435,0	1920,0	300 kcmil
38086	1 x 185 rm / 25	36	18 / 30	8	25	47,0	283,0	537,0	2080,0	350 kcmil
38087	1 x 240 rm / 25	36	10 / 30	8	25	49,0	283,0	696,0	2300,0	500 kcmil
38088	1 x 300 rm / 25	36	18 / 30	8	25	52,0	283,0	870,0	2550,0	600 kcmil
38089	1 x 400 rm / 35	36	18 / 30	8	35	55,0	394,0	1160,0	2960,0	750 kcmil
38090	1 x 500 rm / 35	36	18 / 30	8	35	60,0	394,0	1450,0	3380,0	1000 kcmil
38091	1 x 630 rm / 35	36	18 / 30	8	35	60,0	394,0	1827,0	3900,0	1250 kcmil

Dimensions and specifications may be changed without prior notice. (RQ03)

# NYFGY 3 x ... 3,6/6kV Flat wire sheathing, PVC-sheath



NEW

## Technical data

- Three core PVC-insulated cables to DIN VDE 0271 and IEC 60502
- **Temperature range** during installation up to -5°C
- **Operating temperature** max. +70°C
- **Short circuit temperature** (short circuit duration max. 5 s) +160°C
- **Nominal voltages**  $U_0/U$  3,6/6 kV
- **Operating voltages** max. 7,2 kV
- **Test voltages** 11 kV
- **Minimum bending radius** 15x cable  $\varnothing$

## Cable structure

- Bare copper-conductor, to DIN VDE 0295 cl.2, multi-wire, BS 6360 cl.2, IEC 60228 cl.2
- Core insulation of PVC
- 3 cores stranded
- Wrapping
- Inner sheath of PVC
- Armour of galvanized steel wires with counter helix
- Outer sheath of PVC
- Sheath colour red

## Properties

- The materials used in manufacture are cadmium-free and contain no silicone and free from substances harmful to the wetting properties of lacquers

## Tests

- self-extinguishing and flame retardant acc. to DIN VDE 0482-332-1-2, DIN EN 60332-1-2, IEC 60332-1 (equivalent DIN VDE 0472 part 804 test method B)

## Note

- sm = sectional conductor, multi-wire
- AWG sizes are approximate equivalent values. The actual cross-section is in mm<sup>2</sup>.

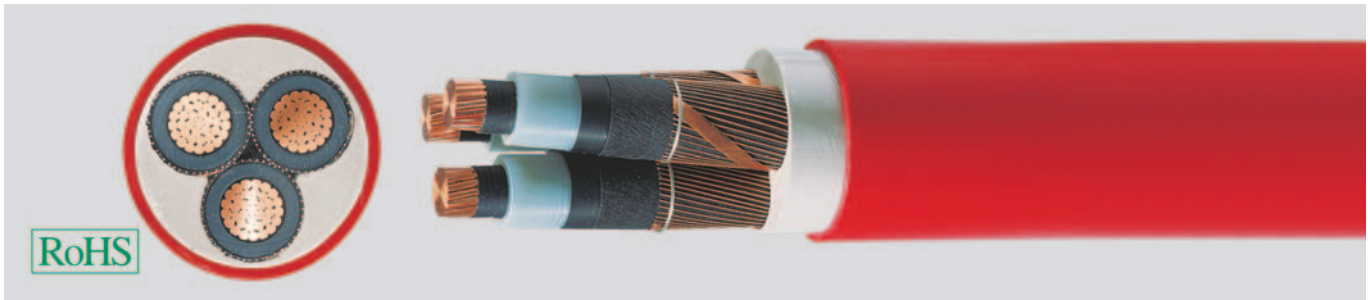
## Application

Indoors and in cable ducts, outdoors with protected laying, underground for power stations, industrial systems and switchgear, whenever increased mechanical protection is required or whenever higher drag forces are expected during assembly and operation.

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Insulation thickness mm	Sheath thickness Nominal value mm	Outer $\varnothing$ min. - max.	Cop. weight kg / km	Weight app. kg / km	AWG-No.
34187	3 x 25 sm	3,4	2,0	34,0 - 42,0	720,0	2640,0	4
34188	3 x 35 sm	3,4	2,1	36,0 - 43,0	1008,0	2680,0	2
34189	3 x 50 sm	3,4	2,2	38,0 - 46,0	1440,0	3205,0	1
34190	3 x 70 sm	3,4	2,3	41,0 - 49,0	2016,0	4085,0	2/0
34191	3 x 95 sm	3,4	2,4	45,0 - 53,0	2736,0	5060,0	3/0
34192	3 x 120 sm	3,4	2,6	48,0 - 56,0	3456,0	5950,0	4/0
34193	3 x 150 sm	3,4	2,7	51,0 - 59,0	4320,0	6930,0	300 kcmil
34194	3 x 185 sm	3,4	2,8	55,0 - 64,0	5328,0	8240,0	350 kcmil
34195	3 x 240 sm	3,4	2,9	59,0 - 68,0	6912,0	10100,0	500 kcmil

Dimensions and specifications may be changed without prior notice. (RQ03)

Q

**N2XSEY 3 x ... 6/10kV** XLPE-insulated, Cu-conductor, PVC-sheath

RoHS

**Technical data**

- Three core XLPE-insulated power cables to DIN VDE 0276 and IEC 60502
- **Temperature range** during installation up to -5°C
- **Operating temperature** max. +90°C
- **Short circuit temperature** core +250°C  
screen +350°C (duration)  
(short circuit duration max. 5 s)
- **Nominal voltages**  $U_0/U$  6/10 kV
- **Operating voltages** max. 12 kV
- **Test voltages** 15 kV
- **Test voltages d.c.** 48 kV
- **Minimum bending radius** 15x cable  $\varnothing$
- **Tests**  
acc. to DIN VDE 0276 and IEC 60502

**Cable structure**

- Bare copper-conductor, to DIN VDE 0295 cl.2, multi-wire, BS 6360 cl.2, IEC 60228 cl.2
- Inner semi-conducting coating
- Core insulation of cross-linked polyethylene (XLPE)
- Outer extrusion of semi-conducting coating spliced with the XLPE-insulation
- Conductive wrapping
- Screen: Braiding of copper wires with one or two tapes applied helically
- 3 cores stranded
- Extruded sheath over three cores
- Outer sheath of PVC compound type DMV6 to HD 620 S2
- Sheath colour red

**Properties**

- The materials used in manufacture are cadmium-free and contain no silicone and free from substances harmful to the wetting properties of lacquers

**Tests**

- self-extinguishing and flame retardant acc. to DIN VDE 0482-332-1-2, DIN EN 60332-1-2, IEC 60332-1 (equivalent DIN VDE 0472 part 804 test method B)

**Installation notes**

To guarantee an optimum on operating reliability the extruded semi-conductive layer is spliced with the insulation for long duration. For this reason we recommend a peeling tool for installation.

**Note**

- rm = round conductor, multi-wire
- AWG sizes are approximate equivalent values. The actual cross-section is in mm<sup>2</sup>.
- **For laying in earth:** For ground thermal resistivity of 1 Kxm/W, laying depth 0,7 m, ground temperature 20°C, EVU load grade 0,7.
- **For laying in air:** Air temperature 30°C, EVU load grade 1,0.
- Conversion factors for laying in earth especially for laying in bundle form and other requirements are noted in DIN VDE 0298 part 2 and 0276 part 1000.
- Conversion factors for laying in air
- Air temperature/Conversion factor  
15°C/1,12; 20°C/1,08; 25°C/1,04;  
30°C/1,0; 35°C/0,96; 35°C/0,96; 40°C/  
0,91; 45°C/0,87; 50°C/0,82;

**Application**

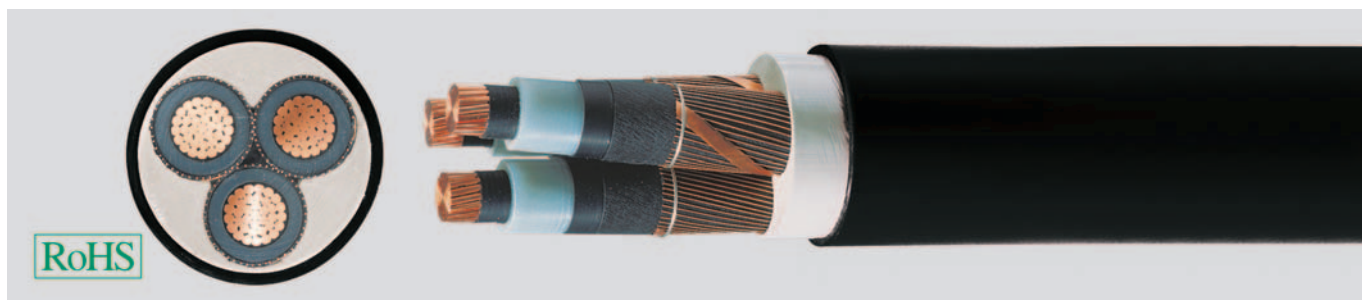
Suitable for installation in indoors and in cable ducts, outdoors with protected laying, as well as for laying on racks for industrial and switching systems and power plants. Limited use when buried in the earth if the PVC outer sheath could be damaged by high mechanical stress.

The inner conducting layer between the conductor and the XLPE insulation and the firmly bonded outer conducting layer on the XLPE insulation assures a construction free of partial discharges with high operational reliability.

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Insulation thickness mm	Screen cross-sec. mm <sup>2</sup>	Sheath thickness Nominal value mm	Outer $\varnothing$ app. mm	Cop. weight kg / km	Weight app. kg / km	AWG-No.
34339	3 x 25 rm / 16	3,4	16	2,5	43,0	1046,0	2850,0	4
34340	3 x 35 rm / 16	3,4	16	2,5	48,0	1210,0	3300,0	2
34341	3 x 50 rm / 16	3,4	16	2,5	50,0	1671,0	3750,0	1
34342	3 x 70 rm / 16	3,4	16	2,6	54,0	2250,0	4650,0	2/0
34343	3 x 95 rm / 16	3,4	16	2,8	58,0	2995,0	5700,0	3/0
34344	3 x 120 rm / 16	3,4	16	2,9	61,0	3715,0	6700,0	4/0
34345	3 x 150 rm / 25	3,4	25	3,0	65,0	4638,0	7900,0	300 kcmil
34346	3 x 185 rm / 25	3,4	25	3,1	68,0	5645,0	9200,0	350 kcmil
34347	3 x 240 rm / 25	3,4	25	3,3	74,0	7274,0	11450,0	500 kcmil
34348	3 x 300 rm / 25	3,4	25	3,3	79,0	9160,0	14450,0	600 kcmil

Dimensions and specifications may be changed without prior notice. (RQ03)

# N2XSEH 3 x ... 6/10kV XLPE-insulated, halogen-free



NEW

## Technical data

- Three core XLPE-insulated power cables to DIN VDE 0276 and IEC 60502
- **Temperature range** during installation up to -20°C
- **Operating temperature** max. +90°C
- **Short circuit temperature** core +250°C screen + 350°C (short circuit duration max. 5 s)
- **Nominal voltages**  $U_0/U$  6/10 kV
- **Operating voltages** max. 12 kV
- **Test voltages** 15 kV
- **Test voltages d.c.** 48 kV
- **Minimum bending radius** 15x cable  $\varnothing$
- **Tests** acc. to DIN VDE 0276 and IEC 60502

## Cable structure

- Bare copper-conductor, to DIN VDE 0295 cl.2, multi-wire, BS 6360 cl.2, IEC 60228 cl.2
- Inner semi-conducting coating
- Core insulation of cross-linked Polyethylene (XLPE)
- Outer extrusion of semi-conducting coating spliced with the XLPE-insulation
- Conductive wrapping
- Screen: Braiding of copper wires with one or two tapes applied helically
- 3 cores stranded
- Extruded sheath over three cores
- outer sheath halogen-free
- Sheath colour black
- LSOH = Low Smoke Zero Halogen

## Properties

- Halogen-free, no liberation of corrosive or toxic gases
- Limited propagation of fire
- Low smoke development, Ozone resistant
- **Installation notes** To guarantee an optimum on operating reliability the extruded semi-conductive layer is spliced with the insulation for long duration. For this reason we recommend a peeling tool for installation.

## Tests

- self-extinguishing and flame retardant acc. to DIN VDE 0482-332-1-2, DIN EN 60332-1-2, IEC 60332-1 (equivalent DIN VDE 0472 part 804 test method B)
- Corrosiveness of combustion gases acc. to DIN VDE 0482 part 267, DIN EN 50267-2-2, IEC 60754-2 (equivalent DIN VDE 0472 part 813)
- Halogen-free acc. to DIN VDE 0482 part 267, DIN EN 50267-2-1, IEC 60754-1 (equivalent DIN VDE 0472 part 815)
- Smoke density acc. to DIN VDE 0482 part 1034-1+2, DIN EN 61034-1+2, IEC 61034-1+2, BS 7622 part 1+2 (previously DIN VDE 0472 part 816)

## Note

- rm = round conductor, multi-wire
- AWG sizes are approximate equivalent values. The actual cross-section is in mm<sup>2</sup>.

## Application

Suitable for installation in indoors and in cable ducts, outdoors as well as for laying on racks for industrial and switching systems and power plants. Limited use when buried in the earth if the outer sheath could be damaged by high mechanical stress.

The inner conducting layer between the conductor and the XLPE insulation and the firmly bonded outer conducting layer on the XLPE insulation assures a construction free of partial discharges with high operational reliability.

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Insulation thickness mm	Screen cross-sec. mm <sup>2</sup>	Sheath thickness Nominal value mm	Outer $\varnothing$ app. mm	Cop. weight kg / km	Weight app. kg / km	AWG-No.
38041	3 x 50 rm / 16	3,4	16	2,5	50,0	1670,0	3800,0	1
38042	3 x 70 rm / 16	3,4	16	2,5	54,0	2250,0	4650,0	2/0
38043	3 x 95 rm / 16	3,4	16	2,5	58,0	2995,0	5700,0	3/0
38044	3 x 120 rm / 16	3,4	16	2,5	61,0	3715,0	6800,0	4/0
38045	3 x 150 rm / 25	3,4	25	2,5	65,0	4635,0	7900,0	300 kcmil
38046	3 x 185 rm / 25	3,4	25	2,5	68,0	5645,0	9350,0	350 kcmil
38047	3 x 240 rm / 25	3,4	25	2,5	74,0	7274,0	11450,0	500 kcmil

Dimensions and specifications may be changed without prior notice. (RQ03)





## ■ DATA, NETWORK & BUS TECHNOLOGY

Fiber optic cables 606

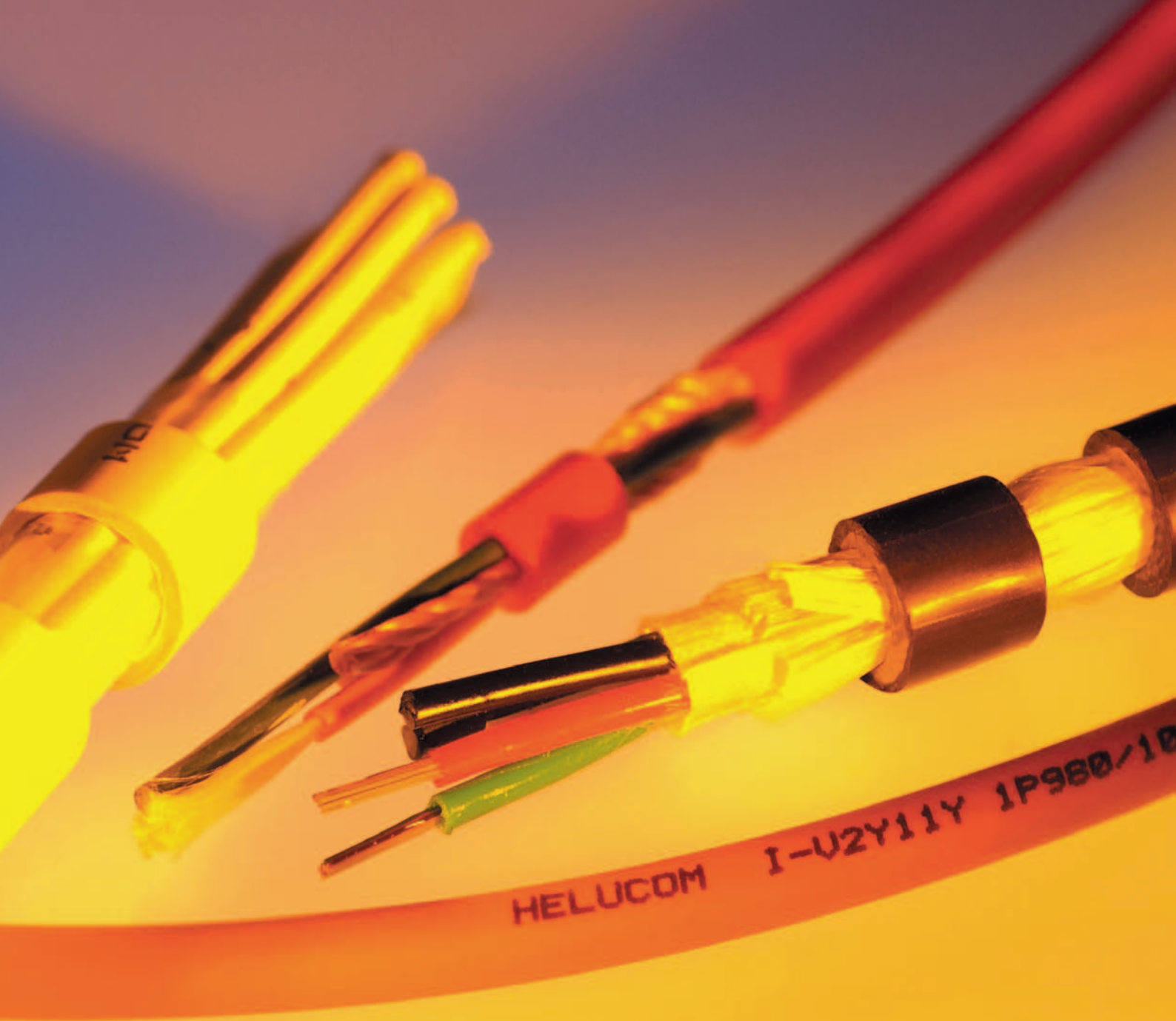
---

Copper data cables 652

---

BUS cables 684

---



Fibre Optic Cable flexible

Plastic-fibre cable industry

Fibre Optic Indoor Cable I-VH

Fibre Optic Cable with Functionality A-DQ(ZN)BH E30

**Fibre Optic Breakout-Cable I-V(ZN)HH**


Fibre Optic Indoor/Outdoor Cable A/I-VQ(ZN)BH

**Aerial Fibre Optic Cable metall free ADSS**

**Fibre Optic Outdoor Cable A-DQ(ZN)2Y, stranded**



# ■ FIBER OPTIC CABLES HELUCOM®

Designation	Drag chain capability	Page
Fiber optic installation cable I-VH, I-V11Y, I-VHH, I-V11Y11Y		608
Fiber optic breakout cable I-V(ZN)HH		609
Fiber optic mini-breakout cable I-V(ZN)H		610
LWK indoor cable loose tube I-D(ZN)H		611
Fiber optic universal mini-breakout cable A/I-VQ(ZN)BH		612
HELUCOM® pact fiber optic universal cable A/IDQ(ZN)BH		613
HELUCOM® pact fiber optic universal cable A/IDQ(ZN)BH OM3 + OM4		614
Fiber optic universal cable A/I-DQ(ZN)BH central		615
Fiber optic universal cable A/I-DQ(ZN)BH stranded		616
Fiber optic with functionality A-DQ(ZN)BH E30		617
Fiber optic cable with functionality A/I-D(ZN)BH(SR)H FS90		618
Fiber optic outdoor cable A-DQ(ZN)2Y, central		619
Fiber optic outdoor cable A-DQ(ZN)2Y, stranded		620
HELUCOM® pact fiber optic outdoor cable A-DQ(ZN)B2Y, central		621
Fiber optic outdoor cable A-DQ(ZN)B2Y, central		622
Fiber optic outdoor A-DQ(ZN)B2Y; stranded		623
Fiber optic outdoor cable HELUCOM® pact A-DQ(ZN)B2Y fiber combination		624
Fiber optic outdoor cable HELUCOM® A-DQ(ZN)B2Y, fibre combination, stranded		625
Fiber optic outdoor cable A-DF(ZN)2Y		626
Fiber optic outdoor cable A-DF(ZN)B2Y		627
Fiber optic outdoor cable A-DF(ZN)2Y4Y		628
Fiber optic outdoor cable Micro A-DQ2Y, central		629
Fiber optic outdoor cable Micro A-DQ2Y, stranded		630
Fiber optic outdoor cable A-DQ(ZN)SR2Y		631
Fiber optic outdoor cable A-DF(ZN)2Y(SR)2Y		632
Fiber optic outdoor cable hybrid A-DSQ(ZN)B2Y		633
Fiber optic outdoor cable hybrid A-DSF(L)(ZN)2Y		634
Fiber optic overhead cable metal-free ADSS		635
Fiber optic cable mobile, easy-to-wind A-V(ZN)11Y		636
Fiber optic cable mobile, flexible A-V(ZN)YY		637
Fiber optic cable flexible AT-V(ZN)H(ZN)11Y, AT-V(ZN)Y(ZN)Y		638
Fiber optic cable flexible AT-V(ZN)YY		639
Fiber optic cable outdoor apportionable AT-V(ZN)HH(BN)2Y		640
Fiber optic cable industry AT-VYY		641
Fiber optic cable industry HCS I-VH, I-VHH		642
Fiber optic breakout cable industry HCS AT-V(ZN)HH		643
Fiber optic breakout cable industry HCS I-V(ZN)YY		644
Fiber optic breakout cable industry HCS I-V(ZN)Y11Y		645
Fiber optic breakout cable industry HCS AT-VQH(ZN)B2Y		646
Fiber optic universal cable industry HCS A/IDQ(ZN)BH		647
Plastic fiber cable industry I-V2Y, I-V2Y(ZN)11Y		648
Plastic fiber cable industry I-V4Y(ZN)11Y		649

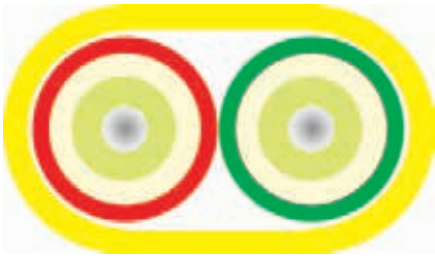
R

# Fibre Optic Indoor Cable

acc. DIN VDE 0888

HELUCOM®

I-VH, I-V11Y, I-VHH, I-V11Y11Y



## Cable structure

Core type: Composite buffered  
Strain relief elements: Aramide  
Outer sheath material: FRNC  
Outer sheath colour: Yellow

## Temperature range

Laying, min.: 0°C  
Laying, max.: +50°C  
Operating, min.: 0°C  
Operating, max.: +60°C

## Other data

Corrosiveness acc. to EN50267-2-3  
Halogen-free acc. to 60754-2  
Flame-resistance acc. to IEC 60332-1  
Smoke density acc. to IEC 61034

Designation	No. of fibres	Fibre type	Fibre category	Outer Ø app. mm	Max. tensile force N	Min. stat. bending radius mm	Caloric load app. MJ / m	Max. transverse pressure N / cm	Weight kg / km	Part no.
I-VH	1	Multimode G50/125	OM2	2,6	300	40	0,17	10	8,7	<b>80783</b>
I-VH	1	Multimode G62.5/125	OM1	2,6	300	40	0,17	10	8,7	<b>80782</b>
I-VH	1	Single-mode E9/125	ITU-T G.652	2,6	300	40	0,17	10	8,7	<b>80784</b>
I-VH	2	Multimode G50/125	OM2	2,6 x 5,6	400	40	0,24	10	17,5	<b>80316</b>
I-VH	2	Multimode G50/125	OM3	2,6 x 5,6	400	40	0,24	10	17,5	<b>804256</b>
I-VH	2	Multimode G62.5/125	OM1	2,6 x 5,6	400	40	0,24	10	17,5	<b>80699</b>
I-VH	2	Single-mode E9/125	ITU-T G.652	2,6 x 5,6	400	40	0,24	10	17,5	<b>80785</b>
I-V11Y	2	Multimode G50/125	OM2	2,6 x 5,6	400	40	2,80	20	14,0	<b>82408</b>
I-V11Y	2	Multimode G62.5/125	OM1	2,6 x 5,6	400	40	2,80	20	14,0	<b>82410</b>
I-V11Y	2	Single-mode E9/125	ITU-T G.652	2,6 x 5,6	400	40	2,80	20	14,0	<b>82411</b>
I-VHH	2	Multimode G50/125	OM2	3,6 x 6,2	600	50	0,57	20	20,0	<b>80789</b>
I-VHH	2	Multimode G50/125	OM3	3,6 x 6,2	600	50	0,57	20	20,0	<b>804254</b>
I-VHH	2	Multimode G62.5/125	OM1	3,6 x 6,2	600	50	0,57	20	20,0	<b>80790</b>
I-VHH	2	Single-mode E9/125	ITU-T G.652	3,6 x 6,2	600	50	0,57	20	20,0	<b>80791</b>
I-V11Y11Y	2	Multimode G50/125	OM2	3,6 x 6,2	600	60	4,20	20	16,0	<b>82409</b>
I-V11Y11Y	2	Multimode G62.5/125	OM1	3,6 x 6,2	600	60	4,20	20	16,0	<b>81900</b>
I-V11Y11Y	2	Single-mode E9/125	ITU-T G.652	3,6 x 6,2	600	60	4,20	20	16,0	<b>82412</b>

Dimensions and specifications may be changed without prior notice.

## Application

These HELUCOM® one-fibre and two-fibre (duplex) cables are used for fixed indoor installation, such as in cable ducts. These cables are also used as ready-made cables (pigtailed) that are spliced to fixed cables or as connection cables (jumper cable) as well as for switch frames. The small diameter and the high flexibility make these cables ideal for the application in switch frames as well as for the connection of terminals.



# Fibre Optic Breakout-Cable

acc. DIN VDE 0888

HELUCOM®

I-V(ZN)HH



## Cable structure

Core type: Composite buffered  
Strain relief elements: Aramide  
Outer sheath material: FRNC  
Outer sheath colour: Yellow

## Temperature range

Laying, min.: 0°C  
Laying, max.: +50°C  
Operating, min.: 0°C  
Operating, max.: +60°C

## Other data

Corrosiveness acc. to EN50267-2-3  
Halogen-free acc. to 60754-2  
Flame-resistance acc. to IEC 60332-1 and IEC 60332-3  
Smoke density acc. to IEC 61034

Designation	No. of fibres	Fibre type	Fibre category	Number of fibres per core	Outer Ø app. mm	Max. tensile force N	Min. stat. bending radius mm	Caloric load app. MJ / m	Max. transverse pressure N / cm	Weight kg / km	Part no.
I-V(ZN)HH	2	Multimode G50/125	OM2	1	7,1	1000	270,0	1,00	150	40,0	<b>80743</b>
I-V(ZN)HH	2	Multimode G62.5/125	OM1	1	7,1	1000	270,0	1,00	150	40,0	<b>80799</b>
I-V(ZN)HH	2	Single-mode E9/125	ITU-T G.652	1	7,1	1000	270,0	1,00	150	40,0	<b>80813</b>
I-V(ZN)HH	4	Multimode G50/125	OM2	1	7,1	1000	270,0	1,00	150	45,0	<b>80753</b>
I-V(ZN)HH	4	Multimode G62.5/125	OM1	1	7,1	1000	270,0	1,00	150	45,0	<b>80800</b>
I-V(ZN)HH	4	Single-mode E9/125	ITU-T G.652	1	7,1	1000	270,0	1,00	150	45,0	<b>80814</b>
I-V(ZN)HH	6	Multimode G50/125	OM2	1	8,4	1350	270,0	1,25	150	70,0	<b>80754</b>
I-V(ZN)HH	6	Multimode G62.5/125	OM1	1	8,4	1350	270,0	1,25	150	70,0	<b>80769</b>
I-V(ZN)HH	6	Single-mode E9/125	ITU-T G.652	1	8,4	1350	270,0	1,25	150	70,0	<b>80815</b>
I-V(ZN)HH	8	Multimode G50/125	OM2	1	9,3	1500	270,0	1,50	150	100,0	<b>80688</b>
I-V(ZN)HH	8	Multimode G62.5/125	OM1	1	9,3	1500	270,0	1,50	150	100,0	<b>80801</b>
I-V(ZN)HH	8	Single-mode E9/125	ITU-T G.652	1	9,3	1500	270,0	1,50	150	100,0	<b>80816</b>
I-V(ZN)HH	12	Multimode G50/125	OM2	1	9,6	2350	270,0	1,85	150	165,0	<b>80795</b>
I-V(ZN)HH	12	Multimode G62.5/125	OM1	1	9,6	2350	270,0	1,85	150	165,0	<b>80803</b>
I-V(ZN)HH	12	Single-mode E9/125	ITU-T G.652	1	9,6	2350	270,0	1,85	150	165,0	<b>80818</b>
I-V(ZN)HH	16	Multimode G50/125	OM2	1	15,0	2400	270,0	2,40	150	170,0	<b>80796</b>
I-V(ZN)HH	16	Multimode G62.5/125	OM1	1	15,0	2400	270,0	2,40	150	170,0	<b>80804</b>
I-V(ZN)HH	16	Single-mode E9/125	ITU-T G.652	1	15,0	2400	270,0	2,40	150	170,0	<b>80819</b>
I-V(ZN)HH	24	Multimode G50/125	OM2	1	17,5	2400	330,0	3,20	150	220,0	<b>80798</b>
I-V(ZN)HH	24	Multimode G62.5/125	OM1	1	17,5	2400	330,0	3,20	150	220,0	<b>80806</b>
I-V(ZN)HH	24	Single-mode E9/125	ITU-T G.652	1	17,5	2400	320,0	3,20	150	220,0	<b>80821</b>

Dimensions and specifications may be changed without prior notice.

## Application

HELUCOM® breakout cables are designed to replace splicing on-site. They are mainly used in indoor applications for small and medium transmission lines. The fibre-optic connectors are mounted directly to the individual cables. Therefore no splicing and no splice boxes are necessary. Pre-assembled cables only need to be laid on site and are immediately functional.

R

# Fibre Optic Minibreakout Cable

acc. DIN VDE 0888

HELUCOM®

I-V(ZN)H



## Cable structure

Core type: Tight buffer  
 Strain relief elements: Aramide  
 Outer sheath material: FRNC  
 Outer sheath colour: Orange

## Temperature range

Laying, min.: -5°C  
 Laying, max.: +50°C  
 Operating, min.: -10°C  
 Operating, max.: +60°C

## Other data

Corrosiveness acc. to EN50267-2-3  
 Halogen-free acc. to 60754-2  
 Flame-resistance acc. to IEC 60332-1  
 Smoke density acc. to IEC 61034

Designation	No. of fibres	Fibre type	Fibre category	Number of fibres per core	Outer Ø app. mm	Max. tensile force N	Min. stat. bending radius mm	Caloric load app. MJ / m	Max. transverse pressure N / cm	Weight kg / km	Part no.
I-V(ZN)H	2	Multimode G50/125	OM2	1	4,0	400	60,0	0,24	40	15,0	<b>80435</b>
I-V(ZN)H	2	Multimode G62.5/125	OM1	1	4,0	400	60,0	0,24	40	15,0	<b>80434</b>
I-V(ZN)H	2	Single-mode E9/125	ITU-T G.652	1	4,0	400	60,0	0,24	40	15,0	<b>80433</b>
I-V(ZN)H	4	Multimode G50/125	OM2	1	4,8	400	70,0	0,31	40	19,0	<b>80432</b>
I-V(ZN)H	4	Multimode G62.5/125	OM1	1	4,8	400	70,0	0,31	40	19,0	<b>80431</b>
I-V(ZN)H	4	Single-mode E9/125	ITU-T G.652	1	4,8	400	70,0	0,31	40	19,0	<b>80430</b>
I-V(ZN)H	6	Multimode G50/125	OM2	1	5,3	400	80,0	0,35	40	23,0	<b>80429</b>
I-V(ZN)H	6	Multimode G62.5/125	OM1	1	5,3	400	80,0	0,35	40	23,0	<b>80428</b>
I-V(ZN)H	6	Single-mode E9/125	ITU-T G.652	1	5,3	400	80,0	0,35	40	23,0	<b>80427</b>
I-V(ZN)H	8	Multimode G50/125	OM2	1	5,3	500	80,0	0,40	40	25,0	<b>80426</b>
I-V(ZN)H	8	Multimode G62.5/125	OM1	1	5,3	500	80,0	0,40	40	25,0	<b>80425</b>
I-V(ZN)H	8	Single-mode E9/125	ITU-T G.652	1	5,3	500	80,0	0,40	40	25,0	<b>80424</b>
I-V(ZN)H	10	Multimode G50/125	OM2	1	6,0	600	90,0	0,53	40	32,0	<b>80423</b>
I-V(ZN)H	10	Multimode G62.5/125	OM1	1	6,0	600	90,0	0,53	40	32,0	<b>80422</b>
I-V(ZN)H	10	Single-mode E9/125	ITU-T G.652	1	6,0	600	90,0	0,53	40	32,0	<b>80421</b>
I-V(ZN)H	12	Multimode G50/125	OM2	1	7,0	800	110,0	0,61	40	40,0	<b>80420</b>
I-V(ZN)H	12	Multimode G62.5/125	OM1	1	7,0	800	110,0	0,61	40	40,0	<b>80419</b>
I-V(ZN)H	12	Single-mode E9/125	ITU-T G.652	1	7,0	800	110,0	0,61	40	40,0	<b>80418</b>

Dimensions and specifications may be changed without prior notice.

## Application

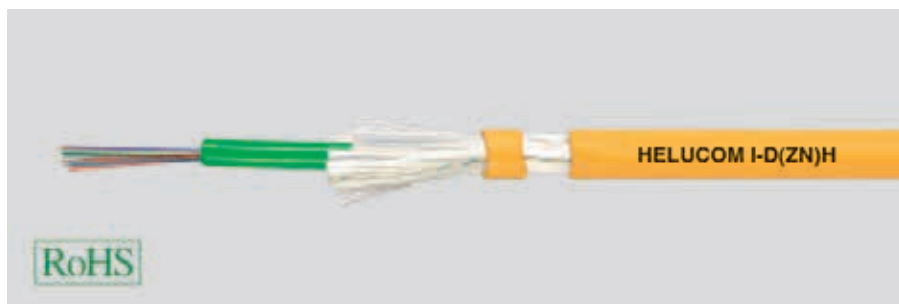
These HELUCOM® fibre-optic cables are used for the data network cabling in indoor applications. A big advantage of this cable type is its space-saving construction. Similar to the breakout cable, the connector is directly mounted at the tight buffer.

# Fibre Optic Indoor Cable

acc. DIN VDE 0888

HELUCOM®

I-D(ZN)H



## Cable structure

Core type: Loose tube  
Strain relief elements: Aramide  
Outer sheath material: FRNC  
Outer sheath colour: Yellow

## Temperature range

Laying, min.: -5°C  
Laying, max.: +50°C  
Operating, min.: -20°C  
Operating, max.: +60°C

## Other data

Corrosiveness acc. to EN50267-2-3  
Halogen-free acc. to 60754-2  
Flame-resistance acc. to IEC 60332-1  
Smoke density acc. to IEC 61034

Designation	No. of fibres	Fibre type	Fibre category	Number of fibres per core	Outer Ø app. mm	Max. tensile force N	Min. stat. bending radius mm	Caloric load app. MJ / m	Max. transverse pressure N / cm	Weight kg / km	Part no.
I-D(ZN)H	4	Multimode G50/125	OM2	4	8,0	1200	120,0	1,50	150	65,0	<b>80631</b>
I-D(ZN)H	4	Multimode G62.5/125	OM1	4	8,0	1200	120,0	1,50	150	65,0	<b>80882</b>
I-D(ZN)H	4	Single-mode E9/125	ITU-T G.652	4	8,0	1200	120,0	1,50	150	65,0	<b>80896</b>
I-D(ZN)H	6	Multimode G50/125	OM2	6	8,0	1200	120,0	1,50	150	65,0	<b>80868</b>
I-D(ZN)H	6	Multimode G62.5/125	OM1	6	8,0	1200	120,0	1,50	150	65,0	<b>80883</b>
I-D(ZN)H	6	Single-mode E9/125	ITU-T G.652	6	8,0	1200	120,0	1,50	150	65,0	<b>80897</b>
I-D(ZN)H	8	Multimode G50/125	OM2	8	8,0	1200	120,0	1,50	150	65,0	<b>80869</b>
I-D(ZN)H	8	Multimode G62.5/125	OM1	8	8,0	1200	120,0	1,50	150	65,0	<b>80884</b>
I-D(ZN)H	8	Single-mode E9/125	ITU-T G.652	8	8,0	1200	120,0	1,50	150	65,0	<b>80898</b>
I-D(ZN)H	10	Multimode G50/125	OM2	10	8,0	1200	120,0	1,50	150	65,0	<b>80793</b>
I-D(ZN)H	10	Multimode G62.5/125	OM1	10	8,0	1200	120,0	1,50	150	65,0	<b>80885</b>
I-D(ZN)H	10	Single-mode E9/125	ITU-T G.652	10	8,0	1200	120,0	1,50	150	65,0	<b>80899</b>
I-D(ZN)H	12	Multimode G50/125	OM2	12	8,0	1200	120,0	1,50	150	65,0	<b>80045</b>
I-D(ZN)H	12	Multimode G62.5/125	OM1	12	8,0	1200	120,0	1,50	150	65,0	<b>80879</b>
I-D(ZN)H	12	Single-mode E9/125	ITU-T G.652	12	8,0	1200	120,0	1,50	150	65,0	<b>80880</b>
I-D(ZN)H	16	Multimode G50/125	OM2	16	8,0	1200	120,0	1,50	150	135,0	<b>80870</b>
I-D(ZN)H	16	Multimode G62.5/125	OM1	16	8,0	1200	120,0	1,50	150	135,0	<b>80886</b>
I-D(ZN)H	16	Single-mode E9/125	ITU-T G.652	16	8,0	1200	120,0	1,50	150	135,0	<b>80900</b>
I-D(ZN)H	24	Multimode G50/125	OM2	12	12,5	3000	190,0	2,20	200	150,0	<b>80872</b>
I-D(ZN)H	24	Multimode G50/125	OM2	24	9,0	1600	140,0	1,50	150	135,0	<b>80871</b>
I-D(ZN)H	24	Multimode G62.5/125	OM1	12	12,5	3000	190,0	2,20	200	150,0	<b>80888</b>
I-D(ZN)H	24	Multimode G62.5/125	OM1	24	9,0	1600	140,0	1,50	150	135,0	<b>81246</b>
I-D(ZN)H	24	Single-mode E9/125	ITU-T G.652	12	12,5	3000	190,0	2,20	200	150,0	<b>80902</b>
I-D(ZN)H	24	Single-mode E9/125	ITU-T G.652	24	9,0	1600	140,0	1,50	150	135,0	<b>80901</b>
I-D(ZN)H	36	Multimode G50/125	OM2	12	13,5	3000	200,0	2,20	200	160,0	<b>80875</b>
I-D(ZN)H	36	Multimode G62.5/125	OM1	12	13,5	3000	200,0	2,20	200	160,0	<b>80891</b>
I-D(ZN)H	36	Single-mode E9/125	ITU-T G.652	12	13,5	3000	200,0	2,20	200	160,0	<b>80905</b>
I-D(ZN)H	48	Multimode G50/125	OM2	12	13,5	3000	200,0	2,20	200	160,0	<b>80877</b>
I-D(ZN)H	48	Multimode G62.5/125	OM1	12	13,5	3000	200,0	2,20	200	160,0	<b>80893</b>
I-D(ZN)H	48	Single-mode E9/125	ITU-T G.652	12	13,5	3000	200,0	2,20	200	160,0	<b>80907</b>
I-D(ZN)H	60	Multimode G50/125	OM2	12	13,5	3000	200,0	2,20	200	170,0	<b>80878</b>
I-D(ZN)H	60	Multimode G62.5/125	OM1	12	13,5	3000	200,0	2,20	200	170,0	<b>80894</b>
I-D(ZN)H	60	Single-mode E9/125	ITU-T G.652	12	13,5	3000	200,0	2,20	200	170,0	<b>80908</b>

Dimensions and specifications may be changed without prior notice.

## Application

These HELUCOM® fibre-optic cables are available either as central bundle core cable or as stranded versions. They are suitable for indoor cabling of buildings and facilities. The halogen-free version is especially suitable for the application in skyscrapers, hospitals and stores as well as in facilities with high concentration of capital goods, such as power plants, computing centers, and at locations with high security requirements, such as underground and control stations.

# Fibre Optic Indoor/Outdoor Minibreakout Cable

acc. DIN VDE 0888

**HELUCOM®**  
A/I-VQ(ZN)BH


## Cable structure

Core type: Tight buffer  
Strain relief elements: Aramide  
Type of armouring: Glass yarns  
Outer sheath material: FRNC  
Outer sheath colour: Black

## Temperature range

Laying, min.: -5°C  
Laying, max.: +50°C  
Operating, min.: -20°C  
Operating, max.: +55°C

## Other data

Corrosiveness acc. to EN50267-2-3  
Halogen-free acc. to 60754-2  
Flame-resistance acc. to IEC 60332-1  
Smoke density acc. to IEC 61034  
UV-resistant

Designation	No. of fibres	Fibre type	Fibre category	Number of fibres per core	Outer Ø app. mm	Max. tensile force N	Min. stat. bending radius mm	Caloric load app. MJ / m	Max. transverse pressure N / cm	Weight kg / km	Part no.
A/I-VQ(ZN)BH	4	Multimode G50/125	OM2	1	6,1	2000	90,0	0,35	40	40,0	<b>82804</b>
A/I-VQ(ZN)BH	4	Multimode G62.5/125	OM1	1	6,1	2000	90,0	0,35	40	40,0	<b>82809</b>
A/I-VQ(ZN)BH	4	Single-mode E9/125	ITU-T G.652	1	6,1	2000	90,0	0,35	40	40,0	<b>82814</b>
A/I-VQ(ZN)BH	6	Multimode G50/125	OM2	1	6,6	2000	100,0	0,41	40	47,0	<b>82805</b>
A/I-VQ(ZN)BH	6	Multimode G62.5/125	OM1	1	6,6	2000	100,0	0,41	40	47,0	<b>82810</b>
A/I-VQ(ZN)BH	6	Single-mode E9/125	ITU-T G.652	1	6,6	2000	100,0	0,41	40	47,0	<b>82815</b>
A/I-VQ(ZN)BH	8	Multimode G50/125	OM2	1	6,6	2000	100,0	0,43	40	51,0	<b>82806</b>
A/I-VQ(ZN)BH	8	Multimode G62.5/125	OM1	1	6,6	2000	100,0	0,43	40	51,0	<b>82811</b>
A/I-VQ(ZN)BH	8	Single-mode E9/125	ITU-T G.652	1	6,6	2000	100,0	0,43	40	51,0	<b>82816</b>
A/I-VQ(ZN)BH	10	Multimode G50/125	OM2	1	8,0	2000	120,0	0,61	40	65,0	<b>82807</b>
A/I-VQ(ZN)BH	10	Multimode G62.5/125	OM1	1	8,0	2000	120,0	0,61	40	65,0	<b>82812</b>
A/I-VQ(ZN)BH	10	Single-mode E9/125	ITU-T G.652	1	8,0	2000	120,0	0,61	40	65,0	<b>82817</b>
A/I-VQ(ZN)BH	12	Multimode G50/125	OM2	1	8,3	3000	125,0	0,71	40	70,0	<b>82808</b>
A/I-VQ(ZN)BH	12	Multimode G62.5/125	OM1	1	8,3	3000	125,0	0,71	40	70,0	<b>82813</b>
A/I-VQ(ZN)BH	12	Single-mode E9/125	ITU-T G.652	1	8,3	3000	125,0	0,71	40	70,0	<b>82818</b>

Dimensions and specifications may be changed without prior notice.

## Application

These HELUCOM® fibre-optic cables are used for the data network cabling in indoor and outdoor applications. With their black UV-resistant outer sheath and the non-metallic rodent protection, they are perfectly suited for outdoor use. A big advantage of this cable type is its space-saving construction. Similar to the breakout cable, the connector is directly mounted at the tight buffer.

# Fibre Optic Indoor/Outdoor Cable

acc. DIN VDE 0888

**HELUCOM<sup>®</sup> pact**  
 A/I-DQ(ZN)BH


## Cable structure

Core type: Loose tube  
 Strain relief elements: Glass yarns  
 Type of armouring: Glass yarns  
 Outer sheath material: FRNC  
 Outer sheath colour: Black

## Temperature range

Laying, min.: -5°C  
 Laying, max.: +50°C  
 Operating, min.: -20°C  
 Operating, max.: +60°C

## Other data

Corrosiveness acc. to EN50267-2-3  
 Halogen-free acc. to 60754-2  
 Flame-resistance acc. to IEC 60332-1  
 Smoke density acc. to IEC 61034  
 Longitudinally water-tight acc. to IEC 60794-1-2-F5  
 UV-resistant

Designation	No. of fibres	Fibre type	Fibre category	Number of fibres per core	Outer Ø app. mm	Max. tensile force N	Min. stat. bending radius mm	Caloric load app. MJ / m	Max. transverse pressure N / cm	Weight kg / km	Part no.
A/I-DQ(ZN)BH	4	Multimode G50/125	OM2	4	7,5	1500	150,0	1,10	200	55,0	<b>82792</b>
A/I-DQ(ZN)BH	4	Multimode G62.5/125	OM1	4	7,5	1500	150,0	1,10	200	55,0	<b>82796</b>
A/I-DQ(ZN)BH	4	Single-mode E9/125	ITU-T G.652	4	7,5	1500	150,0	1,10	200	55,0	<b>82800</b>
A/I-DQ(ZN)BH	6	Multimode G50/125	OM2	6	7,5	1500	150,0	1,10	200	55,0	<b>82793</b>
A/I-DQ(ZN)BH	6	Multimode G62.5/125	OM1	6	7,5	1500	150,0	1,10	200	55,0	<b>82797</b>
A/I-DQ(ZN)BH	6	Single-mode E9/125	ITU-T G.652	6	7,5	1500	150,0	1,10	200	55,0	<b>82801</b>
A/I-DQ(ZN)BH	8	Multimode G50/125	OM2	8	7,5	1500	150,0	1,10	200	55,0	<b>82794</b>
A/I-DQ(ZN)BH	8	Multimode G62.5/125	OM1	8	7,5	1500	150,0	1,10	200	55,0	<b>82798</b>
A/I-DQ(ZN)BH	8	Single-mode E9/125	ITU-T G.652	8	7,5	1500	150,0	1,10	200	55,0	<b>82802</b>
A/I-DQ(ZN)BH	12	Multimode G50/125	OM2	12	7,5	1500	150,0	1,10	200	55,0	<b>82795</b>
A/I-DQ(ZN)BH	12	Multimode G62.5/125	OM1	12	7,5	1500	150,0	1,10	200	55,0	<b>82799</b>
A/I-DQ(ZN)BH	12	Single-mode E9/125	ITU-T G.652	12	7,5	1500	150,0	1,10	200	55,0	<b>82803</b>
A/I-DQ(ZN)BH	24	Multimode G50/125	OM2	24	8,5	1500	170,0	1,40	200	75,0	<b>802143</b>
A/I-DQ(ZN)BH	24	Multimode G62.5/125	OM1	24	8,5	1500	170,0	1,40	200	75,0	<b>802144</b>
A/I-DQ(ZN)BH	24	Single-mode E9/125	ITU-T G.652	24	8,5	1500	170,0	1,40	200	75,0	<b>802145</b>

Dimensions and specifications may be changed without prior notice.

## Application

These HELUCOM<sup>®</sup> pact fibre-optic cables have a small but robust construction. They are suitable for indoor and outdoor cabling of buildings and facilities when space is an important argument. They are used in particular if the installation is to be done in one piece from the inside to the outside without additional use of couplings. With their black UV-resistant outer sheath and the non-metallic rodent protection, they are perfectly suited for outdoor use. The halogen-free outer sheath makes installation inhouse possible without any problems.

R



# Fibre Optic Indoor/Outdoor Cable

acc. DIN VDE 0888

**HELUCOM<sup>®</sup> pact**

A/I-DQ(ZN)BH OM3+OM4



## Cable structure

Core type: Loose tube  
 Strain relief elements: Glass yarns  
 Type of armouring: Glass yarns  
 Outer sheath material: FRNC  
 Outer sheath colour: Black

## Temperature range

Laying, min.: -5°C  
 Laying, max.: +50°C  
 Operating, min.: -20°C  
 Operating, max.: +60°C

## Other data

Corrosiveness acc. to EN50267-2-3  
 Halogen-free acc. to 60754-2  
 Flame-resistance acc. to IEC 60332-1  
 Smoke density acc. to IEC 61034  
 Longitudinally water-tight acc. to IEC 60794-1-2-F5  
 UV-resistant

Designation	No. of fibres	Fibre type	Fibre category	Number of fibres per core	Outer Ø app. mm	Max. tensile force N	Min. stat. bending radius mm	Caloric load app. MJ / m	Max. transverse pressure N / cm	Weight kg / km	Part no.
A/I-DQ(ZN)BH	4	Multimode G50/125	OM3	4	7,5	1500	150,0	1,10	200	55,0	<b>802247</b>
A/I-DQ(ZN)BH	6	Multimode G50/125	OM3	6	7,5	1500	150,0	1,10	200	55,0	<b>802277</b>
A/I-DQ(ZN)BH	8	Multimode G50/125	OM3	8	7,5	1500	150,0	1,10	200	55,0	<b>802278</b>
A/I-DQ(ZN)BH	12	Multimode G50/125	OM3	12	7,5	1500	150,0	1,10	200	55,0	<b>802248</b>
A/I-DQ(ZN)BH	24	Multimode G50/125	OM3	24	8,5	1500	170,0	1,40	200	75,0	<b>802249</b>
A/I-DQ(ZN)BH	12	Multimode G50/125	OM4	12	7,5	1500	150,0	1,10	200	55,0	<b>804705</b>
A/I-DQ(ZN)BH	24	Multimode G50/125	OM4	24	8,5	1500	170,0	1,40	200	75,0	<b>804706</b>

Dimensions and specifications may be changed without prior notice.

## Application

These HELUCOM<sup>®</sup> pact fibre-optic cables have a small but robust construction. They are suitable for indoor and outdoor cabling of buildings and facilities when space is an important argument. They are used in particular if the installation is to be done in one piece from the inside to the outside without additional use of couplings. With their black UV-resistant outer sheath and the non-metallic rodent protection, they are perfectly suited for outdoor use. The halogen-free outer sheath makes installation inhouse possible without any problems.

# Fibre Optic Indoor/Outdoor Cable

acc. DIN VDE 0888

**HELUCOM®**

A/I-DQ(ZN)BH, central



## Cable structure

Core type: Loose tube  
 Strain relief elements: Glass yarns  
 Type of armouring: Glass yarns  
 Outer sheath material: FRNC  
 Outer sheath colour: Black

## Temperature range

Laying, min.: -5°C  
 Laying, max.: +50°C  
 Operating, min.: -20°C  
 Operating, max.: +60°C

## Other data

Corrosiveness acc. to EN50267-2-3  
 Halogen-free acc. to 60754-2  
 Flame-resistance acc. to IEC 60332-1  
 Smoke density acc. to IEC 61034  
 Longitudinally water-tight acc. to IEC 60794-1-2-F5  
 UV-resistant

Designation	No. of fibres	Fibre type	Fibre category	Number of fibres per core	Outer Ø app. mm	Max. tensile force N	Min. stat. bending radius mm	Caloric load app. MJ / m	Max. transverse pressure N / cm	Weight kg / km	Part no.
A/I-DQ(ZN)BH	4	Multimode G50/125	OM2	4	10,0	2500	150,0	1,50	300	75,0	<b>80270</b>
A/I-DQ(ZN)BH	4	Multimode G62.5/125	OM1	4	10,0	2500	150,0	1,50	300	75,0	<b>80276</b>
A/I-DQ(ZN)BH	4	Single-mode E9/125	ITU-T G.652	4	10,0	2500	150,0	1,50	300	75,0	<b>80264</b>
A/I-DQ(ZN)BH	6	Multimode G50/125	OM2	6	10,0	2500	150,0	1,50	300	75,0	<b>80271</b>
A/I-DQ(ZN)BH	6	Multimode G62.5/125	OM1	6	10,0	2500	150,0	1,50	300	75,0	<b>80265</b>
A/I-DQ(ZN)BH	6	Single-mode E9/125	ITU-T G.652	6	10,0	2500	150,0	1,50	300	75,0	<b>80272</b>
A/I-DQ(ZN)BH	8	Multimode G50/125	OM2	8	10,0	2500	150,0	1,50	300	75,0	<b>80273</b>
A/I-DQ(ZN)BH	8	Multimode G62.5/125	OM1	8	10,0	2500	150,0	1,50	300	75,0	<b>80274</b>
A/I-DQ(ZN)BH	8	Single-mode E9/125	ITU-T G.652	8	10,0	2500	150,0	1,50	300	75,0	<b>80275</b>
A/I-DQ(ZN)BH	12	Multimode G50/125	OM2	12	10,0	2500	150,0	1,50	300	75,0	<b>80681</b>
A/I-DQ(ZN)BH	12	Multimode G62.5/125	OM1	12	10,0	2500	150,0	1,50	300	75,0	<b>80278</b>
A/I-DQ(ZN)BH	12	Single-mode E9/125	ITU-T G.652	12	10,0	2500	150,0	1,50	300	75,0	<b>80279</b>
A/I-DQ(ZN)BH	16	Multimode G50/125	OM2	16	10,0	2500	150,0	1,50	300	85,0	<b>80280</b>
A/I-DQ(ZN)BH	16	Multimode G62.5/125	OM1	16	10,0	2500	150,0	1,50	300	85,0	<b>80281</b>
A/I-DQ(ZN)BH	16	Single-mode E9/125	ITU-T G.652	16	10,0	2500	150,0	1,50	300	85,0	<b>80851</b>
A/I-DQ(ZN)BH	24	Multimode G50/125	OM2	24	10,0	2500	150,0	1,50	300	85,0	<b>80725</b>
A/I-DQ(ZN)BH	24	Multimode G62.5/125	OM1	24	10,0	2500	150,0	1,50	300	85,0	<b>82431</b>

Dimensions and specifications may be changed without prior notice.

## Application

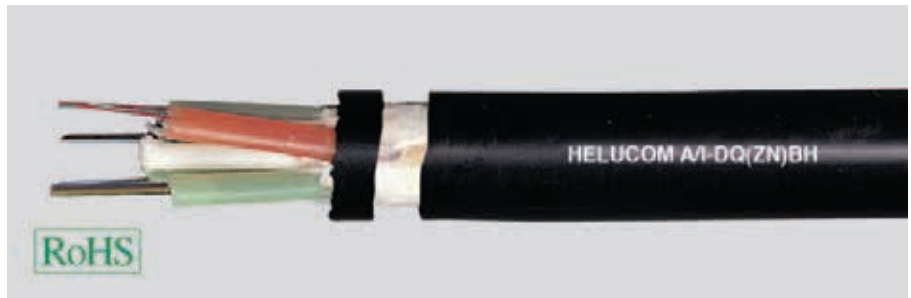
These HELUCOM® fibre-optic cables are available either as central bundle core cable or as stranded versions. They are suitable for indoor and outdoor cabling of buildings and facilities. They are used in particular if the installation is to be done in one piece from the inside to the outside without additional use of couplings. With their black UV-resistant outer sheath and the non-metallic rodent protection, they are perfectly suited for outdoor use. The halogen-free outer sheath makes installation inhouse possible without any problems.

R

# Fibre Optic Indoor/Outdoor Cable

acc. DIN VDE 0888

**HELUCOM®**  
A/I-DQ(ZN)BH, stranded



## Cable structure

Core type: Loose tube  
GRP support element  
Strain relief elements: Glass yarns  
Type of armouring: Glass yarns  
Outer sheath material: FRNC  
Outer sheath colour: Black

## Temperature range

Laying, min.: -5°C  
Laying, max.: +50°C  
Operating, min.: -20°C  
Operating, max.: +60°C

## Other data

Corrosiveness acc. to EN50267-2-3  
Halogen-free acc. to 60754-2  
Flame-resistance acc. to IEC 60332-1  
Smoke density acc. to IEC 61034  
Longitudinally water-tight acc. to IEC 60794-1-2-F5  
UV-resistant

Designation	No. of fibres	Fibre type	Fibre category	Number of fibres per core	Outer Ø app. mm	Max. tensile force N	Min. stat. bending radius mm	Caloric load app. MJ / m	Max. transverse pressure N / cm	Weight kg / km	Part no.
A/I-DQ(ZN)BH	24	Multimode G50/125	OM2	12	11,0	2700	165,0	2,00	600	90,0	<b>81495</b>
A/I-DQ(ZN)BH	24	Multimode G62.5/125	OM1	12	11,0	2700	165,0	2,00	600	90,0	<b>802263</b>
A/I-DQ(ZN)BH	24	Single-mode E9/125	ITU-T G.652	12	11,0	2700	165,0	2,00	600	90,0	<b>80846</b>
A/I-DQ(ZN)BH	48	Multimode G50/125	OM2	12	11,0	2700	165,0	2,00	600	90,0	<b>802261</b>
A/I-DQ(ZN)BH	48	Multimode G62.5/125	OM1	12	11,0	2700	165,0	2,00	600	90,0	<b>802264</b>
A/I-DQ(ZN)BH	48	Single-mode E9/125	ITU-T G.652	12	11,0	2700	165,0	2,00	600	90,0	<b>802266</b>
A/I-DQ(ZN)BH	48	Single-mode E9/125	ITU-T G.652	12	11,0	2700	165,0	2,00	600	90,0	<b>802281</b>
A/I-DQ(ZN)BH	60	Multimode G50/125	OM2	12	11,0	2700	165,0	2,00	600	90,0	<b>802262</b>
A/I-DQ(ZN)BH	60	Multimode G62.5/125	OM1	12	11,0	2700	165,0	2,00	600	90,0	<b>802265</b>
A/I-DQ(ZN)BH	60	Single-mode E9/125	ITU-T G.652	12	11,0	2700	165,0	2,00	600	90,0	<b>802267</b>
A/I-DQ(ZN)BH	72	Multimode G50/125	OM2	12	11,5	2700	175,0	2,10	600	100,0	<b>802268</b>
A/I-DQ(ZN)BH	72	Multimode G62.5/125	OM1	12	11,5	2700	175,0	2,10	600	100,0	<b>802271</b>
A/I-DQ(ZN)BH	72	Single-mode E9/125	ITU-T G.652	12	11,5	2700	175,0	2,10	600	100,0	<b>802274</b>
A/I-DQ(ZN)BH	84	Multimode G50/125	OM2	12	12,5	3000	190,0	2,40	600	130,0	<b>802269</b>
A/I-DQ(ZN)BH	84	Multimode G62.5/125	OM1	12	12,5	3000	190,0	2,40	600	130,0	<b>802272</b>
A/I-DQ(ZN)BH	84	Single-mode E9/125	ITU-T G.652	12	12,5	3000	190,0	2,40	600	130,0	<b>802275</b>
A/I-DQ(ZN)BH	96	Multimode G50/125	OM2	12	12,5	3000	190,0	2,80	600	130,0	<b>802270</b>
A/I-DQ(ZN)BH	96	Multimode G62.5/125	OM1	12	12,5	3000	190,0	2,80	600	130,0	<b>802273</b>
A/I-DQ(ZN)BH	96	Single-mode E9/125	ITU-T G.652	12	12,5	3000	190,0	2,80	600	130,0	<b>802276</b>

Dimensions and specifications may be changed without prior notice.

## Application

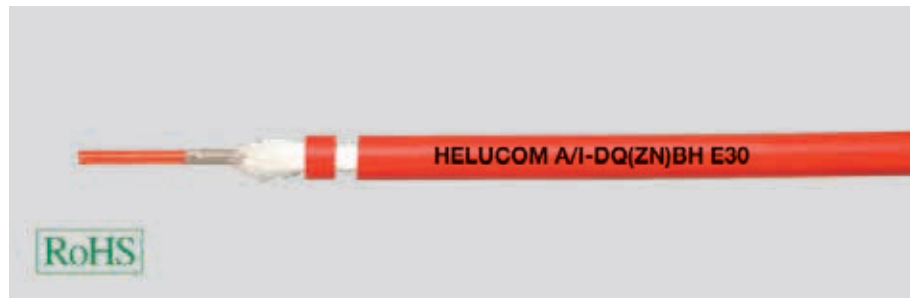
These HELUCOM® fibre-optic cables are available either as central bundle core cable or as stranded versions. They are suitable for indoor and outdoor cabling of buildings and facilities. They are used in particular if the installation is to be done in one piece from the inside to the outside without additional use of couplings. With their black UV-resistant outer sheath and the non-metallic rodent protection, they are perfectly suited for outdoor use. The halogen-free outer sheath makes installation inhouse possible without any problems.

# Fibre Optic Cable with Functionality

with reference to DIN 4102-12

HELUCOM® FS30

A/I-DQ(ZN)BH



## Cable structure

Core type: Loose tube  
Strain relief elements: Aramide  
Type of armouring: Glass yarns  
Outer sheath material: FR/LSOH  
Outer sheath colour: Red

## Temperature range

Laying, min.: -10°C  
Laying, max.: +50°C  
Operating, min.: -25°C  
Operating, max.: +60°C

## Other data

Corrosiveness acc. to EN50267-2-3  
Halogen-free acc. to 60754-2  
Flame-resistance acc. to IEC 60332-1  
Smoke density acc. to IEC 61034  
Longitudinally water-tight acc. to IEC 60794-1-2-F5  
UV-resistant  
Functional integrity: E30

Designation	No. of fibres	Fibre type	Fibre category	Number of fibres per core	Outer Ø app. mm	Max. tensile force N	Min. stat. bending radius mm	Caloric load app. MJ / m	Max. transverse pressure N / cm	Weight kg / km	Part no.
A/I-DQ(ZN)BH	4	Multimode G50/125	OM2	4	7,8	1000	80,0	1,08	200	102,0	<b>801217</b>
A/I-DQ(ZN)BH	4	Multimode G62.5/125	OM1	4	7,8	1000	80,0	1,08	200	102,0	<b>801218</b>
A/I-DQ(ZN)BH	4	Single-mode E9/125	ITU-T G.652	4	7,8	1000	80,0	1,08	200	102,0	<b>801219</b>
A/I-DQ(ZN)BH	12	Multimode G50/125	OM2	12	7,8	1000	80,0	1,08	200	102,0	<b>801220</b>
A/I-DQ(ZN)BH	12	Multimode G62.5/125	OM1	12	7,8	1000	80,0	1,08	200	102,0	<b>801221</b>
A/I-DQ(ZN)BH	12	Single-mode E9/125	ITU-T G.652	12	7,8	1000	80,0	1,08	200	102,0	<b>801190</b>

Dimensions and specifications may be changed without prior notice.

## Application

With the serie HELUCOM® E30 we have realized, based on a special construction and high quality raw materials, a functional integrity according to DIN 4102-12 E30 (30 minutes). Together with the planned accessories the cables realize the full function of the communication in areas like tunnels or buildings for the defined period of time. On request we also can deliver cables with more than 12 fibres as stranded construction.

R

# Fibre Optic Cable with Functionality

with reference to IEC 60331-25

HELUCOM® FS90

A/I-D(ZN)BH(SR)H



## Cable structure

Core type: Loose tube  
Strain relief elements: Glass yarns  
Inner sheath material: FRNC  
Type of armouring: steel tape  
Outer sheath material: FR/LSOH  
Outer sheath colour: Black

## Temperature range

Laying, min.: -5°C  
Laying, max.: +50°C  
Operating, min.: -20°C  
Operating, max.: +70°C

## Other data

Corrosiveness acc. to EN50267-2-3  
Halogen-free acc. to 60754-2  
Flame-resistance acc. to IEC 60332-1 and -3  
Smoke density acc. to IEC 61034  
Longitudinally water-tight acc. to IEC 60794-1-2-F5  
Cable, laterally water-tight  
UV-resistant  
Functional integrity: IEC 60794/ IEC 60331-25

Designation	No. of fibres	Fibre type	Fibre category	Number of fibres per core	Outer Ø app. mm	Max. tensile force N	Min. stat. bending radius mm	Caloric load app. MJ / m	Max. transverse pressure N / cm	Weight kg / km	Part no.
A/I-D(ZN)BH(SR)H	4	Multimode G50/125	OM2	4	12,7	1500	180,0	6,20	300	216,0	<b>803917</b>
A/I-D(ZN)BH(SR)H	4	Single-mode E9/125	ITU-T G.652	4	12,7	1500	180,0	6,20	300	216,0	<b>803919</b>
A/I-D(ZN)BH(SR)H	12	Multimode G50/125	OM2	12	12,7	1500	180,0	6,20	300	216,0	<b>803918</b>
A/I-D(ZN)BH(SR)H	12	Single-mode E9/125	ITU-T G.652	12	12,7	1500	180,0	6,20	300	216,0	<b>803920</b>

Dimensions and specifications may be changed without prior notice.

## Application

With the serie HELUCOM® FS90 we have realized, based on a special construction and high quality raw materials, a functional integrity according to IEC 60331-25 within 90, minutes (up to 750°C). Together with the planned accessories the cables realize the full function of the communication in areas like tunnels or buildings for the defined period of time.



# Fibre Optic Outdoor Cable

acc. DIN VDE 0888

**HELUCOM®**

A-DQ(ZN)2Y, central



## Cable structure

Core type: Loose tube  
 Strain relief elements: Glass yarns  
 Outer sheath material: PE  
 Outer sheath colour: Black

## Temperature range

Laying, min.: -5°C  
 Laying, max.: +50°C  
 Operating, min.: -20°C  
 Operating, max.: +60°C

## Other data

Corrosiveness acc. to EN50267-2-3  
 Halogen-free acc. to 60754-2  
 Longitudinally water-tight acc. to IEC 60794-1-2-F5  
 UV-resistant

Designation	No. of fibres	Fibre type	Fibre category	Number of fibres per core	Outer Ø app. mm	Max. tensile force N	Min. stat. bending radius mm	Caloric load app. MJ / m	Max. transverse pressure N / cm	Weight kg / km	Part no.
A-DQ(ZN)2Y	2	Multimode G50/125	OM2	2	8,8	1500	130,0	1,60	250	40,0	<b>80148</b>
A-DQ(ZN)2Y	2	Multimode G62.5/125	OM1	2	8,8	1500	130,0	1,60	250	40,0	<b>80164</b>
A-DQ(ZN)2Y	2	Single-mode E9/125	ITU-T G.652	2	8,8	1500	130,0	1,60	250	40,0	<b>80131</b>
A-DQ(ZN)2Y	4	Multimode G50/125	OM2	4	8,8	1500	130,0	1,60	250	40,0	<b>80149</b>
A-DQ(ZN)2Y	4	Multimode G62.5/125	OM1	4	8,8	1500	130,0	1,60	250	40,0	<b>80165</b>
A-DQ(ZN)2Y	4	Single-mode E9/125	ITU-T G.652	4	8,8	1500	130,0	1,60	250	40,0	<b>80132</b>
A-DQ(ZN)2Y	6	Multimode G50/125	OM2	6	8,8	1500	130,0	1,60	250	40,0	<b>80150</b>
A-DQ(ZN)2Y	6	Multimode G62.5/125	OM1	6	8,8	1500	130,0	1,60	250	40,0	<b>80166</b>
A-DQ(ZN)2Y	6	Single-mode E9/125	ITU-T G.652	6	8,8	1500	130,0	1,60	250	40,0	<b>80133</b>
A-DQ(ZN)2Y	8	Multimode G50/125	OM2	8	8,8	1500	130,0	1,60	250	40,0	<b>80151</b>
A-DQ(ZN)2Y	8	Multimode G62.5/125	OM1	8	8,8	1500	130,0	1,60	250	40,0	<b>80167</b>
A-DQ(ZN)2Y	8	Single-mode E9/125	ITU-T G.652	8	8,8	1500	130,0	1,60	250	40,0	<b>80134</b>
A-DQ(ZN)2Y	12	Multimode G50/125	OM2	12	8,8	1500	130,0	1,60	250	40,0	<b>80153</b>
A-DQ(ZN)2Y	12	Multimode G62.5/125	OM1	12	8,8	1500	130,0	1,60	250	40,0	<b>80169</b>
A-DQ(ZN)2Y	12	Single-mode E9/125	ITU-T G.652	12	8,8	1500	130,0	1,60	250	40,0	<b>80136</b>
A-DQ(ZN)2Y	16	Multimode G50/125	OM2	16	8,8	1500	130,0	1,80	250	70,0	<b>80154</b>
A-DQ(ZN)2Y	16	Multimode G62.5/125	OM1	16	8,8	1500	130,0	1,80	250	70,0	<b>80170</b>
A-DQ(ZN)2Y	16	Single-mode E9/125	ITU-T G.652	16	8,8	1500	130,0	1,80	250	70,0	<b>80137</b>
A-DQ(ZN)2Y	24	Multimode G50/125	OM2	24	8,8	1500	130,0	1,80	250	70,0	<b>80155</b>
A-DQ(ZN)2Y	24	Multimode G62.5/125	OM1	24	8,8	1500	130,0	1,80	250	70,0	<b>80171</b>
A-DQ(ZN)2Y	24	Single-mode E9/125	ITU-T G.652	24	8,8	1500	130,0	1,80	250	70,0	<b>80138</b>

Dimensions and specifications may be changed without prior notice.

## Application

These HELUCOM® fibre-optic cables are characterized by a design that is particularly easy to mount. Around a central grooved cable, there is a composite of glass yarns and swelling fleece with characteristics that ensure the actual strain relief and waterproofing in longitudinal direction of the cable. In addition, these cables are designed grease-free. Wiping the jelly off is therefore unnecessary. This construction is particularly used in underground, tubes and channel areas, where rodent infestation is not to be expected.

**R**

# Fibre Optic Outdoor Cable

acc. DIN VDE 0888

**HELUCOM®**

A-DQ(ZN)2Y, stranded



## Cable structure

Core type: Loose tube  
 GRP support element  
 Strain relief elements: Glass yarns  
 Outer sheath material: PE  
 Outer sheath colour: Black

## Temperature range

Laying, min.: -5°C  
 Laying, max.: +50°C  
 Operating, min.: -20°C  
 Operating, max.: +60°C

## Other data

Corrosiveness acc. to EN50267-2-3  
 Halogen-free acc. to 60754-2  
 Longitudinally water-tight acc. to IEC 60794-1-2-F5  
 UV-resistant

Designation	No. of fibres	Fibre type	Fibre category	Number of fibres per core	Outer Ø app. mm	Max. tensile force N	Min. stat. bending radius mm	Caloric load app. MJ / m	Max. transverse pressure N / cm	Weight kg / km	Part no.
A-DQ(ZN)2Y	24	Multimode G50/125	OM2	12	10,0	2500	200,0	2,50	400	70,0	<b>80156</b>
A-DQ(ZN)2Y	24	Multimode G62.5/125	OM1	12	10,0	2500	200,0	2,50	400	70,0	<b>80172</b>
A-DQ(ZN)2Y	24	Single-mode E9/125	ITU-T G.652	12	10,0	2500	200,0	2,50	400	70,0	<b>80139</b>
A-DQ(ZN)2Y	36	Multimode G50/125	OM2	12	10,0	2500	200,0	2,50	400	70,0	<b>80448</b>
A-DQ(ZN)2Y	36	Multimode G62.5/125	OM1	12	10,0	2500	200,0	2,50	400	70,0	<b>80449</b>
A-DQ(ZN)2Y	36	Single-mode E9/125	ITU-T G.652	12	10,0	2500	200,0	2,50	400	70,0	<b>80450</b>
A-DQ(ZN)2Y	48	Multimode G50/125	OM2	12	10,0	2500	200,0	2,50	400	70,0	<b>80447</b>
A-DQ(ZN)2Y	48	Multimode G62.5/125	OM1	12	10,0	2500	200,0	2,50	400	70,0	<b>80446</b>
A-DQ(ZN)2Y	48	Single-mode E9/125	ITU-T G.652	12	10,0	2500	200,0	2,50	400	70,0	<b>80445</b>
A-DQ(ZN)2Y	60	Multimode G50/125	OM2	12	10,0	2500	200,0	2,50	400	70,0	<b>80159</b>
A-DQ(ZN)2Y	60	Multimode G62.5/125	OM1	12	10,0	2500	200,0	2,50	400	70,0	<b>80175</b>
A-DQ(ZN)2Y	60	Single-mode E9/125	ITU-T G.652	12	10,0	2500	200,0	2,50	400	70,0	<b>80142</b>
A-DQ(ZN)2Y	72	Multimode G50/125	OM2	12	10,5	2500	210,0	2,60	400	75,0	<b>80444</b>
A-DQ(ZN)2Y	72	Multimode G62.5/125	OM1	12	10,5	2500	210,0	2,60	400	75,0	<b>80443</b>
A-DQ(ZN)2Y	72	Single-mode E9/125	ITU-T G.652	12	10,5	2500	210,0	2,60	400	75,0	<b>80442</b>
A-DQ(ZN)2Y	84	Multimode G50/125	OM2	12	11,5	2700	230,0	3,30	400	110,0	<b>80160</b>
A-DQ(ZN)2Y	84	Multimode G62.5/125	OM1	12	11,5	2700	230,0	3,30	400	110,0	<b>80176</b>
A-DQ(ZN)2Y	84	Single-mode E9/125	ITU-T G.652	12	11,5	2700	230,0	3,30	400	110,0	<b>80143</b>
A-DQ(ZN)2Y	96	Multimode G50/125	OM2	12	11,5	2700	230,0	3,30	400	110,0	<b>80441</b>
A-DQ(ZN)2Y	96	Multimode G62.5/125	OM1	12	11,5	2700	230,0	3,30	400	110,0	<b>80440</b>
A-DQ(ZN)2Y	96	Single-mode E9/125	ITU-T G.652	12	11,5	2700	230,0	3,30	400	110,0	<b>80439</b>
A-DQ(ZN)2Y	108	Multimode G50/125	OM2	12	13,0	2700	260,0	4,00	400	130,0	<b>80161</b>
A-DQ(ZN)2Y	108	Multimode G62.5/125	OM1	12	13,0	2700	260,0	4,00	400	130,0	<b>80177</b>
A-DQ(ZN)2Y	108	Single-mode E9/125	ITU-T G.652	12	13,0	2700	260,0	4,00	400	130,0	<b>80144</b>
A-DQ(ZN)2Y	120	Multimode G50/125	OM2	12	13,0	2700	260,0	4,00	400	130,0	<b>80162</b>
A-DQ(ZN)2Y	120	Multimode G62.5/125	OM1	12	13,0	2700	260,0	4,00	400	130,0	<b>80178</b>
A-DQ(ZN)2Y	120	Single-mode E9/125	ITU-T G.652	12	13,0	2700	260,0	4,00	400	130,0	<b>80146</b>
A-DQ(ZN)2Y	144	Multimode G50/125	OM2	12	14,0	2700	280,0	5,00	400	150,0	<b>80438</b>
A-DQ(ZN)2Y	144	Multimode G62.5/125	OM1	12	14,0	2700	280,0	5,00	400	150,0	<b>80437</b>
A-DQ(ZN)2Y	144	Single-mode E9/125	ITU-T G.652	12	14,0	2700	280,0	5,00	400	150,0	<b>80436</b>

Dimensions and specifications may be changed without prior notice.

## Application

These HELUCOM® fibre-optic cables are characterized by a design that is particularly easy to mount and extremely tension-resistant. Around a stranded grooved cable and filler elements, there is a swelling fleece with characteristics that ensure strain relief and waterproofing in longitudinal direction of the cable. In addition, these cables are designed grease-free. Wiping the jelly off is therefore unnecessary. This construction is particularly used in underground, tubes and channel areas, where above-average tensile stresses and/or transverse compressions occur, but rodent infestation is not to be expected.

# Fibre Optic Outdoor Cable

acc. DIN VDE 0888

**HELUCOM<sup>®</sup> pact**

A-DQ(ZN)B2Y, central



## Cable structure

Core type: Loose tube  
 Strain relief elements: Glass yarns  
 Type of armouring: Glass yarns  
 Outer sheath material: PE  
 Outer sheath colour: Black

## Temperature range

Laying, min.: -5°C  
 Laying, max.: +50°C  
 Operating, min.: -20°C  
 Operating, max.: +60°C

## Other data

Corrosiveness acc. to EN50267-2-3  
 Halogen-free acc. to 60754-2  
 Longitudinally water-tight acc. to IEC 60794-1-2-F5  
 UV-resistant

Designation	No. of fibres	Fibre type	Fibre category	Number of fibres per core	Outer Ø app. mm	Max. tensile force N	Min. stat. bending radius mm	Caloric load app. MJ / m	Max. transverse pressure N / cm	Weight kg / km	Part no.
A-DQ(ZN)B2Y	2	Multimode G50/125	OM2	2	7,5	1500	150,0	1,60	300	40,0	<b>800754</b>
A-DQ(ZN)B2Y	2	Multimode G62.5/125	OM1	2	7,5	1500	150,0	1,60	300	40,0	<b>802131</b>
A-DQ(ZN)B2Y	2	Single-mode E9/125	ITU-T G.652	2	7,5	1500	150,0	1,60	300	40,0	<b>802137</b>
A-DQ(ZN)B2Y	4	Multimode G50/125	OM2	4	7,5	1500	150,0	1,60	300	40,0	<b>800755</b>
A-DQ(ZN)B2Y	4	Multimode G62.5/125	OM1	4	7,5	1500	150,0	1,60	300	40,0	<b>802132</b>
A-DQ(ZN)B2Y	4	Single-mode E9/125	ITU-T G.652	4	7,5	1500	150,0	1,60	300	40,0	<b>802138</b>
A-DQ(ZN)B2Y	6	Multimode G50/125	OM2	6	7,5	1500	150,0	1,60	300	40,0	<b>800756</b>
A-DQ(ZN)B2Y	6	Multimode G62.5/125	OM1	6	7,5	1500	150,0	1,60	300	40,0	<b>802133</b>
A-DQ(ZN)B2Y	6	Single-mode E9/125	ITU-T G.652	6	7,5	1500	150,0	1,60	300	40,0	<b>802139</b>
A-DQ(ZN)B2Y	8	Multimode G50/125	OM2	8	7,5	1500	150,0	1,60	300	40,0	<b>800757</b>
A-DQ(ZN)B2Y	8	Multimode G62.5/125	OM1	8	7,5	1500	150,0	1,60	300	40,0	<b>802134</b>
A-DQ(ZN)B2Y	8	Single-mode E9/125	ITU-T G.652	8	7,5	1500	150,0	1,60	300	40,0	<b>802140</b>
A-DQ(ZN)B2Y	12	Multimode G50/125	OM2	12	7,5	1500	150,0	1,60	300	40,0	<b>800759</b>
A-DQ(ZN)B2Y	12	Multimode G62.5/125	OM1	12	7,5	1500	150,0	1,60	300	40,0	<b>802135</b>
A-DQ(ZN)B2Y	12	Single-mode E9/125	ITU-T G.652	12	7,5	1500	150,0	1,60	300	40,0	<b>802141</b>
A-DQ(ZN)B2Y	24	Multimode G50/125	OM2	24	8,5	1500	170,0	1,90	300	60,0	<b>800762</b>
A-DQ(ZN)B2Y	24	Multimode G62.5/125	OM1	24	8,5	1500	170,0	1,90	300	60,0	<b>802136</b>
A-DQ(ZN)B2Y	24	Single-mode E9/125	ITU-T G.652	24	8,5	1500	170,0	1,90	300	60,0	<b>802142</b>

Dimensions and specifications may be changed without prior notice.

## Application

These HELUCOM<sup>®</sup> pact fibre-optic cables are characterized by a design that is particularly easy to mount and is rodent-protected. Around a central grooved cable, there is a composite of glass yarns and swelling fleece with characteristics that ensure rodent protection, strain relief, and waterproofing in longitudinal direction of the cable. In addition, these cables are designed grease-free. Wiping the jelly off is therefore unnecessary. This construction is particularly used in underground, tubes and channel areas, where normal tensile stresses and/or transverse compressions occur and rodent infestation is to be expected.

R

# Fibre Optic Outdoor Cable

acc. DIN VDE 0888

**HELUCOM®**

A-DQ(ZN)B2Y, central



## Cable structure

Core type: Loose tube  
 Strain relief elements: Glass yarns  
 Type of armouring: Glass yarns  
 Outer sheath material: PE  
 Outer sheath colour: Black

## Temperature range

Laying, min.: -5°C  
 Laying, max.: +50°C  
 Operating, min.: -20°C  
 Operating, max.: +60°C

## Other data

Corrosiveness acc. to EN50267-2-3  
 Halogen-free acc. to 60754-2  
 Longitudinally water-tight acc. to IEC 60794-1-2-F5  
 UV-resistant

Designation	No. of fibres	Fibre type	Fibre category	Number of fibres per core	Outer Ø app. mm	Max. tensile force N	Min. stat. bending radius mm	Caloric load app. MJ / m	Max. transverse pressure N / cm	Weight kg / km	Part no.
A-DQ(ZN)B2Y	2	Multimode G50/125	OM2	2	10,0	2500	160,0	1,60	300	85,0	<b>80196</b>
A-DQ(ZN)B2Y	2	Multimode G62.5/125	OM1	2	10,0	2500	160,0	1,60	300	85,0	<b>80212</b>
A-DQ(ZN)B2Y	2	Single-mode E9/125	ITU-T G.652	2	10,0	2500	160,0	1,60	300	85,0	<b>80180</b>
A-DQ(ZN)B2Y	4	Multimode G50/125	OM2	4	10,0	2500	160,0	1,60	300	85,0	<b>80197</b>
A-DQ(ZN)B2Y	4	Multimode G62.5/125	OM1	4	10,0	2500	160,0	1,60	300	85,0	<b>80213</b>
A-DQ(ZN)B2Y	4	Single-mode E9/125	ITU-T G.652	4	10,0	2500	160,0	1,60	300	85,0	<b>80181</b>
A-DQ(ZN)B2Y	6	Multimode G50/125	OM2	6	10,0	2500	160,0	1,60	300	85,0	<b>80198</b>
A-DQ(ZN)B2Y	6	Multimode G62.5/125	OM1	6	10,0	2500	160,0	1,60	300	85,0	<b>80214</b>
A-DQ(ZN)B2Y	6	Single-mode E9/125	ITU-T G.652	6	10,0	2500	160,0	1,60	300	85,0	<b>80182</b>
A-DQ(ZN)B2Y	8	Multimode G50/125	OM2	8	10,0	2500	160,0	1,60	300	85,0	<b>80199</b>
A-DQ(ZN)B2Y	8	Multimode G62.5/125	OM1	8	10,0	2500	160,0	1,60	300	85,0	<b>80215</b>
A-DQ(ZN)B2Y	8	Single-mode E9/125	ITU-T G.652	8	10,0	2500	160,0	1,60	300	85,0	<b>80183</b>
A-DQ(ZN)B2Y	12	Multimode G50/125	OM2	12	10,0	2500	160,0	1,60	300	85,0	<b>80201</b>
A-DQ(ZN)B2Y	12	Multimode G62.5/125	OM1	12	10,0	2500	160,0	1,60	300	85,0	<b>80217</b>
A-DQ(ZN)B2Y	12	Single-mode E9/125	ITU-T G.652	12	10,0	2500	160,0	1,60	300	85,0	<b>80185</b>
A-DQ(ZN)B2Y	16	Multimode G50/125	OM2	16	10,0	2500	180,0	1,80	300	95,0	<b>80202</b>
A-DQ(ZN)B2Y	16	Multimode G62.5/125	OM1	16	10,0	2500	180,0	1,80	300	95,0	<b>80218</b>
A-DQ(ZN)B2Y	16	Single-mode E9/125	ITU-T G.652	16	10,0	2500	180,0	1,80	300	95,0	<b>80186</b>
A-DQ(ZN)B2Y	24	Multimode G50/125	OM2	24	10,0	2500	180,0	1,80	300	95,0	<b>80204</b>
A-DQ(ZN)B2Y	24	Multimode G62.5/125	OM1	24	10,0	2500	180,0	1,80	300	95,0	<b>80220</b>
A-DQ(ZN)B2Y	24	Single-mode E9/125	ITU-T G.652	24	10,0	2500	180,0	1,80	300	95,0	<b>80187</b>

Dimensions and specifications may be changed without prior notice.

## Application

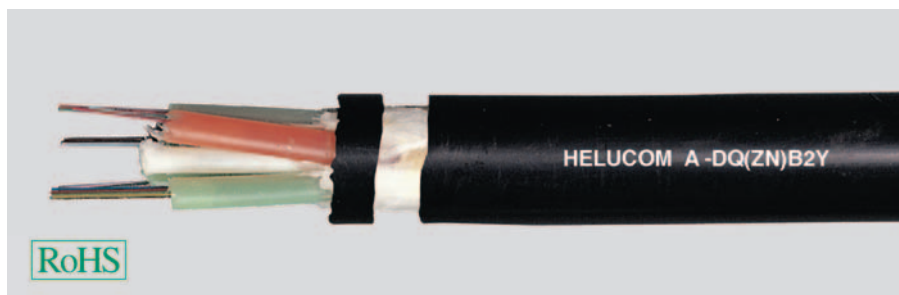
These HELUCOM® fibre-optic cables are characterized by a design that is particularly easy to mount and is rodent-protected. Around a central grooved cable, there is a composite of glass yarns and swelling fleece with characteristics that ensure rodent protection, strain relief, and waterproofing in longitudinal direction of the cable. In addition, these cables are designed grease-free. Wiping the jelly off is therefore unnecessary. This construction is particularly used in underground, tubes and channel areas, where normal tensile stresses and/or transverse compressions occur and rodent infestation is to be expected.

# Fibre Optic Outdoor Cable

acc. DIN VDE 0888

**HELUCOM®**

A-DQ(ZN)B2Y, stranded



## Cable structure

Core type: Loose tube  
GRP support element  
Strain relief elements: Glass yarns  
Type of armouring: Glass yarns  
Outer sheath material: PE  
Outer sheath colour: Black

## Temperature range

Laying, min.: -5°C  
Laying, max.: +50°C  
Operating, min.: -20°C  
Operating, max.: +60°C

## Other data

Corrosiveness acc. to EN50267-2-3  
Halogen-free acc. to 60754-2  
Longitudinally water-tight acc. to IEC 60794-1-2-F5  
UV-resistant

Designation	No. of fibres	Fibre type	Fibre category	Number of fibres per core	Outer Ø app. mm	Max. tensile force N	Min. stat. bending radius mm	Caloric load app. MJ / m	Max. transverse pressure N / cm	Weight kg / km	Part no.
A-DQ(ZN)B2Y 24	24	Multimode G50/125	OM2	12	10,5	2700	210,0	2,70	600	95,0	<b>81382</b>
A-DQ(ZN)B2Y 24	24	Multimode G62.5/125	OM1	12	10,5	2700	210,0	2,70	600	95,0	<b>80219</b>
A-DQ(ZN)B2Y 24	24	Single-mode E9/125	ITU-T G.652	12	10,5	2700	210,0	2,70	600	95,0	<b>80188</b>
A-DQ(ZN)B2Y 36	36	Multimode G50/125	OM2	12	10,5	2700	210,0	2,70	600	95,0	<b>81108</b>
A-DQ(ZN)B2Y 36	36	Multimode G62.5/125	OM1	12	10,5	2700	210,0	2,70	600	95,0	<b>81109</b>
A-DQ(ZN)B2Y 36	36	Single-mode E9/125	ITU-T G.652	12	10,5	2700	210,0	2,70	600	95,0	<b>81110</b>
A-DQ(ZN)B2Y 48	48	Multimode G50/125	OM2	12	10,5	2700	210,0	2,70	600	95,0	<b>82648</b>
A-DQ(ZN)B2Y 48	48	Multimode G62.5/125	OM1	12	10,5	2700	210,0	2,70	600	95,0	<b>81112</b>
A-DQ(ZN)B2Y 48	48	Single-mode E9/125	ITU-T G.652	12	10,5	2700	210,0	2,70	600	95,0	<b>81113</b>
A-DQ(ZN)B2Y 60	60	Multimode G50/125	OM2	12	10,5	2700	210,0	2,70	600	95,0	<b>80207</b>
A-DQ(ZN)B2Y 60	60	Multimode G62.5/125	OM1	12	10,5	2700	210,0	2,70	600	95,0	<b>80223</b>
A-DQ(ZN)B2Y 60	60	Single-mode E9/125	ITU-T G.652	12	10,5	2700	210,0	2,70	600	95,0	<b>80191</b>
A-DQ(ZN)B2Y 72	72	Multimode G50/125	OM2	12	11,0	2700	220,0	2,90	600	100,0	<b>81133</b>
A-DQ(ZN)B2Y 72	72	Multimode G62.5/125	OM1	12	11,0	2700	220,0	2,90	600	100,0	<b>81134</b>
A-DQ(ZN)B2Y 72	72	Single-mode E9/125	ITU-T G.652	12	11,0	2700	220,0	2,90	600	100,0	<b>81120</b>
A-DQ(ZN)B2Y 84	84	Multimode G50/125	OM2	12	12,0	3000	240,0	3,60	600	140,0	<b>80208</b>
A-DQ(ZN)B2Y 84	84	Multimode G62.5/125	OM1	12	12,0	3000	240,0	3,60	600	140,0	<b>80224</b>
A-DQ(ZN)B2Y 84	84	Single-mode E9/125	ITU-T G.652	12	12,0	3000	240,0	3,60	600	140,0	<b>80192</b>
A-DQ(ZN)B2Y 96	96	Multimode G50/125	OM2	12	12,0	3000	240,0	3,60	600	140,0	<b>81135</b>
A-DQ(ZN)B2Y 96	96	Multimode G62.5/125	OM1	12	12,0	3000	240,0	3,60	600	140,0	<b>81136</b>
A-DQ(ZN)B2Y 96	96	Single-mode E9/125	ITU-T G.652	12	12,0	3000	240,0	3,60	600	140,0	<b>81121</b>
A-DQ(ZN)B2Y 108	108	Multimode G50/125	OM2	12	13,5	3000	270,0	4,30	600	155,0	<b>80209</b>
A-DQ(ZN)B2Y 108	108	Multimode G62.5/125	OM1	12	13,5	3000	270,0	4,30	600	155,0	<b>80225</b>
A-DQ(ZN)B2Y 108	108	Single-mode E9/125	ITU-T G.652	12	13,5	3000	270,0	4,30	600	155,0	<b>80193</b>
A-DQ(ZN)B2Y 120	120	Multimode G50/125	OM2	12	13,5	3000	270,0	4,30	600	155,0	<b>80210</b>
A-DQ(ZN)B2Y 120	120	Multimode G62.5/125	OM1	12	13,5	3000	270,0	4,30	600	155,0	<b>80226</b>
A-DQ(ZN)B2Y 120	120	Single-mode E9/125	ITU-T G.652	12	13,5	3000	270,0	4,30	600	155,0	<b>80194</b>
A-DQ(ZN)B2Y 144	144	Multimode G50/125	OM2	12	14,5	3000	290,0	5,40	600	200,0	<b>80211</b>
A-DQ(ZN)B2Y 144	144	Multimode G62.5/125	OM1	12	14,5	3000	290,0	5,40	600	200,0	<b>80227</b>
A-DQ(ZN)B2Y 144	144	Single-mode E9/125	ITU-T G.652	12	14,5	3000	290,0	5,40	600	200,0	<b>80195</b>

Dimensions and specifications may be changed without prior notice.

## Application

These HELUCOM® fibre-optic cables are characterized by a design that is particularly easy to mount, extremely tension-resistant and rodent-proof. Around a stranded grooved cable and filler elements, there is a composite of glass yarns and swelling fleece with characteristics that ensure rodent protection, strain relief, and waterproofing in longitudinal direction of the cable. In addition, these cables are designed grease-free. Wiping the jelly off is therefore unnecessary. This construction is particularly used in underground, tubes and channel areas, where above-average tensile stresses and/or transverse compressions occur and rodent infestation is to be expected.

R



# Fibre Optic Outdoor Cable

acc. DIN VDE 0888

**HELUCOM<sup>®</sup> pact**

A-DQ(ZN)B2Y fibre combi, stranded



## Cable structure

Core type: Loose tube  
 GRP support element  
 Strain relief elements: Glass yarns  
 Type of armouring: Glass yarns  
 Outer sheath material: PE  
 Outer sheath colour: Black

## Temperature range

Laying, min.: -5°C  
 Laying, max.: +50°C  
 Operating, min.: -20°C  
 Operating, max.: +60°C

## Other data

Corrosiveness acc. to EN50267-2-3  
 Longitudinally water-tight acc. to IEC 60794-1-2-F5  
 UV-resistant

Designation	No. of fibres	Fibre type	Fibre category	Number of fibres per core	Outer Ø app. mm	Max. tensile force N	Min. stat. bending radius mm	Caloric load app. MJ / m	Max. transverse pressure N / cm	Weight kg / km	Part no.
A-DQ(ZN)B2Y	24	Single- and multimode G50/125	OM2 + ITU-T G.652	12	9,5	2500	200,0	2,50	400	90,0	<b>803037</b>
A-DQ(ZN)B2Y	24	Single- und Multimode G50/125 OM3	OM3 + ITU-T G.652	12	9,5	2500	200,0	2,50	400	90,0	<b>803923</b>
A-DQ(ZN)B2Y	48	Single- and multimode G50/125	OM2 + ITU-T G.652	12	9,5	2500	200,0	2,50	400	90,0	<b>803038</b>
A-DQ(ZN)B2Y	48	Single- und Multimode G50/125 OM3	OM3 + ITU-T G.652	12	9,5	2500	200,0	2,50	400	90,0	<b>803924</b>

Dimensions and specifications may be changed without prior notice.

## Application

These HELUCOM<sup>®</sup> pact fibre-optic cables are characterized by a design that is particularly easy to mount, tension-resistant and rodent-proof. Around a stranded grooved cable and filler elements, there is a composite of glass yarns and swelling fleece with characteristics that ensure rodent protection, strain relief and waterproofing in longitudinal direction of the cable. In addition, these cables are designed grease-free. Wiping the jelly off is therefore unnecessary. This construction is particularly used in underground, tubes and channel areas, where packing density also plays a role.

# Fibre Optic Outdoor Cable

acc. DIN VDE 0888

**HELUCOM®**

A-DQ(ZN)B2Y fibre combi, stranded



## Cable structure

Core type: Loose tube  
 GRP support element  
 Strain relief elements: Glass yarns  
 Type of armouring: Glass yarns  
 Outer sheath material: PE  
 Outer sheath colour: Black

## Temperature range

Laying, min.: -5°C  
 Laying, max.: +50°C  
 Operating, min.: -20°C  
 Operating, max.: +60°C

## Other data

Corrosiveness acc. to EN50267-2-3  
 Halogen-free acc. to 60754-2  
 Longitudinally water-tight acc. to IEC 60794-1-2-F5  
 UV-resistant

Designation	No. of fibres	Fibre type	Fibre category	Number of fibres per core	Outer Ø app. mm	Max. tensile force N	Min. stat. bending radius mm	Caloric load app. MJ / m	Max. transverse pressure N / cm	Weight kg / km	Part no.
A-DQ(ZN)B2Y	24	Single- and multimode G50/125	OM2 + ITU-T G.652	12	10,5	2700	200,0	2,70	600	95,0	<b>81478</b>
A-DQ(ZN)B2Y	48	Single- and multimode G50/125	OM2 + ITU-T G.652	12	10,5	2700	200,0	2,70	600	95,0	<b>801183</b>

Dimensions and specifications may be changed without prior notice.

## Application

These HELUCOM® fibre-optic cables are characterized by a design that is particularly easy to mount, extremely tension-resistant and rodent-proof. Around a stranded grooved cable and filler elements, there is a composite of glass yarns and swelling fleece with characteristics that ensure rodent protection, strain relief and waterproofing in longitudinal direction of the cable. In addition, these cables are designed grease-free. Wiping the jelly off is therefore unnecessary. This construction is particularly used in underground, tubes and channel areas, where above-average tensile stresses and/or transverse compressions occur and rodent infestation is to be expected.

**R**

# Fibre Optic Outdoor Cable

acc. DIN VDE 0888

HELUCOM®

A-DF(ZN)2Y



## Cable structure

Core type: Loose tube  
GRP support element  
Strain relief elements: Aramide  
Outer sheath material: PE  
Outer sheath colour: Black

## Temperature range

Laying, min.: -5°C  
Laying, max.: +50°C  
Operating, min.: -20°C  
Operating, max.: +60°C

## Other data

Corrosiveness acc. to EN50267-2-3  
Halogen-free acc. to 60754-2  
Longitudinally water-tight acc. to IEC 60794-1-2-F5  
UV-resistant

Designation	No. of fibres	Fibre type	Fibre category	Number of fibres per core	Outer Ø app. mm	Max. tensile force N	Min. stat. bending radius mm	Caloric load app. MJ / m	Max. transverse pressure N / cm	Weight kg / km	Part no.
A-DF(ZN)2Y	2	Multimode G50/125	OM2	2	9,5	2500	95,0	4,20	400	85,0	<b>80016</b>
A-DF(ZN)2Y	2	Multimode G62.5/125	OM1	2	9,5	2500	95,0	4,20	400	85,0	<b>80033</b>
A-DF(ZN)2Y	2	Single-mode E9/125	ITU-T G.652	2	9,5	2500	95,0	4,20	400	85,0	<b>80000</b>
A-DF(ZN)2Y	4	Multimode G50/125	OM2	4	9,5	2500	95,0	4,20	400	85,0	<b>80017</b>
A-DF(ZN)2Y	4	Multimode G62.5/125	OM1	4	9,5	2500	95,0	4,20	400	85,0	<b>80034</b>
A-DF(ZN)2Y	4	Single-mode E9/125	ITU-T G.652	4	9,5	2500	95,0	4,20	400	85,0	<b>80001</b>
A-DF(ZN)2Y	8	Multimode G50/125	OM2	8	9,5	2500	95,0	4,20	400	85,0	<b>80019</b>
A-DF(ZN)2Y	8	Multimode G62.5/125	OM1	8	9,5	2500	95,0	4,20	400	85,0	<b>80036</b>
A-DF(ZN)2Y	8	Single-mode E9/125	ITU-T G.652	8	9,5	2500	95,0	4,20	400	85,0	<b>80003</b>
A-DF(ZN)2Y	12	Multimode G50/125	OM2	12	9,5	2500	95,0	4,20	400	85,0	<b>80021</b>
A-DF(ZN)2Y	12	Multimode G62.5/125	OM1	12	9,5	2500	95,0	4,20	400	85,0	<b>80038</b>
A-DF(ZN)2Y	12	Single-mode E9/125	ITU-T G.652	12	9,5	2500	95,0	4,20	400	85,0	<b>80005</b>
A-DF(ZN)2Y	24	Multimode G50/125	OM2	12	9,5	2700	95,0	4,00	400	85,0	<b>80024</b>
A-DF(ZN)2Y	24	Multimode G62.5/125	OM1	12	9,5	2700	95,0	4,00	400	85,0	<b>80041</b>
A-DF(ZN)2Y	24	Single-mode E9/125	ITU-T G.652	12	9,5	2700	95,0	4,00	400	85,0	<b>80008</b>
A-DF(ZN)2Y	36	Multimode G50/125	OM2	12	9,5	2700	95,0	4,00	400	85,0	<b>80912</b>
A-DF(ZN)2Y	36	Multimode G62.5/125	OM1	12	9,5	2700	95,0	4,00	400	85,0	<b>80913</b>
A-DF(ZN)2Y	36	Single-mode E9/125	ITU-T G.652	12	9,5	2700	95,0	4,00	400	85,0	<b>80914</b>
A-DF(ZN)2Y	48	Multimode G50/125	OM2	12	9,5	2700	95,0	4,00	400	85,0	<b>80026</b>
A-DF(ZN)2Y	48	Multimode G62.5/125	OM1	12	9,5	2700	95,0	4,00	400	85,0	<b>80046</b>
A-DF(ZN)2Y	48	Single-mode E9/125	ITU-T G.652	12	9,5	2700	95,0	4,00	400	85,0	<b>80010</b>
A-DF(ZN)2Y	60	Multimode G50/125	OM2	12	9,5	2700	95,0	4,00	400	85,0	<b>80027</b>
A-DF(ZN)2Y	60	Multimode G62.5/125	OM1	12	9,5	2700	95,0	4,00	400	85,0	<b>80047</b>
A-DF(ZN)2Y	60	Single-mode E9/125	ITU-T G.652	12	9,5	2700	95,0	4,00	400	85,0	<b>80011</b>
A-DF(ZN)2Y	72	Multimode G50/125	OM2	12	10,0	2700	100,0	3,80	400	90,0	<b>80473</b>
A-DF(ZN)2Y	72	Multimode G62.5/125	OM1	12	10,0	2700	100,0	3,80	400	90,0	<b>80474</b>
A-DF(ZN)2Y	72	Single-mode E9/125	ITU-T G.652	12	10,0	2700	100,0	3,80	400	90,0	<b>80475</b>
A-DF(ZN)2Y	84	Multimode G50/125	OM2	12	10,7	3000	107,0	4,30	400	120,0	<b>80028</b>
A-DF(ZN)2Y	84	Multimode G62.5/125	OM1	12	10,7	3000	107,0	4,30	400	120,0	<b>80048</b>
A-DF(ZN)2Y	84	Single-mode E9/125	ITU-T G.652	12	10,7	3000	107,0	4,30	400	120,0	<b>80012</b>
A-DF(ZN)2Y	96	Multimode G50/125	OM2	12	11,5	3000	115,0	5,00	400	135,0	<b>80777</b>
A-DF(ZN)2Y	96	Multimode G62.5/125	OM1	12	11,5	3000	115,0	5,00	400	135,0	<b>80774</b>
A-DF(ZN)2Y	96	Single-mode E9/125	ITU-T G.652	12	11,5	3000	115,0	5,00	400	135,0	<b>80764</b>
A-DF(ZN)2Y	144	Multimode G50/125	OM2	12	14,5	3000	145,0	7,70	400	175,0	<b>80032</b>
A-DF(ZN)2Y	144	Multimode G62.5/125	OM1	12	14,5	3000	145,0	7,70	400	175,0	<b>80051</b>
A-DF(ZN)2Y	144	Single-mode E9/125	ITU-T G.652	12	14,5	3000	145,0	7,70	400	175,0	<b>80015</b>

Dimensions and specifications may be changed without prior notice.

## Application

These HELUCOM® fibre-optic cables are characterized by a stranded construction with jelly filling. They are made waterproof in longitudinal direction by filling a jelly mass into the stranding cavities. Non-metallic tension elements ensure above average strain relief. This construction is particularly used in the area of telecommunication and long distance, but also in regular channels and tubes.

# Fibre Optic Outdoor Cable

acc. DIN VDE 0888

HELUCOM®

A-DF(ZN)B2Y



## Cable structure

Core type: Loose tube  
GRP support element  
Strain relief elements: Aramide  
Type of armouring: Glass yarns  
Outer sheath material: PE  
Outer sheath colour: Black

## Temperature range

Laying, min.: -5°C  
Laying, max.: +50°C  
Operating, min.: -20°C  
Operating, max.: +60°C

## Other data

Corrosiveness acc. to EN50267-2-3  
Halogen-free acc. to 60754-2  
Longitudinally water-tight acc. to IEC 60794-1-2-F5  
UV-resistant

Designation	No. of fibres	Fibre type	Fibre category	Number of fibres per core	Outer Ø app. mm	Max. tensile force N	Min. stat. bending radius mm	Caloric load app. MJ / m	Max. transverse pressure N / cm	Weight kg / km	Part no.
A-DF(ZN)B2Y	2	Multimode G50/125	OM2	2	10,5	2700	105,0	4,40	400	90,0	80100
A-DF(ZN)B2Y	2	Multimode G62.5/125	OM1	2	10,5	2700	105,0	4,40	400	90,0	80115
A-DF(ZN)B2Y	2	Single-mode E9/125	ITU-T G.652	2	10,5	2700	105,0	4,40	400	90,0	80084
A-DF(ZN)B2Y	4	Multimode G50/125	OM2	4	10,5	2700	105,0	4,40	400	90,0	80101
A-DF(ZN)B2Y	4	Multimode G62.5/125	OM1	4	10,5	2700	105,0	4,40	400	90,0	80116
A-DF(ZN)B2Y	4	Single-mode E9/125	ITU-T G.652	4	10,5	2700	105,0	4,40	400	90,0	80085
A-DF(ZN)B2Y	8	Multimode G50/125	OM2	8	10,5	2700	105,0	4,40	400	90,0	80031
A-DF(ZN)B2Y	8	Multimode G62.5/125	OM1	8	10,5	2700	105,0	4,40	400	90,0	80771
A-DF(ZN)B2Y	8	Single-mode E9/125	ITU-T G.652	8	10,5	2700	105,0	4,40	400	90,0	80087
A-DF(ZN)B2Y	12	Multimode G50/125	OM2	12	10,5	2700	105,0	4,40	400	90,0	80104
A-DF(ZN)B2Y	12	Multimode G62.5/125	OM1	12	10,5	2700	105,0	4,40	400	90,0	80120
A-DF(ZN)B2Y	12	Single-mode E9/125	ITU-T G.652	12	10,5	2700	105,0	4,40	400	90,0	80089
A-DF(ZN)B2Y	24	Multimode G50/125	OM2	12	10,5	2700	105,0	4,40	400	90,0	80759
A-DF(ZN)B2Y	24	Multimode G62.5/125	OM1	12	10,5	2700	105,0	4,40	400	90,0	80123
A-DF(ZN)B2Y	24	Single-mode E9/125	ITU-T G.652	12	10,5	2700	105,0	4,40	400	90,0	80092
A-DF(ZN)B2Y	36	Multimode G50/125	OM2	12	10,5	2700	105,0	4,30	400	90,0	81137
A-DF(ZN)B2Y	36	Multimode G62.5/125	OM1	12	10,5	2700	105,0	4,30	400	90,0	81138
A-DF(ZN)B2Y	36	Single-mode E9/125	ITU-T G.652	12	10,5	2700	105,0	4,30	400	90,0	81139
A-DF(ZN)B2Y	48	Multimode G50/125	OM2	12	10,5	2700	105,0	4,20	400	90,0	80109
A-DF(ZN)B2Y	48	Multimode G62.5/125	OM1	12	10,5	2700	105,0	4,20	400	90,0	80125
A-DF(ZN)B2Y	48	Single-mode E9/125	ITU-T G.652	12	10,5	2700	105,0	4,20	400	90,0	80094
A-DF(ZN)B2Y	60	Multimode G50/125	OM2	12	10,5	2700	105,0	4,20	400	90,0	80110
A-DF(ZN)B2Y	60	Multimode G62.5/125	OM1	12	10,5	2700	105,0	4,20	400	90,0	80126
A-DF(ZN)B2Y	60	Single-mode E9/125	ITU-T G.652	12	10,5	2700	105,0	4,20	400	90,0	80095
A-DF(ZN)B2Y	72	Multimode G50/125	OM2	12	11,0	2700	110,0	4,10	400	95,0	81143
A-DF(ZN)B2Y	72	Multimode G62.5/125	OM1	12	11,0	2700	110,0	4,10	400	95,0	81144
A-DF(ZN)B2Y	72	Single-mode E9/125	ITU-T G.652	12	11,0	2700	110,0	4,10	400	95,0	81145
A-DF(ZN)B2Y	84	Multimode G50/125	OM2	12	11,5	3000	115,0	4,60	400	136,0	80111
A-DF(ZN)B2Y	84	Multimode G62.5/125	OM1	12	11,5	3000	115,0	4,60	400	136,0	80127
A-DF(ZN)B2Y	84	Single-mode E9/125	ITU-T G.652	12	11,5	3000	115,0	4,60	400	136,0	80096
A-DF(ZN)B2Y	96	Multimode G50/125	OM2	12	12,0	3000	120,0	5,30	400	155,0	81147
A-DF(ZN)B2Y	96	Multimode G62.5/125	OM1	12	12,0	3000	120,0	5,30	400	155,0	81148
A-DF(ZN)B2Y	96	Single-mode E9/125	ITU-T G.652	12	12,0	3000	120,0	5,30	400	155,0	81149
A-DF(ZN)B2Y	144	Multimode G50/125	OM2	12	14,5	3000	145,0	8,00	400	228,0	80114
A-DF(ZN)B2Y	144	Multimode G62.5/125	OM1	12	14,5	3000	145,0	8,00	400	228,0	80130
A-DF(ZN)B2Y	144	Single-mode E9/125	ITU-T G.652	12	14,5	3000	145,0	8,00	400	228,0	80099

Dimensions and specifications may be changed without prior notice.

## Application

These HELUCOM® fibre-optic cables are characterized by a stranded construction with jelly filling. They are made waterproof in longitudinal direction by filling a jelly mass into the stranding cavities. Non-metallic tension elements and glass yarns ensure above average strain relief and rodent protection. This construction is particularly used in the area of telecommunication and long distance, but also in regular channels and tubes where rodent infestation is possible.

# Fibre Optic Outdoor Cable

acc. DIN VDE 0888

**HELUCOM®**

A-DF(ZN)2Y4Y



## Cable structure

Core type: Loose tube  
 GRP support element  
 Strain relief elements: Aramide  
 Inner sheath material: PE  
 Type of armouring: PA sheath  
 Outer sheath material: PA  
 Outer sheath colour: Black

## Temperature range

Laying, min.: -5°C  
 Laying, max.: +50°C  
 Operating, min.: -20°C  
 Operating, max.: +60°C

## Other data

Corrosiveness acc. to EN50267-2-3  
 Halogen-free acc. to 60754-2  
 Longitudinally water-tight acc. to IEC 60794-1-2-F5  
 Cable, laterally water-tight  
 UV-resistant

Designation	No. of fibres	Fibre type	Fibre category	Number of fibres per core	Outer Ø app. mm	Max. tensile force N	Min. stat. bending radius mm	Caloric load app. MJ / m	Max. transverse pressure N / cm	Weight kg / km	Part no.
A-DF(ZN)2Y4Y	2	Multimode G50/125	OM2	2	10,0	2700	100,0	6,10	400	90,0	<b>80915</b>
A-DF(ZN)2Y4Y	2	Multimode G62.5/125	OM1	2	10,0	2700	100,0	6,10	400	90,0	<b>80927</b>
A-DF(ZN)2Y4Y	2	Single-mode E9/125	ITU-T G.652	2	10,0	2700	100,0	6,10	400	90,0	<b>80945</b>
A-DF(ZN)2Y4Y	4	Multimode G50/125	OM2	4	10,0	2700	100,0	6,10	400	90,0	<b>80735</b>
A-DF(ZN)2Y4Y	4	Multimode G62.5/125	OM1	4	10,0	2700	100,0	6,10	400	90,0	<b>80928</b>
A-DF(ZN)2Y4Y	4	Single-mode E9/125	ITU-T G.652	4	10,0	2700	100,0	6,10	400	90,0	<b>80895</b>
A-DF(ZN)2Y4Y	8	Multimode G50/125	OM2	8	10,0	2700	100,0	6,10	400	90,0	<b>80691</b>
A-DF(ZN)2Y4Y	8	Multimode G62.5/125	OM1	8	10,0	2700	100,0	6,10	400	90,0	<b>80809</b>
A-DF(ZN)2Y4Y	8	Single-mode E9/125	ITU-T G.652	8	10,0	2700	100,0	6,10	400	90,0	<b>80118</b>
A-DF(ZN)2Y4Y	12	Multimode G50/125	OM2	12	10,0	2700	100,0	6,10	400	90,0	<b>80627</b>
A-DF(ZN)2Y4Y	12	Multimode G62.5/125	OM1	12	10,0	2700	100,0	6,10	400	90,0	<b>80931</b>
A-DF(ZN)2Y4Y	12	Single-mode E9/125	ITU-T G.652	12	10,0	2700	100,0	6,10	400	90,0	<b>80947</b>
A-DF(ZN)2Y4Y	24	Multimode G50/125	OM2	12	10,0	2700	100,0	6,10	400	90,0	<b>80578</b>
A-DF(ZN)2Y4Y	24	Multimode G62.5/125	OM1	12	10,0	2700	100,0	6,10	400	90,0	<b>80576</b>
A-DF(ZN)2Y4Y	24	Single-mode E9/125	ITU-T G.652	12	10,0	2700	100,0	6,10	400	90,0	<b>80577</b>
A-DF(ZN)2Y4Y	36	Multimode G50/125	OM2	12	10,0	2700	100,0	6,00	400	90,0	<b>80672</b>
A-DF(ZN)2Y4Y	36	Multimode G62.5/125	OM1	12	10,0	2700	100,0	6,00	400	90,0	<b>80935</b>
A-DF(ZN)2Y4Y	36	Single-mode E9/125	ITU-T G.652	12	10,0	2700	100,0	6,00	400	90,0	<b>80950</b>
A-DF(ZN)2Y4Y	48	Multimode G50/125	OM2	12	10,0	2700	100,0	6,00	400	90,0	<b>80732</b>
A-DF(ZN)2Y4Y	48	Multimode G62.5/125	OM1	12	10,0	2700	100,0	6,00	400	90,0	<b>80936</b>
A-DF(ZN)2Y4Y	48	Single-mode E9/125	ITU-T G.652	12	10,0	2700	100,0	6,00	400	90,0	<b>80951</b>
A-DF(ZN)2Y4Y	60	Multimode G50/125	OM2	12	10,0	2700	100,0	5,80	400	90,0	<b>80920</b>
A-DF(ZN)2Y4Y	60	Multimode G62.5/125	OM1	12	10,0	2700	100,0	5,80	400	90,0	<b>80938</b>
A-DF(ZN)2Y4Y	72	Multimode G50/125	OM2	12	10,5	2700	105,0	5,80	400	95,0	<b>80921</b>
A-DF(ZN)2Y4Y	72	Multimode G62.5/125	OM1	12	10,5	2700	105,0	5,80	400	95,0	<b>80939</b>
A-DF(ZN)2Y4Y	72	Single-mode E9/125	ITU-T G.652	12	10,5	2700	105,0	5,80	400	95,0	<b>80954</b>
A-DF(ZN)2Y4Y	84	Multimode G50/125	OM2	12	11,0	3000	110,0	8,40	400	110,0	<b>80922</b>
A-DF(ZN)2Y4Y	84	Multimode G62.5/125	OM1	12	11,0	3000	110,0	8,40	400	110,0	<b>80940</b>
A-DF(ZN)2Y4Y	84	Single-mode E9/125	ITU-T G.652	12	11,0	3000	110,0	8,40	400	110,0	<b>80955</b>
A-DF(ZN)2Y4Y	96	Multimode G50/125	OM2	12	11,5	3000	115,0	7,20	400	120,0	<b>80923</b>
A-DF(ZN)2Y4Y	96	Multimode G62.5/125	OM1	12	11,5	3000	115,0	7,20	400	120,0	<b>80941</b>
A-DF(ZN)2Y4Y	96	Single-mode E9/125	ITU-T G.652	12	11,5	3000	115,0	7,20	400	120,0	<b>80956</b>
A-DF(ZN)2Y4Y	144	Multimode G50/125	OM2	12	14,5	3000	145,0	10,40	400	180,0	<b>80926</b>
A-DF(ZN)2Y4Y	144	Multimode G62.5/125	OM1	12	14,5	3000	145,0	10,40	400	180,0	<b>80944</b>
A-DF(ZN)2Y4Y	144	Single-mode E9/125	ITU-T G.652	12	14,5	3000	145,0	10,40	400	180,0	<b>80959</b>

Dimensions and specifications may be changed without prior notice.

## Application

These HELUCOM® fibre-optic cables are characterized by a stranded construction with jelly filling. They are made waterproof in longitudinal direction by filling a jelly mass into the stranding cavities. Non-metallic tension elements and a second outer sheath made of polyamide (PA) ensure above average strain relief and rodent protection. This construction is particularly used in the area of telecommunication and long distance, but also in regular channels and tubes where rodent infestation is possible.



# Fibre Optic Outdoor Cable

Microduct

**HELUCOM®**

A-DQ2Y, central



## Cable structure

Core type: Loose tube  
Strain relief elements: Aramide  
Outer sheath material: PE  
Outer sheath colour: Black

## Temperature range

Laying, min.: -20°C  
Laying, max.: +60°C  
Operating, min.: -20°C  
Operating, max.: +60°C

## Other data

Corrosiveness acc. to EN50267-2-3  
Halogen-free acc. to 60754-2  
Longitudinally water-tight acc. to IEC 60794-1-2-F5  
UV-resistant

Designation	No. of fibres	Fibre type	Fibre category	Number of fibres per core	Outer Ø app. mm	Max. tensile force N	Min. stat. bending radius mm	Caloric load app. MJ / m	Max. transverse pressure N / cm	Weight kg / km	Part no.
A-DQ2Y central	4	Single-mode E9/125	ITU-T G.652	4	2,5	180	40,0	1,40	100	6,0	<b>803664</b>
A-DQ2Y central	12	Single-mode E9/125	ITU-T G.652	12	2,5	180	40,0	1,40	100	6,0	<b>803929</b>

Dimensions and specifications may be changed without prior notice.

## Application

These HELUCOM® micro fibre-optic cables are characterized by a design that is slim but robust. Around a central tube, there is a composite of swelling fleece with characteristics that ensure the strain relief, and waterproofing in longitudinal direction of the cable. This construction is particularly used in tubes and channels. These cables can be blowing into microducts.

R

# Fibre Optic Outdoor Cable

Microduct

**HELUCOM®**

A-DQ2Y, stranded



## Cable structure

Core type: Loose tube  
Strain relief elements: Aramide  
Outer sheath material: PE  
Outer sheath colour: Black

## Temperature range

Laying, min.: -5°C  
Laying, max.: +50°C  
Operating, min.: -25°C  
Operating, max.: +70°C

## Other data

Corrosiveness acc. to EN50267-2-3  
Halogen-free acc. to 60754-2  
Longitudinally water-tight acc. to IEC 60794-1-2-F5  
UV-resistant

Designation	No. of fibres	Fibre type	Fibre category	Number of fibres per core	Outer Ø app. mm	Max. tensile force N	Min. stat. bending radius mm	Caloric load app. MJ / m	Max. transverse pressure N / cm	Weight kg / km	Part no.
A-DQ2Y stranded	4	Single-mode E9/125	ITU-T G.652	4	5,8	850	70,0	0,89	150	27,0	<b>803931</b>
A-DQ2Y stranded	12	Single-mode E9/125	ITU-T G.652	12	5,8	850	70,0	0,87	150	27,0	<b>803932</b>
A-DQ2Y stranded	24	Single-mode E9/125	ITU-T G.652	12	5,8	850	70,0	0,87	150	27,0	<b>803930</b>
A-DQ2Y stranded	48	Single-mode E9/125	ITU-T G.652	12	5,8	850	70,0	0,87	150	27,0	<b>803658</b>
A-DQ2Y stranded	72	Single-mode E9/125	ITU-T G.652	12	5,8	850	60,0	0,87	150	27,0	<b>803659</b>
A-DQ2Y stranded	96	Single-mode E9/125	ITU-T G.652	12	6,8	1000	70,0	1,25	150	40,0	<b>803660</b>
A-DQ2Y stranded	144	Single-mode E9/125	ITU-T G.652	12	9,4	1800	140,0	2,19	150	79,0	<b>803661</b>
A-DQ2Y stranded	288	Single-mode E9/125	ITU-T G.652	12	11,2	1500	115,0	2,97	100	90,0	<b>803668</b>

Dimensions and specifications may be changed without prior notice.

## Application

These HELUCOM® micro fibre-optic cables are characterized by a design that is slim but robust. Around stranded tubes, there is a composite of swelling fleece with characteristics that ensure the strain relief, and waterproofing in longitudinal direction of the cable. This construction is particularly used in tubes and channels. These cables can be blowing into microducts.

# Fibre Optic Outdoor Cable

steel armoured

**HELUCOM®**

A-DQ(ZN)(SR)2Y



## Cable structure

Core type: Loose tube  
Strain relief elements: Glass yarns  
Type of armouring: Steel rib  
Outer sheath material: PE  
Outer sheath colour: Black

## Temperature range

Laying, min.: -5°C  
Laying, max.: +50°C  
Operating, min.: -20°C  
Operating, max.: +70°C

## Other data

Corrosiveness acc. to EN50267-2-3  
Halogen-free acc. to 60754-2  
Longitudinally water-tight acc. to IEC 60794-1-2-F5  
Cable, laterally water-tight  
UV-resistant

Designation	No. of fibres	Fibre type	Fibre category	Number of fibres per core	Outer Ø app. mm	Max. tensile force N	Min. stat. bending radius mm	Caloric load app. MJ / m	Max. transverse pressure N / cm	Weight kg / km	Part no.
A-DQ(ZN)(SR)2Y	4	Multimode G50/125	OM2	4	9,5	1500	95,0	2,00	500	115,0	<b>802917</b>
A-DQ(ZN)(SR)2Y	4	Multimode G62.5/125	OM1	4	9,5	1500	95,0	2,00	500	115,0	<b>803925</b>
A-DQ(ZN)(SR)2Y	4	Single-mode E9/125	ITU-T G.652	4	9,5	1500	95,0	2,00	500	105,0	<b>803927</b>
A-DQ(ZN)(SR)2Y	12	Multimode G50/125	OM2	12	9,5	1500	95,0	2,00	500	115,0	<b>802918</b>
A-DQ(ZN)(SR)2Y	12	Multimode G62.5/125	OM1	12	9,5	1500	95,0	2,00	500	115,0	<b>803926</b>
A-DQ(ZN)(SR)2Y	12	Single-mode E9/125	ITU-T G.652	12	9,5	1500	95,0	2,00	500	115,0	<b>803928</b>

Dimensions and specifications may be changed without prior notice.

## Application

These HELUCOM® fibre-optic cables are characterized by a compact construction with a swelling fleece. Above-average rodent protection is achieved with the metallic rodent protection (steel groove) and an outer sheath made of PE. This construction is particularly used in the area of telecommunication and long distance, but also in regular channels and tubes where rodent infestation is possible.

R

# Fibre Optic Outdoor Cable

acc. ARCOR Standard

**HELUCOM®**

A-DF(ZN)2Y(SR)2Y



## Cable structure

Core type: Loose tube  
 GRP support element  
 Strain relief elements: Aramide  
 Inner sheath material: PE  
 Type of armouring: Steel rib  
 Outer sheath material: PE  
 Outer sheath colour: Black

## Temperature range

Laying, min.: -5°C  
 Laying, max.: +50°C  
 Operating, min.: -25°C  
 Operating, max.: +60°C

## Other data

Corrosiveness acc. to EN50267-2-3  
 Halogen-free acc. to 60754-2  
 Longitudinally water-tight acc. to IEC 60794-1-2-F5  
 Cable, laterally water-tight  
 UV-resistant

Designation	No. of fibres	Fibre type	Fibre category	Number of fibres per core	Outer Ø app. mm	Max. tensile force N	Min. stat. bending radius mm	Caloric load app. MJ / m	Max. transverse pressure N / cm	Weight kg / km	Part no.
A-DF(ZN)2Y(SR)2Y	12	Single-mode E9/125	ITU-T G.652	2	13,0	2700	130,0	0,00	800	180,0	<b>82190</b>
A-DF(ZN)2Y(SR)2Y	24	Single-mode E9/125	ITU-T G.652	4	13,0	2700	130,0	0,00	800	180,0	<b>800708</b>
A-DF(ZN)2Y(SR)2Y	48	Single-mode E9/125	ITU-T G.652	12	13,0	2700	130,0	0,00	800	180,0	<b>800709</b>
A-DF(ZN)2Y(SR)2Y	60	Single-mode E9/125	ITU-T G.652	12	13,0	2700	130,0	0,00	800	180,0	<b>800710</b>

Dimensions and specifications may be changed without prior notice.

## Application

These HELUCOM® fibre-optic cables are characterized by a stranded construction with jelly filling. They are made waterproof in longitudinal direction by filling a jelly mass into the stranding cavities. Above-average rodent protection is achieved with the metallic rodent protection (steel groove) and the second outer sheath made of PE. This construction is particularly used in the area of telecommunication and long distance where ARCOR standards must be followed, but also in regular channels and tubes where rodent infestation is possible.

# Fibre Optic Outdoor Cable Hybrid

acc. DIN VDE 0888

HELUCOM®

A-DSQ(ZN)B2Y



## Cable structure

Core type: Loose tube  
GRP support element  
Number of fibres per core: 4  
Strain relief elements: Glass yarns  
Type of armouring: Glass yarns  
Outer sheath material: PE  
Outer sheath colour: Black

## Temperature range

Laying, min.: -10°C  
Laying, max.: +60°C  
Operating, min.: -25°C  
Operating, max.: +60°C

## Other data

Corrosiveness acc. to EN50267-2-3  
Longitudinally water-tight acc. to IEC 60794-1-2-F5  
UV-resistant

Designation	No. of fibres	Fibre type	No. of copper cores	Dimensions of copper cores mm	Outer Ø app. mm	Max. tensile force N	Min. stat. bending radius mm	Caloric load app. MJ / m	Max. transverse pressure N / cm	Weight kg / km	Part no.
A-DSQ(ZN)B2Y	4	Multimode G50/125	2	1,2	12,0	2100	300	4,80	200	140,0	<b>81209</b>
A-DSQ(ZN)B2Y	4	Multimode G62.5/125	2	1,2	12,0	2100	300	4,80	200	140,0	<b>81255</b>
A-DSQ(ZN)B2Y	4	Single-mode E9/125	2	1,2	12,0	2100	300	4,80	200	140,0	<b>81256</b>
A-DSQ(ZN)B2Y	4	Multimode G50/125	2	1,5	12,5	2300	320	4,80	200	160,0	<b>82561</b>
A-DSQ(ZN)B2Y	4	Multimode G62.5/125	2	1,5	12,5	2300	320	4,80	200	160,0	<b>81257</b>
A-DSQ(ZN)B2Y	4	Single-mode E9/125	2	1,5	12,5	2300	320	4,80	200	160,0	<b>81258</b>
A-DSQ(ZN)B2Y	4	Multimode G50/125	4	1,5	17,0	2600	430	5,80	200	250,0	<b>82786</b>
A-DSQ(ZN)B2Y	4	Multimode G62.5/125	4	1,5	17,0	2600	430	5,80	200	250,0	<b>81259</b>
A-DSQ(ZN)B2Y	4	Single-mode E9/125	4	1,5	17,0	2600	430	5,80	200	250,0	<b>81260</b>

Dimensions and specifications may be changed without prior notice.

## Application

These HELUCOM® fibre-optic cables are designed especially for use in fibre-optical temperature measurements, such as monitoring of dams. The extreme mechanical requirements in these areas are fulfilled by the specially designed cable construction. These lines are hybrid glass fibre lines with copper cores and a special PE outer sheath.

R

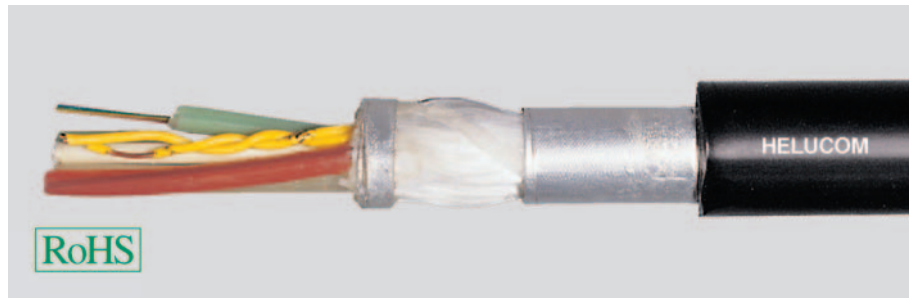


# Fibre Optic Outdoor Cable Hybrid

acc. DIN VDE 0888

HELUCOM®

A-DSF(L)(ZN)2Y



## Cable structure

Core type: Loose tube  
 GRP support element  
 Number of fibres per core: 12  
 Strain relief elements: Aramide  
 Aluminium laminated sheath  
 Outer sheath material: PE  
 Outer sheath colour: Black

## Temperature range

Laying, min.: -5°C  
 Laying, max.: +50°C  
 Operating, min.: -25°C  
 Operating, max.: +60°C

## Other data

Corrosiveness acc. to EN50267-2-3  
 Halogen-free acc. to 60754-2  
 Longitudinally water-tight acc. to IEC 60794-1-2-F5  
 Cable, laterally water-tight  
 UV-resistant

Designation	No. of fibres	Fibre type	No. of copper cores	Dimensions of copper cores mm	Outer Ø app. mm	Max. tensile force N	Min. stat. bending radius mm	Caloric load app. MJ / m	Max. transverse pressure N / cm	Weight kg / km	Part no.
A-DSF(L)(ZN)2Y	12	Single-mode E9/125	2	0,6	12,0	2500	200	4,80	250	135,0	<b>80495</b>
A-DSF(L)(ZN)2Y	12	Single-mode E9/125	4	0,6	12,0	2500	200	4,80	250	140,0	<b>80497</b>
A-DSF(L)(ZN)2Y	24	Single-mode E9/125	2	0,6	13,1	2500	200	4,80	250	139,0	<b>800753</b>
A-DSF(L)(ZN)2Y	24	Single-mode E9/125	4	0,6	13,1	2500	200	4,80	250	144,0	<b>801182</b>
A-DSF(L)(ZN)2Y	48	Single-mode E9/125	2	0,6	13,1	2500	200	4,80	250	141,0	<b>80501</b>
A-DSF(L)(ZN)2Y	48	Single-mode E9/125	4	0,6	13,1	2500	200	4,80	250	146,0	<b>80503</b>
A-DSF(L)(ZN)2Y	60	Single-mode E9/125	2	0,6	14,1	2500	230	4,80	250	166,0	<b>80504</b>
A-DSF(L)(ZN)2Y	60	Single-mode E9/125	4	0,6	14,1	2500	230	4,80	250	171,0	<b>80506</b>
A-DSF(L)(ZN)2Y	72	Single-mode E9/125	2	0,6	14,8	2500	240	5,10	250	179,0	<b>80507</b>
A-DSF(L)(ZN)2Y	72	Single-mode E9/125	4	0,6	14,8	2500	240	5,10	250	184,0	<b>80509</b>
A-DSF(L)(ZN)2Y	96	Single-mode E9/125	2	0,6	16,6	3000	280	6,30	250	276,0	<b>80510</b>
A-DSF(L)(ZN)2Y	96	Single-mode E9/125	4	0,6	16,6	3000	280	6,30	250	281,0	<b>80512</b>
A-DSF(L)(ZN)2Y	120	Single-mode E9/125	2	0,6	18,4	3000	290	8,50	250	280,0	<b>80513</b>
A-DSF(L)(ZN)2Y	120	Single-mode E9/125	4	0,6	18,4	3000	290	8,50	250	285,0	<b>80515</b>
A-DSF(L)(ZN)2Y	144	Single-mode E9/125	2	0,6	20,3	3500	310	10,00	250	331,0	<b>80516</b>
A-DSF(L)(ZN)2Y	144	Single-mode E9/125	4	0,6	20,3	3500	310	10,00	250	336,0	<b>80518</b>

Dimensions and specifications may be changed without prior notice.

## Application

These HELUCOM® outdoor cables are designed for use under extreme environmental conditions. With the double jelly filling and the Al/PE laminated sheath, they are water proof in longitudinal and transverse direction. The welded Al tape acts as an additional vapour barrier. These cables can be laid directly in the ground, in tubes and in ducts. They are mainly used in local and long-distance networks.

# Aerial Fibre Optic Cable

metall free

HELUCOM®

ADSS



## Cable structure

Core type: Loose tube  
GRP support element  
Strain relief elements: Aramide  
Inner sheath material: PE  
Outer sheath material: PE  
Outer sheath colour: Black

## Temperature range

Laying, min.: -10°C  
Laying, max.: +60°C  
Operating, min.: -25°C  
Operating, max.: +70°C

## Other data

Sag at 25°C ADSS 9: 2,0 m  
Sag at 25°C ADSS 16: 4,5 m  
Sag at 25°C ADSS 35: 9,5 m  
Halogen-free acc. to 60754-2  
Longitudinally water-tight acc. to IEC 60794-1-2-F5  
Cable, laterally water-tight  
UV-resistant

Designation	Number of fibres	Fibre type	Number of fibres per core	Span width m	Max. tensile force kN	Additional load daN / m	Min. stat. bending radius mm	Outer Ø app. mm	Weight kg / km	Part no.
ADSS 9	12	Single-mode E9/125	4	150	9	0,5	410	13,6	135	<b>82390</b>
ADSS 9	24	Single-mode E9/125	4	150	9	0,5	410	13,6	137	<b>82391</b>
ADSS 9	36	Single-mode E9/125	6	150	9	0,5	470	15,6	177	<b>82392</b>
ADSS 9	48	Single-mode E9/125	8	150	9	0,5	470	15,6	178	<b>82393</b>
ADSS 9	60	Single-mode E9/125	12	150	9	0,5	450	15,0	161	<b>82394</b>
ADSS 9	144	Single-mode E9/125	12	150	9	0,5	630	20,8	316	<b>82395</b>
ADSS 16	12	Single-mode E9/125	4	350	16	0,3	430	14,4	162	<b>82396</b>
ADSS 16	24	Single-mode E9/125	4	350	16	0,3	430	14,4	165	<b>82397</b>
ADSS 16	36	Single-mode E9/125	6	350	16	0,3	500	16,4	200	<b>82398</b>
ADSS 16	48	Single-mode E9/125	8	350	16	0,3	500	16,4	201	<b>82399</b>
ADSS 16	60	Single-mode E9/125	12	350	16	0,3	480	15,8	184	<b>82400</b>
ADSS 16	144	Single-mode E9/125	12	350	16	0,3	650	21,6	333	<b>82401</b>
ADSS 35	12	Single-mode E9/125	4	700	35	0,35	520	17,2	198	<b>82402</b>
ADSS 35	24	Single-mode E9/125	4	700	35	0,35	520	17,2	200	<b>82403</b>
ADSS 35	36	Single-mode E9/125	6	700	35	0,35	580	19,2	240	<b>82404</b>
ADSS 35	48	Single-mode E9/125	8	700	35	0,35	580	19,2	241	<b>82405</b>
ADSS 35	60	Single-mode E9/125	12	700	35	0,35	560	18,6	227	<b>82406</b>
ADSS 35	144	Single-mode E9/125	12	700	35	0,35	730	24,4	381	<b>82407</b>

Dimensions and specifications may be changed without prior notice.

## Application

These HELUCOM® outdoor cables designed as aerial cables for freely suspended installations on posts and masts. The construction is waterproof in longitudinal direction thanks to the use of jelly-filled bundle cores and swelling tape. The outer jacket is UV-resistant and at the same time provides protection against environmental influences, such as snow, ice, sun insolation and wind.

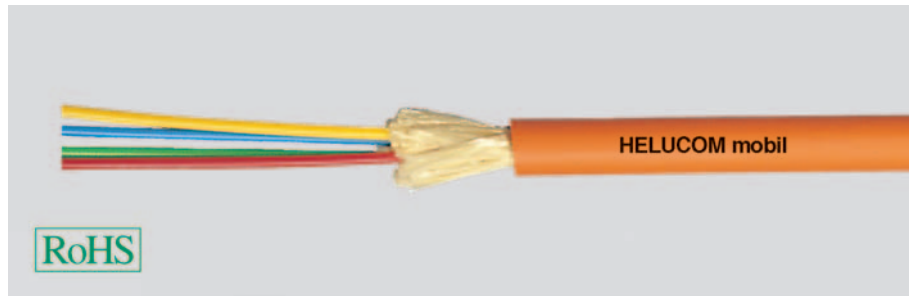
R

# Fibre Optic Cable flexible

WK - mobile

HELUCOM® WK

A-V(ZN)11Y



## Cable structure

Core type: Tight buffer  
Strain relief elements: Aramide  
Outer sheath colour: Orange

## Temperature range

Laying, min.: +5°C  
Laying, max.: +50°C  
Operating, min.: -30°C  
Operating, max.: +70°C

## Other data

Max. tensile force: 650 N  
Max. transverse pressure: 40 N / cm  
Longitudinally water-tight acc. to IEC 60794-1-2-F5  
UV-resistant  
Resistant to hammer impact acc. to IEC 60794-1-2-E6  
Bending cycles acc. to IEC 60794-1-2-E6: 500.000  
Oil-resistant

Designation	Number of fibres	Fibre type	Outer Ø app. mm	Outer sheath material	Min. stat. bending radius mm	Flame proof	halogen-free	UL	Weight kg / km	Part no.
Fibre-optic cable	2	Multimode G50/125	5,0	PUR	75	yes	yes	no	20	<b>80382</b>
Fibre-optic cable	2	Multimode G62.5/125	5,0	PUR	75	yes	yes	no	20	<b>80363</b>
Fibre-optic cable	4	Multimode G50/125	5,8	PUR	90	yes	yes	no	31	<b>80534</b>
Fibre-optic cable	4	Multimode G62.5/125	5,8	PUR	90	yes	yes	no	31	<b>81036</b>
Fibre-optic cable	4	Single-mode E9/125	5,8	PUR	90	yes	yes	no	31	<b>801727</b>
Fibre-optic cable	8	Multimode G50/125	7,0	PUR	105	yes	yes	no	47	<b>81037</b>
Fibre-optic cable	8	Multimode G62.5/125	7,0	PUR	105	yes	yes	no	47	<b>81038</b>

Dimensions and specifications may be changed without prior notice.

## Application

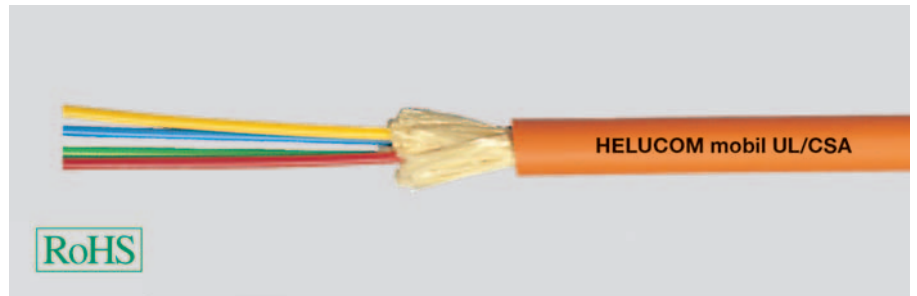
These HELUCOM® cables were designed as mobile field cables. They are easily wound up on a drum and are very tension-proof. As the outer sheath is tightly anchored on the aramid braiding, it is especially suitable for mobile use. The advantage of these cables is evident especially where mobile fibre-optic lines are to be installed, such as for drag chains, TV transmission, supervision of protected areas, etc.

# Fibre Optic Cable flexible

WK - UL/CSA

HELUCOM® WK

A-V(ZN)YY



## Cable structure

Core type: Tight buffer  
Strain relief elements: Aramide  
Outer sheath colour: Orange

## Temperature range

Laying, min.: 0°C  
Laying, max.: +50°C  
Operating, min.: -30°C  
Operating, max.: +80°C

## Other data

Max. tensile force: 1200 N  
Max. transverse pressure: 44 N / cm  
Longitudinally water-tight acc. to IEC 60794-1-2-F5  
UV-resistant  
Bending cycles acc. to IEC 60794-1-2-E6: 9.000  
Oil-resistant

Designation	Number of fibres	Fibre type	Outer Ø app. mm	Outer sheath material	Inner sheath material	Min. stat. bending radius mm	Flame proof	halogen-free	UL	Weight kg / km	Part no.
Fibre-optic cable	4	Multimode G50/125	7,0	PVC	PVC	75	yes	no	yes	50	<b>802792</b>
Fibre-optic cable	4	Multimode G62.5/125	7,0	PVC	PVC	75	yes	no	yes	50	<b>803934</b>
Fibre-optic cable	4	Single-mode E9/125	7,0	PVC	PVC	75	yes	no	yes	50	<b>803935</b>

Dimensions and specifications may be changed without prior notice.

## Application

These HELUCOM® cables were designed as mobile field cables. They are easily wound up on a drum and are very tension-proof. As the outer sheath is tightly anchored on the aramid braiding, it is especially suitable for mobile use. The advantage of these cables is evident especially where mobile fibre-optic lines are to be installed, such as windturbine projects, TV transmission, supervision of protected areas, etc.. This series with PVC jacket is certified according to the **UL/CSA standard OFNG/ FT4**.

R

# Fibre Optic Cable flexible

**WK robust PUR + PVC (UL/CSA)**

**HELUCOM® WK**

AT-V(ZN)H(ZN)11Y, AT-V(ZN)Y(ZN)Y



## Cable structure

Core type: Composite buffered  
Strain relief elements: Aramide  
Outer sheath colour: Black

## Temperature range

Laying, min.: -10°C  
Laying, max.: +50°C  
Operating, min.: -40°C  
Operating, max.: +90°C

## Other data

Max. tensile force: 4800 N  
Max. transverse pressure: 200 N / cm  
Longitudinally water-tight acc. to IEC 60794-1-2-F5  
UV-resistant  
Resistant to hammer impact acc. to IEC 60794-1-2-E6  
Bending cycles acc. to IEC 60794-1-2-E6: 9.000  
Oil-resistant

Designation	Number of fibres	Fibre type	Outer Ø app. mm	Outer sheath material	Inner sheath material	Min. stat. bending radius mm	Flame proof	halogen-free	UL	Weight kg / km	Part no.
AT-V(ZN)H(ZN)11Y 4		Multimode G50/125	8,5	PUR	ULSZH	100	yes	yes	no	125	<b>803346</b>
AT-V(ZN)Y(ZN)Y 4		Multimode G50/125	8,5	PVC	PVC	130	yes	no	yes	125	<b>803348</b>
AT-V(ZN)Y(ZN)Y 12		Multimode G50/125	12,4	PVC	PVC	190	yes	no	yes	320	<b>803349</b>
AT-V(ZN)H(ZN)11Y 12		Multimode G50/125	12,4	PUR	ULSZH	190	yes	yes	no	320	<b>803347</b>
AT-V(ZN)H(ZN)11Y 12		Single-mode E9/125	12,4	PUR	ULSZH	190	yes	yes	no	320	<b>804700</b>

Dimensions and specifications may be changed without prior notice.

## Application

The HELUCOM® WK range is set apart by its extreme rugged yet highly-flexible design. It is used wherever demanding environmental conditions and extreme movements occur. The tight buffer structure enables the cable to be pre-assembled on site with ease. Applications are for example Windturbines, TV transmissions, mobile field applications, etc..



# Fibre Optic Cable flexible

**HELUCOM® WK**

AT-V(ZN)YY



## Cable structure

Core type: Composite buffered  
Strain relief elements: Aramide  
Outer sheath colour: Yellow

## Temperature range

Laying, min.: -10°C  
Laying, max.: +50°C  
Operating, min.: -40°C  
Operating, max.: +90°C

## Other data

Max. tensile force: 1200 N  
Max. transverse pressure: 100 N / cm  
UV-resistant  
Resistant to hammer impact acc. to IEC 60794-1-2-E6  
Bending cycles acc. to IEC 60794-1-2-E6: 15  
Oil-resistant

Designation	Number of fibres	Fibre type	Outer Ø app. mm	Outer sheath material	Inner sheath material	Min. stat. bending radius mm	Flame proof	halogen-free	UL	Weight kg / km	Part no.
Fibre-optic cable	4	Multimode G50/125	7,4	PVC	PVC	90	yes	no	no	65	<b>803364</b>

Dimensions and specifications may be changed without prior notice.

## Application

The HELUCOM® range is set apart by its extreme rugged yet flexible design. It is used wherever demanding environmental conditions and movements occur. The tight buffer structure enables the cable to be pre-assembled on site with ease. Applications are for example industry applications, TV transmissions, etc..

**R**

# Fibre Optic Breakout Cable

outdoor

**HELUCOM®**  
AT-V(ZN)HH(ZN)B2Y



## Cable structure

Core type: Composite buffered  
GRP support element  
Strain relief elements: Aramide  
Inner sheath material: ULSZH  
Outer sheath material: PE  
Outer sheath colour: Black

## Temperature range

Laying, min.: -5°C  
Laying, max.: +50°C  
Operating, min.: -20°C  
Operating, max.: +60°C

## Other data

Longitudinally water-tight acc. to  
IEC 60794-1-2-F5  
UV-resistant  
Oil-resistant

Designation	Number of fibres	Fibre type	Outer Ø app. mm	Max. tensile force N	Min. stat. bending radius mm	Max. transverse pressure N / cm	Caloric load app. MJ / m	Weight kg / km	Part no.
AT-V(ZN)HH(ZN)B2Y 4	4	Multimode G50/125	13,5	1200	340	300	2,95	140	<b>801352</b>

Dimensions and specifications may be changed without prior notice.

## Application

The HELUCOM® range is set apart by its extreme rugged rodent protected design. It is used wherever demanding environmental conditions while fixed installations occur. The tight buffer structure enables the cable to be pre-assembled on site with ease. Applications are for example industry applications, etc..

# Fibre Optic Cable robust

**multimode**

**HELUCOM®**  
AT-VYY



## Cable structure

Core type: Tight buffer  
Strain relief elements: Aramide  
Outer sheath material: PVC  
Outer sheath colour: Black

## Temperature range

Laying, min.: -5°C  
Laying, max.: +50°C  
Operating, min.: -20°C  
Operating, max.: +60°C

## Other data

Flame-resistance acc. to IEC 60332-1  
Longitudinally water-tight acc. to IEC 60794-1-2-F5  
UV-resistant  
Oil-resistant

Designation	Number of fibres	Fibre type	Number of fibres per core	Outer Ø app. mm	Max. tensile force N	Min. stat. bending radius mm	Max. transverse pressure N / cm	Caloric load app. MJ / m	Weight kg / km	Part no.
AT-VYY	2	Multimode G62.5/125	1	6,8 x 10,2	400	110,0	300	1,10	76,0	<b>800126</b>

Dimensions and specifications may be changed without prior notice.

## Application

This HELUCOM® fibre-optic cable is suited for fixed installations in pits and channels, but also for flexible applications as jumper cable. Because of the robust construction with Single- and Overall-jacket you also can use it in industrial areas. With the core-construction, direct plug manufacturing, even on site, poses no problems.

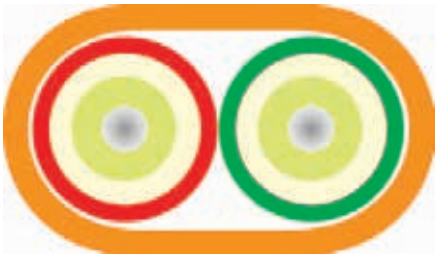
**R**

# Fibre Optic Cable flexible

HCS

HELUCOM®

I-VH, I-VHH



## Cable structure

Core type: Composite buffered  
 Strain relief elements: Aramide  
 Outer sheath material: FRNC  
 Outer sheath colour: Orange

## Temperature range

Laying, min.: -5°C  
 Laying, max.: +50°C  
 Operating, min.: -10°C  
 Operating, max.: +60°C

## Other data

Corrosiveness acc. to EN50267-2-3  
 Halogen-free acc. to 60754-2  
 Flame-resistance acc. to IEC 60332-1  
 Smoke density acc. to IEC 61034

Designation	Number of fibres	Fibre type	Outer Ø app. mm	Max. tensile force N	Min. stat. bending radius mm	Max. transverse pressure N / cm	Caloric load app. MJ / m	Weight kg / km	Part no.
I-VH	1	HCS 200/230	2,8	300	40	10	0,26	2,8	<b>800579</b>
I-VHH	2	HCS 200/230	3,8 x 6,6	600	50	10	0,52	30,0	<b>81238</b>

Dimensions and specifications may be changed without prior notice.

## Application

These HELUCOM® HCS fibre lines are suitable for stationary installation indoors. For heavy-duty mechanical requirements, such as application in industrial environments, a version with PUR outer sheath is available on request. With a HCS fibre transmission lengths of up to 300m can be achieved. With the tight buffer construction, direct plug manufacturing, even on site, poses no problems.

# Fibre Optic Breakout Cable flexible

HCS

HELUCOM®

AT-V(ZN)HH



## Cable structure

Core type: Composite buffered  
 GRP support element  
 Strain relief elements: Aramide  
 Outer sheath material: FRNC  
 Outer sheath colour: Black

## Temperature range

Laying, min.: -20°C  
 Laying, max.: +50°C  
 Operating, min.: -20°C  
 Operating, max.: +70°C

## Other data

Corrosiveness acc. to EN50267-2-3  
 Halogen-free acc. to 60754-2  
 Flame-resistance acc. to IEC 60332-1  
 Smoke density acc. to IEC 61034  
 UV-resistant  
 Oil-resistant

Designation	Number of fibres	Fibre type	Number of fibres per core	Outer Ø app. mm	Max. tensile force N	Min. stat. bending radius mm	Max. transverse pressure N / cm	Caloric load app. MJ / m	Weight kg / km	Part no.
AT-V(ZN)HH	4	HCS 200/230	1	9,0	800	225,0	100	1,60	76,0	<b>802260</b>

Dimensions and specifications may be changed without prior notice.

## Application

This HELUCOM® HCS fibre cable is suitable for fixed and normal flexible installation. Possible applications are normal requirements and also limited industrial environments. With the tight buffer construction, direct plug manufacturing, even on site, poses no problems. With a HCS fibre transmission lengths of up to 300m can be achieved.

R



# Fibre Optic Breakout Cable robust, flexible

HCS UL/CSA

**HELUCOM®**  
I-V(ZN)YY


## Cable structure

Core type: Composite buffered  
Strain relief elements: Aramide  
Outer sheath material: PVC  
Outer sheath colour: Black

## Temperature range

Laying, min.: -20°C  
Laying, max.: +75°C  
Operating, min.: -30°C  
Operating, max.: +85°C

## Other data

Flame-resistance acc. to IEC 60332-1 and IEC 60332-3  
UV-resistant  
Oil-resistant

Designation	Number of fibres	Fibre type	Number of fibres per core	Outer Ø app. mm	Max. tensile force N	Min. stat. bending radius mm	Max. transverse pressure N / cm	Caloric load app. MJ / m	Weight kg / km	Part no.
I-V(ZN)YY	2	HCS 200/230	1	7,5	800	100,0	300	1,40	68,0	<b>801733</b>

Dimensions and specifications may be changed without prior notice.

## Application

This HELUCOM® HCS fibre cable is suitable for fixed and normal flexible installations. Possible applications are normal and heavy-duty mechanical requirements for example in industrial environments. Because of a special PVC jacket this construction is certified by UL (FT1 and FT4). With the tight buffer construction, direct plug manufacturing, even on site, poses no problems. With a HCS fibre transmission lengths of up to 300m can be achieved.

# Fibre Optic Breakout Cable robust, flexible

HCS

**HELUCOM®**  
I-V(ZN)Y11Y



## Cable structure

Core type: Composite buffered  
Strain relief elements: Aramide  
Outer sheath material: PUR  
Outer sheath colour: Red

## Temperature range

Laying, min.: -5°C  
Laying, max.: +50°C  
Operating, min.: -20°C  
Operating, max.: +70°C

## Other data

Oil-resistant

Designation	Number of fibres	Fibre type	Number of fibres per core	Outer Ø app. mm	Max. tensile force N	Min. stat. bending radius mm	Max. transverse pressure N / cm	Caloric load app. MJ / m	Weight kg / km	Part no.
I-V(ZN)Y11Y	2	HCS 200/230	1	7,0	800	50,0	150	1,014	43,0	<b>800980</b>

Dimensions and specifications may be changed without prior notice.

## Application

This HELUCOM® HCS fibre cable is suitable for fixed installation. Possible applications are normal and heavy-duty mechanical requirements for example in industrial environments. With the tight buffer construction, direct plug manufacturing, even on site, poses no problems. With a HCS fibre transmission lengths of up to 300m can be achieved.

R

# Fibre Optic Breakout Cable robust

HCS

HELUCOM®

AT-VQH(ZN)B2Y



## Cable structure

Core type: Composite buffered  
GRP support element  
Strain relief elements: Aramide  
Type of armouring: Glass yarns  
Outer sheath material: PE  
Outer sheath colour: Black

## Temperature range

Laying, min.: -5°C  
Laying, max.: +50°C  
Operating, min.: -25°C  
Operating, max.: +70°C

## Other data

Corrosiveness acc. to EN50267-2-3  
Halogen-free acc. to 60754-2  
Longitudinally water-tight acc. to IEC 60794-1-2-F5  
UV-resistant  
Oil-resistant

Designation	Number of fibres	Fibre type	Number of fibres per core	Outer Ø app. mm	Max. tensile force N	Min. stat. bending radius mm	Max. transverse pressure N / cm	Caloric load app. MJ / m	Weight kg / km	Part no.
AT-VQH(ZN)B2Y	2	HCS 200/230	1	11,0	1500	200,0	500	2,10	90,0	<b>801196</b>

Dimensions and specifications may be changed without prior notice.

## Application

This HELUCOM® HCS fibre cable is suitable for fixed installation outdoors. Possible applications are normal and heavy-duty mechanical requirements for example in industrial environments. This is the reason we also equipped the cable with a non-metallic rodent-protection. With the tight buffer construction, direct plug manufacturing, even on site, poses no problems. With a HCS fibre transmission lengths of up to 300m can be achieved.

# Fibre Optic Universal Cable

HCS

HELUCOM®

A/I-DQ(ZN)BH



## Cable structure

Core type: Loose tube  
 Strain relief elements: Glass yarns  
 Type of armouring: Glass yarns  
 Outer sheath material: FR/LSOH  
 Outer sheath colour: Black

## Temperature range

Laying, min.: -5°C  
 Laying, max.: +50°C  
 Operating, min.: -20°C  
 Operating, max.: +70°C

## Other data

Corrosiveness acc. to EN50267-2-3  
 Halogen-free acc. to 60754-2  
 Flame-resistance acc. to IEC 60332-1  
 Smoke density acc. to IEC 61034  
 Longitudinally water-tight acc. to IEC 60794-1-2-F5  
 UV-resistant

Designation	Number of fibres	Fibre type	Number of fibres per core	Outer Ø app. mm	Max. tensile force N	Min. stat. bending radius mm	Max. transverse pressure N / cm	Caloric load app. MJ / m	Weight kg / km	Part no.
A/I-DQ(ZN)BH	4	HCS 200/230	4	8,5	1500	130,0	150	2,00	76,0	<b>801198</b>
A/I-DQ(ZN)BH	8	HCS 200/230	8	8,5	1500	130,0	150	2,00	79,0	<b>802001</b>
A/I-DQ(ZN)BH	12	HCS 200/230	12	8,5	1500	130,0	150	2,00	82,0	<b>802002</b>
A/I-DQ(ZN)BH	24	HCS 200/230	8	17,7	6000	265,0	300	3,20	280,0	<b>802003</b>
A/I-DQ(ZN)BH	48	HCS 200/230	8	18,9	6000	285,0	300	3,20	355,0	<b>802004</b>

Dimensions and specifications may be changed without prior notice.

## Application

These HELUCOM® fibre-optic cables are available either as central bundle core cable or as stranded versions. They are suitable for fixed indoor and outdoor cabling of buildings and industry facilities. They are used in particular if the installation is to be done in one piece from the inside to the outside without additional use of couplings. With their black UV-resistant outer sheath and the non-metallic rodent protection, they are perfectly suited for outdoor use. The halogen-free outer sheath makes installation inhouse possible without any problems.

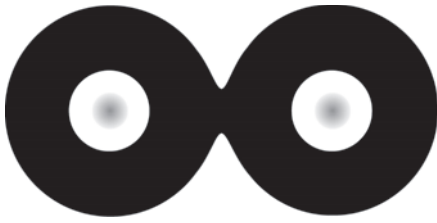
R

# Plastic Fibre cable industry

POF/PE

HELUCOM®

I-V2Y, I-V2Y(ZN)11Y



## Cable structure

Fibre type: POF 980/1000  
Fibre cladding: PE

## Optical characteristic

Refractive index core: 1,492  
Refractive index cladding: 1,419  
Numerical aperture: 0,5  
Attenuation see table

## Temperature range

Laying, min.: -20°C  
Laying, max.: +80°C  
Operating, min.: -20°C  
Operating, max.: +80°C

Designation	Outer sheath material	Sheath colour	Outer Ø app. mm	Max. tensile force N	Min. stat. bending radius mm	Fibre attenuation	Oil-resistant	Acc. to DESINA®	Weight kg / km	Part no.
I-V2Y 1P 980/1000	PE	Black	2,2	70	25,0	160A1	no	no	4,0	<b>80532</b>
I-V2Y 2P 980/1000	PE	Black	2,2 x 4,4	140	25,0	160A1	no	no	8,0	<b>80388</b>
I-V2Y(ZN)11Y 1P 980/1000	PUR	Violet	5,8	400	30,0	230A1	yes	yes	30,0	<b>81611</b>
I-V2Y(ZN)11Y 2P 980/1000	PUR	Violet	6,0	400	31,0	230A1	yes	yes	36,0	<b>80629</b>
I-V2Y(ZN)11Y 2P 980/1000	PUR	Violet	6,0	400	31,0	230A1	yes	yes	36,0	<b>81882</b>
I-V2Y(ZN)11Y 4P 980/1000	PUR	Violet	7,1	400	45,0	230A1	yes	yes	65,0	<b>80630</b>
I-V2Y(ZN)11Y 2P 980/1000 + 2x1mm <sup>2</sup> Cu	PUR	Red	7,8	200	70,0	230A1	yes	no	60,0	<b>82032</b>
I-V2Y(ZN)11Y 2P 980/1000 + 3x1,5mm <sup>2</sup> Cu	PUR	Red	11,0	200	70,0	230A1	yes	no	132,0	<b>82033</b>

Dimensions and specifications may be changed without prior notice.

## Application

HELUCOM® plastic-fibre cables are used in mechanical engineering, both in mobile and fixed applications. With different constructions, such as PUR outer sheaths, special strain relief components, hybrid construction with copper cores for power supply or only raw fibre cables, any possible fields of application are covered. Due to their solidity and their simple adjustability on site, the plastic-fibres (PMMA) are particularly suitable for applications where trouble-free data transmission is necessary under heavy-duty conditions.



# Plastic Fibre Cable Industry

POF/PA

HELUCOM®

I-V4Y(ZN)11Y



## Cable structure

Fibre type: POF 980/1000  
Fibre cladding: PA

## Optical characteristic

Refractive index core: 1,492  
Refractive index cladding: 1,419  
Numerical aperture: 0,5  
Attenuation see table

## Temperature range

Laying, min.: -5°C  
Laying, max.: +50°C  
Operating, min.: -20°C  
Operating, max.: +70°C

Designation	Outer sheath material	Sheath colour	Outer Ø app. mm	Max. tensile force N	Min. stat. bending radius mm	Fibre attenuation	Oil-resistant	Acc. to DESINA®	Weight kg / km	Part no.
I-V4Y(ZN)11Y 2P980/1000 RUGGED	PUR	Red	8,0	100	50,0	160A1	yes	no	42,0	<b>801200</b>
I-V4Y(ZN)11Y 2P980/1000 FLEX RUGGED	PUR	Red	8,0	100	50,0	250A1	yes	no	51,0	<b>801201</b>
I-V4Y(ZN)11Y 2P980/1000 HEAVY	PUR	Red	6,0	100	30,0	160A1	yes	no	28,0	<b>801202</b>

Dimensions and specifications may be changed without prior notice.

## Application

Signal lines as plastic optical fibre. The use of these transmission systems significantly reduces the number of different cables in a planned bus installation in machine tools operations. Furthermore, possible EMC problems are prevented by the metal-free construction. The main application of these cables are in machine construction and automobile industry (PA version).

R

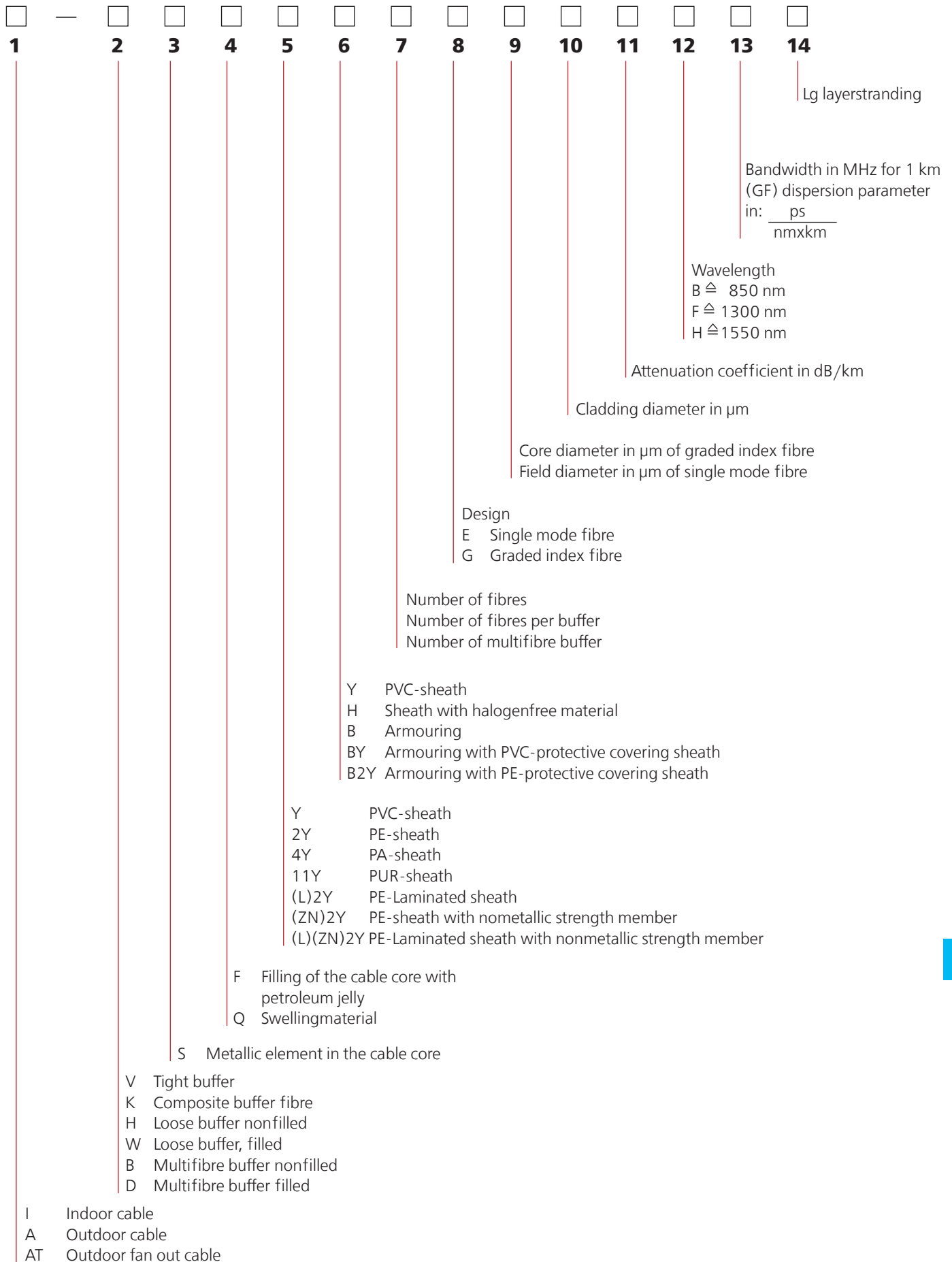
<b>Graded index fibres (multimode)</b>			
<b>Specification</b>		<b>Fibre type G 50/125</b>	<b>Fibre type G 62,5/125</b>
Fibre categorie		OM2 Standardfibre	OM1 Standardfibre
Core diameter		50 ± 3 µm	62,5 ± 3 µm
Numerical aperture		0,200 ± 0,015	0,275 ± 0,015
Typ. attenuation	850 nm	2,8 dB/km	3,0 dB/km
	1300 nm	0,7 dB/km	1,0 dB/km
Min. bandwidth	850 nm	500 MHz x km	200 MHz x km
	1300 nm	800 MHz x km	500 MHz x km
Cladding diameter		125 ± 1 µm	
Primary coating diameter		245 ± 10 µm	
Core noncircularity		< 5 %	
Cladding concentricity error		< 3,0 µm	
Cladding noncircularity		< 2,0 %	

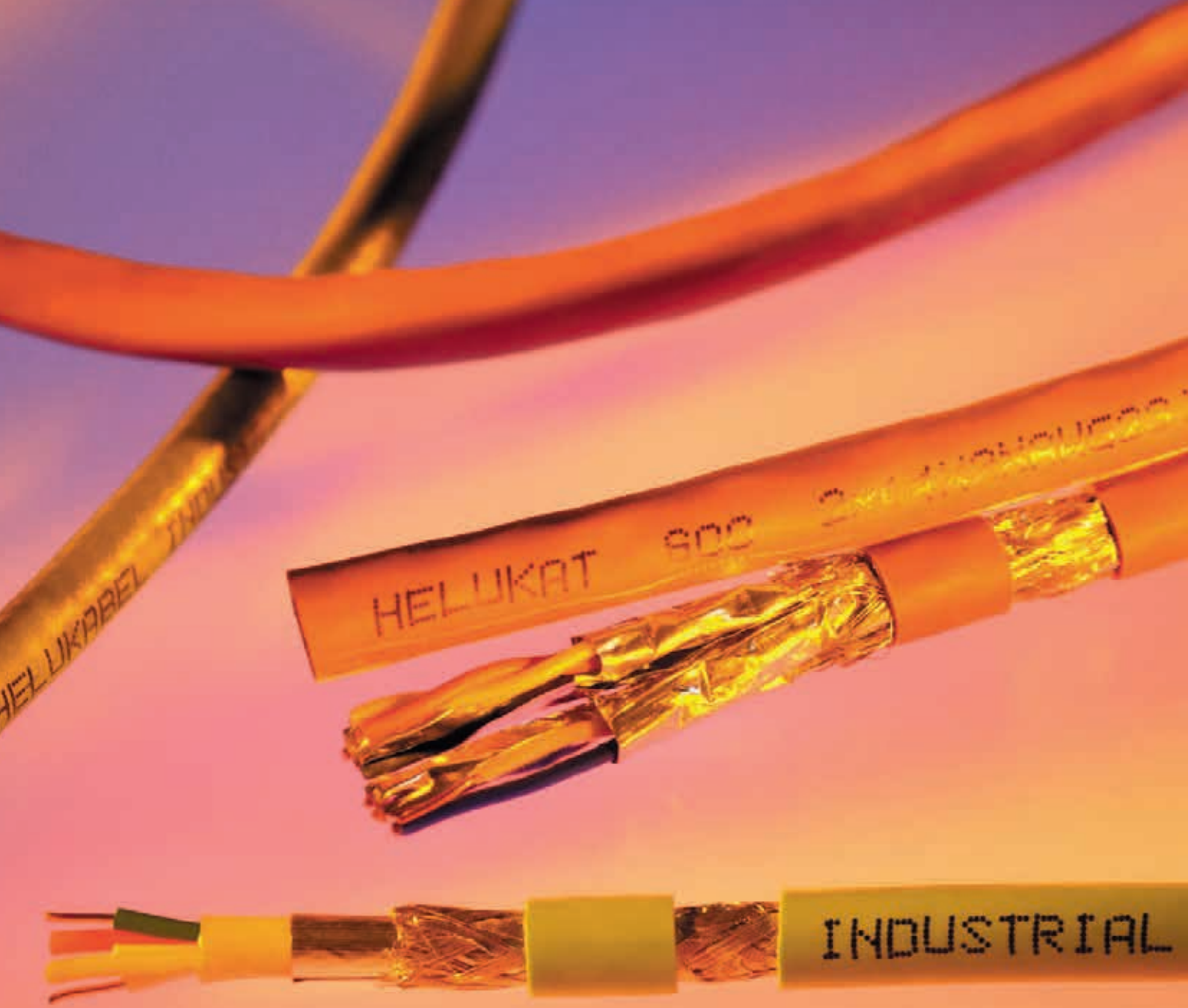
<b>Specification</b>		<b>Fibre type G 50/125</b>	
Fibre categorie		OM3 Standardfibre	OM4 Standardfibre
Core diameter		50 ± 3 µm	50 ± 3 µm
Numerical aperture		0,200 ± 0,015	0,200 ± 0,015
Typ. attenuation	850 nm	2,5 dB/km	3,0 dB/km
	1300 nm	0,5 dB/km	1,0 dB/km
Min. bandwidth	850 nm	1500 MHz x km	3500 MHz x km
	1300 nm	500 MHz x km	500 MHz x km
Cladding diameter		125 ± 1 µm	125 ± 1 µm
Primary coating diameter		245 ± 10 µm	245 ± 10 µm
Core noncircularity		< 5 %	< 5 %
Cladding concentricity error		< 3,0 µm	< 6,0 µm
Cladding noncircularity		< 2,0 %	< 2,0 %

<b>Single-Mode-Fibre</b>			
<b>Specification</b>		<b>Fibre type E9...10/125 (single mode)</b>	
Fibre categorie		ITU-T G. 652.d	
Attenuation	1300 nm	0,36 dB/km	
	1550 nm	0,22 dB/km	
Dispersion	1285 - 1330 nm	< 3,5 ps/(nm x km)	
	1550 nm	< 19 ps/(nm x km)	
Wave length		1312 nm	
Mode field diameter at 1310 nm		9,3 ± 0,5 µm	
Cladding diameter		125 ± 1 µm	
Primary coating diameter		245 ± 10 µm	
Cut-off wavelength		< 1250 nm	
Cladding concentricity error		≤ 0,8 µm	
Cladding noncircularity		< 1,0 %	

<b>POF and HCS-Fibre</b>			
<b>Specification</b>		<b>Fibre type POF P980/1000</b>	<b>Fibre type HCS K200/230</b>
Core diameter		980 µm	200 µm
Numerical aperture		0,5	0,37
Typ. attenuation	650 nm	160 dB/km	10 db/km
	850 nm	-	8 dB/km
Min. Bandwidth	650 nm	10 MHz x 100 m	17 MHz x km
	850 nm	-	20 MHz x km
Wallthickness		1000 µm	230 µm

Fibres with other parameteres on request





LAN Cable 300 UTP UL  
**LAN Cable 155 UTP**

LAN Cable 100 UTP flex

**LAN Cable 450 S-STP**

**LAN Cable 1000 S-STP duplex**

**LAN Cable 200 S-FTP flex**

**Multimedia Cable 1500 S-STP**

# ■ COPPER DATA CABLES HELUKAT®

Designation	Page
HELUKAT 155 UTP solid	654
HELUKAT 155 U/UTP solid, UL	655
HELUKAT 300 U/UTP solid, UL	656
HELUKAT 100 U/UTP flex	657
HELUKAT 155 F/UTP solid	658
HELUKAT 100 F/UTP flex	659
HELUKAT 100-FE60 F/UTP solid	660
HELUKAT 200 F/UTP flex, UL	661
HELUKAT 200 SF/UTP solid	662
HELUKAT 200 SF/UTP duplex solid	663
HELUKAT 200 SF/UTP flex	664
HELUKAT 300 U/FTP flex, UL	665
HELUKAT 450 F/FTP solid	666
HELUKAT 450 F/FTP duplex solid	667
HELUKAT 500 F/FTP solid	668
HELUKAT 500 F/FTP duplex solid	669
HELUKAT 500 U/FTP flex	670
HELUKAT 600 S/FTP solid	671
HELUKAT 600 S/FTP duplex solid	672
HELUKAT 600 S/FTP flex	673
HELUKAT 600A S/FTP solid outdoor	674
HELUKAT 600E S/FTP solid, direct burial	675
HELUKAT 600AE S/FTP solid direct burial	676
HELUKAT 1200-7A S/FTP solid	677
HELUKAT 1200-7A S/FTP duplex solid	678
HELUKAT 1200 S/FTP solid	679
HELUKAT 1200 S/FTP duplex solid	680
HELUKAT 1500 S/FTP solid	681
HELUKAT 1500 S/FTP duplex solid	682
IBM type 1A	683

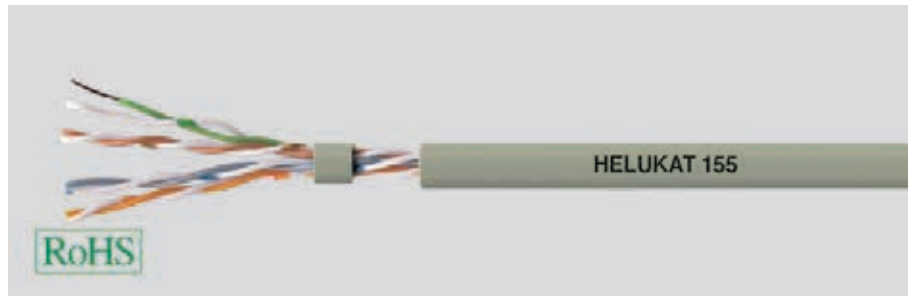
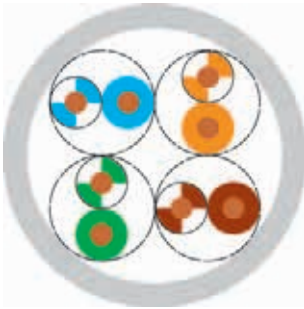
R



# LAN Cable

Category 5e

**HELUKAT®** 155  
U/UTP



## Cable structure

Inner conductor Ø:	0,51 mm
Conductor material:	Copper, bare
Core insulation:	PE
Core colours:	whbu/bu, whog/og, whgn/gn, whbn/bn
Shielding 1:	-
Screen over stranding element:	-
Screen 1 over stranding:	-
Screen 2 over stranding:	-
Outer sheath material:	PVC
Outer diameter:	app. 4,9 mm
Outer sheath colour:	Grey

## U/UTP 4x2xAWG 24/ 1 PVC

## Electrical data

Characteristic impedance:	100 Ohm ± 15 ohm at 1 to 100 MHz 100 Ohm ± 20 ohm at 101 to 155 MHz
Loop resistance:	190 Ohm/km max.
Mutual capacitance:	50 nF/km nom.
Rel. propagation velocity:	66 %

## Typical values

Frequency (MHz)	10	16	62,5	100	155
Attenuation (dB/100m)	6,3	8,0	16,5	21,3	26,8
Next (db)	50,3	47,3	38,4	35,3	33,0
ACR (db)	44,0	39,3	21,9	14,0	6,2

## Technical data

Weight:	app. 26 kg/km
bending radius, repeated:	40 mm
Operating temperature range min.:	-20°C
Operating temperature range max.:	+60°C
Caloric load, approx. value:	0,40 MJ/m
Copper weight:	17,00 kg/km

## Norms

Acc. to ISO/IEC 11801, Acc. to EN 50173, Acc. to EIA/TIA 568-A, Category 5e

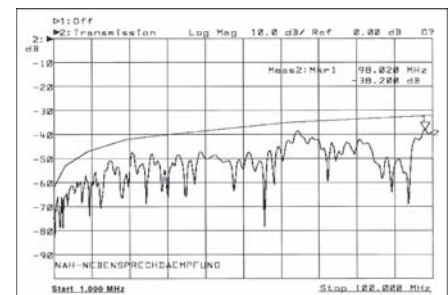
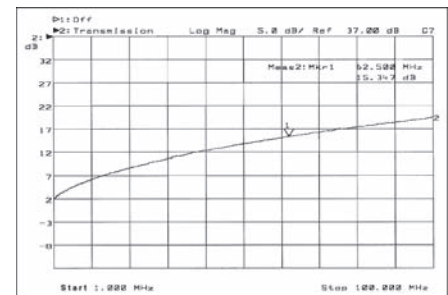
## Application

HELUKAT®155 data cables are used in the tertiary, but also in the secondary level of a network. They are characterized by large performance reserves and outstanding performance. They can be used to implement services such as Fast Ethernet, Ethernet, ATM155, FDDI, token ring 4/16 Mbit/s, or ISDN absolutely trouble-free. Likewise, the mechanical characteristics are perfectly suited for the application in tight cable channels and platforms due to their optimized construction.

## Part no.

**80053**, U/UTP 4x2xAWG24/1 PVC (UTP)

Dimensions and specifications may be changed without prior notice.

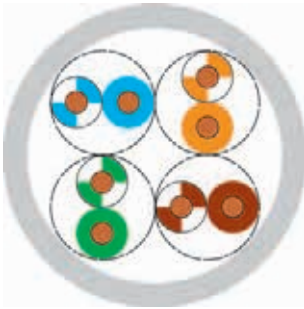


# LAN Cable

Category 5e

**HELUKAT® 155**

U/UTP UL



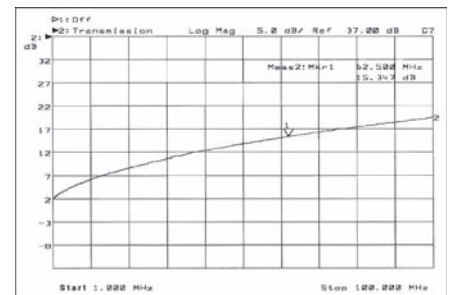
## Cable structure

Inner conductor Ø:	0,53 mm
Conductor material:	Copper, bare
Core insulation:	PE
Core colours:	whbu/bu, whog/og, whgn/gn, whbn/bn
Shielding 1:	-
Screen over stranding element:	-
Screen 1 over stranding:	-
Screen 2 over stranding:	-
Outer sheath material:	PVC
Outer diameter:	app. 5,2 mm
Outer sheath colour:	Grey

## U/UTP 4x2xAWG 24/1 PVC, UL

## Electrical data

Characteristic impedance:	100 Ohm ± 15 ohm at 1 to 100 MHz 100 Ohm ± 20 ohm at 101 to 155 MHz
Loop resistance:	190 Ohm/km max.
Mutual capacitance:	50 nF/km nom.
Rel. propagation velocity:	66 %



## Typical values

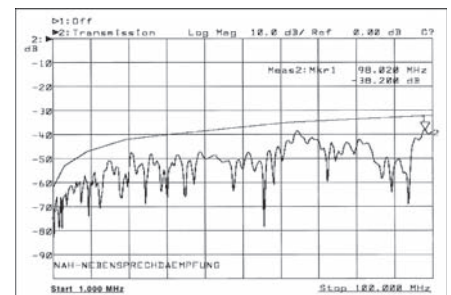
Frequency (MHz)	10	16	62,5	100	155
Attenuation (db/100m)	6,1	7,7	15,2	19,9	22,7
Next (db)	65,0	63,0	53,0	40,0	37,0
ACR (db)	58,9	55,3	37,8	20,1	14,3

## Technical data

Weight:	app. 35 kg/km
bending radius, repeated:	42 mm
Operating temperature range min.:	-20°C
Operating temperature range max.:	+60°C
Caloric load, approx. value:	0,43 MJ/m
Copper weight:	17,00 kg/km

## Norms

Acc. to ISO/IEC 11801, Acc. to EN 50173, Acc. to EIA/TIA 568-A, Category 5e, Flame-retardant acc. to IEC 60332-1, Smoke density acc. to IEC 61034, CMX 444



## Application

HELUKAT®155 data cables are used in the tertiary, but also in the secondary level of a network. They are characterized by large performance reserves and outstanding performance. They can be used to implement services such as Gigabit Ethernet, Fast Ethernet, Ethernet, ATM155, FDDI, token ring 4/16 Mbit/s, or ISDN absolutely trouble-free. Likewise, the mechanical characteristics are perfectly suited for the application in tight cable channels and platforms due to their optimized construction. This type is certified according UL because of the special PVC jacket

## Part no.

**802171**, U/UTP 4x2xAWG24/1 PVC UL (UTP)

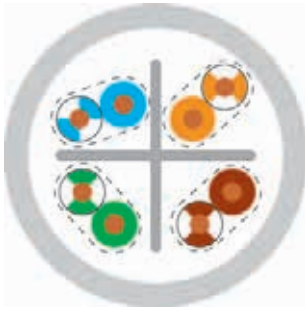
Dimensions and specifications may be changed without prior notice.

# LAN Cable

Category 6

**HELUKAT® 300**

U/UTP UL

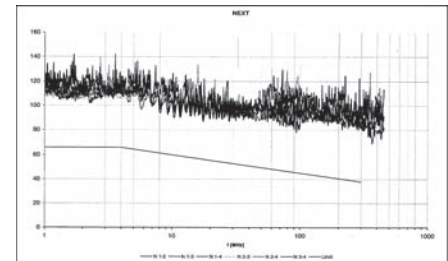


## Cable structure

Inner conductor Ø:  
Conductor material:  
Core insulation:  
Core colours:  
Shielding 1:  
Screen over stranding element:  
Screen 1 over stranding:  
Screen 2 over stranding:  
Outer sheath material:  
Outer diameter:  
Outer sheath colour:

## U/UTP 4x2xAWG 24/ 1 PVC, UL

0,55 mm  
Copper, bare  
PE  
whbu/bu, whog/og, whgn/gn, whbn/bn  
Polyester foil over stranded bundle  
-  
-  
PVC  
app. 6,3 mm  
Grey



## Electrical data

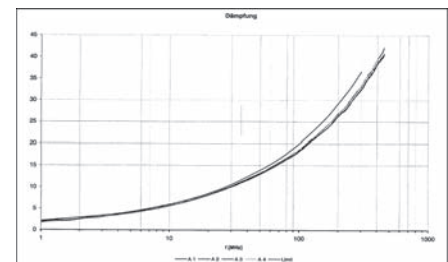
Characteristic impedance: 100 Ohm ± 15 ohm at 1 to 100 MHz  
100 Ohm ± 20 Ohm at 101 to 300 MHz  
Loop resistance: 190 Ohm/km max.  
Mutual capacitance: 50 nF/km nom.  
Rel. propagation velocity: 67 %

## Typical values

Frequency (MHz)	10	16	62,5	100	155	200	300
Attenuation (db/100m)	5,6	7,0	14,3	18,2	22,9	26,0	32,5
Next (db)	72,0	70,0	65,0	63,0	60,0	57,0	55,0
ACR (db)	66,4	63,0	50,7	44,8	37,1	31,0	22,5

## Technical data

Weight: app. 46 kg/km  
bending radius, repeated: 55 mm  
Operating temperature range min.: -20°C  
Operating temperature range max.: +60°C  
Caloric load, approx. value: 0,68 MJ/m  
Copper weight: 20,00 kg/km



## Norms

Acc. to ISO/IEC 11801, Acc. to EN 50173, Acc. to EIA/TIA 568-A, Category 6, Flame-retardant acc. to IEC 60332-1, Smoke density acc. to IEC 61034, CMX 444

## Application

HELUKAT®300 data cables are used in the tertiary, but also in the secondary level of a network. They are characterized by large performance reserves and outstanding performance. They can be used to implement services such as Gigabit Ethernet, Fast Ethernet, Ethernet, ATM155, FDDI, token ring 4/16 Mbit/s, or ISDN absolutely trouble-free. Likewise, the mechanical characteristics are perfectly suited for the application in tight cable channels and platforms due to their optimized construction. This type is certified according UL because of the special PVC jacket

## Part no.

**802172**, U/UTP 4x2xAWG24/1 PVC UL (UTP)

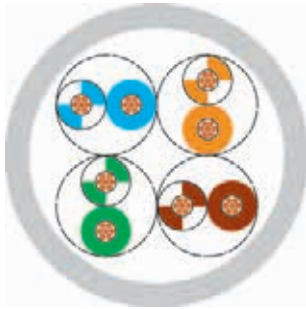
Dimensions and specifications may be changed without prior notice.

# LAN-Cable

Category 5

**HELUKAT® 100**

U/UTP flex



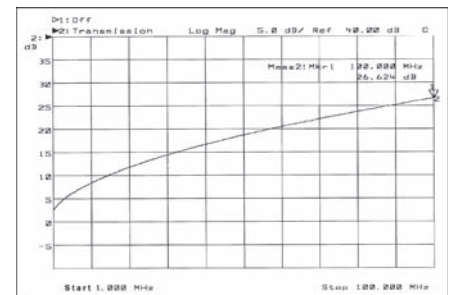
## Cable structure

Inner conductor Ø:	0,48 mm
Conductor material:	Copper, bare
Core insulation:	PO
Core colours:	whbu/bu, whog/og, whgn/gn, whbn/bn
Shielding 1:	-
Screen over stranding element:	-
Screen 1 over stranding:	-
Screen 2 over stranding:	-
Outer sheath material:	PVC
Outer diameter:	app. 4,5 mm
Outer sheath colour:	Grey similar to RAL 7035

## U/UTP 4x2xAWG 26/7 PVC

## Electrical data

Characteristic impedance:	100 Ohm ± 15 ohm at 1 to 100 MHz
Loop resistance:	290 Ohm/km max.
Mutual capacitance:	50 nF/km nom.
Rel. propagation velocity:	74 %



## Typical values

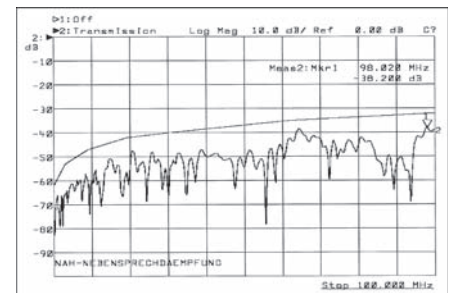
Frequency (MHz)	10	16	62,5	100
Attenuation (dB/10m)	0,9	1,2	2,4	3,1
Next (db)	53,0	50,0	41,0	38,0
ACR (db)	52,1	48,8	38,6	34,9

## Technical data

Weight:	app. 17 kg/km
bending radius, repeated:	35 mm
Operating temperature range min.:	-20°C
Operating temperature range max.:	+60°C
Caloric load, approx. value:	0,527 MJ/m
Copper weight:	11,00 kg/km

## Norms

Acc. to ISO/IEC 11801, Acc. to EN 50173, Acc. to EIA/TIA 568-A, Category 5



## Application

HELUKAT®100 data cables are used in the tertiary level of a network as patch cables and connection cables. They are characterized by large performance reserves and outstanding performance. They can be used to implement services such as Fast Ethernet, Ethernet, ATM155, FDDI, token ring 4/16 Mbit/s, or ISDN absolutely trouble-free. With its optimized construction, the HELUKAT®100 series can be manufactured quickly and easily with all common RJ45 plugs.

## Part no.

**80055**, U/UTP 4x2xAWG 26/7 PVC (UTP)

Dimensions and specifications may be changed without prior notice.

# LAN Cable

Category 5e

**HELUKAT®** 155  
F/UTP



## Cable structure

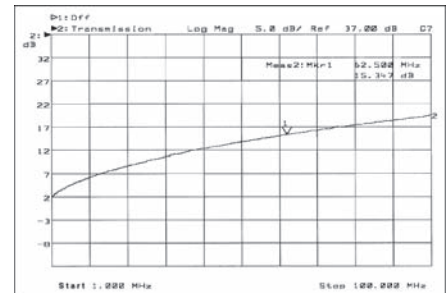
Inner conductor Ø:	0,51 mm
Conductor material:	Copper, bare
Core insulation:	PE
Core colours:	whbu/bu, whog/og, whgn/gn, whbn/bn
Shielding 1:	Polyester foil over stranded bundle
Screen over stranding element:	-
Screen 1 over stranding:	Polyester foil, aluminium-lined
Screen 2 over stranding:	-
Drain wire:	yes
Outer sheath material:	PVC
Outer diameter:	app. 5,9 mm
Outer sheath colour:	Yellow similar to RAL 1021

## F/UTP 4x2xAWG 24/1 PVC

Inner conductor Ø:	0,51 mm
Conductor material:	Copper, bare
Core insulation:	PE
Core colours:	whbu/bu, whog/og, whgn/gn, whbn/bn
Shielding 1:	Polyester foil over stranded bundle
Screen over stranding element:	-
Screen 1 over stranding:	Polyester foil, aluminium-lined
Screen 2 over stranding:	-
Drain wire:	yes
Outer sheath material:	PVC
Outer diameter:	app. 5,9 mm
Outer sheath colour:	Yellow similar to RAL 1021

## Electrical data

Characteristic impedance:	100 Ohm ± 15 ohm at 1 to 100 MHz 100 Ohm ± 20 ohm at 101 to 155 MHz
Loop resistance:	170 Ohm/km max.
Mutual capacitance:	50 nF/km nom.
Rel. propagation velocity:	69 %



## Typical values

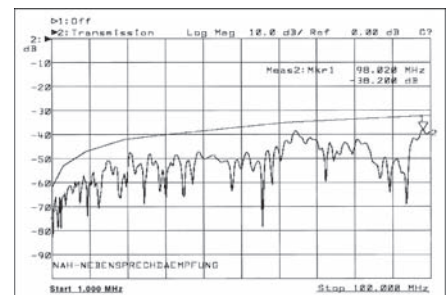
Frequency (MHz)	10	16	62,5	100	155
Attenuation (dB/100m)	5,9	7,6	15,7	20,3	22,0
Next (db)	59,0	53,0	44,0	40,0	40,0
ACR (db)	53,1	45,4	28,3	19,7	18,0

## Technical data

Weight:	app. 40 kg/km
bending radius, repeated:	48 mm
Operating temperature range min.:	-20°C
Operating temperature range max.:	+60°C
Caloric load, approx. value:	0,40 MJ/m
Copper weight:	18,00 kg/km

## Norms

Acc. to ISO/IEC 11801, Acc. to EN 50173, Acc. to EIA/TIA 568-A, Category 5e



## Application

HELUKAT®155 data cables are used in the tertiary, but also in the secondary level of a network. They are characterized by large performance reserves and outstanding performance. They can be used to implement services such as Fast Ethernet, Ethernet, ATM155, FDDI, token ring 4/16 Mbit/s, or ISDN absolutely trouble-free. Likewise, the mechanical characteristics are perfectly suited for the application in tight cable channels and platforms due to their optimized construction.

## Part no.

**80043**, F/UTP 4x2xAWG24/1 PVC (FTP)

Dimensions and specifications may be changed without prior notice.

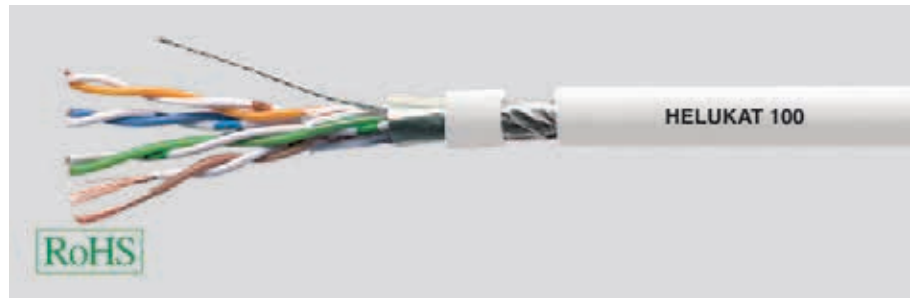


# LAN Cable

Category 5

**HELUKAT® 100**

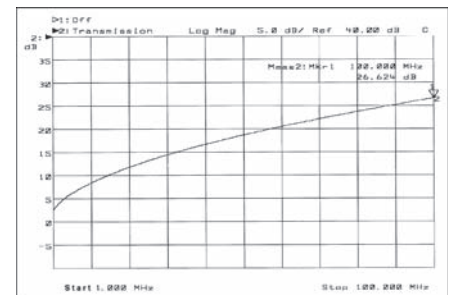
F/UTP flex



## Cable structure

Inner conductor Ø:	0,48 mm
Conductor material:	Copper, bare
Core insulation:	Foam-skin-PE
Core colours:	whbu/bu, whog/og, whgn/gn, whbn/bn
Shielding 1:	-
Screen over stranding element:	-
Screen 1 over stranding:	Polyester foil, aluminium-lined
Screen 2 over stranding:	-
Drain wire:	yes
Outer sheath material:	FRNC
Outer diameter:	app. 5,3 mm
Outer sheath colour:	Grey similar to RAL 7035

## F/UTP 4x2xAWG 26/7 FRNC



## Electrical data

Characteristic impedance:	100 Ohm ± 15 ohm at 1 to 100 MHz
Loop resistance:	290 Ohm/km max.
Mutual capacitance:	50 nF/km nom.
Rel. propagation velocity:	74 %

## Typical values

Frequency (MHz)	10	16	62,5	100
Attenuation (dB/10m)	0,9	1,2	2,4	2,9
Next (db)	58,0	56,0	45,0	43,0
ACR (db)	57,1	54,8	42,6	40,1

## Technical data

Weight:	app. 31 kg/km
bending radius, repeated:	40 mm
Operating temperature range min.:	-20°C
Operating temperature range max.:	+60°C
Caloric load, approx. value:	0,45 MJ/m
Copper weight:	14,00 kg/km

## Norms

Acc. to ISO/IEC 11801, Acc. to EN 50173, Acc. to EIA/TIA 568-A, Category 5, Flame-retardant acc. to IEC 60332-1, Smoke density acc. to IEC 61034, Halogen-free acc. to 60754-2, Corrosiveness acc. to EN50267-2-3

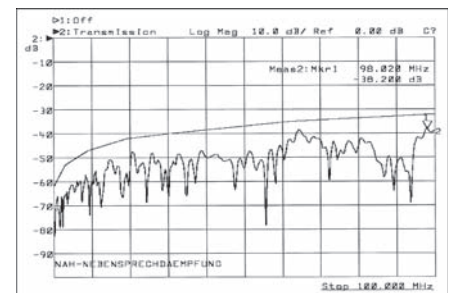
## Application

HELUKAT® 100 data cables are used in the tertiary level of a network as patch cables and connection cables. They are characterized by large performance reserves and outstanding performance. They can be used to implement services such as Fast Ethernet, Ethernet, ATM155, FDDI, token ring 4/16 Mbit/s, or ISDN absolutely trouble-free. With its optimized construction, the HELUKAT® 100 series can be manufactured quickly and easily with all common RJ45 plugs.

## Part no.

**81278**, F/UTP 4x2xAWG 26/7 FRNC (FTP)

Dimensions and specifications may be changed without prior notice.



R

# LAN Cable

Category 5

**HELUKAT® 100**

F/UTP FE60



## Cable structure

Inner conductor Ø:	0,57 mm
Conductor material:	Copper, bare
Core insulation:	PO + flame resistant tape
Core colours:	whbu/bu, whog/og, whgn/gn, whbn/bn
Shielding 1:	-
Screen over stranding element:	PO tape
Screen 1 over stranding:	Helical glasfibre tape
Screen 2 over stranding:	Polyester foil, aluminium-lined
Drain wire:	yes
Outer sheath material:	LSZH
Outer diameter:	app. 8,3 mm
Outer sheath colour:	Red

## F/UTP 4x2xAWG 23/1 FR-0H

## Electrical data

Characteristic impedance:	100 Ohm ± 15 ohm at 1 to 100 MHz
Loop resistance:	188 Ohm/km max.
Mutual capacitance:	65 nF/km nom.
Rel. propagation velocity:	67 %

## Typical values

Frequency (MHz)	10	16	62,5	100
Attenuation (dB/100m)	5,7	7,3	14,9	19,3
Next (db)	56,0	53,0	42,0	38,0
ACR (db)	50,3	45,7	27,1	18,7

## Technical data

Weight:	app. 75 kg/km
bending radius, repeated:	130 mm
Operating temperature range min.:	-20°C
Operating temperature range max.:	+70°C
Caloric load, approx. value:	0,72 MJ/m
Copper weight:	24,00 kg/km

## Norms

Acc. to ISO/IEC 11801, Acc. to EN 50173, Acc. to EIA/TIA 568-A, Category 5, Flame-retardant acc. to IEC 60332-3, Smoke density acc. to IEC 61034, Halogen-free acc. to 60754-2, Corrosiveness acc. to EN50267-2-3

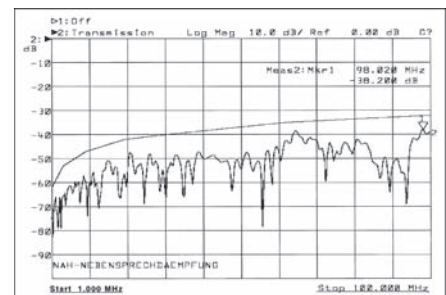
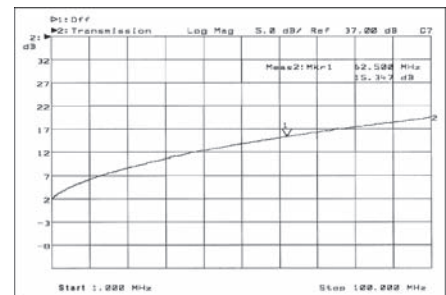
## Application

HELUKAT®100-FE60 data cables are used in the tertiary, but also in the secondary level of a network. They are characterized by large performance reserves and outstanding performance. They can be used to implement services such as Fast Ethernet, Ethernet, ATM155, FDDI, token ring 4/16 Mbit/s, or ISDN absolutely trouble-free. Likewise, the thermal characteristics are perfectly suited to realize an isolation integrity according EN50200-FE60 due to their optimized construction.

## Part no.

**804045**, F/UTP 4x2xAWG23/1 FRNC (FTP)

Dimensions and specifications may be changed without prior notice.

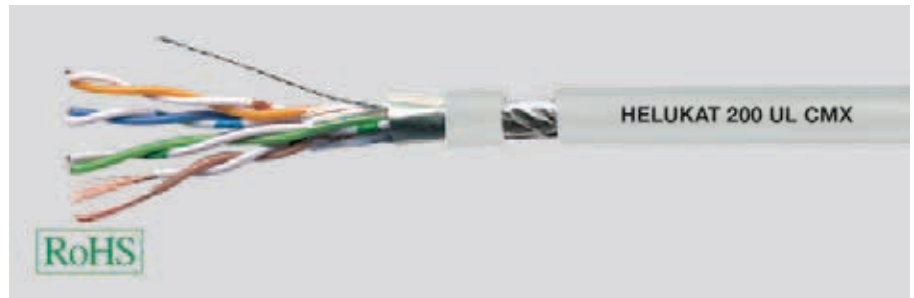
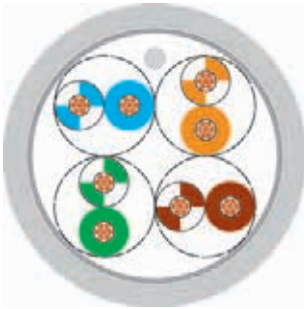


# LAN Cable

Category 5e

**HELUKAT® 200**

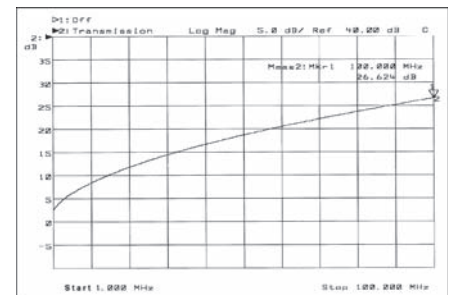
F/UTP Flex, UL



## Cable structure

Inner conductor Ø:	0,48 mm
Conductor material:	Copper, bare
Core insulation:	PE
Core colours:	whbu/bu, whog/og, whgn/gn, whbn/bn
Shielding 1:	-
Screen over stranding element:	-
Screen 1 over stranding:	Polyester foil, aluminium-lined
Screen 2 over stranding:	-
Drain wire:	yes
Outer sheath material:	PVC
Outer diameter:	app. 5,4 mm
Outer sheath colour:	Grey similar to RAL 7035

## F/UTP 4x2xAWG 26/7 PVC, UL



## Electrical data

Characteristic impedance:	100 Ohm ± 15 ohm at 1 to 100 MHz 100 Ohm ± 20 Ohm at 101 to 200 MHz
Loop resistance:	290 Ohm/km max.
Mutual capacitance:	50 nF/km nom.
Rel. propagation velocity:	67 %

## Typical values

Frequency (MHz)	10	16	62,5	100	200
Attenuation (db/10m)	0,9	1,2	2,4	3,1	3,9
Next (db)	62,0	60,0	50,0	48,0	45,0
ACR (db)	61,1	58,8	47,6	44,9	41,1

## Technical data

Weight:	app. 30 kg/km
bending radius, repeated:	44 mm
Operating temperature range min.:	-20°C
Operating temperature range max.:	+60°C
Caloric load, approx. value:	0,40 MJ/m
Copper weight:	15,00 kg/km

## Norms

Acc. to ISO/IEC 11801, Acc. to EN 50173, Acc. to EIA/TIA 568-A, Category 5e, Flame-retardant acc. to IEC 60332-1, Smoke density acc. to IEC 61034, CMX 444

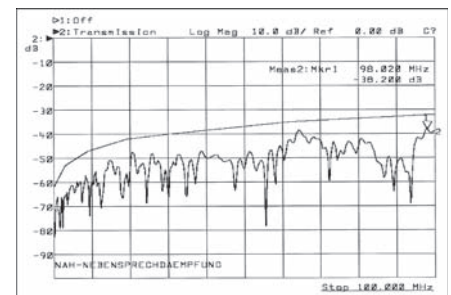
## Application

HELUKAT®200 data cables are used in the tertiary level of a network as patch cables and connection cables. They are characterized by large performance reserves and outstanding performance. They can be used to implement services such as Gigabit Ethernet, Fast Ethernet, Ethernet, ATM155, FDDI, token ring 4/16 Mbit/s, or ISDN absolutely trouble-free. With its optimized construction, the HELUKAT®200 series can be manufactured quickly and easily with all common RJ45 plugs. This type is certified according to UL because of the special PVC jacket.

## Part no.

**802173**, F/UTP 4x2xAWG26/7 PVC UL (FTP)

Dimensions and specifications may be changed without prior notice.

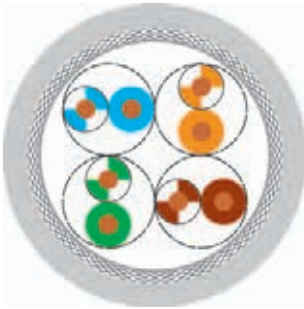


R

# LAN Cable

Category 5e

**HELUKAT® 200**  
SF/UTP



## Cable structure

Inner conductor Ø:	0,51 mm
Conductor material:	Copper, bare
Core insulation:	Foam-skin-PE
Core colours:	whbu/bu, whog/og, whgn/gn, whbn/bn
Shielding 1:	-
Screen over stranding element:	-
Screen 1 over stranding:	Polyester foil, aluminium-lined
Screen 2 over stranding:	Cu braid
Outer sheath material:	PVC / FRNC
Outer diameter:	app. 6,0 mm / app. 6,0 mm
Outer sheath colour:	Grey similar to RAL 7035

## Electrical data

Characteristic impedance:	100 Ohm ± 15 ohm at 1 to 100 MHz 100 Ohm ± 20 Ohm at 101 to 200 MHz
Loop resistance:	185 Ohm/km max.
Mutual capacitance:	48 nF/km nom.
Rel. propagation velocity:	74 %

## Typical values

Frequency (MHz)	10	16	62,5	100	200
Attenuation (dB/100m)	5,6	7,2	14,4	18,2	25,9
Next (db)	62,0	59,0	50,0	46,0	40,0
ACR (db)	56,4	51,8	35,6	27,8	14,6

## Technical data

Weight:	app. 50 kg/km
bending radius, repeated:	52 mm
Operating temperature range min.:	-20°C
Operating temperature range max.:	+60°C
Caloric load, approx. value:	0,60 MJ/m / 0,48 MJ/m
Copper weight:	28,00 kg/km

## Norms

81610:  
Acc. to ISO/IEC 11801, Acc. to EN 50173, Acc. to EIA/TIA 568-A, Category 5e  
81609:  
Acc. to ISO/IEC 11801, Acc. to EN 50173, Acc. to EIA/TIA 568-A, Category 5e, Flame-retardant:  
acc. to IEC 60332-3, Smoke density acc. to IEC 61034, Halogen-free acc. to 60754-2, Corrosiveness  
acc. to EN50267-2-3

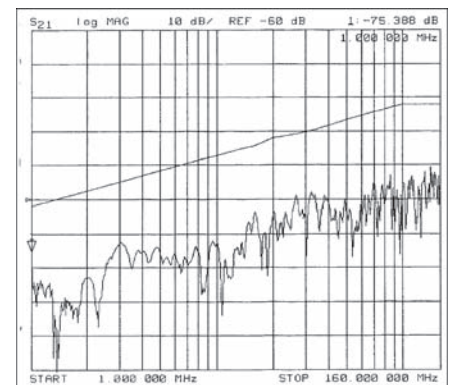
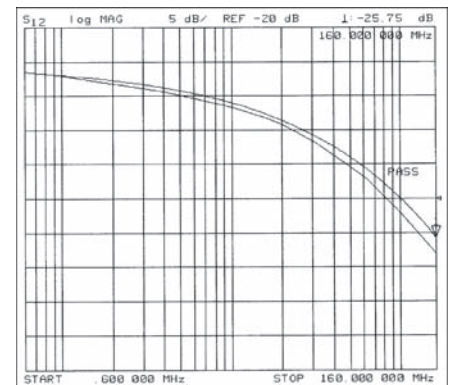
## Application

HELUKAT®200 data cables are used in the tertiary, but also in the secondary level of a network. They are characterized by large performance reserves and outstanding performance. They can be used to implement services such as Gigabit Ethernet, Fast Ethernet, Ethernet, ATM155, FDDI, token ring 4/16 Mbit/s, or ISDN absolutely trouble-free. Likewise, the mechanical characteristics are perfectly suited for the application in tight cable channels and platforms due to their optimized construction.

## Part no.

**81610**, SF/UTP 4x2xAWG 24/1 PVC (S-FTP)      **81609**, SF/UTP 4x2xAWG 24/1 FRNC (S-FTP)

Dimensions and specifications may be changed without prior notice.

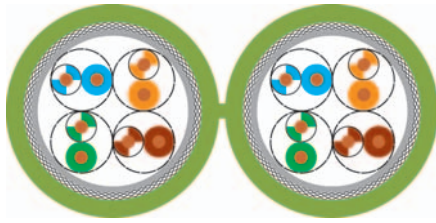


# LAN Cable

Category 5e

**HELUKAT® 200**

SF/UTP duplex



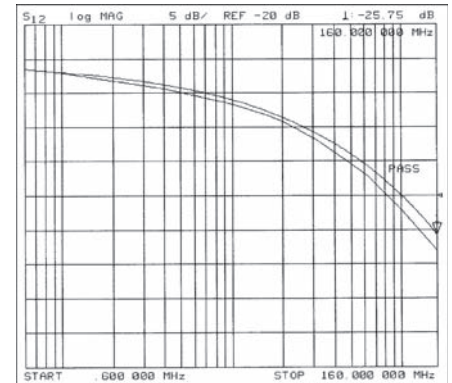
## Cable structure

Inner conductor Ø:	0,51 mm
Conductor material:	Copper, bare
Core insulation:	Foam-skin-PE
Core colours:	whbu/bu, whog/og, whgn/gn, whbn/bn
Shielding 1:	-
Screen over stranding element:	-
Screen 1 over stranding:	Polyester foil, aluminium-lined
Screen 2 over stranding:	Cu braid
Outer sheath material:	FRNC
Cable dimensions:	app. 6,0 mm x 12,5 mm
Outer sheath colour:	Green similar to RAL 6018

## SF/UTP 2x(4x2xAWG 24/1) FRNC

## Electrical data

Characteristic impedance:	100 Ohm ± 15 ohm at 1 to 100 MHz 100 Ohm ± 20 Ohm at 101 to 200 MHz
Loop resistance:	185 Ohm/km max.
Mutual capacitance:	48 nF/km nom.
Rel. propagation velocity:	74 %



## Typical values

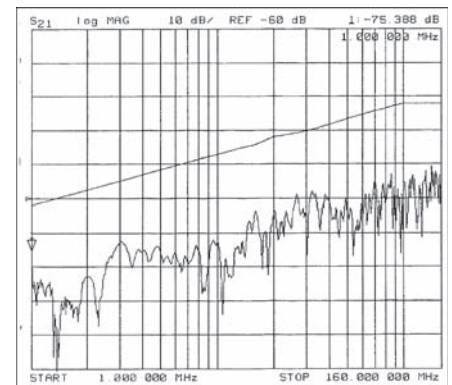
Frequency (MHz)	10	16	62,5	100	200
Attenuation (dB/100m)	5,6	7,2	14,4	18,2	25,9
Next (db)	62,0	59,0	50,0	46,0	40,0
ACR (db)	56,4	51,8	35,6	27,8	14,6

## Technical data

Weight:	app. 100 kg/km
bending radius, repeated:	52 mm
Operating temperature range min.:	-20°C
Operating temperature range max.:	+60°C
Caloric load, approx. value:	0,96 MJ/m
Copper weight:	56,00 kg/km

## Norms

Acc. to ISO/IEC 11801, Acc. to EN 50173, Acc. to EIA/TIA 568-A, Category 5e, Flame-retardant acc. to IEC 60332-3, Smoke density acc. to IEC 61034, Halogen-free acc. to 60754-2, Corrosiveness acc. to EN50267-2-3



## Application

HELUKAT®200 data cables are used in the tertiary, but also in the secondary level of a network. They are characterized by large performance reserves and outstanding performance. They can be used to implement services such as Gigabit Ethernet, Fast Ethernet, Ethernet, ATM155, FDDI, token ring 4/16 Mbit/s, or ISDN absolutely trouble-free. Likewise, the mechanical characteristics are perfectly suited for the application in tight cable channels and platforms due to their optimized construction.

## Part no.

**81123**, SF/UTP 2x(4x2xAWG 24/1) FRNC (S-FTP)

Dimensions and specifications may be changed without prior notice.

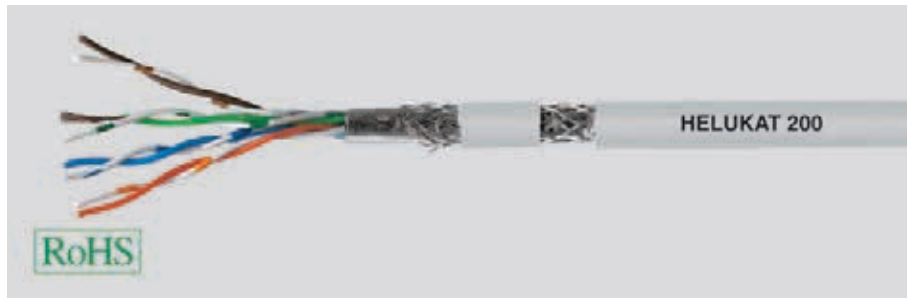
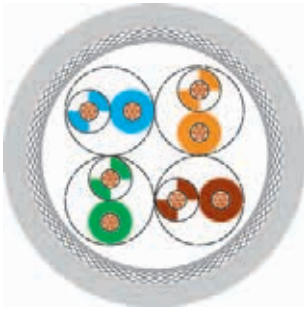


# LAN Cable

Category 5e

**HELUKAT® 200**

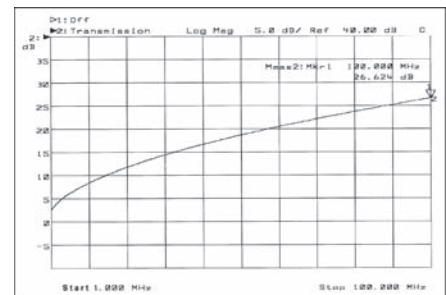
SF/UTP flex



## Cable structure

Inner conductor Ø:	0,48 mm
Conductor material:	Copper, bare
Core insulation:	Foam-skin-PE
Core colours:	whbu/bu, whog/og, whgn/gn, whbn/bn
Shielding 1:	-
Screen over stranding element:	-
Screen 1 over stranding:	Polyester foil, aluminium-lined
Screen 2 over stranding:	Cu braid
Outer sheath material:	FRNC
Outer diameter:	app. 5,4 mm
Outer sheath colour:	Grey similar to RAL 7035

## SF/UTP 4x2xAWG 26/7 FRNC



## Electrical data

Characteristic impedance:	100 Ohm ± 15 ohm at 1 to 100 MHz 100 Ohm ± 20 Ohm at 101 to 200 MHz
Loop resistance:	300 Ohm/km max.
Mutual capacitance:	47 nF/km nom.
Rel. propagation velocity:	69 %

## Typical values

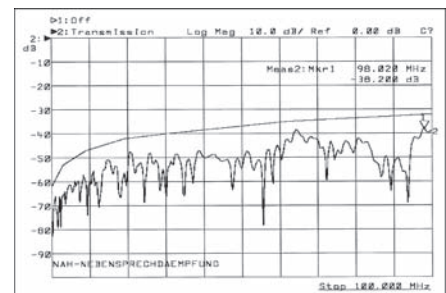
Frequency (MHz)	10	16	62,5	100	200
Attenuation (dB/10m)	0,8	1,1	2,4	2,9	4,3
Next (db)	58,0	56,0	45,0	43,0	37,0
ACR (db)	57,2	54,9	42,6	40,1	32,7

## Technical data

Weight:	app. 40 kg/km
bending radius, repeated:	46 mm
Operating temperature range min.:	-20°C
Operating temperature range max.:	+60°C
Caloric load, approx. value:	0,543 MJ/m
Copper weight:	24,00 kg/km

## Norms

Acc. to ISO/IEC 11801, Acc. to EN 50173, Acc. to EIA/TIA 568-A, Category 5e, Flame-retardant acc. to IEC 60332-1, Smoke density acc. to IEC 61034, Halogen-free acc. to 60754-2, Corrosiveness acc. to EN50267-2-3



## Application

HELUKAT®200 data cables are used in the tertiary level of a network as patch cables and connection cables. They are characterized by large performance reserves and outstanding performance. They can be used to implement services such as Gigabit Ethernet, Fast Ethernet, Ethernet, ATM155, FDDI, token ring 4/16 Mbit/s, or ISDN absolutely trouble-free. With its optimized construction, the HELUKAT®200 series can be manufactured quickly and easily with all common RJ45 plugs.

## Part no.

**81254**, SF/UTP 4x2xAWG 26/7 FRNC (S-FTP)

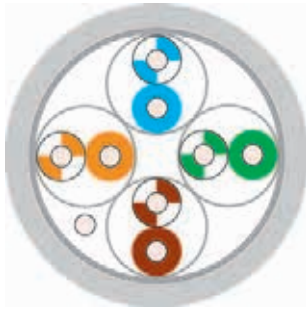
Dimensions and specifications may be changed without prior notice.

# LAN Cable

Category 6

**HELUKAT® 300**

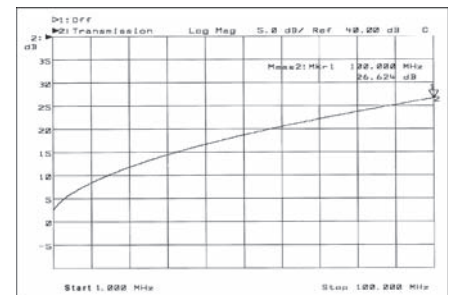
U/FTP, UL



## Cable structure

Inner conductor Ø:	0,48 mm
Conductor material:	Copper, tinned
Core insulation:	Foam-skin-PE
Core colours:	whbu/bu, whog/og, whgn/gn, whbn/bn
Shielding 1:	Polyester foil over stranded bundle
Screen over stranding element:	Polyester foil, aluminium-lined
Screen 1 over stranding:	-
Screen 2 over stranding:	-
Drain wire:	yes
Outer sheath material:	PVC
Outer diameter:	app. 5,9 mm
Outer sheath colour:	Grey similar to RAL 7035

## U/FTP 4x2xAWG 26/7 PVC, UL



## Electrical data

Characteristic impedance:	100 Ohm ± 15 ohm at 1 to 100 MHz 100 Ohm ± 20 Ohm at 101 to 300 MHz
Loop resistance:	290 Ohm/km max.
Mutual capacitance:	45 nF/km nom.
Rel. propagation velocity:	77 %

## Typical values

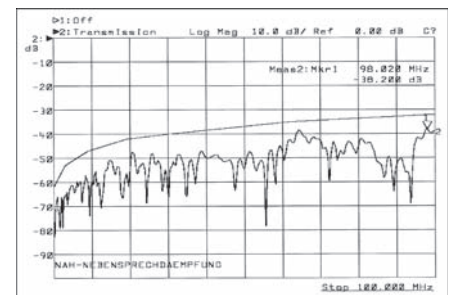
Frequency (MHz)	10	16	62,5	100	200	300
Attenuation (db/10m)	0,9	1,1	2,2	2,7	3,9	4,7
Next (db)	90,0	88,0	83,0	80,0	76,0	73,0
ACR (db)	89,1	86,9	80,8	77,3	72,1	68,3

## Technical data

Weight:	app. 37 kg/km
bending radius, repeated:	48 mm
Operating temperature range min.:	-20°C
Operating temperature range max.:	+60°C
Caloric load, approx. value:	0,41 MJ/m
Copper weight:	20,00 kg/km

## Norms

Acc. to ISO/IEC 11801, Acc. to EN 50173, Acc. to EIA/TIA 568-A, Category 6, Flame-retardant acc. to IEC 60332-1, Smoke density acc. to IEC 61034, CMX 444



## Application

HELUKAT®300 data cables are used in the tertiary level of a network as patch cables and connection cables. They are characterized by large performance reserves and outstanding performance. They can be used to implement services such as Gigabit Ethernet, Fast Ethernet, Ethernet, ATM155, FDDI, token ring 4/16 Mbit/s, or ISDN absolutely trouble-free. With its optimized construction, the HELUKAT®300 series can be manufactured quickly and easily with all common RJ45 plugs. This type is certified according to UL because of the special PVC jacket.

## Part no.

**802174**, U/FTP 4x2xAWG 26/7 PVC

Dimensions and specifications may be changed without prior notice.

# LAN Cable

Category 6

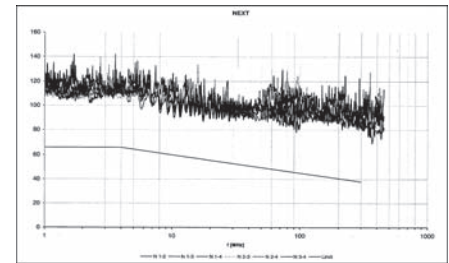
**HELUKAT® 450**  
F/FTP

## Cable structure

Inner conductor Ø: 0,52 mm  
 Conductor material: Copper, bare  
 Core insulation: Foam-skin-PE  
 Core colours: wh/bu, wh/og, wh/gn, wh/bn  
 Shielding 1: -  
 Screen over stranding element: Polyester foil, aluminium-lined  
 Screen 1 over stranding: Polyester foil, aluminium-lined  
 Screen 2 over stranding: -  
 Drain wire: yes  
 Outer sheath material: FRNC  
 Outer diameter: app. 7,4 mm  
 Outer sheath colour: Green similar to RAL 6018

## F/FTP 4x2xAWG 24/1 FRNC

0,52 mm  
 Copper, bare  
 Foam-skin-PE  
 wh/bu, wh/og, wh/gn, wh/bn  
 -  
 Polyester foil, aluminium-lined  
 Polyester foil, aluminium-lined  
 -  
 yes  
 FRNC  
 app. 7,4 mm  
 Green similar to RAL 6018



## Electrical data

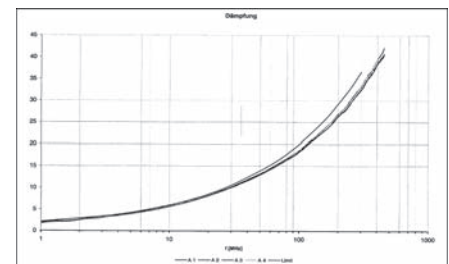
Characteristic impedance: 100 Ohm ± 15 ohm at 1 to 100 MHz  
 100 Ohm ± 20 ohm at 101 to 450 MHz  
 Loop resistance: 165 Ohm/km max.  
 Mutual capacitance: 43 nF/km nom.  
 Rel. propagation velocity: 79 %

## Typical values

Frequency (MHz)	10	16	62,5	100	200	300	450
Attenuation (dB/100m)	5,4	7,0	13,8	17,6	26,0	34,0	38,5
Next (db)	100,0	100,0	95,8	94,5	91,0	87,0	84,3
ACR (db)	94,6	93,0	82,0	76,9	65,0	53,0	45,8

## Technical data

Weight: app. 50 kg/km  
 bending radius, repeated: 59 mm  
 Operating temperature range min.: -20°C  
 Operating temperature range max.: +60°C  
 Caloric load, approx. value: 0,57 MJ/m  
 Copper weight: 24,00 kg/km



## Norms

Acc. to ISO/IEC 11801, Acc. to EN 50173, Acc. to EIA/TIA 568-A, Category 6, Flame-retardant acc. to IEC 60332-3, Smoke density acc. to IEC 61034, Halogen-free acc. to 60754-2, Corrosiveness acc. to EN50267-2-3

## Application

HELUKAT®450 data cables are used in the tertiary, but also in the secondary level of a network. They are characterized by large performance reserves and outstanding performance. They can be used to implement services such as Gigabit Ethernet, Fast Ethernet, Ethernet, ATM155, FDDI, token ring 4/16 Mbit/s or ISDN absolutely trouble-free. Likewise, the mechanical characteristics are perfectly suited for the application in tight cable channels and platforms due to their optimized construction.

## Part no.

**82501**, F/FTP 4x2xAWG 24/1 FRNC (S-STP)

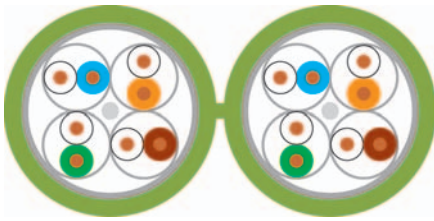
Dimensions and specifications may be changed without prior notice.

# LAN Cable

Category 6

**HELUKAT® 450**

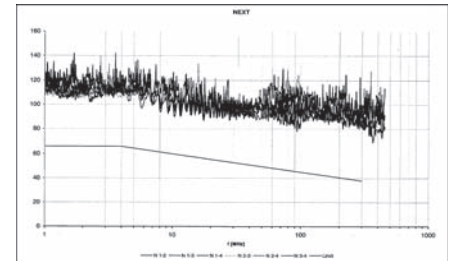
F/FTP duplex



## Cable structure

Inner conductor Ø:	0,52 mm
Conductor material:	Copper, bare
Core insulation:	Foam-skin-PE
Core colours:	wh/bu, wh/og, wh/gn, wh/bn
Shielding 1:	-
Screen over stranding element:	Polyester foil, aluminium-lined
Screen 1 over stranding:	Polyester foil, aluminium-lined
Screen 2 over stranding:	-
Drain wire:	yes
Outer sheath material:	FRNC
Cable dimensions:	app. 7,4 mm x 15,0 mm
Outer sheath colour:	Green similar to RAL 6018

## F/FTP 2x(4x2xAWG 24/1) FRNC



## Electrical data

Characteristic impedance:	100 Ohm ± 15 ohm at 1 to 100 MHz 100 Ohm ± 20 ohm at 101 to 450 MHz
Loop resistance:	165 Ohm/km max.
Mutual capacitance:	43 nF/km nom.
Rel. propagation velocity:	79 %

## Typical values

Frequency (MHz)	10	16	62,5	100	200	300	450
Attenuation (dB/100m)	5,4	7,0	13,8	17,6	26,0	34,0	38,5
Next (db)	100,0	100,0	95,8	94,5	91,0	87,0	84,3
ACR (db)	94,6	93,0	82,0	76,9	65,0	53,0	45,8

## Technical data

Weight:	app. 100 kg/km
bending radius, repeated:	59 mm
Operating temperature range min.:	-20°C
Operating temperature range max.:	+60°C
Caloric load, approx. value:	1,14 MJ/m
Copper weight:	48,00 kg/km

## Norms

Acc. to ISO/IEC 11801, Acc. to EN 50173, Acc. to EIA/TIA 568-A, Category 6, Flame-retardant acc. to IEC 60332-3, Smoke density acc. to IEC 61034, Halogen-free acc. to 60754-2, Corrosiveness acc. to EN50267-2-3

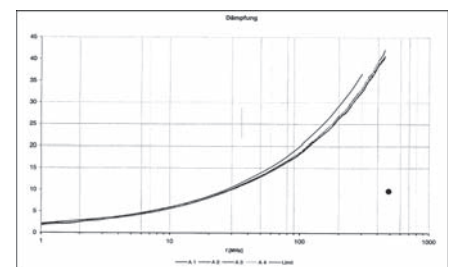
## Application

HELUKAT®450 data cables are used in the tertiary, but also in the secondary level of a network. They are characterized by large performance reserves and outstanding performance. They can be used to implement services such as Gigabit Ethernet, Fast Ethernet, Ethernet, ATM155, FDDI, token ring 4/16 Mbit/s or ISDN absolutely trouble-free. Likewise, the mechanical characteristics are perfectly suited for the application in tight cable channels and platforms due to their optimized construction.

## Part no.

**82502**, F/FTP 2x4x2xAWG 24/1 FRNC (S-STP)

Dimensions and specifications may be changed without prior notice.



R

# LAN Cable

Category 6A

**HELUKAT® 500**  
F/FTP

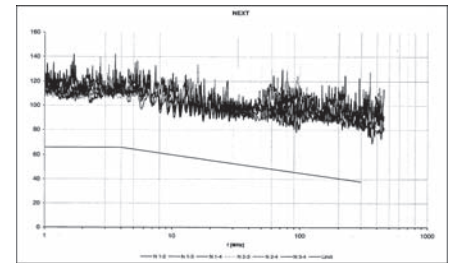


## Cable structure

Inner conductor Ø: 0,57 mm  
 Conductor material: Copper, bare  
 Core insulation: Foam-skin-PE  
 Core colours: wh/bu, wh/og, wh/gn, wh/bn  
 Shielding 1: -  
 Screen over stranding element: Polyester foil, aluminium-lined  
 Screen 1 over stranding: Polyester foil, aluminium-lined  
 Screen 2 over stranding: -  
 Drain wire: yes  
 Outer sheath material: LSZH  
 Outer diameter: app. 7,5 mm  
 Outer sheath colour: Blue Lilac similar to RAL 4005

## F/FTP 4x2xAWG 23/1 LSZH

Characteristic impedance: 100 Ohm ± 15 ohm at 1 to 100 MHz  
 100 Ohm ± 20 ohm at 101 to 500 MHz  
 Loop resistance: 160 Ohm/km max.  
 Mutual capacitance: 45 nF/km nom.  
 Rel. propagation velocity: 80 %



## Electrical data

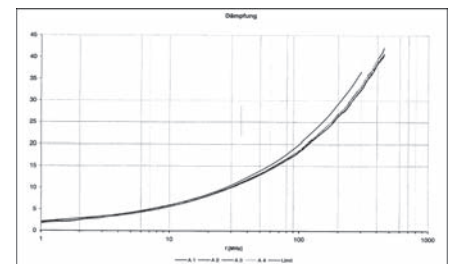
Characteristic impedance:  
 Loop resistance:  
 Mutual capacitance:  
 Rel. propagation velocity:

## Typical values

Frequency (MHz)	10	16	62,5	100	200	250	300	500
Attenuation (db/100m)	5,7	7,2	14,2	18,1	25,8	29,0	31,9	41,8
Next (db)	100,0	100,0	100,0	97,4	92,9	91,4	90,2	86,9
ACR (db)	94,3	92,8	85,8	79,3	67,1	62,4	58,3	45,1

## Technical data

Weight: app. 50 kg/km  
 bending radius, repeated: 100 mm  
 Operating temperature range min.: -20°C  
 Operating temperature range max.: +60°C  
 Caloric load, approx. value: 0,55 MJ/m  
 Copper weight: 26,00 kg/km



## Norms

Acc. to ISO/IEC 11801, Acc. to EN 50173, Acc. to EIA/TIA 568-A, Category 6A, Flame-retardant acc. to IEC 60332-3, Smoke density acc. to IEC 61034, Halogen-free acc. to 60754-2, Corrosiveness acc. to EN50267-2-3

## Application

HELUKAT® 500 data cables are used in the tertiary, but also in the secondary level of a network. They are characterized by large performance reserves and outstanding performance. They can be used to implement services such as 10Gigabit Ethernet, Gigabit Ethernet, Fast Ethernet, Ethernet, ATM155, FDDI, token ring 4/16 Mbit/s or ISDN absolutely trouble-free. Likewise, the mechanical characteristics are perfectly suited for the application in tight cable channels and platforms due to their optimized construction.

## Part no.

**803378**, F/FTP 4x2xAWG 23/1 LSZH (S-STP)

Dimensions and specifications may be changed without prior notice.

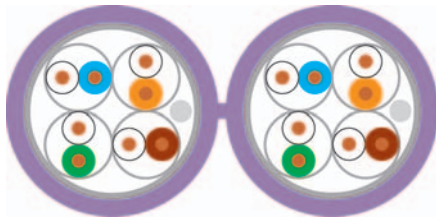


# LAN Cable

Kategorie 6A

**HELUKAT® 500**

F/FTP duplex

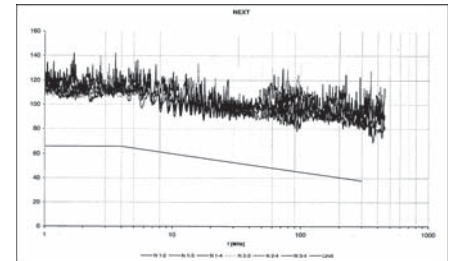


## Cable structure

Inner conductor Ø: 0,57 mm  
 Conductor material: Copper, bare  
 Core insulation: Foam-skin-PE  
 Core colours: wh/bu, wh/og, wh/gn, wh/bn  
 Shielding 1: -  
 Screen over stranding element: Polyester foil, aluminium-lined  
 Screen 1 over stranding: Polyester foil, aluminium-lined  
 Screen 2 over stranding: -  
 Drain wire: yes  
 Outer sheath material: LSZH  
 Cable dimensions: app. 7,8 mm x 15,9 mm  
 Outer sheath colour: Blue Lilac similar to RAL 4005

## F/FTP 2x(4x2xAWG 23/1) LSZH (S-STP)

0,57 mm  
 Copper, bare  
 Foam-skin-PE  
 wh/bu, wh/og, wh/gn, wh/bn  
 -  
 Polyester foil, aluminium-lined  
 Polyester foil, aluminium-lined  
 -  
 yes  
 LSZH  
 app. 7,8 mm x 15,9 mm  
 Blue Lilac similar to RAL 4005



## Electrical data

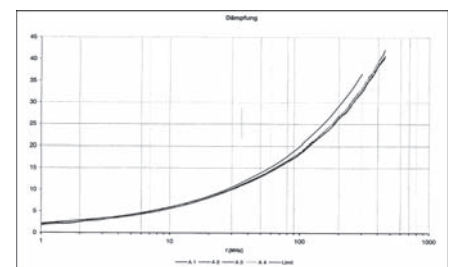
Characteristic impedance: 100 Ohm ± 15 ohm at 1 to 100 MHz  
 100 Ohm ± 20 ohm at 101 to 500 MHz  
 Loop resistance: 160 Ohm/km max.  
 Mutual capacitance: 45 nF/km nom.  
 Rel. propagation velocity: 80 %

## Typical values

Frequency (MHz)	10	16	62,5	100	200	250	300	500
Attenuation (db/100m)	5,7	7,2	14,2	18,1	25,8	29,0	31,9	41,8
Next (db)	100,0	100,0	100,0	97,4	92,9	91,4	90,2	86,9
ACR (db)	94,3	92,8	85,8	79,3	67,1	62,4	58,3	45,1

## Technical data

Weight: app. 100 kg/km  
 bending radius, repeated: 100 mm  
 Operating temperature range min.: -20°C  
 Operating temperature range max.: +60°C  
 Caloric load, approx. value: 1,13 MJ/m  
 Copper weight: 52,00 kg/km



## Norms

Acc. to ISO/IEC 11801, Acc. to EN 50173, Acc. to EIA/TIA 568-A, Category 6A, Flame-retardant acc. to IEC 60332-3, Smoke density acc. to IEC 61034, Halogen-free acc. to 60754-2, Corrosiveness acc. to EN50267-2-3

## Application

HELUKAT® 500 data cables are used in the tertiary, but also in the secondary level of a network. They are characterized by large performance reserves and outstanding performance. They can be used to implement services such as 10Gigabit Ethernet, Gigabit Ethernet, Fast Ethernet, Ethernet, ATM155, FDDI, token ring 4/16 Mbit/s or ISDN absolutely trouble-free. Likewise, the mechanical characteristics are perfectly suited for the application in tight cable channels and platforms due to their optimized construction.

## Part no.

**803379**, F/FTP 2x4x2xAWG 23/1 LSZH (S-STP)

Dimensions and specifications may be changed without prior notice.

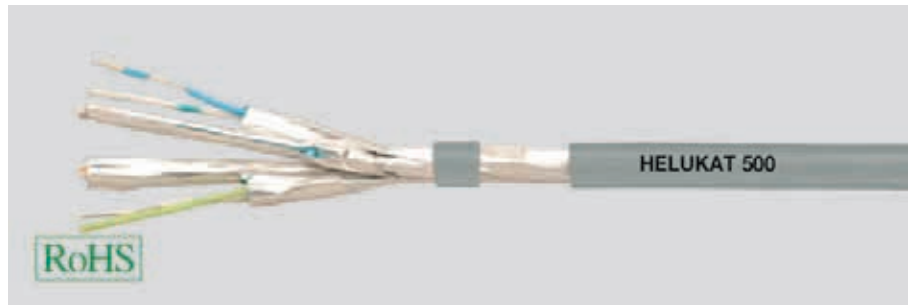
R

# LAN Cable

Category 6A

**HELUKAT® 500**

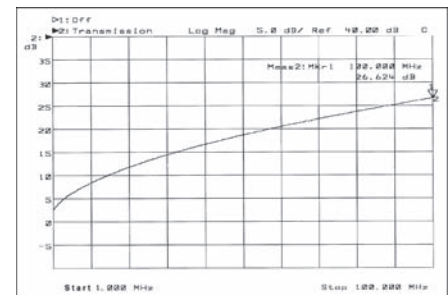
U/FTP, flex



## Cable structure

Inner conductor Ø: 0,48 mm  
 Conductor material: Copper, bare  
 Core insulation: Foam-skin-PE  
 Core colours: wh/bu, wh/og, wh/gn, wh/bn  
 Shielding 1: -  
 Screen over stranding element: Polyester foil, aluminium-lined  
 Screen 1 over stranding: -  
 Screen 2 over stranding: -  
 Drain wire: yes  
 Outer sheath material: LSZH  
 Outer diameter: app. 5,8 mm  
 Outer sheath colour: Grey similar to RAL 7035

## U/FTP 4x2xAWG 26/7 (stranded) LSZH



## Electrical data

Characteristic impedance: 100 Ohm ± 15 ohm at 1 to 100 MHz  
 100 Ohm ± 20 ohm at 101 to 500 MHz  
 Loop resistance: 330 Ohm/km max.  
 Mutual capacitance: 54 nF/km nom.  
 Rel. propagation velocity: 78 %

## Typical values

Frequency (MHz)	10	16	62,5	100	200	250	500
Attenuation (dB/10m)	0,8	1,1	2,1	2,7	3,9	4,4	6,3
Next (db)	100,0	100,0	100,0	97,0	92,0	91,0	86,0
ACR (db)	99,2	98,9	97,9	94,3	88,1	86,6	79,7

## Technical data

Weight: app. 35 kg/km  
 bending radius, repeated: 49 mm  
 Operating temperature range min.: -20°C  
 Operating temperature range max.: +60°C  
 Caloric load, approx. value: 0,39 MJ/m  
 Copper weight: 15,00 kg/km

## Norms

Acc. to ISO/IEC 11801, Acc. to EN 50173, Acc. to EIA/TIA 568-A, Category 6A, Flame-retardant acc. to IEC 60332-1, Smoke density acc. to IEC 61034, Halogen-free acc. to 60754-2, Corrosiveness acc. to EN50267-2-3

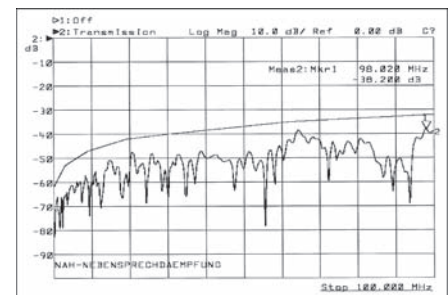
## Application

HELUKAT® 500 data cables are used in the tertiary level of a network as patch cables and connection cables. They are characterized by large performance reserves and outstanding performance. They can be used to implement services such as 10Gigabit Ethernet, Gigabit Ethernet, Fast Ethernet, Ethernet, ATM155, FDDI, token ring 4/16 Mbit/s or ISDN absolutely trouble-free. With its optimized construction, the HELUKAT®500 series can be manufactured quickly and easily with many common RJ45 plugs.

## Part no.

**804043**, U/FTP 4x2xAWG 26/7 LSZH

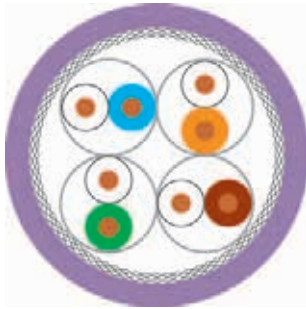
Dimensions and specifications may be changed without prior notice.



# LAN Cable

Category 7e

**HELUKAT® 600**  
S/FTP



## Cable structure

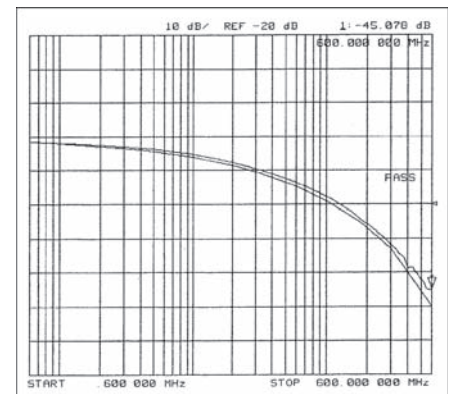
Inner conductor Ø: 0,57 mm  
 Conductor material: Copper, bare  
 Core insulation: Foam-skin-PE  
 Core colours: wh/bu, wh/og, wh/gn, wh/bn  
 Shielding 1: -  
 Screen over stranding element: Polyester foil, aluminium-lined  
 Screen 1 over stranding: Cu braid  
 Screen 2 over stranding: -  
 Outer sheath material: FRNC  
 Outer diameter: app. 7,5 mm  
 Outer sheath colour: Blue Lilac similar to RAL 4005

## S/FTP 4x2xAWG 23/1 FRNC

0,57 mm  
 Copper, bare  
 Foam-skin-PE  
 wh/bu, wh/og, wh/gn, wh/bn  
 -  
 Polyester foil, aluminium-lined  
 Cu braid  
 -  
 FRNC  
 app. 7,5 mm  
 Blue Lilac similar to RAL 4005

## Electrical data

Characteristic impedance: 100 Ohm ± 15 ohm at 1 to 100 MHz  
 100 Ohm ± 20 ohm at 101 to 1000 MHz  
 Loop resistance: 169 Ohm/km max.  
 Mutual capacitance: 43 nF/km nom.  
 Rel. propagation velocity: 79 %



## Typical values

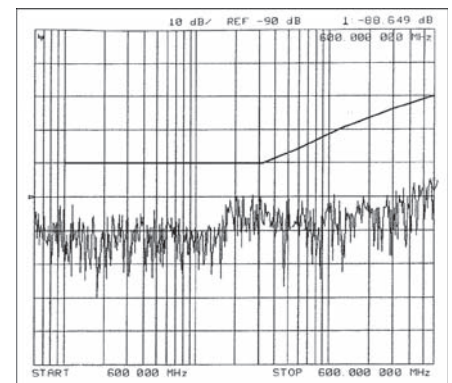
Frequency (MHz)	10	16	62,5	100	200	300	600	900	1000
Attenuation (dB/100m)	5,6	7,1	13,9	17,5	25,2	32,1	44,9	55,0	58,0
Next (db)	100,0	100,0	96,0	94,0	88,0	84,0	73,0	71,0	69,0
ACR (db)	94,4	92,9	82,1	76,5	62,8	51,9	28,1	16,0	9,0

## Technical data

Weight: app. 60 kg/km  
 bending radius, repeated: 60 mm  
 Operating temperature range min.: -20°C  
 Operating temperature range max.: +60°C  
 Caloric load, approx. value: 0,60 MJ/m  
 Copper weight: 28,00 kg/km

## Norms

Acc. to ISO/IEC 11801, Acc. to EN 50173, Acc. to EIA/TIA 568-A, Category 7e, Flame-retardant acc. to IEC 60332-3, Smoke density acc. to IEC 61034, Halogen-free acc. to 60754-2, Corrosiveness acc. to EN50267-2-3



## Application

HELUKAT®600 data cables are used in the tertiary, but also in the secondary level of a network. They are characterized by large performance reserves and outstanding performance. They can be used to implement services such as Gigabit Ethernet, Fast Ethernet, Ethernet, ATM155, FDDI, token ring 4/16 Mbit/s or ISDN absolutely trouble-free. Likewise, the mechanical characteristics are perfectly suited for the application in tight cable channels and platforms due to their optimized construction.

## Part no.

**80810**, S/FTP 4x2xAWG 23/1 FRNC (S-STP)

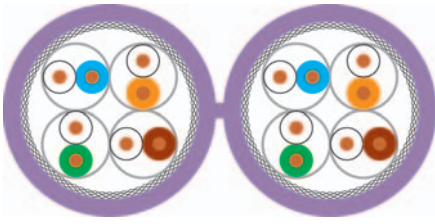
Dimensions and specifications may be changed without prior notice.

# LAN Cable

Category 7e

**HELUKAT® 600**

S/FTP duplex



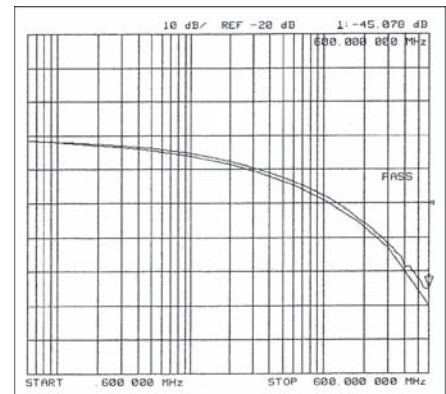
## Cable structure

Inner conductor Ø:	0,57 mm
Conductor material:	Copper, bare
Core insulation:	Foam-skin-PE
Core colours:	wh/bu, wh/og, wh/gn, wh/bn
Shielding 1:	-
Screen over stranding element:	Polyester foil, aluminium-lined
Screen 1 over stranding:	Cu braid
Screen 2 over stranding:	-
Outer sheath material:	FRNC
Cable dimensions:	app. 7,5 mm x 16,0 mm
Outer sheath colour:	Blue Lilac similar to RAL 4005

## S/FTP 2x(4x2xAWG 23/1) FRNC

## Electrical data

Characteristic impedance:	100 Ohm ± 15 ohm at 1 to 100 MHz 100 Ohm ± 20 ohm at 101 to 1000 MHz
Loop resistance:	169 Ohm/km max.
Mutual capacitance:	43 nF/km nom.
Rel. propagation velocity:	79 %



## Typical values

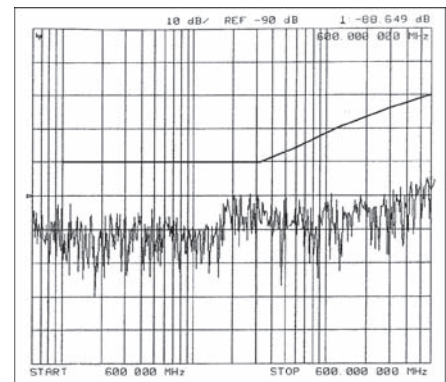
Frequency (MHz)	10	16	62,5	100	200	300	600	900	1000
Attenuation (dB/100m)	5,6	7,1	13,9	17,5	25,2	32,1	44,9	55,0	58,0
Next (db)	100,0	100,0	96,0	94,0	88,0	84,0	73,0	71,0	69,0
ACR (db)	94,4	92,9	82,1	76,5	62,8	51,9	28,1	16,0	9,0

## Technical data

Weight:	app. 120 kg/km
bending radius, repeated:	60 mm
Operating temperature range min.:	-20°C
Operating temperature range max.:	+60°C
Caloric load, approx. value:	1,20 MJ/m
Copper weight:	56,00 kg/km

## Norms

Acc. to ISO/IEC 11801, Acc. to EN 50173, Acc. to EIA/TIA 568-A, Category 7e, Flame-retardant acc. to IEC 60332-3, Smoke density acc. to IEC 61034, Halogen-free acc. to 60754-2, Corrosiveness acc. to EN50267-2-3



## Application

HELUKAT®600 data cables are used in the tertiary, but also in the secondary level of a network. They are characterized by large performance reserves and outstanding performance. They can be used to implement services such as Gigabit Ethernet, Fast Ethernet, Ethernet, ATM155, FDDI, token ring 4/16 Mbit/s or ISDN absolutely trouble-free. Likewise, the mechanical characteristics are perfectly suited for the application in tight cable channels and platforms due to their optimized construction.

## Part no.

**81446**, S/FTP 2x(4x2xAWG 23/1) FRNC (S-STP)

Dimensions and specifications may be changed without prior notice.

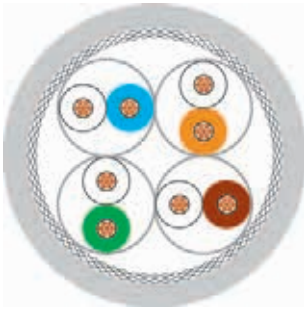


# LAN Cable

Category 7

**HELUKAT® 600**

S/FTP flex



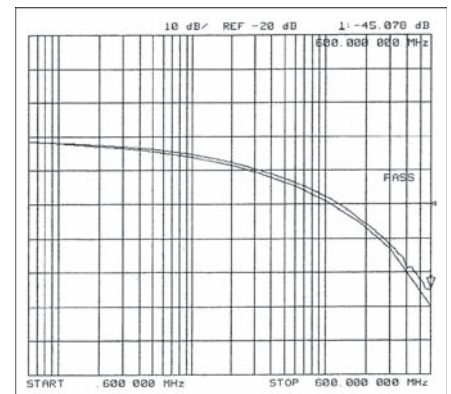
## Cable structure

Inner conductor Ø: 0,48 mm  
 Conductor material: Copper, bare  
 Core insulation: Foam-skin-PE  
 Core colours: wh/bu, wh/og, wh/gn, wh/bn  
 Shielding 1: -  
 Screen over stranding element: Polyester foil, aluminium-lined  
 Screen 1 over stranding: Cu braid  
 Screen 2 over stranding: -  
 Outer sheath material: FRNC  
 Outer diameter: app. 5,9 mm  
 Outer sheath colour: Grey similar to RAL 7035

## S/FTP 4x2xAWG 26/7 FRNC

## Electrical data

Characteristic impedance: 100 Ohm ± 15 ohm at 1 to 100 MHz  
 100 Ohm ± 20 ohm at 101 to 600 MHz  
 Loop resistance: 290 Ohm/km max.  
 Mutual capacitance: 45 nF/km nom.  
 Rel. propagation velocity: 77 %



## Typical values

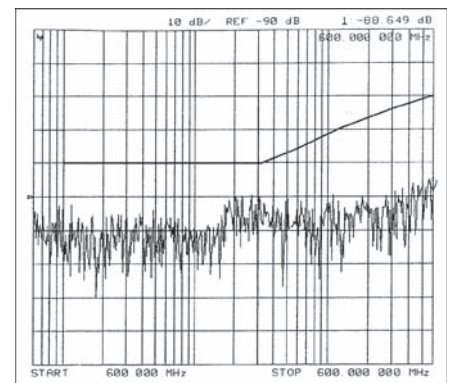
Frequency (MHz)	10	16	62,5	100	200	300	600
Attenuation (dB/10m)	0,8	1,0	2,0	2,6	4,0	4,9	6,3
Next (db)	96,0	96,0	95,0	94,0	88,0	86,0	80,0
ACR (db)	95,2	95,0	93,0	91,4	84,0	81,1	73,7

## Technical data

Weight: app. 42 kg/km  
 bending radius, repeated: 55 mm  
 Operating temperature range min.: -20°C  
 Operating temperature range max.: +60°C  
 Caloric load, approx. value: 0,47 MJ/m  
 Copper weight: 22,00 kg/km

## Norms

Acc. to ISO/IEC 11801, Acc. to EN 50173, Acc. to EIA/TIA 568-A, Category 7, Flame-retardant acc. to IEC 60332-1, Smoke density acc. to IEC 61034, Halogen-free acc. to 60754-2, Corrosiveness acc. to EN50267-2-3



## Application

HELUKAT®600 data cables are used in the tertiary level of a network as patch cables and connection cables. They are characterized by large performance reserves and outstanding performance. They can be used to implement services such as Gigabit Ethernet, Fast Ethernet, Ethernet, ATM155, FDDI, token ring 4/16 Mbit/s or ISDN absolutely trouble-free. With its optimized construction, the HELUKAT®600 series can be manufactured quickly and easily with all common RJ45 plugs.

## Part no.

**80294**, S/FTP 4x2xAWG 26/7 FRNC (S-STP)

Dimensions and specifications may be changed without prior notice.



# LAN Cable Outdoor

Category 7e

**HELUKAT® 600A**

S/FTP PVC/PVC



## Cable structure

Inner conductor Ø:  
Conductor material:  
Core insulation:  
Core colours:  
Shielding 1:  
Inner sheath material:  
Screen over stranding element:  
Screen 1 over stranding:  
Screen 2 over stranding:  
Outer sheath material:  
Outer diameter:  
Outer sheath colour:

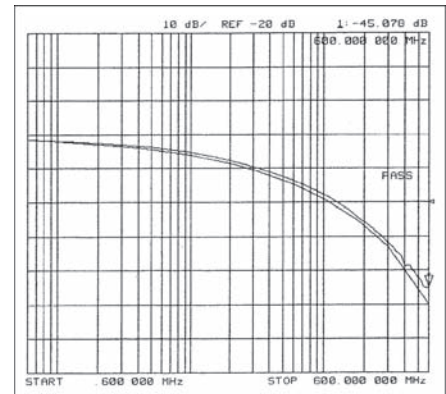
## S/FTP 4x2xAWG 23/1 PVC/PVC

0,58 mm  
Copper, bare  
Foam-skin-PE  
wh/bu, wh/og, wh/gn, wh/bn  
-  
PVC  
Polyester foil, aluminium-lined  
Cu braid  
-  
PVC  
app. 11,6 mm  
Black similar to RAL 9005

## Electrical data

Characteristic impedance:  
  
Loop resistance:  
Mutual capacitance:  
Rel. propagation velocity:

100 Ohm ± 15 ohm at 1 to 100 MHz  
100 Ohm ± 20 ohm at 101 to 1000 MHz  
160 Ohm/km max.  
43 nF/km nom.  
79 %



## Typical values

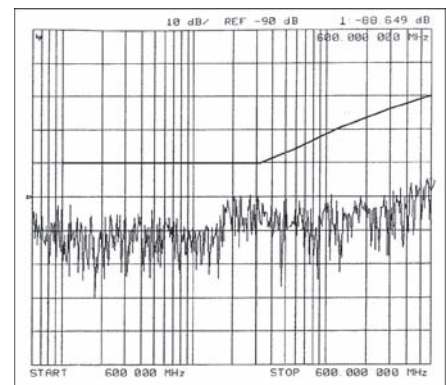
Frequency (MHz)	10	16	62,5	100	200	300	600	900	1000
Attenuation (dB/100m)	5,6	7,1	13,9	17,5	25,2	32,1	44,9	55,0	58,0
Next (db)	100,0	100,0	96,0	94,0	88,0	84,0	73,0	71,0	69,0
ACR (db)	94,4	92,9	82,1	76,5	62,8	51,9	28,1	16,0	9,0

## Technical data

Weight: app. 153 kg/km  
bending radius, repeated: 95 mm  
Operating temperature range min.: -30°C  
Operating temperature range max.: +70°C  
Caloric load, approx. value: 2,62 MJ/m  
Copper weight: 32,00 kg/km

## Norms

Acc. to ISO/IEC 11801, Acc. to EN 50173, Acc. to EIA/TIA 568-A, Category 7e, Flame-retardant acc. to IEC 60332-1



## Application

HELUKAT® 600 data cables are used in the tertiary, but also in the secondary level of a network. They are characterized by large performance reserves and outstanding performance. They can be used to implement services such as Gigabit Ethernet, Fast Ethernet, Ethernet, ATM155, FDDI, token ring 4/16 Mbit/s or ISDN absolutely trouble-free. The series of HELUKAT® 600A with a double PVC jacket is constructed especially for outdoor applications like laying at house walls or in cable lines.

## Part no.

**801147**, S/FTP 4x2xAWG 23/1 PVC/PVC (S-STP)

Dimensions and specifications may be changed without prior notice.

# LAN Cable direct Burial

Category 7e

**HELUKAT® 600E**  
S/FTP PVC



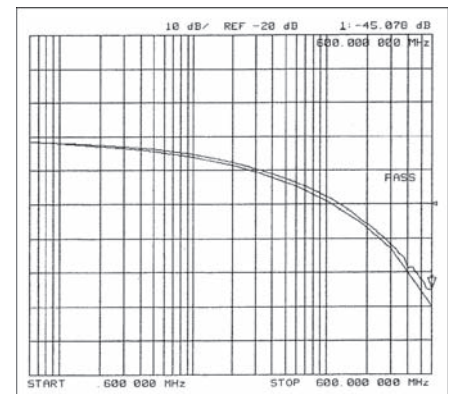
## Cable structure

Inner conductor Ø: 0,58 mm  
 Conductor material: Copper, bare  
 Core insulation: Foam-skin-PE  
 Core colours: wh/bu, wh/og, wh/gn, wh/bn  
 Shielding 1: -  
 Screen over stranding element: Polyester foil, aluminium-lined  
 Screen 1 over stranding: Cu braid  
 Screen 2 over stranding: -  
 Outer sheath material: PVC  
 Outer diameter: app. 9,8 mm  
 Outer sheath colour: Black

## S/FTP 4x2xAWG 23/1 direct burial

0,58 mm  
 Copper, bare  
 Foam-skin-PE  
 wh/bu, wh/og, wh/gn, wh/bn  
 -  
 Polyester foil, aluminium-lined  
 Cu braid  
 -  
 PVC  
 app. 9,8 mm  
 Black

100 Ohm ± 15 ohm at 1 to 100 MHz  
 100 Ohm ± 20 ohm at 101 to 1000 MHz  
 150 Ohm/km max.  
 42 nF/km nom.  
 79 %



## Electrical data

Characteristic impedance:

Loop resistance:  
 Mutual capacitance:  
 Rel. propagation velocity:

## Typical values

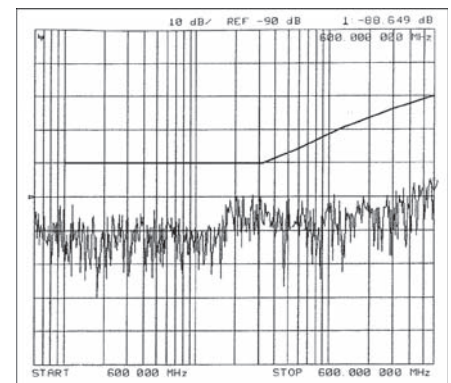
Frequency (MHz)	10	16	62,5	100	200	300	600	900	1000
Attenuation (dB/100m)	5,6	7,1	13,9	17,5	25,2	32,1	44,9	55,0	58,0
Next (db)	100,0	100,0	96,0	94,0	88,0	84,0	73,0	71,0	69,0
ACR (db)	94,4	92,9	82,1	76,5	62,8	51,9	28,1	16,0	9,0

## Technical data

Weight: app. 102 kg/km  
 bending radius, repeated: 100 mm  
 Operating temperature range min.: -45°C  
 Operating temperature range max.: +65°C  
 Caloric load, approx. value: 1,40 MJ/m  
 Copper weight: 32,00 kg/km

## Norms

Acc. to ISO/IEC 11801, Acc. to EN 50173, Acc. to EIA/TIA 568-A, Category 7e, Flame-retardant acc. to IEC 60332-1, Smoke density acc. to IEC 61034



## Application

HELUKAT® 600 data cables are used in the tertiary, but also in the secondary level of a network. They are characterized by large performance reserves and outstanding performance. They can be used to implement services such as Gigabit Ethernet, Fast Ethernet, Ethernet, ATM155, FDDI, token ring 4/16 Mbit/s or ISDN absolutely trouble-free. The serie of HELUKAT® 600E with a cold resistant PVC jacket is constructed especially for outdoor applications like laying at house walls or direct burial.

## Part no.

**802167**, S/FTP 4x2xAWG23/1 PVC (S-STP)

Dimensions and specifications may be changed without prior notice.

# LAN Cable direct Burial / armoured

Category 7e

**HELUKAT® 600AE**

S/FTP FRNC/PE



## Cable structure

Inner conductor Ø:  
Conductor material:  
Core insulation:  
Core colours:  
Shielding 1:  
Inner sheath material:  
Screen over stranding element:  
Screen 1 over stranding:  
Screen 2 over stranding:  
:  
Outer sheath material:  
Outer diameter:  
Outer sheath colour:

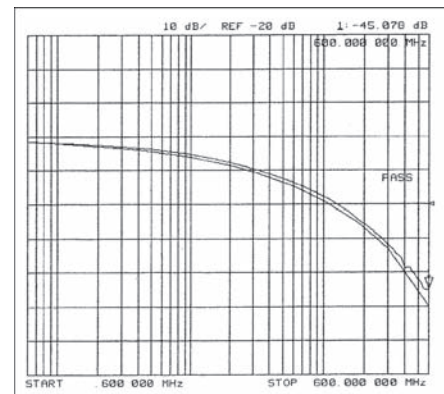
## S/FTP 4x2xAWG 23/1 FRNC/PE

0,58 mm  
Copper, bare  
Foam-skin-PE  
wh/bu, wh/og, wh/gn, wh/bn  
-  
FRNC  
Polyester foil, aluminium-lined  
Cu braid  
-  
Steel shaft  
PE  
app. 12,2 mm  
Black

## Electrical data

Characteristic impedance:  
  
Loop resistance:  
Mutual capacitance:  
Rel. propagation velocity:

100 Ohm ± 15 ohm at 1 to 100 MHz  
100 Ohm ± 20 ohm at 101 to 1000 MHz  
150 Ohm/km max.  
43 nF/km nom.  
79 %



## Typical values

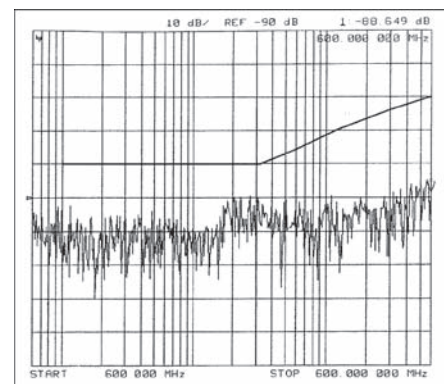
Frequency (MHz)	10	16	62,5	100	200	300	600	900	1000
Attenuation (dB/100m)	5,6	7,1	13,9	17,5	25,2	32,1	44,9	55,0	58,0
Next (db)	100,0	100,0	96,0	94,0	88,0	84,0	73,0	71,0	69,0
ACR (db)	94,4	92,9	82,1	76,5	62,8	51,9	28,1	16,0	9,0

## Technical data

Weight: app. 155 kg/km  
bending radius, repeated: 330 mm  
Operating temperature range min.: -45°C  
Operating temperature range max.: +70°C  
Caloric load, approx. value: 2,30 MJ/m  
Copper weight: 32,00 kg/km

## Norms

Acc. to ISO/IEC 11801, Acc. to EN 50173, Acc. to EIA/TIA 568-A, Category 7e



## Application

HELUKAT® 600 data cables are used in the tertiary, but also in the secondary level of a network. They are characterized by large performance reserves and outstanding performance. They can be used to implement services such as Gigabit Ethernet, Fast Ethernet, Ethernet, ATM155, FDDI, token ring 4/16 Mbit/s or ISDN absolutely trouble-free. The series of HELUKAT® 600AE with a FRNC/PE double jacket and the rodent protection is constructed especially for outdoor and direct burial applications.

## Part no.

**802168**, S/FTP 4x2xAWG 23/1 FRNC/PE (S-STP)

Dimensions and specifications may be changed without prior notice.

# LAN Cable

Category 7<sub>A</sub>

**HELUKAT®** 1200  
S/FTP



## Cable structure

Inner conductor Ø:	0,57 mm
Conductor material:	Copper, bare
Core insulation:	Foam-skin-PE
Core colours:	wh/bu, wh/og, wh/gn, wh/bn
Shielding 1:	-
Screen over stranding element:	Polyester foil, aluminium-lined
Screen 1 over stranding:	Cu braid
Screen 2 over stranding:	-
Outer sheath material:	LSZH
Outer diameter:	app. 7,5 mm
Outer sheath colour:	Blue Lilac similar to RAL 4005

## Electrical data

Characteristic impedance:	100 Ohm ± 15 ohm at 1 to 100 MHz 100 Ohm ± 20 ohm at 101 to 1200 MHz
Loop resistance:	160 Ohm/km max.
Mutual capacitance:	43 nF/km nom.
Rel. propagation velocity:	77 %

## Typical values

Frequency (MHz)	10	16	62,5	100	200	300	600	900	1000	1200
Attenuation (db/100m)	5,2	6,8	13,3	17,3	24,2	30,2	43,5	54,3	56,9	62,9
Next (db)	105,0	105,0	105,0	100,0	95,0	93,0	88,0	85,0	84,0	82,0
ACR (db)	99,8	98,2	91,7	82,7	70,8	62,8	44,5	30,7	27,1	19,1

## Technical data

Weight:	app. 60 kg/km
bending radius, repeated:	65 mm
Operating temperature range min.:	-20°C
Operating temperature range max.:	+60°C
Caloric load, approx. value:	0,57 MJ/m
Copper weight:	30,00 kg/km

## Norms

Acc. to ISO/IEC 11801, Acc. to EN 50173, Acc. to EIA/TIA 568-A, Category 7<sub>A</sub>, Flame-retardant acc. to IEC 60332-3, Smoke density acc. to IEC 61034, Halogen-free acc. to 60754-2, Corrosiveness acc. to EN50267-2-3

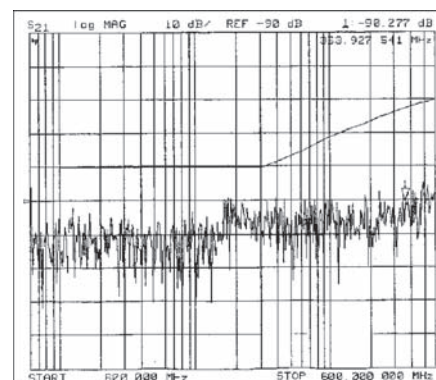
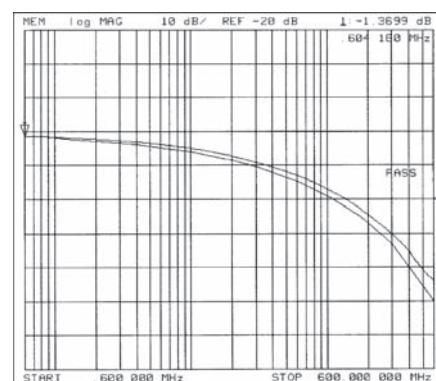
## Application

HELUKAT®1200-7A data cables are used in the tertiary, but also in the secondary level of a network. They are characterized by large performance reserves and outstanding performance. They can be used to implement services such as 10Gigabit Ethernet, Gigabit Ethernet, Fast Ethernet, Ethernet, ATM155, FDDI, token ring 4/16 Mbit/s or ISDN absolutely trouble-free. Likewise, the mechanical characteristics are perfectly suited for the application in tight cable channels and platforms due to their optimized construction.

## Part no.

**803380**, S/FTP 4x2xAWG 23/1 FRNC (S-STP)

Dimensions and specifications may be changed without prior notice.



R

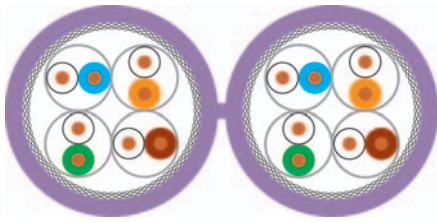


# LAN Cable

Category 7<sub>A</sub>

**HELUKAT® 1200**

S/FTP duplex



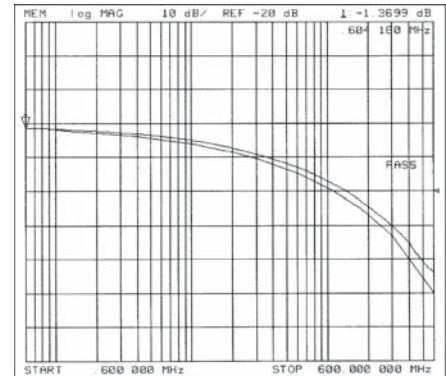
## Cable structure

Inner conductor Ø:	0,57 mm
Conductor material:	Copper, bare
Core insulation:	Foam-skin-PE
Core colours:	wh/bu, wh/og, wh/gn, wh/bn
Shielding 1:	-
Screen over stranding element:	Polyester foil, aluminium-lined
Screen 1 over stranding:	Cu braid
Screen 2 over stranding:	-
Outer sheath material:	LSZH
Cable dimensions:	app. 16,0 mm x 7,5 mm
Outer sheath colour:	Blue Lilac similar to RAL 4005

## S/FTP 2x(4x2xAWG 23/1) LSZH

## Electrical data

Characteristic impedance:	100 Ohm ± 15 ohm at 1 to 100 MHz 100 Ohm ± 20 ohm at 101 to 1200 MHz
Loop resistance:	160 Ohm/km max.
Mutual capacitance:	43 nF/km nom.
Rel. propagation velocity:	77 %



## Typical values

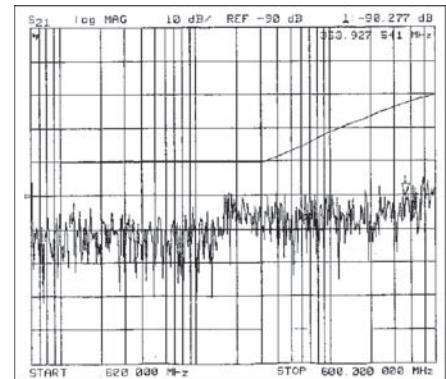
Frequency (MHz)	10	16	62,5	100	200	300	600	900	1000	1200
Attenuation (db/100m)	5,2	6,8	13,3	17,3	24,2	30,2	43,5	54,3	56,9	62,9
Next (db)	105,0	105,0	105,0	100,0	95,0	93,0	88,0	85,0	84,0	82,0
ACR (db)	99,8	98,2	91,7	82,7	70,8	62,8	44,5	30,7	27,1	19,1

## Technical data

Weight:	app. 120 kg/km
bending radius, repeated:	65 mm
Operating temperature range min.:	-20°C
Operating temperature range max.:	+60°C
Caloric load, approx. value:	1,16 MJ/m
Copper weight:	60,00 kg/km

## Norms

Acc. to ISO/IEC 11801, Acc. to EN 50173, Acc. to EIA/TIA 568-A, Category 7<sub>A</sub>, Flame-retardant acc. to IEC 60332-3, Smoke density acc. to IEC 61034, Halogen-free acc. to 60754-2, Corrosiveness acc. to EN50267-2-3



## Application

HELUKAT®1200-7A data cables are used in the tertiary, but also in the secondary level of a network. They are characterized by large performance reserves and outstanding performance. They can be used to implement services such as 10Gigabit Ethernet, Gigabit Ethernet, Fast Ethernet, Ethernet, ATM155, FDDI, token ring 4/16 Mbit/s or ISDN absolutely trouble-free. Likewise, the mechanical characteristics are perfectly suited for the application in tight cable channels and platforms due to their optimized construction.

## Part no.

**803381**, S/FTP 2x(4x2xAWG 23/1) FRNC (S-STP)

Dimensions and specifications may be changed without prior notice.



# LAN Cable

Category 8

**HELUKAT® 1200**  
S/FTP



## Cable structure

Inner conductor Ø:	0,64 mm
Conductor material:	Copper, bare
Core insulation:	Foam-skin-PE
Core colours:	wh/bu, wh/og, wh/gn, wh/bn
Shielding 1:	-
Screen over stranding element:	Polyester foil, aluminium-lined
Screen 1 over stranding:	Cu braid
Screen 2 over stranding:	-
Outer sheath material:	FRNC
Outer diameter:	app. 7,7 mm
Outer sheath colour:	Blue similar to RAL 5015

## Electrical data

Characteristic impedance:	100 Ohm ± 15 ohm at 1 to 100 MHz 100 Ohm ± 20 ohm at 101 to 1200 MHz
Loop resistance:	120 Ohm/km max.
Mutual capacitance:	43 nF/km nom.
Rel. propagation velocity:	79 %

## Typical values

Frequency (MHz)	10	16	62,5	100	200	300	600	1000	1200
Attenuation (db/100m)	4,9	6,3	12,7	16,3	23,5	29,4	42,8	53,0	59,0
Next (db)	100,0	100,0	95,0	93,0	90,0	87,0	81,0	78,0	77,0
ACR (db)	95,1	93,7	82,3	76,7	66,5	57,6	38,2	25,0	18,0

## Technical data

Weight:	app. 66 kg/km
bending radius, repeated:	72 mm
Operating temperature range min.:	-20°C
Operating temperature range max.:	+60°C
Caloric load, approx. value:	0,70 MJ/m
Copper weight:	40,00 kg/km

## Norms

Acc. to ISO/IEC 11801, Acc. to EN 50173, Acc. to EIA/TIA 568-A, Category 8 (draft),  
Flame-retardant acc. to IEC 60332-3, Smoke density acc. to IEC 61034, Halogen-free acc. to 60754-2, Corrosiveness acc. to EN50267-2-3

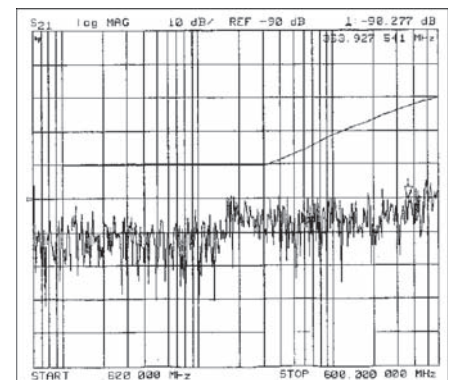
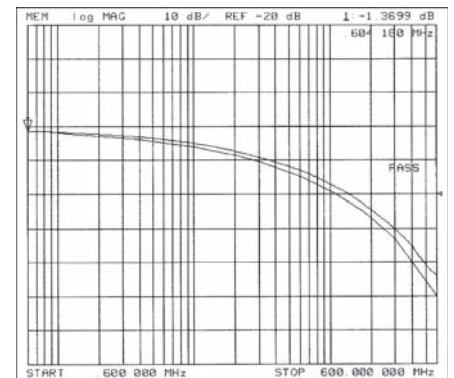
## Application

HELUKAT® 1200 data cables are used in the tertiary, but also in the secondary level of a network. They are characterized by large performance reserves and outstanding performance. They can be used to implement services such as Gigabit Ethernet, Fast Ethernet, Ethernet, ATM155, FDDI, token ring 4/16 Mbit/s or ISDN absolutely trouble-free. Likewise, the mechanical characteristics are perfectly suited for the application in tight cable channels and platforms due to their optimized construction.

## Part no.

**81699**, S/FTP 4x2xAWG 22/1 FRNC (S-FTP)

Dimensions and specifications may be changed without prior notice.



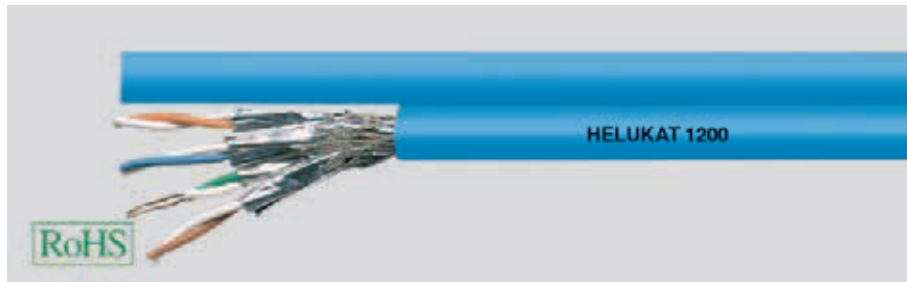
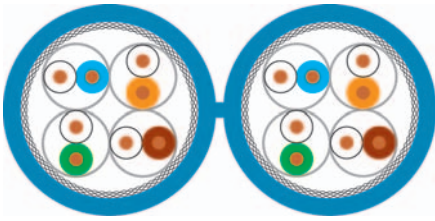
R

# LAN Cable

Category 8

**HELUKAT® 1200**

S/FTP duplex



## Cable structure

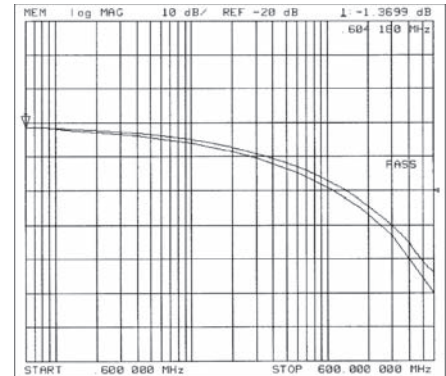
Inner conductor Ø:  
Conductor material:  
Core insulation:  
Core colours:  
Shielding 1:  
Screen over stranding element:  
Screen 1 over stranding:  
Screen 2 over stranding:  
Outer sheath material:  
Cable dimensions:  
Outer sheath colour:

## S/FTP 2x(4x2xAWG 22/1) FRNC

0,64 mm  
Copper, bare  
Foam-skin-PE  
wh/bu, wh/og, wh/gn, wh/bn  
-  
Polyester foil, aluminium-lined  
Cu braid  
-  
FRNC  
app. 7,7 mm x 16,5 mm  
Blue similar to RAL 5015

## Electrical data

Characteristic impedance: 100 Ohm ± 15 ohm at 1 to 100 MHz  
100 Ohm ± 20 ohm at 101 to 1200 MHz  
Loop resistance: 120 Ohm/km max.  
Mutual capacitance: 43 nF/km nom.  
Rel. propagation velocity: 79 %



## Typical values

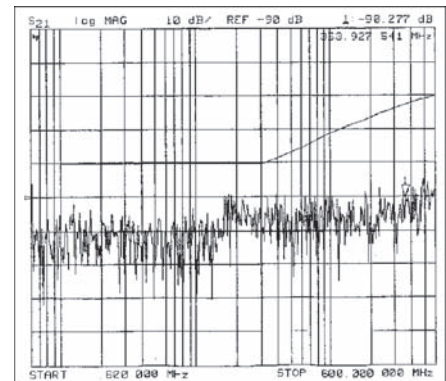
Frequency (MHz)	10	16	62,5	100	200	300	600	1000	1200
Attenuation (db/100m)	4,9	6,3	12,7	16,3	23,5	29,4	42,8	53,0	59,0
Next (db)	100,0	100,0	95,0	93,0	90,0	87,0	81,0	78,0	77,0
ACR (db)	95,1	93,7	82,3	76,7	66,5	57,6	38,2	25,0	18,0

## Technical data

Weight: app. 133 kg/km  
bending radius, repeated: 72 mm  
Operating temperature range min.: -20°C  
Operating temperature range max.: +60°C  
Caloric load, approx. value: 1,50 MJ/m  
Copper weight: 80,00 kg/km

## Norms

Acc. to ISO/IEC 11801, Acc. to EN 50173, Acc. to EIA/TIA 568-A, Category 8 (draft),  
Flame-retardant acc. to IEC 60332-3, Smoke density acc. to IEC 61034, Halogen-free acc. to 60754-2, Corrosiveness acc. to EN50267-2-3



## Application

HELUKAT®1200 data cables are used in the tertiary, but also in the secondary level of a network. They are characterized by large performance reserves and outstanding performance. They can be used to implement services such as Gigabit Ethernet, Fast Ethernet, Ethernet, ATM155, FDDI, token ring 4/16 Mbit/s or ISDN absolutely trouble-free. Likewise, the mechanical characteristics are perfectly suited for the application in tight cable channels and platforms due to their optimized construction.

## Part no.

**800647**, S/FTP 2x(4x2xAWG 22/1) FRNC (S-STP)

Dimensions and specifications may be changed without prior notice.

# Multimedia Cable

Category 8

**HELUKAT® 1500**  
S/FTP

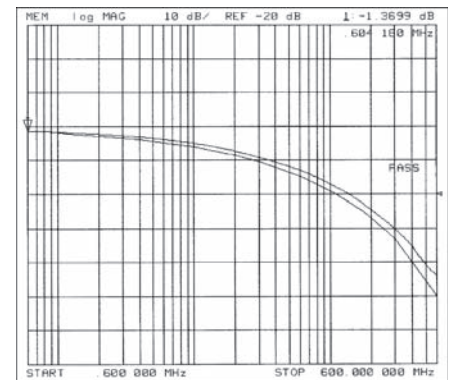


## Cable structure

Inner conductor Ø:	0,64 mm
Conductor material:	Copper, bare
Core insulation:	Foam-skin-PE
Core colours:	wh/bu, wh/og, wh/gn, wh/bn
Shielding 1:	-
Screen over stranding element:	Polyester foil, aluminium-lined
Screen 1 over stranding:	Cu braid
Screen 2 over stranding:	-
Outer sheath material:	FRNC
Outer diameter:	app. 7,7 mm
Outer sheath colour:	Yellow

## S/FTP 4x2xAWG 22/1 FRNC

Inner conductor Ø:	0,64 mm
Conductor material:	Copper, bare
Core insulation:	Foam-skin-PE
Core colours:	wh/bu, wh/og, wh/gn, wh/bn
Shielding 1:	-
Screen over stranding element:	Polyester foil, aluminium-lined
Screen 1 over stranding:	Cu braid
Screen 2 over stranding:	-
Outer sheath material:	FRNC
Outer diameter:	app. 7,7 mm
Outer sheath colour:	Yellow



## Electrical data

Characteristic impedance:	100 Ohm ± 15 ohm at 1 to 100 MHz 100 Ohm ± 20 ohm at 101 to 1200 MHz
Loop resistance:	120 Ohm/km max.
Mutual capacitance:	42 nF/km nom.
Rel. propagation velocity:	77 %

## Typical values

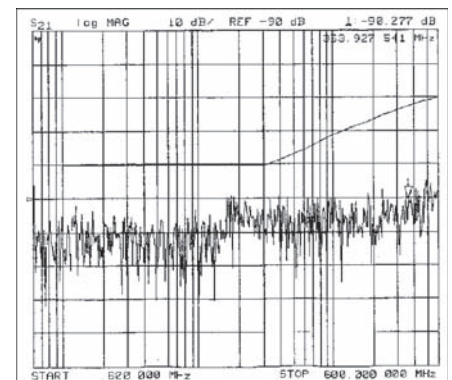
Frequency (MHz)	10	16	62,5	100	200	300	600	1000	1200	1500
Attenuation (db/100m)	4,2	6,3	12,7	16,5	21,5	27,5	41,7	54,4	59,8	66,2
Next (db)	110,0	110,0	110,0	110,0	110,0	105,0	95,0	85,0	80,0	74,0
ACR (db)	105,8	103,7	97,3	93,5	88,5	77,5	53,3	30,6	22,2	7,8

## Technical data

Weight:	app. 66 kg/km
bending radius, repeated:	68 mm
Operating temperature range min.:	-20°C
Operating temperature range max.:	+60°C
Caloric load, approx. value:	0,74 MJ/m
Copper weight:	41,00 kg/km

## Norms

Acc. to ISO/IEC 11801, Acc. to EN 50173, Acc. to EIA/TIA 568-A, Category 8 (draft),  
Flame-retardant acc. to IEC 60332-3, Smoke density acc. to IEC 61034, Halogen-free acc. to  
60754-2, Corrosiveness acc. to EN50267-2-3



## Application

HELUKAT® 1500 data cables are used in the tertiary, but also in the secondary level of a network. They are characterized by large performance reserves and outstanding performance. They can be used to implement services such as 10Gigabit Ethernet, Gigabit Ethernet, Fast Ethernet, Ethernet, ATM155, FDDI, token ring 4/16 Mbit/s or ISDN absolutely trouble-free. That means applications such as multimedia (TV, Video, Data, Speech) are no problem for this series. Likewise, the mechanical characteristics are perfectly suited for the application in tight cable channels and platforms due to their optimized construction.

## Part no.

**802169**, S/FTP 4x2xAWG 22/1 FRNC (S-STP)

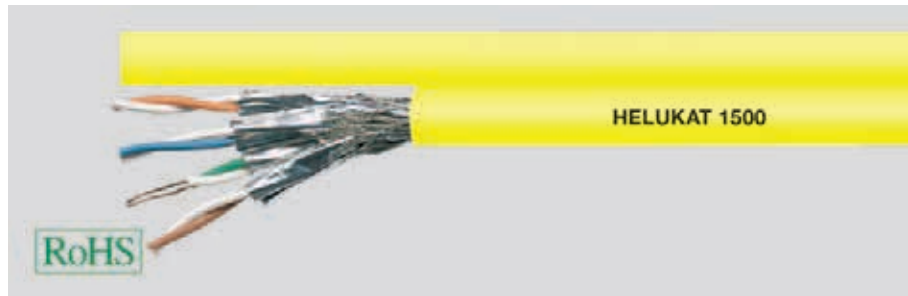
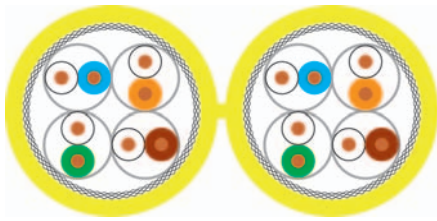
Dimensions and specifications may be changed without prior notice.

# Multimedia Cable

Category 8

**HELUKAT® 1500**

S/FTP duplex



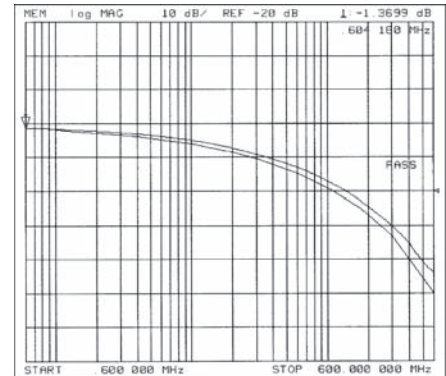
## Cable structure

Inner conductor Ø:	0,64 mm
Conductor material:	Copper, bare
Core insulation:	Foam-skin-PE
Core colours:	wh/bu, wh/og, wh/gn, wh/bn
Shielding 1:	-
Screen over stranding element:	Polyester foil, aluminium-lined
Screen 1 over stranding:	Cu braid
Screen 2 over stranding:	-
Outer sheath material:	FRNC
Cable dimensions:	app. 7,7 mm x 16,2 mm
Outer sheath colour:	Yellow

## S/FTP 2x(4x2xAWG 22/1) FRNC

## Electrical data

Characteristic impedance:	100 Ohm ± 15 ohm at 1 to 100 MHz 100 Ohm ± 20 ohm at 101 to 1200 MHz
Loop resistance:	120 Ohm/km max.
Mutual capacitance:	42 nF/km nom.
Rel. propagation velocity:	77 %



## Typical values

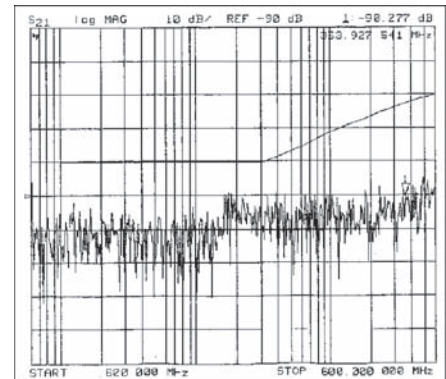
Frequency (MHz)	10	16	62,5	100	200	300	600	1000	1200	1500
Attenuation (db/100m)	4,2	6,3	12,7	16,5	21,5	27,5	41,7	54,4	59,8	66,2
Next (db)	110,0	110,0	110,0	110,0	110,0	105,0	95,0	85,0	80,0	74,0
ACR (db)	105,8	103,7	97,3	93,5	88,5	77,5	53,3	30,6	22,2	7,8

## Technical data

Weight:	app. 135 kg/km
bending radius, repeated:	68 mm
Operating temperature range min.:	-20°C
Operating temperature range max.:	+60°C
Caloric load, approx. value:	1,50 MJ/m
Copper weight:	82,00 kg/km

## Norms

Acc. to ISO/IEC 11801, Acc. to EN 50173, Acc. to EIA/TIA 568-A, Category 8 (draft),  
Flame-retardant acc. to IEC 60332-3, Smoke density acc. to IEC 61034, Halogen-free acc. to 60754-2, Corrosiveness acc. to EN50267-2-3



## Application

HELUKAT®1500 data cables are used in the tertiary, but also in the secondary level of a network. They are characterized by large performance reserves and outstanding performance. They can be used to implement services such as 10Gigabit Ethernet, Gigabit Ethernet, Fast Ethernet, Ethernet, ATM155, FDDI, token ring 4/16 Mbit/s or ISDN absolutely trouble-free. That means applications such as multimedia (TV, Video, Data, Speech) are no problem for this series. Likewise, the mechanical characteristics are perfectly suited for the application in tight cable channels and platforms due to their optimized construction.

## Part no.

**802170**, S/FTP 2x(4x2xAWG 22/1) FRNC (S-STP)

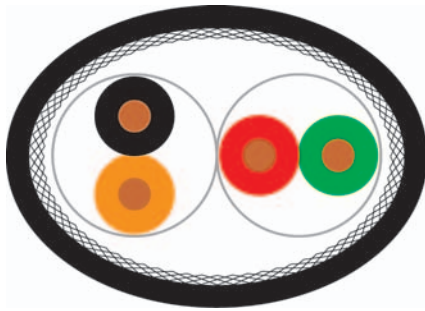
Dimensions and specifications may be changed without prior notice.



# LAN Cable

**HELUKABEL® IVS**

IBM P/N 33G2772



## Cable structure

Inner conductor Ø:  
 Conductor material:  
 Core insulation:  
 Number of cores:  
 Core colours:  
 Screen over stranding element:  
 Screen over stranding 1:  
 Screen over stranding 2:  
 Outer sheath material:  
 Cable dimensions:  
 Outer sheath colour:

## IBM P/N 33G2772 type 1A

0,64 mm  
 Copper, bare  
 Foam-skin-PE  
 4  
 bk/og, rd/gn  
 Polyester foil, aluminium-lined  
 Cu braid, tinned  
 -  
 PVC  
 app. 7,6 mm x 11,9 mm  
 Black

## Electrical data

Characteristic impedance:  
  
 Direct current resistance:  
 Rel. propagation velocity:

150 Ohm  
 ± 15 ohm at 3 to 20 MHz  
 185 Ohm  
 ± 18.5 ohm at 38.4 kHz  
 270 Ohm  
 ± 27 ohm at 9.6 kHz  
 57,1 Ohm/km  
 78 %

## Typical values

Frequency (MHz)	20	100	20	100	20	100
Attenuation (dB/100m)	7,4	18,7	4,9	12,3	7,4	18,7
Next (db)	80,0	60,0	50,0	39,0	60,0	49,0

## Technical data

Weight: app. 85 kg/km  
 bending radius, repeated: 110 mm  
 Operating temperature range min.: -10°C  
 Operating temperature range max.: +70°C  
 Caloric load, approx. value: 1,70 MJ/m  
 Copper weight: 38,00 kg/km

## Application

HELUKABEL® IVS types are used in the area of the IVS system, developed by IBM. They correspond to the wiring guidelines set by IBM.

## Part no.

**80068**, IBM P/N 33G2772 type 1A

Dimensions and specifications may be changed without prior notice.

**R**



**BUS Cables USB 3.0 Bus**

BUS Cables Profibus SHIPLINE

BUS Cables E-Bus

**BUS Cables CAN Bus**

Industrial Ethernet PROFinet Typ A

Industrial Ethernet 200IND SF/UTP ROBUSTFLEX

**Industrial Ethernet PROFinet C Torsion**



# BUS CABLES

Designation	Drag chain capability	Page
Industrial Ethernet HELUKAT 600IND S/FTP solid, ROBUST		687
Industrial Ethernet HELUKAT 600IND S/FTP SHIPLINE		688
Industrial Ethernet HELUKAT 600IND S/FTP Robustflex, UL		689
Industrial Ethernet Standard Cable S/FTP Cat. 6A, PVC		690
Industrial Ethernet HELUKAT 250S SF/UTP 4 pairs, drag chain	☞	691
Industrial Ethernet HELUKAT 200IND SF/UTP Robustflex		692
Industrial Ethernet WK 105°C		693
Industrial Ethernet HELUKAT 100S ECO SF/UTP 4-core, drag chain	☞	694
Industrial Ethernet HELUKAT 100S ECO SF/UTP 4 pairs, drag chain	☞	695
Industrial Ethernet HELUKAT 200S SF/UTP 4-cores, drag chain	☞	696
Industrial Ethernet HELUKAT 200S SF/UTP 4 pairs, drag chain	☞	697
Industrial Ethernet HELUKAT 100T SF/UTP Tordierflex	☞	698
Industrial Ethernet PROFINet type A, PVC and PUR		699
Industrial Ethernet PROFINet type A, radiation resistant and armoured		700
Industrial Ethernet PROFINet type B hybrid		701
Industrial Ethernet PROFINet type B SHIPLINE		702
Industrial Ethernet PROFINet type B and C	☞	703
Industrial Ethernet PROFINet type C Torsion		704
Profibus L2, fixed installation indoor		705
Profibus L2, fixed installation outdoor and robust		706
Profibus L2, direct burial, PVC/PE and armoured		707
Profibus L2, 7-wire		708
Profibus L2, drag chain	☞	709
Profibus ET200X, Profibus ECOFAST	☞	710
Profibus, SHIPLINE and high temperature		711
Profibus hybrid, DESINA®		712
Profibus L2, torsion and festoon		713
Profibus PA		714
Profibus PA, armoured		715
Profibus PA, Long Distance		716
Profibus SK, indoor and outdoor		717
Profibus SK, FRNC and Robust (PUR)		718
Profibus SK, drag chain	☞	719
FOUNDATION™ Fieldbus FF type A, basic		720
FOUNDATION™ Fieldbus FF type A, with device ground		721
FOUNDATION™ Fieldbus FF type A, with device ground and armouring		722
FOUNDATION™ Fieldbus FF type A, without device ground		723
Bus Cable HMCB200, PVC		724
Bus Cable HMCB500S, PVC	☞	725
Bus Cable HMCB800, TPE	☞	726

R

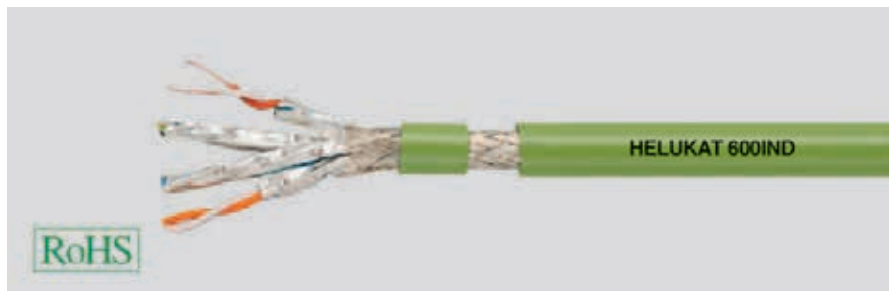
# BUS CABLES

Designation	Drag chain capability	Page
Bus Cable USB S, PUR		727
Bus Cable USB L, PUR		728
Bus Cable USB 3.0, PUR		729
Bus Cable Coax 50 Ohm, PUR		730
CAN bus 0.22 mm <sup>2</sup> , flexible		731
CAN bus 0,22 mm <sup>2</sup> (pair stranded), flexible		732
CAN bus 0.25 mm <sup>2</sup> , flexible, 105°C		733
CAN bus 0.34 mm <sup>2</sup> , flexible		734
CAN bus 0.34 mm <sup>2</sup> , flexible		735
CAN bus 0.50 mm <sup>2</sup> , flexible		736
CAN bus 0.50 mm <sup>2</sup> , flexible	737	
CAN bus 0.50 mm <sup>2</sup> , direct burial	738	
CAN bus 0.75 mm <sup>2</sup> , flexible	739	
CAN bus 0.25 mm <sup>2</sup> , drag chain		740
CAN bus 0.34 mm <sup>2</sup> drag chain, UL		741
Interbus fixed installation, remote bus and installation remote bus	742	
Interbus fixed installation, remote bus halogenfree	743	
Interbus drag chain, remote bus and installation remote bus		744
Multibus I, highflexible		745
Multibus II, highflexible	746	
ASI bus, EPDM	747	
ASI bus, EPDM, Long Distance	748	
ASI bus, PUR, UL/CSA		749
ASI bus, PUR, UL/CSA, Long Distance		750
ASI bus, TPE	751	
AS-Interface for electrical cabinets, FLIH	752	
DeviceNet™ PVC	753	
DeviceNet™ FRNC	754	
DeviceNet™ CPE	755	
DeviceNet™ PUR		756
CC link bus		757
SafetyBUS p, FRNC and PUR		758
LON BUS, H122 and Y116		759
EIB bus, 4 cores, PVC	760	
EIB bus, 4-core FRNC and 4-pair PVC	761	
EIB bus, 4 cores, direct burial	762	
KH bus, PVC and FRNC	763	

# Industrial Ethernet

**ROBUST**
**HELUKAT® 600IND**

S/FTP, Category 7e



## Type

### Cable structure

Inner conductor diameter:  
 Core insulation:  
 Core colours:  
 Stranding element:  
 Shielding 1:  
 Shielding 2:  
 Screen 1 over stranding:  
 Screen 2 over stranding:  
 Outer sheath material:  
 Cable external diameter:  
 Outer sheath colour:

## Industrial Area

### S/FTP 4x2xAWG 23/1 PUR

Copper, bare (AWG 23/1)  
 Foam-skin-PE  
 wh/bu, wh/og, wh/gn, wh/bn  
 Double core  
 -  
 Polyester foil, aluminium-lined  
 Cu braid  
 -  
 PUR  
 app. 8,2 mm  
 Green similar to RAL 6018

## Electrical data

Characteristic impedance: 100 Ohm ± 15 ohm at 1 to 100 MHz  
 100 Ohm ± 20 ohm at 101 to 1000 MHz  
 Loop resistance: 148 Ohm/km max.  
 Mutual capacitance: 43 nF/km nom.  
 Relative propagation velocity: 78 %

## Typical values

Frequency (MHz)	10	16	62,5	100	200	300	600	900	1000
Attenuation (dB/100m)	5,6	7,1	13,9	17,5	25,2	32,1	44,9	55,0	58,0
Next (db)	100,0	100,0	96,0	94,0	88,0	84,0	73,0	71,0	69,0
ACR (db)	94,4	92,9	82,1	76,5	62,8	51,9	28,1	16,0	9,0

## Technical data

Weight: app. 62 kg/km  
 bending radius, repeated: 85 mm  
 Operating temperature range min.: -40°C  
 Operating temperature range max.: +80°C  
 Caloric load, approx. value: 0,74 MJ/m  
 Copper weight: 34,00 kg/km

## Norms

Acc. to ISO/IEC 11801, Acc. to EN 50173, Acc. to EIA/TIA 568-A, Category 7e, Flame-retardant acc. to IEC 60332-1, Halogen-free acc. to 60754-2, Corrosiveness acc. to EN50267-2-3, Oil-resistant

## Application

HELUKAT® 600IND Cat 7e Robust is used for harsh industrial environments. Mechanically, this product exhibits excellent resistance to mineral oils, greases and cooling lubricants and has good microbe and hydrolysis resistance. Electrically, this cable is characterized by high reserve capacity and outstanding performance. This allows you to create services such as Gigabit Ethernet, Fast Ethernet, Ethernet, ATM155, FDDI, Token Ring 4/16 Mbit/s or ISDN without difficulty. These cable considerably exceed the requirement for compliance with Class B interference emission to EN55022, as well as interference immunity to EN55024. This gives the series outstanding EMC characteristics.

## Part no.

**801197, S/FTP 4x2xAWG 23/1 PUR (S-STP)**

Dimensions and specifications may be changed without prior notice.

**R**

# Industrial Ethernet

SHIPLINE

**HELUKAT® 600IND**

S/FTP, Category 7



## Type

### Cable structure

Inner conductor diameter:  
Core insulation:  
Core colours:  
Stranding element:  
Shielding 1:  
Shielding 2:  
Screen 1 over stranding:  
Screen 2 over stranding:  
Outer sheath material:  
Cable external diameter:  
Outer sheath colour:

## Marine and Offshore

### S/FTP 4x2xAWG 24/7 (stranded) FRNC

Copper, bare (AWG 24/7)  
Foam-skin-PE  
wh/bu, wh/og, wh/gn, wh/bn  
Double core  
-  
Polyester foil, aluminium-lined  
Cu braid  
-  
FRNC  
app. 9,1 mm ± 0,3 mm  
Grey similar to RAL 7035

## Electrical data

Characteristic impedance: 100 Ohm ± 15 ohm at 1 to 100 MHz  
100 Ohm ± 20 ohm at 101 to 600 MHz  
Loop resistance: 168 Ohm/km max.  
Mutual capacitance: 43 nF/km nom.  
Relative propagation velocity: 72 %

## Typical values

Frequency (MHz)	10	16	62,5	100	200	600
Attenuation (dB/10m)	0,7	0,8	1,6	2,1	3,1	5,2
Next (db)	90,0	90,0	85,0	81,0	76,0	68,0
ACR (db)	89,3	89,2	83,4	78,9	72,9	62,8

## Technical data

Weight: app. 85 kg/km  
bending radius, repeated: 85 mm  
Operating temperature range min.: -20°C  
Operating temperature range max.: +75°C  
Caloric load, approx. value: 0,80 MJ/m  
Copper weight: 36,00 kg/km

## Norms

Acc. to ISO/IEC 11801, Acc. to EN 50173, Acc. to EIA/TIA 568-A, Category 7, Flame-retardant acc. to IEC 60332-3, Smoke density acc. to IEC 61034, Halogen-free acc. to 60754-2, Corrosiveness acc. to EN50267-2-3, Oil-resistant

## Application

HELUKAT® 600IND Cat 7 Shipline is designed specially for use in shipbuilding and exceptionally well-suited for Ethernet applications. It guarantees excellent transmission characteristics and may be used even under the harshest conditions. The cable listed here is certified by **German Lloyd**; this means it is designed for flexible marine and offshore applications.

## Part no.

**803382**, S/FTP 4x2xAWG 24/7 stranded FRNC (S-STP)

Dimensions and specifications may be changed without prior notice.



# Industrial Ethernet

**ROBUSTFLEX**
**HELUKAT® 600IND**

S/FTP, Category 7



## Type

### Cable structure

Inner conductor diameter:  
 Core insulation:  
 Core colours:  
 Stranding element:  
 Shielding 1:  
 Shielding 2:  
 Screen 1 over stranding:  
 Screen 2 over stranding:  
 Outer sheath material:  
 Cable external diameter:  
 Outer sheath colour:

## Industrial Patch Cables

### S/FTP 4x2xAWG 26/7 PUR

Copper, bare (AWG 26/7)  
 Foam-skin-PE  
 wh/bu, wh/og, wh/gn, wh/bn  
 Double core  
 -  
 Polyester foil, aluminium-lined  
 Cu braid  
 -  
 PUR  
 app. 6,4 mm ± 0,3 mm  
 Green similar to RAL 6018

## Electrical data

Characteristic impedance: 100 Ohm ± 15 ohm at 1 to 100 MHz  
 100 Ohm ± 20 ohm at 101 to 600 MHz  
 Loop resistance: 290 Ohm/km max.  
 Mutual capacitance: 42 nF/km nom.  
 Relative propagation velocity: 64 %

## Typical values

Frequency (MHz)	10	16	62,5	100	200	600
Attenuation (db/10m)	0,8	1,1	2,2	2,8	4,0	7,4
Next (db)	80,0	80,0	75,0	72,0	68,0	61,0
ACR (db)	79,2	78,9	72,8	69,2	64,0	53,6

## Technical data

Weight: app. 48 kg/km  
 bending radius, repeated: 64 mm  
 Operating temperature range min.: -40°C  
 Operating temperature range max.: +80°C  
 Caloric load, approx. value: 0,45 MJ/m  
 Copper weight: 28,00 kg/km

## Norms

Acc. to ISO/IEC 11801, Acc. to EN 50173, Acc. to EIA/TIA 568-A, Category 7, Flame-retardant acc. to IEC 60332-1, Smoke density acc. to IEC 61034, Halogen-free acc. to 60754-2, Corrosiveness acc. to EN50267-2-3, Oil-resistant, AWM 20963 (80°C/30V)

## Application

HELUKAT®600IND Cat 7 Robustflex is an Ethernet cable that, thanks to use of a halogen-free PU outer sheath, is ideal for harsh industrial surroundings. This cable is configurable with common RJ45 plugs (industrial and office version), as well as with some Sub-D and M12 plugs.

## Part no.

**802184**, S/FTP 4x2xAWG 26/7 PUR (S-STP)

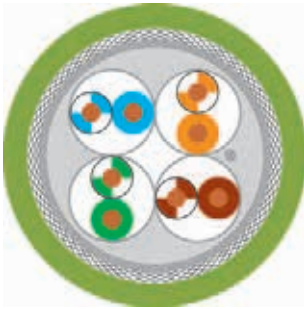
Dimensions and specifications may be changed without prior notice.

**R**

# Industrial Ethernet

**10GIG****HELUKAT® 500IND**

S/FTP, Category 6A



## Type

### Cable structure

Inner conductor diameter:  
Core insulation:  
Core colours:  
Stranding element:  
Shielding 1:  
Inner sheath material:  
Shielding 2:  
Total shielding:  
Drain wire:  
Outer sheath material:  
Cable external diameter:  
Outer sheath colour:

## Industrial Area

### S/FTP 4x2xAWG 22/1

Copper, bare (AWG 22/1)  
Foam-skin-PE  
whbu/bu, whog/og, whgn/gn, whbn/bn  
Double core  
Polyester foil over stranded bundle  
PVC  
Polyester foil, aluminium-lined  
Foil + braid  
yes  
PVC  
app. 9,6 mm ± 0,3 mm  
Green similar to RAL 6018

## Electrical data

Characteristic impedance: 100 Ohm ± 15 ohm at 1 to 100 MHz  
100 Ohm ± 20 Ohm at 101 to 500 MHz  
Conductor resistance, max.: 59 Ohm/km  
Insulation resistance, min.: 0,5 GOhm x km  
Loop resistance: 118 Ohm/km max.  
Mutual capacitance: 72 nF/km nom.  
Test voltage: 0,7 kV  
Relative propagation velocity: 62 %

## Typical values

Frequency (MHz)	10	16	62,5	100	250	500
Attenuation (db/100m)	5,9	7,5	15,0	19,1	31,1	45,3
Next (dB)	60,3	57,2	48,4	45,3	39,3	34,3
PSNext (dB)	57,3	54,2	45,4	42,3	36,3	31,8

## Technical data

Weight: app. 115 kg/km  
bending radius, repeated: 80 mm  
Operating temperature range min.: -40°C  
Operating temperature range max.: +70°C  
Caloric load, approx. value: 1,69 MJ/m  
Copper weight: 44,00 kg/km

## Norms

Acc. to ISO/IEC 11801, Acc. to EN 50173, Acc. to EIA/TIA 568-A, Category 6A, Flame-retardant acc. to IEC 60332-3, CMG FT4

## Application

HELUKAT® 600IND 10GIG was designed specially for extreme industrial applications. The copper data cable is especially well-suited for Category 6A Ethernet applications up to 10 Gigabits / 500 MHz (**IEC61156-5**). It guarantees excellent transmission characteristics and may be used even under the harshest conditions. The cable listed here is based on PROFinet Type A. Thanks to the additional inner sheath, the cable can be processed using the quick contact method. This version with PVC jacket is designed specifically for fixed installation under difficult industrial conditions.

## Part no.

**803693**, INDUSTRIAL ETHERNET CAT.6A 10GIG

Dimensions and specifications may be changed without prior notice.

# Industrial Ethernet

## Drag Chain

# HELUKAT® 250S

## SF/UTP, Category 6



### Type

#### Cable structure

Inner conductor diameter:  
Core insulation:  
Core colours:  
Stranding element:  
Shielding 1:  
Inner sheath material:  
Shielding 2:  
Total shielding:  
Outer sheath material:  
Cable external diameter:  
Outer sheath colour:

### Drag chain applications

#### SF/UTP 4x2x0.15 mm<sup>2</sup> (stranded) PUR

Copper, tinned (AWG 26/19)  
PP  
whbu/bu, whog/og, whgn/gn, whbn/bn  
Double core  
-  
FRNC  
-  
Foil + braid  
PUR  
app. 7,8 mm ± 0,2 mm  
Green similar to RAL 6018

### Electrical data

Characteristic impedance: 100 Ohm ± 15 ohm at 1 to 100 MHz  
100 Ohm ± 20 Ohm bei 101 bis 250 MHz  
Conductor resistance, max.: 140 Ohm/km  
Insulation resistance, min.: 0,5 GOhm x km  
Loop resistance: 280 Ohm/km max.  
Mutual capacitance: 52 nF/km nom.  
Test voltage: 0,7 kV  
Relative propagation velocity: 67 %

### Typical values

Frequency (MHz)	10	16	62,5	100	250
Attenuation (db/10m)	0,9	1,2	2,4	2,9	4,9
Next (db)	59,3	56,2	47,4	44,3	38,3
ACR (db)	58,4	55,0	45,0	41,4	33,4

### Technical data

Weight: app. 63 kg/km  
bending radius, repeated: 60 mm  
Operating temperature range min.: -30°C  
Operating temperature range max.: +70°C  
Caloric load, approx. value: 1,35 MJ/m  
Copper weight: 34,00 kg/km

### Norms

Acc. to ISO/IEC 11801, Acc. to EN 50173, Acc. to EIA/TIA 568-A, Category 6, Flame-retardant acc. to IEC 60332-1, Halogen-free acc. to 60754-2, CMX 75°C (shielded)

### Application

HELUKAT® 250S trailing cable Cat 6 is designed for use in cable carriers and the recurring loads caused by moving machine components and provides excellent transmission characteristics under extremely difficult conditions.

### Part no.

**803387**, INDUSTRIAL ETHERNET CAT.6

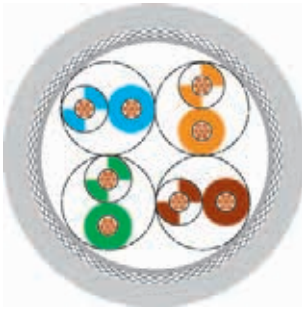
Dimensions and specifications may be changed without prior notice.

R

# Industrial Ethernet

**ROBUSTFLEX**
**HELUKAT® 200IND**

SF/UTP, Category 5e



## Type

### Cable structure

Inner conductor diameter:  
 Core insulation:  
 Core colours:  
 Stranding element:  
 Shielding 1:  
 Shielding 2:  
 Screen 1 over stranding:  
 Screen 2 over stranding:  
 Outer sheath material:  
 Cable external diameter:  
 Outer sheath colour:

## Industrial Patch Cables

### SF/UTP 4x2xAWG 26/7 PUR

Copper, bare (AWG 26/7)  
 PO  
 whbu/bu, whog/og, whgn/gn, whbn/bn  
 Double core  
 Polyester foil over stranded bundle  
 -  
 Polyester foil, aluminium-lined  
 Cu braid  
 PUR  
 app. 5,8 mm  
 Grey similar to RAL 7035

## Electrical data

Characteristic impedance:  
 Loop resistance:  
 Mutual capacitance:  
 Relative propagation velocity:

100 Ohm ± 15 ohm at 1 to 100 MHz  
 100 Ohm ± 20 Ohm at 101 to 200 MHz  
 260 Ohm/km max.  
 47 nF/km nom.  
 74 %

## Typical values

Frequency (MHz)	10	16	62,5	100	200
Attenuation (dB/10m)	0,8	1,1	2,4	2,9	4,3
Next (db)	58,0	56,0	45,0	43,0	37,0
ACR (db)	57,2	54,9	42,6	40,1	32,7

## Technical data

Weight: app. 44 kg/km  
 bending radius, repeated: 46 mm  
 Operating temperature range min.: -40°C  
 Operating temperature range max.: +80°C  
 Caloric load, approx. value: 0,54 MJ/m  
 Copper weight: 24,00 kg/km

## Norms

Acc. to ISO/IEC 11801, Acc. to EN 50173, Acc. to EIA/TIA 568-A, Category 5e, Flame-retardant acc. to IEC 60332-1, Smoke density acc. to IEC 61034, Halogen-free acc. to 60754-2, Oil-resistant

## Application

HELUKAT® 200IND Cat 5e Robustflex is used in harsh industrial surroundings and characterized by high reserve capacity and outstanding performance. Mechanically, the halogen-free PU outer sheath makes it ideal for harsh industrial surroundings. This cable is configurable with common RJ45 plugs (industrial and office version), as well as with various Sub-D and M12 plugs.

## Part no.

**800068**, SF/UTP 4x2xAWG 26/7 PUR (S-FTP)

Dimensions and specifications may be changed without prior notice.

# Industrial Ethernet

WK Industrial 105°C

**HELUKAT® 100IND**

SF/UTP, Category 5e



## Type

### Cable structure

Inner conductor diameter:  
Core insulation:  
Core colours:  
Stranding element:  
Shielding 1:  
Shielding 2:  
Total shielding:  
Outer sheath material:  
Cable external diameter:  
Outer sheath colour:

## Windenergy

### SF/UTP 2x2x0,75 mm (stranded)

Copper, tinned (AWG 22/7)  
XLPE ray cross-linking  
wh, ye, bu, og  
Star quad  
Polyester foil over stranded bundle  
Polyester foil, aluminium-lined  
Cu braid, tinned  
X-FRNC  
app. 6,5 mm ± 0,2 mm  
Black similar to RAL 9005

## Electrical data

Characteristic impedance: 100 Ohm ± 15 ohm at 1 to 100 MHz  
Conductor resistance, max.: 60 Ohm/km  
Insulation resistance, min.: 0,5 GOhm x km  
Loop resistance: 120 Ohm/km max.  
Mutual capacitance: 52 nF/km nom.  
Test voltage: 2 kV  
Relative propagation velocity: 69 %

## Typical values

Frequency (MHz)	10	16	62,5	100
Attenuation (dB/100m)	6,3	8,0	16,5	21,3
Next (db)	70,0	65,0	55,0	50,0
ACR (db)	63,7	57,0	38,5	28,7

## Technical data

Weight: app. 64 kg/km  
bending radius, repeated: 52 mm  
Operating temperature range min.: -40°C  
Operating temperature range max.: +105°C \*  
Caloric load, approx. value: 0,89 MJ/m  
Copper weight: 34,00 kg/km

## Norms

Acc. to ISO/IEC 11801, Acc. to EN 50173, Category 5, Flame-retardant acc. to IEC 60332-3, Halogen-free acc. to 60754-2, Corrosiveness acc. to EN50267-2-3, UL-Style 21281 80°C/300V

## Application

HELUKAT® 100IND Cat 5e WK Industrial 105°C is designed specially for demanding temperature requirements such as those encountered in wind turbines. Radiation cross-linking provides improved thermal stability as well good oil resistance.

## Part no.

**802293**, INDUSTRIAL ETHERNET CAT.5

Dimensions and specifications may be changed without prior notice.

R



# Industrial Ethernet

**DRAG CHAIN ECO**

**HELUKAT® 100S**

SF/UTP 4 core, Category 5e



## Type

### Cable structure

Inner conductor diameter:  
Core insulation:  
Core colours:  
Stranding element:  
Shielding 1:  
Shielding 2:  
Total shielding:  
Outer sheath material:  
Cable external diameter:  
Outer sheath colour:

## Drag chain applications

### SF/UTP 4x1x0.15 mm<sup>2</sup> (stranded)

Copper, bare (AWG 26/19)  
PO  
whbl, bl, whor, or  
Star quad  
-  
PETP fleece  
Foil + braid  
PUR  
app. 4,8 mm ± 0,2 mm  
Green

## Electrical data

Characteristic impedance: 100 Ohm ± 15 ohm at 1 to 100 MHz  
Insulation resistance, min.: 5 GOhm x km  
Loop resistance: 250 Ohm/km max.  
Mutual capacitance: 51 nF/km nom.  
Test voltage: 0,5 kV  
Relative propagation velocity: 67 %

## Typical values

Frequency (MHz)	10	16	62,5	100	155
Attenuation (db/100m)	9,5	12,1	24,8	32,0	41,0
Next (db)	50,0	48,0	38,5	35,3	30,0

## Technical data

Weight: app. 30 kg/km  
bending radius, repeated: 70 mm  
Operating temperature range min.: -40°C  
Operating temperature range max.: +80°C  
Caloric load, approx. value: 0,37 MJ/m  
Copper weight: 17,00 kg/km

## Norms

Acc. to ISO/IEC 11801, Acc. to EN 50173, Acc. to EIA/TIA 568-A, Category 5e, Flame-retardant acc. to IEC 60332-1, Halogen-free acc. to 60754-2, Corrosiveness acc. to EN50267-2-3, AWM 20963 (80°C/30V)

## Application

HELUKAT® 100S Cat 5e drag chain Eco is designed in use in cable carriers and the recurring loads cause by moving machine components. Thanks to the PU sheath, it also offers excellent resistance to common mineral oils, greases and cooling lubricants.

## Part no.

**82838**, INDUSTRIAL ETHERNET CAT.5e

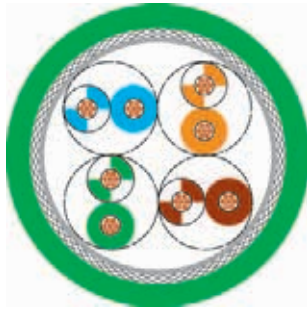
Dimensions and specifications may be changed without prior notice.

# Industrial Ethernet

Drag chain ECO

**HELUKAT® 100S**

SF/UTP 4-pair, Category 5e



## Type

### Cable structure

Inner conductor diameter:  
Core insulation:  
Core colours:  
Stranding element:  
Shielding 1:  
Shielding 2:  
Total shielding:  
Outer sheath material:  
Cable external diameter:  
Outer sheath colour:

## Drag chain applications

### SF/UTP 4x2x0.15 mm<sup>2</sup> (stranded)

Copper, bare (AWG 26/19)  
PO  
whbu/bu, whog/og, whgn/gn, whbn/bn  
Double core  
-  
PETP fleece  
Foil + braid  
PUR  
app. 6,6 mm ± 0,2 mm  
Green

## Electrical data

Characteristic impedance: 100 Ohm ± 15 ohm at 1 to 100 MHz  
Insulation resistance, min.: 5 GOhm x km  
Loop resistance: 250 Ohm/km max.  
Mutual capacitance: 48 nF/km nom.  
Test voltage: 0,5 kV  
Relative propagation velocity: 67 %

## Typical values

Frequency (MHz)	10	16	62,5	100	155
Attenuation (db/100m)	9,5	12,1	24,8	32,0	41,0
Next (db)	50,0	48,0	38,5	35,3	30,0

## Technical data

Weight: app. 56 kg/km  
bending radius, repeated: 102 mm  
Operating temperature range min.: -40°C  
Operating temperature range max.: +80°C  
Caloric load, approx. value: 0,64 MJ/m  
Copper weight: 31,00 kg/km

## Norms

Acc. to ISO/IEC 11801, Acc. to EN 50173, Acc. to EIA/TIA 568-A, Category 5e, Flame-retardant acc. to IEC 60332-1, Halogen-free acc. to 60754-2, Corrosiveness acc. to EN50267-2-3, AWM 20963 (80°C/30V)

## Application

HELUKAT® 100S Cat 5e drag chain Eco is designed for use in cable carriers and the recurring loads caused by moving machine components. Thanks to the PU sheath, it also offers excellent resistance to common mineral oils, greases and cooling lubricants.

## Part no.

**82839**, INDUSTRIAL ETHERNET CAT.5e

Dimensions and specifications may be changed without prior notice.

R

# Industrial Ethernet

## DRAG CHAIN

# HELUKAT® 200S

## SF/UTP 4 core, Category 5



### Type

#### Cable structure

Inner conductor diameter:  
Core insulation:  
Core colours:  
Stranding element:  
Shielding 1:  
Shielding 2:  
Screen 1 over stranding:  
Screen 2 over stranding:  
Outer sheath material:  
Cable external diameter:  
Outer sheath colour:

### Drag Chain Patch Cables

#### SF/UTP 4x1xAWG 24/ 19 (stranded) PUR

Copper, bare (AWG 24/19)  
PP  
wh/bn, gn/ye  
Quad  
Polyester foil over stranded bundle  
-  
Polyester foil, aluminium-lined  
Cu braid  
PUR  
app. 6,2 mm ± 0,2 mm  
Green similar to RAL 6026

### Electrical data

Characteristic impedance: 100 Ohm ± 15 ohm at 1 to 100 MHz  
Loop resistance: 156 Ohm/km max.  
Mutual capacitance: 51 nF/km nom.  
Relative propagation velocity: 67 %

### Typical values

Frequency (MHz)	10	16	62,5	100
Attenuation (dB/10m)	1,0	1,2	2,6	3,3
Next (db)	47,0	44,0	35,0	32,0
ACR (db)	46,0	42,8	32,4	28,7

### Technical data

Weight: app. 54 kg/km  
bending radius, repeated: 75 mm  
Operating temperature range min.: -25°C  
Operating temperature range max.: +70°C  
Caloric load, approx. value: 0,944 MJ/m  
Copper weight: 30,00 kg/km

### Norms

Acc. to ISO/IEC 11801, Acc. to EN 50173, Acc. to EIA/TIA 568-A, Category 5, Flame-retardant acc. to IEC 60332-1, Halogen-free acc. to 60754-2, Oil-resistant

### Application

HELUKAT® 200S Cat 5 drag chain is designed for use in cable carriers and the extreme loads caused by moving machine components and provides excellent transmission characteristics under the most difficult and extreme conditions. Thanks to the clever structure, it is also suitable mechanically for use even in cable carriers with a high packing density. This cable configurable with conventional Sub-D plugs, as well as with various RJ45 plugs.

### Part no.

**800088**, SF/UTP 4x1xAWG 24/19 PUR (S-FTP)

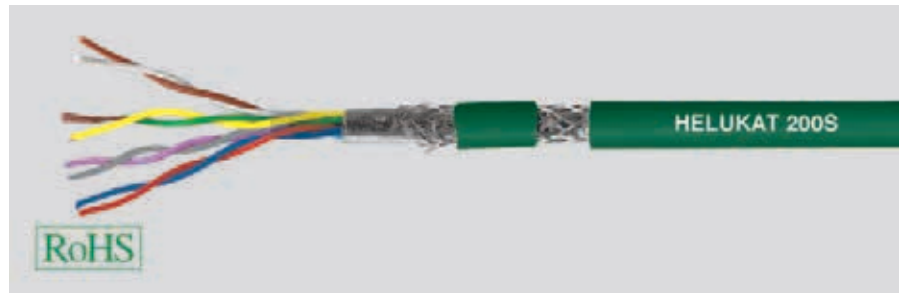
Dimensions and specifications may be changed without prior notice.

# Industrial Ethernet

## DRAG CHAIN

# HELUKAT® 200S

## SF/UTP 4 pair, Category 5



### Type

#### Cable structure

Inner conductor diameter:  
Core insulation:  
Core colours:  
Stranding element:  
Shielding 1:  
Shielding 2:  
Screen 1 over stranding:  
Screen 2 over stranding:  
Outer sheath material:  
Cable external diameter:  
Outer sheath colour:

### Drag Chain Patch Cables

#### SF/UTP 4x2xAWG 24/19 PUR (stranded)

Copper, bare (AWG 24/19)  
PE  
wh/bn, gn/ye, gy/pk, bu/rd  
Double core  
Polyester foil over stranded bundle  
-  
Polyester foil, aluminium-lined  
Cu braid  
PUR  
app. 9,5 mm ± 0,2 mm  
Green similar to RAL 6026

### Electrical data

Characteristic impedance: 100 Ohm ± 15 ohm at 1 to 100 MHz  
Loop resistance: 156 Ohm/km max.  
Mutual capacitance: 51 nF/km nom.  
Relative propagation velocity: 67 %

### Typical values

Frequency (MHz)	10	16	62,5	100
Attenuation (dB/10m)	1,0	1,2	2,6	3,3
Next (db)	47,0	44,0	35,0	32,0
ACR (db)	46,0	42,8	32,4	28,7

### Technical data

Weight: app. 110 kg/km  
bending radius, repeated: 115 mm  
Operating temperature range min.: -25°C  
Operating temperature range max.: +70°C  
Caloric load, approx. value: 2,08 MJ/m  
Copper weight: 54,30 kg/km

### Norms

Acc. to ISO/IEC 11801, Acc. to EN 50173, Acc. to EIA/TIA 568-A, Category 5, Flame-retardant acc. to IEC 60332-1, Halogen-free acc. to 60754-2, Oil-resistant

### Application

HELUKAT® 200S Cat 5 drag chain is designed for use in cable carriers and the extreme loads caused by moving machine components and provides excellent transmission characteristics under the most difficult and extreme conditions. Thanks to the clever structure, it is also suitable mechanically for use even in cable carriers with a high packing density. This cable is configurable with conventional Sub-D plugs, as well as with various RJ45 plugs.

### Part no.

**81155**, SF/UTP 4x2xAWG 24/19 PUR (S-FTP)

Dimensions and specifications may be changed without prior notice.

R

# Industrial Ethernet

**TORDIERFLEX**
**HELUKAT® 100T**

SF/UTP, Category 5



## Type

### Cable structure

Inner conductor diameter:  
 Core insulation:  
 Core colours:  
 Stranding element:  
 Shielding 1:  
 Shielding 2:  
 Screen 1 over stranding:  
 Screen 2 over stranding:  
 Outer sheath material:  
 Cable external diameter:  
 Outer sheath colour:

## Torsion Patch Cables

### SF/UTP 4x2xAWG 26/19 PUR (stranded)

Copper, bare (AWG 26/19)  
 PP  
 wh/bu, wh/og, wh/gn, wh/bn  
 Double core  
 Polyester foil over stranded bundle  
 -  
 Polyester foil, aluminium-lined  
 Cu braid  
 PUR  
 app. 7,5 mm  
 Green similar to RAL 6018

## Electrical data

Characteristic impedance: 100 Ohm ± 15 ohm at 1 to 100 MHz  
 Loop resistance: 260 Ohm/km max.  
 Mutual capacitance: 50 nF/km nom.  
 Relative propagation velocity: 68 %

## Typical values

Frequency (MHz)	10	16	62,5	100
Attenuation (dB/10m)	1,3	1,6	3,2	4,0
Next (db)	47,0	44,0	35,0	32,0
ACR (db)	45,7	42,4	31,8	28,0

## Technical data

Weight: app. 63 kg/km  
 bending radius, repeated: 56 mm  
 Operating temperature range min.: -40°C  
 Operating temperature range max.: +80°C  
 Caloric load, approx. value: 1,234 MJ/m  
 Copper weight: 29,50 kg/km

## Norms

Acc. to ISO/IEC 11801, Acc. to EN 50173, Acc. to EIA/TIA 568-A, Category 5, Flame-retardant acc. to IEC 60332-1, Smoke density acc. to IEC 61034, Halogen-free acc. to 60754-2, Oil-resistant, AWM Style 20236 80°C/30V

## Application

HELUKAT® 100T Cat 5 Torsionflex is designed for applications with torsion loads, e.g. in robots, and characterized by high reserve capacity and outstanding performance, even after exposure to extreme conditions. Thanks to the clever structure, it is also possible to achieve a long service life mechanically. These cables are configurable with conventional Sub-D plugs, as well as with various RJ45 plugs.

## Part no.

**800067**, SF/UTP 4x2xAWG 26/19 PUR (S-FTP)

Dimensions and specifications may be changed without prior notice.



# Industrial Ethernet

## PROFINet Type A

**HELUKAT®**

fixed installed + robust



### Type Cable structure

Inner conductor diameter:  
Core insulation:  
Core colours:  
Stranding element:  
Shielding 1:  
Inner sheath material:  
Shielding 2:  
Total shielding:  
Outer sheath material:  
Cable external diameter:  
Outer sheath colour:

### Fixed installation, indoor 2x2x0.64 mm

Copper, bare (AWG 22/1)  
PE  
wh, ye, bu, og  
Star quad  
Polyester foil over stranded bundle  
PVC  
Polyester foil, aluminium-lined  
Cu braid, tinned  
PVC  
app. 6,5 mm ± 0,2 mm  
Green similar to RAL 6018

### Industrial Area 2x2x0.64 mm

Copper, bare (AWG 22/1)  
PE  
wh, ye, bu, og  
Star quad  
Polyester foil over stranded bundle  
FRNC  
Polyester foil, aluminium-lined  
Cu braid, tinned  
PUR  
app. 6,5 mm ± 0,2 mm  
Green similar to RAL 6018

### Electrical data

Characteristic impedance:  
Conductor resistance, max.:  
Insulation resistance, min.:  
Loop resistance:  
Mutual capacitance:  
Test voltage:

100 Ohm ± 15 ohm at 1 to 100 MHz  
62 Ohm/km  
0,5 GOhm x km  
115 Ohm/km max.  
50 nF/km nom.  
2 kV

100 Ohm ± 15 ohm at 1 to 100 MHz  
62 Ohm/km  
0,5 GOhm x km  
115 Ohm/km max.  
50 nF/km nom.  
2 kV

### Typical values

Frequency (MHz)	10	16	62,5	100
Attenuation (dB/100m)	5,2	6,9	15,0	19,5
Next (db)	70,0	65,0	55,0	50,0
ACR (db)	64,8	58,1	40,0	30,5

### Technical data

Weight:  
bending radius, repeated:  
Operating temperature range min.:  
Operating temperature range max.:  
Caloric load, approx. value:  
Copper weight:

app. 67 kg/km  
65 mm  
-40°C  
+80°C  
0,34 MJ/m  
32,00 kg/km

app. 64 kg/km  
65 mm  
-40°C  
+70°C  
0,91 MJ/m  
32,00 kg/km

### Norms

Applicable standards:

PROFINet Guideline  
Acc. to ISO/IEC 11801  
Acc. to EN 50173  
Category 5e  
Flame-retardant acc. to IEC 60332-1  
CMG 75°C PLTC FT4  
CSA FT 4

PROFINet Guideline  
Acc. to ISO/IEC 11801  
Acc. to EN 50173  
Category 5e  
Flame-retardant acc. to IEC 60332-1  
-  
-

### Application

HELUKAT® PROFInet Type A Cat 5e for fixed installation in industrial networks, rugged. It guarantees excellent transmission characteristics and may be used even under the harshest conditions. The cable listed here corresponds to PROFInet Type A; this means the version with PVC sheath is designed for normal fixed installations and the version with PU sheath is for difficult fixed installations in harsh industrial environments.

### Part no.

**800653**, PROFInet type A (SK)

**801194**, PROFInet type A (SK)

Dimensions and specifications may be changed without prior notice.

**R**

# Industrial Ethernet

## PROFInet Type A

**HELUKAT®**

radiation resistant + armoured



### Type Cable structure

Inner conductor diameter:  
Core insulation:  
Core colours:  
Stranding element:  
Shielding 1:  
Inner sheath material:  
Shielding 2:  
Total shielding:  
Armouring:  
Outer sheath material:  
Cable external diameter:  
Outer sheath colour:

### ray loaded areas 2x2x0.64 mm

Copper, bare (AWG 22/1)  
XLPE ray cross-linking  
wh, ye, bu, og  
Star quad  
Polyester foil over stranded bundle  
TPR ray cross-linking  
Polyester foil, aluminium-lined  
Cu braid, tinned  
-  
PUR  
app. 6,5 mm ± 0,2 mm  
Green similar to RAL 6018

### Fixed installation, outdoor 2x2x0.64 mm

Copper, bare (AWG 22/1)  
PE  
wh, ye, bu, og  
Star quad  
Polyester foil over stranded bundle  
PVC  
Polyester foil, aluminium-lined  
Cu braid, tinned  
Steel band  
PE  
app. 9,3 mm ± 0,5 mm  
Black

### Electrical data

Characteristic impedance:  
Conductor resistance, max.:  
Insulation resistance, min.:  
Loop resistance:  
Mutual capacitance:  
Test voltage:

100 Ohm ± 15 ohm at 1 to 100 MHz  
62 Ohm/km  
0,5 GOhm x km  
124 Ohm/km max.  
50 nF/km nom.  
2 kV

100 Ohm ± 15 ohm at 1 to 100 MHz  
62 Ohm/km  
0,5 GOhm x km  
115 Ohm/km max.  
50 nF/km nom.  
2 kV

### Typical values

Frequency (MHz)	10	16	62,5	100
Attenuation (dB/100m)	5,2	6,9	15,0	19,5
Next (db)	70,0	65,0	55,0	50,0
ACR (db)	64,8	58,1	40,0	30,5

### Technical data

Weight: app. 63 kg/km  
bending radius, repeated: 100 mm  
Operating temperature range min.: -40°C  
Operating temperature range max.: +80°C  
Caloric load, approx. value: 0,29 MJ/m  
Copper weight: 32,00 kg/km

app. 124 kg/km  
100 mm  
-40°C  
+70°C  
2,14 MJ/m  
31,00 kg/km

### Norms

Applicable standards: PROFInet Guideline  
Acc. to ISO/IEC 11801  
Acc. to EN 50173  
Category 5e

PROFInet Guideline  
Acc. to ISO/IEC 11801  
Acc. to EN 50173  
Category 5e

### Application

HELUKAT® PROFInet Type A Cat 5e is radiation-resistant + armoured for fixed installation in industrial networks. It guarantees excellent transmission characteristics and may be used even under the harshest conditions. The cables listed here correspond to PROFInet Type A and thanks to their special construction with cross-linked PVC-inner sheath/PU outer sheath are well-suited for fixed applications inside irradiated areas, while the armoured type with PVC inner sheath/PE outer sheath is ideal for areas with rodent problems.

### Part no.

**801195**, PROFInet type A (SK)

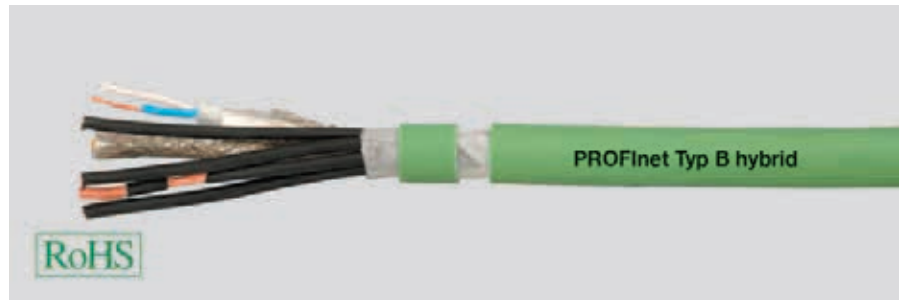
**801650**, PROFInet type A (SK)

Dimensions and specifications may be changed without prior notice.

# Industrial Ethernet

## PROFINet Type B

**HELUKAT®**  
hybrid



### Type

#### Cable structure

Inner conductor diameter 1:  
Inner conductor diameter 2:  
Core insulation 1:  
Core insulation 2:  
Core colours 1:  
Core colours 2:  
Stranding element 1:  
Shielding 1:  
Shielding 2:  
Total shielding:  
Outer sheath material:  
Cable external diameter:  
Outer sheath colour:

### Mobile use

#### 2x2x0,75 mm (stranded)+ 4x1,5qmm

Copper, bare (AWG 22/7)  
Copper, bare (AWG 16/84)  
Foam-skin-PE  
PO  
wh, ye, bu, og  
Black  
Double core  
Polyester foil over stranded bundle  
Polyester foil, aluminium-lined  
Polyester foil  
FRNC  
app. 10,3 mm ± 0,3 mm  
Green similar to RAL 6018

### Electrical data

Characteristic impedance:  
Conductor resistance, max.:  
Insulation resistance, min.:  
Loop resistance:  
Mutual capacitance:  
Test voltage:

100 Ohm ± 15 ohm at 1 to 100 MHz  
60 Ohm/km  
0,5 GOhm x km  
120 Ohm/km max.  
52 nF/km nom.  
2 kV

### Typical values

Frequency	(MHz)	10	16	62,5	100
Attenuation	(dB/100m)	6,3	8,0	16,5	21,3
Next	(db)	50,0	47,0	38,0	35,0
ACR	(db)	43,7	39,0	21,5	13,7

### Technical data

Weight: app. 153 kg/km  
bending radius, repeated: 103 mm  
Operating temperature range min.: -40°C  
Operating temperature range max.: +70°C  
Caloric load, approx. value: 1,50 MJ/m  
Copper weight: 94,00 kg/km

### Norms

Applicable standards:

PROFINet Guideline  
Acc. to ISO/IEC 11801  
Acc. to EN 50173  
Category 5e  
Halogen-free acc. to 60754-2  
Flame-retardant acc. to IEC 60332-1  
Corrosiveness acc. to EN50267-2-3  
Low-smoke acc. to EN50268-2  
UL Style 21282

UL Style:

### Application

HELUKAT® PROFINet Type B Cat 5e hybrid for flexible applications. The cable listed here corresponds to PROFINet Type B with integrated power supply in a cable with halogen-free and flame-retardant construction.

### Part no.

**801651**, PROFINet type B (SK)

Dimensions and specifications may be changed without prior notice.

R

# Industrial Ethernet

## PROFInet Typ B

**HELUKAT®**

SHIPLINE + FESTOON



### Type

#### Cable structure

Inner conductor diameter:  
 Core insulation:  
 Core colours:  
 Stranding element:  
 Shielding 1:  
 Inner sheath material:  
 Shielding 2:  
 Total shielding:  
 Outer sheath material:  
 Cable external diameter:  
 Outer sheath colour:

### Marine and Offshore

#### 2x2x0,34 qmm (stranded)

Copper, tinned (AWG 22/7)  
 PP  
 wh, ye, bu, og  
 Star quad  
 Polyester foil over stranded bundle  
 FRNC  
 Polyester foil, aluminium-lined  
 Cu braid, tinned  
 FRNC  
 app. 6,5 mm ± 0,4 mm  
 Green similar to RAL 6018

### FESTOON

#### 2x2x0.75 mm (stranded)

Copper, tinned (AWG 22/7)  
 PE  
 wh, ye, bu, og  
 Star quad  
 Polyester foil over stranded bundle  
 PVC  
 Polyester foil, aluminium-lined  
 Cu braid, tinned  
 PVC  
 app. 6,5 mm ± 0,2 mm  
 Green similar to RAL 6018

### Electrical data

Characteristic impedance:  
 Conductor resistance, max.:  
 Insulation resistance, min.:  
 Loop resistance:  
 Mutual capacitance:  
 Test voltage:

100 Ohm ± 15 ohm at 1 to 100 MHz  
 60 Ohm/km  
 0,5 GOhm x km  
 120 Ohm/km max.  
 52 nF/km nom.  
 2 kV

100 Ohm ± 5 %  
 60 Ohm/km  
 0,5 GOhm x km  
 120 Ohm/km max.  
 52 nF/km nom.  
 2 kV

### Typical values

		10	16	62,5	100
Frequency (MHz)		10	16	62,5	100
Attenuation (dB/100m)		6,0	7,6	16,0	21,0
Next (db)		70,0	65,0	55,0	50,0
ACR (db)		64,0	57,4	39,0	29,0

### Technical data

Weight: app. 68 kg/km  
 bending radius, repeated: 50 mm  
 Operating temperature range min.: -40°C  
 Operating temperature range max.: +70°C  
 Caloric load, approx. value: 0,45 MJ/m  
 Copper weight: 32,00 kg/km

app. 68 kg/km  
 70 mm  
 -10°C  
 +80°C  
 1,20 MJ/m  
 32,00 kg/km

### Norms

Applicable standards:

PROFInet Guideline  
 Acc. to ISO/IEC 11801  
 Acc. to EN 50173  
 Category 5e  
 Halogen-free acc. to 60754-2  
 Flame-retardant acc. to IEC 60332-3  
 Corrosiveness acc. to EN50267-2-3  
 Low-smoke acc. to EN50268-2  
 CMG 75°C PLTC FT4  
 CSA FT 4

PROFInet Guideline  
 Acc. to ISO/IEC 11801  
 Acc. to EN 50173  
 Category 5e  
 Flame-retardant acc. to IEC 60332-3

UL Style:  
 CSA standard:

CMG 75°C or PLTC or AWM 21694 600V  
 CSA FT 4

### Application

HELUKAT® PROFInet Type B Cat 5e SHIPLINE + FESTOON designed specially for marine/offshore applications as well as FESTOON applications. The SHIPLINE version is certified by the **Germanische Lloyd** and suitable for flexible **marine and offshore applications**.

### Part no.

**802185**, PROFInet type B (SK)

**803295**, PROFInet type B (SK)

Dimensions and specifications may be changed without prior notice.

# Industrial Ethernet

## PROFINet Type B + C

**HELUKAT®**

flexible + high flexible



### Type Cable structure

Inner conductor diameter:  
Core insulation:  
Core colours:  
Stranding element:  
Shielding 1:  
Inner sheath material:  
Shielding 2:  
Total shielding:  
Outer sheath material:  
Cable external diameter:  
Outer sheath colour:

### Mobile use 2x2x0,75 mm (stranded)

Copper, tinned (AWG 22/7)  
PE  
wh, ye, bu, og  
Star quad  
Polyester foil over stranded bundle  
PVC  
Polyester foil, aluminium-lined  
Cu braid, tinned  
PVC  
app. 6,5 mm ± 0,2 mm  
Green similar to RAL 6018

### Drag chain applications 2x2x0.75 mm (stranded)

Copper, tinned (AWG 22/7)  
PE  
wh, ye, bu, og  
Star quad  
Polyester foil over stranded bundle  
FRNC  
Polyester foil, aluminium-lined  
Cu braid, tinned  
PUR  
app. 6,5 mm ± 0,2 mm  
Green similar to RAL 6018

### Electrical data

Characteristic impedance:  
Conductor resistance, max.:  
Insulation resistance, min.:  
Loop resistance:  
Mutual capacitance:  
Test voltage:

100 Ohm ± 15 ohm at 1 to 100 MHz  
62 Ohm/km  
0,5 GOhm x km  
115 Ohm/km max.  
52 nF/km nom.  
2 kV

100 Ohm ± 15 ohm at 1 to 100 MHz  
60 Ohm/km  
0,5 GOhm x km  
115 Ohm/km max.  
52 nF/km nom.  
0,7 kV

### Typical values

Frequency (MHz)	10	16	62,5	100
Attenuation (dB/100m)	6,0	7,6	16,0	21,0
Next (db)	70,0	65,0	55,0	50,0
ACR (db)	64,0	57,4	39,0	29,0

### Technical data

Weight:  
bending radius, repeated:  
Operating temperature range min.:  
Operating temperature range max.:  
Caloric load, approx. value:  
Copper weight:

app. 67 kg/km  
100 mm  
-40°C  
+70°C  
0,32 MJ/m  
32,00 kg/km

app. 61 kg/km  
55 mm  
-40°C  
+70°C  
0,85 MJ/m  
32,00 kg/km

### Norms

Applicable standards:

PROFINet Guideline  
Acc. to ISO/IEC 11801  
Acc. to EN 50173  
Category 5e  
Flame-retardant acc. to IEC 60332-1

PROFINet Guideline  
Acc. to ISO/IEC 11801  
Acc. to EN 50173  
Category 5e  
Halogen-free acc. to 60754-2  
Flame-retardant acc. to IEC 60332-1  
CMX 75°C (shielded)  
-

UL Style:

CSA standard:

CMG 75°C PLTC FT4  
CSA FT 4

### Application

HELUKAT® PROFINet Type B (flexible) + Type C (highly flexible) Cat 5e for use on moving parts and in cable carriers. The cables listed here correspond to the PROFINet classifications Type B and Type C for moving cables and are designed to withstand mechanical loads.

### Part no.

**800654**, PROFINet type B (SK)

**800655**, PROFINet type C (SK)

Dimensions and specifications may be changed without prior notice.

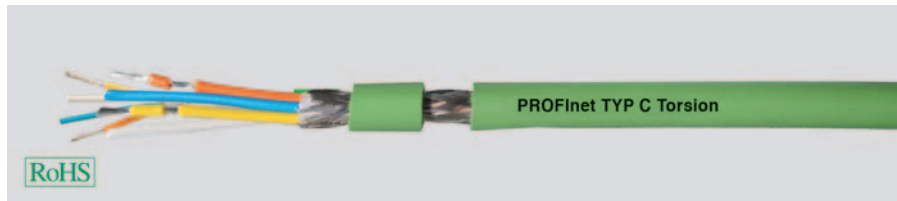


# Industrial Ethernet

## PROFINet Type C

**HELUKAT**®

Torsion



### Type

#### Cable structure

Inner conductor diameter:  
Core insulation:  
Core colours:  
Stranding element:  
Shielding 1:  
Shielding 2:  
Total shielding:  
Outer sheath material:  
Cable external diameter:  
Outer sheath colour:

### Torsional applications

#### 2x2x0,75 mm (stranded)

Copper, tinned (AWG 22/19)  
Foam-skin-PE  
wh, ye, bu, og  
Star quad  
Polyester foil over stranded bundle  
Cu braid, tinned  
Cu braid, tinned  
PUR  
app. 6,5 mm ± 0,2 mm  
Green similar to RAL 6018

### Electrical data

Characteristic impedance: 100 Ohm ± 15 ohm at 1 to 100 MHz  
Conductor resistance, max.: 60 Ohm/km  
Insulation resistance, min.: 0,5 GOhm x km  
Loop resistance: 120 Ohm/km max.  
Mutual capacitance: 52 nF/km nom.  
Test voltage: 0,7 kV

### Typical values

Frequency (MHz)	10	16	62,5	100
Attenuation (db/100m)	7,6	10,0	26,5	41,0
ELFEXT (db)	43,8	39,7	24,0	20,0

### Technical data

Weight: app. 54 kg/km  
bending radius, repeated: 70 mm  
Operating temperature range min.: -40°C  
Operating temperature range max.: +80°C  
Caloric load, approx. value: 0,45 MJ/m  
Copper weight: 32,00 kg/km

### Norms

Applicable standards: PROFINet Guideline  
Category 5e  
Halogen-free acc. to 60754-2  
Flame-retardant acc. to IEC 60332-1  
Corrosiveness acc. to EN50267-2-3  
Low-smoke acc. to EN50268-2  
UL Style: AWM Style 21161 80°C

### Application

HELUKAT® PROFINet Type C Cat 5e TORSION offers excellent transmission characteristics and is designed for applications with torsion loads, e.g. in robots. The cable listed here corresponds to the PROFINet Type C classification for continuous movement.

### Part no.

**802186**, PROFINet type C (SK)

Dimensions and specifications may be changed without prior notice.

# BUS Cables

## Profibus L2



Indoor



### Type Cable structure

Inner conductor diameter:  
Core insulation:  
Core colours:  
Stranding element:  
Shielding 1:  
Shielding 2:  
Total shielding:  
Outer sheath material:  
Cable external diameter:  
Outer sheath colour:

### Fixed installation, indoor 1x2x0.64 mm

Copper, bare (AWG 22/1)  
Foam-skin-PE  
rd, gn  
2 cores + 2 fillers stranded together  
Polyester foil over stranded bundle  
Polyester foil, aluminium-lined  
Cu braid, tinned  
PVC  
app. 7,8 mm ± 0,2 mm  
Grey similar to RAL 7001

### Fixed installation, indoor 1x2x0.64 mm

Copper, bare (AWG 22/1)  
Foam-skin-PE  
rd, gn  
2 cores + 2 fillers stranded together  
Polyester foil over stranded bundle  
Polyester foil, aluminium-lined  
Cu braid, tinned  
PVC  
app. 7,8 mm ± 0,2 mm  
Violet similar to RAL 4001

### Electrical data

Characteristic impedance:  
Conductor resistance, max.:  
Insulation resistance, min.:  
Loop resistance:  
Mutual capacitance:  
Test voltage:  
Attenuation:

150 Ohm ± 10 %  
55 Ohm/km  
1 GOhm x km  
110 Ohm/km max.  
30 nF/km nom.  
1,5 kV  
9,6 kHz < 2,5 dB/km  
38,4 kHz < 4,0 dB/km  
4 MHz < 22,0 dB/km  
16 MHz < 42,0 dB/km

150 Ohm ± 10 %  
55 Ohm/km  
1 GOhm x km  
110 Ohm/km max.  
30 nF/km nom.  
1,5 kV  
9,6 kHz < 2,5 dB/km  
38,4 kHz < 4,0 dB/km  
4 MHz < 22,0 dB/km  
16 MHz < 42,0 dB/km

### Technical data

Weight:  
bending radius, repeated:  
Operating temperature range min.:  
Operating temperature range max.:  
Caloric load, approx. value:  
Copper weight:

app. 69 kg/km  
120 mm  
-40°C  
+70°C  
0,99 MJ/m  
24,00 kg/km

app. 69 kg/km  
120 mm  
-40°C  
+70°C  
0,99 MJ/m  
24,00 kg/km

### Norms

Applicable standards:  
UL Style:  
CSA standard:

Profibus acc. to DIN 19245 T3 and EN50170  
Flame-retardant acc. to IEC 60332-1  
CMX 75°C (shielded)  
CSA FT1

Profibus acc. to DIN 19245 T3 and EN50170  
Flame-retardant acc. to IEC 60332-1  
CMX 75°C (shielded)  
CSA FT1

### Application

HELUKABEL® Profibus L2 Indoor is designed for fixed indoor installation in Profibus industrial networks. Depending on the application, the colour grey (special colour) or violet (standard colour) is available. Otherwise, the technical characteristics of the two products are identical.

### Part no.

**80384**, Profibus L2

**81448**, Profibus L2

Dimensions and specifications may be changed without prior notice.

R

# BUS Cables

**PROFIBUS L2 Outdoor + Industry**



Outdoor + Industry



## Type Cable structure

Inner conductor diameter:  
Core insulation:  
Core colours:  
Stranding element:  
Shielding 1:  
Shielding 2:  
Total shielding:  
Outer sheath material:  
Cable external diameter:  
Outer sheath colour:

## Fixed installation, outdoor 1x2x0.64 mm

Copper, bare (AWG 22/1)  
Foam-skin-PE  
rd, gn  
2 cores + 2 fillers stranded together  
Polyester foil over stranded bundle  
Polyester foil, aluminium-lined  
Cu braid, tinned  
PE  
app. 8,0 mm ± 0,4 mm  
Black similar to RAL 9005

## Industrial Area 1x2x0.64 mm

Copper, bare (AWG 22/1)  
Foam-skin-PE  
rd, gn  
2 cores + 2 fillers stranded together  
Polyester foil over stranded bundle  
Polyester foil, aluminium-lined  
Cu braid, tinned  
PUR  
app. 8,0 mm ± 0,4 mm  
Petrol similar to RAL 5018

## Electrical data

Characteristic impedance:  
Conductor resistance, max.:  
Insulation resistance, min.:  
Loop resistance:  
Mutual capacitance:  
Test voltage:  
Attenuation:

150 Ohm ± 10 %  
55 Ohm/km  
1 GOhm x km  
110 Ohm/km max.  
30 nF/km nom.  
1,5 kV  
9,6 kHz < 2,5 dB/km  
38,4 kHz < 4,0 dB/km  
4 MHz < 22,0 dB/km  
16 MHz < 42,0 dB/km

150 Ohm ± 10 %  
55 Ohm/km  
1 GOhm x km  
110 Ohm/km max.  
30 nF/km nom.  
1,5 kV  
9,6 kHz < 2,5 dB/km  
38,4 kHz < 4,0 dB/km  
4 MHz < 22,0 dB/km  
16 MHz < 42,0 dB/km

## Technical data

Weight:  
bending radius, repeated:  
Operating temperature range min.:  
Operating temperature range max.:  
Caloric load, approx. value:  
Copper weight:

app. 64 kg/km  
120 mm  
-40°C  
+70°C  
2,26 MJ/m  
24,00 kg/km

app. 67 kg/km  
120 mm  
-40°C  
+70°C  
1,52 MJ/m  
24,00 kg/km

## Norms

Applicable standards:

Profibus acc. to DIN 19245 T3 and EN50170  
Halogen-free acc. to 60754-2

Profibus acc. to DIN 19245 T3 and EN50170  
Halogen-free acc. to 60754-2  
Flame-retardant acc. to IEC 60332-1

## Application

HELUKABEL® Profibus L2 Outdoor + Industry are special cables for use in Profibus industrial networks. The Outdoor version is designed for use in open-air environments, i.e. can withstand wind, weather and sun (not for burial directly in the ground). The Industry version is used in fixed installation applications in harsh industrial environment. Mechanically, this product exhibits excellent resistance to mineral oils, greases and cooling lubricants and has good microbe and hydrolysis resistance.

## Part no.

**80792**, Profibus L2

**81186**, Profibus L2

Dimensions and specifications may be changed without prior notice.

# BUS Cables

## Profibus L2 direct Burial



without + with Armouring



### Type Cable structure

Inner conductor diameter:  
Core insulation:  
Core colours:  
Stranding element:  
Shielding 1:  
Inner sheath material:  
Shielding 2:  
Total shielding:  
Armouring:  
Outer sheath material:  
Cable external diameter:  
Outer sheath colour:

### Direct burial 1x2x0.64 mm

Copper, bare (AWG 22/1)  
Foam-skin-PE  
rd, gn  
2 cores + 2 fillers stranded together  
Polyester foil over stranded bundle  
PVC  
Polyester foil, aluminium-lined  
Cu braid, tinned  
-  
PE  
app. 10,0 mm ± 0,2 mm  
Black similar to RAL 9005

### Direct burial 1x2x0.64 mm

Copper, bare (AWG 22/1)  
Cell PE  
rd, gn  
2 cores + 2 fillers stranded together  
-  
PVC  
Polyester foil, aluminium-lined  
Cu braid, tinned  
Steel band  
PE  
app. 10,6 mm ± 0,5 mm  
Black similar to RAL 9005

### Electrical data

Characteristic impedance:  
Conductor resistance, max.:  
Insulation resistance, min.:  
Loop resistance:  
Mutual capacitance:  
Nominal voltage:  
Test voltage:  
Attenuation:

150 Ohm ± 10 %  
55 Ohm/km  
1 GOhm x km  
110 Ohm/km max.  
30 nF/km nom.  
-  
1,5 kV  
9,6 kHz < 2,5 dB/km  
38,4 kHz < 4,0 dB/km  
3 MHz < 22,0 dB/km  
20 MHz < 42,0 dB/km

150 Ohm ± 10 %  
55 Ohm/km  
5 GOhm x km  
110 Ohm/km max.  
30 nF/km nom.  
250 V  
1,5 kV  
9,6 kHz < 2,5 dB/km  
38,4 kHz < 4,0 dB/km  
4 MHz < 22,0 dB/km  
16 MHz < 42,0 dB/km

### Technical data

Weight:  
bending radius, repeated:  
Operating temperature range min.:  
Operating temperature range max.:  
Caloric load, approx. value:  
Copper weight:

app. 92 kg/km  
150 mm  
-40°C  
+80°C  
2,657 MJ/m  
24,00 kg/km

app. 132 kg/km  
165 mm  
-40°C  
+80°C  
2,40 MJ/m  
24,00 kg/km

### Norms

Applicable standards:

Profibus acc. to DIN 19245 T3 and EN50170

Profibus acc. to DIN 19245 T3 and EN50170

### Application

HELUKABEL® Profibus L2 Direct Burial cables without + with armouring are special cables in the Profibus industrial networks. The version without armouring is for normal an direct cable burial in the ground. The version with steel tape armouring offers additional protection against rodents and is the right choice for regions with such animals.

### Part no.

**82824**, Profibus ERD

**802177**, Profibus L2

Dimensions and specifications may be changed without prior notice.

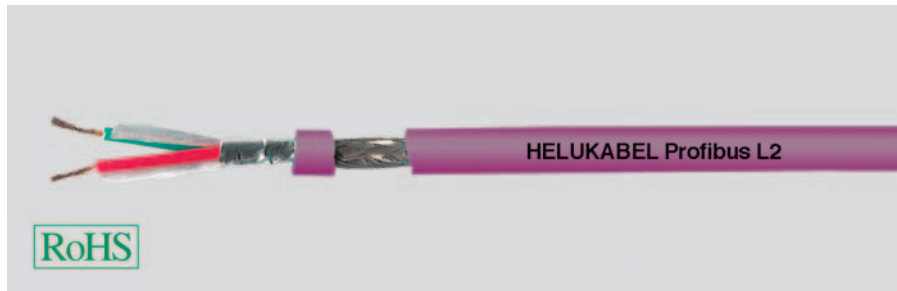
R

# BUS Cables

## Profibus L2



7-wire



### Type

#### Cable structure

Inner conductor diameter:  
Core insulation:  
Core colours:  
Stranding element:  
Shielding 1:  
Shielding 2:  
Total shielding:  
Outer sheath material:  
Cable external diameter:  
Outer sheath colour:

### Mobile use

#### 1x2x0.64 mm (stranded)

Copper, bare (AWG 24/7)  
Foam-skin-PE  
rd, gn  
2 cores + 2 fillers stranded together  
Polyester foil over stranded bundle  
Polyester foil, aluminium-lined  
Cu braid, tinned  
PVC  
app. 7,8 mm ± 0,3 mm  
Violet similar to RAL 4001

### Electrical data

Characteristic impedance:	150 Ohm ± 10 %
Conductor resistance, max.:	86,7 Ohm/km
Insulation resistance, min.:	1 GOhm x km
Loop resistance:	173 Ohm/km max.
Mutual capacitance:	30 nF/km nom.
Test voltage:	1,5 kV
Attenuation:	9,6 kHz < 3,0 dB/km
	38,4 kHz < 5,0 dB/km
	4 MHz < 26,0 dB/km
	16 MHz < 55,0 dB/km

### Technical data

Weight:	app. 75 kg/km
bending radius, repeated:	80 mm
Operating temperature range min.:	-20°C
Operating temperature range max.:	+80°C
Caloric load, approx. value:	1,20 MJ/m
Copper weight:	24,00 kg/km

### Norms

Applicable standards:	Profibus acc. to DIN 19245 T3 and EN50170 Flame-retardant acc. to EN 50265-2-1
UL Style:	UL Style 2571

### Application

HELUKABEL® Profibus L2 7-wire for mobile applications in Profibus industrial networks. With its core design and the special PVC sheath, the type described here is suitable for normal mobile applications.

### Part no.

**800648**, Profibus L2

Dimensions and specifications may be changed without prior notice.

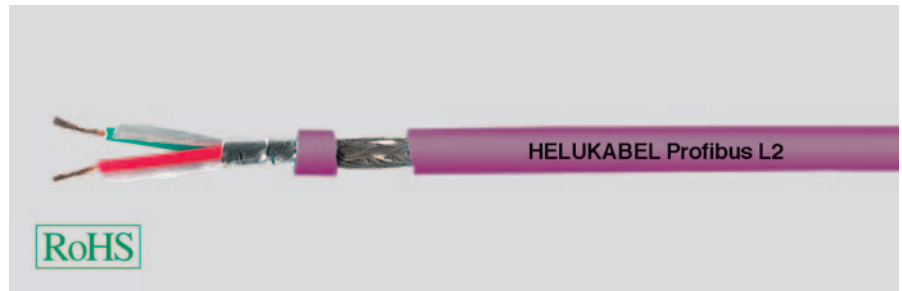


# BUS Cables

## Profibus L2



Drag Chain



### Type Cable structure

Inner conductor diameter:  
Core insulation:  
Core colours:  
Stranding element:  
Shielding 1:  
Shielding 2:  
Total shielding:  
Outer sheath material:  
Cable external diameter:  
Outer sheath colour:

### Drag chain applications 1x2x0.64 mm (stranded)

Copper, bare (AWG 24/19)  
Foam-skin-PE  
rd, gn  
2 cores + 2 fillers stranded together  
Polyester foil over stranded bundle  
Polyester foil, aluminium-lined  
Cu braid, tinned  
PUR  
app. 8,0 mm ± 0,4 mm  
Violet similar to RAL 4001

### Drag chain applications 1x2x0.64 mm (stranded)

Copper, bare (AWG 24/19)  
Foam-skin-PE  
rd, gn  
2 cores + 2 fillers stranded together  
Polyester foil over stranded bundle  
Polyester foil, aluminium-lined  
Cu braid, tinned  
PUR  
app. 8,0 mm ± 0,4 mm  
Petrol similar to RAL 5018

### Electrical data

Characteristic impedance:  
Conductor resistance, max.:  
Insulation resistance, min.:  
Loop resistance:  
Mutual capacitance:  
Test voltage:  
Attenuation:

150 Ohm ± 10 %  
80 Ohm/km  
1 GOhm x km  
160 Ohm/km max.  
30 nF/km nom.  
1,5 kV  
9,6 kHz < 3,0 dB/km  
38,4 kHz < 5,0 dB/km  
4 MHz < 25,0 dB/km  
16 MHz < 52,0 dB/km

150 Ohm ± 10 %  
80 Ohm/km  
1 GOhm x km  
160 Ohm/km max.  
30 nF/km nom.  
1,5 kV  
9,6 kHz < 3,0 dB/km  
38,4 kHz < 5,0 dB/km  
4 MHz < 25,0 dB/km  
16 MHz < 52,0 dB/km

### Technical data

Weight:  
bending radius, repeated:  
Operating temperature range min.:  
Operating temperature range max.:  
Caloric load, approx. value:  
Copper weight:

app. 65 kg/km  
63 mm  
-30°C  
+70°C  
1,52 MJ/m  
25,00 kg/km

app. 65 kg/km  
63 mm  
-30°C  
+70°C  
1,52 MJ/m  
25,00 kg/km

### Norms

Applicable standards:

Profibus acc. to DIN 19245 T3 and EN50170  
Halogen-free acc. to 60754-2  
Flame-retardant acc. to IEC 60332-1

Profibus acc. to DIN 19245 T3 and EN50170  
Halogen-free acc. to 60754-2  
Flame-retardant acc. to IEC 60332-1

### Application

This system cable is used to interconnect L2-BUS components. This cable is an economical solution for the cell and field area. For the information exchange between different automation systems as well as for communication with the connected decentralized field units, serial field bus systems are used. The above mentioned types are suitable for drag chains (stranded).

### Part no.

**80267**, Profibus L2

**81003**, Profibus L2

Dimensions and specifications may be changed without prior notice.

R

# BUS Cables

Profibus

**HELUKABEL**

ET200X + ECOFAST



## Type Cable structure

Inner conductor diameter 1:  
Inner conductor diameter 2:  
Core insulation 1:  
Core insulation 2:  
Core colours 1:  
Core colours 2:  
Stranding element 1:  
Shielding 1:  
Shielding 2:  
Total shielding:  
Outer sheath material:  
Cable external diameter:  
Outer sheath colour:

## Drag chain applications 1x2x0.65 mm + 3x1x0.75 mm<sup>2</sup> (stranded)

Copper, bare (AWG 22/19)  
Copper, bare (AWG 18/24)  
Foam-skin-PE  
PVC  
rd, gn  
bk, bu, gnye  
Double core  
Polyester foil over stranded bundle  
Foil + braid  
Polyester foil  
PUR  
app. 9,7 mm ± 0,5 mm  
Petrol similar to RAL 5018

## Drag chain applications 1x2x0.65 mm + 4x1x1.5 mm<sup>2</sup> (stranded)

Copper, bare (AWG 24/19)  
Copper, bare (AWG 18/84)  
Foam-skin-PE  
TPM  
rd, gn  
bk, bk, bk, bk  
2 cores + 2 fillers stranded together  
Polyester foil over stranded bundle  
Foil + braid  
-  
TPU  
app. 11,5 mm ± 0,3 mm  
Violet similar to RAL 4001

## Electrical data

Characteristic impedance:  
Conductor resistance, max.:  
Insulation resistance, min.:  
Loop resistance:  
Mutual capacitance:  
Test voltage:  
Relative propagation velocity:  
Attenuation:

150 Ohm ± 10 %  
73 Ohm/km  
1 GOhm x km  
145 Ohm/km max.  
30 nF/km nom.  
1,5 kV  
-  
9,6 kHz < 3,0 dB/Km  
38,4 kHz < 5,0 dB/Km  
4 MHz < 25,0 dB/Km  
16 MHz < 52,0 dB/Km

150 Ohm ± 15 %  
73 Ohm/km  
1 GOhm x km  
145 Ohm/km max.  
30 nF/km nom.  
1,5 kV  
81 %  
9,6 kHz ≤ 3,0 dB/km  
38,4 kHz ≤ 5,0 dB/km  
4 MHz ≤ 30,0 dB/km  
16 MHz ≤ 60,0 dB/km

## Technical data

Weight:  
bending radius, repeated:  
Operating temperature range min.:  
Operating temperature range max.:  
Caloric load, approx. value:  
Copper weight:

app. 105 kg/km  
140 mm  
-5°C  
+60°C  
1,973 MJ/m  
46,00 kg/km

app. 159 kg/km  
165 mm  
-15°C  
+60°C  
2,835 MJ/m  
90,00 kg/km

## Norms

Applicable standards:

Profibus acc. to DIN 19245 T3 and EN50170  
Halogen-free acc. to 60754-2

Profibus acc. to DIN 19245 T3 and EN50170  
Halogen-free acc. to 60754-2  
Flame-retardant acc. to IEC 60332-1  
UL Style 20233

UL Style:

AWM Style 20236 AWM I/II A/B 80°C 30V  
FT1

## Application

HELUKABEL® Profibus ET200X + Ecofast Hybrid cables are designed for continuous motion in cable carriers. The hybrid construction integrates the power supply next to the Profibus in one cable. The type ET200X offers three 0,75mm<sup>2</sup> power conductors, while the type Ecofast 4 has 1,5mm<sup>2</sup> power conductors and greater current-carrying capacity.

## Part no.

**82913**, Profibus L2

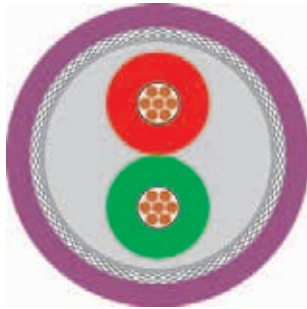
**800044**, Profibus L2

Dimensions and specifications may be changed without prior notice.

# BUS Cables

Profibus

**HELUKABEL®**  
SHIPLINE and High Temperature



## Type Cable structure

Inner conductor diameter:  
Core insulation:  
Core colours:  
Stranding element:  
Shielding 1:  
Inner sheath material:  
Shielding 2:  
Total shielding:  
Outer sheath material:  
Cable external diameter:  
Outer sheath colour:

## Marine and Offshore 1x2x0.75 mm (stranded)

Copper, bare (AWG 22/7)  
Foam-skin-PE  
rd, gn  
Double core  
Polyester foil over stranded bundle  
FRNC  
Polyester foil, aluminium-lined  
Cu braid, tinned  
X-FRNC  
app. 8,0 mm ± 0,4 mm  
Violet similar to RAL 4001

## High temperature areas 1x2x0.64 mm

Copper, bare (AWG 22/1)  
FEP  
rd, gn  
2 cores + 2 fillers stranded together  
-  
Polyester foil, aluminium-lined  
Cu braid, tinned  
FEP  
app. 7,2 mm ± 0,3 mm  
Violet similar to RAL 4001

## Electrical data

Characteristic impedance:  
Conductor resistance, max.:  
Insulation resistance, min.:  
Loop resistance:  
Mutual capacitance:  
Nominal voltage:  
Test voltage:  
Attenuation:

150 Ohm ± 10 %  
55 Ohm/km  
1,6 GOhm x km  
110 Ohm/km max.  
29 nF/km nom.  
60 V  
1 kV  
9,6 kHz < 2,5 dB/Km  
38,4 kHz < 4,0 dB/Km  
4 MHz < 22,0 dB/Km  
16 MHz < 42,0 dB/Km

150 Ohm ± 10 %  
55 Ohm/km  
1,6 GOhm x km  
110 Ohm/km max.  
28 nF/km nom.  
250 V  
3,6 kV  
9,6 kHz < 2,5 dB/km  
38,4 kHz < 4,0 dB/km  
4 MHz < 22,0 dB/km  
16 MHz < 42,0 dB/km

## Technical data

Weight:  
bending radius, repeated:  
Operating temperature range min.:  
Operating temperature range max.:  
Caloric load, approx. value:  
Copper weight:

app. 84 kg/km  
80 mm  
-25°C  
+80°C  
1,26 MJ/m  
35,00 kg/km

app. 64 kg/km  
52 mm  
-50°C  
+180°C  
0,30 MJ/m  
24,00 kg/km

## Norms

Applicable standards:

Profibus acc. to DIN 19245 T3 and EN50170  
Halogen-free acc. to 60754-2  
Flame-retardant acc. to IEC 60332-1

Profibus acc. to DIN 19245 T3 and EN50170  
Flame-retardant acc. to IEC 60332-3

## Application

HELUKABEL® Profibus Shipline is designed for marine/offshore applications and **certified by German Lloyd**. Thanks to use of stranded conductors, this cable can be moved occasionally. The High-Temperature version is used in fixed installations with demanding temperature requirements, e.g. in the vicinity of a hot furnace or near welding activities.

## Part no.

**802178**, Profibus SHIPLINE

**802179**, Profibus high temperature

Dimensions and specifications may be changed without prior notice.

R

# BUS Cables

DESINA®-HYBRID-BUS



hybrid



## Type

### Cable structure

Conductor material  
Core insulation:  
Polymer optical fibre:  
Core colours:  
Core identification:  
Total shielding:  
Outer sheath material:  
Cable external diameter:  
Outer sheath colour:

## Hybrid Bus Cable

### 4x1.5 mm<sup>2</sup> + 2xPOF

Copper, bare, KL.6 = extra fine wire  
TPM  
4x POF 980/1000  
Black  
Numbers  
PETP fleece  
TPU  
app. 8,8 mm ± 0,3 mm  
Violet similar to RAL 4001

## Electrical data

Conductor resistance, max.:  
Insulation resistance, min.:  
Test voltage:

13,7 Ohm/km  
0,5 GOhm x km  
3 kV

## Optical characteristic

Fibre attenuation:

230 dB/km max. at 650 nm

## Technical data

Weight:  
bending radius, repeated:  
Operating temperature range min.:  
Operating temperature range max.:  
Copper weight:

app. 120 kg/km  
130 mm  
-20°C  
+80°C  
60,00 kg/km

## Norms

Applicable standards:

Detail specification for DESINA®

## Application

HELUKABEL® DESINA®-Hybrid-Bus is used for mobile applications in machinery. Use of a PU sheath provides excellent resistance to common mineral oils, greases and cooling lubricants in industrial automation.

## Part no.

**81713**, DESINA® HYBRID BUS

Dimensions and specifications may be changed without prior notice.

# BUS Cables

## Profibus L2



### Type

#### Cable structure

Inner conductor diameter:  
Core insulation:  
Core colours:  
Stranding element:  
Shielding 1:  
Shielding 2:  
Total shielding:  
Outer sheath material:  
Cable external diameter:  
Outer sheath colour:

### Torsional applications 1x2x0.80 mm (stranded)

Copper, bare (AWG 22/19)  
Foam-skin-PE  
rd, gn  
2 cores + filler  
Polyester foil over stranded bundle  
Polyester foil, aluminium-lined  
Cu braid, tinned  
PUR  
app. 8,0 mm ± 0,4 mm  
Violet similar to RAL 4001

### Mobile use

#### 1x2x0.65 mm (stranded)

Copper, bare (AWG 24/19)  
Cell PE  
rd, gn  
2 cores + 2 fillers stranded together  
Polyester foil over stranded bundle  
Polyester foil, aluminium-lined  
Cu braid, tinned  
PVC  
app. 8,0 mm ± 0,3 mm  
Petrol similar to RAL 5018

### Electrical data

Characteristic impedance:  
Conductor resistance, max.:  
Insulation resistance, min.:  
Loop resistance:  
Mutual capacitance:  
Test voltage:  
Relative propagation velocity:  
Attenuation:

150 Ohm ± 10 %  
49 Ohm/km  
1 GOhm x km  
98 Ohm/km max.  
29 nF/km nom.  
3,6 kV  
-  
9,6 kHz < 3,0 dB/km  
38,4 kHz < 5,0 dB/km  
4 MHz < 25,0 dB/km  
16 MHz < 51,0 dB/km

150 Ohm ± 10 %  
66,5 Ohm/km  
1,6 GOhm x km  
133 Ohm/km max.  
28 nF/km nom.  
2 kV  
81 %  
9,6 kHz ≤ 3,0 dB/km  
38,4 kHz ≤ 4,0 dB/km  
4 MHz ≤ 25,0 dB/km  
16 MHz ≤ 49,0 dB/km

### Technical data

Weight:  
bending radius, repeated:  
Operating temperature range min.:  
Operating temperature range max.:  
Caloric load, approx. value:  
Copper weight:

app. 66 kg/km  
100 mm  
-25°C  
+75°C  
0,89 MJ/m  
32,00 kg/km

app. 64 kg/km  
70 mm  
-40°C  
+60°C  
1,09 MJ/m  
23,00 kg/km

### Norms

Applicable standards:

Profibus acc. to DIN 19245 T3 and EN50170  
Halogen-free acc. to 60754-2  
Flame-retardant acc. to IEC 60332-1  
CMX 75°C (shielded)  
-

Profibus acc. to DIN 19245 T3 and EN50170  
Flame-retardant acc. to EN 50265-2-1

UL Style:  
CSA standard:

CMG 75°C or CL2 or AWM 20201 600V  
CSA FT 4

### Application

HELUKABEL® Profibus Torsion is used in mobile applications in robots. The special torsion construction allows this cable to be twisted (torsioned) and is halogen-free thanks to use PU sheath. The Festoon version is used for hanging/moving loads in garland applications.

### Part no.

**800109**, Profibus L2

**800649**, Profibus L2

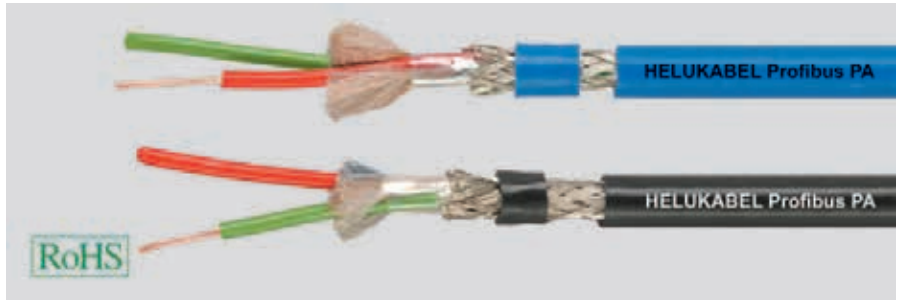
Dimensions and specifications may be changed without prior notice.

R



# BUS Cables

## Profibus PA



### Type Cable structure

Inner conductor diameter:  
Core insulation:  
Core colours:  
Stranding element:  
Shielding 1:  
Shielding 2:  
Total shielding:  
Outer sheath material:  
Cable external diameter:  
Outer sheath colour:

### Hazardous areas 1x2x1.0/2.55 mm

Copper, bare (AWG 18/1)  
PE  
rd, gn  
2 cores + 2 fillers stranded together  
Polyester foil over stranded bundle  
Polyester foil, aluminium-lined  
Cu braid, tinned  
PVC  
app. 7,6 mm ± 0,2 mm  
Blue

### Non-hazardous areas 1x2x1.0/2.55 mm

Copper, bare (AWG 18/1)  
PE  
rd, gn  
2 cores + 2 fillers stranded together  
Polyester foil over stranded bundle  
Polyester foil, aluminium-lined  
Cu braid, tinned  
PVC  
app. 7,6 mm ± 0,2 mm  
Black

### Electrical data

Characteristic impedance:  
Conductor resistance, max.:  
Insulation resistance, min.:  
Loop resistance:  
Mutual capacitance:  
Nominal voltage:  
Test voltage:  
Attenuation:

100 Ohm ± 20 %  
22 Ohm/km  
1 GOhm x km  
44 Ohm/km max.  
60 nF/km nom.  
300 V  
2,5 kV  
39 kHz ≤ 3,0 dB/km

100 Ohm ± 20 %  
22 Ohm/km  
1 GOhm x km  
44 Ohm/km max.  
60 nF/km nom.  
300 V  
2,5 kV  
39 kHz ≤ 3,0 dB/km

### Technical data

Weight:  
bending radius, repeated:  
Operating temperature range min.:  
Operating temperature range max.:  
Caloric load, approx. value:  
Copper weight:

app. 76 kg/km  
140 mm  
-30°C  
+80°C  
0,95 MJ/m  
44,00 kg/km

app. 76 kg/km  
140 mm  
-30°C  
+80°C  
0,95 MJ/m  
44,00 kg/km

### Norms

Applicable standards:  
UL Style:

Profibus acc. to DIN 19245 T3 and EN50170  
Flame-retardant acc. to EN 50265-2-1  
UL Style 2571

Profibus acc. to DIN 19245 T3 and EN50170  
Flame-retardant acc. to EN 50265-2-1  
UL Style 2571

### Application

HELUKABEL® Profibus PA is used for normal requirements in the process automation field (chemical industry). The colour blue identifies it as suitable for use in potentially explosive areas (and ATEX/ Class II, EX-i/ EN 60079-14). For other applications, the colour black is usually selected.

### Part no.

**82835**, Profibus PA

**82836**, Profibus PA

Dimensions and specifications may be changed without prior notice.

# BUS Cables

## Profibus PA



armoured



### Type Cable structure

Inner conductor diameter:  
Core insulation:  
Core colours:  
Stranding element:  
Shielding 1:  
Inner sheath material:  
Shielding 2:  
Total shielding:  
Armouring:  
Outer sheath material:  
Cable external diameter:  
Outer sheath colour:

### Hazardous areas 1x2x1.0/2.55 mm

Copper, bare (AWG 18/1)  
PE  
rd, gn  
2 cores + 2 fillers stranded together  
Polyester foil over stranded bundle  
PVC  
Polyester foil, aluminium-lined  
Cu braid, tinned  
Steel band  
PVC  
app. 10,2 mm ± 0,2 mm  
Blue

### Non-hazardous areas 1x2x1.0/2.55 mm

Copper, bare (AWG 18/1)  
PE  
rd, gn  
2 cores + 2 fillers stranded together  
Polyester foil over stranded bundle  
PVC  
Polyester foil, aluminium-lined  
Cu braid, tinned  
Steel band  
PVC  
app. 10,2 mm ± 0,2 mm  
Black

### Electrical data

Characteristic impedance:  
Conductor resistance, max.:  
Insulation resistance, min.:  
Loop resistance:  
Mutual capacitance:  
Nominal voltage:  
Test voltage:  
Attenuation:

100 Ohm ± 15 %  
22 Ohm/km  
1 GOhm x km  
44 Ohm/km max.  
55 nF/km nom.  
300 V  
2,5 kV  
39 kHz ≤ 3,0 dB/km

100 Ohm ± 15 %  
22 Ohm/km  
1 GOhm x km  
44 Ohm/km max.  
55 nF/km nom.  
300 V  
2,5 kV  
39 kHz ≤ 3,0 dB/km

### Technical data

Weight:  
bending radius, repeated:  
Operating temperature range min.:  
Operating temperature range max.:  
Caloric load, approx. value:  
Copper weight:

app. 170 kg/km  
140 mm  
-20°C  
+70°C  
1,95 MJ/m  
45,00 kg/km

app. 170 kg/km  
200 mm  
-20°C  
+70°C  
1,95 MJ/m  
45,00 kg/km

### Norms

Applicable standards:

Profibus acc. to DIN 19245 T3 and EN50170  
Flame-retardant acc. to EN 50265-2-1

Profibus acc. to DIN 19245 T3 and EN50170  
Flame-retardant acc. to EN 50265-2-1

### Application

HELUKABEL® Profibus PA Armoured finds use in areas with rodent such as rats, nutria etc. but also offers additional protection against all other outside mechanical influences thanks to its steel tape armouring. The colour blue identifies it as suitable for use in potentially explosive areas (and ATEX/ Class II, EX-i/EN 60079-14). For other applications, the colour black is usually selected.

### Part no.

**802180**, Profibus PA

**802181**, Profibus PA

Dimensions and specifications may be changed without prior notice.

R

# BUS Cables

## Profibus PA



Long Distance



### Type

#### Cable structure

Inner conductor diameter:  
Core insulation:  
Core colours:  
Stranding element:  
Shielding 1:  
Shielding 2:  
Total shielding:  
Outer sheath material:  
Cable external diameter:  
Outer sheath colour:

### Hazardous areas 1x2x1.6/3.2 mm

Copper, bare (AWG 16/7)  
Foam-skin-PE  
rd, gn  
2 cores + 2 fillers stranded together  
Polyester foil over stranded bundle  
Polyester foil, aluminium-lined  
Cu braid, tinned  
PVC  
app. 9,5 mm ± 0,3 mm  
Blue

### Non-hazardous areas 1x2x1.6/3.2 mm

Copper, bare (AWG 16/7)  
Foam-skin-PE  
rd, gn  
2 cores + 2 fillers stranded together  
Polyester foil over stranded bundle  
Polyester foil, aluminium-lined  
Cu braid, tinned  
PVC  
app. 9,5 mm ± 0,3 mm  
Black

### Electrical data

Characteristic impedance: 100 Ohm ± 20 %  
Conductor resistance, max.: 24 Ohm/km  
Insulation resistance, min.: 1 GOhm x km  
Loop resistance: 48 Ohm/km max.  
Mutual capacitance: 60 nF/km nom.  
Nominal voltage: 300 V  
Test voltage: 1 kV  
Attenuation: 39 kHz ≤ 2,7 dB/km

100 Ohm ± 20 %  
24 Ohm/km  
1 GOhm x km  
48 Ohm/km max.  
60 nF/km nom.  
300 V  
1 kV  
39 kHz ≤ 2,7 dB/km

### Technical data

Weight: app. 131 kg/km  
bending radius, repeated: 100 mm  
Operating temperature range min.: -40°C  
Operating temperature range max.: +70°C  
Caloric load, approx. value: 1,57 MJ/m  
Copper weight: 62,00 kg/km

app. 131 kg/km  
100 mm  
-40°C  
+70°C  
1,57 MJ/m  
62,00 kg/km

### Norms

Applicable standards: Profibus acc. to DIN 19245 T3 and EN50170  
Flame-retardant acc. to IEC 60332-1  
UL Style: 2571

Profibus acc. to DIN 19245 T3 and EN50170  
Flame-retardant acc. to IEC 60332-1  
UL Style 2571

### Application

HELUKABEL® Profibus PA Long Distance is used for especially long transmission distances in process networks. It uses a larger conductor cross-section to satisfy the attenuation requirements. The colour blue identifies it as suitable for use in potentially explosive areas (and ATEX/Class II, EX-i/EN 60079-14). For other applications, the colour black is usually selected.

### Part no.

**800650**, Profibus PA

**800715**, Profibus PA

Dimensions and specifications may be changed without prior notice.

# BUS Cables

## Profibus SK



Indoor + Outdoor



### Type Cable structure

Inner conductor diameter:  
Core insulation:  
Core colours:  
Stranding element:  
Shielding 1:  
Inner sheath material:  
Shielding 2:  
Total shielding:  
Outer sheath material:  
Cable external diameter:  
Outer sheath colour:

### Fixed installation, indoor 1x2x0.64 mm

Copper, bare (AWG 22/1)  
Foam-skin-PE  
rd, gn  
Double core  
Polyester foil over stranded bundle  
PVC  
Polyester foil, aluminium-lined  
Cu braid, tinned  
PVC  
app. 8,0 mm ± 0,4 mm  
Violet similar to RAL 4001

### Fixed installation, outdoor 1x2x0.64 mm

Copper, bare (AWG 22/1)  
Foam-skin-PE  
rd, gn  
Double core  
Polyester foil over stranded bundle  
PVC  
Polyester foil, aluminium-lined  
Cu braid, tinned  
PE  
app. 8,0 mm ± 0,4 mm  
Black similar to RAL 9005

### Electrical data

Characteristic impedance:  
Conductor resistance, max.:  
Insulation resistance, min.:  
Loop resistance:  
Mutual capacitance:  
Test voltage:  
Attenuation:

150 Ohm ± 10 %  
55 Ohm/km  
1 GOhm x km  
110 Ohm/km max.  
35 nF/km nom.  
1,5 kV  
9,6 kHz < 2,5 dB/km  
38,4 kHz < 4,0 dB/km  
4,0 MHz < 22,0 dB/km  
16,0 MHz < 42,0 dB/km

150 Ohm ± 10 %  
55 Ohm/km  
1 GOhm x km  
110 Ohm/km max.  
35 nF/km nom.  
1,5 kV  
9,6 kHz < 2,5 dB/km  
38,4 kHz < 4,0 dB/km  
4 MHz < 22,0 dB/km  
16 MHz < 42,0 dB/km

### Technical data

Weight:  
bending radius, repeated:  
Operating temperature range min.:  
Operating temperature range max.:  
Caloric load, approx. value:  
Copper weight:

app. 79 kg/km  
120 mm  
-40°C  
+80°C  
1,068 MJ/m  
24,00 kg/km

app. 65 kg/km  
120 mm  
-20°C  
+70°C  
1,451 MJ/m  
24,00 kg/km

### Norms

Applicable standards:

Profibus acc. to DIN 19245 T3 and EN50170  
Flame-retardant acc. to IEC 60332-3  
CMG 75°C or CL3 or AWM 21694 600V  
CSA FT 4

Profibus acc. to DIN 19245 T3 and EN50170  
Halogen-free acc. to 60754-2  
-  
-

### Application

HELUKABEL® Profibus SK Indoor + Outdoor have a special structure for processing with the Fast Connect Stripping Tool from Siemens. The indoor version is used for normal requirements in fixed installation applications in equipment; the Outdoor version is used in open-air applications, i.e. can withstand wind, weather and sun (not for burial directly in the ground).

### Part no.

**81903**, Profibus SK

**81904**, Profibus SK

Dimensions and specifications may be changed without prior notice.

R

# BUS Cables

## Profibus SK



FRNC + Robust



### Type Cable structure

Inner conductor diameter:  
Core insulation:  
Core colours:  
Stranding element:  
Shielding 1:  
Inner sheath material:  
Shielding 2:  
Total shielding:  
Outer sheath material:  
Cable external diameter:  
Outer sheath colour:

### Fixed installation, indoor 1x2x0.64 mm

Copper, bare (AWG 22/1)  
Foam-skin-PE  
rd, gn  
Double core  
Polyester foil over stranded bundle  
FRNC  
Polyester foil, aluminium-lined  
Cu braid, tinned  
FRNC  
app. 8,0 mm ± 0,4 mm  
Violet similar to RAL 4001

### Industrial Area 1x2x0.64 mm

Copper, bare (AWG 22/1)  
Foam-skin-PE  
rd, gn  
Double core  
Polyester foil over stranded bundle  
FRNC  
Polyester foil, aluminium-lined  
Cu braid, tinned  
PUR  
app. 8,0 mm ± 0,4 mm  
Violet similar to RAL 4001

### Electrical data

Characteristic impedance:  
Conductor resistance, max.:  
Insulation resistance, min.:  
Loop resistance:  
Mutual capacitance:  
Test voltage:  
Attenuation:

150 Ohm ± 10 %  
55 Ohm/km  
1 GOhm x km  
110 Ohm/km max.  
35 nF/km nom.  
1,5 kV  
9,6 kHz < 2,5 dB/km  
38,4 kHz < 4,0 dB/km  
4 MHz < 22,0 dB/km  
16 MHz < 42,0 dB/km

150 Ohm ± 10 %  
55 Ohm/km  
1 GOhm x km  
110 Ohm/km max.  
35 nF/km nom.  
1,5 kV  
9,6 kHz < 2,5 dB/km  
38,4 kHz < 4,0 dB/km  
4 MHz < 22,0 dB/km  
16 MHz < 42,0 dB/km

### Technical data

Weight:  
bending radius, repeated:  
Operating temperature range min.:  
Operating temperature range max.:  
Caloric load, approx. value:  
Copper weight:

app. 73 kg/km  
160 mm  
-25°C  
+70°C  
1,203 MJ/m  
24,00 kg/km

app. 71 kg/km  
120 mm  
-40°C  
+70°C  
1,574 MJ/m  
24,00 kg/km

### Norms

Applicable standards:

Profibus acc. to DIN 19245 T3 and EN50170  
Halogen-free acc. to 60754-2  
Flame-retardant acc. to EN 50265-2-1  
CM 750C (shielded)

Profibus acc. to DIN 19245 T3 and EN50170  
Halogen-free acc. to 60754-2  
Flame-retardant acc. to IEC 60332-1  
AWM Style 20236 AWM I/II A/B 80°C 30V  
FT1  
CSA FT1

UL Style:

CSA standard:

### Application

HELUKABEL® Profibus SK FRNC + Robust has a special structure for processing with the Fast Connect Stripping Tool from Siemens. The FRNC version is used to satisfy halogen-free and flame-retardant requirements in buildings. The Rpbust version is used in harsh industrial environments and offers excellent resistance to mineral oils, greases and cooling lubricants.

### Part no.

**81501**, Profibus SK

**81905**, Profibus SK

Dimensions and specifications may be changed without prior notice.

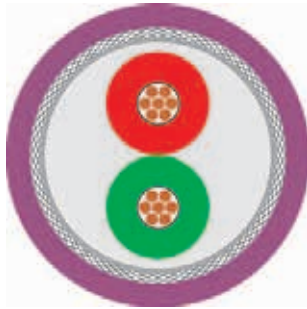


# BUS Cables

## Profibus SK



Drag Chain



### Type Cable structure

Inner conductor diameter:  
Core insulation:  
Core colours:  
Stranding element:  
Shielding 1:  
Inner sheath material:  
Shielding 2:  
Total shielding:  
Outer sheath material:  
Cable external diameter:  
Outer sheath colour:

### Drag chain applications 1x2x0.65 mm (stranded)

Copper, bare (AWG 24/19)  
Foam-skin-PE  
rd, gn  
Double core  
Polyester foil over stranded bundle  
PVC  
Polyester foil, aluminium-lined  
Cu braid, tinned  
PUR  
app. 8,0 mm ± 0,4 mm  
Violet similar to RAL 4001

### Drag chain applications 1x2x0.65 mm (stranded)

Copper, bare (AWG 24/19)  
Foam-skin-PE  
rd, gn  
Double core  
Polyester foil over stranded bundle  
PVC  
Polyester foil, aluminium-lined  
Cu braid, tinned  
PUR  
app. 8,0 mm ± 0,4 mm  
Petrol similar to RAL 5018

### Electrical data

Characteristic impedance:  
Conductor resistance, max.:  
Insulation resistance, min.:  
Loop resistance:  
Mutual capacitance:  
Test voltage:  
Attenuation:

150 Ohm ± 10 %  
67 Ohm/km  
1 GOhm x km  
134 Ohm/km max.  
35 nF/km nom.  
1,5 kV  
9,6 kHz < 3,0 dB/km  
38,4 kHz < 5,0 dB/km  
4 MHz < 25,0 dB/km  
16 MHz < 52,0 dB/km

150 Ohm ± 10 %  
67 Ohm/km  
1 GOhm x km  
134 Ohm/km max.  
35 nF/km nom.  
1,5 kV  
9,6 kHz < 3,0 dB/km  
38,4 kHz < 5,0 dB/km  
4 MHz < 25,0 dB/km  
16 MHz < 52,0 dB/km

### Technical data

Weight:  
bending radius, repeated:  
Operating temperature range min.:  
Operating temperature range max.:  
Caloric load, approx. value:  
Copper weight:

app. 70 kg/km  
100 mm  
-40°C  
+70°C  
1,53 MJ/m  
25,00 kg/km

app. 70 kg/km  
100 mm  
-40°C  
+70°C  
1,53 MJ/m  
25,00 kg/km

### Norms

Applicable standards:  
UL Style:  
CSA standard:

Profibus acc. to DIN 19245 T3 and EN50170  
Flame-retardant acc. to IEC 60332-1  
CMX 75°C (shielded)  
CSA FT1

Profibus acc. to DIN 19245 T3 and EN50170  
Flame-retardant acc. to IEC 60332-1  
CMX 75°C (shielded)  
CSA FT1

### Application

HELUKABEL® Profibus SK drag chain is designed for continuous motion in cable carriers and has a special structure for processing with the Fast Connect Stripping Tool from Siemens. Thanks to the PU sheath, it also offers excellent resistance to common mineral oils, greases and cooling lubricants. Depending on the application, the colour petrol or violet is available.

### Part no.

**801659**, Profibus SK

**81906**, Profibus SK

Dimensions and specifications may be changed without prior notice.

R

# BUS Cables

FOUNDATION™ Fieldbus



Basic



## Type

### Cable structure

Inner conductor diameter:  
Core insulation:  
Core colours:  
Stranding element:  
Shielding 1:  
Shielding 2:  
Total shielding:  
Drain wire:  
Outer sheath material:  
Cable external diameter:  
Outer sheath colour:

## process automation

### 1x2x1.1/2, 55-100 LI

Copper, bare (AWG 18/7)  
PO  
or, bl  
2 cores + 2 fillers stranded together  
Polyester foil over stranded bundle  
Polyester foil, aluminium-lined  
Cu braid, tinned  
yes  
PVC  
app. 8,0 mm ± 0,3 mm  
Orange

## Electrical data

Characteristic impedance: 100 Ohm ± 20 Ohm  
Conductor resistance, max.: 22 Ohm/km  
Insulation resistance, min.: 5 GOhm x km  
Loop resistance: 44 Ohm/km max.  
Mutual capacitance: 60 nF/km nom.  
Nominal voltage: 300 V  
Test voltage: 1,5 kV  
Attenuation: 39 kHz ≤ 3,4 dB/km

## Technical data

Weight: app. 85 kg/km  
bending radius, repeated: 80 mm  
Operating temperature range min.: -40°C  
Operating temperature range max.: +80°C  
Caloric load, approx. value: 1,22 MJ/m  
Copper weight: 45,00 kg/km

## Norms

Applicable standards: Foundation Fieldbus Spec. FF-816-1.4  
Flame-retardant acc. to IEC 60332-3  
UL Style: CMG 75°C PLTC FT4  
CSA standard: CSA FT 4

## Application

HELUKABEL® FOUNDATION™ Fieldbus Basic for normal requirements in this industrial networks. Thanks to use of stranded conductors, this cable can be moved occasionally and satisfies the usual American requirements for such networks.

## Part no.

**803354**, Foundation™ Fieldbus Basic

Dimensions and specifications may be changed without prior notice.

# BUS Cables

FOUNDATION™ Fieldbus



Type A + gnye



## Type

### Cable structure

Inner conductor diameter 1:  
 Inner conductor diameter 2:  
 Core insulation 1:  
 Core insulation 2:  
 Core colours 1:  
 Core colours 2:  
 Stranding element 1:  
 Shielding 1:  
 Shielding 2:  
 Total shielding:  
 Drain wire:  
 Outer sheath material:  
 Cable external diameter:  
 Outer sheath colour:

## process automation

### 1x2x1.1/2, 85-100 LI + 1x0,8 gnye

Copper, bare (AWG 18/41)  
 Copper, bare (AWG 18/41)  
 XLPE ray cross-linking  
 PVC  
 bu, bn  
 gn/ye  
 Double core  
 -  
 Polyester foil, aluminium-lined  
 Cu braid, tinned  
 yes  
 PVC  
 app. 7,9 mm ± 0,3 mm  
 Yellow

## Electrical data

Characteristic impedance: 100 Ohm ± 20 Ohm  
 Conductor resistance, max.: 24 Ohm/km  
 Insulation resistance, min.: 2 GOhm x km  
 Loop resistance: 48 Ohm/km max.  
 Mutual capacitance: 65 nF/km nom.  
 Nominal voltage: 300 V  
 Test voltage: 1,5 kV  
 Attenuation: 39 kHz ≤ 3,4 dB/km

## Technical data

Weight: app. 84 kg/km  
 bending radius, repeated: 80 mm  
 Operating temperature range min.: -25°C  
 Operating temperature range max.: +105°C  
 Caloric load, approx. value: 1,00 MJ/m  
 Copper weight: 49,00 kg/km

## Norms

Applicable standards: Foundation Fieldbus Spec. FF-816-1.4  
 Flame-retardant acc. to IEC 60332-3  
 UL Style: CMG 105° or CL3 FT4  
 CSA standard: CSA FT 4

## Application

HELUKABEL® FOUNDATION™ Fieldbus Type A + gnye offers an additional conductor in the structure in compliance with the FF specification. Thanks to use of stranded conductors, this cable can be moved occasionally and satisfies the usual American requirements for such networks.

## Part no.

**801191**, Foundation Fieldbus FF A

Dimensions and specifications may be changed without prior notice.

R

# BUS Cables

**FOUNDATION™ Fieldbus****HELUKABEL®**

Type A armoured



## Type

### Cable structure

Inner conductor diameter 1:  
 Inner conductor diameter 2:  
 Core insulation 1:  
 Core insulation 2:  
 Core colours 1:  
 Core colours 2:  
 Stranding element 1:  
 Shielding 1:  
 Shielding 2:  
 Total shielding:  
 Drain wire:  
 Armouring:  
 Outer sheath material:  
 Cable external diameter:  
 Outer sheath colour:

## process automation

### 1x2x1.1/2, 85-100 LI + 1x0,8 gnye, armoured

Copper, bare (AWG 18/41)  
 Copper, bare (AWG 18/37)  
 XLPE ray cross-linking  
 PVC  
 bu, bn  
 gn/ye  
 Double core  
 -  
 Polyester foil, aluminium-lined  
 Polyester foil, aluminium-lined  
 yes  
 Corrugated copper tube  
 PVC  
 app. 12,3 mm ± 0,3 mm  
 Yellow

## Electrical data

Characteristic impedance: 100 Ohm ± 20 Ohm  
 Conductor resistance, max.: 24 Ohm/km  
 Insulation resistance, min.: 2 GOhm x km  
 Loop resistance: 48 Ohm/km max.  
 Mutual capacitance: 65 nF/km nom.  
 Nominal voltage: 300 V  
 Test voltage: 1,5 kV  
 Attenuation: 39 kHz ≤ 3,4 dB/km

## Technical data

Weight: app. 187 kg/km  
 bending radius, repeated: 130 mm  
 Operating temperature range min.: -25°C  
 Operating temperature range max.: +105°C  
 Caloric load, approx. value: 1,65 MJ/m  
 Copper weight: 125,00 kg/km

## Norms

Applicable standards: Foundation Fieldbus Spec. FF-816-1.4  
 Flame-retardant acc. to IEC 60332-3  
 CMG 105°C or PLTC FT4 Sun Res  
 CSA standard: CSA FT 4

## Application

HELUKABEL® FOUNDATION™ Type A Armoured finds use in areas with rodents such as rats, nutria etc. but also offers additional protection against all other outside mechanical influences thanks to its corrugated tape armouring. Thanks to use of stranded conductors, this cable can be moved occasionally and satisfies the usual American requirements for such networks.

## Part no.

**801192**, Foundation Fieldbus FF A

Dimensions and specifications may be changed without prior notice.

# BUS Cables

## FOUNDATION™ Fieldbus



Type A



### Type

#### Cable structure

Inner conductor diameter:  
Core insulation:  
Core colours:  
Stranding element:  
Shielding 1:  
Shielding 2:  
Total shielding:  
Drain wire:  
Outer sheath material:  
Cable external diameter:  
Outer sheath colour:

### process automation

#### 1x2x1.1/2, 85-100 LI

Copper, bare (AWG 18/37)  
XLPE ray cross-linking  
bu, bn  
Double core  
-  
Polyester foil, aluminium-lined  
Cu braid, tinned  
yes  
PVC  
app. 7,9 mm ± 0,3 mm  
Yellow

### Electrical data

Characteristic impedance: 100 Ohm ± 20 Ohm  
Conductor resistance, max.: 24 Ohm/km  
Insulation resistance, min.: 2 GOhm x km  
Loop resistance: 48 Ohm/km max.  
Mutual capacitance: 65 nF/km nom.  
Nominal voltage: 300 V  
Test voltage: 1,5 kV  
Attenuation: 39 kHz ≤ 3,4 dB/km

### Technical data

Weight: app. 89 kg/km  
bending radius, repeated: 80 mm  
Operating temperature range min.: -40°C  
Operating temperature range max.: +105°C  
Caloric load, approx. value: 1,05 MJ/m  
Copper weight: 42,00 kg/km

### Norms

Applicable standards: Foundation Fieldbus Spec. FF-816-1.4  
Flame-retardant acc. to IEC 60332-3  
UL Style: CMG 105° or CL3 FT4  
CSA standard: CSA FT 4

### Application

HELUKABEL® FOUNDATION™ Fieldbus Type A for normal requirements in this industrial network. Thanks to use of stranded conductors, this cable can be moved occasionally and satisfies the usual American requirements for such networks.

### Part no.

**801193**, Foundation Fieldbus FF A

Dimensions and specifications may be changed without prior notice.

R



# BUS Cables

**HMCB200**


fixed installed



## Type

### Cable structure

Inner conductor diameter:  
 Core insulation:  
 Core colours:  
 Stranding element:  
 Shielding 1:  
 Shielding 2:  
 Total shielding:  
 Outer sheath material:  
 Cable external diameter:  
 Outer sheath colour:

## Fixed installation, indoor

### 2x2x0,22qmm

Copper, bare (AWG 22/7)  
 Foam-skin-PE  
 gn, ye, pk, bu  
 Double core  
 Polyester foil over stranded bundle  
 Polyester foil, aluminium-lined  
 Cu braid, tinned  
 PVC  
 app. 6,8 mm ± 0,15 mm  
 Green similar to RAL 6018

## Electrical data

Characteristic impedance: 100 Ohm ± 15 ohm at 1 to 100 MHz  
 Conductor resistance, max.: 90 Ohm/km  
 Insulation resistance, min.: 1 GOhm x km  
 Loop resistance: 180 Ohm/km max.  
 Mutual capacitance: 50 nF/km nom.  
 Test voltage: 0,5 kV

## Typical values

Frequency (MHz)	10	16	62,5	100
Attenuation (db/100m)	8,0	10,0	20,0	27,0
Next (db)	47,0	44,0	35,0	32,0
ACR (db)	39,0	34,0	15,0	5,0

## Technical data

Weight: app. 63 kg/km  
 bending radius, repeated: 70 mm  
 Operating temperature range min.: -20°C  
 Operating temperature range max.: +80°C  
 Caloric load, approx. value: 0,92 MJ/m  
 Copper weight: 35,00 kg/km

## Norms

Applicable standards: Flame-retardant acc. to IEC 60332-1  
 UL Style: AWM Style 2502 AWM I/II A/B 80°C 30V FT1

## Application

HELUKABEL® HMCB200 for fixed installation and slight occasional movement, range up to 100m. This cable is used in Siemens Systems. Typical plugs are RJ45 Industrial IP20 Siemens or Y-Con RJ45 Yamaichi or round M-Connectors from Molex.

## Part no.

**802471, HMCB200**

Dimensions and specifications may be changed without prior notice.

\* Drive Cliq is registered trademark from Siemens AG.

# BUS Cables

**HMCB500S**


Drag Chain



## Type

### Cable structure

Inner conductor diameter 1:  
 Inner conductor diameter 2:  
 Core insulation 1:  
 Core insulation 2:  
 Core colours 1:  
 Core colours 2:  
 Stranding element 1:  
 Shielding 1:  
 Shielding 2:  
 Total shielding:  
 Outer sheath material:  
 Cable external diameter:  
 Outer sheath colour:

## Drag chain applications

### 2x2xAWG24 + 1x2xAWG22

Copper, bare (AWG 24/7)  
 Copper, tinned (AWG 22/19)  
 Foam-skin-PE  
 PE  
 gn, ye, pk, bu  
 rd, bk  
 Double core  
 -  
 -  
 Foil + braid  
 PVC  
 app. 6,95 mm ± 0,15 mm  
 Green similar to RAL 6018

## Electrical data

Characteristic impedance:  
 Conductor resistance, max.:  
 Insulation resistance, min.:  
 Loop resistance:  
 Mutual capacitance:  
 Test voltage:

100 Ohm ± 15 ohm at 1 to 100 MHz  
 90 Ohm/km  
 1 GOhm x km  
 180 Ohm/km max.  
 50 nF/km nom.  
 0,5 kV

## Typical values

Frequency	(MHz)	10	16	62,5	100
Attenuation	(db/100m)	10,0	12,0	23,0	30,0
Next	(db)	47,0	44,0	35,0	32,0
ACR	(db)	37,0	36,0	12,0	2,0

## Technical data

Weight: app. 66 kg/km  
 bending radius, repeated: 125 mm  
 Operating temperature range min.: 0°C  
 Operating temperature range max.: +60°C  
 Caloric load, approx. value: 0,00 MJ/m  
 Copper weight: 38,00 kg/km

## Norms

Applicable standards: Flame-retardant acc. to IEC 60332-1  
 UL Style: AWM Style 2502 AWM I/II A/B 80°C 30V FT1  
 CSA standard: CSA FT1

## Application

HELUKABEL® HMCB500S is designed for occasional moving in cable carriers and ranges up to 100m without repeater. This cable is used in Siemens Systems.

Typical plugs are RJ45 Industrial IP20 Siemens or Y-Con RJ45 Yamaichi or round M-Connectors from Molex.

## Part no.

**803672, HMCB500S**

Dimensions and specifications may be changed without prior notice.

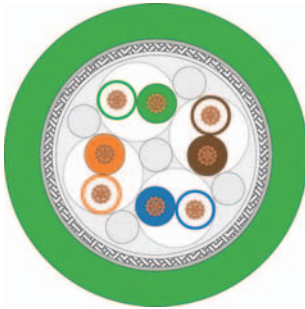
\* Drive Cliq is registered trademark from Siemens AG.

**R**

# BUS Cables

**HMCB800**


Drag Chain



## Type

### Cable structure

Inner conductor diameter 1:  
 Inner conductor diameter 2:  
 Core insulation 1:  
 Core insulation 2:  
 Core colours 1:  
 Core colours 2:  
 Stranding element 1:  
 Shielding 1:  
 Shielding 2:  
 Total shielding:  
 Outer sheath material:  
 Cable external diameter:  
 Outer sheath colour:

## Drag chain applications

### 2x2x0,20qmm + 1x2x0,38qmm

Copper, bare (AWG 25/19)  
 Copper, tinned (AWG 22/19)  
 PE  
 PE  
 gn, ye, pk, bu  
 rd, bk  
 Double core  
 -  
 -  
 Foil + braid  
 PUR  
 app. 6,95 mm ± 0,15 mm  
 Green similar to RAL 6018

## Electrical data

Characteristic impedance: 100 Ohm ± 15 ohm at 1 to 100 MHz  
 Conductor resistance, max.: 100 Ohm/km  
 Insulation resistance, min.: 1 GOhm x km  
 Loop resistance: 270 Ohm/km max.  
 Mutual capacitance: 50 nF/km nom.  
 Test voltage: 0,5 kV

## Typical values

Frequency (MHz)	10	16	62,5	100
Attenuation (db/100m)	8,0	10,0	20,0	27,0
Next (db)	47,0	44,0	35,0	32,0
ACR (db)	39,0	34,0	15,0	5,0

## Technical data

Weight: app. 61 kg/km  
 bending radius, repeated: 75 mm  
 Operating temperature range min.: -20°C  
 Operating temperature range max.: +60°C  
 Caloric load, approx. value: 0,90 MJ/m  
 Copper weight: 40,00 kg/km

## Norms

Applicable standards: Halogen-free acc. to 60754-2  
 Flame-retardant acc. to IEC 60332-1  
 UL Style: AWM Style 20236 AWM I/II A/B 80°C 30V FT1  
 CSA standard: CSA FT1

## Application

HELUKABEL® HMCB800W is designed for the most demanding continuous moving requirements in cable carriers and ranges up to 70 m without repeater. This cable is ideal solution in Siemens systems.

Typical plugs are RJ45 Industrial IP20 Siemens or Y-Con RJ45 Yamaichi or round M-Connectors from Molex.

## Part no.

**804767, HMCB800**

Dimensions and specifications may be changed without prior notice.

# BUS Cables

## USB Bus S



Drag Chain



### Type

#### Cable structure

Inner conductor diameter 1:  
 Inner conductor diameter 2:  
 Core insulation 1:  
 Core insulation 2:  
 Core colours 1:  
 Core colours 2:  
 Stranding element 1:  
 Shielding 1:  
 Shielding 2:  
 Total shielding:  
 Outer sheath material:  
 Cable external diameter:  
 Outer sheath colour:

### Drag chain applications

#### 1x2xAWG28 + 1x2xAWG20

Copper, tinned (AWG 28/19)  
 Copper, tinned (AWG 20/64)  
 PP  
 PP  
 wh, gn  
 rd, bk  
 2 cores + 2 fillers stranded together  
 Polyester foil over stranded bundle  
 -  
 Foil + braid  
 PUR  
 app. 5,0 mm ± 0,2 mm  
 Violet similar to RAL 4001

### Electrical data

Characteristic impedance:  
 Conductor resistance, max.:  
 Insulation resistance, min.:  
 Loop resistance:  
 Mutual capacitance:  
 Test voltage:

90 Ohm ± 15 %  
 230 Ohm/km  
 0,1 GOhm x km  
 460 Ohm/km max.  
 60 nF/km nom.  
 0,5 kV

### Typical values

Frequency (MHz)	10	16	62,5	100	200	300	400
Attenuation (db/100m)	10,1	15,4	31,0	39,7	60,2	76,2	99,7

### Technical data

Weight: app. 45 kg/km  
 bending radius, repeated: 50 mm  
 Operating temperature range min.: -30°C  
 Operating temperature range max.: +60°C  
 Caloric load, approx. value: 0,55 MJ/m  
 Copper weight: 30,00 kg/km

### Norms

Applicable standards: USB-Standard 2.0  
 Halogen-free acc. to 60754-2  
 Flame-retardant CSA FT1  
 UL Style: AWM 20963 (80°C/30V)  
 CSA standard: CSA FT1

### Application

HELUKABEL® USB BUS S is designed for continuous moving in cable carriers and lengths up to max. 5m. Conventional USB cables fail within a short period of time, which is why HELUKABEL developed this special cable. Thanks to the PU sheath, it also offers excellent resistance to common mineral oils, greases and cooling lubricants.

### Part no.

**802469**, USB S

Dimensions and specifications may be changed without prior notice.

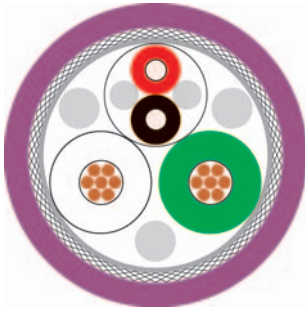
R

# BUS Cables

## USB Bus L



Drag Chain



### Type

#### Cable structure

Inner conductor diameter 1:  
 Inner conductor diameter 2:  
 Core insulation 1:  
 Core insulation 2:  
 Core colours 1:  
 Core colours 2:  
 Stranding element 1:  
 Shielding 1:  
 Shielding 2:  
 Total shielding:  
 Drain wire:  
 Outer sheath material:  
 Cable external diameter:  
 Outer sheath colour:

### Drag chain applications

#### 1x2xAWG24 + 1x2xAWG20

Copper, tinned (AWG 24/19)  
 Copper, tinned (AWG 20/19)  
 PO  
 PVC  
 wh, gn  
 rd, bk  
 Double core  
 -  
 -  
 Foil + braid  
 yes  
 PUR  
 app. 6,3 mm ± 0,2 mm  
 Violet similar to RAL 4001

### Electrical data

Characteristic impedance: 90 Ohm ± 15 %  
 Conductor resistance, max.: 36 Ohm/km  
 Insulation resistance, min.: 0,2 GOhm x km  
 Loop resistance: 71 Ohm/km max.  
 Mutual capacitance: 50 nF/km nom.  
 Nominal voltage: 300 V  
 Test voltage: 2 kV

### Typical values

Frequency (MHz)	1	24	48	96	200	400
Attenuation (db/100m)	4,0	19,0	27,0	38,0	64,0	116,0

### Technical data

Weight: app. 56 kg/km  
 bending radius, repeated: 95 mm  
 Operating temperature range min.: -30°C  
 Operating temperature range max.: +70°C  
 Caloric load, approx. value: 0,57 MJ/m  
 Copper weight: 40,00 kg/km

### Norms

Applicable standards: USB-Standard 2.0  
 Flame-retardant acc. to IEC 60332-1  
 AWM 21198 (80°C/ 300V)  
 UL Style:

### Application

HELUKABEL® USB BUS L is designed for continuous motion in cable carriers and lengths up to max. 10m without a repeater. Conventional USB cables fail within a short period of time and need a repeater after a cable length of 5m, which is why HELUKABEL developed this special cable with a larger cross-section. Thanks to the PU sheath, it also offers excellent resistance to common mineral oils, greases and cooling lubricants.

### Part no.

**802470**, USB L

Dimensions and specifications may be changed without prior notice.



# BUS Cables

## USB Bus 3.0



Drag Chain



### Type

#### Cable structure

Inner conductor diameter 1:  
 Inner conductor diameter 2:  
 Core insulation 1:  
 Core insulation 2:  
 Core colours 1:  
 Core colours 2:  
 Stranding element 1:  
 Shielding 1:  
 Shielding 2:  
 Total shielding:  
 Outer sheath material:  
 Cable external diameter:  
 Outer sheath colour:

### Drag chain applications

#### 2x2xAWG28 + 2x(1x2xAWG28)

Copper, tinned (AWG 28/19)  
 Copper, tinned (AWG 28/19)  
 Foam-skin-PE  
 PE  
 bu/ye, or/vio  
 rd/bk, gn/gnwh  
 Double core  
 Polyester foil over stranded bundle  
 Foil + braid  
 Cu braid, tinned  
 PUR  
 app. 6,5 mm ± 0,3 mm  
 Violet similar to RAL 4001

### Electrical data

Characteristic impedance:  
 Conductor resistance, max.:  
 Insulation resistance, min.:  
 Loop resistance:  
 Mutual capacitance:  
 Test voltage:  
 Relative propagation velocity:

90 Ohm ± 20 %  
 105 Ohm ± 15% at 1 MHz  
 205 Ohm/km  
 2 GOhm x km  
 410 Ohm/km max.  
 60 nF/km nom.  
 0,7 kV  
 75 %

### Typical values

Frequency (MHz)	1	625	1200
Attenuation (db/100m)	4,0	115	180

### Technical data

Weight:  
 bending radius, repeated:  
 Operating temperature range min.:  
 Operating temperature range max.:  
 Caloric load, approx. value:  
 Copper weight:

app. 62 kg/km  
 55 mm  
 -30°C  
 +70°C  
 0,69 MJ/m  
 42,00 kg/km

### Norms

Applicable standards:  
 UL Style:  
 CSA standard:

USB-Standard 3.0  
 Halogen-free acc. to 60754-2  
 Flame-retardant acc. to IEC 60332-1  
 AWM Style 20236 AWM I/II A/B 80°C 30V FT1  
 CSA FT1

### Application

HELUKABEL® USB S 3.0, designed specifically for use in heavy-duty industries, are the ideal solution for highly-flexible applications such as drag chains and camera technology. They guarantee superior transmission properties. The transmission distance is connected with the transmission rate.

### Part no.

**805287**, USB S

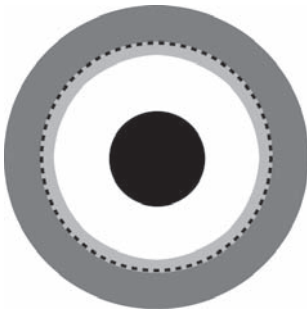
Dimensions and specifications may be changed without prior notice.

R

# BUS Cables

**Coax 50 Ohm, PUR**

Drag Chain

**NEW**

## Cable structure

Inner conductor material:	Copper, bare
Inner conductor diameter:	0.9 mm
Outer conductor material:	Copper, tinned
Outer conductor form:	Screening
Dialektrikum:	PP
Total shielding:	Cu braid, vz
Sheat material:	PUR (Polyurethan)
External diameter:	app. 5,4 mm ± 0,2 mm
Sheat colour:	black

## 19x0,18/ 2,95mm 50 Ohm

## Electrical data

Characteristic impedance:	50 Ohm ± 2 Ohm
Conductor resistance, max.:	38 Ohm/km
Insulation resistance, min.:	1 GOhm x km
Test voltage:	2 kV
Relative propagation velocity:	67 %

## Typical values

Frequency (MHz)	50	100	200	300	500	800	900	1000	1800	2000
Attenuation (db/100m)	11,5	16,5	24,0	30,0	40,0	52,0	59,0	65,0	105,0	112,0

## Technical data

Weight:	app. 45 kg/km
bending radius, repeated:	54 mm
Operating temperature range max.:	+50°C
Laying temperature range min.:	-20°C
Laying temperature range max.:	+50°C
Copper weight:	23,00 kg/km

## Norms

Applicable standards:	Halogen-free acc. to 60754-2
-----------------------	------------------------------

## Application

This Coax cable, designed specifically for use in heavy-duty industries, is the ideal solution for highly-flexible applications such as drag chains. It guarantee superior transmission properties.

## Part no.

**804299**, Coax, Drag Chain

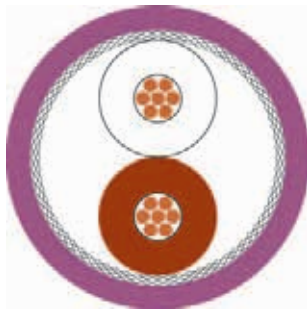
Dimensions and specifications may be changed without prior notice.

# BUS Cables

## CAN Bus



fixed installed



### Type Cable structure

Inner conductor diameter:  
Core insulation:  
Core colours:  
Stranding element:  
Shielding 1:  
Shielding 2:  
Total shielding:  
Outer sheath material:  
Cable external diameter:  
Outer sheath colour:

### Fixed installation, indoor 1x2x0.22 mm<sup>2</sup> (stranded)

Copper, bare (AWG 24/7)  
Cell PE  
wh/bn  
Double core  
Polyester foil over stranded bundle  
-  
Cu braid, tinned  
PVC  
app. 5,4 mm ± 0,2 mm  
Violet similar to RAL 4001

### Fixed installation, indoor 4x1x0.22 mm<sup>2</sup> (stranded)

Copper, bare (AWG 24/7)  
Cell PE  
wh, bn, gn, ye  
Star quad  
Polyester foil over stranded bundle  
-  
Cu braid, tinned  
PVC  
app. 6,9 mm ± 0,2 mm  
Violet similar to RAL 4001

### Electrical data

Characteristic impedance:  
Conductor resistance, max.:  
Insulation resistance, min.:  
Loop resistance:  
Mutual capacitance:  
Nominal voltage:  
Test voltage:

120 Ohm ± 10 %  
88 Ohm/km  
1 GOhm x km  
175 Ohm/km max.  
58 nF/km nom.  
30 V  
1,5 kV

120 Ohm ± 10 %  
88 Ohm/km  
1 GOhm x km  
175 Ohm/km max.  
58 nF/km nom.  
30 V  
1,5 kV

### Technical data

Weight:  
bending radius, repeated:  
Operating temperature range min.:  
Operating temperature range max.:  
Caloric load, approx. value:  
Copper weight:

app. 41 kg/km  
81 mm  
-40°C  
+70°C  
0,574 MJ/m  
17,00 kg/km

app. 60 kg/km  
107 mm  
-40°C  
+70°C  
1,234 MJ/m  
21,00 kg/km

### Norms

Applicable standards:  
UL Style:

CAN Bus acc. to ISO 11898-2  
Flame-retardant acc. to EN 50265-2-1  
UL Style 2571

CAN Bus acc. to ISO 11898-2  
Flame-retardant acc. to EN 50265-2-1  
UL Style 2571

### Application

HELUKABEL® CAN Bus for fixed installation and occasional motion, for normal requirements. The 2-pair version is designed with star-quad twisting, i.e. diagonal conductors form an electrical pair and satisfy the requirements of the CAN Standard. For cable lengths up to max. 40m (observe CAN specifications).

### Part no.

**81286**, CAN BUS

**81287**, CAN BUS

Dimensions and specifications may be changed without prior notice.

R

# BUS Cables

## CAN Bus



fixed installed



### Type

#### Cable structure

Inner conductor diameter:  
Core insulation:  
Core colours:  
Stranding element:  
Shielding 1:  
Shielding 2:  
Total shielding:  
Outer sheath material:  
Cable external diameter:  
Outer sheath colour:

#### Fixed installation, indoor 2x2x0.22 mm<sup>2</sup> (stranded)

Copper, bare (AWG 24/7)  
Cell PE  
wh/bn, gn/ye  
2 cores + 2 fillers stranded together  
Polyester foil over stranded bundle  
-  
Cu braid, tinned  
PVC  
app. 7,5 mm ± 0,3 mm  
Violet similar to RAL 4001

#### Electrical data

Characteristic impedance: 120 Ohm ± 10 %  
Conductor resistance, max.: 87,6 Ohm/km  
Insulation resistance, min.: 5 GOhm x km  
Loop resistance: 175 Ohm/km max.  
Mutual capacitance: 40 nF/km nom.  
Nominal voltage: 30 V  
Test voltage: 1,5 kV

#### Technical data

Weight: app. 60 kg/km  
bending radius, repeated: 113 mm  
Operating temperature range min.: -25°C  
Operating temperature range max.: +70°C  
Caloric load, approx. value: 1,13 MJ/m  
Copper weight: 32,00 kg/km

#### Norms

Applicable standards: CAN Bus acc. to ISO 11898-2  
Flame-retardant acc. to IEC 60332-1  
UL Style: UL Style 2571  
CSA standard: CSA FT1

#### Application

HELUKABEL® CAN BUS for fixed installation and occasion motion, for normal requirements. The two signal pairs are provided in the form twisted pairs. As a result, the diameter is somewhat larger than that of 81287. In the event of diameter problems, please see this type. For cable lengths up to max. 40m (observe CAN specifications).

#### Part no.

**82509**, CAN BUS

Dimensions and specifications may be changed without prior notice.

# BUS Cables

## CAN Bus



fixed installed, 105°C



### Type

#### Cable structure

Inner conductor diameter:  
Core insulation:  
Core colours:  
Stranding element:  
Shielding 1:  
Shielding 2:  
Total shielding:  
Outer sheath material:  
Cable external diameter:  
Outer sheath colour:

### Industrial Area

#### 2x2xAWG 24/ 19 mm<sup>2</sup> (stranded)

Copper, bare (AWG 24/19)  
XLPE ray cross-linking  
wh/bn, gn/ye  
Double core  
Polyester foil over stranded bundle  
-  
Cu braid, tinned  
PUR  
app. 8,4 mm ± 0,3 mm  
Violet similar to RAL 4001

### Electrical data

Characteristic impedance: 120 Ohm ± 10 %  
Conductor resistance, max.: 87,2 Ohm/km  
Insulation resistance, min.: 1 GOhm x km  
Loop resistance: 174 Ohm/km max.  
Mutual capacitance: 42 nF/km nom.  
Nominal voltage: 600 V  
Test voltage: 2,5 kV

### Technical data

Weight: app. 80 kg/km  
bending radius, repeated: 126 mm  
Operating temperature range min.: -40°C  
Operating temperature range max.: +105°C \*  
Caloric load, approx. value: 1,31 MJ/m  
Copper weight: 40,00 kg/km

### Norms

Applicable standards: CAN Bus acc. to ISO 11898-2  
Halogen-free acc. to 60754-2  
Flame-retardant acc. to IEC 60332-1  
UL/CSA 21223 80°C, 600V

UL Style:

### Application

HELUKABEL® CAN Bus for fixed installation up to 105°C in difficult industrial environments with demanding temperature requirements thanks to cross-linking of the conductor insulation. Thanks to use a PU sheath, this version is also halogen-free. For cable lengths up to max. 40m (observe CAN specifications).

### Part no.

**801982**, CAN BUS

Dimensions and specifications may be changed without prior notice.

R

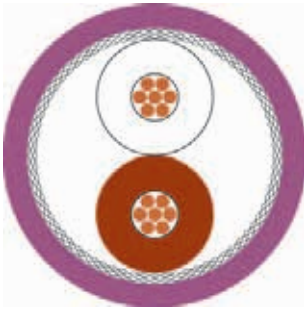


# BUS Cables

## CAN Bus



fixed installed



### Type Cable structure

Inner conductor diameter:  
Core insulation:  
Core colours:  
Stranding element:  
Shielding 1:  
Shielding 2:  
Total shielding:  
Outer sheath material:  
Cable external diameter:  
Outer sheath colour:

### Fixed installation, indoor 1x2x0.34 mm<sup>2</sup> (stranded)

Copper, bare (AWG 22/7)  
Cell PE  
wh/bn  
Double core  
Polyester foil over stranded bundle  
-  
Cu braid, tinned  
PVC  
app. 6,5 mm ± 0,2 mm  
Violet similar to RAL 4001

### Fixed installation, indoor 4x1x0.34 mm<sup>2</sup> (stranded)

Copper, bare (AWG 22/7)  
Cell PE  
wh/bn, gn/ye  
Star quad  
Polyester foil over stranded bundle  
-  
Cu braid, tinned  
PVC  
app. 8,0 mm ± 0,2 mm  
Violet similar to RAL 4001

### Electrical data

Characteristic impedance:  
Conductor resistance, max.:  
Insulation resistance, min.:  
Loop resistance:  
Mutual capacitance:  
Nominal voltage:  
Test voltage:

120 Ohm ± 10 %  
57 Ohm/km  
5 GOhm x km  
114 Ohm/km max.  
58 nF/km nom.  
30 V  
2 kV

120 Ohm ± 10 %  
57 Ohm/km  
5 GOhm x km  
114 Ohm/km max.  
40 nF/km nom.  
30 V  
2 kV

### Technical data

Weight:  
bending radius, repeated:  
Operating temperature range min.:  
Operating temperature range max.:  
Caloric load, approx. value:  
Copper weight:

app. 65 kg/km  
98 mm  
-30°C  
+70°C  
1,109 MJ/m  
23,00 kg/km

app. 77 kg/km  
120 mm  
-30°C  
+70°C  
1,179 MJ/m  
30,00 kg/km

### Norms

Applicable standards:  
UL Style:

CAN Bus acc. to ISO 11898-2  
Flame-retardant acc. to EN 50265-2-1  
UL Style 2571

CAN Bus acc. to ISO 11898-2  
Flame-retardant acc. to EN 50265-2-1  
UL Style 2571

### Application

HELUKABEL® CAN Bus for fixed installation and occasional motion, for normal requirements. The 2-pair version is designed with a star-quad twisting, i.e. diagonal conductors form an electrical pair and satisfy the requirements of the CAN standard. For cable lengths up to max. 40m (observe CAN specifications).

### Part no.

**801572**, CAN BUS

**801573**, CAN BUS

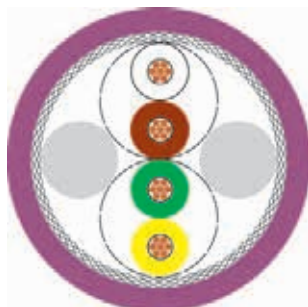
Dimensions and specifications may be changed without prior notice.

# BUS Cables

## CAN Bus



fixed installed



### Type Cable structure

Inner conductor Ø:  
Core insulation:  
Core colours:  
Stranding element:  
Shielding 1:  
Shielding 2:  
Total shielding:  
Outer sheath material:  
Cable external diameter:  
Outer sheath colour:

### Fixed installation, indoor 2x2x0.34 mm<sup>2</sup> (stranded)

Copper, bare (AWG 22/7)  
Foam-skin-PE  
wh/bn, gn/ye  
Double core  
Polyester foil over stranded bundle  
-  
Cu braid, tinned  
PVC  
app. 8,5 mm ± 0,3 mm  
Violet similar to RAL 4001

### Electrical data

Characteristic impedance: 120 Ohm ± 10 %  
Conductor resistance, max.: 55,4 Ohm/km  
Insulation resistance, min.: 5 GOhm x km  
Loop resistance: 110 Ohm/km max.  
Mutual capacitance: 40 nF/km nom.  
Nominal voltage: 250 V  
Test voltage: 1,5 kV

### Technical data

Weight: app. 85 kg/km  
bending radius, repeated: 130 mm  
Operating temperature range min.: -40°C  
Operating temperature range max.: +70°C  
Caloric load, approx. value: 1,32 MJ/m  
Copper weight: 46,00 kg/km

### Norms

Applicable standards: CAN Bus acc. to ISO 11898-2  
Flame-retardant acc. to IEC 60332-1  
UL Style: CMX 75°C (shielded)  
CSA standard: CSA FT1

### Application

HELUKABEL® CAN Bus for fix installations an occasion motion, for normal requirements. The two signal pairs are provided in the form twisted pairs. As a result, the diameter is somewhat larger than that of 801573. In the event of diameter problems, please see this type. For cable lengths up to max. 40m (observe CAN specifications).

### Part no.

**803344**, CAN BUS

Dimensions and specifications may be changed without prior notice.

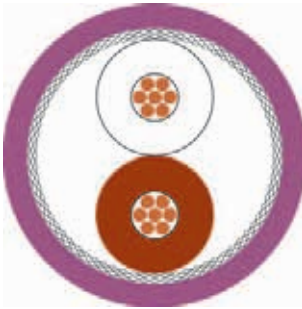
R

# BUS Cables

## CAN Bus



fixed installed



### Type Cable structure

Inner conductor diameter:  
Core insulation:  
Core colours:  
Stranding element:  
Shielding 1:  
Shielding 2:  
Total shielding:  
Outer sheath material:  
Cable external diameter:  
Outer sheath colour:

### Fixed installation, indoor 1x2x0.50 mm<sup>2</sup> (stranded)

Copper, bare (AWG 20/7)  
Foam-skin-PE  
wh/bn  
Double core  
Polyester foil over stranded bundle  
-  
Cu braid, tinned  
PVC  
app. 7,0 mm ± 0,2 mm  
Violet similar to RAL 4001

### Fixed installation, indoor 4x1x0.50 mm<sup>2</sup> (stranded)

Copper, bare (AWG 20/7)  
Foam-skin-PE  
wh, bn, gn, ye  
Star quad  
Polyester foil over stranded bundle  
-  
Cu braid, tinned  
PVC  
app. 8,5 mm ± 0,2 mm  
Violet similar to RAL 4001

### Electrical data

Characteristic impedance:  
Conductor resistance, max.:  
Insulation resistance, min.:  
Loop resistance:  
Mutual capacitance:  
Test voltage:

120 Ohm ± 10 %  
33 Ohm/km  
1 GOhm x km  
66 Ohm/km max.  
40 nF/km nom.  
1,5 kV

120 Ohm ± 10 %  
37 Ohm/km  
1 GOhm x km  
74 Ohm/km max.  
44 nF/km nom.  
1,5 kV

### Technical data

Weight:  
bending radius, repeated:  
Operating temperature range min.:  
Operating temperature range max.:  
Caloric load, approx. value:  
Copper weight:

app. 69 kg/km  
100 mm  
-40°C  
+70°C  
1,09 MJ/m  
30,00 kg/km

app. 100 kg/km  
130 mm  
-40°C  
+70°C  
1,64 MJ/m  
45,00 kg/km

### Norms

Applicable standards:

CAN Bus acc. to ISO 11898-2  
Flame-retardant acc. to EN 50265-2-1  
UL Style 2571

CAN Bus acc. to ISO 11898-2  
Flame-retardant acc. to EN 50265-2-1  
UL Style 2571

### Application

HELUKABEL® CAN Bus for fixed installation and occasion motion, for normal requirements. The 2-pair version is designed with star-quad twisting, i.e. diagonal conductors form an electrical pair and satisfy the requirements of the CAN standard. For cable lengths up to 600m (observe CAN specifications).

### Part no.

**800571**, CAN BUS

**800685**, CAN BUS

Dimensions and specifications may be changed without prior notice.

# BUS Cables

## CAN Bus



fixed installed



### Type Cable structure

Inner conductor diameter:  
Core insulation:  
Core colours:  
Stranding element:  
Shielding 1:  
Shielding 2:  
Total shielding:  
Outer sheath material:  
Cable external diameter:  
Outer sheath colour:

### Fixed installation, indoor 2x2x0.50 mm<sup>2</sup> (stranded)

Copper, bare (AWG 20/7)  
Foam-skin-PE  
wh/bn, gn/ye  
Double core  
Polyester foil over stranded bundle  
-  
Cu braid, tinned  
PVC  
app. 9,6 mm ± 0,3 mm  
Violet similar to RAL 4001

### Electrical data

Characteristic impedance: 120 Ohm ± 10 %  
Conductor resistance, max.: 34,4 Ohm/km  
Insulation resistance, min.: 5 GOhm x km  
Loop resistance: 68 Ohm/km max.  
Mutual capacitance: 40 nF/km nom.  
Nominal voltage: 250 V  
Test voltage: 1,5 kV

### Technical data

Weight: app. 116 kg/km  
bending radius, repeated: 150 mm  
Operating temperature range min.: -40°C  
Operating temperature range max.: +70°C  
Caloric load, approx. value: 1,62 MJ/m  
Copper weight: 60,00 kg/km

### Norms

Applicable standards: CAN Bus acc. to ISO 11898-2  
Flame-retardant acc. to IEC 60332-1  
UL Style: CMX 75°C (shielded)  
CSA standard: CSA FT1

### Application

HELUKABEL® CAN Bus for fixed installation and occasion motion, for normal requirements. The two signal pairs are provided in the form twisted pairs. As a result, the diameter is somewhat larger than that of 800685. In the event of diameter problems, please see this type. For cable lengths up to 600m (observe CAN specifications).

### Part no.

**803722**, CAN BUS

Dimensions and specifications may be changed without prior notice.

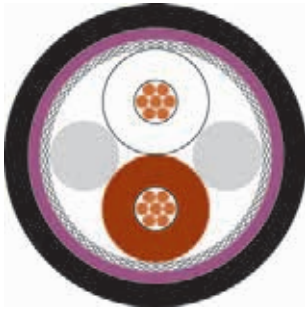
R

# BUS Cables

## CAN Bus



direct Burial



### Type Cable structure

Inner conductor diameter:  
Core insulation:  
Core colours:  
Stranding element:  
Shielding 1:  
Inner sheath material:  
Shielding 2:  
Total shielding:  
Armouring:  
Outer sheath material:  
Cable external diameter:  
Outer sheath colour:

### Direct burial 1x2x0.50 mm<sup>2</sup> (stranded)

Copper, bare (AWG 20/7)  
Foam-skin-PE  
wh/bn  
2 cores + 2 fillers stranded together  
Polyester foil over stranded bundle  
PVC  
-  
Cu braid, tinned  
PET/PA tape  
PE  
app. 9,2 mm ± 0,4 mm  
Black similar to RAL 9005

### Direct burial 4x1x0.50 mm<sup>2</sup> (stranded)

Copper, bare (AWG 20/7)  
Foam-skin-PE  
wh, bn, gn, ye  
Star quad  
Polyester foil over stranded bundle  
PVC  
-  
Cu braid, tinned  
PET/PA tape  
PE  
app. 9,7 mm ± 0,4 mm  
Black similar to RAL 9005

### Electrical data

Characteristic impedance:  
Conductor resistance, max.:  
Insulation resistance, min.:  
Loop resistance:  
Mutual capacitance:  
Test voltage:

120 Ohm ± 10 %  
37 Ohm/km  
1 GOhm x km  
74 Ohm/km max.  
40 nF/km nom.  
1,5 kV

120 Ohm ± 10 %  
36,4 Ohm/km  
1 GOhm x km  
72 Ohm/km max.  
44 nF/km nom.  
1,5 kV

### Technical data

Weight:  
bending radius, repeated:  
Operating temperature range min.:  
Operating temperature range max.:  
Caloric load, approx. value:  
Copper weight:

app. 105 kg/km  
150 mm  
-40°C  
+70°C  
2,05 MJ/m  
33,00 kg/km

app. 115 kg/km  
160 mm  
-40°C  
+70°C  
2,18 MJ/m  
45,00 kg/km

### Norms

Applicable standards:

CAN Bus acc. to ISO 11898-2

CAN Bus acc. to ISO 11898-2

### Application

HELUKABEL® CAN Bus Direct Burial is suitable for fixed outdoor installation or direct burial applications. The 2-pair version is designed with star-quad twisting, i.e. diagonal conductors form an electrical pair and satisfy the requirements of the CAN standard. For cable lengths up to 600m (observe CAN specifications).

### Part no.

**804268**, CAN BUS

**804269**, CAN BUS

Dimensions and specifications may be changed without prior notice.

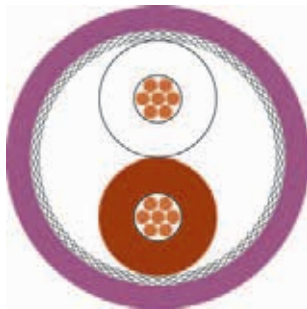


# BUS Cables

## CAN Bus



fixed installed



### Type Cable structure

Inner conductor diameter:  
Core insulation:  
Core colours:  
Stranding element:  
Shielding 1:  
Shielding 2:  
Total shielding:  
Outer sheath material:  
Cable external diameter:  
Outer sheath colour:

### Fixed installation, indoor 1x2x0.75 mm<sup>2</sup> (stranded)

Copper, bare (AWG 18/24)  
Foam-skin-PE  
wh/bn  
Double core  
Polyester foil over stranded bundle  
-  
Cu braid, tinned  
PVC  
app. 8,3 mm ± 0,3 mm  
Violet similar to RAL 4001

### Fixed installation, indoor 4x1x0.75 mm<sup>2</sup> (stranded)

Copper, bare (AWG 18/24)  
Foam-skin-PE  
wh, bn, gn, ye  
Star quad  
Polyester foil over stranded bundle  
-  
Cu braid, tinned  
PVC  
app. 8,8 mm ± 0,3 mm  
Violet similar to RAL 4001

### Electrical data

Characteristic impedance:  
Conductor resistance, max.:  
Insulation resistance, min.:  
Loop resistance:  
Mutual capacitance:  
Nominal voltage:  
Test voltage:

120 Ohm ± 15 %  
27,5 Ohm/km  
1 GOhm x km  
55 Ohm/km max.  
42 nF/km nom.  
300 V  
1,5 kV

120 Ohm ± 15 %  
27,5 Ohm/km  
1 GOhm x km  
55 Ohm/km max.  
42 nF/km nom.  
300 V  
1,5 kV

### Technical data

Weight:  
bending radius, repeated:  
Operating temperature range min.:  
Operating temperature range max.:  
Caloric load, approx. value:  
Copper weight:

app. 101 kg/km  
110 mm  
-40°C  
+70°C  
1,67 MJ/m  
40,00 kg/km

app. 112 kg/km  
110 mm  
-40°C  
+70°C  
1,76 MJ/m  
58,00 kg/km

### Norms

Applicable standards:  
UL Style:  
CSA standard:

CAN Bus acc. to ISO 11898-2  
Flame-retardant acc. to IEC 60332-1  
UL Style 2571  
CSA FT1

CAN Bus acc. to ISO 11898-2  
Flame-retardant acc. to IEC 60332-1  
UL Style 2571  
CSA FT1

### Application

HELUKABEL® CAN Bus for fix installation and occasion motion, for normal requirements. The 2-pair version is designed with star-quad twisting, i.e. diagonal conductors form an electrical pair and satisfy the requirements of the CAN standard. For cable lengths over 600m (observe CAN specifications).

### Part no.

**803383**, CAN BUS

**803384**, CAN BUS

Dimensions and specifications may be changed without prior notice.

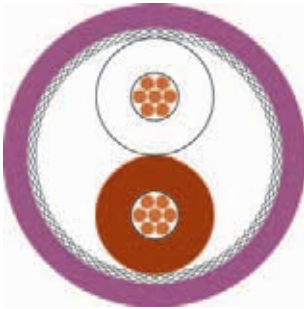
R

# BUS Cables

## CAN Bus



Drag Chain



### Type Cable structure

Inner conductor diameter:  
Core insulation:  
Core colours:  
Stranding element:  
Shielding 1:  
Shielding 2:  
Total shielding:  
Outer sheath material:  
Cable external diameter:  
Outer sheath colour:

### Drag chain applications 1x2x0.25 mm<sup>2</sup> (stranded)

Copper, bare (AWG 24/19)  
PE  
wh/bn  
Double core  
Polyester foil over stranded bundle  
-  
Cu braid, tinned  
PUR  
app. 6,1 mm ± 0,3 mm  
Violet similar to RAL 4001

### Drag chain applications 4x1x0.25 mm<sup>2</sup> (stranded)

Copper, bare (AWG 24/19)  
PE  
wh, bn, gn, ye  
Star quad  
Polyester foil over stranded bundle  
-  
Cu braid, tinned  
PUR  
app. 6,5 mm ± 0,3 mm  
Violet similar to RAL 4001

### Electrical data

Characteristic impedance:  
Conductor resistance, max.:  
Insulation resistance, min.:  
Loop resistance:  
Mutual capacitance:  
Test voltage:

120 Ohm ± 10 %  
74 Ohm/km  
1 GOhm x km  
148 Ohm/km max.  
50 nF/km nom.  
1,5 kV

120 Ohm ± 10 %  
85 Ohm/km  
1 GOhm x km  
170 Ohm/km max.  
50 nF/km nom.  
1,5 kV

### Technical data

Weight:  
bending radius, repeated:  
Operating temperature range min.:  
Operating temperature range max.:  
Caloric load, approx. value:  
Copper weight:

app. 40 kg/km  
90 mm  
-40°C  
+70°C  
0,798 MJ/m  
18,00 kg/km

app. 45 kg/km  
95 mm  
-30°C  
+70°C  
0,943 MJ/m  
25,00 kg/km

### Norms

Applicable standards:

CAN Bus acc. to ISO 11898-2  
Halogen-free acc. to 60754-2

CAN Bus acc. to ISO 11898-2  
Halogen-free acc. to 60754-2

### Application

HELUKABEL® CAN Bus is designed for guided continuous motion in cable carriers. The 2-pair version is designed with a star-quad twisting, i.e. diagonal conductors form an electrical pair and satisfy the requirements of the CAN standard. For cable lengths up to max. 40m (observe CAN specifications).

### Part no.

**81911**, CAN BUS, highly flexible

**81912**, CAN BUS, highly flexible

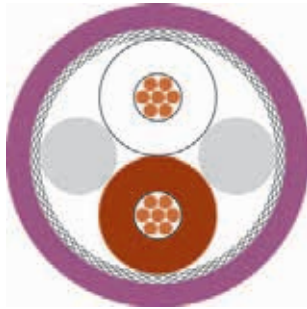
Dimensions and specifications may be changed without prior notice.

# BUS Cables

CAN Bus



Drag Chain, UL



## Type Cable structure

Inner conductor diameter:  
Core insulation:  
Core colours:  
Stranding element:  
Shielding 1:  
Shielding 2:  
Total shielding:  
Outer sheath material:  
Cable external diameter:  
Outer sheath colour:

## Drag chain applications 1x2x0.34 mm<sup>2</sup> (stranded)

Copper, bare (AWG 22)  
Foam-skin-PE  
wh/bn  
2 cores + 2 fillers stranded together  
-  
-  
Cu braid, tinned  
PUR  
app. 6,9 mm ± 0,3 mm  
Violet similar to RAL 4001

## Drag chain applications 4x1x0.34 mm<sup>2</sup> (stranded)

Copper, bare (AWG 22/43)  
Foam-skin-PE  
wh/bn, gn/ye  
Star quad  
-  
-  
Cu braid, tinned  
PUR  
app. 7,5 mm ± 0,3 mm  
Violet similar to RAL 4001

## Electrical data

Characteristic impedance:  
Conductor resistance, max.:  
Insulation resistance, min.:  
Loop resistance:  
Mutual capacitance:  
Nominal voltage:  
Test voltage:

120 Ohm ± 15 %  
56 Ohm/km  
5 GOhm x km  
170 Ohm/km max.  
40 nF/km nom.  
250 V  
1,5 kV

120 Ohm ± 15 %  
56 Ohm/km  
5 GOhm x km  
170 Ohm/km max.  
40 nF/km nom.  
250 V  
1,5 kV

## Technical data

Weight:  
bending radius, repeated:  
Operating temperature range min.:  
Operating temperature range max.:  
Caloric load, approx. value:  
Copper weight:

app. 54 kg/km  
105 mm  
-30°C  
+70°C  
1,20 MJ/m  
30,00 kg/km

app. 64 kg/km  
130 mm  
-30°C  
+70°C  
1,20 MJ/m  
42,00 kg/km

## Norms

Applicable standards:

CAN Bus acc. to ISO 11898-2  
Halogen-free acc. to 60754-2  
Flame-retardant acc. to IEC 60332-1  
CMX 444

UL Style:

CAN Bus acc. to ISO 11898-2  
Halogen-free acc. to 60754-2  
Flame-retardant acc. to IEC 60332-1  
CMX 444

## Application

HELUKABEL® CAN Bus is designed for guided continuous motion in cable carriers. The 2-pair version is designed with star-quad twisting, i.e. diagonal conductors form an electrical pair and satisfy the requirements of the CAN standard. For cable lengths up to max. 40m (observe CAN specifications).

## Part no.

**802182**, CAN BUS, highly flexible

**802339**, CAN BUS, highly flexible

Dimensions and specifications may be changed without prior notice.

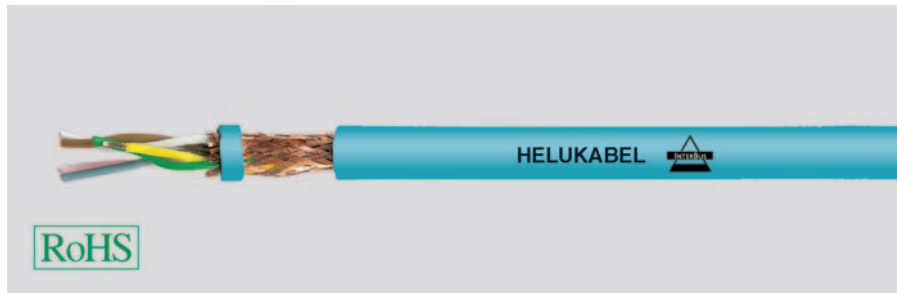
R

# BUS Cables

I-BUS



fixed installed



## Type Cable structure

Inner conductor diameter:  
Inner conductor diameter 2:  
Core insulation:  
Core insulation 2:  
Core colours:  
Core colours 2:  
Stranding element:  
Shielding 1:  
Shielding 2:  
Total shielding:  
Outer sheath material:  
Cable external diameter:  
Outer sheath colour:

## Fixed installation, indoor 3x2x0.22 mm<sup>2</sup>

Copper, bare (AWG 24/7)  
-  
PE  
-  
wh/bn, gn/rd, ye/gn  
-  
Double core  
Polyester foil over stranded bundle  
-  
Cu braid, bare  
PVC  
app. 7,0 mm ± 0,3 mm  
Pastel turquoise similar to RAL 6034

## Fixed installation, indoor 3x2x0.22 mm<sup>2</sup> + 3x1.0 mm<sup>2</sup>

Copper, bare (AWG 24/7)  
Copper, bare (AWG 17/56)  
PE  
PE  
wh/bn, gn/rd, ye/gn  
bu, rd, gnye  
Double core  
Polyester foil over stranded bundle  
-  
Cu braid, bare  
PVC  
app. 8,0 mm ± 0,3 mm  
Pastel turquoise similar to RAL 6034

## Electrical data

Characteristic impedance:  
Conductor resistance, max.:  
Insulation resistance, min.:  
Loop resistance:  
Mutual capacitance:  
Test voltage:  
Attenuation:

100 Ohm ± 15 Ohm  
96 Ohm/km  
1 GOhm x km  
192 Ohm/km max.  
60 nF/km nom.  
1 kV  
256 kHz < 1,5 dB/100m  
772 kHz < 2,4 dB/100m  
1 MHz < 2,7 dB/100m  
4 MHz < 5,2 dB/100m  
10 MHz < 8,4 dB/100m  
16 MHz < 11,2 dB/100m  
20 MHz < 11,9 dB/100m

100 Ohm ± 15 Ohm  
96 Ohm/km  
1 GOhm x km  
192 Ohm/km max.  
60 nF/km nom.  
1 kV  
256 kHz < 1,5 dB/100m  
772 kHz < 2,4 dB/100m  
1 MHz < 2,7 dB/100m  
4 MHz < 5,2 dB/100m  
10 MHz < 8,4 dB/100m  
16 MHz < 11,2 dB/100m  
20 MHz < 11,9 dB/100m

## Technical data

Weight:  
bending radius, repeated:  
Operating temperature range min.:  
Operating temperature range max.:  
Caloric load, approx. value:  
Copper weight:

app. 70 kg/km  
110 mm  
-40°C  
+70°C  
1,20 MJ/m  
35,00 kg/km

app. 96 kg/km  
120 mm  
-40°C  
+70°C  
1,31 MJ/m  
68,00 kg/km

## Norms

Applicable standards:

interbus specification 2.0, IEC61158  
Flame-retardant acc. to EN 50265-2-1  
UL Style 2571

interbus specification 2.0, IEC61158  
Flame-retardant acc. to EN 50265-2-1  
UL Style 2571

## Application

HELUKABEL® I-Bus is designed for fixed installation and occasional motion, for normal Interbus installation and as a hybrid cable with integrated power supply.

## Part no.

80778, I-BUS

81202, I-BUS

Dimensions and specifications may be changed without prior notice.

# BUS Cables

I-BUS



fixed installed, halogenfree



## Type Cable structure

Inner conductor diameter:  
Core insulation:  
Core colours:  
Stranding element:  
Shielding 1:  
Shielding 2:  
Total shielding:  
Outer sheath material:  
Cable external diameter:  
Outer sheath colour:

## Fixed installation, indoor 3x2x0.22 mm<sup>2</sup>

Copper, bare (AWG 24/7)  
PE  
wh/bn, gn/rd, ye/gn  
Double core  
Polyester foil over stranded bundle  
Polyester foil, aluminium-lined  
Cu braid, bare  
PE  
app. 7,0 mm ± 0,3 mm  
Pastel turquoise similar to RAL 6034

## Electrical data

Characteristic impedance:  
Conductor resistance, max.:  
Insulation resistance, min.:  
Loop resistance:  
Mutual capacitance:  
Test voltage:  
Attenuation:

100 Ohm ± 15 Ohm  
96 Ohm/km  
1 GOhm x km  
192 Ohm/km max.  
50 nF/km nom.  
1 kV  
256 kHz < 1,5 dB/100m  
772 kHz < 2,4 dB/100m  
1 MHz < 2,7 dB/100m  
4 MHz < 5,2 dB/100m  
10 MHz < 8,4 dB/100m  
16 MHz < 11,2 dB/100m  
20 MHz < 11,9 dB/100m

## Technical data

Weight:  
bending radius, repeated:  
Operating temperature range min.:  
Operating temperature range max.:  
Caloric load, approx. value:  
Copper weight:

app. 67 kg/km  
110 mm  
-25°C  
+60°C  
1,10 MJ/m  
35,00 kg/km

## Norms

Applicable standards:

interbus specification 2.0, IEC61158  
Halogen-free acc. to 60754-2

## Application

HELUKABEL® I-Bus is halogen-free and designed for fixed installation in buildings in an Interbus network. The cable is used in dry areas where its halogen-free construction is a major aspect.

## Part no.

**81557**, I-BUS

Dimensions and specifications may be changed without prior notice.

R



# BUS Cables

I-BUS



Drag Chain



## Type Cable structure

Inner conductor diameter:  
Inner conductor diameter 2:  
Core insulation:  
Core insulation 2:  
Core colours:  
Core colours 2:  
Stranding element:  
Shielding 1:  
Shielding 2:  
Total shielding:  
Outer sheath material:  
Cable external diameter:  
Outer sheath colour:

## Drag chain applications 3x2x0.25 mm<sup>2</sup>

Copper, bare (AWG 24/19)  
-  
PE  
-  
wh/bn, gn/rd, ye/gn  
-  
Double core  
Polyester foil over stranded bundle  
-  
Cu braid, bare  
PUR  
app. 7,6 mm ± 0,3 mm  
Pastel turquoise similar to RAL 6034

## Drag chain applications 3x2x0.25 mm<sup>2</sup> + 3x1.0 mm<sup>2</sup>

Copper, bare (AWG 24/19)  
Copper, bare (AWG 17/56)  
PE  
PE  
wh/bn, gn/rd, ye/gn  
bu, rd, gnye  
Double core  
Polyester foil over stranded bundle  
-  
Cu braid, bare  
PUR  
app. 8,6 mm ± 0,3 mm  
Violet similar to RAL 4001

## Electrical data

Characteristic impedance:  
Conductor resistance, max.:  
Insulation resistance, min.:  
Loop resistance:  
Mutual capacitance:  
Test voltage:  
Attenuation:

100 Ohm ± 15 Ohm  
96 Ohm/km  
1 GOhm x km  
192 Ohm/km max.  
60 nF/km nom.  
1 kV  
256 kHz < 1,5 dB/100m  
772 kHz < 2,4 dB/100m  
1 MHz < 2,7 dB/100m  
4 MHz < 5,2 dB/100m  
10 MHz < 8,4 dB/100m  
16 MHz < 11,2 dB/100m  
20 MHz < 11,9 dB/100m

100 Ohm ± 15 Ohm  
96 Ohm/km  
1 GOhm x km  
192 Ohm/km max.  
60 nF/km nom.  
1 kV  
256 kHz < 1,5 dB/100m  
772 kHz < 2,4 dB/100m  
1 MHz < 2,7 dB/100m  
4 MHz < 5,2 dB/100m  
10 MHz < 8,4 dB/100m  
16 MHz < 11,2 dB/100m  
20 MHz < 11,9 dB/100m

## Technical data

Weight:  
bending radius, repeated:  
Operating temperature range min.:  
Operating temperature range max.:  
Caloric load, approx. value:  
Copper weight:

app. 63 kg/km  
120 mm  
-20°C  
+70°C  
0,937 MJ/m  
36,00 kg/km

app. 92 kg/km  
130 mm  
-20°C  
+70°C  
1,227 MJ/m  
70,00 kg/km

## Norms

Applicable standards:

interbus specification 2.0, IEC61158  
Halogen-free acc. to 60754-2  
Flame-retardant acc. to EN 50265-2-1

interbus specification 2.0, IEC61158  
Halogen-free acc. to 60754-2

## Application

HELUKABEL® I-Bus is designed for guided continuous motion in cable carriers and as strictly a bus cable or a hybrid version (with integrated power supply). Both versions feature a halogen-free PU jacket.

## Part no.

81203, I-BUS

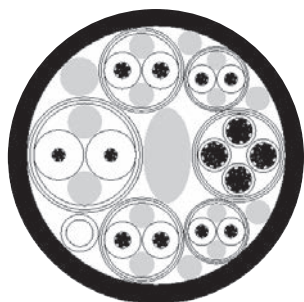
82696, I-BUS

Dimensions and specifications may be changed without prior notice.

# BUS-Cables



Multibus I, high flexible



## Type Cable structure

Profibus:  
DeviceNet™:  
Interbus:  
Power cores:  
Protective earth core:  
Stranding:  
Total shielding:  
Outer sheath material:  
Cable external diameter:  
Outer sheath colour:

## Multibus I, 15 cores high flexible

1 x 2 x AWG 22 mm<sup>2</sup> (Foam-Skin PO/rd/gn)  
2 x 2 x AWG 22 mm<sup>2</sup> (Foam-Skin PO/wh/bn, ye/gn)  
2 x 2 x 0,25 (Foam-Skin PO/ gn/pk, ye/gn)  
4 x 1 x 1,0 mm<sup>2</sup> (PO/rd, bl, bu, bn)  
1,0 mm<sup>2</sup> (PO/gnye)  
Single cores totally stranded together and filled with plastic elements  
PP vlies  
PUR, halogenfree  
app. 14,7 mm  
violet similar to RAL 4001

## Electrical data

Characteristic impedance:

150 + - 15 Ohm (Profibus)  
120 + - 12 Ohm (DeviceNet™)  
100 + - 15 Ohm (Interbus)

Conductor resistance:

<= 20 Ohm/km (power cores + protection core)  
<= 70 Ohm/km (Profibus)  
<= 70 Ohm/km (DeviceNet™)  
<= 80 Ohm/km (Interbus)

Insulation resistance:

&gt;= 500 Mohm x km (at 20° C)

Mutual capacitance:

30 pF/m nominal (Profibus)  
40 pF/m nominal (DeviceNet™)  
50 pF/m nominal (Interbus)

Testvoltage:

2500 V (core/ core)  
1500 V (core/ screen)

## Mechanical data

Bending radius single:  
Bending radius repeated:  
Tensile strength static:  
Tensile strength dynamic:  
Oil resistance:  
Flame resistance:  
FCKW free:  
Self extinguishable:  
Other attributes:

<= 70 mm  
<= 110 mm  
300 N  
140 N  
Diesel, IRM 902, Biohydran TM68, Ecocut HFN 10LE  
IEC 60332-1, VW1/ FT1 acc. C-UL  
yes  
yes  
PVC free, free of lacquer wetting disturbing substances, siliconfree,  
resistant against PVC flexibiliser and cable fat RB1

## Thermal attributes

Operating temperature range:  
Laying temperature range:

- 40° C to + 80° C  
- 30° C to + 80° C

## Norms

Profibus standard, DeviceNet™ standard, Interbus standard

## UL-Style

VW1/ FT1 acc. C-UL, AWM style 20236

## Application

HELUKABEL® Multibus I is highly flexible with a special structure for use in cable carrier applications and robotics (use in acc. with HELU specification) in a PVC-free design. The Multibus I combines the Profibus / DeviceNet™ / Interbus bus systems as well as the power supply in a single hybrid cable.

## Part no.

801652, Multibus I, 15 cores

# BUS-Cables



Multibus II, high flexible



## Type Cable structure

Profibus:	1 x 2 x 0,34 mm <sup>2</sup> (Foam-Skin PO/rd/gn)
DeviceNet™:	4 x 2 x 0,34 mm <sup>2</sup> (Foam-Skin PE/ye, or, wh, bu-ye, or, wh, bu)
Power cores 1:	2 x 1,0 mm <sup>2</sup> (PO/rd, bl)
Power cores 2:	2 x 1,5 mm <sup>2</sup> (PO/bu, bn)
Protective earth core:	1,5 mm <sup>2</sup> (PO/gnye)
Stranding:	Single cores totally stranded together and filled with plastic elements
Total shielding:	PP vlies
Outer sheath material:	PUR, halogenfree
Cable external diameter:	app. 15,0 mm
Outer sheath colour:	violet similar to RAL 4001

## Electrical data

Characteristic impedance:	150 + - 15 Ohm (Profibus) 100 + - 15 Ohm (PROFINet)
Conductor resistance:	<= 20 Ohm/km (power cores + protection core) <= 70 Ohm/km (Profibus) <= 62 Ohm/km (PROFINet)
Insulation resistance:	>= 500 Mohm x km (at 20° C)
Mutual capacitance:	30 pF/m nominal (Profibus) 40 pF/m nominal (PROFINet)
Testvoltage:	2500 V (core/ core) 1500 V (core/ screen)

## Mechanical data

Bending radius single:	<= 70 mm
Bending radius repeated:	<= 110 mm
Tensile strength static:	300 N
Tensile strength dynamic:	140 N
Oil resistance:	Diesel, IRM 902, Biohydran TM68, Ecocut HFN 10LE
Flame resistance:	IEC 60332-1, VW1/ FT1 acc. C-UL
FCKW free:	yes
Self extinguishable:	yes
Other attributes:	PVC free, free of lacquer wetting disturbing substances, siliconfree, resistant against PVC flexibiliser and cable fat RB1

## Thermal attributes

Operating temperature range:	- 40° C to + 80° C
Laying temperature range:	- 20° C to + 80° C

## Norms

Profibus standard, PROFINet standard

VW1/ FT1 acc. C-UL, AWM style 20236

## Application

HELUKABEL® Multibus II is highly flexible with a special structure for use in cable carrier applications and robotics (use in acc. with HELU specification) in a PVC-free design. The Multibus II (further development of Multibus I) combines the Profibus /Profinet bus systems as well as the power supply in a single hybrid cable.

## Part no.

**804115**, Multibus II, 15 cores

# BUS Cables

A-BUS



EPDM



## Type

### Cable structure

Inner conductor:  
Core insulation:  
Core colours:  
Shielding 1:  
Shielding 2:  
Total shielding:  
Outer sheath material:  
Outer sheath colour:

### Actuator Sensor Interface 2x1.5 mm<sup>2</sup>

Copper, tinned  
Rubber compound  
bu, bn  
-  
-  
-  
EPDM  
Yellow similar to RAL 1023

### Actuator Sensor Interface 2x1.5 mm<sup>2</sup>

Copper, tinned  
Rubber compound  
bu, bn  
-  
-  
-  
EPDM  
Black similar to RAL 9005

### Electrical data

Conductor resistance, max.:  
Insulation resistance, min.:  
Loop resistance:  
Nominal voltage:  
Test voltage:

13,7 Ohm/km  
1 GOhm x km  
27 Ohm/km max.  
32 V  
1 kV at 15 min.

13,7 Ohm/km  
1 GOhm x km  
27 Ohm/km max.  
48 V  
1 kV at 15 min.

### Technical data

Weight:  
bending radius, repeated:  
Operating temperature range min.:  
Operating temperature range max.:  
Caloric load, approx. value:  
Copper weight:

app. 70 kg/km  
30 mm  
-40°C  
+85°C  
0,975 MJ/m  
31,00 kg/km

app. 70 kg/km  
30 mm  
-40°C  
+85°C  
0,975 MJ/m  
31,00 kg/km

### Norms

Applicable standards:

ASI standard  
Halogen-free acc. to 60754-2

ASI standard  
Halogen-free acc. to 60754-2

### Application

HELUKABEL® A-Bus EPDM Rubber for normal use in an AS-I system. Applications include wet/dry areas where the properties of a rubber jacket are desired. In addition, this material offers benefits such as low compression forces needed when contacting and the best sealing against the AS-I module.

### Part no.

**80824**, A-BUS EPDM

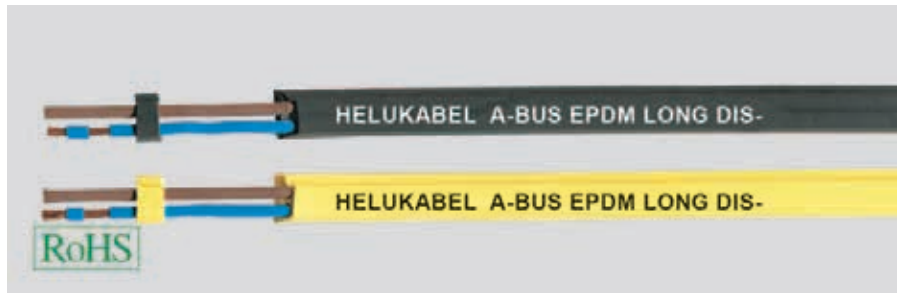
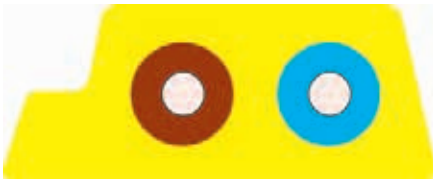
**80825**, A-BUS EPDM

Dimensions and specifications may be changed without prior notice.

R

# BUS Cables

## A-BUS EPDM, Long Distance



### Type Cable structure

Inner conductor:  
Core insulation:  
Core colours:  
Shielding 1:  
Shielding 2:  
Total shielding:  
Outer sheath material:  
Outer sheath colour:

### Industrial Area 2x2.5 mm<sup>2</sup>

Copper, tinned  
Rubber compound  
bu, bn  
-  
-  
-  
EPDM  
Yellow similar to RAL 1023

### Industrial Area 2x2.5 mm<sup>2</sup>

Copper, tinned  
Rubber compound  
bu, bn  
-  
-  
-  
EPDM  
Black similar to RAL 9005

### Electrical data

### Technical data

Weight:  
bending radius, repeated:  
Operating temperature range min.:  
Operating temperature range max.:  
Caloric load, approx. value:  
Copper weight:

app. 130 kg/km  
35 mm  
-40°C  
+85°C  
0,70 MJ/m  
49,00 kg/km

app. 130 kg/km  
30 mm  
-40°C  
+85°C  
0,70 MJ/m  
49,00 kg/km

### Norms

Applicable standards:

ASI standard  
Halogen-free acc. to 60754-2

ASI standard  
Halogen-free acc. to 60754-2

### Application

HELUKABEL® A-Bus Long Distance EPDM Rubber 2,5mm<sup>2</sup> for normal use in an AS-I system. The enlarged cross-section allows bigger transmission distances, higher ampacity and this results in savings of supplementary power packs. Applications include wet/dry areas where the properties of a rubber jacket are desired. In addition, this material offers benefits such as low compression forces needed when contacting and the best sealing against the AS-I module.

### Part no.

**804408**, A-BUS EPDM

**804409**, A-BUS EPDM

Dimensions and specifications may be changed without prior notice.



# BUS Cables

A-BUS



PUR, UL/CSA



## Type Cable structure

Inner conductor:  
Core insulation:  
Core colours:  
Shielding 1:  
Shielding 2:  
Total shielding:  
Outer sheath material:  
Outer sheath colour:

## Actuator Sensor Interface 2x1.5 mm<sup>2</sup>

Copper, tinned  
PO  
bu, bn  
-  
-  
-  
PUR  
Yellow similar to RAL 1023

## Actuator Sensor Interface 2x1.5 mm<sup>2</sup>

Copper, tinned  
PO  
bu, bn  
-  
-  
-  
PUR  
Black similar to RAL 9005

## Electrical data

Conductor resistance, max.: 13,7 Ohm/km  
Insulation resistance, min.: 1 GOhm x km  
Loop resistance: 27 Ohm/km max.  
Nominal voltage: 32 V  
Test voltage: 1 kV at 15 min.

13,7 Ohm/km  
1 GOhm x km  
27 Ohm/km max.  
48 V  
1 kV at 15 min.

## Technical data

Weight: app. 64 kg/km  
bending radius, repeated: 30 mm  
Operating temperature range min.: -40°C  
Operating temperature range max.: +80°C  
Caloric load, approx. value: 0,965 MJ/m  
Copper weight: 31,00 kg/km

app. 64 kg/km  
30 mm  
-40°C  
+80°C  
0,965 MJ/m  
31,00 kg/km

## Norms

Applicable standards:

ASI standard  
Halogen-free acc. to 60754-2  
Flame-retardant acc. to IEC 60332-1  
AWM Style 20549  
CSA FT2

ASI standard  
Halogen-free acc. to 60754-2  
Flame-retardant acc. to IEC 60332-1  
AWM Style 20549  
CSA FT2

## Application

HELUKABEL® A-Bus PU is ideal for use in wet/dry areas thanks to its outstanding characteristics when exposed to common coolants/lubricants. This version can also be used in cable carriers (special installation conditions must be observed: place wide cable side on inside radius, use partitions and install flat/round cables separately). These types are approved for use in the American market (UL 1581, FT2) thanks to use of special materials.

## Part no.

82434, A-BUS PUR

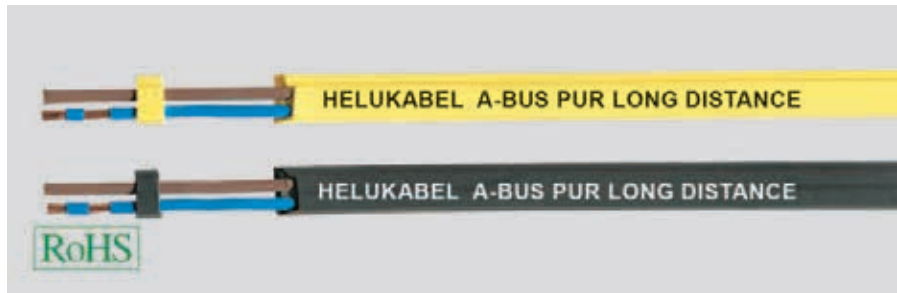
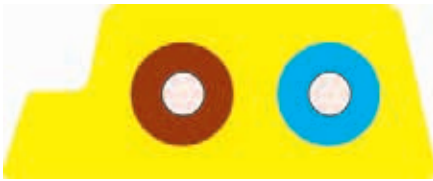
82822, A-BUS PUR

Dimensions and specifications may be changed without prior notice.

R

# BUS Cables

**A-BUS PUR 2X2.5 PUR, Long Distance, UL/CSA**



## Type Cable structure

Inner conductor:  
Core insulation:  
Core colours:  
Shielding 1:  
Shielding 2:  
Total shielding:  
Outer sheath material:  
Outer sheath colour:

## Drag chain applications 2x2.5 mm<sup>2</sup>

Copper, tinned  
PO  
bu, bn  
-  
-  
-  
PUR  
Yellow similar to RAL 1023

## Drag chain applications 2x1.5 mm<sup>2</sup>

Copper, tinned  
PO  
bu, bn  
-  
-  
-  
PUR  
Black similar to RAL 9005

## Electrical data

Conductor resistance, max.:  
Loop resistance:  
Nominal voltage:

8,21 Ohm/km  
16 Ohm/km max.  
32 V

8,21 Ohm/km  
16 Ohm/km max.  
48 V

## Technical data

Weight:  
bending radius, repeated:  
Operating temperature range min.:  
Operating temperature range max.:  
Caloric load, approx. value:  
Copper weight:

app. 140 kg/km  
30 mm  
-40°C  
+80°C  
0,90 MJ/m  
49,00 kg/km

app. 140 kg/km  
30 mm  
-40°C  
+80°C  
0,90 MJ/m  
49,00 kg/km

## Norms

Applicable standards:

ASI standard  
Halogen-free acc. to 60754-2  
Flame-retardant CSA FT2  
AWM Style 20549  
CSA FT2

ASI standard  
Halogen-free acc. to 60754-2  
Flame-retardant CSA FT2  
AWM Style 20549  
CSA FT2

## Application

AS components are interconnected with this special system cable. With the AS interface, the cable assembly from the control system to the sensor/actuator is not needed. The AS interface is the field bus system that transmits both data and power in one single cable. With fast contacting in penetration technique, the possibility of errors in cabling is largely reduced. The special outer jacket provides protection against oil, grease, and refrigerant lubricants, and the cable is therefore even suitable for applications in wet surroundings, in machinery and plant construction, as well as in the machine tool and automotive industry. The PUR variant is suitable for heavy-duty industrial environments.

Because of the cross section 2,5qmm it is possible to realize longer distances.

These types are certified for the American market (UL 1581, FT2) through the use of special materials.

## Part no.

**804410**, A-BUS PUR

**804411**, A-BUS PUR

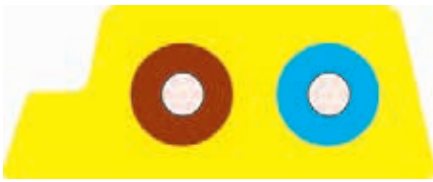
Dimensions and specifications may be changed without prior notice.

# BUS Cables

A-BUS



TPE



## Type

### Cable structure

Inner conductor:  
Core insulation:  
Core colours:  
Shielding 1:  
Shielding 2:  
Total shielding:  
Outer sheath material:  
Outer sheath colour:

### Actuator Sensor Interface 2x1.5 mm<sup>2</sup>

Copper, tinned  
TPE  
bu, bn  
-  
-  
-  
TPE  
Yellow

### Actuator Sensor Interface 2x1.5 mm<sup>2</sup>

Copper, tinned  
TPE  
bu, bn  
-  
-  
-  
TPE  
Black

### Electrical data

Conductor resistance, max.:  
Insulation resistance, min.:  
Loop resistance:  
Nominal voltage:  
Test voltage:

13,7 Ohm/km  
1 GOhm x km  
27 Ohm/km max.  
32 V  
1,5 kV at 15 min.

13,7 Ohm/km  
1 GOhm x km  
27 Ohm/km max.  
48 V  
1,5 kV at 15 min.

### Technical data

Weight:  
bending radius, repeated:  
Operating temperature range min.:  
Operating temperature range max.:  
Caloric load, approx. value:  
Copper weight:

app. 70 kg/km  
24 mm  
-40°C  
+105°C  
1,10 MJ/m  
31,00 kg/km

app. 70 kg/km  
24 mm  
-40°C  
+105°C  
1,10 MJ/m  
31,00 kg/km

### Norms

Applicable standards:

ASI standard  
Flame-retardant acc. to IEC 60332-1

ASI standard  
Flame-retardant acc. to IEC 60332-1

### Application

HELUKABEL® A-Bus TPE for demanding temperature requirements up to 105 °C and flame retardance. The special outer sheath makes the cable resistant to many oils, greases and cooling lubricants and thus suitable for applications in wet surroundings, in machinery and plant construction as well as the machine tool and automotive industries.

### Part no.

801846, A-BUS TPE

801847, A-BUS TPE

Dimensions and specifications may be changed without prior notice.

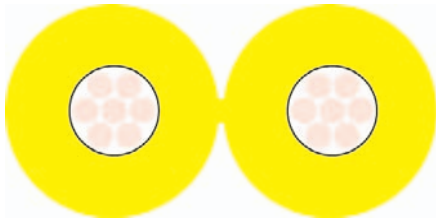
R

# BUS Cables

## AS-Interface



Electrical Cabinet FLIH



### Type Cable structure

Inner conductor:  
Shielding 1:  
Shielding 2:  
Total shielding:  
Outer sheath material:  
Outer sheath colour:

### Fixed installation, indoor 2x0,86/ 2,5

Copper, tinned  
-  
-  
-  
FRNC  
Yellow

### Electrical data

Characteristic impedance: 105 Ohm  $\pm$  35 Ohm  
Conductor resistance, max.: 23 Ohm/km  
Insulation resistance, min.: 0,01 GOhm x km  
Loop resistance: 46 Ohm/km max.  
Nominal voltage: 300 V  
Test voltage: 2 kV at 15 min.

### Technical data

Weight: app. 24 kg/km  
bending radius, repeated: 30 mm  
Operating temperature range min.: -25°C  
Operating temperature range max.: +70°C  
Caloric load, approx. value: 0,30 MJ/m  
Copper weight: 20,00 kg/km

### Norms

Applicable standards: ASI standard  
Halogen-free acc. to 60754-2  
Flame-retardant acc. to IEC 60332-1  
UL Style: UL Style 2444

### Application

HELUKABEL® AS-Interface FLIH for electrical cabinet applications, especially for wiring inside electrical cabinets. Compared to "normal" AS-I wire, less space is needed and routing is improved. This cable is also designed for appropriate fast contacting through use of the penetration technique. Special modules for electrical cabinets that are compatible with this wire are available on the market.

### Part no.

**802183**, AS-Interface FLIH

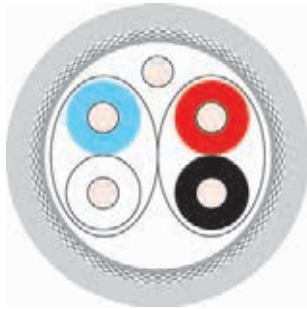
Dimensions and specifications may be changed without prior notice.

# BUS Cables

DeviceNet™



PVC



## Type Cable structure

Inner conductor diameter 1:  
Inner conductor diameter 2:  
Core insulation 1:  
Core insulation 2:  
Core colours 1:  
Core colours 2:  
Stranding element 1:  
Shielding 1:  
Shielding 2:  
Total shielding:  
Drain wire:  
Outer sheath material:  
Cable external diameter:  
Outer sheath colour:

## Electrical data

Characteristic impedance:  
Conductor resistance, max.:  
Insulation resistance, min.:  
Loop resistance:  
Mutual capacitance:  
Test voltage:  
Attenuation:

## Technical data

Weight:  
bending radius, repeated:  
Operating temperature range min.:  
Operating temperature range max.:  
Caloric load, approx. value:  
Copper weight:

## Norms

Applicable standards:  
  
UL Style:  
CSA standard:

## Application

HELUKABEL® DeviceNet™ PVC for fixed installation. The special aspect of this bus system is that a data pair and a power supply pair are **always** integrated in one cable. The small cross-section is used for short distances or as a point-to-point connection; the large cross-section as main conductor for long distances and frequently in combination with the thin conductor as drain wire.

## Part no.

Dimensions and specifications may be changed without prior notice.

## Fixed installation, indoor 1x2xAWG18 + 1x2xAWG15

Copper, tinned (AWG 18/19)  
Copper, tinned (AWG 15/19)  
Foam-skin-PE  
PVC  
light bu, wh  
rd, bk  
Double core  
-  
Polyester foil, aluminium-lined  
Cu braid, tinned  
yes  
PVC  
app. 12,2 mm ± 0,3 mm  
Grey

120 Ohm ± 10 %  
22,6 Ohm/km  
0,2 GOhm x km  
45 Ohm/km max.  
39,8 nF/km nom.  
2 kV  
125 kHz < 0,42 dB/100m  
500 kHz < 0,81 dB/100m

app. 192 kg/km  
190 mm  
-20°C  
+80°C  
2,92 MJ/m  
88,00 kg/km

ODVA DeviceNet™  
Flame-retardant acc. to EN 50265-2-1  
CMG 75°C PLTC FT4  
CEC: CMG FT4

## Fixed installation, indoor 1x2xAWG24 + 1x2xAWG22

Copper, tinned (AWG 24/19)  
Copper, tinned (AWG 22/19)  
Foam-skin-PE  
PVC  
light bu, wh  
rd, bk  
Double core  
-  
Polyester foil, aluminium-lined  
Copper shifting, tinned  
yes  
PVC  
app. 6,9 mm ± 0,3 mm  
Grey

120 Ohm ± 10 %  
90 Ohm/km  
0,2 GOhm x km  
180 Ohm/km max.  
39,8 nF/km nom.  
2 kV  
125 kHz < 0,95 dB/100m  
500 kHz < 1,64 dB/100m

app. 67 kg/km  
110 mm  
-20°C  
+80°C  
0,91 MJ/m  
35,00 kg/km

ODVA DeviceNet™  
Flame-retardant acc. to EN 50265-2-1  
CMG 75°C PLTC FT4  
CSA FT 4

**800683**, DeviceNet™ PVC

**800684**, DeviceNet™ PVC

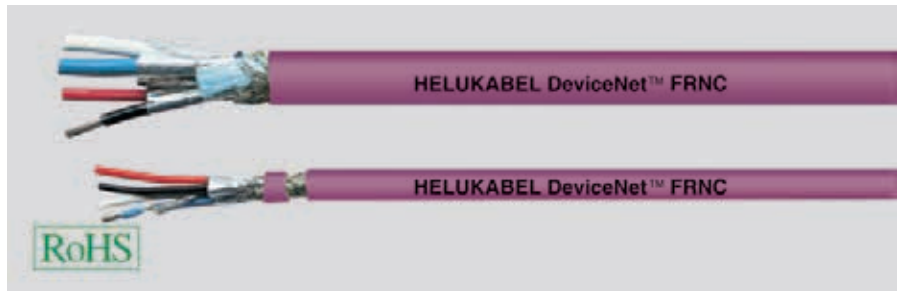


# BUS Cables

DeviceNet™

**HELUKABEL**

FRNC



## Type Cable structure

Inner conductor diameter 1:  
Inner conductor diameter 2:  
Core insulation 1:  
Core insulation 2:  
Core colours 1:  
Core colours 2:  
Stranding element 1:  
Shielding 1:  
Shielding 2:  
Total shielding:  
Drain wire:  
Outer sheath material:  
Cable external diameter:  
Outer sheath colour:

## Fixed installation, indoor 1x2xAWG18 + 1x2xAWG15

Copper, tinned (AWG 18/19)  
Copper, tinned (AWG 15/19)  
Cell PE  
PE  
light bu, wh  
rd, bk  
Double core  
-  
Polyester foil, aluminium-lined  
Cu braid, tinned  
yes  
FRNC  
app. 12,2 mm ± 0,3 mm  
Violet similar to RAL 4001

## Fixed installation, indoor 1x2xAWG24 + 1x2xAWG22

Copper, tinned (AWG 24/19)  
Copper, tinned (AWG 22/19)  
Cell PE  
PE  
light bu, wh  
rd, bk  
Double core  
-  
Polyester foil, aluminium-lined  
Cu braid, tinned  
yes  
FRNC  
app. 6,9 mm ± 0,3 mm  
Violet similar to RAL 4001

## Electrical data

Characteristic impedance:  
Conductor resistance, max.:  
Insulation resistance, min.:  
Loop resistance:  
Mutual capacitance:  
Test voltage:  
Attenuation:

120 Ohm ± 10 %  
22,6 Ohm/km  
0,2 GOhm x km  
45 Ohm/km max.  
39 nF/km nom.  
2 kV  
125 kHz < 0.42 dB/100m  
500 kHz < 0.81 dB/100m

120 Ohm ± 10 %  
90 Ohm/km  
0,2 GOhm x km  
180 Ohm/km max.  
39,8 nF/km nom.  
2 kV  
125 kHz < 0.95 dB/100m  
500 kHz < 1.64 dB/100m

## Technical data

Weight:  
bending radius, repeated:  
Operating temperature range min.:  
Operating temperature range max.:  
Caloric load, approx. value:  
Copper weight:

app. 195 kg/km  
190 mm  
-25°C  
+80°C  
2,73 MJ/m  
88,00 kg/km

app. 70 kg/km  
110 mm  
-25°C  
+80°C  
0,82 MJ/m  
34,00 kg/km

## Norms

Applicable standards:

ODVA DeviceNet™  
Halogen-free acc. to 60754-2  
Flame-retardant acc. to EN 50265-2-1  
CL2 CMG  
CEC: CMG FT4

ODVA DeviceNet™  
Halogen-free acc. to 60754-2  
Flame-retardant acc. to EN 50265-2-1  
CL2 CMG  
CEC: CMG FT4

## Application

HELUKABEL® DeviceNet™ FRNC for fixed installation in areas where high flame retardance and a halogen-free design are needed. The special aspect of this bus system is that a data pair and a power supply pair are **always** integrated in one cable. The small cross-section is used for short distances or as a point-to-point connection; the large cross-section as main conductor for long distances and frequently in combination with the thin conductor as drain wire.

## Part no.

**800681**, DeviceNet™ FRNC

**800682**, DeviceNet™ FRNC

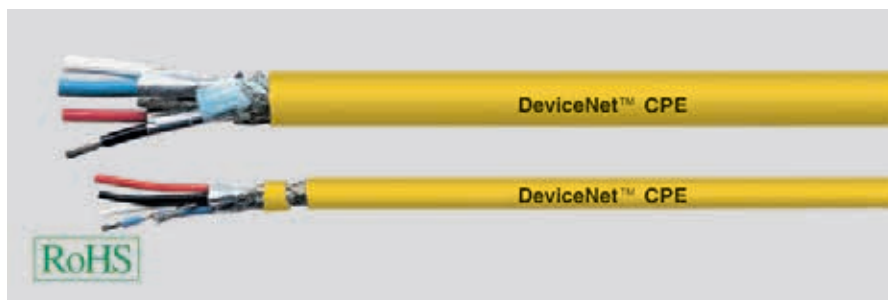
Dimensions and specifications may be changed without prior notice.

# BUS Cables

DeviceNet™



CPE



## Type Cable structure

Inner conductor diameter 1:  
Inner conductor diameter 2:  
Core insulation 1:  
Core insulation 2:  
Core colours 1:  
Core colours 2:  
Stranding element 1:  
Shielding 1:  
Shielding 2:  
Total shielding:  
Drain wire:  
Outer sheath material:  
Cable external diameter:  
Outer sheath colour:

## Electrical data

Characteristic impedance:  
Conductor resistance, max.:  
Insulation resistance, min.:  
Loop resistance:  
Mutual capacitance:  
Test voltage:  
Attenuation:

## Technical data

Weight:  
bending radius, repeated:  
Operating temperature range min.:  
Operating temperature range max.:  
Caloric load, approx. value:  
Copper weight:

## Norms

Applicable standards:

UL Style:

CSA standard:

## Application

HELUKABEL® DeviceNet™ CPE for fixed installation with very high flame-retardance requirements. The special aspect of this bus system is that a data pair and a power supply pair are **always** integrated in one cable. The small cross-section is used for short distances or as a point-to-point connection; the large cross-section as main conductor for long distances and frequently in combination with the thin conductor as drain wire.

## Part no.

Dimensions and specifications may be changed without prior notice.

## Fixed installation, indoor 1x2xAWG18 + 1x2xAWG15

Copper, tinned (AWG 18/19)  
Copper, tinned (AWG 15/19)  
Cell PE  
PE  
light bu, wh  
rd, bk  
Double core  
-  
Polyester foil, aluminium-lined  
Cu braid, tinned  
yes  
CPE  
app. 12,0 mm ± 0,3 mm  
Yellow

120 Ohm ± 10 %  
22,6 Ohm/km  
0,2 GOhm x km  
45 Ohm/km max.  
39 nF/km nom.  
2 kV  
125 kHz < 0,43 dB/100m  
500 kHz < 0,82 dB/100m

app. 195 kg/km  
190 mm  
-20°C  
+60°C  
2,73 MJ/m  
71,20 kg/km

ODVA DeviceNet™  
Flame-retardant acc. to EN 50265-2-1  
CMG PLTC  
CEC: CMG FT4

## Fixed installation, indoor 1x2xAWG24 + 1x2xAWG22

Copper, tinned (AWG 24/19)  
Copper, tinned (AWG 22/19)  
PE  
PVC  
light bu, wh  
rd, bk  
Double core  
-  
Polyester foil, aluminium-lined  
Cu braid, tinned  
yes  
CPE  
app. 7,0 mm ± 0,3 mm  
Yellow

120 Ohm ± 10 %  
90 Ohm/km  
0,2 GOhm x km  
180 Ohm/km max.  
39 nF/km nom.  
2 kV  
125 kHz < 0,95 dB/100m  
500 kHz < 1,64 dB/100m

app. 70 kg/km  
110 mm  
-20°C  
+60°C  
0,82 MJ/m  
28,10 kg/km

ODVA DeviceNet™  
Flame-retardant acc. to EN 50265-2-1  
CL2 CMG  
CEC: CMG FT4

**81907**, DeviceNet™ CPE

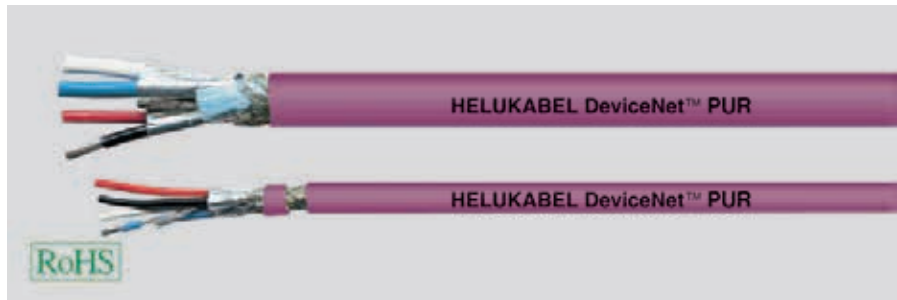
**81908**, DeviceNet™ CPE

# BUS Cables

DeviceNet™

**HELUKABEL**

PUR, high flexible



## Type Cable structure

Inner conductor diameter 1:  
Inner conductor diameter 2:  
Core insulation 1:  
Core insulation 2:  
Core colours 1:  
Core colours 2:  
Stranding element 1:  
Shielding 1:  
Shielding 2:  
Total shielding:  
Drain wire:  
Outer sheath material:  
Cable external diameter:  
Outer sheath colour:

## Drag chain applications 1x2xAWG18 + 1x2xAWG15

Copper, tinned (AWG 18/40)  
Copper, tinned (AWG 15/84)  
Cell PE  
PE  
light bu, wh  
rd, bk  
Double core  
-  
Polyester foil, aluminium-lined  
Cu braid, tinned  
yes  
PUR  
app. 12,2 mm ± 0,3 mm  
Violet similar to RAL 4001

## Drag chain applications 1x2xAWG24 + 1x2xAWG22

Copper, tinned (AWG 24/19)  
Copper, tinned (AWG 22/19)  
Cell PE  
PE  
light bu, wh  
rd, bk  
Double core  
-  
Polyester foil, aluminium-lined  
Cu braid, tinned  
yes  
PUR  
app. 6,9 mm ± 0,3 mm  
Violet similar to RAL 4001

## Electrical data

Characteristic impedance:  
Conductor resistance, max.:  
Insulation resistance, min.:  
Loop resistance:  
Mutual capacitance:  
Test voltage:  
Attenuation:

120 Ohm ± 10 %  
22,6 Ohm/km  
0,2 GOhm x km  
45 Ohm/km max.  
39,8 nF/km nom.  
2 kV  
125 kHz < 0,41 dB/100m  
500 kHz < 0,82 dB/100m

120 Ohm ± 10 %  
90 Ohm/km  
0,2 GOhm x km  
45 Ohm/km max.  
39,8 nF/km nom.  
2 kV  
125 kHz < 0,95 dB/100m  
500 kHz < 1,64 dB/100m

## Technical data

Weight:  
bending radius, repeated:  
Operating temperature range min.:  
Operating temperature range max.:  
Caloric load, approx. value:  
Copper weight:

app. 185 kg/km  
61 mm  
-40°C  
+80°C  
2,54 MJ/m  
90,00 kg/km

app. 68 kg/km  
70 mm  
-40°C  
+80°C  
0,76 MJ/m  
35,00 kg/km

## Norms

Applicable standards:

ODVA DeviceNet™  
Halogen-free acc. to 60754-2  
Flame-retardant acc. to EN 50265-2-1  
CMX 75°C CL2X

ODVA DeviceNet™  
Halogen-free acc. to 60754-2  
Flame-retardant acc. to EN 50265-2-1  
CMX 75°C CL2X

## Application

HELUKABEL® DeviceNet™ PU highly flexible for use in cable carriers with outstanding resistance to common coolants/lubricants. The special aspect of this bus system is that a data pair and a power supply pair are **always** integrated in one cable. The small cross-section is used for short distances or as a point-to-point connection; the large cross-section as main conductor for long distances and frequently in combination with the thin conductor as drain wire.

## Part no.

**81909**, DeviceNet™ PUR

**81910**, DeviceNet™ PUR

Dimensions and specifications may be changed without prior notice.

# BUS Cables

## CC-Link BUS



PVC



### Type Cable structure

Inner conductor diameter:  
Core insulation:  
Core colours:  
Stranding element:  
Shielding 1:  
Shielding 2:  
Total shielding:  
Drain wire:  
Outer sheath material:  
Cable external diameter:  
Outer sheath colour:

### Fixed installation, indoor 3x0.5 mm<sup>2</sup>

Copper, bare (AWG 20/7)  
Foam-skin-PE  
wh, bu, ye  
Triple core  
Polyester foil over stranded bundle  
Polyester foil, aluminium-lined  
Cu braid, tinned  
yes  
PVC  
app. 7,7 mm ± 0,3 mm  
Red

### Electrical data

Characteristic impedance:  
Conductor resistance, max.:  
Insulation resistance, min.:  
Loop resistance:  
Mutual capacitance:  
Test voltage:  
Attenuation:

110 Ohm ± 15 Ohm  
37,8 Ohm/km  
10 GOhm x km  
75 Ohm/km max.  
60 nF/km nom.  
2 kV  
1 MHz < 16,0 dB/100m  
5 MHz < 35,0 dB/100m

### Technical data

Weight:  
bending radius, repeated:  
Operating temperature range min.:  
Operating temperature range max.:  
Caloric load, approx. value:  
Copper weight:

app. 77 kg/km  
120 mm  
-40°C  
+75°C  
1,10 MJ/m  
40,00 kg/km

### Norms

Applicable standards:  
UL Style:  
CSA standard:

CC-Link Specification 1.10  
Flame-retardant acc. to EN 50265-2-1  
CM 75°C or PLTC  
CSA FT 4

### Application

HELUKABEL® CC-Link Bus PVC for fixed installation. The primary market is Asia, but the USA and the United Kingdom are using CC-Link increasingly. The cable has the appropriate approvals for these markets. A version with power supply conductors is optionally available. It is used particularly in channels.

### Part no.

**800497**, CC-Link communications cable

Dimensions and specifications may be changed without prior notice.

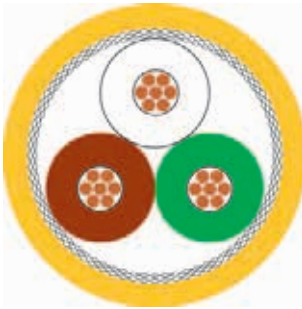
R

# BUS Cables

SafetyBUS

**HELUKABEL®**

FRNC + PUR



## Type Cable structure

Inner conductor diameter:  
Core insulation:  
Core colours:  
Stranding element:  
Shielding 1:  
Shielding 2:  
Total shielding:  
Outer sheath material:  
Cable external diameter:  
Outer sheath colour:

## Fixed installation, indoor 3x0,75 mm<sup>2</sup> (stranded)

Copper, bare (AWG 18/24)  
Foam-skin-PE  
wh, bn, gn  
Triple core  
Polyester foil over stranded bundle  
-  
Cu braid, tinned  
FRNC  
app. 7,5 mm ± 0,3 mm  
Yellow similar to RAL 1003

## Drag chain applications 3x0,75 mm<sup>2</sup> (stranded)

Copper, bare (AWG 18)  
Foam-skin-PE  
wh, bn, gn  
Triple core  
Polyester foil over stranded bundle  
-  
Cu braid, tinned  
PUR  
app. 7,8 mm ± 0,2 mm  
Yellow similar to RAL 1003

## Electrical data

Characteristic impedance:  
Conductor resistance, max.:  
Insulation resistance, min.:  
Loop resistance:  
Mutual capacitance:  
Nominal voltage:  
Test voltage:  
Attenuation:

110 Ohm ± 10 Ohm  
27,7 Ohm/km  
5 GOhm x km  
52 Ohm/km max.  
45 nF/km nom.  
250 V  
3 kV  
1 MHz < 1,6 dB/Km  
5 MHz < 3,4 dB/Km  
10 MHz < 5,6 dB/Km  
16 MHz < 7,5 dB/Km

110 Ohm ± 10 Ohm  
26 Ohm/km  
5 GOhm x km  
52 Ohm/km max.  
45 nF/km nom.  
250 V  
3 kV  
1 MHz < 1,6 dB/Km  
5 MHz < 3,4 dB/Km  
10 MHz < 5,6 dB/Km  
16 MHz < 7,5 dB/Km

## Technical data

Weight:  
bending radius, repeated:  
Operating temperature range min.:  
Operating temperature range max.:  
Caloric load, approx. value:  
Copper weight:

app. 68 kg/km  
75 mm  
-25°C  
+80°C  
0,72 MJ/m  
50,00 kg/km

app. 65 kg/km  
80 mm  
-30°C  
+80°C  
0,76 MJ/m  
50,00 kg/km

## Norms

Applicable standards:

abuttet at SafetyBUS p technical guidelines  
copper wires 1.0  
Halogen-free acc. to 60754-2  
Flame-retardant acc. to IEC 60332-3  
-

abuttet at SafetyBUS p technical guidelines  
copper wires 1.0  
Halogen-free acc. to 60754-2  
Flame-retardant acc. to IEC 60332-1  
CMX 75°C (shielded)

UL Style:

## Application

HELUKABEL® SafetyBUS FRNC for fixed installation; the PU version is intended for use in cable carriers. Both versions are halogen-free.

## Part no.

**800651**, SafetyBus p

**800652**, SafetyBus p

Dimensions and specifications may be changed without prior notice.



# BUS Cables

LON BUS

**HELUKABEL®**

H122 + Y116



## Type Cable structure

Inner conductor diameter:  
Core insulation:  
Core colours:  
Stranding element:  
Shielding 1:  
Shielding 2:  
Total shielding:  
Drain wire:  
Outer sheath material:  
Cable external diameter:  
Outer sheath colour:

## Electrical data

Characteristic impedance:  
Conductor resistance, max.:  
Insulation resistance, min.:  
Loop resistance:  
Mutual capacitance:  
Nominal voltage:  
Test voltage:

## Technical data

Weight:  
bending radius, repeated:  
Operating temperature range min.:  
Operating temperature range max.:  
Caloric load, approx. value:  
Copper weight:  
Applicable standards:

## Application

HELUKABEL® LON BUS H122 FRNC for fixed installation; version Y116 for mobile applications. For both versions: Use indoors is in fixed installations (H122) and as a patch cable (Y116) and must comply with DIN EN 50090-2-2 (VDE 0892 Part 2-2:1997-06).

## Part no.

Dimensions and specifications may be changed without prior notice.

## Fixed installation, indoor 1x2xAWG 22/1

Copper, tinned (AWG 22/1)  
PE  
wh, bu  
Double core  
Polyester foil over stranded bundle  
-  
Polyester foil, aluminium-lined  
yes  
FRNC  
app. 4,4 mm ± 0,3 mm  
White

100 Ohm ± 10 %  
57 Ohm/km  
5 GOhm x km  
114 Ohm/km max.  
45 nF/km nom.  
125 V  
0,7 kV

app. 25 kg/km  
70 mm  
-20°C  
+75°C  
0,337 MJ/m  
11,00 kg/km  
Halogen-free acc. to 60754-2  
Flame-retardant acc. to IEC 60332-1

## Mobile use 1x2xAWG 16/19

Copper, tinned (AWG 16/19)  
PVC  
wh, bk  
Double core  
Polyester foil over stranded bundle  
-  
-  
-  
PVC  
app. 7,0 mm ± 0,4 mm  
Grey

85 Ohm ± 15 %  
15,8 Ohm/km  
0,02 GOhm x km  
31 Ohm/km max.  
10 nF/km nom.  
300 V  
2 kV

app. 65 kg/km  
85 mm  
-20°C  
+80°C  
1,25 MJ/m  
30,00 kg/km  
Flame-retardant acc. to IEC 60332-1

R

# BUS Cables

E-BUS



PVC



## Type Cable structure

Inner conductor:  
Core insulation:  
Core colours:  
Stranding element:  
Shielding 1:  
Shielding 2:  
Total shielding:  
Drain wire:  
Outer sheath material:  
Cable external diameter:  
Outer sheath colour:

## 2-pairs 2x2x0.8 mm

Copper, bare  
PVC  
wh, ye, rd, bk  
Star quad  
Polyester foil over stranded bundle  
-  
Polyester foil, aluminium-lined  
yes  
PVC  
app. 6,6 mm ± 0,3 mm  
Blue Lilac similar to RAL 4005

## 2-pairs 2x2x0.8 mm

Copper, bare  
PVC  
wh, ye, rd, bk  
Star quad  
Polyester foil over stranded bundle  
-  
Polyester foil, aluminium-lined  
yes  
PVC  
app. 6,6 mm ± 0,3 mm  
Green similar to RAL 6010

## Electrical data

Characteristic impedance:  
Conductor resistance, max.:  
Insulation resistance, min.:  
Loop resistance:  
Mutual capacitance:  
Test voltage:

100 Ohm  
73,2 Ohm/km  
0,1 GOhm x km  
146 Ohm/km max.  
100 nF/km nom.  
4 kV

100 Ohm  
73,2 Ohm/km  
0,1 GOhm x km  
146 Ohm/km max.  
100 nF/km nom.  
4 kV

## Technical data

Weight:  
bending radius, repeated:  
Operating temperature range min.:  
Operating temperature range max.:  
Caloric load, approx. value:  
Copper weight:

app. 64 kg/km  
95 mm  
-30°C  
+70°C  
0,90 MJ/m  
25,00 kg/km

app. 64 kg/km  
95 mm  
-30°C  
+70°C  
0,90 MJ/m  
25,00 kg/km

## Norms

Applicable standards:

EIB standard  
Flame-retardant acc. to EN 50265-2-1

EIB standard  
Flame-retardant acc. to EN 50265-2-1

## Application

HELUKABEL® E-BUS PVC for fixed installation. The E-Bus cable is intended for transmission of bus signals in intelligent building systems. The cables ensure perfect communication in compliance with EIB regulations. They can be installed over, in and under plaster, in conduits and cable channels, in dry, damp and wet rooms as well as outdoors - if protected from direct sunlight. Wiring together with high-power cables is possible without limitation. The EIB bus can be used to control lighting, blinds, heating, ventilation, indicator boards etc.

## Part no.

81081, E-BUS

81663, E-BUS

Dimensions and specifications may be changed without prior notice.

# BUS Cables

E-BUS



FRNC + PVC



## Type Cable structure

Inner conductor:  
Core insulation:  
Core colours:  
Stranding element:  
Shielding 1:  
Shielding 2:  
Total shielding:  
Drain wire:  
Outer sheath material:  
Cable external diameter:  
Outer sheath colour:

## 2-pairs 2x2x0.8 mm

Copper, bare  
PE  
wh, ye, rd, bk  
Star quad  
Polyester foil over stranded bundle  
-  
Polyester foil, aluminium-lined  
yes  
FRNC  
app. 6,6 mm ± 0,3 mm  
Blue Lilac similar to RAL 4005

## 4-pairs 4x2x0.8 mm

Copper, bare  
PVC  
wh, ye, rd, gn, bu, bn, wh, wh  
Double core  
Polyester foil over stranded bundle  
-  
Polyester foil, aluminium-lined  
yes  
PVC  
app. 8,2 mm ± 0,4 mm  
Blue Lilac similar to RAL 4005

## Electrical data

Characteristic impedance:  
Conductor resistance, max.:  
Insulation resistance, min.:  
Loop resistance:  
Mutual capacitance:  
Test voltage:

100 Ohm  
73,2 Ohm/km  
0,1 GOhm x km  
146 Ohm/km max.  
100 nF/km nom.  
4 kV

100 Ohm  
73,2 Ohm/km  
0,1 GOhm x km  
146 Ohm/km max.  
100 nF/km nom.  
4 kV

## Technical data

Weight:  
bending radius, repeated:  
Operating temperature range min.:  
Operating temperature range max.:  
Caloric load, approx. value:  
Copper weight:

app. 54 kg/km  
95 mm  
-30°C  
+70°C  
0,58 MJ/m  
25,00 kg/km

app. 92 kg/km  
120 mm  
-30°C  
+70°C  
1,37 MJ/m  
41,00 kg/km

## Norms

Applicable standards:

EIB standard  
Halogen-free acc. to 60754-2  
Flame-retardant acc. to EN 50265-2-1

EIB standard  
Flame-retardant acc. to EN 50265-2-1

## Application

HELUKABEL® E-BUS FRNC + PVC for fixed installation. If the application requires a halogen-free installation, the FRNC version is the right choice. The E-Bus cable is intended for transmission of bus signals in intelligent building systems. The cables ensure perfect communication in compliance with EIB regulations. They can be installed over, in and under plaster, in conduits and cable channels, in dry, damp and wet rooms as well as outdoors - if protected from direct sunlight. Wiring together with high-power cables is possible without limitation. The EIB bus can be used to control lighting, blinds, heating, ventilation, indicator boards etc.

## Part no.

80826, E-BUS

81077, E-BUS

Dimensions and specifications may be changed without prior notice.

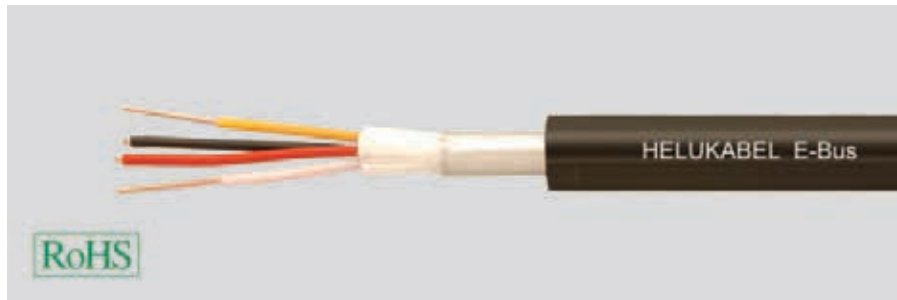
R

# BUS Cables

## E-BUS DIRECT BURIAL



PE, ERD



### Type Cable structure

Inner conductor:  
Core insulation:  
Core colours:  
Stranding element:  
Shielding 1:  
Shielding 2:  
Total shielding:  
Outer sheath material:  
Cable external diameter:  
Outer sheath colour:

### Direct burial 2x2x0.8 mm

Copper, bare  
PE  
wh, ye, rd, bk  
Star quad  
Polyester foil over stranded bundle  
-  
Polyester foil, aluminium-lined  
PE  
app. 8,8 mm ± 0,3 mm  
Black similar to RAL 9005

### Electrical data

Characteristic impedance: 100 Ohm  
Conductor resistance, max.: 73,2 Ohm/km  
Insulation resistance, min.: 5 GOhm x km  
Loop resistance: 146 Ohm/km max.  
Mutual capacitance: 55 nF/km nom.  
Test voltage: 0,8 kV

### Technical data

Weight: app. 75 kg/km  
bending radius, repeated: 130 mm  
Operating temperature range min.: -20°C  
Operating temperature range max.: +70°C  
Caloric load, approx. value: 2,00 MJ/m  
Copper weight: 25,00 kg/km

### Norms

Applicable standards: EIB standard  
Halogen-free acc. to 60754-2

### Application

HELUKABEL® E-BUS ERD with PE jacket for fixed installation in the ground or outdoors and as a connection between buildings or to EIB components on the building. They can be installed over, in and under plaster, in conduits and cable channels, in dry, damp and wet rooms as well as outdoors - if protected from direct sunlight. Wiring together with high-power cables is possible without limitation. The EIB bus can be used to control lighting, blinds, heating, ventilation, indicator boards etc.

### Part no.

**802800**, E-BUS BURIAL

Dimensions and specifications may be changed without prior notice.

# BUS Cables

KH-BUS



PVC + FRNC



## Type Cable structure

Inner conductor, power core:  
Inner conductor, data core:  
Core insulation, power core:  
Core insulation, data core:  
Core colours, power core:  
Core colours, data core:  
Stranding element, data core:  
Shielding, data pair:  
Drain wire:  
Outer sheath material:  
Cable external diameter:  
Outer sheath colour:

## Electrical data

Insulation resistance, min.:  
Mutual capacitance:  
Test voltage:

## Technical data

Weight:  
bending radius, repeated:  
Operating temperature range min.:  
Operating temperature range max.:  
Caloric load, approx. value:  
Copper weight:

## Application

HELUKABEL® KH-BUS PVC + FRNC for fixed installation of patient calling systems. Simple and fast installation is an important factor there. For this reason, a 6-conductor hybrid cable is used to connect the individual components of the calling system. This cable is used for the power supply, speech and data transmission. The FRNC version is the right choice when a halogen-free installation is required.

## Part no.

Dimensions and specifications may be changed without prior notice.

## Hospital-Bus 2x1.5mm<sup>2</sup> (stranded) + 2x2x0.60 mm (solid)

Copper, bare  
Copper, tinned  
PVC  
PE  
rd, bu  
gn/ye, gy/pk  
Double core  
PP foil + aluminium-lined foil + PP foil  
yes  
PVC  
app. 8,0 mm ± 0,3 mm  
Green similar to RAL 6001

0,02 GOhm x km  
70 nF/km nom.  
2 kV

app. 90 kg/km  
120 mm  
-40°C  
+80°C  
1,01 MJ/m  
53,00 kg/km

## Hospital-Bus 2x1.5mm<sup>2</sup> (stranded) + 2x2x0.60 mm (solid)

Copper, bare  
Copper, tinned  
PE  
PE  
rd, bu  
gn/ye, gy/pk  
Double core  
PP foil + aluminium-lined foil + PP foil  
yes  
FRNC  
app. 8,0 mm ± 0,3 mm  
Green similar to RAL 6001

0,02 GOhm x km  
70 nF/km nom.  
2 kV

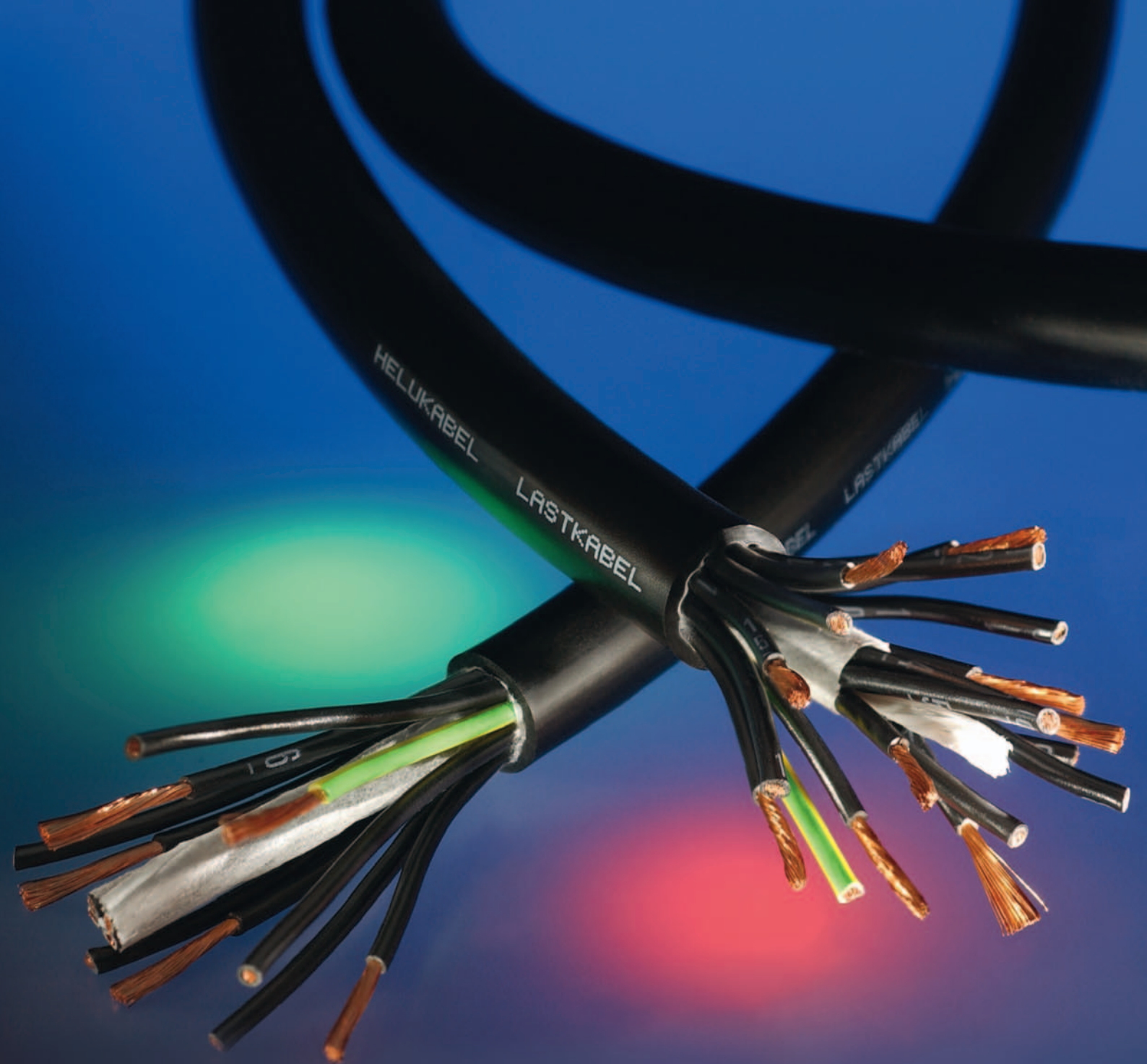
app. 93 kg/km  
120 mm  
-25°C  
+80°C  
0,86 MJ/m  
53,00 kg/km

**81085**, KH-BUS

**81447**, KH-BUS

R





Audio & Light  
Light & Power

HELUSOUND® 600 FRNC halogen-free

**HELUSOUND® 400 PVC**

Speaker cable

HELUSOUND® DMX + Power

# MEDIA TECHNOLOGY

<b>Designation</b>	<b>Properties</b>	<b>Page</b>
Audio	Audio cables with braided shielding	<b>766</b>
Audio	Audio cables, multicore with braided shielding	<b>767</b>
Audio	Audio cables with foil shielding, single pair	<b>768</b>
Audio	Audio cables, multipaired with foil shielding	<b>769</b>
Audio	Audio cables, multipaired, spirally screened pairs and overall braided shielding	<b>770</b>
Audio	Digital audio cables AES/EBU, single pair with spiral screen	<b>771</b>
Audio	Digital audio cables AES/EBU, single pair with foil/braided shielding	<b>772</b>
Audio	Digital audio cables AES/EBU, multipaired, pair and overall foil shielding	<b>773</b>
Audio	Digital audio cables AES/EBU, multipaired, spirally screened pairs and overall foil shielding	<b>774</b>
Audio & Light	AES/EBU & DMX patch cable	<b>775</b>
Audio & Light	AES/EBU & DMX cables	<b>776</b>
Audio & Light	AES/EBU TP DMX 512	<b>777</b>
Audio & Light	DMX cables, multicore with spiral screen	<b>778</b>
Light+Power	DMX-POWER	<b>779</b>
HELUSOUND® DMX + Power		<b>780</b>
Audio	Instrument cables with spiral screen	<b>781</b>
Audio	Microphone cables with spiral screen, paired	<b>782</b>
Audio	Microphone cables with braided shielding	<b>783</b>
Audio	Microphone cables with braided shielding, star quads	<b>784</b>
Speaker cables		<b>785</b>
HELUSOUND® 400 PVC	Speaker cables, round	<b>786</b>
HELUSOUND® 500 PUR		<b>787</b>
HELUSOUND® 600 FRNC, halogen-free		<b>788</b>
Audio	Speaker cables, coaxial	<b>789</b>
Load cables 300/500 V + 600/1000 V		<b>790</b>
Video cables		<b>791</b>
Video	Video cables, multicore	<b>792</b>
Video	Camera cables	<b>793</b>

# Audio

## Audio cables with braided shielding



### Type

#### Cable structure

Conductor material:  
Core insulation:  
Core colours:  
Stranding element:  
Sheath material:  
Cable external diameter:  
Sheath colour:

### HELUSOUND audio cable analog

#### 2x0,25 + 0,25

Copper, bare  
PVC  
rd, wh  
2 cores with 1 filler and 1 earth conductor stranded  
PVC  
approx. 3,4 mm  
black

### Electrical data

Conductor resistance, max.: 75 Ohm/km  
Insulation resistance, min.: 5 MOhm x km

### Technical data

Weight: approx. 20 kg/km  
Min. bending radius for laying: 35 mm  
Operating temperature range min.: -25°C  
Operating temperature range max.: +70°C  
Copper weight: 13,5 kg/km

### Norms

Corrosiveness acc. to EN50267-2-3

Part no.	Cable structure	Conductor resistance Ohm / km	Outer diameter approx. mm	Cop. weight kg / km	Weight approx. kg / km
400000	2x0,25 + 0,25	< 75,0	3,4	13,5	20,0
400001	2x0,33+0,33	< 60,0	4,0	16,3	26,0
400002	2x0,5+0,33	< 36,8	5,6	26,1	49,0

Dimensions and specifications may be changed without prior notice.

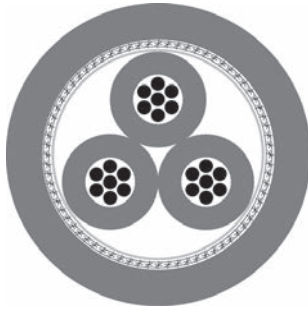
### Application

The HELUSOUND® audio cable is a 2-core, shielded multipurpose cable with earth conductor. It is particularly suitable for use in microphone, radio, studio and transmission systems.  
Analog cable for short transmission distances and low frequencies.

# Audio

Audio cables, multicore, with braided shielding

**HELUSOUND**



## Type

### Cable structure

Conductor material:  
Core insulation:  
Stranding element:  
Sheath material:  
Cable external diameter:  
Sheath colour:

### HELUSOUND audio cable analog 2x0,26

Copper, bare  
PE  
pairs stranded  
PVC  
approx. 5,2 mm  
black

### Electrical data

Conductor resistance, max.: 73,9 Ohm/km  
Insulation resistance, min.: 1 GOhm x km

### Technical data

Weight: approx. 37 kg/km  
Min. bending radius for laying: 52 mm  
Operating temperature range min.: -25°C  
Operating temperature range max.: +70°C  
Copper weight: 16,8 kg/km

### Norms

Corrosiveness acc. to EN50267-2-3

Part no.	Cable structure	Conductor resistance Ohm / km	Outer diameter approx. mm	Cop. weight kg / km	Weight approx. kg / km
400003	2x0,26	< 73,9	5,2	16,8	37,0
400004	2x0,33	< 61,6	5,3	18,2	38,0
400005	4x0,33	< 61,6	5,9	27,2	52,0
400006	2x0,50	< 39,0	5,7	22,0	46,0
400007	2x0,75	< 26,0	7,2	30,0	70,0
400008	3x0,75	< 26,0	7,7	50,0	90,0
400009	4x0,75	< 26,0	8,3	60,0	102,0
400010	5x0,75	< 26,0	8,9	72,0	120,0

Dimensions and specifications may be changed without prior notice.

### Application

The 2-5-core shielded HELUSOUND® audio cable with a common PE core insulation, braided shielding and PVC outer sheath is especially well suited for use in microphone, loudspeaker, radio and transmission systems.

# Audio

## Audio cables with foil shielding, single pair



### Type

#### Cable structure

Conductor material:  
Core insulation:  
Core colours:  
Stranding element:  
Sheath material:  
Cable external diameter:  
Sheath colour:

### Analog audio cables

#### 2x0,22

Copper, tinned  
PE  
rd, bu  
2 cores with 1 filler  
PVC  
approx. 3,4 mm  
black

### Electrical data

Conductor resistance, max.:  
Insulation resistance, min.:

86 Ohm/km  
1 GOhm x km

### Technical data

Weight:  
Min. bending radius for laying:  
Operating temperature range min.:  
Operating temperature range max.:  
Copper weight:

approx. 17 kg/km  
35 mm  
-25°C  
+70°C  
6,6 kg/km

### Norms

Corrosiveness acc. to EN50267-2-3

### Part no.

**400011**

Dimensions and specifications may be changed without prior notice.

### Application

The 2-core HELUSOUND® audio cable is a foil shielded cable with earth conductor. This symmetrical cable is suitable for use in racks and for studio cabling.



# Audio

Audio cables, multipaired, pairs with foil shielding

**HELUSOUND®**



## Type

### Cable structure

Conductor material:  
Core insulation:  
Core colours:  
Stranding element:  
Sheath material:  
Cable external diameter:  
Sheath colour:

## Analog audio cables

### 2x2x0,22

Copper, tinned  
PE  
rd, bu  
pairs stranded  
PVC  
approx. 7,6 mm  
black

## Electrical data

Conductor resistance, max.: 86 Ohm/km  
Insulation resistance, min.: 1 GOhm x km

## Technical data

Weight: approx. 72 kg/km  
Min. bending radius for laying: 76 mm  
Operating temperature range min.: -25°C  
Operating temperature range max.: +70°C  
Copper weight: 15,0 kg/km

## Norms

Corrosiveness acc. to EN50267-2-3

Part no.	Cable structure	Outer diameter approx. mm	Cop. weight kg / km	Weight approx. kg / km
400012	2x2x0,22	7,6	15,0	72,0
400013	4x2x0,22	9,2	29,0	100,0
400014	8x2x0,22	12,2	59,0	179,0
400015	12x2x0,22	14,2	90,0	248,0
400016	16x2x0,22	16,4	111,0	337,0
400017	20x2x0,22	18,4	149,0	421,0
400018	24x2x0,22	20,4	178,0	493,0
400019	32x2x0,22	22,4	238,0	620,0
400020	40x2x0,22	24,6	303,0	759,0

Dimensions and specifications may be changed without prior notice.

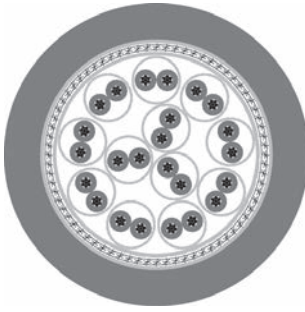
## Application

The HELUSOUND® audio cable is an insulated, multi-core audio cable which is screened symmetrically and in pairs. The cable is particularly suitable for permanent laying in public buildings, such as, e.g. theatres or music stages and for permanent studio installation.

# Audio

Audio cables, multipaired, spirally screened pairs and overall braided shielding

**HELUSOUND**



## Type

### Cable structure

Conductor material:  
Core insulation:  
Stranding element:  
Sheath material:  
Cable external diameter:  
Sheath colour:

## Analog audio cables

### 12x2x0,14

Copper, tinned  
TPE  
pairs stranded  
PUR  
approx. 12,7 mm  
black

## Analog audio cables

### 16x2x0,14

Copper, tinned  
TPE  
pairs stranded  
PUR  
approx. 14,1 mm  
black

## Electrical data

Conductor resistance, max.:  
Insulation resistance, min.:

150 Ohm/km  
100 MOhm x km

150 Ohm/km  
100 MOhm x km

## Technical data

Weight:  
Min. bending radius for laying:  
Operating temperature range min.:  
Operating temperature range max.:  
Copper weight:

approx. 190 kg/km  
127 mm  
-25°C  
+70°C  
118,0 kg/km

approx. 247 kg/km  
142 mm  
-25°C  
+70°C  
165,0 kg/km

## Norms

Halogen-free acc. to 60754-2

Halogen-free acc. to 60754-2

## Part no.

**400042**

**400043**

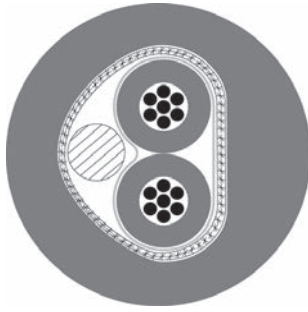
Dimensions and specifications may be changed without prior notice.

## Application

The multipaired HELUSOUND® special sound audio cable has individually shielded pairs and is protected by an additional braided shielding and ribbed PUR sheath. This cable is particularly suitable for use in mobile radio and transmission systems.

# Audio

## AES/EBU digital audio cables, single pair, with spiral screen



### Type

#### Cable structure

Conductor material:  
Core insulation:  
Core colours:  
Stranding element:  
Sheath material:  
Cable external diameter:  
Sheath colour:

### Digital audio cables

#### 2x0,22

Copper, bare  
PE  
rd, bu  
2 cores with 1 earth conductor  
PVC  
approx. 5,0 mm  
black

### Electrical data

Characteristic impedance: 110 Ohm  
Conductor resistance, max.: 86 Ohm/km  
Insulation resistance, min.: 1 GOhm x km

### Technical data

Weight: approx. 35 kg/km  
Min. bending radius for laying: 50 mm  
Operating temperature range min.: -25°C  
Operating temperature range max.: +70°C  
Copper weight: 14,7 kg/km

### Norms

Corrosiveness acc. to EN50267-2-3

### Part no.

**400021**

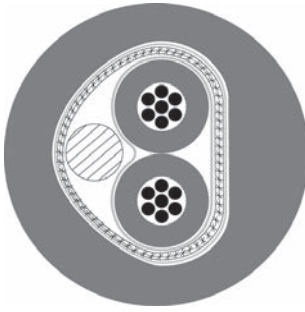
Dimensions and specifications may be changed without prior notice.

### Application

The HELUSOUND® AES/EBU audio cable is a 2-core, symmetrical and shielded digital sound cable with flexible spiral screen and PVC outer sheath. The cable is suitable for longer transmission rates and larger data volumes, the transmission of digital and analog audio signals and can therefore, for example, be used for connecting audio amplifiers, digital mixers, DAT recorders etc. The cable is also available with PUR outer sheath.

# Audio

## AES/EBU digital audio cables, single pair, foil/braided shielding



### Type

#### Cable structure

Conductor material:  
Core insulation:  
Core colours:  
Stranding element:  
Sheath material:  
Cable external diameter:  
Sheath colour:

### Digital audio cables

#### 2x0,22

Copper, tinned  
Cell PE  
rd, bu  
2 cores with 1 earth conductor  
PVC  
approx. 6,0 mm  
black

### Electrical data

Characteristic impedance: 110 Ohm  
Conductor resistance, max.: 86 Ohm/km  
Insulation resistance, min.: 1 GOhm x km

### Technical data

Weight: approx. 43 kg/km  
Min. bending radius for laying: 60 mm  
Operating temperature range min.: -25°C  
Operating temperature range max.: +70°C  
Copper weight: 16,5 kg/km

### Norms

Corrosiveness acc. to EN50267-2-3

Part no.	Cable structure	Screen	Conductor resistance Ohm / km	Outer diameter approx. mm	Cop. weight kg / km	Weight approx. kg / km
400022	2x0,22	Foil + braid	< 86,0	6,0	16,5	43,0
400023	2x0,22	Foil + braid	< 86,0	4,5	15,7	25,0
400024	2x0,22	Foil	< 86,0	4,2	7,3	18,0

Dimensions and specifications may be changed without prior notice.

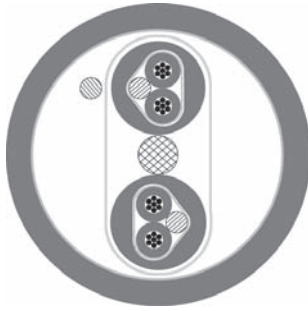
### Application

The HELUSOUND® AES/EBU audio cable is a 2-core, symmetrical and shielded digital sound cable. The cable is available in three different versions. The standard version is characterised by double shielding; the patch variant has reduced outside diameter and the foil shielded variant is suitable for the permanent wiring of digital devices. All three versions are suitable for the transmission of digital audio signals.

# Audio

**AES/EBU digital audio cables, multipaired, pairs with foil shielding and overall foil shielding**

**HELUSOUND®**



## Type

### Cable structure

Conductor material:  
Core insulation:  
Core colours:  
Stranding element:  
Sheath material:  
Cable external diameter:  
Sheath colour:

## Digital audio cables 2x2x0,22

Copper, tinned  
Cell PE  
rd, bu  
2 cores with 1 earth conductor  
PVC  
approx. 9,9 mm  
black

## Electrical data

Characteristic impedance: 110 Ohm  
Conductor resistance, max.: 86 Ohm/km  
Insulation resistance, min.: 1 GOhm x km

## Technical data

Weight: approx. 85 kg/km  
Min. bending radius for laying: 100 mm  
Operating temperature range min.: -25°C  
Operating temperature range max.: +70°C  
Copper weight: 16,0 kg/km

## Norms

Corrosiveness acc. to EN50267-2-3

Part no.	Cable structure	Outer diameter approx. mm	Cop. weight kg / km	Weight approx. kg / km
400025	2x2x0,22	9,9	16,0	85,0
400026	4x2x0,22	11,8	31,0	119,0
400027	6x2x0,22	14,9	46,0	195,0
400028	8x2x0,22	16,1	59,0	232,0
400029	12x2x0,22	19,1	85,0	330,0
400158	24x2x0,22	24,5	162,0	670,0

Dimensions and specifications may be changed without prior notice.

## Application

The multipaired, digital HELUSOUND® AES/EBU audio cable is characterised by its shielding in pairs, its element sheaths and by the additional overall sheath. This cable is suitable for the transmission of digital audio signals.



# Audio

**AES/EBU digital audio cables, multipaired, spirally screened pairs and overall foil shielding**

**HELUSOUND®**



## Type

### Cable structure

Conductor material:  
Core insulation:  
Core colours:  
Stranding element:  
Sheath material:  
Cable external diameter:  
Sheath colour:

## Digital audio cables

### 12x2x0,22

Copper, bare  
Cell PE  
rd, bu  
2 cores with 1 earth conductor  
PVC  
approx. 17,0 mm  
black

## Electrical data

Characteristic impedance: 110 Ohm  
Conductor resistance, max.: 86 Ohm/km  
Insulation resistance, min.: 1 GOhm x km

## Technical data

Weight: approx. 320 kg/km  
Min. bending radius for laying: 170 mm  
Operating temperature range min.: -20°C  
Operating temperature range max.: +70°C  
Copper weight: 171,0 kg/km

## Norms

Corrosiveness acc. to EN50267-2-3

## Part no.

**400030**

Dimensions and specifications may be changed without prior notice.

## Application

The multipaired, digital HELUSOUND® AES/EBU audio cable is characterised by its shielding in pairs, its element sheaths and by the additional overall sheath. This cable is suitable for the transmission of digital audio signals.

# Audio & Light

## AES/EBU & DMX patch cable

**HELULIGHT**<sup>®</sup>


### Type

#### Cable structure

Conductor material:  
Core insulation:  
Core colours:  
Stranding element:  
Sheath material:  
Cable external diameter:  
Sheath colour:

### DMX cables

#### 2x0,22

Copper, tinned  
Cell PE  
rd, bu  
2 cores with 1 filler  
PVC  
approx. 5,0 mm  
blue

### Electrical data

Characteristic impedance:  
Conductor resistance, max.:  
Insulation resistance, min.:

110 Ohm  
80 Ohm/km  
5 GOhm x km

### Technical data

Weight:  
Min. bending radius for laying:  
Operating temperature range min.:  
Operating temperature range max.:  
Copper weight:

approx. 33 kg/km  
50 mm  
-30°C  
+70°C  
14,0 kg/km

### Part no.

**400031**

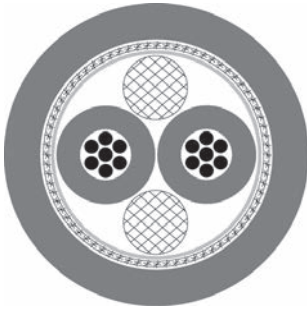
Dimensions and specifications may be changed without prior notice.

### Application

The 2-core HELUSOUND<sup>®</sup> AES/EBU & DMX patch cable is foil shielded and optimally protected against external interference by its copper spiral screen. This cable is suitable for indoor use for permanent laying for the control of lighting systems or for patching in studio technology.

# Audio & Light

## AES/EBU & DMX cables

**HELULIGHT**<sup>®</sup>


### Type

#### Cable structure

Conductor material:  
Core insulation:  
Core colours:  
Stranding element:  
Sheath material:  
Cable external diameter:  
Sheath colour:

### DMX cables

#### 2x0,34

Copper, bare  
Cell PE  
rd, wh  
2 cores with textile filler stranded  
PVC  
approx. 6,4 mm  
black

### DMX cables

#### 4x0,34

Copper, bare  
Cell PE  
wh,gn,bn,ye  
Star quad  
PVC  
approx. 7,0 mm  
black

### Electrical data

Characteristic impedance:  
Conductor resistance, max.:  
Insulation resistance, min.:

110 Ohm  
53 Ohm/km  
10 GOhm x km

110 Ohm  
53 Ohm/km  
5 GOhm x km

### Technical data

Weight:  
Min. bending radius for laying:  
Operating temperature range min.:  
Operating temperature range max.:  
Copper weight:

approx. 50 kg/km  
64 mm  
-30°C  
+70°C  
18,0 kg/km

approx. 65 kg/km  
70 mm  
-30°C  
+70°C  
29,0 kg/km

### Part no.

**400032**
**400033**

Dimensions and specifications may be changed without prior notice.

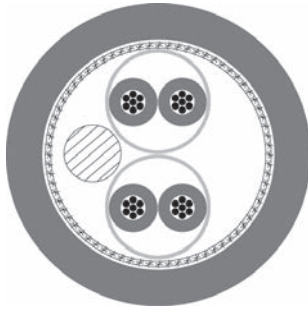
### Application

The 2-core HELUSOUND<sup>®</sup> AES/EBU & DMX patch cable is protected against external interferences by its copper spiral screen. This cable is suitable for permanent laying for the control of lighting systems or for connecting digital audio amplifiers. It can be installed indoors and outdoors. The max. transmission path for DMX control amounts approx. 1000m

# Audio & Light

AES/EBU TP DMX 512

**HELULIGHT**<sup>®</sup>



## Type

### Cable structure

Conductor material:  
Core insulation:  
Core colours:  
Stranding element:  
Sheath material:  
Cable external diameter:  
Sheath colour:

## DMX cables

### 2x2x0,22

Copper, tinned  
Cell PE  
or/wh, bu/wh  
pairs stranded  
PVC soft  
approx. 8,0 mm  
black matt

## Electrical data

Characteristic impedance: 110 Ohm  
Conductor resistance, max.: 85 Ohm/km  
Insulation resistance, min.: 100 GOhm x km

## Technical data

Weight: approx. 76 kg/km  
Min. bending radius for laying: 80 mm  
Operating temperature range min.: -25°C  
Operating temperature range max.: +70°C  
Copper weight: 38,0 kg/km

## Part no.

**400034**

Dimensions and specifications may be changed without prior notice.

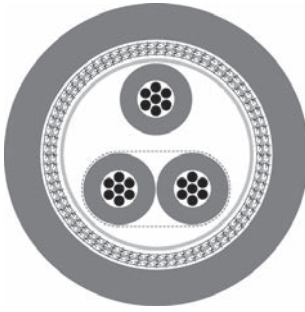
## Application

The 4-core HELUSOUND<sup>®</sup> AES/EBU & DMX cable is protected against external interference by its AL/PT foil, its copper spiral screen and its PVC outer sheath. This cable is suitable for controlling all types of digital equipment. Also to use as microphone cable.

# Audio & Light

**DMX cables, multicore with spiral screen**

**HELULIGHT®**



## Type

### Cable structure

Conductor material:  
Core insulation:  
Core colours:  
Stranding element:  
Sheath material:  
Cable external diameter:  
Sheath colour:

## DMX cables

### 2x0,22+0,22

Copper, tinned  
PE spumed  
wh, bu+rd  
pair and core stranded together  
PVC  
approx. 6,4 mm  
black

## Electrical data

Characteristic impedance: 110 Ohm  
Conductor resistance, max.: 86 Ohm/km  
Insulation resistance, min.: 1 MOhm x km

## Technical data

Weight: approx. 79 kg/km  
Min. bending radius for laying: 64 mm  
Operating temperature range min.: -25°C  
Operating temperature range max.: +70°C  
Copper weight: 66,0 kg/km

## Norms

Corrosiveness acc. to EN50267-2-3

## Part no.

**400035**

Dimensions and specifications may be changed without prior notice.

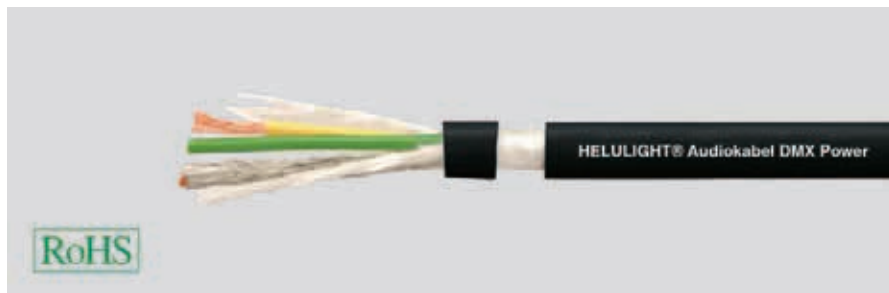
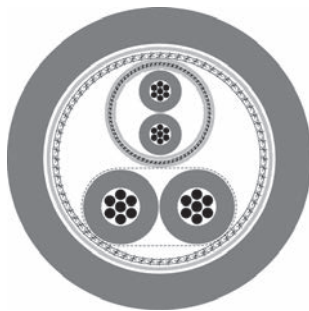
## Application

The 3-core, shielded HELUSOUND® digital sound cable consists of a symmetrical pair and an additional third core. A double spiral screen and the PVC outer sheath protect the cable against electrical interference. This AES/EBU and DMX compliant (110 Ohm) special cable is suitable for the transmission of digital audio signals and can therefore, for example, be used for connecting digital mixers, audio amplifiers, DAT recorders, light and scanner systems etc.



# Light+Power

## DMX-POWER

**HELULIGHT**<sup>®</sup>


### Type

#### Cable structure

Conductor material:

Core insulation:

Core colours:

Stranding element:

Sheath material:

Cable external diameter:

Sheath colour:

### DMX cables

#### (1x2x0,24)+2x1,0

Copper, bare

Foam-Skin-PE (DMX), PVC (Power)

red, white (DMX); yellow, green (Power)

2 cores with 1 filler

PVC soft

approx. 7,4 mm

black matt

### Electrical data

Characteristic impedance:

110 Ohm

### Technical data

Weight:

approx. 74 kg/km

Copper weight:

36,0 kg/km

### Part no.

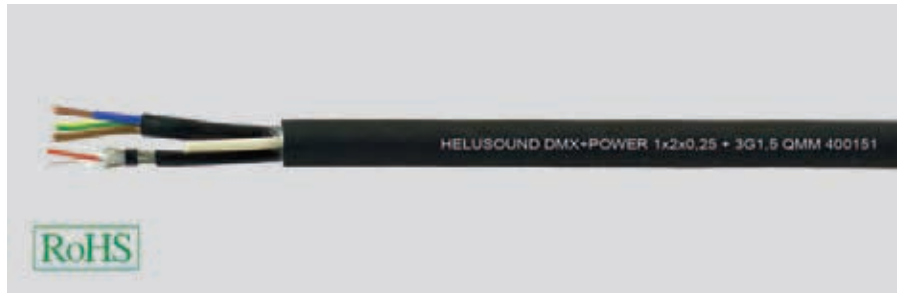
**400081**

Dimensions and specifications may be changed without prior notice.

### Application

The hybrid DMX Power cable is used in the professional DMX light controller. It transmits power for the light and control signals for the movement. The cable is compact, flexible and easy to process.

# HELUSOUND® DMX+POWER



## Type

### Cable structure

Conductor material:  
Core insulation:  
Core insulation 2:  
Core colours:  
Stranding element:  
Sheath material:  
Cable external diameter:  
Sheath colour:

### DMX cables

#### (1x2x0,25)+3G1,5

Copper, bare  
Foam-Skin-PE (DMX), PVC (Power)  
PVC  
red, white (DMX); brown, blue, green/yellow (Power)  
DMX-Element together with Power-Element and filler stranded  
PVC flexible at low temperatures  
approx. 13,2 mm  
black

### Electrical data

Characteristic impedance: 110 Ohm  
Conductor resistance, max.: 78 Ohm/km  
Insulation resistance, min.: 20 GOhm x km

### Technical data

Weight: approx. 50 kg/km  
Min. bending radius for laying: 64 mm  
Operating temperature range min.: -30°C  
Operating temperature range max.: +70°C  
Copper weight: 60,5 kg/km

### Part no.

**400151**

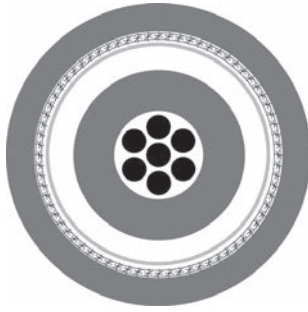
Dimensions and specifications may be changed without prior notice.

### Application

The HELUSOUND® DMX+POWER hybrid cable combines a shielded light control wire and the power supply wire. The DMX-cable, which is shielded by a tin-coated copper braiding is perfectly suited for the control of light systems and mixing boards (110 Ohm characteristic intrinsic impedance). It highlights a soft PVC insulation and it is qualified for the use at indoor and outdoor installations. The DMX cable can also be used for the transmission of audio signals such as a microphone wire or as a power supply wire for active loudspeaker systems.

# Audio

## Instrument cables with spiral screen



### Type

#### Cable structure

Conductor material:  
Core insulation:  
Sheath material:  
Cable external diameter:  
Sheath colour:

#### Electrical data

Conductor resistance, max.:  
Insulation resistance, min.:

#### Technical data

Weight:  
Min. bending radius for laying:  
Operating temperature range min.:  
Operating temperature range max.:  
Copper weight:

#### Norms

#### Part no.

Dimensions and specifications may be changed without prior notice.

#### Application

The HELUSOUND® instrument cable with spiral screen is a non-symmetrical, double shielded cable. This cable is specially suitable for connecting high ohmic components such as synthesisers, keyboards or guitars in professional stage and studio operation. The high-quality 1x0.38 special cable has an increased cross-section, a semi-conductor layer and a double spiral screen, which makes it suitable for the most stringent requirements of professional stages and studios.

#### Instrument cables

##### 1x0,22

Copper, bare  
Foam-skin-PE  
PVC  
approx. 5,9 mm  
black

86 Ohm/km  
1 GOhm x km

approx. 44 kg/km  
60 mm  
-25°C  
+70°C  
7,9 kg/km

Corrosiveness acc. to EN50267-2-3

**400036**

#### Instrument cables

##### 1x0,38

Copper, bare  
Cell PE  
PVC  
approx. 7,0 mm  
black

55 Ohm/km  
1 GOhm x km

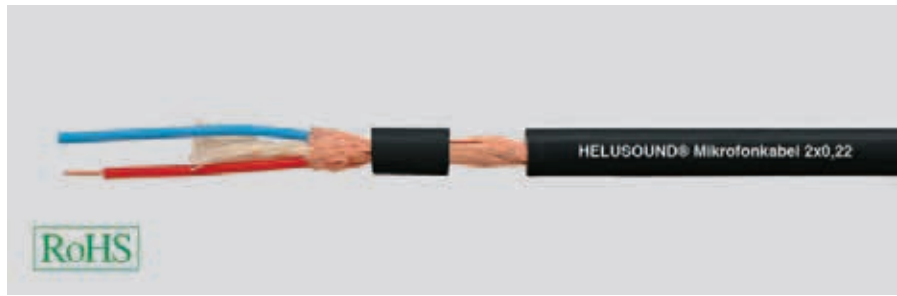
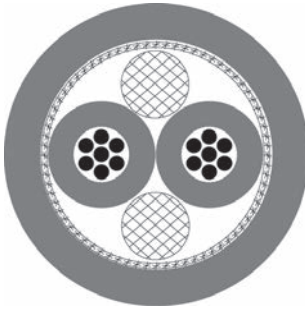
approx. 55 kg/km  
70 mm  
-25°C  
+70°C  
29,0 kg/km

Corrosiveness acc. to EN50267-2-3

**400037**

# Audio

## Microphone cables with spiral screen, paired



### Type

#### Cable structure

Conductor material:  
Core insulation:  
Core colours:  
Stranding element:  
Sheath material:  
Cable external diameter:  
Sheath colour:

### Microphone cable

#### 2x0,22

Copper, bare  
PE  
rd, bu  
2 cores with textile filler stranded  
PVC  
approx. 6,0 mm  
black

### Microphone cable

#### 2x0,15

Copper, bare  
PVC  
rd, wh  
pairs stranded  
PVC  
approx. 4,2 mm  
black

### Electrical data

Conductor resistance, max.:  
Insulation resistance, min.:

86 Ohm/km  
1 GOhm x km

120 Ohm/km  
1 GOhm x km

### Technical data

Weight:  
Min. bending radius for laying:  
Operating temperature range min.:  
Operating temperature range max.:  
Copper weight:

approx. 55 kg/km  
60 mm  
-25°C  
+70°C  
12,1 kg/km

approx. 27 kg/km  
42 mm  
-25°C  
+70°C  
14,0 kg/km

### Norms

Corrosiveness acc. to EN50267-2-3

Corrosiveness acc. to EN50267-2-3

### Part no.

**400038**

**400039**

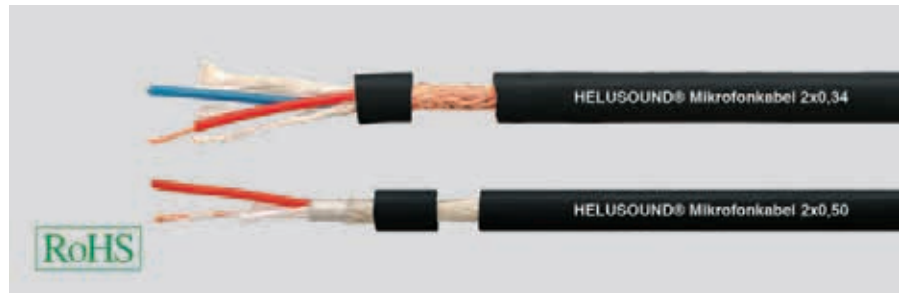
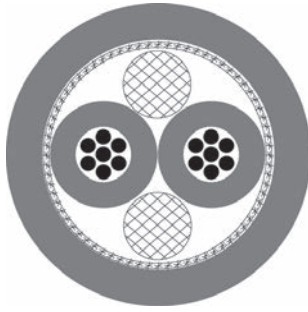
Dimensions and specifications may be changed without prior notice.

### Application

The 2-core HELUSOUND® microphone cable with spiral screen is suitable for use in professional stage and studio operation. The microphone cable 2x0.15 has a double spiral screen made of bare copper wires.

# Audio

## Microphone cables with braided shielding



### Type

#### Cable structure

Conductor material:  
Core insulation:  
Core colours:  
Stranding element:  
Sheath material:  
Cable external diameter:  
Sheath colour:

#### Electrical data

Conductor resistance, max.:  
Insulation resistance, min.:

#### Technical data

Weight:  
Min. bending radius for laying:  
Operating temperature range min.:  
Operating temperature range max.:  
Copper weight:

#### Part no.

Dimensions and specifications may be changed without prior notice.

#### Application

The 2-wire HELUSOUND® microphone cable with copper braid shield is suitable for use in the professional stage and studio operations, as well as for fixed installation. The line is characterized by its highly flexible PVC jacket.

#### Microphone cable

##### 2x0,34

Copper, bare  
PE  
rd, bu  
2 cores with textile filler stranded  
PVC  
approx. 6,5 mm  
black

53 Ohm/km  
1 GOhm x km

approx. 30 kg/km  
65 mm  
-30°C  
+70°C  
15,2 kg/km

#### 400040

#### Microphone cable

##### 2x0,50

Copper, bare  
PE  
rd, wh  
2 cores with textile filler stranded  
PVC  
approx. 6,7 mm  
black

37 Ohm/km  
1 GOhm x km

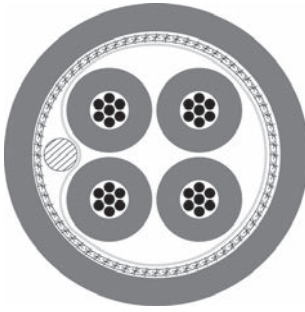
approx. 59 kg/km  
67 mm  
-30°C  
+70°C  
37,0 kg/km

#### 400080



# Audio

## Microphone cables with braided shielding, star quads



### Type

#### Cable structure

Conductor material:  
Core insulation:  
Core colours:  
Stranding element:  
Drain wire:  
Inner sheath material:  
Sheath material:  
Cable external diameter:  
Sheath colour:

### Microphone cable

#### 4x0,22

Copper, bare  
PE  
rd, bu, gn, bk  
Star quad  
AWG 26/7, copper bare  
PE  
PVC  
approx. 6,1 mm  
black

### Electrical data

Conductor resistance, max.:  
Insulation resistance, min.:

86 Ohm/km  
1 GOhm x km

### Technical data

Weight:  
Min. bending radius for laying:  
Operating temperature range min.:  
Operating temperature range max.:  
Copper weight:

approx. 50 kg/km  
62 mm  
-25°C  
+70°C  
25,0 kg/km

### Norms

Corrosiveness acc. to EN50267-2-3

### Part no.

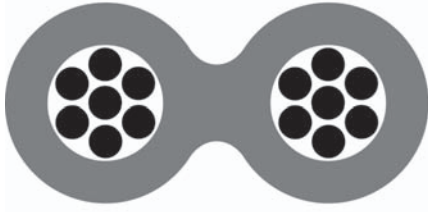
**400041**

Dimensions and specifications may be changed without prior notice.

### Application

The 4-core HELUSOUND® microphone cable is stranded in star quads and suitable for special application due to its earth conductor and braided shielding. It is e.g. used as a stereo cable in the area of professional studio and microphone technique. Easy stripping.

# Loudspeaker Cables



Cross section (mm <sup>2</sup> )	2 x 0,5	2 x 0,5	2 x 0,75	2 x 0,75	2 x 1,5	2 x 1,5	2 x 2,5	2 x 2,5	2 x 4	2 x 4
Part no.	40180	40023	40181	40024	40182	40025	40183	40026	40184	40027

## Cable structure

**Conductor material: Copper litz wire, bare**

**Identification: Grooves**

Cond. make-up	16 x 0,20	16 x 0,20	24 x 0,20	24 x 0,20	28 x 0,25	28 x 0,25	48 x 0,25	48 x 0,25	55 x 0,30	55 x 0,30
Insulation h x w mm	2,0 x 5,0	2,1 x 4,7	2,2 x 4,9	2,2 x 4,9	2,6 x 5,5	2,6 x 5,5	3,3 x 7,0	3,3 x 7,0	4,3 x 8,2	4,3 x 8,2
Sheath material	PVC	PVC	PVC	PVC	PVC	PVC	PVC	PVC	PVC	PVC
Sheath colour	transparent	black/red	transparent	black/red	transparent	black/red	transparent	black/red	transparent	black/red
Weight approx. kg / km	15	15	20	20	37	37	63	63	80	80

## Electrical characteristics

### Loop resistance

<b>max. (Ohm/km)</b>	<b>70</b>	<b>70</b>	<b>47</b>	<b>47</b>	<b>23</b>	<b>23</b>	<b>14</b>	<b>14</b>	<b>9</b>	<b>9</b>
Capacitance pF/m	47	47	60	60	67	67	67	67	64	64
Inductance µH/m at										
1 kHz	0,7	0,67	0,61	0,61	0,54	0,54	0,54	0,54	0,58	0,58
10 kHz	0,8	0,79	0,73	0,73	0,59	0,59	0,62	0,62	0,65	0,65
100 kHz	0,8	0,85	0,73	0,73	0,59	0,59	0,62	0,62	0,65	0,65
1000 kHz	0,8	0,8	0,67	0,67	0,52	0,52	0,56	0,56	0,59	0,59
Copper weight kg/km	9,6	9,6	14,4	14,4	28,8	28,8	48,0	48,0	76,8	76,8

Cross section (mm <sup>2</sup> )	2 x 1,5	2 x 2,5	2 x 4	2 x 6	2 x 10
Part no.	40185	40186	40187	40188	40189

## Cable structure

**Conductor material: Bare copper litz wire, highly flexible**

**Identification: Stripes**

Cond. make-up	189 x 0,10	322 x 0,10	511 x 0,10	777 x 0,10	1273 x 0,10
Insulation h x w mm	3,1 x 6,5	3,6 x 7,5	5 x 10,2	6,1 x 12,5	7,0 x 15,0
Sheath material	PVC	PVC	PVC	PVC	PVC
Sheath colour	transparent	transparent	transparent	transparent	transparent
Weight approx. kg / km	41	60	79	136	254

## Electrical characteristics

### Loop resistance

<b>max. (Ohm/km)</b>	<b>23</b>	<b>14</b>	<b>9</b>	<b>6</b>	<b>3</b>
Capacitance pF/m	67	53	50	54	59
Inductance µH/m at					
1 kHz	0,54	0,48	0,49	0,46	0,45
10 kHz	0,61	0,55	0,56	0,54	0,53
100 kHz	0,62	0,59	0,6	0,56	0,56
1000 kHz	0,55	0,54	0,56	0,53	0,52
Copper weight kg/km	28,8	48,0	76,8	115,2	192,0

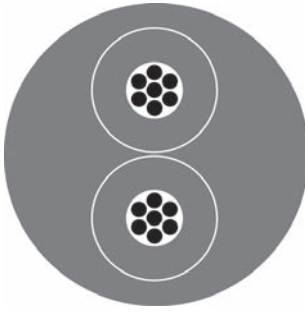
Dimensions and specifications may be changed without prior notice. (RM01)

## Note

The materials used in manufacture are cadmium-free, contain no silicone and are free from substances harmful to the wetting properties of lacquers.

# HELUSOUND® 400 PVC

Speaker cables, round



## Type

### Cable structure

Conductor material:  
Core insulation:  
Core colours:  
Sheath material:  
Cable external diameter:  
Sheath colour:

### Speaker cable HELUSOUND® 400 2x1,5

Copper, bare  
PVC  
rd, bk  
PVC  
approx. 6,6 mm  
black

### Electrical data

Conductor resistance, max.: 12,7 Ohm/km

### Technical data

Weight: approx. 73,4 kg/km  
Min. bending radius for laying: 33 mm  
Operating temperature range min.: -10°C  
Operating temperature range max.: +70°C  
Copper weight: 28,8 kg/km

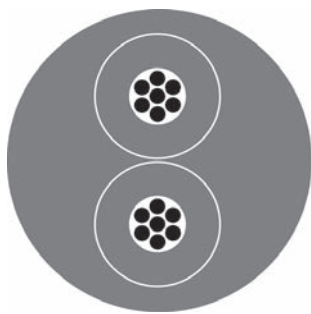
Part no.	Cable structure	Conductor resistance Ohm / km	Outer diameter approx. mm	Cop. weight kg / km	Weight approx. kg / km
400089	2x1,5	< 12,7	6,6	28,8	73,4
400090	2x2,5	< 7,9	7,5	48,0	106,9
400091	2x4,0	< 4,9	9,4	76,8	163,7
400092	4x2,5	< 7,9	8,8	96,0	169,3
400093	4x4,0	< 4,9	11,6	153,6	272,4
400060	8x2,5	< 7,9	13,5	192,0	349,0
400094	8x4,0	< 4,9	16,8	307,2	541,6

Dimensions and specifications may be changed without prior notice.

## Application

All products of the HELUSOUND® 400 LOUDSPEAKER series impress with their extremely high flexibility. 0,15 stranded wires and a very soft PVC outer sheath make this possible. These cables are particularly used in mobile applications on stages, in studios or in the conference industry.

# HELUSOUND® 500 PUR



## Type

### Cable structure

Conductor material:  
Core insulation:  
Core colours:  
Stranding element:  
Sheath material:  
Cable external diameter:  
Sheath colour:

## Speaker cable HELUSOUND® 500 PUR 2x1,5

Copper, bare  
PVC  
rd, bk  
pairs stranded  
PUR  
approx. 6,6 mm  
black

### Electrical data

Conductor resistance, max.: 12,7 Ohm/km

### Technical data

Weight: approx. 66,9 kg/km  
Min. bending radius for laying: 33 mm  
Operating temperature range min.: -25°C  
Operating temperature range max.: +80°C  
Copper weight: 28,8 kg/km

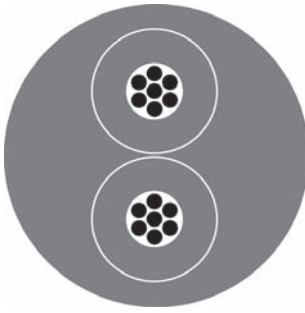
Part no.	Cable structure	Conductor resistance Ohm / km	Outer diameter approx. mm	Cop. weight kg / km	Weight approx. kg / km
400109	2x1,5	< 12,7	6,6	28,8	66,9
400110	2x2,5	< 7,9	7,5	48,0	98,5
400111	2x4,0	< 4,9	9,4	76,8	150,2
400112	4x2,5	< 7,9	8,8	96,0	159,1
400113	4x4,0	< 4,9	11,6	153,6	253,0
400114	8x2,5	< 7,9	13,5	192,0	332,1
400115	8x4,0	< 4,9	16,8	307,2	499,5

Dimensions and specifications may be changed without prior notice.

## Application

The robust solution for medium and high mechanical stresses, as robust, abrasion-resistant and cut resistant. Also suitable for outdoor use.

# HELUSOUND® 600 FRNC, halogen-free



## Type

### Cable structure

Conductor material:  
Core insulation:  
Core colours:  
Stranding element:  
Sheath material:  
Cable external diameter:  
Sheath colour:

## Speaker cable HELUSOUND® 600 FRNC 2x1,5

Copper, bare  
FRNC  
rd, bk  
pairs stranded  
FRNC  
approx. 6,6 mm  
black

### Electrical data

Conductor resistance, max.: 12,7 Ohm/km

### Technical data

Weight: approx. 77 kg/km  
Min. bending radius for laying: 33 mm  
Operating temperature range min.: -5°C  
Operating temperature range max.: +70°C  
Copper weight: 28,8 kg/km

Part no.	Cable structure	Conductor resistance Ohm / km	Outer diameter approx. mm	Cop. weight kg / km	Weight approx. kg / km
400116	2x1,5	< 12,7	6,6	28,8	77,0
400117	2x2,5	< 7,9	7,5	48,0	105,6
400118	2x4,0	< 4,9	9,4	76,8	166,9
400119	4x2,5	< 7,9	8,8	96,0	161,5
400120	4x4,0	< 4,9	11,6	153,6	271,6
400121	8x2,5	< 7,9	13,5	192,0	338,6
400122	8x4,0	< 4,9	16,8	307,2	531,5

Dimensions and specifications may be changed without prior notice.

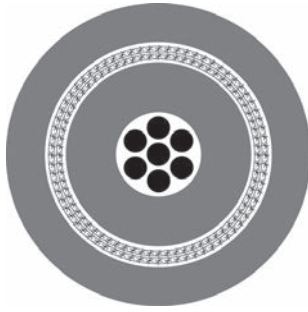
## Application

The safe solution for increasing demands on the security in case of fire, as flame retardant, low smoke, halogen-free, no corrosion damage by released gases and fumes, no flame propagation provide for local flame propagation for the integrity of important systems.



# Audio

## Speaker cables, coaxial



### Type

#### Cable structure

Conductor material:  
Core insulation:  
Core colours:  
Sheath material:  
Cable external diameter:  
Sheath colour:

#### Electrical data

Conductor resistance, max.:  
Insulation resistance, min.:

#### Technical data

Weight:  
Min. bending radius for laying:  
Operating temperature range min.:  
Operating temperature range max.:  
Copper weight:

#### Norms

#### Part no.

Dimensions and specifications may be changed without prior notice.

#### Application

The coaxial HELUSOUND® speaker cable is protected by a counter-rotating double spiral shield and outer jacket. It is characterized due to the construction, in addition to robustness and good drum reeling, especially by high flexibility and small dimensions.

### Speaker cable

#### 2x2,5

Copper, bare  
PVC  
Black  
PVC  
approx. 6,8 mm  
black

7,98 Ohm/km  
5 MOhm x km

approx. 84 kg/km  
68 mm  
-25°C  
+70°C  
52,0 kg/km

Corrosiveness acc. to EN50267-2-3

**400061**

### Speaker cable

#### 2x4,0

Copper, bare  
PVC  
Black  
PVC  
approx. 7,9 mm  
black

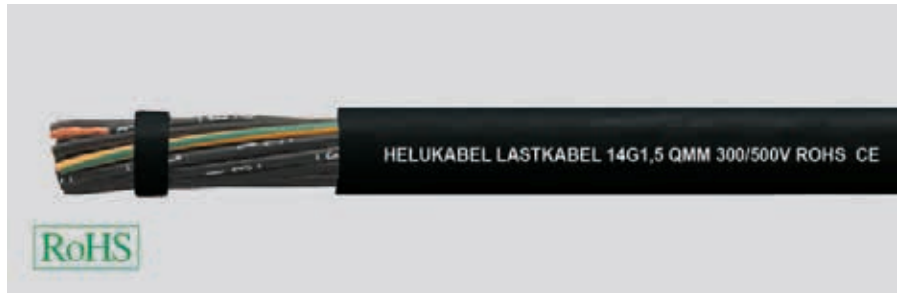
4,95 Ohm/km  
5 MOhm x km

approx. 129 kg/km  
80 mm  
-25°C  
+70°C  
87,0 kg/km

Corrosiveness acc. to EN50267-2-3

**400062**

# Loadcable 300/500 V + 600/1000 V



## Type

### Cable structure

Conductor material:	Copper, bare
Core insulation:	PVC flexible at low temperatures
Core colours:	black number coded + gn/ye
Stranding element:	14 cores stranded
Sheath material:	PVC flexible at low temperatures
Cable external diameter:	approx. 13,4 mm
Sheath colour:	black

### Electrical data

Conductor resistance, max.:	13,3 Ohm/km
-----------------------------	-------------

### Technical data

Weight:	approx. 322 kg/km
Min. bending radius for laying:	53,6 mm
Operating temperature range min.:	-40°C
Operating temperature range max.:	+80°C
Copper weight:	201,6 kg/km

### Loadcable 300/500 V

Part no.	Cable structure	Conductor resistance Ohm / km	Outer diameter approx. mm	Cop. weight kg / km	Weight approx. kg / km
400143	14 G 1,5	< 13,3	13,4	201,6	322,0
400144	18 G 1,5	< 13,3	15,2	259,2	422,0
400145	14 G 2,5	< 7,98	16,6	336,0	487,0
400146	18 G 2,5	< 7,98	19,0	432,0	634,0

### Loadcable 0,6/1 kV

Part no.	Cable structure	Conductor resistance Ohm / km	Outer diameter approx. mm	Cop. weight kg / km	Weight approx. kg / km
400147	14 G 1,5	< 13,3	17,7	201,6	430,0
400148	18 G 1,5	< 13,3	20,2	259,2	560,0
400149	14 G 2,5	< 7,98	20,0	336,0	604,0
400150	18 G 2,5	< 7,98	22,6	432,0	778,0

Dimensions and specifications may be changed without prior notice.

## Application

The highly flexible load cables are applied at medium mechanical stress in the professional stage and lighting technology, and other load circuits. The flexibility is achieved through the building with extra fine 0,15 mm<sup>2</sup> strands and the core and sheath insulation from cold-flexible PVC.

# Video Cables



used as	Indoors	Indoors, underground	Indoors	Indoors	Indoors, underground	Indoors	Indoors	Indoors	Indoors, outdoors
<b>Type</b>	<b>0,6/2,8</b>	<b>1,0/6,6</b>	<b>1,0/6,6 2YD</b>	<b>1,0/6,6</b>	<b>1,0/6,6D</b>	<b>0,6L/3,7</b>	<b>0,6/3,7</b>	<b>1,0/6,6D</b>	<b>0,6L/3,7+2x0,75</b>
Part no.	40022	40056	40175	40173	40073	40170	40171	40174	40028
<b>Cable structure</b>									
Inner conductor diameter mm	0,6	1	1	1	1	0,2	0,6	1	0,6
	Copper, bare	Copper, bare	Copper, bare	Copper, bare	Copper, bare	Copper, bare	Copper, bare	Copper, bare	Copper, bare
Insulation Ø mm	2,8 Cell PE	6,4 PE	6,4 PE	6,4 PE	6,4 PE	3,7 PE	3,7 PE	6,4 PE	3,7 PE
1st Outer conductor	Polyester foil coated with aluminium on both sides	Bare copper braid	Bare copper braid	Bare copper braid	Bare copper braid	Bare copper braid	Bare copper braid	Bare copper braid	Bare copper braid
Ø approx. mm	-	7	7	7	7	4,2	4,3	7	-
Inner sheath/Foil	-	-	PE	-	Foil	-	-	Foil	-
Ø approx. mm	-	-	8,5	-	-	-	-	-	-
2nd Outer conductor	Tinned copper braid	no	Bare copper braid	no	Bare copper braid	no	no	Bare copper braid	-
Ø approx. mm	-	-	9,1	-	7,6	-	-	7,6	-
Outer sheath	FRNC	PE	PVC	PVC	PE	PVC	PVC	PVC	PVC
Sheath colour	green	black	green	green	black	green	green	green	black
Outer Ø approx. mm	4,3	8,8	11,0	8,8	9,0	6,1	6,1	9,0	11,8
Min. bending radius approx. mm	25	45	55	45	50	30	30	50	50
Weight approx. kg / km	24	93	151	95	125	48	48	128	85
<b>Electrical characteristics</b>									
<b>Impedance (Ohm)</b>	<b>75 ± 2</b>	<b>75 ± 1</b>	<b>75 ± 1</b>	<b>75 ± 1</b>	<b>75 ± 1</b>	<b>75 ± 1</b>	<b>75 ± 1</b>	<b>75 ± 1</b>	<b>75 ± 3</b>
Attenuation at 20°C (db/100m)									
1 MHz	0,9	0,6	0,6	0,6	0,6	1,2	1,1	0,6	1,1
5 MHz	2,2	1,3	1,4	1,3	1,4	2,6	2,5	1,4	2,5
7 MHz	2,6	-	-	-	-	-	-	-	-
10 MHz	3,2	2	2	2	2	3,6	3,5	2	3,5
50 MHz	7,5	-	-	-	-	-	-	-	-
100 MHz	10,2	-	-	-	-	-	-	-	-
Propagation velocity v/c	0,8	0,66	0,66	0,66	0,66	0,66	0,66	0,66	0
<b>DC resistance at 20°C</b>									
Inner conductor max.Ohm/km	63	22	24	22	24	83	63	24	63
Outer conductor max.Ohm/km	21	7,5	6,5	7,5	3,5	12,5	13	3,5	13
Capacitance pF/m	54	67	67	67	67	67	67	67	67
Test voltage (50 Hz, kVeff.)	3,5	7	7	7	7	4,2	4,2	7	4
<b>Working voltage at (kV)</b>									
Pulse operation	-	6	6	6	6	3,6	3,6	6	-
HF-operation (peak value)	-	3	3	3	3	1,8	1,8	3	-
DC operation	-	14	14	14	14	8	8	14	-
Screening efficiency (dB)									
50 and 900 MHz≥	90	-	-	-	-	-	-	-	-
Copper weight kg/km	11,0	32,0	78,0	32,0	78,0	22,0	22,0	78,0	38,0

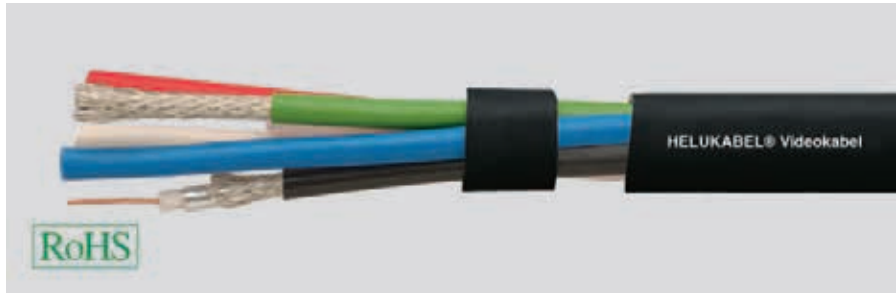
Dimensions and specifications may be changed without prior notice. (RM01)

## Note

- The materials used in manufacture are cadmium-free and contain no silicone and free from substances harmful to the wetting properties of lacquers.
- **ALPR**=Polyesterfoil coated with Aluminium on both sides  
**bl**=Bare, **bk**=Black, **Cu**=Copper, **D**=2xbraiding, **FRNC**=Flame Retardant Non-Corrosive, **G**=Braid, **gn**=Green, **PE**=Polyethylene, **PEE**=Cell-PE, **PVC**=Polyvinylchloride

# Video

## Video cables, multicore



### Type

#### Cable structure

Conductor material:  
Core insulation:  
Sheath material:  
Cable external diameter:  
Sheath colour:

### Video Cables

#### 3x(0,6/2,8)

Copper, bare  
Cell PE  
PVC  
approx. 12,9 mm  
black

### Electrical data

Characteristic impedance:  
Inner conductor resistance, max.:

75 Ohm  
65 Ohm/km

### Technical data

Weight:  
Min. bending radius for laying:  
Operating temperature range min.:  
Operating temperature range max.:  
Copper weight:

approx. 178 kg/km  
130 mm  
-25°C  
+70°C  
49,0 kg/km

### Norms

Corrosiveness acc. to EN50267-2-3

Part no.	Cable structure	Outer diameter approx. mm	Cop. weight kg / km	Weight approx. kg / km
400068	3x(0,6/2,8)	12,9	49,0	178,0
400069	4x(0,6/2,8)	14,1	65,0	214,0
400070	5x(0,6/2,8)	15,3	81,0	259,0
400071	6x(0,6/2,8)	16,7	97,0	295,0
400072	7x(0,6/2,8)	16,7	113,0	310,0

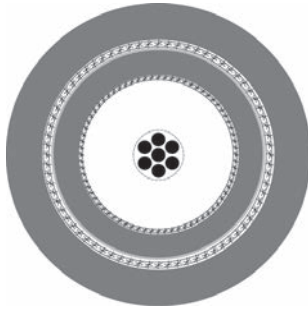
Dimensions and specifications may be changed without prior notice.

### Application

The multi-core, coaxial HELUKABEL® video cable is distinguished by 75 Ohm, cell PE insulation, AL foil and braided shielding, PVC element sheath and outer sheath. Alternative we also offer a halogen-free and flame-resistant version. As example it is suitable for the parallel transmission of signals (e.g. RGB).

# Video

## Camera cables



### Type

#### Cable structure

Conductor material:  
Core insulation:  
Sheath material:  
Cable external diameter:  
Sheath colour:

### Camera Cables

#### Triax 8

Copper, silvered  
PE  
PUR  
approx. 8,5 mm  
red

### Electrical data

Characteristic impedance:

75 Ohm

### Technical data

Weight: approx. 95 kg/km  
Min. bending radius for laying: 80 mm  
Operating temperature range min.: -30°C  
Operating temperature range max.: +80°C  
Copper weight: 55,0 kg/km

Part no.	Cable structure	Conductor insulation mm	Outer diameter approx. mm	Cop. weight kg / km	Weight approx. kg / km
400073	Triax 8	4,5	8,5	55,0	95,0
400074	Triax 11	6,5	11,0	80,0	150,0
400075	Triax 14	9,7	14,4	128,0	235,0
400076	Triax 8 flex	4,5	8,5	55,0	105,0
400077	Triax 11 flex	6,1	11,2	80,0	160,0
400078	Triax 14 flex	9,7	14,4	133,0	250,0

Dimensions and specifications may be changed without prior notice.

### Application

The HELUKABEL® Triax cable ensures the optimal transmission of image signals. This is possible because of the low attenuation values, thick cross-braided shielding and an especially rugged outer sheath. For the Flex variant, the PVC inner and outer sheath are replaced by TPE to guarantee greater flexibility. The Triax cables are primarily used to connect video cameras and image transmission systems and are suitable for mobile use.





## ■ RENEWABLE ENERGY & TRANSPORTATION

Cables for photovoltaic installations 796

---

Cables for wind turbines 802

---

Cables for aircraft supply 822

---

Cables for commercial vehicles 826

---

Cables for train & traffic 832





## ■ CABLES FOR PHOTOVOLTAIC INSTALLATIONS

Designation	Properties	Approvals	Page
SOLARFLEX®-X PV1-F		ERC 	798
SOLARFLEX®-X PV1-F NTS			799
SOLARFLEX®-X PV1-F TWIN			800





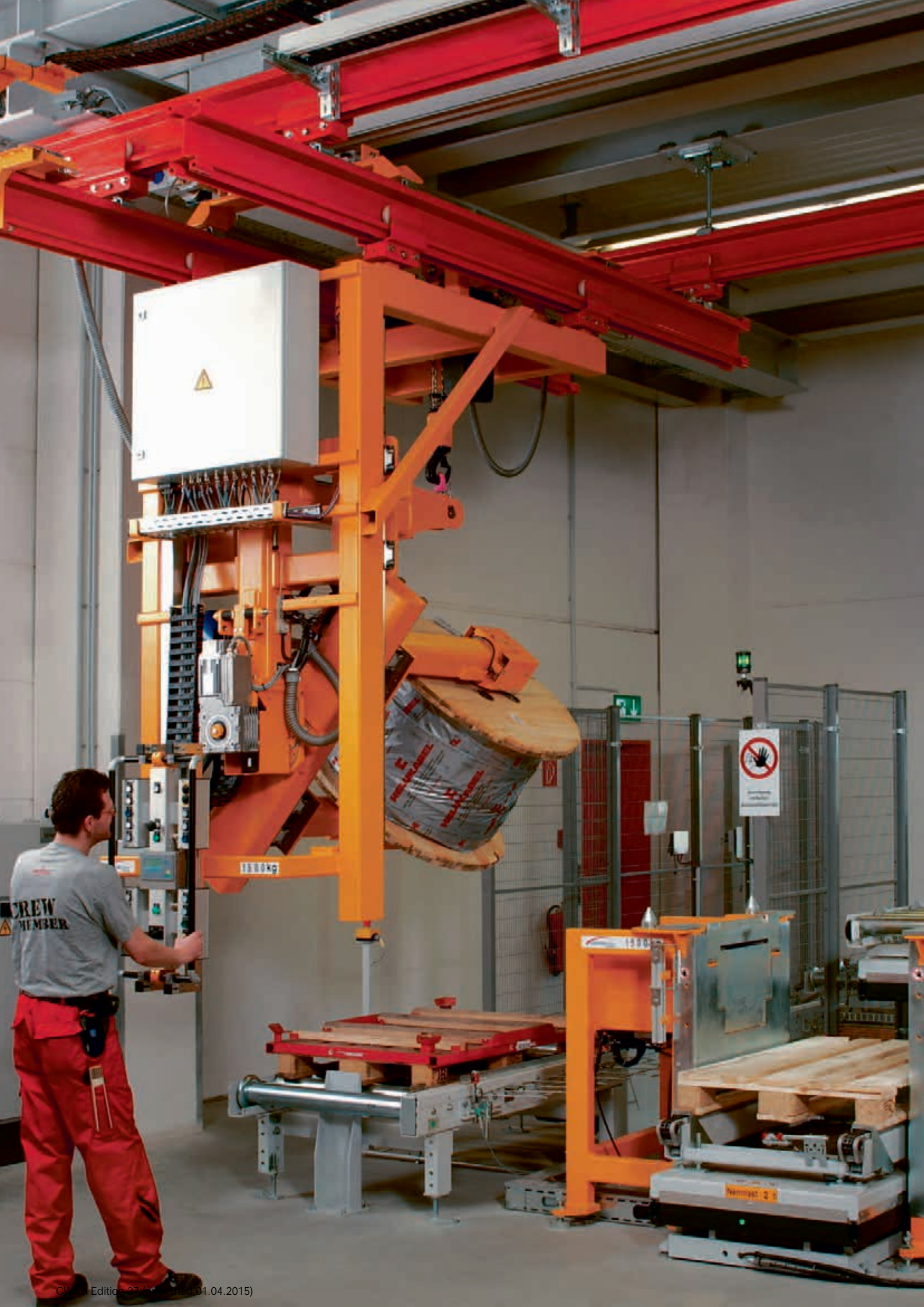


















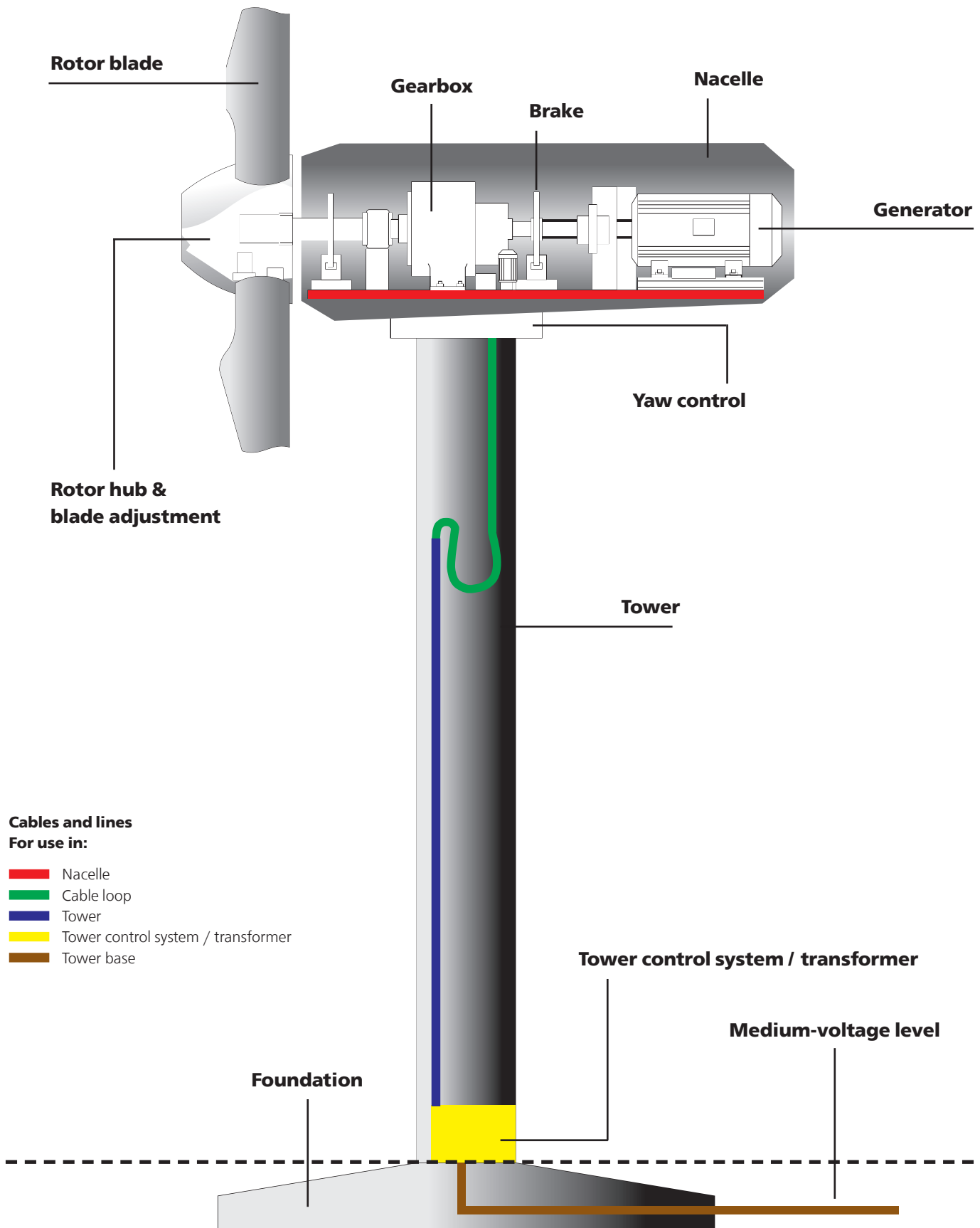


# ■ CABLES FOR WIND TURBINES

Designation	Properties	Approvals	Page
HEL UWIND® WK 103w EMV D-T	UV-resistant, UL/CSA style 10678/21179 single-core/multicore		<b>808</b>
HEL UWIND® WK 103k EMV D-T	UV-resistant, UL/CSA style 10269/2570 single-core/multicore		<b>809</b>
HEL UWIND® WK 135-Torsion	UV-resistant, UL/CSA style** 10553 / 20234, single-core/multicore 90°C (80°C in accordance with UL), suitable for offshore		<b>810</b>
HEL UWIND® WK 137-Torsion	UV-resistant, suitable for offshore, UL/CSA style 10553/20234, single-core/multicore, 90°C (80°C in accordance with UL)		<b>811</b>
HEL UWIND® WK 300w-Torsion	UV-resistant, also suitable for direct burial		<b>812</b>
HEL UWIND® WK 310-Torsion	UV-resistant, suitable for offshore		<b>813</b>
HEL UWIND® WK H07BN4N4-F WIND-Torison	Torsion +/- 150°/1m, UV-resistant, 750V/90°C		<b>814</b>
HEL UWIND® WK 101 H	0.6/1 kV halogen-free		<b>815</b>
HEL UWIND® WK fire alarm cable Torsion	Halogen-free, FT1, 24V		<b>816</b>
HEL UWIND® WK DLO 2kV	FT4, UV-resistant, UL44 1kV, 90°C, VW-1, LS, MSHA		<b>817</b>
HEL UWIND® WK Powerline ALU	0.6/1 kV or 1.8/3kV, each also available as robust version		<b>818</b>
HEL UWIND® THERMFLEX® 145	Halogen-free, +145°C		<b>819</b>
WK (N)A2XH	0.6/1 kV, halogen-free		<b>820</b>



# ■ FUNCTION VIEW - WIND TURBINES



# SELECTION TABLE - CABLES & WIRES

Use, see graphic  
 Approval  
 Fire test FT 4  
 Fire test FT 1 (with FT 2)  
 Nominal voltage in accordance with UL  
 Nominal voltage in accordance with VDE  
 Halogen-free  
 Oil-resistant \*\*  
 Extensively UV-resistant  
 UV-resistant  
 Offshore use  
 Temp. fixed installation in °C  
 Temp. flexing in °C  
 Torsionable +/- per meter  
 Cu-screen  
**Page**

Torsion cables																
Product	UL	Approval	Fire test FT 4	Fire test FT 1 (with FT 2)	Nominal voltage in accordance with UL	Nominal voltage in accordance with VDE	Halogen-free	Oil-resistant **	Extensively UV-resistant	UV-resistant	Offshore use	Temp. fixed installation in °C	Temp. flexing in °C	Torsionable +/- per meter	Cu-screen	Page
WK 103w-T	UL 10678/ 21179, cRUus, CE		x		1000 V	0.6/1 kV	x*	x	x			-40° to +90°	-35° to +90°	140°		808
WK 103w EMV D-T	UL 10269, 2570, cRUus, CE		x		1000 V	0.6/1 kV	x*	x	x			-40° to +90°	-35° to +90°	90°		808
WK 103k-T	UL 10269, 2570, cRUus, CE		x		1000 V	0.6/1 kV		x	x			-40° to +80°	-40° to +80°	140°		809
WK 103k EMV D-Torsion	UL 10269, 2570, cRUus, CE		x		1000 V	0.6/1 kV		x	x			-40° to +80°	-40° to +80°	90°		809
WK 135-T	UL 10553, 20234, cRUus, CE, VDE	60332-3			1000 V	0.6/1 kV	x	x		x	x	-40° to +90°	-40° to +90°	150°		810
WK 135 EMV D-T	UL 10553, 20234, cRUus, CE, VDE	60332-3			1000 V	0.6/1 kV	x	x		x	x	-40° to +90°	-40° to +90°	150°		810
WK 137-T FT4	UL 10553, 20234, cRUus, CE, VDE		x <sup>1</sup>		1000 V	0.6/1 kV	x	x		x	x	-40° to +90°	-40° to +90°	150°		811
WK 137 EMV D-T	UL 10553, 20234, cRUus, CE, VDE		x <sup>1</sup>		1000 V	0.6/1 kV	x	x		x	x	-40° to +90°	-40° to +90°	150°		811
WK 300w-T	CE					1.8/3kV		x	x			-40° to +90°	-35° to +90°	90°		812
WK 310-T	CE	30332-3				1.8/3kV	x	x		x		-40° to +90°	-40° to +90°	150°		813
WK H07BN4-F WIND-T	CE					450/750V				x		-45° to +90°	-35° to +90°	150°		814
WK 101 H	CE					0.6/1 kV	x		x	x		-50° to +100°	-40° to +90°			815
WK fire alarm cable-T	CE		x			24V	x	x				-50° to +90°	-40° to +80°	215°		816
WK NTSCGEWOEU-T	CE					3.6/6kV		x	x			-40° to +90°	-40° to +90°	100°		???
WK DLO 2 kV	UL 44, CSA, CE		x	x	2000 V					x		-40° to +90°				817
WK Powerline ALU		60332-3				0.6/1 kV		x	x	x		-40° to +105°	-20° to +105°			818
WK THERMFLEX® 145	CE					0.6/1 kV	x		x			-55° to +145°	-20° to +120°			819
WK (N)A2XH	CE	60332-3				0.6/1 kV	x		x			-30° to +90°	-5° to +50°			820
Tower & infrastructure cables																
NYJ-J/-0	CE		x			0.6/1 kV						-40° to +70°	-5° to +50°			538
NAYY	CE		x			0.6/1 kV						-40° to +70°	-5° to +50°			544
NA2XY	CE		x			0.6/1 kV						-40° to +70°	-5° to +50°			551
N2XH	CE		x			0.6/1 kV	x					-30° to +90°	-5° to +50°			???
WK (N)A2XH	CE	60332-3				0.6/1 kV	x		x			-40° to +90°	-5° to +50°			820
N2XS2Y						6-30 kV			x			-40° to +90°		x		587
NA2XS2Y						6-30 kV			x			-40° to +90°		x		595
N2XS(F)2Y						6-30 kV			x			-40° to +90°		x		589
NA2XS(F)2Y						6-30 kV			x			-40° to +90°		x		597

x<sup>1</sup> for multicore types      \*in preparation      \*\*based on UL 1277

# SELECTION TABLE - CABLES & WIRES

Use, see graphic  
Approval  
FT1 corresponds to IEC 60332-1  
Nominal voltage in accordance with UL  
Nominal voltage in accordance with VDE  
Halogen-free  
Extensively oil-resistant  
UV-resistant  
Temp. fixed installation in °C  
Temp. flexing in °C  
Cu-screen  
**Page**

Control cables												
JZ-500	CE, VDE	x		300/500 V	x					-40° to +80°	-15° to +80°	<b>30</b>
F-CY-JZ	CE, VDE	x		300/500 V	x					-40° to +80°	-40° to +80°	<b>50</b>
Y-CY-JZ	CE, VDE	x		300/500 V						-40° to +80°	-5° to +80°	<b>53</b>
JZ-500 HMH	CE	60332-3		300/500 V		x				-40° to +70°	-15° to +70°	<b>86</b>
JZ-500 HMH-C	CE	60332-3		300/500 V		x				-40° to +70°	-15° to +70°	<b>96</b>
MEGAFLEX® 500	UL, CSA, CE	60332-3	300/600 V	300/500 V	x	x	x			-40° to +80°	-30° to +90°	<b>88</b>
MEGAFLEX® 500-C	UL, CSA, CE	60332-3	300/600 V	300/500 V	x	x	x			-40° to +80°	-30° to +90°	<b>98</b>
JZ-600	CE	x		0.6/1 kV		x	x			-40° to +80°	-5° to +80°	<b>40</b>
JZ-600-Y-CY	CE	x		0.6/1 kV		x	x			-40° to +80°	-5° to +80°	<b>60</b>
Single 600-J/-O	UL, CSA, CE	x	600 V	0.6/1 kV			x			-40° to +90°	-5° to +90°	<b>498</b>
Single 600-CY -J/-O	UL, CSA, CE	x	600 V	0.6/1 kV			x			-40° to +90°	-5° to +90°	<b>499</b>
JZ-600 HMH	CE	60332-3		0.6/1 kV	x	x	x			-40° to +70°	-15° to +70°	<b>91</b>
JZ-600 HMH-C	CE	60332-3		0.6/1 kV	x	x	x			-40° to +70°	-5° to +70°	<b>100</b>
JZ-600 UL/CSA	UL, CSA, CE	x	1kV	0.6/1 kV		x	in sw			-40° to +80°	-5° to +80°	<b>362</b>
JZ-600-Y-CY-UL/CSA	UL, CSA, CE	x	1kV	0.6/1 kV		x	in sw			-40° to +80°	-5° to +80°	<b>378</b>
JZ-602	UL, CSA, CE	x	600 V				x			-40° to +90°	-5° to +90°	<b>356</b>
JZ-602-CY	UL, CSA, CE	x	600 V				x			-40° to +90°	-5° to +90°	<b>373</b>
JZ-603	UL, CSA, CE, HAR	x	600 V	300/500 V			x			-40° to +70°	-5° to +70°	<b>358</b>
JZ-603-CY	UL, CSA, CE, HAR	x	600 V	300/500 V			x			-40° to +70°	-5° to +70°	<b>375</b>
H07RN-F	UL, CSA, CE, HAR		600 V	450/750 V			x			-40° to +90°		<b>242</b>
H07RN-F/SOOW	UL, CSA, CE, HAR		600 V	450/750 V			x			-40° to +90°		<b>481</b>
HELUTHERM® 145 MULTI	CE	60332-3		300/500 V	x	x	x			-55° to +145°	-35° to +120°	<b>221</b>
HELUTHERM® 145 MULTI/-C	CE	60332-3		450/750 V	x	x	x			-55° to +145°	-35° to +120°	<b>230</b>
Data lines												
TRONIC-CY	CE	x		350/500V			x			-40° to +80°	-5° to +80°	<b>133</b>
PAAR-TRONIC-CY	CE	x		350/500V			x			-30° to +80°	-5° to +80°	<b>135</b>
DATAFLAMM®	CE	x		350/500V	x					-40° to +70°	-5° to +70°	<b>130</b>
DATAFLAMM®-C	CE	x		350/500V	x					-40° to +70°	-5° to +70°	<b>147</b>
DATAFLAMM®-C-PAAR	CE	x		350/500V	x					-40° to +70°	-5° to +70°	<b>148</b>
LIYY-UL	UL, CSA, CE		300V				x			-20° to +80°	-10° to +80°	<b>403</b>
LIYY-TP-UL	UL, CSA, CE		300V				x			-20° to +80°	-10° to +80°	<b>407</b>
SUPERTRONIC®-PURö	CE			350V			x			-40° to +70°	-5° to +70°	<b>191</b>
SUPERTRONIC®-C-PURö	CE			350V			x			-40° to +70°	-5° to +70°	<b>192</b>
SUPERTRONIC®-330 PURö	UL, CSA, CE	x	300V	300V	x	x				-50° to +80°	-40° to +80°	<b>447</b>
SUPERTRONIC®-330-C-PURö	UL, CSA, CE	x	300V	300V	x	x				-50° to +80°	-40° to +80°	<b>449</b>
SUPER-PAAR-TRONIC-C-PUR®	UL, CSA, CE	x	300V	350V	x	x				-50° to +70°	-40° to +70°	<b>193</b>
SUPER-PAAR-TRONIC 340-C-PUR®	UL, CSA, CE	x	300V	350V	x	x				-50° to +70°	-40° to +70°	<b>451</b>

# SELECTION TABLE - CABLES & WIRES

Use, see graphic Approval  
 FT1 corresponds to IEC 60332-1  
 Nominal voltage in accordance with UL  
 Nominal voltage in accordance with VDE  
 Halogen-free  
 Extensively oil-resistant  
 UV-resistant  
 Temp. fixed installation in °C  
 Temp. flexing in °C  
 Cu-screen  
**Page**

Single cores												
H07 V-K/(H)07 V-K	CE	x								-30° to +80°	-5° to +70°	291
H05Z-K/H07Z-K	CE	x								-40° to +90°	-5° to +70°	300
FIVE APPROVAL	UL, CSA, CE	x								-40° to +90°	-5° to +90°	490
HELUTHERM® 145 600V	UL, CSA, CE					x	x			-55° to +125°	-35° to +120°	305
HELUTHERM® 145 600V UL	UL, CSA, CE					x	x			-55° to +125°	-35° to +120°	496
TC TRAY CABLES USA												
TRAYCONTROL® 300	UL, CSA, CE	FT 4	300V					x		-25° to +105°	-25° to +105°	405
TRAYCONTROL® 300-C	UL, CSA, CE	FT 4	300V					x		-25° to +105°	-25° to +105°	x 416
TRAYCONTROL® 300-C TP	UL, CSA, CE	FT 4	300V					x		-25° to +105°	-25° to +105°	x 420
TRAYCONTROL® 500	UL 1277, CSA, CE	FT 4	1000V					x		-40° to +90°	-5° to +90°	359
TRAYCONTROL® 500-C	UL 1277, CSA, CE	FT 4	1000V					x		-40° to +90°	-5° to +90°	x 376
JZ-604 TC TRAY CABLE	UL 1277, CSA, CE	FT 4	600V					x	x	-25° to +90°	-5° to +90°	364
JZ-604-YCY TC TRAY CABLE	UL 1277, CSA	FT 4	600V					x	x	-25° to +90°	-5° to +90°	x 381
TRAYCONTROL® 600	UL 1277, CSA, CE	FT 4	1000V					x	x	-40° to +90°	-5° to +90°	366
Communication cables												
Industrial Ethernet 105°C	UL, CSA, CE	60332-1	300V	100V	x	x	x			-40° to +105°	-40° to +105°	x 693
Industrial Ethernet S-FTP TORDIERFLEX	UL, CSA, CE	60332-1	300V	100V	x	x	x			-20° to +80°	-20° to +80°	x 697
BUS cable HELUWIND® WK CAN BUS 105°C	UL, CSA, CE	x	600V	100V	x	x	x			-40° to +105°	-20° to +60°	x ???
BUS cable Indoor	UL, CSA, CE	x	600V	100V			x			-40° to +70°	-5° to +60°	x 717
Profibus SK Outdoor	CE			100V	x		x			-40° to +70°	-5° to +60°	x 717
BUS cable Torsion	UL, CMX, CE	x	300V	100V	x	x	x			-40° to +75°	-25° to +75°	x 704
Profibus L2 Industry	CE	x		100V	x	x	x			-40° to +70°	-5° to +60°	x 706
AT-V(ZN)Y(ZN)Y	Submitted	Submitted					x	x		-40° to +90°	-40° to +90°	638
AT-V(ZN)H(ZN)11Y					x	x	x			-40° to +90°	-40° to +90°	638
Fiber-optic cable, mobile, easy-to-wind A-V(ZN)11Y		60332-1			x	x	x			-30° to +70°	-20° to +70°	636
Fiber-optic cable mobile A-V(ZN)Y	UL, CSA	FT4					x	x		-30° to +80°	-20° to +80°	637
Fiber optic breakout cable Industry HCS I-V(ZN)YY	UL, CSA	FT4					x	x		-30° to +85°	-20° to +85°	644
Fiber optic breakout cable Industry HCS I-V(ZN)Y11Y					x	x				-20° to +80°	-20° to +80°	645
Plastic fiber cable Industry POF/PE I-V2Y, I-V2Y(ZN)11Y		60332-1					x	x		-20° to +80°	-20° to +80°	648
Fiber optic universal cable A/I-DQ(ZN)BH		60332-1			x	x	x			-20° to +60°	-5° to +50°	613
Fiber optic outdoor cable A-DQ(ZN)B2Y (central)							x			-20° to +60°	-5° to +50°	619
Fiber optic outdoor cable A-DQ(ZN)B2Y (stranded)							x			-20° to +60°	-5° to +50°	620
Fiber optic outdoor cable A-DQ(ZN)B2Y (Stranded, fiber combination)							x			-20° to +60°	-5° to +50°	625

T

# HELUWIND® WK 103w-T, WK 103w EMV D-T UV-resistant, UL/CSA-Style 10678/21179

Single-/Multicore



## Technical data

- **Temperature range**  
flexing -35°C to +90°C  
fixed installation -40°C to +90°C  
installation -20°C to +90°C
- **Operating temperature at conductor**  
max. +90°C
- **Nominal voltage**  
VDE U<sub>0</sub>/U 0,6/1 kV  
UL 1000 V
- **Test voltage**  
core/core 4000 V
- **Minimum bending radius**  
flexing 8x cable Ø  
fixed installation 4x cable Ø
- **Torsion application**  
+/- 140° per 1m
- **Approvals**  
Singlecore UL-Style 10678  
Multicore UL-Style 21179  
cRUus
- **Flame test**  
FT1, VW-1, IEC 60332-1

## Cable structure

- Special bare copper conductors, fine stranded acc. to IEC 60228
- Special heat-resistant insulation
- Core identification JZ: black with white numbers + GN-YE conductor
- Multiconductors cabled
- Sheath special heat-resistant compound
- Black sheath

## Properties

- UV-resistant
- multi-climate operation
- torsion tested
- flame-retardant
- oil-resistant
- recyclable
- **easy to assemble**

## Note

Other diameters, part-no. and prices on request. Please contact us with your individual requirements via fax +49 7150 9209 5135.

## Highest permissible Voltage

- DC:  
Conductor/Conductor 1,8 kV  
Conductor/Earth 0,9 kV
- AC: Conductor/Earth 0,7 kV
- Three phase: Conductor/Conductor 1,2 kV

## Application

The WK 103w has been designed for flexible use, and specifically for torsional load in the cable loop of a wind power plant. The voltage level has been configured as 0.6/1 kV for all dimensions, which means that the cables can also be laid in parallel in compliance with UL standards. It is no longer necessary to separate the cable routes. The WK series has been successfully tested with more than 18,000 torsion cycles and thus offers optimum operational reliability far beyond the service life of the wind power plant.

CE= The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

Dimensions and specifications may be changed without prior notice.



# HELUWIND® WK 103k-T, WK 103k EMV D-T

**UV-resistant, UL/CSA-Style 10269/2570 Single-/Multicore, screened/unscreened**

## Technical data

- **Temperature range**  
flexing -40°C to +80°C  
fixed installation -40°C to +80°C  
installation -40°C to +80°C
- **Nominal voltage**  
VDE U<sub>0</sub>/U 0,6/1 kV  
UL 1000 V
- **Test voltage**  
core/core 4000 V
- **Minimum bending radius**  
flexing 8x cable Ø  
fixed installation 4x cable Ø
- **Torsion application**  
+/-140° per 1 m
- **Approvals**  
Singlecore UL-Style 10269  
Multicore UL-Style 2570  
cRUus
- **Flame test**  
FT1, VW-1, IEC 60332-1

## Cable structure

- Special bare copper conductors, fine stranded acc. to IEC 60228
- Special flexible insulation material for low temperatures
- Core identification to DIN 47100  
JZ: black with white numbers + GN-YE conductor
- Multiconductors cabled
- Sheath special heat-resistant compound
- Sheath colour black

## Properties

- UV-resistant
- multi-climate operation
- torsion tested
- flame-retardant
- oil-resistant
- recyclable
- **easy to assemble**

## Note

Other diameters, part-no. and prices on request. Please contact us with your individual requirements via  
fax +49 7150 9209 5135.

### Highest permissible Voltage

- DC:  
Conductor/Conductor 1,8 kV  
Conductor/Earth 0,9 kV
- AC: Conductor/Earth 0,7 kV
- Three phase: Conductor/Conductor 1,2 kV

## Application

The WK 103k has been designed for flexible use, and specifically for torsional load in the cable loop of a wind power plant. The voltage level has been configured as 0.6/1 kV for all dimensions, which means that the cables can also be laid in parallel in compliance with UL standards. It is no longer necessary to separate the cable routes. The WK series has been successfully tested with more than 18,000 torsion cycles and thus offers optimum operational reliability far beyond the service life of the wind power plant.

CE= The product is conformed with the EC Low-Voltage Directive 2006/95/EC..

Dimensions and specifications may be changed without prior notice.



Suitable accessories can be found in Chapter X.

- Cable lug

# HELUWIND® WK 135-T,

## WK 135 D-EMV T UV-resistant, UL/CSA-Style\*\* 10553

/ 20234, Single-/Multicore 90°C (80°C acc. to UL), suitable for offshore



### Technical data

- **Temperature range**  
flexing -40°C to +90°C  
fixed installation -40°C to +90°C  
UL +80°C
- **Operating temperature at conductor**  
max. +90°C
- **Nominal voltage**  
VDE U<sub>0</sub>/U 0,6/1 kV  
UL 1000 V
- **Test voltage**  
core/core 4000 V
- **Minimum bending radius**  
flexing 8x cable Ø  
fixed installation 4x cable Ø
- **Torsion application**  
+/- 150° per 1m
- **Approvals**  
Singlecore UL-Style 10553  
Multicore UL-Style 20234  
cRUus
- **Flame test**  
FT1, IEC 60332-3-24  
UL 758, Cable flame test
- **Halogen free**  
IEC 60754-1
- **Smoke density**  
IEC 61034-1+2
- **Oil**  
acc. to oil res II
- **WTTC** in preparation

### Cable structure

- Special bare copper conductors, fine stranded acc. to IEC 60228
- Insulation special compound
- Core identification  
JZ: black with white numbers + GN-YE conductor or colour code DIN 47100 or VDE 0293 HD 308
- Multiconductors cabled
- Sheath special compound
- Black sheath

### Properties

- halogen-free
- extremely abrasion-resistant
- low adhesion
- high flame retardant
- torsion tested
- suitable for Offshore
- extremely oil resistant
- UV-resistant
- recyclable
- multi climate operation
- designed for CCV application
- **easy to assemble**

### Note

Other diameters, part-no. and prices on request. Please contact us with your individual requirements via fax +49 7150 9209 5135.

### Highest permissible Voltage

- DC:  
Conductor/Conductor 1,8 kV  
Conductor/Earth 0,9 kV
- AC: Conductor/Earth 0,7 kV
- Three phase: Conductor/Conductor 1,2 kV

### Application

The WK 135 has been designed for flexible use, and specifically for torsional load in the cable loop of a wind power plant. The voltage level has been configured as 0.6/1 kV for all dimensions, which means that the cables can also be laid in parallel in compliance with UL standards. It is no longer necessary to separate the cable routes. Thanks to its highly durable sheath and absence of halogen, this cable is ideal for use in offshore wind power plants. The WK series has been successfully tested with more than 18,000 torsion cycles and thus offers optimum operational reliability far beyond the service life of the wind power plant. Advantages of WK 135-T over H07BN4-F: Fire behaviour in accordance with IEC 60332-3-24 Increased wear resistance Recyclable

CE= The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

Dimensions and specifications may be changed without prior notice.

# HELUWIND® WK 137-T /

**WK 137 EMV D-T<sub>FT 4</sub> UV-resistant, suitable for offshore, UL/CSA-Style 10553/20234, Single-/Multicore, 90°C, (80°C according to UL)**



## Technical data

- **Temperature range**  
flexing -40°C to +90°C  
fixed installation -40°C to +90°C  
acc. UL to +80°C
- **Operating temperature at conductor**  
max. +90°C
- **Nominal voltage**  
VDE U<sub>0</sub>/U 0,6/1 kV  
UL 1000 V
- **Test voltage**  
core/core 4000 V  
core/shield 2000 V
- **Minimum bending radius**  
flexing 8x cable Ø  
fixed installation 4x cable Ø
- **Torsion application**  
+/-150° per 1m
- **Approvals**  
Singlecore UL-Style 10553  
Multicore UL-Style 20234  
cRUus
- **Flame test**  
FT 4  
IEC 60332-3-24  
UL 758, Cable flame test
- **Halogen free**  
IEC 60754-1
- **Smoke density**  
IEC 61034-1+2
- **Oil**  
acc. to oil res II
- **WTTC** in preparation

## Application

The WK 137 has been designed for flexible use, and specifically for torsional load in the cable loop of a wind power plant. The voltage level has been configured as 0,6/1 kV for all dimensions, which means that the cables can also be laid in parallel in compliance with UL standards. It is no longer necessary to separate the cable routes. Additionally, this cable meets the strict requirements of CSA flame test FT4 and, thanks to its highly durable sheath and absence of halogen, is ideal for use in offshore wind power plants. The WK series has been successfully tested with more than 18,000 torsion cycles and thus offers optimum operational reliability far beyond the service life of the wind power plant. Advantages of WK 137-T FT4 over H07BN4-F: Fire behaviour in accordance with IEC 60332-3-24 and FT4 Increased wear resistance

CE= The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

Dimensions and specifications may be changed without prior notice.

## Cable structure

- Special bare copper conductors, fine stranded  
acc. to IEC 60228
- Insulation special compound
- Core identification  
JZ: black with white numbers +  
GN-YE conductor or colour code DIN 47100
- Multiconductors cabled
- Sheath special compound SSH
- Black sheath

## Properties

- halogen-free
- extremely abrasion-resistant
- low adhesion
- high flame retardant
- torsion tested
- suitable for Offshore
- extremely oil resistant
- UV-resistant
- multi climate operation
- designed for CCV application
- **easy to assemble**

## Note

Other diameters, part-no. and prices on request. Please contact us with your individual requirements via fax +49 7150 9209 5135.

## Highest permissible Voltage

- DC:  
Conductor/Conductor 1,8 kV  
Conductor/Earth 0,9 kV
- AC: Conductor/Earth 0,7 kV
- Three phase: Conductor/Conductor 1,2 kV



Suitable accessories can be found in Chapter X.

- Cable lug

# HELUWIND® WK 300w-Torsion 1,8/3kV UV-resistant,

also suitable for underground laying



## Technical data

- **Temperatur range**  
flexing -35°C to +90°C  
fixed installation -40°C to +90°C  
installation -20°C to +90°C
- **Operating temperature at conductor**  
max. +90°C
- **Nominal voltage**  
VDE U<sub>0</sub>/U 1,8/3 kV
- **Test voltage**  
9000 V
- **Minimum bending radius**  
flexing 10x cable Ø  
fixed installation 5x cable Ø
- **Torsion application**  
+/-100° per 1m for unscreened version
- **Flame test**  
FT1, VW-1, IEC 60332-1  
flame retardant and self-extinguishing

## Cable structure

- Special bare copper conductor, fine stranded acc. to IEC 60228
- Special heat-resistant insulation black
- Sheath special heat-resistant compound
- Black sheath

## Properties

- UV-resistant
- multi-climate operation
- torsion tested
- flame-retardant
- oil-resistant
- recyclable
- **easy to assemble**
- also for direct burial

## Note

Other diameters, part-no. and prices on request.  
Please contact us with your individual requirements via  
fax +49 7150 9209 5135.

## Application

The WK 300w has been designed for flexible use, and specifically for torsional load in the cable loop of a wind power plant. The WK series has been successfully tested with more than 18,000 torsion cycles and thus offers optimum operational reliability far beyond the service life of the wind power plant. Another special feature is the higher voltage level of 1.8/3 kV. The WK 300w is also designed for flexible installation through ductwork and in the ground. It can be used in power cabling from a converter cabinet to an external transformer station, for example. A conductor temperature of +90° enables a high level of current carrying capacity.

Dimensions and specifications may be changed without prior notice.



Suitable accessories can be found in Chapter X.

- Cable lug

# HELUWIND® WK 310-Torsion 1,8/3kV

UV-resistant, suitable for offshore



## Technical data

- **Temperature range**  
flexing -40°C to +90°C  
fixed installation -40°C to +90°C
- **Operating temperature at conductor**  
max. +90°C
- **Nominal voltage**  
VDE U<sub>0</sub>/U 1,8/3 kV
- **Test voltage**  
9000 V
- **Minimum bending radius**  
flexing 10x cable Ø  
fixed installation 5x cable Ø
- **Torsion application**  
+/-100° per 1m
- **Flame test**  
IEC 60332-3, FT2
- **Halogen free**  
IEC 60754-1
- **Smoke density**  
IEC 61034-1+2
- **Oil test**  
acc. to oil res II

## Cable structure

- Special bare copper conductor, fine stranded  
acc. to IEC 60228
- Special insulation black
- Sheath SSH compound low adhesion
- Black sheath

## Properties

- halogen free
- extremely abrasion resistant
- low adhesion
- high flame retardant
- torsion tested
- suitable for offshore
- extremely oil resistant
- UV resistant
- recyclable
- Multi climate operation
- designed for CCV application
- **easy to assemble**

## Note

Other diameters, part-no. and prices on request.  
Please contact us with your individual requirements via  
fax +49 7150 9209 5135.

## Application

The WK 310 has been designed for flexible use, and specifically for torsional load in the cable loop of a wind power plant. The WK series has been successfully tested with more than 18,000 torsion cycles and thus offers optimum operational reliability far beyond the service life of the wind power plant. Another special feature is the higher voltage level of 1.8/3 kV. The WK 310 can be used instead of the WK 300 in cases where cables need to be halogen-free.

Dimensions and specifications may be changed without prior notice.



Suitable accessories can be found in Chapter X.

- Cable lug



# HELWIND® WK H07BN4-F WIND-Torsion

Torsion +/- 150°/1m, UV-resistant, 750 V/90°C



## Technical data

- **Temperature range**  
Ambient temperature -45°C to +90°C
- **Operating temperature at conductor**  
max. +90°C
- **Nominal voltage**  
450/750 V
- **Test voltage**  
3000 V
- **Minimum bending radius**  
6x cable Ø
- **Torsion application**  
+/- 150° per 1m

## Cable structure

- Special bare copper conductors, fine stranded acc. to IEC 60228
- Insulation Special EPR compound black
- Sheath Special EPR compound
- colour black

## Properties

- UV-resistant

## Note

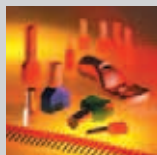
Other diameters, part-no. and prices on request. Please contact us with your individual requirements via fax +49 7150 9209 5135.

## Application

The HELWIND® WK H07BN4-F Wind-Torsion cable is the special version for torsion applications in wind power plants. We supply the leading wind power plant manufacturers with our cables.

CE= The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

Dimensions and specifications may be changed without prior notice.



Suitable accessories can be found in Chapter X.

- Cable lug

**HELUWIND® WK 101 H 0,6/1kV halogen-free****Technical data**

- **Temperature range**  
flexing -40°C to +90°C  
fixed installation -50°C to +100°C  
acc. to UL +80°C
- **Operating temperature at conductor**  
max. +90°C
- **Nominal voltage**  
VDE U<sub>0</sub>/U 0,6/1 kV
- **Test voltage**  
4000 V
- **Minimum bending radius**  
flexing 7,5x cable Ø  
fixed installation 4x cable Ø
- **Halogen free**  
IEC 60754-1

**Cable structure**

- Special bare copper conductors, fine stranded acc. to IEC 60228
- Separating foil wrap
- Insulation special compound black
- Sheath special compound
- Sheath colour black

**Properties**

- halogen-free
- abrasion-resistant
- extremely oil resistant
- UV and ozone resistant
- recyclable
- multi climate application

**Note**

Other diameters, part-no. and prices on request. Please contact us with your individual requirements via fax +49 7150 9209 5135.

**A torsional version for loop application is available on request.**

**Highest permissible Voltage**

- DC:  
Conductor/Conductor 1,8 kV  
Conductor/Earth 0,9 kV
- AC: Conductor/Earth 0,7 kV
- Three phase: Conductor/Conductor 1,2 kV

**Application**

The HELUWIND® WK series has been specifically designed for use in wind power plants. These cables are used in cases that require extremely narrow bending radii and high current carrying capacity levels (+90°C conductor temperature).

CE= The product is conformed with the EC Low-Voltage Directive 2006/95/EC..

Dimensions and specifications may be changed without prior notice.

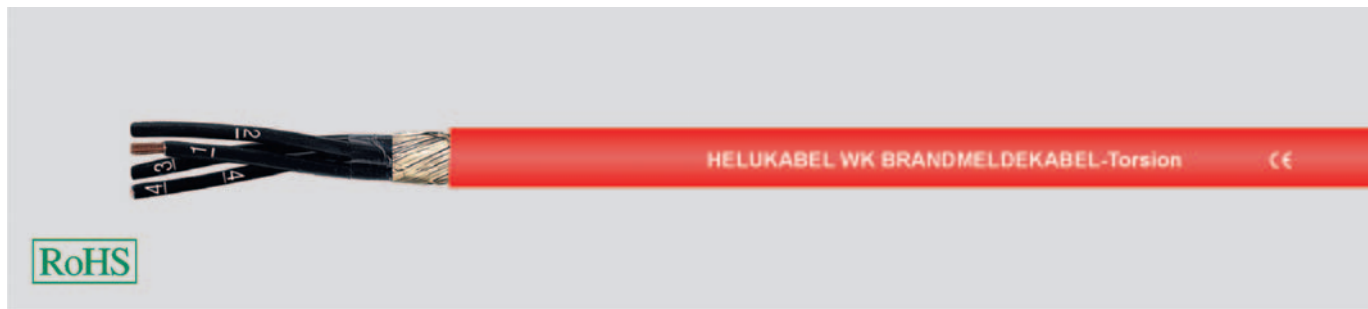


Suitable accessories can be found in Chapter X.

- Cable lug

# HELUWIND® WK Fire Alarm Cable-Torsion

halogen-free, FT1, 24V



## Technical data

- **Temperature range**  
flexing -40°C to +80°C  
fixed installation -50°C to +90°C
- **Nominal voltage**  
300/500 V
- **Test voltage**  
core/core 1500 V  
core/shield 800 V
- **Minimum bending radius**  
10x cable Ø
- **Torsion application**  
3 x 360° on 5m (= 216° je m)
- **Approvals**  
IEC 60332-1, test type B acc. to VDE 0472 Part 804,
- **Flame test**  
FT1

## Cable structure

- Special bare copper conductors, fine stranded acc. to IEC 60228
- Special Polyester insulation
- Core identification (OZ) black with numbers 1 - \_
- Multiconductors cabled
- EMV-shielded types have tinned copper wrapping
- Sheath special polyurethane compound low adhesion
- Sheath colour red RAL 3000

## Properties

- very good oil and petrol-resistance acc. to DIN VDE 0250 and 0472
- good resistance to acids, alkalis and solvents

## Note

Other diameters, part-no. and prices on request. Please contact us with your individual requirements via fax +49 7150 9209 5135.

## Application

This fire alarm cable has been specifically developed for torsion applications in wind power plant loops. We supply the leading wind power plant manufacturers with our cables.

CE= The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

Dimensions and specifications may be changed without prior notice.

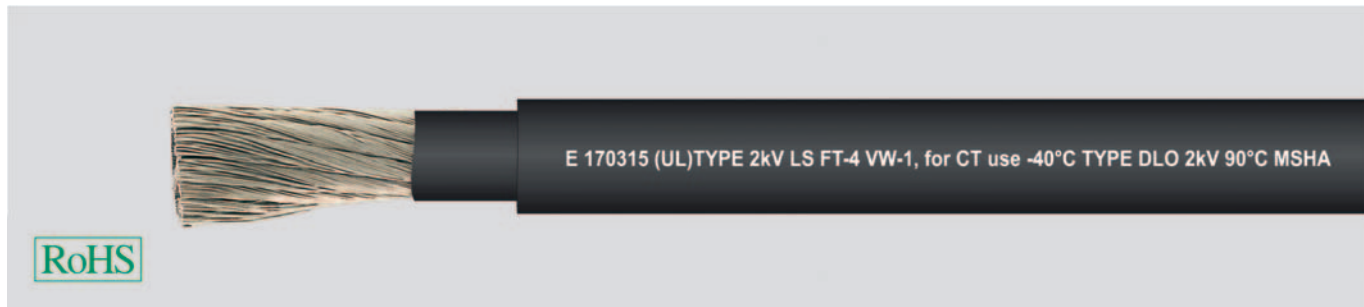


Suitable accessories can be found in Chapter X.

- Cable lug

# HELWIND® WK DLO 2kV FT4, UV-resistant, UL44

1kV, 90°C, VW-1, LS, MSHA



## Technical data

- **Temperature range**  
flexing -40°C to +90°C
- **Nominal voltage**  
DLO 2000 V
- **Approvals**  
UL44, CSA, ICEA S-68-516/NEMA WC-8, MSHA, VW-1, FOR CT USE. LS CERTIFIED
- **Flame test**  
FT4, FT1

## Cable structure

- Tinned copper conductors acc. to ASTM B-172, ASTM B-33
- Special wrapping
- Special EPR insulation
- Special CPE sheath compound, non-adhesive
- Sheath colour black

## Properties

- UV-resistant

## Note

Other diameters, part-no. and prices on request. Please contact us with your individual requirements via fax +49 7150 9209 5135.

## Application

The cable is UL 44 listed. The WK DLO is a flexible cable for continuous tower cabling in wind power plants, right up to the topmost tower segment. For the torsion cable through the cable loop to the generator in the nacelle, we recommend the WK 103 or WK 135.

Dimensions and specifications may be changed without prior notice.



Suitable accessories can be found in Chapter X.

- Cable lug

# HELUWIND® WK Powerline ALU 105°C<sub>0,6/1kV</sub> or <sub>1,8/3kV</sub>, also available as a robust version



## Technical data

- **Temperature range**  
flexing -20°C to +90°C  
fixed installation -40°C to +105°C
- **Operating temperature at conductor**  
max. +105°C
- **Nominal voltage**  
0,6/1 kV
- **Test voltage**  
2,5 kV
- **Minimum bending radius**  
flexing 10x cable Ø  
fixed installation 4x cable Ø
- **Flame test**  
IEC 60332-1
- **Approvals**  
acc. to DIN VDE 0250-813  
UL/CSA in preparation

## Cable structure

- Aluminium conductor, fine stranded wires
- Special insulation black
- Sheath special compound
- black sheath

## Properties

- UV resistant
- oil-resistant
- easy to assemble
- recyclable

## Note

Please ask for our extended notes/information about the properties and for the necessary connection technology.  
Please contact us with your individual requirements via  
fax +49 7150 9209 5135.

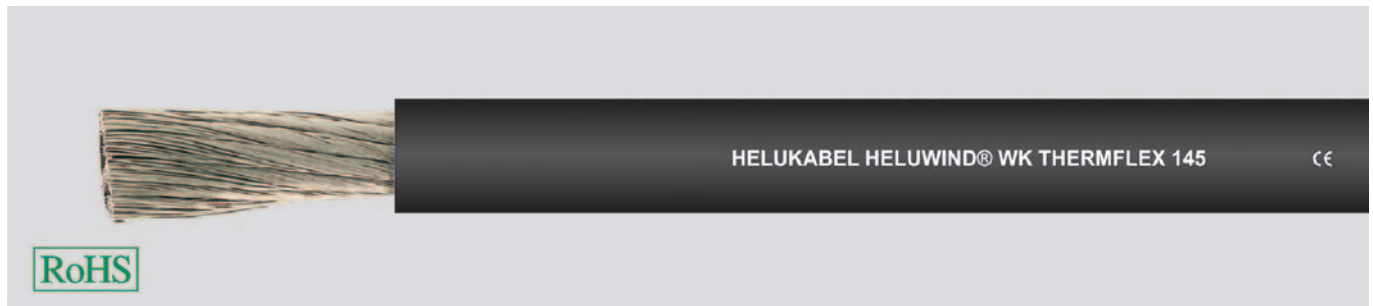
## Application

The WK Powerline ALU is a highly flexible aluminium cable with a finely stranded structure and is designed for use in the power engineering sector; specifically, for power cabling in wind power plants. Thanks to its high degree of flexibility and low tare weight, this cable can be fed into the tower as a single length. This eliminates the need for time-consuming cabling of each individual tower segment. However, its key advantage lies in the process reliability the connection technology offers: using this cable can reduce the number of interruptions between the topmost tower segment and the converter from 90 connection points to just 18 (depending on the number of power cables and tower segments). As a result, the amount of time required for installation can drop from several days to a few hours. For torsion applications, we recommend the WK 103-T, WK 135-T or WK 137-T. The WK Powerline ALU may only be used with certified connection technology from HELUKABEL®: either C8 crimp connections or screwed connections (tested in accordance with IEC 61238-1 Cl. A). See the accessories section of the catalogue. The cable is also available with a halogen-free design, UL/CSA approval or a rated voltage of 1.8/3 kV.

CE= The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

Dimensions and specifications may be changed without prior notice.



**HELWIND® WK THERMFLEX® 145** halogen-free, +145°C**Technical data**

- **Temperature range**  
flexing -20°C to +120°C  
fixed installation -55°C to +145°C
- **Nominal voltage**  
U<sub>0</sub>/U 0,6/1 kV
- **Test voltage**  
4000 V
- **Insulation resistance**  
min. 100 MOhm x km
- **Minimum bending radius**  
flexing 12,5x cable Ø  
fixed installation 4x cable Ø
- **Flame test**  
IEC 60332-3-24 Cat. C

**Cable structure**

- Tinned copper conductors, fine stranded acc. to IEC 60228 cl.5
- Insulation special polyolefin-copolymer, halogen-free, flame retardant
- Sheath colour black

**Properties**

- Halogen-free, no release of corrosive or toxic gases
- Reduced propagation of fire
- Minimal smoke generation
- Good abrasion-resistance
- Good oil and weathering resistance
- Resistant to UV radiation and ozone
- Thermal class B
- **easy to assemble**
- The materials used are silicone and cadmium-free and free of substances harmful to paint adhesion

**Note**

Other diameters, part-no. and prices on request. Please contact us with your individual requirements via fax +49 7150 9209 5135.

**Highest permissible Voltage**

- DC:
  - Conductor/Conductor 1,8 kV
  - Conductor/Earth 0,9 kV
- AC: Conductor/Earth 0,7 kV
- Three phase: Conductor/Conductor 1,2 kV

**Application**

This special cable can be used as a generator connecting cable in wind power plants, for example. Other areas of application: Connecting cable for temperature class B (130°C) in the case of motors, transformers, relays, coils, magnets, and so on. Unit connections in the automotive industry. Halogen-free wiring of switchgear and control cabinets. Connecting cable for heating equipment. Supply line for high-power lighting in industry, sports centres and street lighting

CE The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

Dimensions and specifications may be changed without prior notice.



Suitable accessories can be found in Chapter X.

- Cable lug

**HELUWIND® WK (N)A2XH 0,6/1kV, halogen-free****Technical data**

- **Temperature range**  
fixed installation -40°C to +90°C  
during assembly -5°C to +50°C
- **Operating temperature at conductor**  
max. +90°C
- **Nominal voltage**  
U<sub>0</sub>/U 0,6/1 V
- **Test voltage**  
4 kV
- **Approvals**  
production in according to VDE standards,  
CE compliant
- **Minimum bending radius**  
15 x cable Ø
- **Flame test**  
acc. to DIN VDE 0482 part 266-2,  
BS 4066 part 3, EN 50266-2,  
IEC 60332-3-24 (equivalent  
DIN VDE 0472 part 804 cat. C)
- **Smoke density**  
acc. to DIN VDE 0482 part 268, HD 606,  
EN 50268-12, IEC 61034-1-2,  
BS 7622 Teil 12 (equivalent  
DIN VDE 0472 Teil 816)
- **Corrosivity of combustion gases**  
acc. to VDE 0482 Teil 267,  
DIN EN 50267-2-2, IEC 60754-2  
(equivalent DIN VDE 0472 part 813)
- **Halogen free**  
acc. to DIN VDE 0482 part 267,  
DIN EN 50267-2-1, IEC 60754-1  
(equivalent DIN VDE 0472 part 815)

**Cable structure**

- ALU conductors, stranded conductors acc. to IEC 60228 Cl. 2
- core insulation cross-linked PE
- Core identification black
- Sheath thermoplastic polymer
- black sheath

**Properties**

- Halogen-free
- UV resistant

**Note**

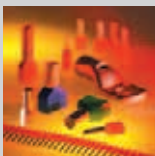
Other diameters, part-no. and prices on request.  
Please contact us with your individual requirements via  
fax +49 7150 9209 5135.

**Application**

The HELUWIND® WK series was specifically designed for wind power applications. We supply the leading wind turbine manufacturers with our cables.

CE= The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

Dimensions and specifications may be changed without prior notice.



Suitable accessories can be found in Chapter X.

- Cable lug







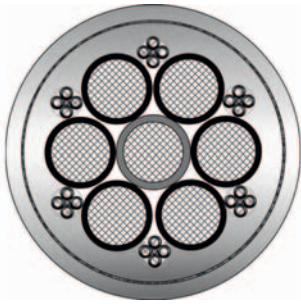


## ■ CABLES FOR AIRCRAFT SUPPLY

<b>Designation</b>	<b>Properties</b>	<b>Page</b>
AIRPORT 400 Hz	easy-to-wind, PUR, halogen-free, flame-retardant	<b>824</b>
AIRPORT 400 Hz	PUR, halogen-free, flame-retardant	<b>825</b>



# AIRPORT 400 Hz trailing, PUR, halogen-free, flame retardant



## Technical data

- **Temperature range**  
-40°C to +90°C
- **Nominal voltage**  
115/200 V
- **Operating voltage**  
 $U_0/U$  0,6/1 kV
- **Test voltage**  
4000 V
- **Minimum bending radius**  
flexing 7x cable  $\emptyset$   
fixed installation 4x cable  $\emptyset$

## Cable structure

- Fine copper wire in acc. with DIN VDE 0295 and IEC 60228
- Core insulation PP, black with number 1-6 + blue/..., with number 7-30/1 mm<sup>2</sup>
- 4 cores each 1 mm<sup>2</sup> twisted to a quad
- Cores and 6 bundles laid-up together
- PUR inner sheath
- Support braiding
- PUR outer sheath, orange (RAL 2003)

### Part no. 702801

- Bare copper conductor, 7 strands
- Core insulation cross-linked polyethylene, black with number 1-6 + blue
- Polyethylene inner sheath
- Concentric conductor of plain Cu wires, cross-section 35 mm<sup>2</sup>
- Black polyethylene outer sheath

## Properties

- Low adhesion, abrasion resistant, halogen-free, resistant to UV-, oil-, hydrolysis and microbial attack

### Special feature:

The use of four-core cables to transmit large amounts of power in a 400 Hz grid results in voltage asymmetries and larger inductive voltage losses. These unfavourable cable characteristics can be improved through the employment of seven-core cables. In this case the central core is used as a earth conductor (blue) and six cores with the same cross-section (black with imprint) stranded in a single layer around the central core. Each pair of two opposite cores is connected in parallel to a phase conductor.

### Note

- Distribution only over authorised partner

## Application

400 Hz cables are used to supply power to aircraft (on-board power), data processing systems, radar stations, radio stations, etc. For safety reasons, 400 Hz cables are used to connect data processing systems, radar systems and communications systems to uninterruptible power supplies. Such power supplies prevent a total failure of power and compensate for frequency and voltage fluctuations. Suitable for installation indoors, outdoors. Applications: Below floor level cable dispensers (drums), attached to jetways and retractable articulated cable carries.

☑= The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer $\emptyset$ app. mm	Cop. weight kg / km	Weight app. kg / km	AWG-No.
700573	7 x 25 + 6 x 4 x 1,0	41,0	1910,0	2140,0	4
770009	7 x 35 + 6 x 4 x 1,0	42,5	2625,0	2950,0	2
700574	7 x 50 + 6 x 4 x 1,0	51,0	3590,0	4030,0	1

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer $\emptyset$ app. mm	Cop. weight kg / km	Weight app. kg / km	AWG-No.
702801	7 G 35	35,8	2746,0	3050,0	2

Dimensions and specifications may be changed without prior notice.

# AIRPORT 400 Hz trailing, PUR, halogen-free, flame retardant



## Technical data

- **Temperature range**  
-40°C to +90°C
- **Nominal voltage**  
115/200 V
- **Operating voltage**  
 $U_o/U$  0,6/1 kV
- **Test voltage**  
4000 V
- **Minimum bending radius**  
6x cable Ø

## Cable structure

- Part Nos. 700566-700569**
- Fine copper wire in acc. with DIN VDE 0295 and IEC 60228
  - Special plastic core insulation
  - Sheath colour yellow (RAL 1021)
- Part Nos. 700570, 770001-770003**
- Fine copper wire in acc. with DIN VDE 0295 and IEC 60228
  - Core insulation PP/PUR, grey with number 1-4/1 mm<sup>2</sup>
  - Core 1 mm<sup>2</sup> stranded with bundle conductor
  - Double-sheath PUR/PUR
  - Sheath colour yellow (RAL 1021)
- Part Nos. 700571, 770005, 770004, 700572**
- Each set of 4 parts, 700570, 770001-770003, is stranded

## Properties

- Part Nos. 700570, 770001-770003**
- Low adhesion, abrasion resistant, halogen-free, resistant to UV-, oil-, hydrolysis and microbial attack

## Note

- Distribution only over authorised partner

## Application

400 Hz cables are used to supply power to aircraft (on-board power), data processing systems, radar stations, radio stations, etc. For safety reasons, 400 Hz cables are used to connect data processing systems, radar systems and communications systems to uninterruptible power supplies. Such power supplies prevent a total failure of power and compensate for frequency and voltage fluctuations. Suitable for installation indoors, outdoors. Highly flexible, and can thus be plugged directly into the connector in the aircraft without an adapter, and without endangering the contacts.

CE The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer Ø app. mm	Cop. weight kg / km	Weight app. kg / km	AWG-No.
700566	1 x 35	11,5	336,0	430,0	2
700570	1 x 35 + 4 x 1,0	16,1	375,0	490,0	2
700567	1 x 50	12,6	480,0	665,0	1
770001	1 x 50 + 4 x 1,0	17,0	519,0	600,0	1
700568	1 x 70	14,0	672,0	910,0	2/0
770002	1 x 70 + 4 x 1,0	20,5	711,0	800,0	2/0
700569	1 x 120	23,0	1152,0	1545,0	4/0
770003	1 x 120 + 4 x 1,0	25,0	1191,0	1400,0	4/0

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer Ø app. mm	Cop. weight kg / km	Weight app. kg / km	AWG-No.
700571	4 x 1 x 35 + 4 x 1,0	33,0	1498,0	2600,0	2
770005	4 x 1 x 50 + 4 x 1,0	40,0	2074,0	3900,0	1
770004	4 x 1 x 70 + 4 x 1,0	49,2	2844,0	4300,0	2/0
700572	4 x 1 x 120 + 4 x 1,0	56,0	4765,0	7400,0	4/0

Dimensions and specifications may be changed without prior notice.



## ■ CABLES FOR COMMERCIAL VEHICLES

<b>Designation</b>	<b>Properties</b>	<b>Page</b>
HELUTRUCK® 270	with ADR approval, PVC, low-voltage cable for commercial vehicles	<b>828</b>
HELUTRUCK® 271	with ADR approval, PUR, low-voltage cable for commercial vehicles	<b>829</b>
HELUTRUCK® 272	with ADR approval, ribbon cable for side marker lights	<b>830</b>
HELUTRUCK® 273	Battery cable, battery charging cable, twin cable	<b>831</b>



# HELUTRUCK® 270 (FLRY) with ADR-approval, PVC low voltage cable for commercial vehicles



## Technical data

- **Temperature range**  
-40°C to +85°C
- **Test voltage**  
2000 V min. 5 minutes
- **Capacitance**  
max. 50 pF/m for the data pair  
max. 100 pF/m between data pair cores and the other cores
- **Insulation resistance**  
min. 20 MOhm x km
- **Minimum bending radius**  
12x cable Ø

## Cable structure

- Bare copper-conductor, to DIN VDE 0295 cl.5, fine-wire, IEC 60228 cl.5
- Core insulation of cold-resistant special PVC
- Core identification coloured, see table below
- Outer sheath of special PVC also available with PUR sheath
- Sheath colour black

## Properties

- Cold-resistant special PVC sheath, UV-resistant
- Largely resistant to oil, weather, and chemicals; Chemical resistance (see table Technical Information)

## Tests

- PVC self-extinguishing and flame retardant acc. to DIN VDE 0482-332-1-2, DIN EN 60332-1-2, IEC 60332-1 (equivalent DIN VDE 0472 part 804 test method B)
- These cables conform to the national standard ISO 4141 and the international standard DIN/ISO 6722
- Component codes TÜ.EGG.073-03

## Special feature:

- Complies with GGVS regulations
- Approved and tested by the TÜV
- Complies with ADR regulations

## Note

- Further sizes are available on request.

## Application

These low-voltage cables are designed for the wiring of electrical installations in the manufacture of commercial vehicles. Due to the ADR-approval especially suitable for trailers and semitrailers manufactured for the transport of GGVS hazardous substances.

Part no.	No. cores x cross-sec. mm²	Outer Ø app. mm	Cop. weight kg / km	Weight app. kg / km	AWG-No.
700016	2 x 0,5	4,8	9,6	40,0	20
700575	2 x 0,75 + 2 x 1,5	7,0	43,2	91,0	18
702179	3 x 0,75	5,3	21,6	52,4	17
700582	7 x 0,75	7,3	50,4	101,0	18
75255	2 x 1	6,0	19,2	56,0	17
75254	2 x 1	6,0	19,2	56,0	17
75256	3 x 1	6,3	28,8	66,0	17
700578	3 x 1	6,6	28,8	66,0	17
75257	4 x 1	6,8	38,4	80,0	17
75258	5 x 1	7,5	48,0	98,0	17
75260	5 x 1 + 1 x 2,5	9,0	72,0	132,0	17
700580	5 x 1 + 1 x 2,5	9,0	72,0	132,0	17
75259	5 x 1 + 1 x 2,5	9,0	72,0	132,0	17
700581	5 x 1 + 1 x 2,5	9,0	72,0	132,0	17
700849	5 x 1 + 1 x 2,5	9,3	65,7	149,5	16
700576	2 x 1,5	6,6	28,8	66,0	16
700577	2 x 1,5	6,6	28,8	66,0	16

Part no.	No. cores x cross-sec. mm²	Outer Ø app. mm	Cop. weight kg / km	Weight app. kg / km	AWG-No.
700579	4 x 1,5	7,5	57,6	106,0	16
700407	8 x 1,5 + 1 x 2,5	11,5	139,2	238,0	16
75262	6 x 1,5 + 1 x 2,5	10,3	110,5	187,0	16
700032	7 x 1,5	10,3	100,8	185,0	16
75261	7 x 1,5	8,9	100,2	165,0	16
75263	8 x 1,5 + 1 x 2,5	11,7	139,2	238,0	16
700583	8 x 1,5 + 5 x 2,5	14,8	235,2	360,0	16
75267	9 x 1,5 + 4 x 2,5	14,8	200,0	350,0	16
75265	10 x 1,5 + 3 x 2,5	12,5	168,0	366,0	16
75319	10 x 1,5 + 3 x 2,5 + 2 x 1,5	14,4	244,8	393,0	16
700017	10 x 1,5 + 3 x 2,5 + 2 x 1,5	14,3	244,8	391,0	16
705167	10 x 1,5 + 3 x 2,5 + 2 x 1,5	14,4	244,8	393,0	16
75266	10 x 1,5 + 3 x 2,5	13,0	216,0	345,0	16
700018	11 x 1,5 + 3 x 2,5	13,5	230,4	365,0	16
700142	3 x 2,5 + 4 x 1,5	10,3	129,6	221,0	14
706627	4 x 6 + 1 x 1,5	13,7	244,8	411,0	18

Dimensions and specifications may be changed without prior notice.

Part No.	Core colours
700016	WH, BK
700575	0,75 mm² WH, BN + 1,5 mm² GN, YE
702179	BU, BN, GN-YE
700582	WH, BK, YE, RD, GN, BN, BU
75255	WH, BN
75254	WH, BK
75256	BK, BU, BN
700578	WH, BN, BU
75257	WH, BK, RD, BN
75258	WH, BN, GN, RD, GY
75260	1 mm² YE, BK, RD, BU, VT + 2,5 mm² WH
700580	1 mm² BN, GN, RD, GY, VT + 2,5 mm² WH
75259	1 mm² GN, BN, RD, BU, VT + 2,5 mm² WH
700581	1 mm² BN, YE, RD, GY, VT + 2,5 mm² WH
700849	1 mm² GN-YE, BN/BK, BU, RD, VT + 2,5 mm² WH
700576	WH, BK
700577	WH, BN

Part No.	Core colours
700579	WH, BK, RD, BN
700407	1,5 mm² BK, BU, GN, YE, VT, GY, RD, BN + 2,5 mm² WH
75262	1,5 mm² BK, YE, RD, GN, BN, BU + 2,5 mm² WH
700032	PK, BU, OG, WH/RD, WH/GN, WH/BU, WH/BK
75261	WH, BK, YE, RD, GN, BN, BU
75263	1,5 mm² BK, YE, RD, GN, BN, BU, GY, VT + 2,5 mm² WH
700583	1,5 mm² YE, BU, GN, BN, RD, BK, PK, WH/BU + 2,5 mm² WH, OG, GY, WH/BK, WH/RD
75267	WH with number, 1,5 mm² 2, 4-8, 10-12 + 2,5 mm² 1, 3, 9, 13
75265	WH with number, 1,5 mm² 1-2, 4-8, 10-12 + 2,5 mm² 3, 9, 13
75319	WH with number, 1,5 mm² 1-3, 5-8, 10-12 + 2,5 mm² 4, 9, 13 + 1,5 mm² data pair 14-15
700017	1,5 mm² WH/BU, WH/BK, YE, GN, BU, BK, BN, RD, VT, GY + 2,5 mm² WH, OG, WH/RD + 1,5 mm² WH/BR, WH/GN
705167	1,5 mm² WH/BU, WH/BK, YE, GN, BU, BK, BN, RD, VT, GY + 2,5 mm² WH, OG, WH/RD + 1,5 mm² WH/BR, WH/GN
75266	WH with number, 1,5 mm² 1, 2, 4-8, 10-12 + 2,5 mm² 3, 9, 13
700018	1,5 mm² WH/BN, WH/GN, OG, WH/RD, WH/BU, WH/BK, PK, BU, YE, GN, RD + 2,5 mm² WH, BN, BK
700142	2,5 mm² WH, BN, BK + 1,5 mm² WH/BN, GY, YE, RD
706627	6 mm² BN, RD, BK, BU + 1,5 mm² GY



# HELUTRUCK® 271 (FLRYY11Y) with ADR-approval, PUR low voltage cable for commercial vehicles



## Technical data

- **Temperature range**  
-40°C to +85°C
- **Test voltage**  
2000 V min. 5 minutes
- **Capacitance**  
max. 50 pF/m for the data pair  
max. 100 pF/m between data pair  
cores and the other cores
- **Insulation resistance**  
min. 20 MOhm x km
- **Minimum bending radius**  
12x cable Ø

## Cable structure

- Bare copper-conductor, to DIN VDE 0295 cl.5, fine-wire, IEC 60228 cl.5
- Core insulation of cold-resistant special PVC
- Core identification see table below
- Inner sheath of special PVC
- Outer sheath of PUR also available with PVC sheath
- Sheath colour black

## Properties

- PUR outer sheath, low adhesion, abrasion resistant, halogen-free, resistant to UV-, oil-, hydrolysis and microbial attack
- Largely resistant to oil, weather, and chemicals; Chemical resistance (see table Technical Information)

## Tests

- These cables conform to the national standard ISO 4141 and the international standard DIN/ISO 6722
- Component codes TÜ.EGG.074-03

## Special feature:

- Complies with GGVS regulations
- Approved and tested by the TÜV
- PUR sheath provides high resistance to abrasion, UV and wear
- Complies with ADR regulations

## Note

- Further sizes are available on request.

## Application

These low-voltage cables are designed for the wiring of electrical installations in the manufacture of commercial vehicles. Due to the ADR-approval especially suitable for trailers and semitrailers manufactured for the transport of GGVS hazardous substances.

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer Ø app. mm	Cop. weight kg / km	Weight app. kg / km	AWG-No.
708090	9 x 0,5 + 4 x 2,5 + 2 x 0,5	12,0	148,0	490,0	16
709556	2 x 0,75	5,4	14,4	45,8	18
700585	2 x 0,75 + 2 x 1,5	7,0	43,2	91,0	18
700592	7 x 0,75	7,9	50,4	100,0	18
75528	2 x 1	6,0	19,0	56,0	17
75529	2 x 1	6,0	19,0	56,0	17
75530	3 x 1	6,3	28,8	66,0	17
700588	3 x 1	6,3	28,8	66,0	17
75531	4 x 1	6,8	38,5	80,0	17
75532	5 x 1	7,5	48,1	98,0	17
700591	5 x 1 + 1 x 2,5	9,0	72,0	132,0	17
75533	5 x 1 + 1 x 2,5	9,0	72,0	132,0	17
700590	5 x 1 + 1 x 2,5	9,0	72,0	132,0	17
75534	5 x 1 + 1 x 2,5	9,0	72,0	132,0	17
705135	7 x 1	8,6	68,0	133,1	17
700586	2 x 1,5	6,6	28,8	67,0	16

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer Ø app. mm	Cop. weight kg / km	Weight app. kg / km	AWG-No.
700587	2 x 1,5	6,6	28,8	67,0	16
700589	4 x 1,5	7,5	57,6	105,0	16
75536	6 x 1,5 + 1 x 2,5	10,3	110,4	187,0	16
75535	7 x 1,5	8,9	100,8	165,0	16
75537	8 x 1,5 + 1 x 2,5	11,7	139,2	238,0	16
75539	10 x 1,5 + 3 x 2,5	14,4	214,0	366,0	16
700594	10 x 1,5 + 3 x 2,5	14,4	214,0	366,0	16
75538	10 x 1,5 + 3 x 2,5 + 2 x 1,5	14,4	244,8	393,0	16
700595	18 x 1,5	17,0	259,2	520,0	16
700596	25 x 1,5	19,9	360,0	730,0	16
701045	2 x 2,5	7,6	48,0	104,9	16
701044	2 x 2,5 + 5 x 1,5	10,3	120,0	214,4	16
75932	2 x 4 + 3 x 1,5 + 2 x 1,5	12,0	148,8	230,0	12
75541	2 x 6 + 3 x 1,5 + 2 x 1,5	12,0	187,2	320,0	10
75540	2 x 6 + 3 x 1,5	12,0	158,6	270,0	10

Dimensions and specifications may be changed without prior notice.

Part No.	Core colours
708090	WH with number, 2,5 mm <sup>2</sup> 1-3 + 0,5 mm <sup>2</sup> WH 4-14
709556	WH, BK
700585	0,75 mm <sup>2</sup> WH, BN + 1,5 mm <sup>2</sup> GN, YE
700592	WH, BK, YE, RD, GN, BN, BU
75528	WH, BK
75529	WH, BN
75530	BK, BU, BN
700588	WH, BN, BU
75531	WH, BK, RD, BN
75532	WH, BN, GN, RD, GY
700591	1 mm <sup>2</sup> BN, YE, RT, GY, VT + 2,5 mm <sup>2</sup> WH
75533	1 mm <sup>2</sup> GN, BN, RT, BU, VT + 2,5 mm <sup>2</sup> WH
700590	1 mm <sup>2</sup> BN, GN, RT, GY, VT + 2,5 mm <sup>2</sup> WH
75534	1 mm <sup>2</sup> YE, BK, RT, BU, VT + 2,5 mm <sup>2</sup> WH
705135	WH, BK, YE, RD, GN, BN, BU
700586	WH, BK

Part No.	Core colours
700587	WH, BN
700589	WH, BK, RD, BN
75536	1,5 mm <sup>2</sup> BK, YE, RD, GN, BN, BU + 2,5 mm <sup>2</sup> WH
75535	WH, BK, YE, RD, GN, BN, BU
75537	1,5 mm <sup>2</sup> BK, YE, RD, GN, BN, BU, GY, VT + 2,5 mm <sup>2</sup> WH
75539	WH with number, 1,5 mm <sup>2</sup> 1-3, 5-8, 10-12 + 2,5 mm <sup>2</sup> 4, 9, 13
700594	1,5 mm <sup>2</sup> YE, GN, BU, BK, BN, RD, PK, GY, WH/BK, WH/BU + 2,5 mm <sup>2</sup> WH, OG, WH/RD
75538	WH with number, 1,5 mm <sup>2</sup> 1-3, 5-8, 10-12 + 2,5 mm <sup>2</sup> 4, 9, 13 + 1,5 mm <sup>2</sup> data pair 14-15
700595	WH with number
700596	WH with number
701045	WH, BK
701044	2,5 mm <sup>2</sup> BN, RD + 1,5 mm <sup>2</sup> BU, BN, YE, RD, GN
75932	4 mm <sup>2</sup> RD, BN + 1,5 mm <sup>2</sup> BK, YE, WH + 1,5 mm <sup>2</sup> data pair WH/GY, WH/BN
75541	6 mm <sup>2</sup> RD, BN + 1,5 mm <sup>2</sup> BK, YE, WH + 1,5 mm <sup>2</sup> data pair WH/GY, WH/BN
75540	6 mm <sup>2</sup> RD, BN + 1,5 mm <sup>2</sup> BK, YE, WH

# HELUTRUCK® 272 (FLRYF) with ADR-approval, flat cable for the sideways lighting



## Technical data

- Flat cable for the sideways lighting (FLRYF)
- **Temperature range**  
-40°C to +85°C
- **Test voltage**  
2000 V
- **Insulation resistance**  
min. 20 MOhm x km
- **Minimum bending radius**  
fixed installation 5x cable Ø

## Cable structure

- Bare copper-conductor, to DIN VDE 0295 cl.5, fine-wire, IEC 60228 cl.5
- Core insulation of cold resistant special PVC
- Core identification  
Art.-Nr. 76706 BK, WH  
Art.-Nr. 78983 WH, BN  
Art.-Nr. 700035 BK, WH
- Outer sheath of cold-resistant special PVC also available with PUR sheath
- Sheath colour black

## Properties

- Cold resistant, UV-resistant, largely resistant to oil, weather, and chemicals, Chemical resistance see table TechnicalInformation
- Polarity easy to determine by a white line on the sheath above the white core

## Tests

- PVC self-extinguishing and flame retardant acc. to DIN VDE 0482-332-1-2, DIN EN 60332-1-2, IEC 60332-1 (equivalent DIN VDE 0472 part 804 test method B)

## Special feature

- Complies with GGVS regulations
- Approved and tested by the TÜV
- Complies with ADR regulations

## Note

- Further sizes are available on request.

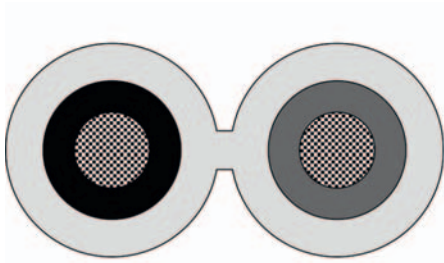
## Application

This low-voltage cable is designed for the wiring of electrical installations in the manufacture of commercial vehicles. Especially suitable for trailers and semitrailers. This flat cable can be used for simple and quick contacting of sidelights by means of core penetration. Its flat construction and the special contacting method eliminate the need for time-consuming assembly of cables. This facilitates quick installation, making it possible to save a great deal of time. ADR approval for transport of hazardous substances by trailers and semitrailers.

## HELUTRUCK® 272

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer dimension app. mm	Cop. weight kg / km	Weight app. kg / km	AWG-No.
76706	2 x 1,5	4,5 x 6,8	28,8	90,0	16
700035	2 x 1,5	4,5 x 6,8	28,8	90,0	16
78983	2 x 1,5	4,5 x 6,8	28,8	90,0	16

Dimensions and specifications may be changed without prior notice.

**HELUTRUCK® 273** battery cable, battery charging cable, twin cable**Technical data**

- Battery cable, battery charging cable (twin cable)
- **Temperature range**  
-40°C to +85°C
- **Nominal voltage**  
75 V DC
- **Test voltage**  
3000 V
- **Insulation resistance**  
min. 20 MOhm x km
- **Minimum bending radius**  
fixed installation 15x cable Ø

**Cable structure**

- Bare copper-conductor, to DIN VDE 0295 cl.5, fine-wire, IEC 60228 cl.5
- Core insulation of cold-resistant special PVC
- Core identification RD, BK
- Outer sheath of cold-resistant special PVC also available with PUR sheath
- Sheath colour transparent

**Properties**

- Cold resistant, UV-resistant, largely resistant to oil, weather, and chemicals, Chemical resistance see table Technical Information
- The additional sheath means that the cable is very robust, and can be installed without a corrugated conduit
- Installation time is shorter due to twin design
- The special construction of the conductor enables optimal crimping
- Easy mechanical separation of the sheath web

**Tests**

- PVC self-extinguishing and flame retardant acc. to DIN VDE 0482-332-1-2, DIN EN 60332-1-2, IEC 60332-1 (equivalent DIN VDE 0472 part 804 test method B)

**Note**

- Further sizes are available on request.

**Application**

This battery cable can be used between the battery and the ultimate consumer (e.g. DC motor of the tail-lift).

CE= The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

**HELUTRUCK® 273**

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer dimension app. mm	Cop. weight kg / km	Weight app. kg / km	AWG-No.
75507	2 x 2,5	5,6 x 28,8	48,0	87,0	14
75508	2 x 4	6,6 x 14,8	77,0	125,0	12
75509	2 x 6	6,8 x 14,6	116,0	175,0	10
75510	2 x 10	8,1 x 17,2	192,0	270,0	8
75511	2 x 16	8,9 x 18,5	308,0	390,0	6
75512	2 x 25	10,7 x 21,7	480,0	575,0	4
75513	2 x 35	12,8 x 26,6	672,0	820,0	2
75514	2 x 50	14,1 x 29,2	960,0	1065,0	1
709043	2 x 70	16,1 x 33,2	1344,0	1475,0	2/0

Dimensions and specifications may be changed without prior notice.

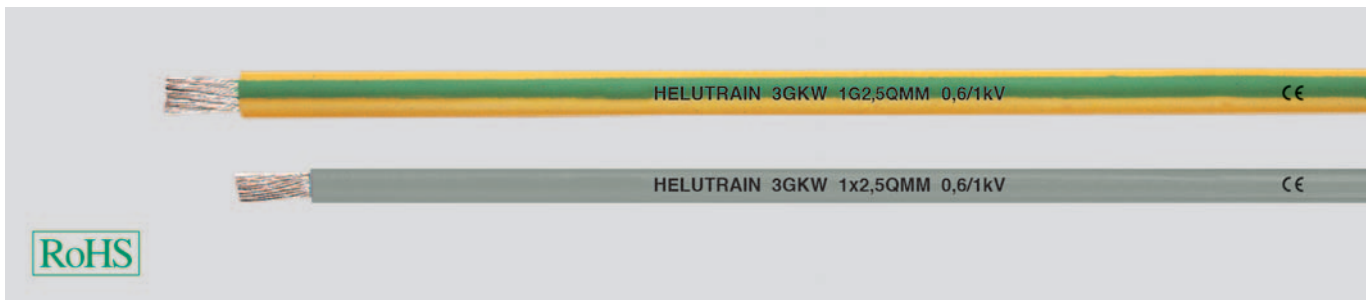




## ■ CABLES FOR TRAIN & TRAFFIC

Designation	Properties	Approvals	Page
HELUTRAIN® 3GKW	train cable, robust special core cable, halogen-free 0.6/1 kV	ERC	834
HELUTRAIN® 4GKW-AXplus	single-core train cable, robust halogen-free, 1.8/3kV meter marking	ERC	835
Vehicle cable FLY	one colour / two color /old type FLK), in accordance with DIN ISO 6722		836
Vehicle cable FLY	one colour / two color /old type FLK), in accordance with DIN ISO 6722		837
Vehicle cable FLY	one colour / two color /old type FLK), in accordance with DIN ISO 6722		838
Vehicle cable FLRY	FLRY -type A (FLK-R)/ -type B (FLK-D)		839



**HELUTRAIN® 3GKW** Train-Cable, robust special single core, halogen-free,**0,6/1kV****Technical data**

- Temperature resistant special-insulated wire
- **Temperature range**  
flexing -35°C to +90°C  
fixed installation -45°C to +120°C
- **Short-circuit temperature**  
+250°C
- **Nominal voltage**  
U<sub>0</sub>/U 0,6/1 kV (AC)  
U<sub>0</sub>/U 0,9/1,8 kV (DC)
- **Test voltage**  
3,5 kV
- **Minimum bending radius**  
fixed installation for outer Ø  
up to 10 mm 3x outer Ø  
> 10 mm 4x outer Ø  
flexing for outer Ø  
up to 10 mm 5x outer Ø  
> 10 mm 6x outer Ø

**Cable structure**

- Tinned copper, fine wire conductors, conform to DIN VDE 0295 cl.5 and IEC 60228 cl.5
- Core insulation from Polyolefin Copolymer, cross-linked
- Colour grey or green-yellow

**Properties**

- The materials used in manufacture are cadmium-free and contain no silicone and free from substances harmful to the wetting properties of lacquers
- Resistant to mechanical influences in rough environmental conditions
- Good chemical durability with simultaneous high fire safety
- Reduction of toxic combustion gases and the spread of the fire source in case of fire increases protection against personal injury and property damage

**Tests**

- Flame test acc. to  
DIN VDE 0482-332-3, BS 4066 part 3,  
DIN EN 60332-3, IEC 60332-3 (previously  
DIN VDE 0472 part 804 test method C)
- Flame retardant acc. to  
DIN VDE 0482-331-1-2, DIN EN 60332-1-2,  
IEC 60332-1
- Corrosiveness of combustion gases  
acc. to DIN VDE 0482 part 267,  
DIN EN 50267-2-2, IEC 60754-2  
(equivalent DIN VDE 0472 part 813)
- Halogen-free acc. to DIN VDE 0482  
part 267, DIN EN 50267-2-1, IEC 60754-1  
(equivalent DIN VDE 0472 part 815)
- Smoke density acc. to DIN VDE 0482  
part 1034-1+2, DIN EN 61034-1+2,  
IEC 61034-1+2, BS 7622 part 1+2  
(equivalent DIN VDE 0472 part 816)
- Oil- and gasoline resistant to  
EN 50305
- Ozon resistant to EN 50305
- Low fire load (DIN 51900)
- No fluor (EN 60684-2)

**Application**

HELUTRAIN® 3 GKW train cable are Halogen-free and suitable for fixed and protected installation in rough environmental conditions inside and outside of rail vehicles. For connecting fixed and moving parts. Due to the flexibility and the small outer diameter suitable for fixed installation in small bending radii.

CE= The product is conformed with the EC Low-Voltage Directive 2006/95/EC..

**Core colour grey**

Part no.	No.cores x cross-sec. mm <sup>2</sup>	Outer Ø app. mm	Cop. weight kg / km	Weight app. kg / km	AWG-No.
59114	1 x 0,5	2,0	4,8	9,0	-
59115	1 x 0,75	2,2	7,2	12,0	-
59116	1 x 1	2,4	9,6	14,0	-
59117	1 x 1,5	2,7	14,4	21,0	-
59118	1 x 2,5	3,4	24,0	31,0	-
59119	1 x 4	3,9	38,4	46,0	-
59126	1 x 6	4,6	57,6	68,0	-
59127	1 x 10	5,5	96,0	111,0	-
59128	1 x 16	7,1	154,0	166,0	-
59129	1 x 25	8,6	240,0	250,0	-
59130	1 x 35	9,8	336,0	350,0	-
59131	1 x 50	12,0	480,0	500,0	-
59132	1 x 70	14,2	672,0	690,0	-
59133	1 x 95	15,6	912,0	940,0	-
59134	1 x 120	17,6	1152,0	1180,0	-
59135	1 x 150	20,3	1440,0	1460,0	-

**Core colour green-yellow**

Part no.	No.cores x cross-sec. mm <sup>2</sup>	Outer Ø app. mm	Cop. weight kg / km	Weight app. kg / km	AWG-No.
53762	1 x 0,5	2,0	4,8	9,0	-
53763	1 x 0,75	2,2	7,2	12,0	-
53764	1 x 1	2,4	9,6	14,0	-
53765	1 x 1,5	2,7	14,4	21,0	-
53766	1 x 2,5	3,4	24,0	31,0	-
53767	1 x 4	3,9	38,4	46,0	-
53768	1 x 6	4,6	57,6	68,0	-
53769	1 x 10	5,5	96,0	111,0	-
53770	1 x 16	7,1	154,0	166,0	-
53771	1 x 25	8,6	240,0	250,0	-
53772	1 x 35	9,8	336,0	350,0	-
53773	1 x 50	12,0	480,0	500,0	-
53774	1 x 70	14,2	672,0	690,0	-
53775	1 x 95	15,6	912,0	940,0	-
53776	1 x 120	17,6	1152,0	1180,0	-
53777	1 x 150	20,3	1440,0	1460,0	-

Dimensions and specifications may be changed without prior notice. (RK01)

# HELUTRAIN® 4GKW-AXplus Train-Cable, robust special single core, halogen-free, 1,8/3kV, meter marking



## Technical data

- **Temperature range**  
fixed installation: -60°C to +120°C  
flexing: -35°C to +90°C  
short circuit: +200°C
- **Nominal voltage**  
U<sub>0</sub>/U 1,8/3 kV (AC)  
U<sub>0</sub>/U 2,7/5,4 kV (DC)
- **Test voltage**  
6,5 kV AC
- **Minimum bending radius**  
fixed installation for outer Ø  
up to 10 mm 5x outer Ø  
> 10 mm 6x outer Ø  
flexing for outer Ø  
up to 10 mm 7x outer Ø  
> 10 mm 8x outer Ø

## Cable structure

- Tinned copper conductor, fine wire stranded acc. to DIN VDE 0295 cl.5, BS 6360 cl.5 or IEC 60228 cl.5
- Core insulation of cross-linked polyolefin copolymer
- Outer sheath of cross-linked Elastomer
- Sheath colour black

## Properties

- The materials used in manufacture are cadmium-free and contain no silicone and free from substances harmful to the wetting properties of lacquers
- ### Tests
- Flame test acc. to DIN VDE 0482-332-3, BS 4066 part 3, DIN EN 60332-3, IEC 60332-3 (previously DIN VDE 0472 part 804 test method C)
  - Flame retardant acc. to DIN VDE 0482-331-1-2, DIN EN 60332-1-2, IEC 60332-1
  - Corrosiveness of combustion gases acc. to DIN VDE 0482 part 267, DIN EN 50267-2-2, IEC 60754-2 (equivalent DIN VDE 0472 part 813)
  - Halogen-free acc. to DIN VDE 0482 part 267, DIN EN 50267-2-1, IEC 60754-1 (equivalent DIN VDE 0472 part 815)
  - Smoke density acc. to DIN VDE 0482 part 1034-1+2, DIN EN 61034-1+2, IEC 61034-1+2, BS 7622 part 1+2 (equivalent DIN VDE 0472 part 816)
  - No toxic gases (EN 50305)
  - Oil- and gasoline resistant to EN 50305
  - Ozon resistant to EN 50305
  - Low fire load (DIN 51900)
  - No fluor (EN 60684-2)
  - High voltage resistance and mechanical influences in rough environmental conditions
  - Resistant to mechanical influences in rough environmental conditions
  - Good chemical durability with simultaneous high fire safety
  - Reduction of toxic combustion gases and the spread of the fire source in case of fire increases protection against personal injury and property damage

## Note

- screened analogue type part no. 54092  
**HELUTRAIN®-C 4GKW 1x35**

## Application

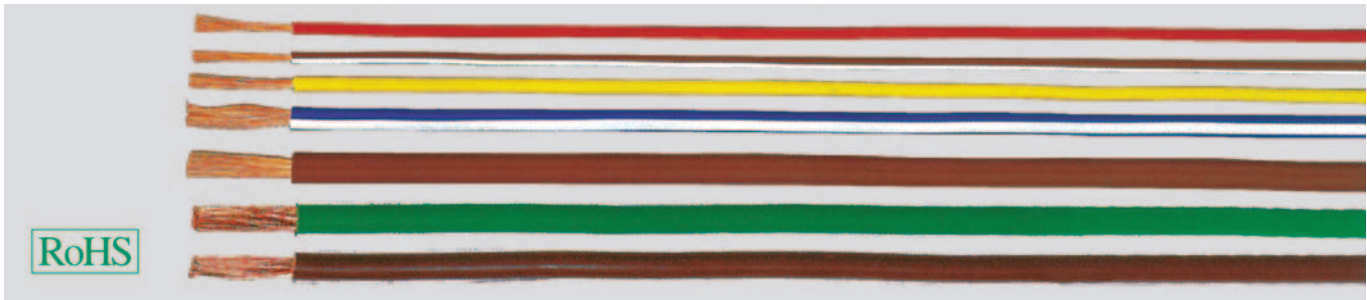
For fixed installation inside and outside of unprotected rail cars and buses. For connecting fixed and moving parts. Suitable for wiring of switchboards, distribution boards, power converters, electrical panels and blocks, resistor and brake blocks.

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer Ø app. mm	Cop. weight kg / km	Weight app. kg / km	AWG-No.
59262	1 x 1,5	3,6	14,4	24,0	-
59263	1 x 2,5	4,0	24,0	34,0	-
59264	1 x 4	4,9	38,4	53,0	-
59265	1 x 6	5,5	57,6	74,0	-
59266	1 x 10	6,5	96,0	118,0	-
59267	1 x 16	8,7	153,6	182,0	-
59268	1 x 25	10,2	240,0	274,0	-
59269	1 x 35	11,5	336,0	379,0	-

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer Ø app. mm	Cop. weight kg / km	Weight app. kg / km	AWG-No.
59312	1 x 50	13,6	480,0	536,0	-
59313	1 x 70	16,0	672,0	729,0	-
59314	1 x 95	17,5	912,0	960,0	-
59315	1 x 120	20,0	1152,0	1203,0	-
59316	1 x 150	22,0	1440,0	1464,0	-
59317	1 x 185	24,1	1776,0	1802,0	-
59318	1 x 240	26,8	2304,0	2348,0	-

Dimensions and specifications may be changed without prior notice. (RK01)

# Vehicle Cable FLY one colour / two colour (old type FLK), according to DIN ISO 6722



## Technical data

- Special PVC core insulation
- **Temperature stability** (3000 h) -25°C to +90°C
- **Nominal voltage** up to 24 V
- **Test voltage** 1 kV (effective value)
- **Breakdown voltage** 5 kV (effective value)
- **Specific volume resistance** min. 10<sup>9</sup> Ohm x mm

## Cable structure

- Bare copper conductor, soft annealed electrolytic copper E-Cu58 F21 according to DIN 40500 part 4 (the mechanical requirements valid for unprocessing single wires)
- Copper conductor fine wire stranded as per DIN ISO 6722 part 3
- PVC core insulation
- For three-colour combinations we produce only on request

## Properties

- Oil and fuel resistant as per DIN ISO 6722 part 2

## Note

- **Minimum quantities**  
Per cross-section and colour combination:  
2-colour  
0,5 to 2,5 mm<sup>2</sup> = 3 km  
4,0 to 25 mm<sup>2</sup> = 1 km  
3-colour  
0,5 to 2,5 mm<sup>2</sup> = 5 km  
4,0 to 25 mm<sup>2</sup> = 3 km  
Remaining cross-sections on request.

## Application

PVC insulated single core cables are used for vehicle constructions.

### one colour

Cross-sec. mm <sup>2</sup>	Outer Ø min. - max.	Cop. weight kg / km	Weight app. kg / km	BK	BU	BN	RD	WH	GY	VT	YE	PK	GN	OG
Part no. 0,5	2,0 - 2,3	4,8	9,0	29800	40217	40243	40282	40204	40321	40269	40308	40295	40256	40230
Part no. 0,75	2,2 - 2,5	7,2	12,0	29801	40218	40244	40283	40205	40322	40270	40309	40296	40257	40231
Part no. 1	2,4 - 2,7	9,6	15,0	29802	40219	40245	40284	40206	40323	40271	40310	40297	40258	40232
Part no. 1,5	2,7 - 3,0	14,4	20,0	29803	40220	40246	40285	40207	40324	40272	40311	40298	40259	40233
Part no. 2,5	3,3 - 3,6	24,0	32,0	29804	40221	40247	40286	40208	40325	40273	40312	40299	40260	40234
Part no. 4	4,0 - 4,4	38,4	48,0	29805	40222	40248	40287	40209	40326	40274	40313	40300	40261	40235
Part no. 6	4,6 - 5,0	57,6	68,0	29806	40223	40249	40288	40210	40327	40275	40314	40301	40262	40236
Part no. 10	6,0 - 6,5	96,0	117,0	29807	40224	40250	40289	40211	40328	40276	40315	40302	40263	40237
Part no. 16	7,0 - 8,3	154,0	189,0	29808	40225	40251	40290	40212	40329	40277	40316	40303	40264	40238
Part no. 25	9,4 - 10,4	240,0	288,0	29809	40226	40252	40291	40213	40330	40278	40317	40304	40265	40239
Part no. 35	10,8 - 11,6	336,0	382,0	29810	40227	40253	40292	40214	40331	40279	40318	40305	40266	40240
Part no. 50	12,5 - 13,5	480,0	540,0	29811	40228	40254	40293	40215	40332	40280	40319	40306	40267	40241
Part no. 70	14,5 - 15,5	672,0	744,0	29812	40229	40255	40294	40216	40333	40281	40320	40307	40268	40242

Dimensions and specifications may be changed without prior notice. (RK01)

# Vehicle Cable FLY one colour / two colour (old type FLK), according to DIN ISO 6722

## two colour

Cross-sec. mm <sup>2</sup>	Outer Ø min. - max.	Cop. weight kg / km	Weight app. kg / km	WH/GY	WH/RD	WH/BN	WH/BU	WH/BK	YE/GY	YE/RD	YE/BN	YE/BU	YE/BK
Part no. 0,5	2,0 - 2,3	4,8	9,0	40334	40347	40360	40373	40386	40399	40412	40425	40438	40451
Part no. 0,75	2,2 - 2,5	7,2	12,0	40335	40348	40361	40374	40387	40400	40413	40426	40439	40452
Part no. 1	2,4 - 2,7	9,6	15,0	40336	40349	40362	40375	40388	40401	40414	40427	40440	40453
Part no. 1,5	2,7 - 3,0	14,4	20,0	40337	40350	40363	40376	40389	40402	40415	40428	40441	40454
Part no. 2,5	3,3 - 3,6	24,0	32,0	40338	40351	40364	40377	40390	40403	40416	40429	40442	40455
Part no. 4	4,0 - 4,4	38,4	48,0	40339	40352	40365	40378	40391	40404	40417	40430	40443	40456
Part no. 6	4,6 - 5,0	57,6	68,0	40340	40353	40366	40379	40392	40405	40418	40431	40444	40457
Part no. 10	6,0 - 6,5	96,0	117,0	40341	40354	40367	40380	40393	40406	40419	40432	40445	40458
Part no. 16	7,0 - 8,3	154,0	189,0	40342	40355	40368	40381	40394	40407	40420	40433	40446	40459
Part no. 25	9,4 - 10,4	240,0	288,0	40343	40356	40369	40382	40395	40408	40421	40434	40447	40460
Part no. 35	10,8 - 11,6	336,0	382,0	40344	40357	40370	40383	40396	40409	40422	40435	40448	40461
Part no. 50	12,5 - 13,5	480,0	540,0	40345	40358	40371	40384	40397	40410	40423	40436	40449	40462
Part no. 70	14,5 - 15,5	672,0	744,0	40346	40359	40372	40385	40398	40411	40424	40437	40450	40463

## two colour

Cross-sec. mm <sup>2</sup>	Outer Ø min. - max.	Cop. weight kg / km	Weight app. kg / km	GY/GN	GY/RD	GY/BN	GY/BK	GN/WH	GN/GY	GN/BN	GN/BU	GN/BK
Part no. 0,5	2,0 - 2,3	4,8	9,0	40464	40477	40490	40802	40503	40516	40529	40542	40555
Part no. 0,75	2,2 - 2,5	7,2	12,0	40465	40478	40491	40803	40504	40517	40530	40543	40556
Part no. 1	2,4 - 2,7	9,6	15,0	40466	40479	40492	40804	40505	40518	40531	40544	40557
Part no. 1,5	2,7 - 3,0	14,4	20,0	40467	40480	40493	40805	40506	40519	40532	40545	40558
Part no. 2,5	3,3 - 3,6	24,0	32,0	40468	40481	40494	40806	40507	40520	40533	40546	40559
Part no. 4	4,0 - 4,4	38,4	48,0	40469	40482	40495	40807	40508	40521	40534	40547	40560
Part no. 6	4,6 - 5,0	57,6	68,0	40470	40483	40496	40808	40509	40522	40535	40548	40561
Part no. 10	6,0 - 6,5	96,0	117,0	40471	40484	40497	40809	40510	40523	40536	40549	40562
Part no. 16	7,0 - 8,3	154,0	189,0	40472	40485	40498	40810	40511	40524	40537	40550	40563
Part no. 25	9,4 - 10,4	240,0	288,0	40473	40486	40499	40811	40512	40525	40538	40551	40564
Part no. 35	10,8 - 11,6	336,0	382,0	40474	40487	40500	40812	40513	40526	40539	40552	40565
Part no. 50	12,5 - 13,5	480,0	540,0	40475	40488	40501	40813	40514	40527	40540	40553	40566
Part no. 70	14,5 - 15,5	672,0	744,0	40476	40489	40502	40814	40515	40528	40541	40554	40567

Dimensions and specifications may be changed without prior notice.

# Vehicle Cable FLY one colour / two colour (old type FLK), according to DIN ISO 6722

## two colour

Cross-sec. mm <sup>2</sup>	Outer Ø min. - max.	Cop. weight kg / km	Weight app. kg / km	RD/WH	RD/YE	RD/GY	RD/GN	RD/BU	RD/BK	BN/WH	BN/YE	BN/GN	BN/BK
Part no. 0,5	2,0 - 2,3	4,8	9,0	40568	40581	40594	40607	40620	40633	40646	40659	40672	40685
Part no. 0,75	2,2 - 2,5	7,2	12,0	40569	40582	40595	40608	40621	40634	40647	40660	40673	40686
Part no. 1	2,4 - 2,7	9,6	15,0	40570	40583	40596	40609	40622	40635	40648	40661	40674	40687
Part no. 1,5	2,7 - 3,0	14,4	20,0	40571	40584	40597	40610	40623	40636	40649	40662	40675	40688
Part no. 2,5	3,3 - 3,6	24,0	32,0	40572	40585	40598	40611	40624	40637	40650	40663	40676	40689
Part no. 4	4,0 - 4,4	38,4	48,0	40573	40586	40599	40612	40625	40638	40651	40664	40677	40690
Part no. 6	4,6 - 5,0	57,6	68,0	40574	40587	40600	40613	40626	40639	40652	40665	40678	40691
Part no. 10	6,0 - 6,5	96,0	117,0	40575	40588	40601	40614	40627	40640	40653	40666	40679	40692
Part no. 16	7,0 - 8,3	154,0	189,0	40576	40589	40602	40615	40628	40641	40654	40667	40680	40693
Part no. 25	9,4 - 10,4	240,0	288,0	40577	40590	40603	40616	40629	40642	40655	40668	40681	40694
Part no. 35	10,8 - 11,6	336,0	382,0	40578	40591	40604	40617	40630	40643	40656	40669	40682	40695
Part no. 50	12,5 - 13,5	480,0	540,0	40579	40592	40605	40618	40631	40644	40657	40670	40683	40696
Part no. 70	14,5 - 15,5	672,0	744,0	40580	40593	40606	40619	40632	40645	40658	40671	40684	40697

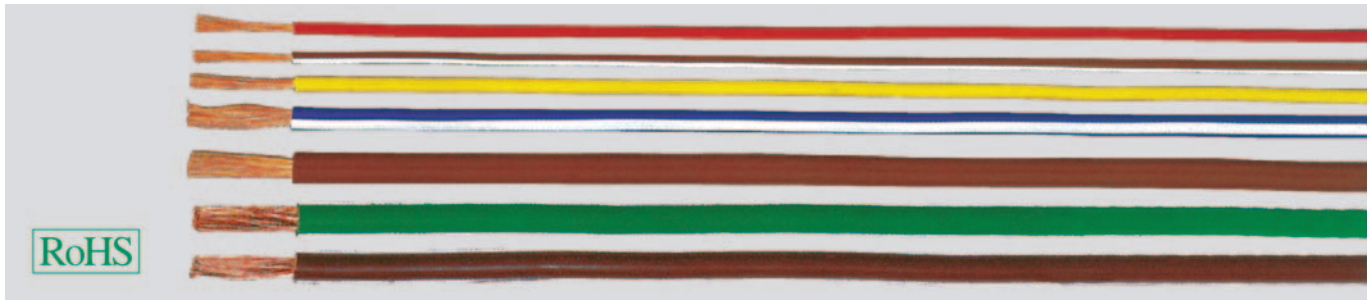
## two colour

Cross-sec. mm <sup>2</sup>	Outer Ø min. - max.	Cop. weight kg / km	Weight app. kg / km	BU/WH	BU/YE	BU/GN	BU/RD	BK/WH	BK/YE	BK/GN	BK/RD
Part no. 0,5	2,0 - 2,3	4,8	9,0	40698	40711	40724	40737	40750	40763	40776	40789
Part no. 0,75	2,2 - 2,5	7,2	12,0	40699	40712	40725	40738	40751	40764	40777	40790
Part no. 1	2,4 - 2,7	9,6	15,0	40700	40713	40726	40739	40752	40765	40778	40791
Part no. 1,5	2,7 - 3,0	14,4	20,0	40701	40714	40727	40740	40753	40766	40779	40792
Part no. 2,5	3,3 - 3,6	24,0	32,0	40702	40715	40728	40741	40754	40767	40780	40793
Part no. 4	4,0 - 4,4	38,4	48,0	40703	40716	40729	40742	40755	40768	40781	40794
Part no. 6	4,6 - 5,0	57,6	68,0	40704	40717	40730	40743	40756	40769	40782	40795
Part no. 10	6,0 - 6,5	96,0	117,0	40705	40718	40731	40744	40757	40770	40783	40796
Part no. 16	7,0 - 8,3	154,0	189,0	40706	40719	40732	40745	40758	40771	40784	40797
Part no. 25	9,4 - 10,4	240,0	288,0	40707	40720	40733	40746	40759	40772	40785	40798
Part no. 35	10,8 - 11,6	336,0	382,0	40708	40721	40734	40747	40760	40773	40786	40799
Part no. 50	12,5 - 13,5	480,0	540,0	40709	40722	40735	40748	40761	40774	40787	40800
Part no. 70	14,5 - 15,5	672,0	744,0	40710	40723	40736	40749	40762	40775	40788	40801

Dimensions and specifications may be changed without prior notice.



# Vehicle Cable FLRY FLRY-Type A (FLK-R) / -Type B (FLK-D)



## Technical data

- Special PVC core insulation
- **Temperature stability** (3000 h) -40°C to +105°C
- **Nominal voltage** up to 24 V
- **Test voltage** 1 kV (effective value)
- **Breakdown voltage** 5 kV (effective value)
- **Specific volume resistance** min.  $10^9$  Ohm · mm
- **Type A** = Conductor make-up symmetrical (1+6+12), number of single wires are odd number; a single wire laying at the centre of the cross-section.

## Cable structure

- Bare copper conductor, soft annealed electrolytic copper E-Cu58 F21 according to DIN 40500 part 4 (the mechanical requirements valid for unprocessing single wires)
- Stranded copper conductor bare, conductor make-up as per DIN 72551
- **Type A:** Conductor make-up symmetrical
- **Type B:** Conductor make-up unsymmetrical
- Core insulation of special PVC

## Properties

- Oil and fuel resistant as per DIN ISO 6722 part 2
- **Special characteristics** Place and weight saving by using the reduced insulation wall thickness.
- **Requirements and tests** As per DIN 72551 part 5

## Note

- **Indication for order** Please mention the core colour and colour combination **clearly** to your order, because a re-acceptance of false ordered articles is impossible.
- **Minimum quantities** Per cross-section and colour combination:  
2-colour  
 0,5 to 2,5 mm<sup>2</sup> = 3 km  
 4,0 to 25 mm<sup>2</sup> = 1 km  
3-colour  
 0,5 to 2,5 mm<sup>2</sup> = 5 km  
 4,0 to 25 mm<sup>2</sup> = 3 km  
 Remaining cross-sections on request.
- AWG sizes are approximate equivalent values. The actual cross-section is in mm<sup>2</sup>.

## Application

PVC insulated single core cables are used for vehicle constructions.

### FLRY - Type A (FLK-R)

Cross-sec. mm <sup>2</sup>	Outer Ø min. - max.	Cop. weight kg / km	Weight app. kg / km	BK	BU	BN	RD	WH	GY	VT	YE	PK	GN	OG
Part no. 0,35	1,2 - 1,3	3,4	4,5	28484	28486	28488	28491	28485	28494	28490	28493	28492	28489	28487
Part no. 0,5	1,4 - 1,6	4,8	6,6	28495	28497	28499	28502	28496	28505	28501	28504	28503	28500	28498

### FLRY - Type B (FLK-D)

Cross-sec. mm <sup>2</sup>	Outer Ø min. - max.	Cop. weight kg / km	Weight app. kg / km	BK	BU	BN	RD	WH	GY	VT	YE	PK	GN	OG
Part no. 0,75	1,7 - 1,9	7,2	9,0	28506	28508	28510	28513	28507	28516	28512	28515	28514	28511	28509
Part no. 1	1,9 - 2,1	9,6	11,0	28517	28519	28521	28524	28518	28527	28523	28526	28525	28522	28520
Part no. 1,5	2,2 - 2,4	14,4	16,0	28528	28530	28532	28535	28529	28538	28534	28537	28536	28533	28531
Part no. 2,5	2,7 - 3,0	24,0	26,0	28539	28541	28543	28546	28540	28549	28545	28548	28547	28544	28542
Part no. 4	3,4 - 3,7	38,0	42,0	28550	28552	28554	28557	28551	28560	28556	28559	28558	28555	28553
Part no. 6	4,0 - 4,3	58,0	61,0	28561	28563	28565	28568	28562	28571	28567	28570	28569	28566	28564

### Further types of Vehicle Cables on request

FLYW	FLSY	FL6G	FLYZ	FLYDY	FL4G11Y
FLX	FLYY	FL4C	FLYYF	FLRYDY	FL4GYW
FLYK	FLYTL	FL7Y	FZLY	FLRYBDY	
FLRY		FL6Y			

Dimensions and specifications may be changed without prior notice. (RK01)



=472+A04  
-M61

=472+A04  
-M61

=112+A04  
-WXS7

## ■ PRE-ASSEMBLED CABLES

Servo motor, feedback & fan cables 842

---

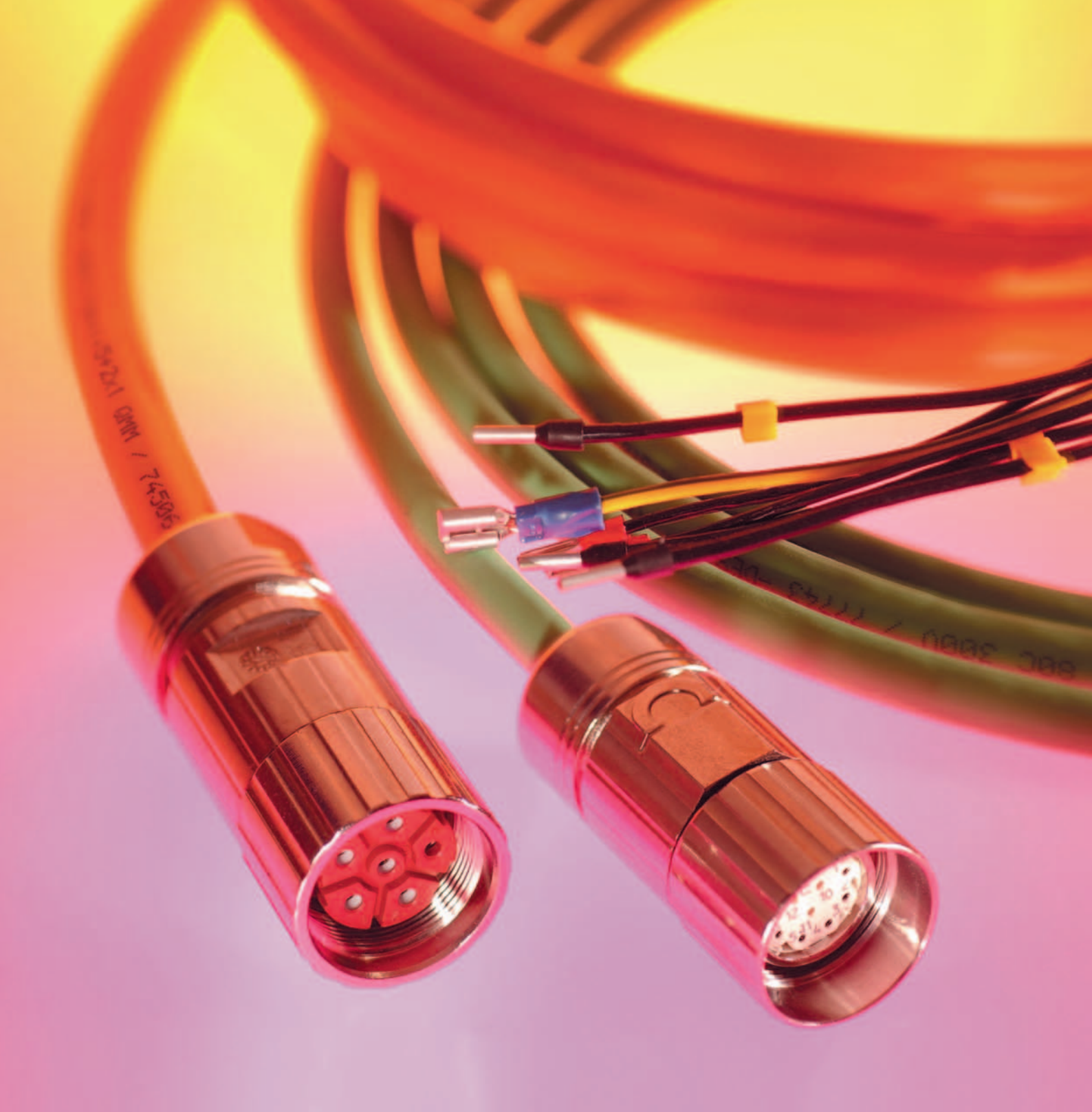
ROBOFLEX®-recycle 878

---

Connecting cables & extensions 898

---





## **Pre-assembled feedback cables**

Pre-assembled adapter cables

# Pre-assembled servo motor cables

Pre-assembled fan cables

# SERVO MOTOR, FEEDBACK & FAN CABLES

Designation	Properties	Approvals	Page
<b>Base line for use on SIEMENS drive systems</b>			
Pre-assembled servo motor cables	for fixed laying		844
Pre-assembled servo motor cables	for mobile use		845
Pre-assembled feedback cables	for fixed laying		846
Pre-assembled feedback cables	for mobile use		847
Pre-assembled servo motor cables	for fixed laying		848
Pre-assembled servo motor cables	for mobile use		849
Pre-assembled feedback cables	for fixed laying		850
Pre-assembled feedback cables	for mobile use		851
<b>Base line for use on REXROTH drive systems</b>			
Pre-assembled servo motor cables	for mobile use (PVC)		852
Pre-assembled servo motor cables	for mobile use (PUR)		853
Pre-assembled feedback cables	for mobile use (PVC)		855
Pre-assembled feedback cables	for mobile use (PUR)		856
<b>Base line for use on LENZE drive systems</b>			
Pre-assembled servo motor cables	for fixed laying		857
Pre-assembled servo motor cables	for mobile use		858
Pre-assembled feedback cables	for fixed laying		859
Pre-assembled feedback cables	for mobile use		860
Pre-assembled fan cables	for fixed laying		861
Pre-assembled fan cables	for mobile use		862
Pre-assembled servo motor cables	for fixed laying		863
Pre-assembled servo motor cables	for mobile use		864
Pre-assembled feedback cables	for fixed laying		865
Pre-assembled feedback cables	for mobile use		866
Pre-assembled fan cables	for fixed laying		867
Pre-assembled fan cables	for mobile use		868
<b>Base line for use on SEW drive systems</b>			
Pre-assembled servo motor cables	for fixed laying		869
Pre-assembled servo motor cables	for mobile use		870
Pre-assembled feedback cables	for fixed laying		871
Pre-assembled feedback cables	for mobile use		872
Pre-assembled servo motor cables	for fixed laying		873
Pre-assembled servo motor cables	for mobile use		874
<b>For use on HEIDENHAIN measurement systems/hand wheels</b>			
Pre-assembled feedback cables			875
Pre-assembled adapter cable			876

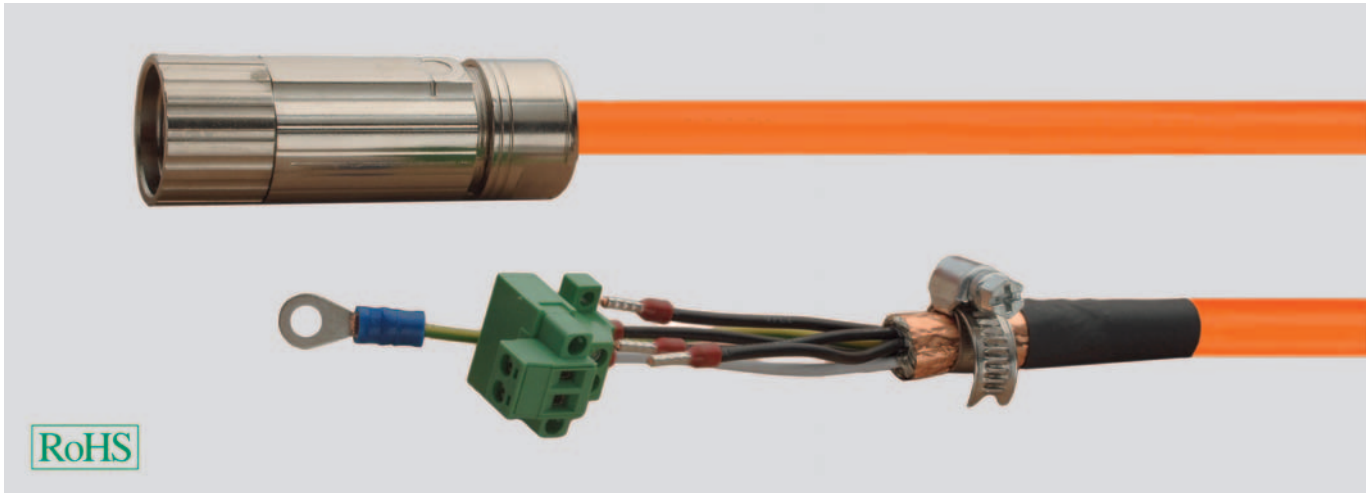
U



# Pre-assembled servo motor cables

## for fixed laying

Base line for use on SIEMENS drive systems



### Technical data

- **Temperature range**  
flexing 0°C to +60°C  
fixed installation -20°C to +80°C
- **Minimum bending radius**  
flexing 20x cable Ø  
fixed installation 5x cable Ø
- **Max. acceleration**  
2 m/s<sup>2</sup>
- **Bending cycles**  
100,000 for ≥ 20x cable Ø
- **Nominal voltage (UL/CSA)**  
(power + signal) 1000 V
- **Nominal voltage (VDE)**  
(power) U<sub>0</sub>/U 0,6/1 kV  
(signal) 24 V
- **Test voltage**  
power cores 4 kV  
signal cores 2 kV
- **Insulation resistance** ≥ 20 MOhm x km

### Approbations

DESINA® (ISO 23570)  
VDE  
UL/CSA

### Cable structure

#### Power supply cores

- Bare copper, acc. to IEC 60228 cl.6
- PVC core insulation
- Core identification U/L1/C/L+  
V/L2  
W/L3/D/L-
- GN-YE conductor

#### Signal cores

- Copper conductors, bare
- TPE-E core insulation
- Core identification black, white
- Cores twisted in pairs
- Shield tin-plated copper braiding
- Complete shield of tin-plated copper braiding, coverage approx. 80%
- PVC outer sheath
- Sheath colour orange (RAL 2003)

### Application

This high quality pre-assembled motor connection cable is specially manufactured for applications with static installation. The special PVC outer sheath allows use in many industrial environments of general machine and plant construction.

### Characteristic

Economical alternatives to the cable carrier compatible cable types which otherwise meet all requirements of the servo drive manufacturers. These pre-assembled cables can be produced in any lengths and also with customer-specific modifications.

### Note

Please observe the drive or controller manufacturer's information about maximum permitted cable length. The prefabricated cables listed here are not original parts, but accessories manufactured by the company HELUKABEL® GmbH. The data, standards and approvals relate solely to the bulk goods used.

Manufacturer Designation	Helukabel Designation	Helukabel Part no.
6FX5002-5CA01	5CA01 DESINA PVC	660224
6FX5002-5CA11	5CA11 DESINA PVC	660227
6FX5002-5CA21	5CA21 DESINA PVC	660230
6FX5002-5CA31	5CA31 DESINA PVC	660234
6FX5002-5CA41	5CA41 DESINA PVC	660237
6FX5002-5CA51	5CA51 DESINA PVC	660238
6FX5002-5CA61	5CA61 DESINA PVC	660239
6FX5002-5CA13	5CA13 DESINA PVC	660229
6FX5002-5CA23	5CA23 DESINA PVC	660232
6FX5002-5DA01	5DA01 DESINA PVC	660241
6FX5002-5DA11	5DA11 DESINA PVC	660244

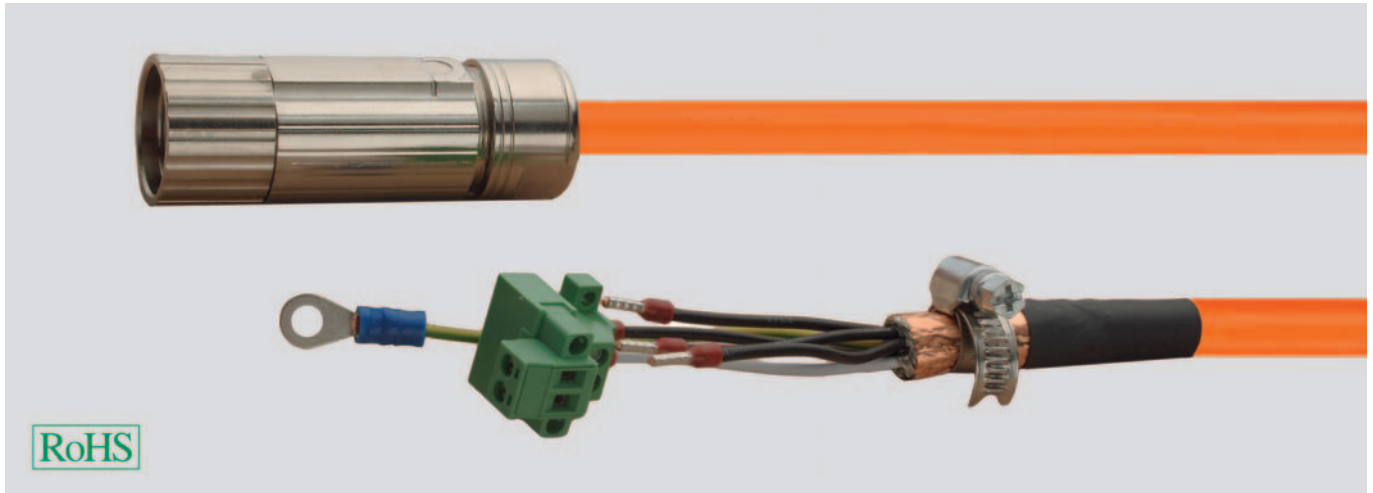
Manufacturer Designation	Helukabel Designation	Helukabel Part no.
6FX5002-5DA21	5DA21 DESINA PVC	660247
6FX5002-5DA31	5DA31 DESINA PVC	660250
6FX5002-5DA41	5DA41 DESINA PVC	660254
6FX5002-5DA51	5DA51 DESINA PVC	660257
6FX5002-5DA61	5DA61 DESINA PVC	660259
6FX5002-5DA13	5DA13 DESINA PVC	660666
6FX5002-5DA23	5DA23 DESINA PVC	660249
6FX5002-5DA33	5DA33 DESINA PVC	660252
6FX5002-5DA43	5DA43 DESINA PVC	660255
6FX5002-5DA53	5DA53 DESINA PVC	660667

Dimensions and specifications may be changed without prior notice.

# Pre-assembled servo motor cables

for mobile use

Base line for use on SIEMENS drive systems



RoHS

## Technical data

- **Temperature range**  
flexing -20°C to +60°C  
fixed installation -50°C to +80°C
- **Minimum bending radius**  
flexing 10x cable Ø  
fixed installation 7x cable Ø
- **Max. acceleration**  
5 m/s<sup>2</sup>
- **Bending cycles**  
10 million for ≥ 12x cable Ø
- **Operating voltage**  
VDE U<sub>0</sub>/U 600/1000 V  
UL 1000 V
- **Test voltage**  
power cores 4 kV  
control cores 2 kV
- **Insulation resistance** ≥ 500 MOhm x km

## Approbations

DESINA® (ISO 23570)  
VDE  
UL/CSA

## Cable structure

### Power supply cores

- Bare copper, extra fine wire conductor acc. to DIN VDE 0295 cl.6
- high quality PP core insulation
- Core identification U/L1/C/L+ V/L2 W/L3/D/L-
- GN-YE conductor

### Signal cores

- Copper conductors, bare
- High quality PP core insulation
- Core identification black white
- Cores twisted in pairs
- Shielding screened with tin-plated copper wires
- Complete shield of tin-plated copper braiding, coverage approx. 80%
- PUR outer sheath
- Sheath colour orange (RAL 2003)

## Application

This high quality pre-assembled motor connection cable is specially manufactured for applications with mobile use. The special PUR outer sheath allows use in many industrial environments of general machine and plant construction.

## Characteristic

These pre-assembled cables can be produced in any lengths and also with customer-specific modifications.

## Note

Please observe the installation instructions for laying cables in cable carriers and the drive or controller manufacturer's information about maximum permitted cable length.

The prefabricated cables listed here are not original parts, but accessories manufactured by the company HELUKABEL® GmbH. The data, standards and approvals relate solely to the bulk goods used.

Manufacturer Designation	Helukabel Designation	Helukabel Part no.	Manufacturer Designation	Helukabel Designation	Helukabel Part no.
6FX8002-5CA01	5CA01 DESINA PUR	660053	6FX8002-5DA21	5DA21 DESINA PUR	660076
6FX8002-5CA11	5CA11 DESINA PUR	660056	6FX8002-5DA31	5DA31 DESINA PUR	660080
6FX8002-5CA21	5CA21 DESINA PUR	660059	6FX8002-5DA41	5DA41 DESINA PUR	660084
6FX8002-5CA31	5CA31 DESINA PUR	660063	6FX8002-5DA51	5DA51 DESINA PUR	660088
6FX8002-5CA41	5CA41 DESINA PUR	660066	6FX8002-5DA61	5DA61 DESINA PUR	660089
6FX8002-5CA51	5CA51 DESINA PUR	660067	6FX8002-5DA13	5DA13 DESINA PUR	89800
6FX8002-5CA61	5CA61 DESINA PUR	660068	6FX8002-5DA23	5DA23 DESINA PUR	89802
6FX8002-5CA13	5CA13 DESINA PUR	660058	6FX8002-5DA33	5DA33 DESINA PUR	660082
6FX8002-5CA23	5CA23 DESINA PUR	660061	6FX8002-5DA43	5DA43 DESINA PUR	660085
6FX8002-5DA01	5DA01 DESINA PUR	660070	6FX8002-5DA53	5DA53 DESINA PUR	660668
6FX8002-5DA11	5DA11 DESINA PUR	660073			

Dimensions and specifications may be changed without prior notice.

U

# Pre-assembled feedback cables

## for fixed laying

Base line for use on SIEMENS drive systems



### Technical data

- **Temperature range**  
-20°C to +80°C
- **Minimum bending radius**  
18x cable Ø
- **Max. acceleration**  
2 m/s<sup>2</sup>
- **Bending cycles**  
100,000
- **Max. operating voltage** 30 V AC
- **Test voltage** 500 V
- **Insulation resistance** ≥ 100 MOhm x km

### Approbations

DESINA® (ISO 23570)  
UL/CSA

### Cable structure

- Tinned copper conductors
- Polyolefin polymer core insulation
- Complete shield of tin-plated copper braiding, coverage approx. 80%
- PVC outer sheath
- Sheath colour green

#### Structure(3x(2x0, 14)+4x0, 14+2x0, 5)

- 3 pairs with tin-plated copper wires, coverage approx. 90%
- Colour code  
Pair 1: YE+GN  
Pair 2: BK+BN  
Pair 3: RD+OG  
Quad 1: GY+BU+WH/YE+BK/WH  
Pair 4: BN/RD+BN/BU

#### Structure(3x(2x0, 14)+4x0, 14+4x0, 22+2x0, 5)

- 3 pairs with tin-plated copper wires, coverage approx. 90%
- Colour code  
Pair 1: YE+GN  
Pair 2: BK+BN  
Pair 3: RD+OG  
Quad 1: GY+BU+WH/YE+BK/WH  
Quad 2: BN/YE+BN/GY+GN/BK+RD/GN  
Pair 4: BN/RD+BN/BU

#### Structure(4x2x0, 34+4x0, 5)

- Colour code  
Pair 1: BU+VT  
Pair 2: BN+BK  
Pair 3: RD+OG  
Pair 4: YE+GN  
Quad: YE/WH+RD/WH+BU/WH+BK/WH

### Application

This high quality pre-assembled feedback cable is specially manufactured for applications with static installation. The special PVC outer sheath allows use in many industrial environments of general machine and plant construction.

### Characteristic

Economical alternatives to the cable carrier compatible cable types which otherwise meet all requirements of the servo drive manufacturers. These pre-assembled cables can be produced in any lengths and also with customer-specific modifications.

### Note

Please observe the drive or controller manufacturer's information about maximum permitted cable length. The prefabricated cables listed here are not original parts, but accessories manufactured by the company HELUKABEL® GmbH. The data, standards and approvals relate solely to the bulk goods used.

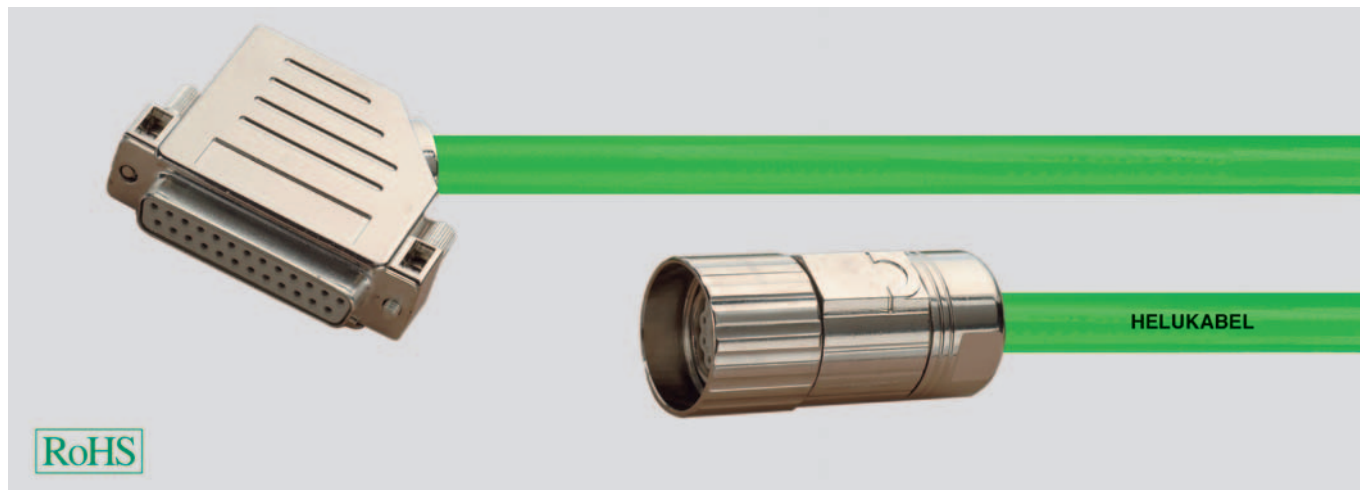
Manufacturer Designation	Helukabel Designation	Helukabel Part no.	Manufacturer Designation	Helukabel Designation	Helukabel Part no.
6FX5002-2AD00	2AD00 DESINA PVC	660207	6FX5002-2CC11	2CC11 DESINA PVC	660670
6FX5002-2AH00	2AH00 DESINA PVC	660209	6FX5002-2CD01	2CD01 DESINA PVC	660671
6FX5002-2CA11	2CA11 DESINA PVC	660210	6FX5002-2CF02	2CF02 DESINA PVC	660219
6FX5002-2CA15	2CA15 DESINA PVC	660211	6FX5002-2CG00	2CG00 DESINA PVC	660672
6FX5002-2CA31	2CA31 DESINA PVC	660212	6FX5002-2CH00	2CH00 DESINA PVC	660220
6FX5002-2CA51	2CA51 DESINA PVC	660214	6FX5002-2EQ10	2EQ10 DESINA PVC	660222
6FX5002-2CA61	2CA61 DESINA PVC	660215	6FX5002-2CE02	2CE02 DESINA PVC	660673
6FX5002-2CA72	2CA72 DESINA PVC	660669	6FX5002-2CM00	2CM00 DESINA PVC	660674
6FX5002-2CB51	2CB51 DESINA PVC	660217	6FX5002-2CE07	2CE07 DESINA PVC	660675

Dimensions and specifications may be changed without prior notice.

# Pre-assembled feedback cables

for mobile use

Base line for use on SIEMENS drive systems



## Technical data

- **Temperature range**  
flexing -20°C to +60°C  
fixed installation -50°C to +80°C
- **Minimum bending radius**  
flexing 11x cable Ø  
fixed installation 7x cable Ø
- **Max. acceleration**  
5 m/s<sup>2</sup>
- **Bending cycles**  
10 million for ≥ 12x cable Ø
- **Operating voltage** 30 V
- **Test voltage** 500 V
- **Insulation resistance** ≥ 10 MOhm x km

## Approbations

DESINA® (ISO 23570)  
UL/CSA

## Cable structure

- Tinned copper conductors
- high quality PP core insulation
- Complete shield of tin-plated copper braiding, coverage approx. 80%
- PUR outer sheath
- Sheath colour green

### Structure/colour code

- **(2x2x0, 18)**  
BK, BN, RD, OG
- **(4x2x0, 18)**  
BK+BN, RD+OG, YE+GN, BU+VT
- **(8x2x0, 18)**  
BK+BN, RD+OG, YE+GN, BU+VT,  
GY+WH, WH/BK+WH/BN,  
WH/RD+WH/OG, WH/YE+WH/GN
- **(12x0, 22)**  
BK, BN, RD, OG, YE, GN, BU, VT,  
GY, WH, WH/BK, WH/BN
- **(4x2x0, 34+4x0, 5)**  
RD+OG, YE+GN, BU+VT,  
BK+BN, WH/RD, WH/YE, WH/BU, WH/BK
- **(3x(2x0, 14)+2x(0, 5))**  
RD+OG, YE+GN, BK+BN, BK, RD
- **(3x(2x0, 14)+2x0, 5+4x0, 14)**  
RD+OG, YE+GN, BK+BN, BN/RD, BN/BU,  
GY, BU, WH/YE, WH/BK
- **(3x(2x0, 14)+2x0, 5+4x0, 14+4x0, 22)**  
RD+OG, YE+GN, BK+BN, BN/RD, BN/BU,  
GY, BU, WH/YE, WH/BK, BN/YE,  
BN/GY/GN/BK, GN/RD

## Application

This high quality pre-assembled feedback cable is specially manufactured for applications with mobile use. The special PUR outer sheath allows use in many industrial environments of general machine and plant construction.

## Characteristic

These pre-assembled cables can be produced in any lengths and also with customer-specific modifications.

## Note

Please observe the installation instructions for laying cables in cable carriers and the drive or controller manufacturer's information about maximum permitted cable length.

The prefabricated cables listed here are not original parts, but accessories manufactured by the company HELUKABEL® GmbH. The data, standards and approvals relate solely to the bulk goods used.

Manufacturer Designation	Helukabel Designation	Helukabel Part no.	Manufacturer Designation	Helukabel Designation	Helukabel Part no.
6FX8002-2AD00	2AD00 DESINA PUR	660014	6FX8002-2CC11	2CC11 DESINA PUR	660032
6FX8002-2AH00	2AH00 DESINA PUR	87328	6FX8002-2CD01	2CD01 DESINA PUR	660033
6FX8002-2CA11	2CA11 DESINA PUR	660018	6FX8002-2CF02	2CF02 DESINA PUR	89293
6FX8002-2CA15	2CA15 DESINA PUR	660019	6FX8002-2CG00	2CG00 DESINA PUR	660034
6FX8002-2CA31	2CA31 DESINA PUR	660021	6FX8002-2CH00	2CH00 DESINA PUR	660035
6FX8002-2CA51	2CA51 DESINA PUR	660023	6FX8002-2EQ10	2EQ10 PUR DESINA	660038
6FX8002-2CA61	2CA61 DESINA PUR	660024	6FX8002-2CA21	2CA21 DESINA PUR	660020
6FX8002-2CA72	2CA72 DESINA PUR	660676	6FX8002-2CE02	2CE02 DESINA PUR	660677
6FX8002-2CB31	2CB31 DESINA PUR	650122	6FX8002-2CM00	2CM00 DESINA PUR	660678
6FX8002-2CB51	2CB51 DESINA PUR	660031	6FX8002-2CE07	2CE07 DESINA PUR	660679

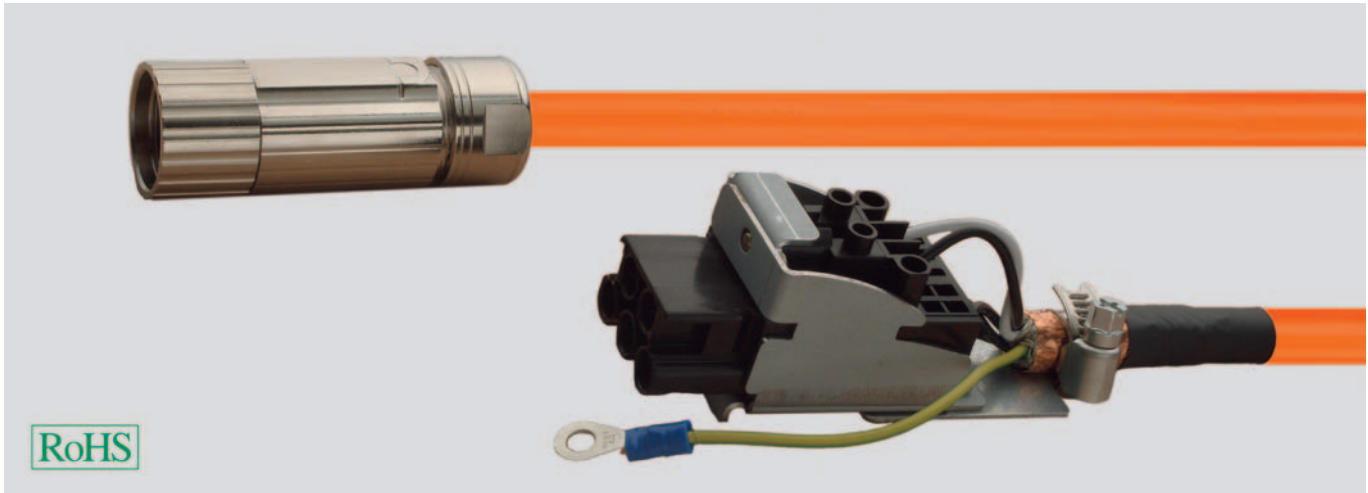
Dimensions and specifications may be changed without prior notice.

U

# Pre-assembled servo motor cables

## for fixed laying

Base line for use on SIEMENS drive systems (Drive Cliq\*)



### Technical data

- **Temperature range**  
flexing 0°C to +60°C  
fixed installation -20°C to +80°C
- **Minimum bending radius**  
flexing 20x cable Ø  
fixed installation 5x cable Ø
- **Max. acceleration**  
2 m/s<sup>2</sup>
- **Bending cycles**  
100,000 for ≥ 20x cable Ø
- **Nominal voltage VDE**  
(power) U<sub>0</sub>/U 0,6/1 kV  
(signal) 24 V
- **Nominal voltage UL/CSA**  
(power + signal) 1000 V
- **Test voltage**  
power cores 4 kV  
signal cores 1 kV
- **Insulation resistance** ≥ 20 MOhm x km

### Approbations

DESINA® (ISO 23570)  
VDE  
UL/CSA

### Cable structure

#### Power supply cores

- Bare copper, acc. to IEC 60228 cl.6
- PVC core insulation
- Core identification U/L1/C/L+  
V/L2  
W/L3/D/L-
- GN-YE conductor

#### Signal cores

- Copper conductors, bare
- TPE-E core insulation
- Core identification black, white
- Cores twisted in pairs
- Shield tin-plated copper braiding
- Complete shield of tin-plated copper braiding, coverage approx. 80%
- PVC outer sheath
- Sheath colour orange (RAL 2003)

### Application

This high quality pre-assembled motor connection cable is specially manufactured for applications with static installation. The special PVC outer sheath allows use in many industrial environments of general machine and plant construction.

### Characteristic

Economical alternatives to the cable carrier compatible cable types which otherwise meet all requirements of the servo drive manufacturers. These pre-assembled cables can be produced in any lengths and also with customer-specific modifications.

### Note

Please observe the drive or controller manufacturer's information about maximum permitted cable length. The prefabricated cables listed here are not original parts, but accessories manufactured by the company HELUKABEL® GmbH. The data, standards and approvals relate solely to the bulk goods used.  
\* Drive Cliq is registered trademark from Siemens AG.

Manufacturer Designation	Helukabel Designation	Helukabel Part no.
6FX5002-5CS01	5CS01 DESINA PVC	660855
6FX5002-5CS11	5CS11 DESINA PVC	660856
6FX5002-5CS21	5CS21 DESINA PVC	660857
6FX5002-5CS31	5CS31 DESINA PVC	660858
6FX5002-5CS41	5CS41 DESINA PVC	660859
6FX5002-5CS51	5CS51 DESINA PVC	660860
6FX5002-5CS61	5CS61 DESINA PVC	660861
6FX5002-5CS13	5CS13 DESINA PVC	660862

Manufacturer Designation	Helukabel Designation	Helukabel Part no.
6FX5002-5DS01	5DS01 DESINA PVC	660863
6FX5002-5DS11	5DS11 DESINA PVC	660864
6FX5002-5DS21	5DS21 DESINA PVC	660865
6FX5002-5DS31	5DS31 DESINA PVC	660866
6FX5002-5DS41	5DS41 DESINA PVC	660867
6FX5002-5DS51	5DS51 DESINA PVC	660868
6FX5002-5DS61	5DS61 DESINA PVC	660869
6FX5002-5DS13	5DS13 DESINA PVC	660870

Dimensions and specifications may be changed without prior notice.

\* Drive Cliq is registered trademark from Siemens AG.



# Pre-assembled servo motor cables

for mobile use

Base line for use on SIEMENS drive systems (Drive Cliq\*)



RoHS

## Technical data

- **Temperature range**  
flexing -20°C to +60°C  
fixed installation -50°C to +80°C
- **Minimum bending radius**  
flexing 10x cable Ø  
fixed installation 7x cable Ø
- **Max. acceleration**  
5 m/s<sup>2</sup>
- **Bending cycles**  
10 million for ≥ 12x cable Ø
- **Operating voltage**  
VDE U<sub>0</sub>/U 600/1000 V  
UL 1000 V
- **Test voltage**  
power cores 4 kV  
signal cores 2 kV
- **Insulation resistance** ≥ 500 MOhm x km

## Approbations

DESINA® (ISO 23570)  
UL/CSA

## Cable structure

### Power supply cores

- Bare copper, extra fine wire conductor acc. to DIN VDE 0295 cl.6
- high quality PP core insulation
- Core identification U/L1/C/L+V/L2 W/L3/D/L-
- GN-YE conductor

### Signal cores

- Copper conductors, bare
- High quality PP core insulation
- Core identification black, white
- Cores twisted in pairs
- Shielding screened with tin-plated copper wires
- Complete shield of tin-plated copper braiding, coverage approx. 80%
- PUR outer sheath
- Sheath colour orange (RAL 2003)

## Application

This high quality pre-assembled motor connection cable is specially manufactured for applications with mobile use. The special PUR outer sheath allows use in many industrial environments of general machine and plant construction.

## Characteristic

These pre-assembled cables can be produced in any lengths and also with customer-specific modifications.

## Note

Please observe the installation instructions for laying cables in cable carriers and the drive or controller manufacturer's information about maximum permitted cable length.

The prefabricated cables listed here are not original parts, but accessories manufactured by the company HELUKABEL® GmbH. The data, standards and approvals relate solely to the bulk goods used.

\* Drive Cliq is registered trademark from Siemens AG.

Manufacturer Designation	Helukabel Designation	Helukabel Part no.
6FX8002-5CS01	5CS01 DESINA PUR	660871
6FX8002-5CS11	5CS11 DESINA PUR	660872
6FX8002-5CS21	5CS21 DESINA PUR	660873
6FX8002-5CS31	5CS31 DESINA PUR	660874
6FX8002-5CS41	5CS41 DESINA PUR	660875
6FX8002-5CS51	5CS51 DESINA PUR	660876
6FX8002-5CS61	5CS61 DESINA PUR	660877
6FX8002-5CS13	5CS13 DESINA PUR	660878

Manufacturer Designation	Helukabel Designation	Helukabel Part no.
6FX8002-5DS01	5DS01 DESINA PUR	660879
6FX8002-5DS11	5DS11 DESINA PUR	660880
6FX8002-5DS21	5DS21 DESINA PUR	660881
6FX8002-5DS31	5DS31 DESINA PUR	660882
6FX8002-5DS41	5DS41 DESINA PUR	660883
6FX8002-5DS51	5DS51 DESINA PUR	660884
6FX8002-5DS61	5DS61 DESINA PUR	660885
6FX8002-5DS13	5DS13 DESINA PUR	660886

Dimensions and specifications may be changed without prior notice.

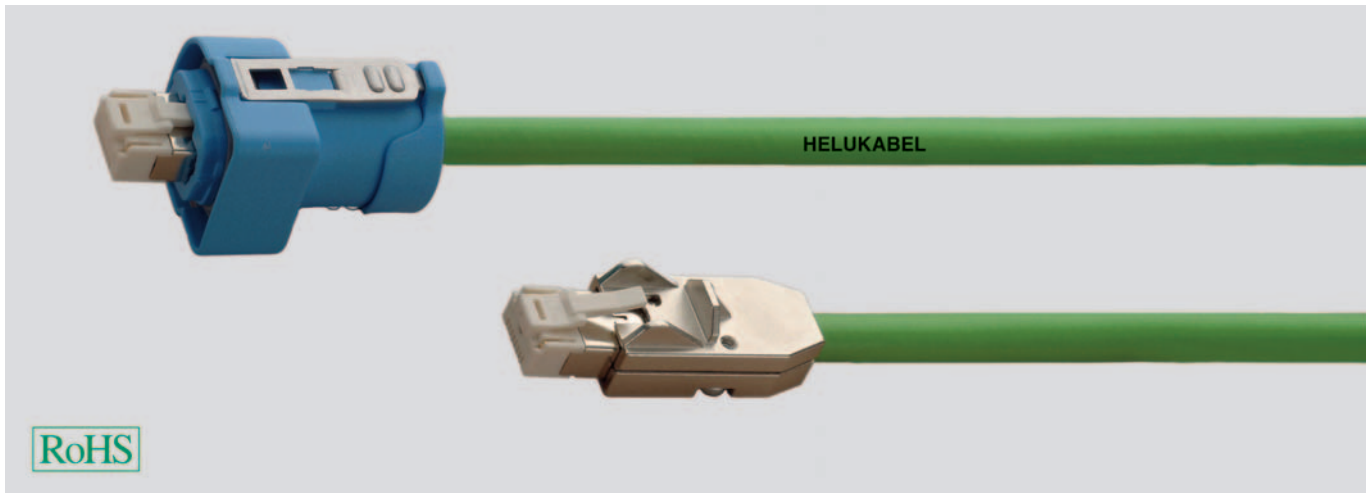
\* Drive Cliq is registered trademark from Siemens AG.

# Pre-assembled feedback cables



## for fixed laying

Base line for use on SIEMENS drive systems (Drive Cliq\*)



### Technical data

- **Temperature range**  
flexing -20°C to +60°C  
fixed installation -20°C to +80°C
- **Minimum bending radius**  
flexing 10x cable Ø  
fixed installation 5x cable Ø
- **Max. acceleration**  
2 m/s<sup>2</sup>
- **Bending cycles**  
100.000 for ≥ 10x cable Ø
- **max. operating voltage** 30 V AC (UL)
- **Test voltage** 500 V / 50 Hz / 1 min
- **Insulation resistance** ≥ 1 GOhm x km
- **Conductor resistance**  
Core AWG26 ≤ 135 ohms/km  
Core AWG22 ≤ 62 ohms/km
- **Characteristic impedance AWG26 pairs**  
from 1 MHz to 100 MHz 100+/- 15 Ohm
- **Operating capacitance AWG26 pairs**  
for 800 Hz rated 50 nF/km

### Approbations

UL/CSA

### Cable structure

- Bare copper conductor, 7 strands
- Polyolefin core insulation
- Complete shield aluminium foil coated with plastic, braiding of tin-plated copper wires, coverage approx. 85%
- PUR outer sheath
- Sheath colour green

### Structure/colour code

- **(2xAWG22+2x2xAWG26)**

Colour code

Pair AWG22: RD+BK

Pair 1 AWG26: YW+GN

Pair 2 AWG26: PK+BU

### Connector data

RJ45 connector CAT5

Material: nickel-plated PBT/brass

Contacts 30u" Au/Ni

Rated voltage: 50 V DC / 35 V AC

Operating temperature: -20°C to + 120°C

Mating cycles: 1000

Cover

zinc die-cast

zinc die-cast / PBT blue

PBT blue

PBT black

### Application

This high quality pre-assembled feedback cable is specially manufactured for applications with static installation. The special PVC outer sheath allows use in many industrial environments of general machine and plant construction.

### Characteristic

Economical alternatives to the cable carrier compatible cable types which otherwise meet all requirements of the servo drive manufacturers. These pre-assembled cables can be produced in any lengths and also with customer-specific modifications.

### Note

Please observe the drive or controller manufacturer's information about maximum permitted cable length. The prefabricated cables listed here are not original parts, but accessories manufactured by the company HELUKABEL® GmbH. The data, standards and approvals relate solely to the bulk goods used.  
\* Drive Cliq is registered trademark from Siemens AG.

Manufacturer Designation	Helukabel Designation	Helukabel Part no.
6FX5002-2DC00	2DC00 DESINA PUR	660887
6FX5002-2DC10	2DC10 DESINA PUR	660888

Manufacturer Designation	Helukabel Designation	Helukabel Part no.
6FX5002-2DC20	2DC20 DESINA PUR	660889

Dimensions and specifications may be changed without prior notice.

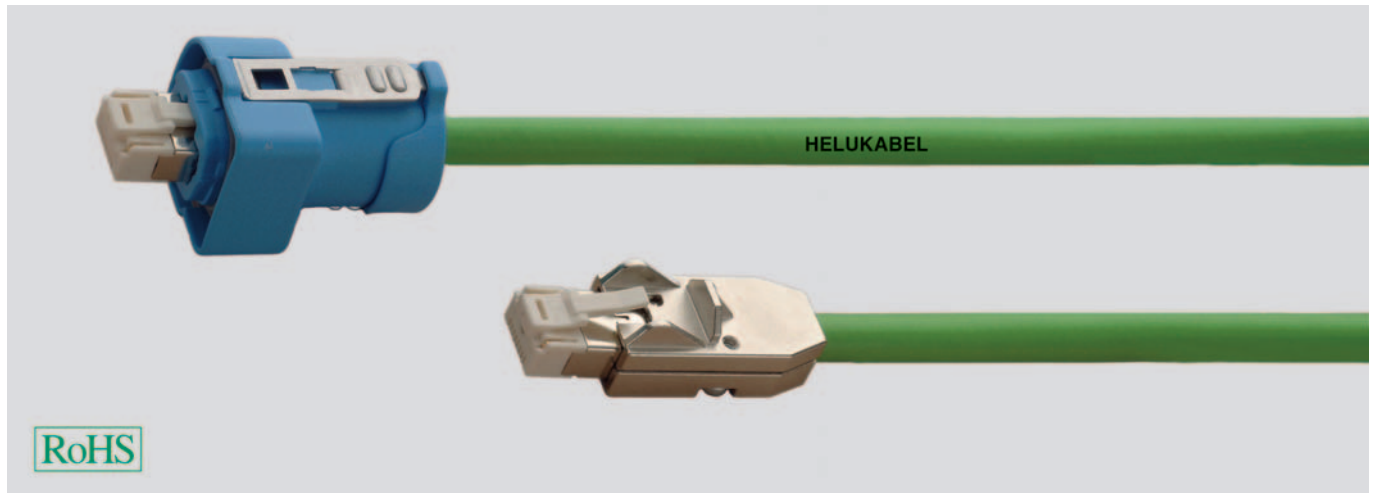
\* Drive Cliq is registered trademark from Siemens AG.



# Pre-assembled feedback cables

for mobile use

Base line for use on SIEMENS drive systems (Drive Cliq\*)



## Technical data

- **Temperature range**  
flexing -20°C to +60°C  
fixed installation -20°C to +80°C
- **Minimum bending radius**  
flexing 15x cable Ø  
fixed installation 5x cable Ø
- **Max. acceleration**  
5 m/s<sup>2</sup>
- **Bending cycles**  
2 million for ≥ 15x cable Ø
- **max. operating voltage** 30 V
- **Test voltage** 500 V / 50 Hz / 1 min
- **Insulation resistance** ≥ 1 GOhm x km
- **Conductor resistance**  
Core AWG26 ≤ 135 ohms/km  
Core AWG22 ≤ 62 ohms/km
- **Characteristic impedance 0,15 mm<sup>2</sup> pairs**  
from 1 MHz to 100 MHz 100+/-15 Ohm
- **Operating capacitance 0,15 mm<sup>2</sup> pairs**  
for 800 Hz rated 50 nF/km

## Approbations

UL/CSA

## Cable structure

- 0,15 mm<sup>2</sup> Bare copper conductor, 19 strands
- 0,38 mm<sup>2</sup> Tin-plated copper conductor, 19 strands
- Polyolefin core insulation
- Complete shield aluminium foil coated with plastic, braiding of tin-plated copper wires, coverage approx. 85%
- PUR outer sheath
- Sheath colour green

## Structure/colour code

- **(2x0,38mm<sup>2</sup>)+2x(2x0,15mm<sup>2</sup>)**  
Colour code  
Pair 0,38 mm<sup>2</sup>: RD+BK  
Pair 1 0,15 mm<sup>2</sup>: YE+GN  
Pair 2 0,15 mm<sup>2</sup>: PK+BU

## Connector data

RJ45 connector CAT5  
Material: nickel-plated PBT/brass  
Contacts 30u" Au/Ni  
Rated voltage: 50 V DC / 35 V AC  
Operating temperature: -20°C to + 120°C  
Mating cycles: 1000  
Cover  
zinc die-cast  
zinc die-cast / PBT blue  
PBT blue  
PBT black

## Application

This high quality pre-assembled feedback cable is specially manufactured for applications with mobile use. The special PUR outer sheath allows use in many industrial environments of general machine and plant construction.

## Characteristic

These pre-assembled cables can be produced in any lengths and also with customer-specific modifications.

## Note

Please observe the installation instructions for laying cables in cable carriers and the drive or controller manufacturer's information about maximum permitted cable length. The prefabricated cables listed here are not original parts, but accessories manufactured by the company HELUKABEL® GmbH. The data, standards and approvals relate solely to the bulk goods used.  
\* Drive Cliq is registered trademark from Siemens AG.

Manufacturer Designation	Helukabel Designation	Helukabel Part no.
6FX8002-2DC00	2DC00 DESINA PUR	660890
6FX8002-2DC10	2DC10 DESINA PUR	660891

Manufacturer Designation	Helukabel Designation	Helukabel Part no.
6FX8002-2DC20	2DC20 DESINA PUR	660892

Dimensions and specifications may be changed without prior notice.

\* Drive Cliq is registered trademark from Siemens AG.

# Pre-assembled servo motor cables

for mobile use (PVC)

Base line for use on REXROTH drive systems



RoHS

## Technical data

- **Temperature range**  
flexing -30°C to +80°C  
fixed installation -50°C to +90°C
- **Minimum bending radius**  
flexing 10x cable Ø  
fixed installation 7x cable Ø
- **Max. acceleration**  
4 m/s<sup>2</sup>
- **Bending cycles**  
5 million for ≥ 10x cable Ø
- **Nominal voltage**  
UL/CSA 1000 V
- **Test voltage**  
power cores 4 kV  
signal cores 2 kV
- **Insulation resistance** ≥ 20 MOhm x km

## Approbations

DESINA® (ISO 23570)  
UL/CSA

## Cable structure

### Power supply cores

- Bare copper, extra fine wire conductor acc. to DIN VDE 0295 cl.6
- PETP core insulation
- Core identification 1, 2, 3
- GN-YE conductor

### Signal cores

- Bare copper, extra fine wire conductor acc. to DIN VDE 0295 cl.6
- Core insulation PETP
- Core identification  
Pair 1: 5. 6  
Pair 2: 7. 8
- Cores twisted in pairs
- Shielding aluminium/polyester foil  
Drain wire  
tin-plated copper braiding
- Complete shield of tin-plated copper braiding, coverage approx. 85%
- PVC outer sheath
- Sheath colour orange (RAL 2003)

## Application

This high quality pre-assembled motor connection cable is specially manufactured for applications with high mechanical stress. The special PVC outer sheath allows use in many industrial environments of general machine and plant construction.

## Characteristic

Particularly suitable for use with small bending radii and high acceleration. These pre-assembled cables can be produced in any lengths and also with customer-specific modifications.

## Note

Please observe the installation instructions for laying cables in cable carriers and the drive or controller manufacturer's information about maximum permitted cable length. The prefabricated cables listed here are not original parts, but accessories manufactured by the company HELUKABEL® GmbH. The data, standards and approvals relate solely to the bulk goods used.

Helukabel Designation	Helukabel Part no.
motor cable 4009 PVC	660680
motor cable 4017 PVC	660681
motor cable 4039 PVC	660682
motor cable 4060 PVC	660683
motor cable 4055 PVC	660684

Helukabel Designation	Helukabel Part no.
motor cable 4020 PVC	660685
motor cable 4018 PVC	660686
motor cable 4016 PVC	660687
motor cable 4119 PVC	660688

Dimensions and specifications may be changed without prior notice.

# Pre-assembled servo motor cables

for mobile use (PUR)

Base line for use on REXROTH drive systems



RoHS

## Technical data

- **Temperature range**  
flexing -20°C to +60°C  
fixed installation -50°C to +80°C
- **Minimum bending radius**  
flexing 10x cable Ø  
fixed installation 7x cable Ø
- **Max. acceleration**  
5 m/s<sup>2</sup>
- **Bending cycles**  
5 million for ≥ 10x cable Ø
- **Nominal voltage**  
UL/CSA 1000 V
- **Test voltage**  
power cores 4 kV  
signal cores 2 kV
- **Insulation resistance** ≥ 10 MOhm x km

## Approbations

DESINA® (ISO 23570)  
UL/CSA

## Cable structure

### Power supply cores

- Bare copper, extra fine wire conductor acc. to DIN VDE 0295 cl.6
- PETP core insulation or high quality PP core insulation
- Core identification 1, 2, 3
- GN-YE conductor

### Signal cores

- Bare copper, extra fine wire conductor acc. to DIN VDE 0295 cl.6
- PETP or high quality PP core insulation
- Core identification  
Pair 1: 5, 6  
Pair 2: 7, 8
- Cores twisted in pairs
- Shielding aluminium/polyester foil  
Drain wire  
tin-plated copper braiding
- Complete shield of tin-plated copper braiding, coverage approx. 80%
- PUR outer sheath
- Sheath colour orange (RAL 2003)

## Application

This high quality pre-assembled motor connection cable is specially manufactured for applications with high mechanical stress. The special PUR outer sheath allows use in many industrial environments of general machine and plant construction.

## Characteristic

Particularly suitable for use with small bending radii and high acceleration. These pre-assembled cables can be produced in any lengths and also with customer-specific modifications.

## Note

Please observe the installation instructions for laying cables in cable carriers and the drive or controller manufacturer's information about maximum permitted cable length. The prefabricated cables listed here are not original parts, but accessories manufactured by the company HELUKABEL® GmbH. The data, standards and approvals relate solely to the bulk goods used.

Manufacturer Designation	Helukabel Designation	Helukabel Part no.	Manufacturer Designation	Helukabel Designation	Helukabel Part no.
IKG4008	motor cable 4008 PUR	660090	IKG4130	motor cable 4130 PUR	660125
IKG4009	motor cable 4009 PUR	660091	IKG4127	motor cable 4127 PUR	660126
IKG4017	motor cable 4017 PUR	660092	IKG4143	motor cable 4143 PUR	660129
IKG4077	motor cable 4077 PUR	660093	IKG4150	motor cable 4150 PUR	660130
IKG4029	motor cable 4029 PUR	660095	IKG4147	motor cable 4147 PUR	660131
IKG4039	motor cable 4039 PUR	660096	IKG4163	motor cable 4163 PUR	660134
IKG4028	motor cable 4028 PUR	660097	IKG4170	motor cable 4170 PUR	660135
IKG4073	motor cable 4073 PUR	660099	IKG4167	motor cable 4167 PUR	660136
IKG4071	motor cable 4071 PUR	660100	IKG4183	motor cable 4183 PUR	660139
IKG4072	motor cable 4072 PUR	660101	IKG4200	motor cable 4200 PUR	660140
IKG4053	motor cable 4053 PUR	660103	IKG4186	motor cable 4186 PUR	660141
IKG4060	motor cable 4060 PUR	660104	IKG4203	motor cable 4203 PUR	660144
IKG4055	motor cable 4055 PUR	660105	IKG4210	motor cable 4210 PUR	660145
IKG4063	motor cable 4063 PUR	660108	IKG4204	motor cable 4204 PUR	660146
IKG4070	motor cable 4070 PUR	660109	IKG4223	motor cable 4223 PUR	660149
IKG4068	motor cable 4068 PUR	660110	IKG4224	motor cable 4224 PUR	660150
IKG4067	motor cable 4067 PUR	660111	IKG4013	motor cable 4013 PUR	660153
IKG4083	motor cable 4083 PUR	660114	IKG4020	motor cable 4020 PUR	660154
IKG4090	motor cable 4090 PUR	660115	IKG4018	motor cable 4018 PUR	660155
IKG4087	motor cable 4087 PUR	660116	IKG4016	motor cable 4016 PUR	660156
IKG4103	motor cable 4103 PUR	660119	IKG4033	motor cable 4033 PUR	660157
IKG4110	motor cable 4110 PUR	660120	IKG4050	motor cable 4050 PUR	660158
IKG4107	motor cable 4107 PUR	660121	IKG4035	motor cable 4035 PUR	660159
IKG4123	motor cable 4123 PUR	660124	IKG4037	motor cable 4037 PUR	660160

Continuation ▶



# Pre-assembled servo motor cables

for mobile use (PUR)

Base line for use on REXROTH drive systems



Manufacturer Designation	Helukabel Designation	Helukabel Part no.
IKG4136	motor cable 4136 PUR	<b>660689</b>
IKG4155	motor cable 4155 PUR	<b>660690</b>
IKG4176	motor cable 4176 PUR	<b>660691</b>
IKG4186	motor cable 4186 PUR	<b>660692</b>
IKG4172	motor cable 4172 PUR	<b>660693</b>
IKG4173	motor cable 4173 PUR	<b>660694</b>
IKG4174	motor cable 4174 PUR	<b>660695</b>
IKG4115	motor cable 4115 PUR	<b>660696</b>
IKG4140	motor cable 4140 PUR	<b>660697</b>
IKG4116	motor cable 4116 PUR	<b>660698</b>
RKL4421	motor cable 4421 PUR	<b>660699</b>
IKG4117	motor cable 4117 PUR	<b>660700</b>
IKG4177	motor cable 4177 PUR	<b>660701</b>
IKG4118	motor cable 4118 PUR	<b>660702</b>
IKG4215	motor cable 4215 PUR	<b>660703</b>
IKG4175	motor cable 4175 PUR	<b>660704</b>
IKG4169	motor cable 4169 PUR	<b>660705</b>
IKG4138	motor cable 4138 PUR	<b>660706</b>
IKG4134	motor cable 4134 PUR	<b>660707</b>
IKG4119	motor cable 4119 PUR	<b>660708</b>
IKG4120	motor cable 4120 PUR	<b>660709</b>
IKG4137	motor cable 4137 PUR	<b>660710</b>
RKL4302	motor cable 4302 PUR	<b>660627</b>
RKL4303	motor cable 4303 PUR	<b>660711</b>
RKL4300	motor cable 4300 PUR	<b>660712</b>
RKL4301	motor cable 4301 PUR	<b>660713</b>
RKL4306	motor cable 4306 PUR	<b>660714</b>
RKL4307	motor cable 4307 PUR	<b>660715</b>
RKL4308	motor cable 4308 PUR	<b>660716</b>
RKL4309	motor cable 4309 PUR	<b>660717</b>
RKL4310	motor cable 4310 PUR	<b>660718</b>

Manufacturer Designation	Helukabel Designation	Helukabel Part no.
RKL4313	motor cable 4313 PUR	<b>660719</b>
RKL4314	motor cable 4314 PUR	<b>660720</b>
RKL4315	motor cable 4315 PUR	<b>660721</b>
RKL4317	motor cable 4317 PUR	<b>660722</b>
RKL4318	motor cable 4318 PUR	<b>660723</b>
RKL4401	motor cable 4401 PUR	<b>660724</b>
RKL4421	motor cable 4421 PUR	<b>660725</b>
RKL4431	motor cable 4431 PUR	<b>660726</b>
RKL4441	motor cable 4441 PUR	<b>660727</b>
RKL4421	motor cable 4421 PUR	<b>660728</b>
RKL4421	motor cable 4421 PUR	<b>660729</b>
RKL4421	motor cable 4421 PUR	<b>660730</b>
RKL4421	motor cable 4421 PUR	<b>660732</b>
RKL4421	motor cable 4421 PUR	<b>660733</b>
RKL4421	motor cable 4421 PUR	<b>660734</b>
RKL4421	motor cable 4421 PUR	<b>660735</b>
RKL4421	motor cable 4421 PUR	<b>660736</b>
RKL4421	motor cable 4421 PUR	<b>660737</b>
RKL4421	motor cable 4421 PUR	<b>660739</b>
RKL4421	motor cable 4421 PUR	<b>660740</b>
RKL4421	motor cable 4421 PUR	<b>660741</b>
RKL4421	motor cable 4421 PUR	<b>660742</b>
RKL4421	motor cable 4421 PUR	<b>660743</b>
RKL4421	motor cable 4421 PUR	<b>660744</b>
RKL4421	motor cable 4421 PUR	<b>660745</b>
RKL4421	motor cable 4421 PUR	<b>660746</b>
RKL4421	motor cable 4421 PUR	<b>660747</b>
RKL4421	motor cable 4421 PUR	<b>660748</b>
RKL4421	motor cable 4421 PUR	<b>660749</b>
RKL4421	motor cable 4421 PUR	<b>660750</b>
RKL4421	motor cable 4421 PUR	<b>660751</b>

Dimensions and specifications may be changed without prior notice.

# Pre-assembled feedback cables



for mobile use (PVC)

Base line for use on REXROTH drive systems



## Technical data

- **Temperature range**  
flexing -10°C to +80°C  
fixed installation -40°C to +80°C
- **Minimum bending radius**  
flexing 12x cable Ø  
fixed installation 8x cable Ø
- **Max. acceleration**  
4 m/s<sup>2</sup>
- **Bending cycles**  
5 million for ≥ 12x cable Ø
- **Operating voltage** 30 V
- **Test voltage** 1500 V
- **Insulation resistance** ≥ 100 MOhm x km

## Approbations

UL/CSA

## Cable structure

- Copper conductors
  - Polyolefin core insulation
  - Complete shield of tin-plated copper braiding, coverage approx. 85%
  - PVC outer sheath
  - Sheath colour orange
- Structure/colour code**
- **(2x0,5+4x2x0,25)**  
WH, BN, BN+GN, RD+BL, BU+VT, GY+PK
  - **(2x1,0+4x2x0,25)**  
WH, BN, BN+GN, RD+BL, BU+VT, GY+PK

## Application

This high quality pre-assembled feedback cable is specially manufactured for applications with mobile use. The special PVC outer sheath allows use in many industrial environments of general machine and plant construction.

## Characteristic

Particularly suitable for use with small bending radii and high acceleration. These pre-assembled cables can be produced in any lengths and also with customer-specific modifications.

## Note

Please observe the installation instructions for laying cables in cable carriers and the drive or controller manufacturer's information about maximum permitted cable length. The prefabricated cables listed here are not original parts, but accessories manufactured by the company HELUKABEL® GmbH. The data, standards and approvals relate solely to the bulk goods used.

Helukabel Designation	Helukabel Part no.
feedback cables 4374 PVC	660752
feedback cables 4042 PVC	660753
feedback cables 4375 PVC	660754

Helukabel Designation	Helukabel Part no.
feedback cables 4103 PVC	660755
feedback cables 4200 PVC	660756

Dimensions and specifications may be changed without prior notice.

# Pre-assembled feedback cables

for mobile use (PUR)

Base line for use on REXROTH drive systems



## Technical data

- **Temperature range**  
flexing 0°C to +60°C  
fixed installation -40°C to +60°C
- **Minimum bending radius**  
flexing 10x cable Ø  
fixed installation 8x cable Ø
- **Max. acceleration**  
5 m/s<sup>2</sup>
- **Bending cycles**  
10 million for ≥ 12x cable Ø
- **Operating voltage**  
VDE 300 V AC  
UL/CSA 30 V
- **Test voltage** 1000 V ( 0,14 mm<sup>2</sup> 0,5 kV)
- **Insulation resistance** ≥ 100 MOhm x km

## Approbations

UL/CSA

## Cable structure

- Copper conductors
- high quality PP core insulation / polyolefin core insulation
- Complete shield of tin-plated copper braiding, coverage approx. 80%
- PUR outer sheath
- Sheath colour orange  
(for (2x0,5+4x2x0,25) green also possible)

## Structure/colour code

- **(2x0,5+4x2x0,25)**  
WH, BN, BN+GN, RD+BK, BU+VT, GY+PK
- **(2x1,0+4x2x0,25)**  
WH, BN, BN+GN, RD+BK, BU+VT, GY+PK
- **(4x2x0,14+4x1,0+(4x0,14))**  
GY+PK, YE+VT, GN+BN, RD+BK, BU, WH/GN, BN/GN, WH, GN/BK, BU/BK, YE/BK, RD/BK

## Application

This high quality pre-assembled feedback cable is specially manufactured for applications with mobile use. The special PUR outer sheath allows use in many industrial environments of general machine and plant construction.

## Characteristic

Particularly suitable for use with small bending radii and high acceleration. These pre-assembled cables can be produced in any lengths and also with customer-specific modifications.

## Note

Please observe the installation instructions for laying cables in cable carriers and the drive or controller manufacturer's information about maximum permitted cable length.

The prefabricated cables listed here are not original parts, but accessories manufactured by the company HELUKABEL® GmbH. The data, standards and approvals relate solely to the bulk goods used.

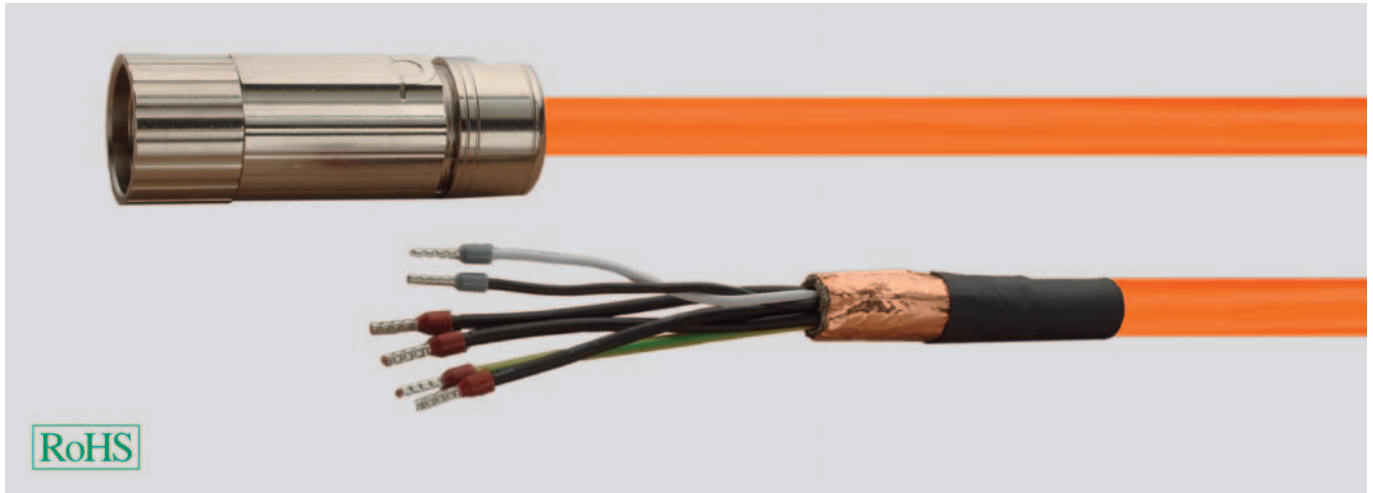
Manufacturer Designation	Helukabel Designation	Helukabel Part no.	Manufacturer Designation	Helukabel Designation	Helukabel Part no.
IKS4374	feedback cables 4374 PUR	<b>660260</b>	IKS0205	feedback cables 0205 PUR	<b>660275</b>
IKS4042	feedback cables 4042 PUR	<b>660757</b>	IKS0204	feedback cables 0204 PUR	<b>660276</b>
IKS4375	feedback cables 4375 PUR	<b>660263</b>	IKS0206	feedback cables 0206 PUR	<b>660277</b>
IKS4040	feedback cables 4040 PUR	<b>660758</b>	IKS4142	feedback cables 4142 PUR	<b>660283</b>
IKS4041	feedback cables 4041 PUR	<b>660759</b>	IKS4038	feedback cables 4038 PUR	<b>660761</b>
IKS4020	feedback cables 4020 PUR	<b>660266</b>	IKS4001	feedback cables 4001 PUR	<b>660313</b>
IKS4043	feedback cables 4043 PUR	<b>660760</b>	IKS4019	feedback cables 4019 PUR	<b>660314</b>
IKS4103	feedback cables 4103 PUR	<b>660272</b>	RKG4200	feedback cables 4200 PUR	<b>660628</b>

Dimensions and specifications may be changed without prior notice.

# Pre-assembled servo motor cables

for fixed laying

Base line for use on LENZE drive systems of the type Global Drive



RoHS

## Technical data

- **Temperature range**  
flexing -20°C to +70°C  
fixed installation -20°C to +80°C
- **Minimum bending radius**  
flexing 18x cable Ø  
fixed installation 9x cable Ø
- **Max. acceleration**  
2 m/s<sup>2</sup>
- **Bending cycles**  
50.000 for ≥ 18x cable Ø
- **Nominal voltage** U<sub>0</sub>/U 0,6/1 kV
- **Test voltage** 4 kV
- **Insulation resistance** ≥ 500 MOhm x km

## Approbations

DESINA® (ISO 23570)  
VDE  
UL/CSA

## Cable structure

### Power supply cores

- Copper conductors, bare
- high quality PP core insulation
- Core identification 1, 2, 3
- GN-YE conductor

### Signal cores

- Copper conductors, bare
- High quality PP core insulation
- Core identification black, white
- Shielding aluminium/polyester foil  
screened with tin-plated copper wires
- Complete shield of tin-plated copper  
braiding, coverage approx. 80%
- PVC outer sheath
- Sheath colour orange (RAL 2003)

## Application

This high quality pre-assembled motor connection cable is specially manufactured for applications with static installation. The special PVC outer sheath allows use in many industrial environments of general machine and plant construction.

## Characteristic

Economical alternatives to the cable carrier compatible cable types which otherwise meet all requirements of the servo drive manufacturers. These pre-assembled cables can be produced in any lengths and also with customer-specific modifications.

## Note

Please observe the drive or controller manufacturer's information about maximum permitted cable length. The prefabricated cables listed here are not original parts, but accessories manufactured by the company HELUKABEL® GmbH. The data, standards and approvals relate solely to the bulk goods used.

Manufacturer Designation	Helukabel Designation	Helukabel Part no.
EWLMxxxGM-015C	motor cable GM 015	<b>660334</b>
EWLMxxxGM-015C	motor cable GM 015	<b>660482</b>
EWLMxxxGM-040	motor cable GM 040	<b>660350</b>
-	motor cable GM 060	<b>660731</b>

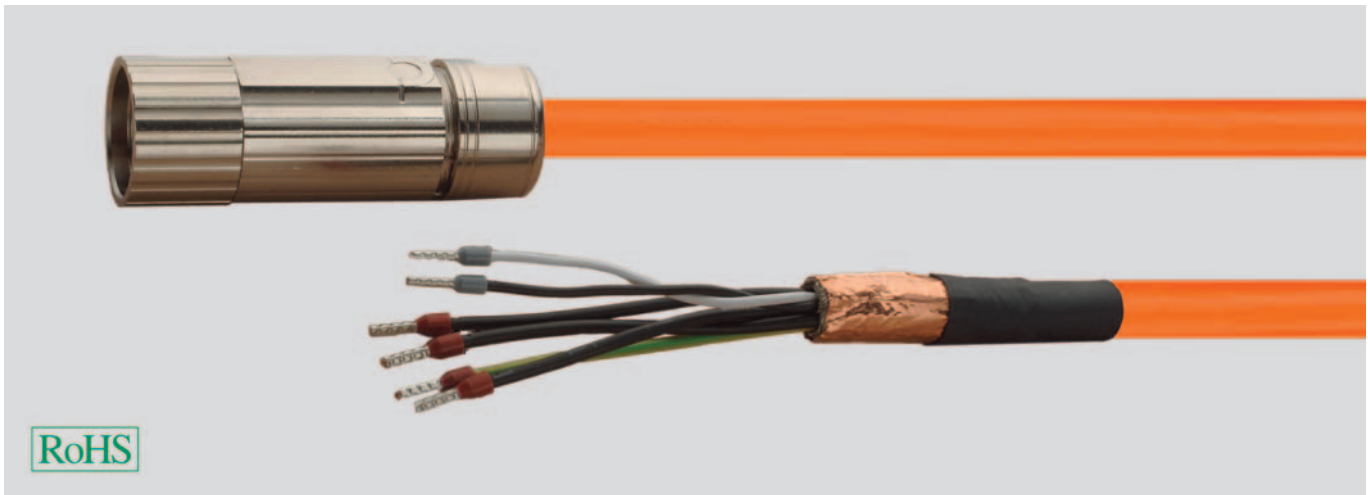
Manufacturer Designation	Helukabel Designation	Helukabel Part no.
EWLMxxxGM-100	motor cable GM 100	<b>660738</b>
EWLMxxxGM-040I	motor cable GM 040I	<b>660762</b>
-	motor cable GM 060I	<b>660763</b>
EWLMxxxGM-100I	motor cable GM 100I	<b>660764</b>

Dimensions and specifications may be changed without prior notice.

# Pre-assembled servo motor cables

for mobile use

Base line for use on LENZE drive systems of the type Global Drive



## Technical data

- **Temperature range**  
flexing 0°C to +60°C  
fixed installation -30°C to +80°C
- **Minimum bending radius**  
flexing 12x cable Ø  
fixed installation 7x cable Ø
- **Max. acceleration**  
4 m/s<sup>2</sup>
- **Bending cycles**  
10 million for ≥ 12x cable Ø
- **Operating voltage** 1000 V
- **Test voltage**  
power cores 3 kV  
control cores 1,5 kV
- **Insulation resistance**  
power cores ≥ 5000 MOhm x km  
signal cores ≥ 20 MOhm x km

## Approbations

DESINA® (ISO 23570)  
UL/CSA

## Cable structure

### Power supply cores

- Bare copper conductor  
acc. to DIN VDE 0295 cl.6
- Polyolefin polymer core insulation
- Core identification 1, 2, 3
- GN-YE conductor

### Signal cores

- Copper conductors, bare
- Polyolefin/polymer core insulation
- Core identification black, white
- Cores twisted in pairs
- Shield, tin-plated copper braiding
- Complete shield of tin-plated copper braiding, coverage approx. 85%
- PUR outer sheath
- Sheath colour orange (RAL 2003)

## Application

This high quality pre-assembled motor connection cable is specially manufactured for applications with mobile use. The special PUR outer sheath allows use in many industrial environments of general machine and plant construction.

## Characteristic

Particularly suitable for use with small bending radii and high acceleration. These pre-assembled cables can be produced in any lengths and also with customer-specific modifications.

## Note

Please observe the installation instructions for laying cables in cable carriers and the drive or controller manufacturer's information about maximum permitted cable length.

The prefabricated cables listed here are not original parts, but accessories manufactured by the company HELUKABEL® GmbH. The data, standards and approvals relate solely to the bulk goods used.

Manufacturer Designation	Helukabel Designation	Helukabel Part no.
-	motor cable GMS 015	<b>660500</b>
EWLMxxxGMS-025	motor cable GMS 025	<b>660648</b>
EWLMxxxGMS-040	motor cable GMS 040	<b>660766</b>
-	motor cable GMS 060	<b>660767</b>

Manufacturer Designation	Helukabel Designation	Helukabel Part no.
-	motor cable GMS 100	<b>660768</b>
-	motor cable GMS 040I	<b>660769</b>
-	motor cable GMS 060I	<b>660770</b>
-	motor cable GMS 100I	<b>660771</b>

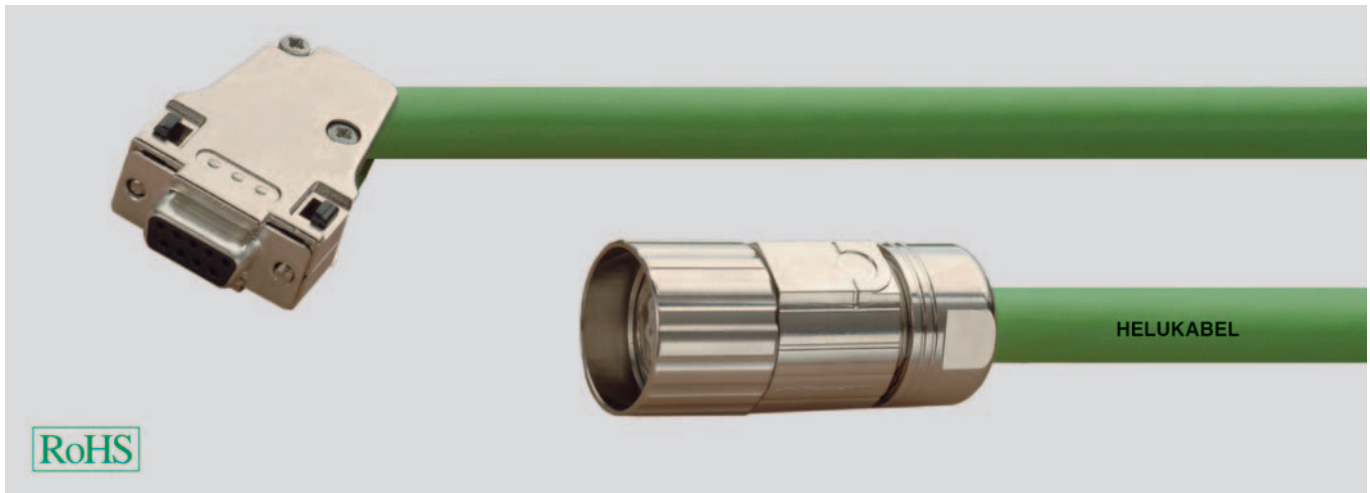
Dimensions and specifications may be changed without prior notice.



# Pre-assembled feedback cables

## for fixed laying

Base line for use on LENZE drive systems of the type Global Drive



### Technical data

- **Temperature range**  
fixed installation -25°C to +80°C
- **Minimum bending radius**  
fixed installation 8x cable Ø
- **Operating voltage** 30 V
- **Test voltage** 1000 V
- **Insulation resistance**  $\geq 10 \text{ MOhm} \times \text{km}$

### Approbations

DESINA® (ISO 23570)  
UL/CSA

### Cable structure

- Tinned copper conductors
- PVC or PE core insulation
- Shield of tin-plated copper braiding, coverage approx. 75%
- PVC outer sheath
- Sheath colour green

### Structure/colour code

- **(3x(2x0,14)+2x(0,5))**  
YE+BK, GN+BK, RD+BK, WH, BK
- **(4x(2x0,14)+2x(1,0))**  
YE+GN, PK+GY, RD+BU, BK+VT, WH, BN

### Application

This high quality pre-assembled feedback cable is specially manufactured for applications with static installation. The special PVC outer sheath allows use in many industrial environments of general machine and plant construction.

### Characteristic

Economical alternatives to the cable carrier compatible cable types which otherwise meet all requirements of the servo drive manufacturers. These pre-assembled cables can be produced in any lengths and also with customer-specific modifications.

### Note

Please observe the drive or controller manufacturer's information about maximum permitted cable length. The prefabricated cables listed here are not original parts, but accessories manufactured by the company HELUKABEL® GmbH. The data, standards and approvals relate solely to the bulk goods used.

Manufacturer Designation	Helukabel Designation	Helukabel Part no.
EWLRxxxGM-T	feedback cables GM-T	660335
EWLRxxxGM-T	encoder cables GM-T	660772

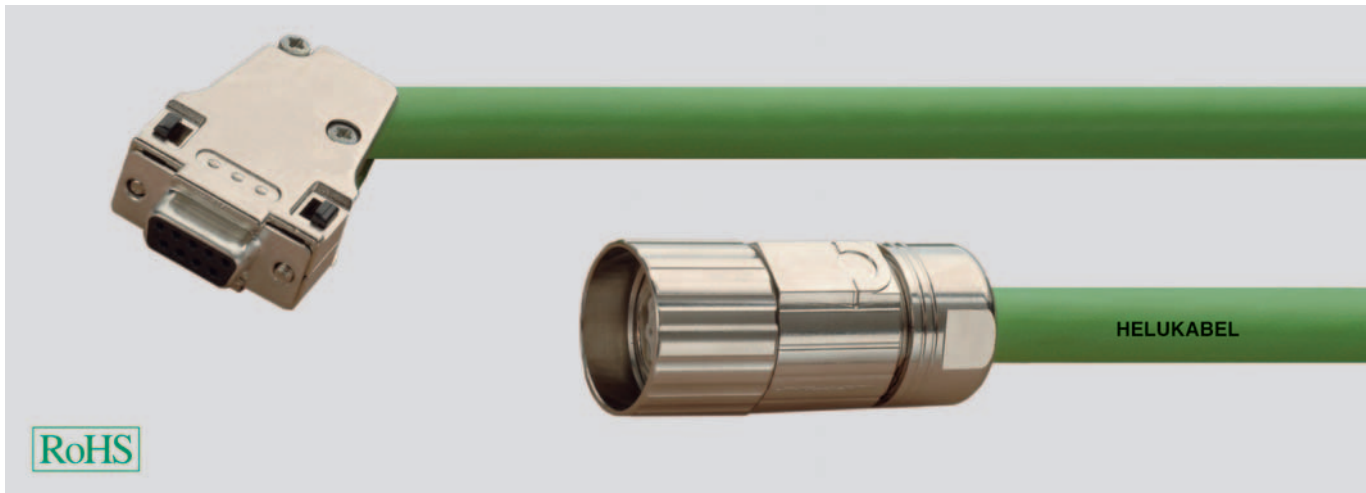
Manufacturer Designation	Helukabel Designation	Helukabel Part no.
EWLDxxxGGBS93	system cable GGBS 93	660773

Dimensions and specifications may be changed without prior notice.

# Pre-assembled feedback cables

for mobile use

Base line for use on LENZE drive systems of the type Global Drive



## Technical data

- **Temperature range**  
flexing -5°C to +70°C  
fixed installation -40°C to +80°C
- **Minimum bending radius**  
flexing 15x cable Ø  
fixed installation 8x cable Ø
- **Max. acceleration**  
3 m/s<sup>2</sup>
- **Bending cycles**  
2 million for ≥ 15x cable Ø
- **Operating voltage** 30 V
- **Test voltage** 1000 V

## Approbations

DESINA® (ISO 23570)  
UL/CSA

## Cable structure

- Tinned copper conductors
- Polyester/polyolefin core insulation
- Shield of tin-plated copper braiding, coverage approx. 80%
- PUR outer sheath
- Sheath colour green  
(0-000000-02866 orange)

### Structure/colour code

- **(3x(2x0, 14)+2x(0, 5))**  
YE+BK, GN+BK, RD+BK, WH, BK
- **(3x(2x0, 14)+2x(0, 5))**  
YE+GN, PK+GY, RD+BU, WH, BN
- **(4x(2x0, 14)+2x(1, 0))**  
YE+GN, PK+GY, RD+BU, BK+VT, WH, BN
- **(4x(2x0, 14)+2x(0, 5))**  
YE+GN, PK+GY, RD+BU, BK+VT, WH, BN

## Application

This high quality pre-assembled feedback cable is specially manufactured for applications with mobile use. The special PUR outer sheath allows use in many industrial environments of general machine and plant construction.

## Characteristic

These pre-assembled cables can be produced in any lengths and also with customer-specific modifications.

## Note

Please observe the installation instructions for laying cables in cable carriers and the drive or controller manufacturer's information about maximum permitted cable length.

The prefabricated cables listed here are not original parts, but accessories manufactured by the company HELUKABEL® GmbH. The data, standards and approvals relate solely to the bulk goods used.

**Helukabel**  
**Designation**  
feedback cables GMS-T

**Helukabel**  
**Part no.**  
660445

**Helukabel**  
**Designation**  
encoder cables GMS-T

**Helukabel**  
**Part no.**  
660774

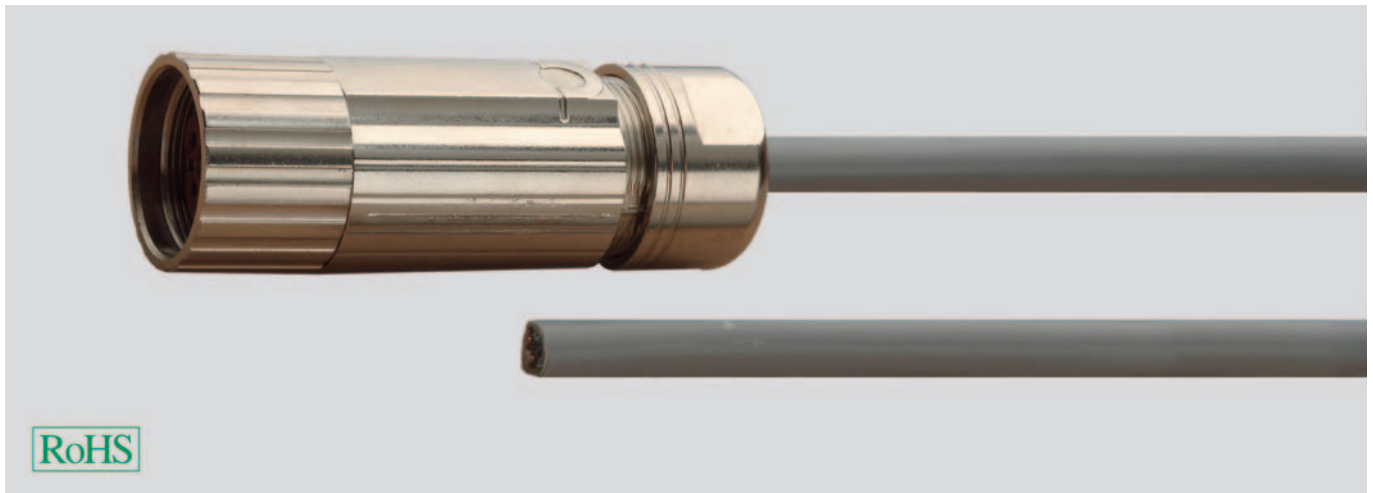
Dimensions and specifications may be changed without prior notice.



# Pre-assembled fan cables

## for fixed laying

Base line for use on LENZE drive systems of the type Global Drive



### Technical data

- **Temperature range**  
flexing -5°C to +70°C  
fixed installation -40°C to +70°C
- **Minimum bending radius**  
flexing 8x cable Ø  
fixed installation 4x cable Ø
- **Nominal voltage**  
HAR U<sub>0</sub>/U 300/500 V  
UL/CSA 600 V
- **Test voltage** power cores 3 kV
- **Insulation resistance** ≥ 20 MOhm x km

### Approbations

UL/CSA

### Cable structure

- Bare copper conductor, fine wire stranded
- PVC core insulation
- Core identification 1, 2, 3
- GN-YE conductor
- PVC outer sheath
- Sheath colour grey

### Application

This high quality pre-assembled fan cable is specially manufactured for applications with static installation. The special PVC outer sheath allows use in many industrial environments of general machine and plant construction.

### Characteristic

Economical alternatives to the cable carrier compatible cable types which otherwise meet all requirements of the servo drive manufacturers. These pre-assembled cables can be produced in any lengths and also with customer-specific modifications.

### Note

Please observe the drive or controller manufacturer's information about maximum permitted cable length. The prefabricated cables listed here are not original parts, but accessories manufactured by the company HELUKABEL® GmbH. The data, standards and approvals relate solely to the bulk goods used.

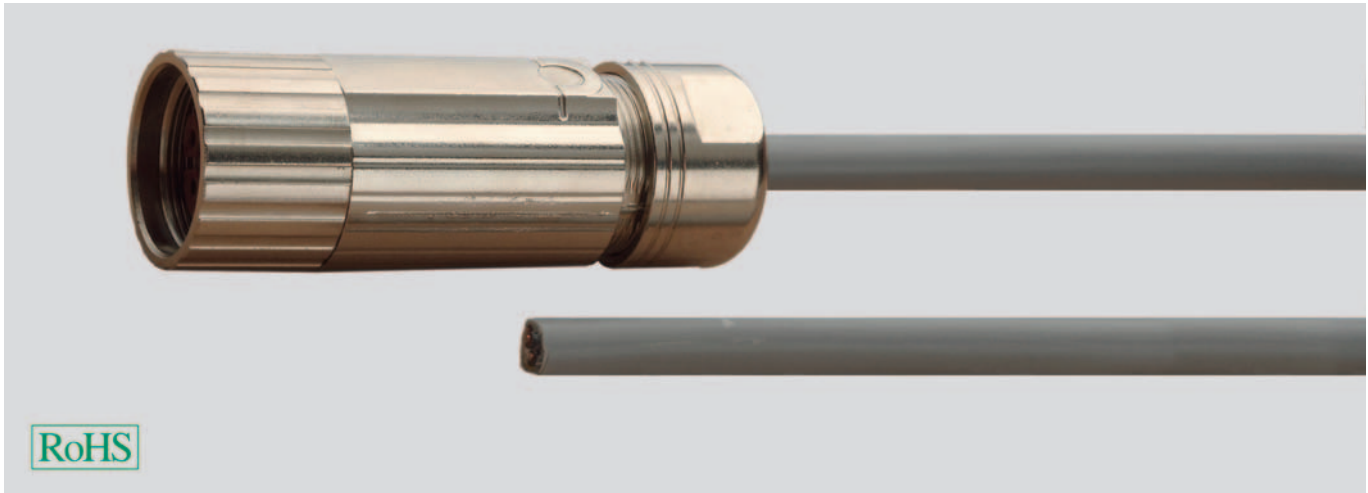
Manufacturer Designation	Helukabel Designation	Helukabel Part no.
EWLLxxxGM	fan cables GM	660351

Dimensions and specifications may be changed without prior notice.

# Pre-assembled fan cables

## for mobile use

Base line for use on LENZE drive systems of the type Global Drive



RoHS

### Technical data

- **Temperature range**  
flexing -5°C to +80°C  
fixed installation -40°C to +80°C
- **Minimum bending radius**  
flexing 8x cable Ø  
fixed installation 4x cable Ø
- **Nominal voltage** UL/CSA 600 V
- **Test voltage** power cores 4 kV
- **Insulation resistance**  $\geq 20 \text{ MOhm} \times \text{km}$

### Approbations

UL/CSA

### Cable structure

- Copper conductors, bare, fine wire stranded
- PVC core insulation
- Core identification 1, 2, 3
- GN-YE conductor
- PUR outer sheath
- Sheath colour grey

### Application

This high quality pre-assembled fan cable is specially manufactured for applications with mobile use.

The special PUR outer sheath allows use in many industrial environments of general machine and plant construction.

### Characteristic

Particularly suitable for use with small bending radii and high acceleration.

These pre-assembled cables can be produced in any lengths and also with customer-specific modifications.

### Note

Please observe the installation instructions for laying cables in cable carriers and the drive or controller manufacturer's information about maximum permitted cable length.

The prefabricated cables listed here are not original parts, but accessories manufactured by the company HELUKABEL® GmbH.

The data, standards and approvals relate solely to the bulk goods used.

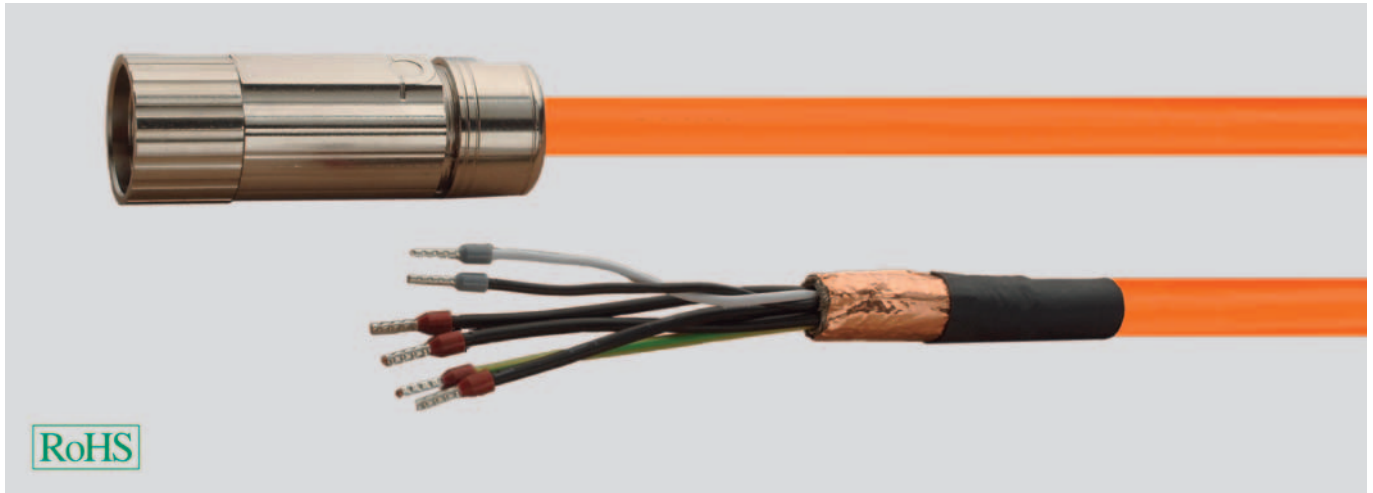
Manufacturer Designation	Helukabel Designation	Helukabel Part no.
EWLLxxxGMS	fan cables GMS	660850

Dimensions and specifications may be changed without prior notice.

# Pre-assembled servo motor cables

for fixed laying

Base line for use on LENZE drive systems of the type L-force®



RoHS

## Technical data

- **Temperature range**  
flexing -20°C to +70°C  
fixed installation -20°C to +80°C
- **Minimum bending radius**  
flexing 18x cable Ø  
fixed installation 9x cable Ø
- **Max. acceleration**  
2 m/s<sup>2</sup>
- **Bending cycles**  
50.000 for ≥ 18x cable Ø
- **Operating voltage**  
VDE U<sub>0</sub>/U 0,6/1 kV
- **Test voltage** 4 kV
- **Insulation resistance** ≥ 500 MOhm x km

## Approbations

DESINA® (ISO 23570)  
VDE  
UL/CSA

## Cable structure

### Power supply cores

- Copper conductors, bare
- high quality PP core insulation
- Core identification 1, 2, 3
- GN-YE conductor

### Signal cores

- Copper conductors, bare
- High quality PP core insulation
- Core identification black, white
- Shielding aluminium/polyester foil screened with tin-plated copper wires
- Complete shield of tin-plated copper braiding, coverage approx. 80%
- PVC outer sheath
- Sheath colour orange (RAL 2003)

## Application

This high quality pre-assembled motor connection cable is specially manufactured for applications with static installation. The special PVC outer sheath allows use in many industrial environments of general machine and plant construction.

## Characteristic

Economical alternatives to the cable carrier compatible cable types which otherwise meet all requirements of the servo drive manufacturers. These pre-assembled cables can be produced in any lengths and also with customer-specific modifications.

## Note

Please observe the drive or controller manufacturer's information about maximum permitted cable length. The prefabricated cables listed here are not original parts, but accessories manufactured by the company HELUKABEL® GmbH. The data, standards and approvals relate solely to the bulk goods used.

Manufacturer Designation	Helukabel Designation	Helukabel Part no.	Manufacturer Designation	Helukabel Designation	Helukabel Part no.
EYP 0006 A xxxx C01 A00	motor cable 0006AC01A00 PVC	<b>660776</b>	EYP 0008 A xxxx M03 A00	motor cable 0008AM03A00 PVC	<b>660781</b>
EYP 0008 A xxxx C02 A00	motor cable 0008AC02A00 PVC	<b>660777</b>	EYP 0009 A xxxx M03 A00	motor cable 0009AM03A00 PVC	<b>660782</b>
EYP 0005 A xxxx M02 A00	motor cable 0005AM02A00 PVC	<b>660778</b>	EYP 0003 A xxxx M01 A00	motor cable 0003AM01A00 PVC	<b>660783</b>
EYP 0006 A xxxx M02 A00	motor cable 0006AM02A00 PVC	<b>660779</b>	EYP 0004 A xxxx M01 A00	motor cable 0004AM01A00 PVC	<b>660784</b>
EYP 0007 A xxxx M03 A00	motor cable 0007AM03A00 PVC	<b>660780</b>	EYP 0005 A xxxx M01 A00	motor cable 0005AM01A00 PVC	<b>660785</b>

Dimensions and specifications may be changed without prior notice.

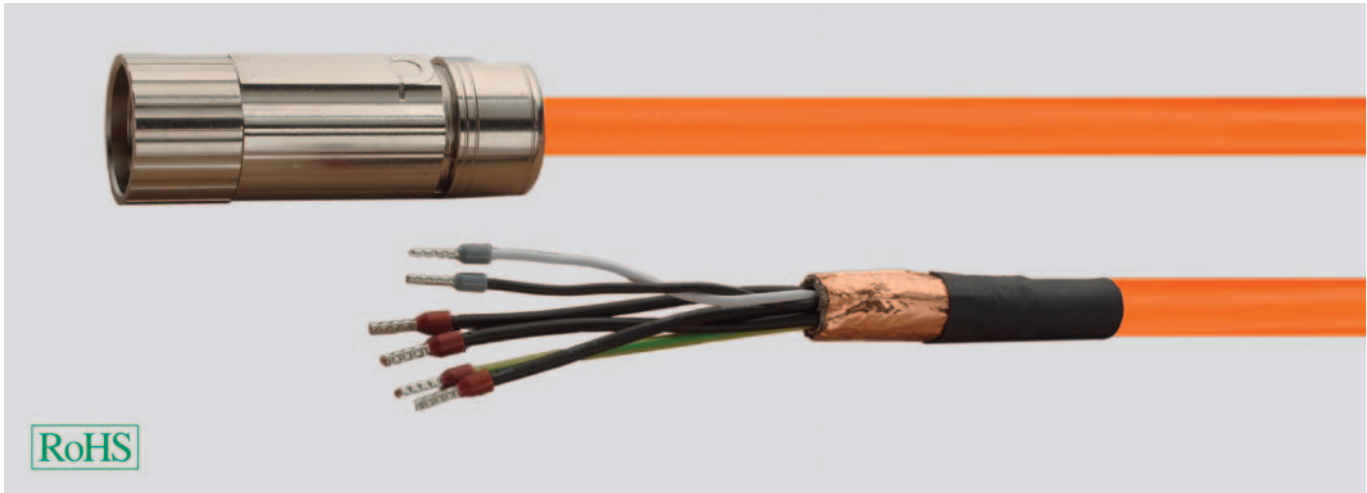
U



# Pre-assembled servo motor cables

for mobile use

Base line for use on LENZE drive systems of the type L-force®



RoHS

## Technical data

- **Temperature range**  
flexing 0°C to +60°C  
fixed installation -30°C to +80°C
- **Minimum bending radius**  
flexing 12x cable Ø  
fixed installation 7x cable Ø
- **Max. acceleration**  
4 m/s<sup>2</sup>
- **Bending cycles**  
10 million for ≥ 12x cable Ø
- **Operating voltage** 1000 V
- **Test voltage**  
power cores 3 kV  
control cores 1,5 kV
- **Insulation resistance**  
power cores ≥ 5000 MOhm x km  
signal cores ≥ 20 MOhm x km

## Approbations

DESINA® (ISO 23570)  
UL/CSA

## Cable structure

### Power supply cores

- Bare copper conductor  
acc. to DIN VDE 0295 cl.6
- Polyolefin polymer core insulation
- Core identification 1, 2, 3
- GN-YE conductor

### Signal cores

- Copper conductors, bare
- Polyolefin/polymer core insulation
- Core identification black, white
- Cores twisted in pairs
- Shielding screened with tin-plated copper wires
- Complete shield of tin-plated copper braiding, coverage approx. 85%
- PUR outer sheath
- Sheath colour orange (RAL 2003)

## Application

This high quality pre-assembled motor connection cable is specially manufactured for applications with mobile use. The special PUR outer sheath allows use in many industrial environments of general machine and plant construction.

## Characteristic

Particularly suitable for use with small bending radii and high acceleration. These pre-assembled cables can be produced in any lengths and also with customer-specific modifications.

## Note

Please observe the installation instructions for laying cables in cable carriers and the drive or controller manufacturer's information about maximum permitted cable length.

The prefabricated cables listed here are not original parts, but accessories manufactured by the company HELUKABEL® GmbH. The data, standards and approvals relate solely to the bulk goods used.

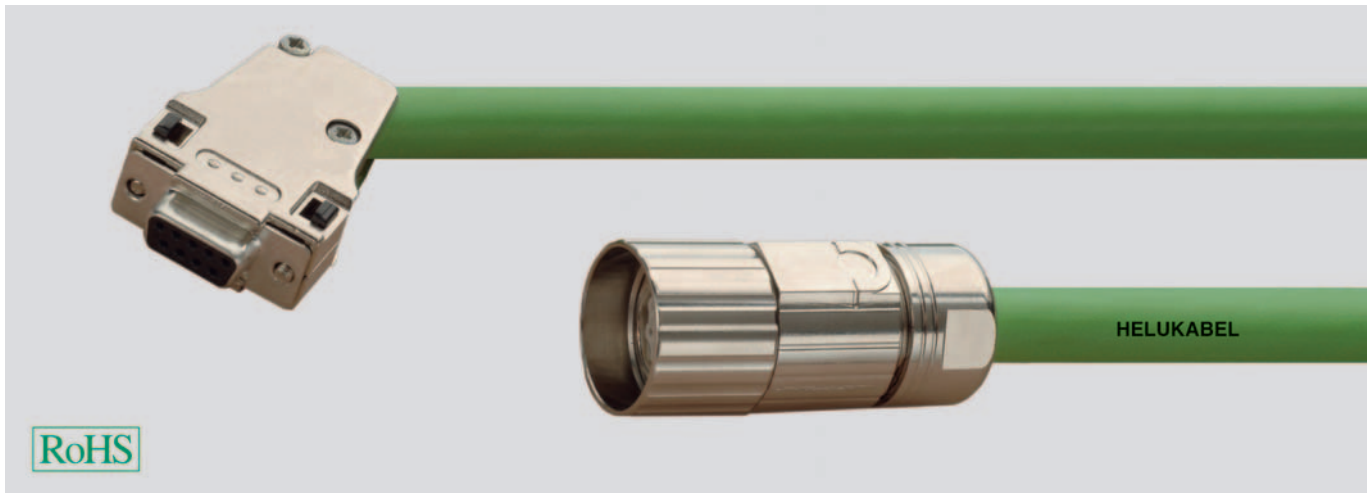
Manufacturer Designation	Helukabel Designation	Helukabel Part no.	Manufacturer Designation	Helukabel Designation	Helukabel Part no.
EYP 0013 A xxxx C01 A00	motor cable 0013AC01A00 PUR	<b>660786</b>	EYP 0015 A xxxx M03 A00	motor cable 0015AM03A00 PUR	<b>660791</b>
EYP 0015 A xxxx C02 A00	motor cable 0015AC02A00 PUR	<b>660787</b>	EYP 0016 A xxxx M03 A00	motor cable 0016AM03A00 PUR	<b>660792</b>
EYP 0012 A xxxx M02 A00	motor cable 0012AM02A00 PUR	<b>660788</b>	EYP 0010 A xxxx M01 A00	motor cable 0010AM01A00 PUR	<b>660793</b>
EYP 0013 A xxxx M02 A00	motor cable 0013AM02A00 PUR	<b>660789</b>	EYP 0011 A xxxx M01 A00	motor cable 0011AM01A00 PUR	<b>660510</b>
EYP 0014 A xxxx M03 A00	motor cable 0014AM03A00 PUR	<b>660790</b>	EYP 0012 A xxxx M01 A00	motor cable 0012AM01A00 PUR	<b>660794</b>

Dimensions and specifications may be changed without prior notice.

# Pre-assembled feedback cables

## for fixed laying

Base line for use on LENZE drive systems of the type L-force®



### Technical data

- **Temperature range**  
fixed installation -25°C to +80°C
- **Minimum bending radius**  
fixed installation 8x cable Ø
- **Operating voltage** 30 V
- **Test voltage** 1000 V
- **Insulation resistance** ≥ 10 MOhm x km

### Approbations

DESINA® (ISO 23570)  
UL/CSA

### Cable structure

- Tinned copper conductors
- PVC/polyolefin core insulation
- Shield of tin-plated copper braiding, coverage approx. 75%
- PVC outer sheath
- Sheath colour green

### Structure/colour code

- **(3x(2x0,14)+2x(0,5))**  
YE+BK, GN+BK, RS+BK, WH, BK
- **(4x(2x0,14)+2x(1,0))**  
YE+GN, PK+GY, RD+BU, BK+VT, WH, BN

### Application

This high quality pre-assembled feedback cable is specially manufactured for applications with static installation. The special PVC outer sheath allows use in many industrial environments of general machine and plant construction.

### Characteristic

Economical alternatives to the cable carrier compatible cable types which otherwise meet all requirements of the servo drive manufacturers. These pre-assembled cables can be produced in any lengths and also with customer-specific modifications.

### Note

Please observe the drive or controller manufacturer's information about maximum permitted cable length. The prefabricated cables listed here are not original parts, but accessories manufactured by the company HELUKABEL® GmbH. The data, standards and approvals relate solely to the bulk goods used.

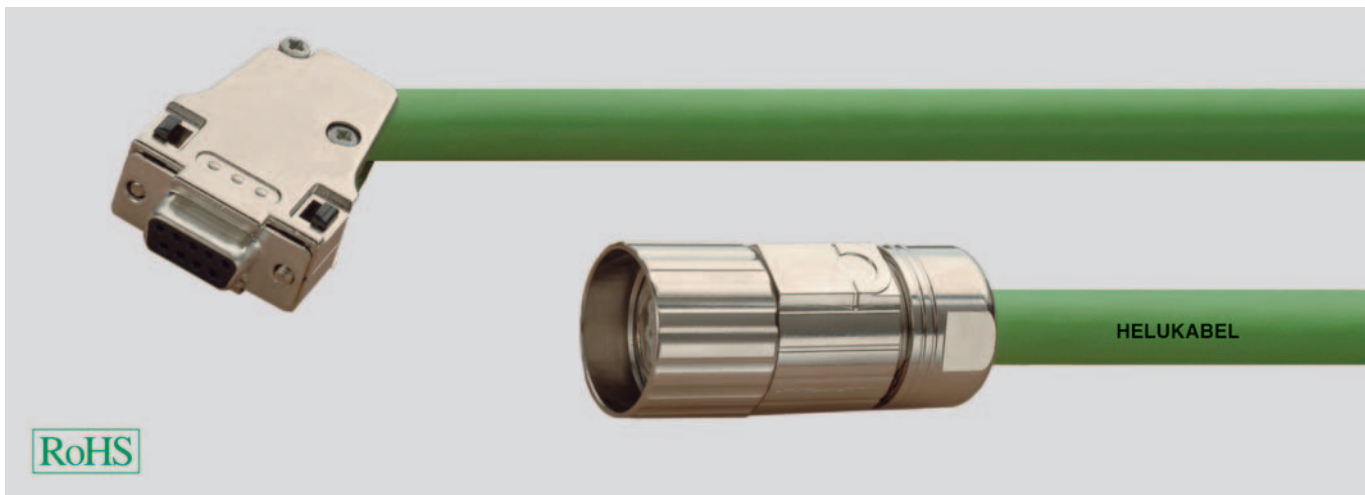
Manufacturer Designation	Helukabel Designation	Helukabel Part no.	Manufacturer Designation	Helukabel Designation	Helukabel Part no.
EYD 0017 A xxxx W01 S01	feedback cables 0017AW01S01 PVC	<b>660795</b>	EYF 0028 A xxxx A00 G02	feedback cables 0028AA00G02 PVC	<b>660805</b>
EYD 0017 A xxxx W01 S02	feedback cables 0017AW01S02 PVC	<b>660796</b>	EYF 0018 A xxxx A00 S03	feedback cables 0018AA00S03 PVC	<b>660806</b>
EYD 0017 A xxxx W01 W01	feedback cables 0017AW01W01 PVC	<b>660797</b>	EYF 0018 A xxxx A00 W02	feedback cables 0018AA00W02 PVC	<b>660807</b>
EYD 0017 A xxxx W03 S01	feedback cables 0017AW03S01 PVC	<b>660798</b>	EYF 0018 A xxxx F02 A00	feedback cables 0018AF02A00 PVC	<b>660808</b>
EYD 0017 A xxxx W03 S02	feedback cables 0017AW03S02 PVC	<b>660799</b>	EYF 0028 A xxxx F02 G02	feedback cables 0028AF02G02 PVC	<b>660809</b>
EYD 0017 A xxxx W03 W01	feedback cables 0017AW03W01 PVC	<b>660800</b>	EYF 0018 A xxxx F02 S03	feedback cables 0018AF02S03 PVC	<b>660810</b>
EYF 0017 A xxxx A00 S01	feedback cables 0017AA00S01 PVC	<b>660801</b>	EYF 0018 A xxxx F02 W02	feedback cables 0018AF02W02 PVC	<b>660811</b>
EYF 0017 A xxxx A00 S02	feedback cables 0017AA00S02 PVC	<b>660802</b>	EYF 0021 A xxxx A00 S03	feedback cables 0021AA00S03 PVC	<b>660812</b>
EYF 0017 A xxxx F01 A00	feedback cables 0017AF01A00 PVC	<b>660803</b>	EYF 0021 A xxxx F03 A00	feedback cables 0021AF03A00 PVC	<b>660813</b>
EYF 0017 A xxxx F01 S01	feedback cables 0017AF01S01 PVC	<b>660630</b>	EYF 0021 A xxxx F03 S03	feedback cables 0021AF03S03 PVC	<b>660814</b>
EYF 0017 A xxxx F01 S02	feedback cables 0017AF01S02 PVC	<b>660804</b>			

Dimensions and specifications may be changed without prior notice.

# Pre-assembled feedback cables

for mobile use

Base line for use on LENZE drive systems of the type L-force®



## Technical data

- **Temperature range**  
flexing -5°C to +70°C  
fixed installation -40°C to +80°C
- **Minimum bending radius**  
flexing 15x cable Ø  
fixed installation 8x cable Ø
- **Max. acceleration**  
3 m/s<sup>2</sup>
- **Bending cycles**  
2 million for ≥ 15x cable Ø
- **Operating voltage** 30 V
- **Test voltage** 1000 V

## Approbations

DESINA® (ISO 23570) (except  
0-000000-02866)  
UL/CSA

## Cable structure

- Tinned copper conductors
- Polyester/polyolefin core insulation
- Shield of tin-plated copper braiding, coverage approx. 80%
- PUR outer sheath
- Sheath colour green

### Structure/colour code

- **(3x(2x0,14)+2x(0,5))**  
YE+BK, GN+BK, RD+BK, WH, BK
- **(3x(2x0,14)+2x(0,5))**  
YE+GN, PK+GY, RD+BU, WH, BN
- **(4x(2x0,14)+2x(1,0))**  
YE+GN, PK+GY, RD+BU, BK+VT, WH, BN
- **(4x(2x0,14)+2x(0,5))**  
YE+GN, PK+GY, RD+BU, BK+VT, WH, BN

## Application

This high quality pre-assembled feedback cable is specially manufactured for applications with mobile use. The special PUR outer sheath allows use in many industrial environments of general machine and plant construction.

## Characteristic

These pre-assembled cables can be produced in any lengths and also with customer-specific modifications.

## Note

Please observe the installation instructions for laying cables in cable carriers and the drive or controller manufacturer's information about maximum permitted cable length.

The prefabricated cables listed here are not original parts, but accessories manufactured by the company HELUKABEL® GmbH. The data, standards and approvals relate solely to the bulk goods used.

Manufacturer Designation	Helukabel Designation	Helukabel Part no.
EYD 0019 A xxxx F02 A00	feedback cables 0019AF02A00 PUR	<b>660815</b>
EYD 0020 A xxxx A00 S04	feedback cables 0020AA00S04 PUR	<b>660816</b>
EYF 0020 A xxxx A00 S05	feedback cables 0020AA00S05 PUR	<b>660817</b>
EYF 0020 A xxxx F01 A00	feedback cables 0020AF01A00 PUR	<b>660818</b>

Manufacturer Designation	Helukabel Designation	Helukabel Part no.
EYF 0020 A xxxx F01 S01	feedback cables 0020AF01S01 PUR	<b>660819</b>
EYF 0020 A xxxx F01 S02	feedback cables 0020AF01S02 PUR	<b>660820</b>
EYF 0022 A xxxx F03 A00	feedback cables 0022AF03A00 PUR	<b>660821</b>

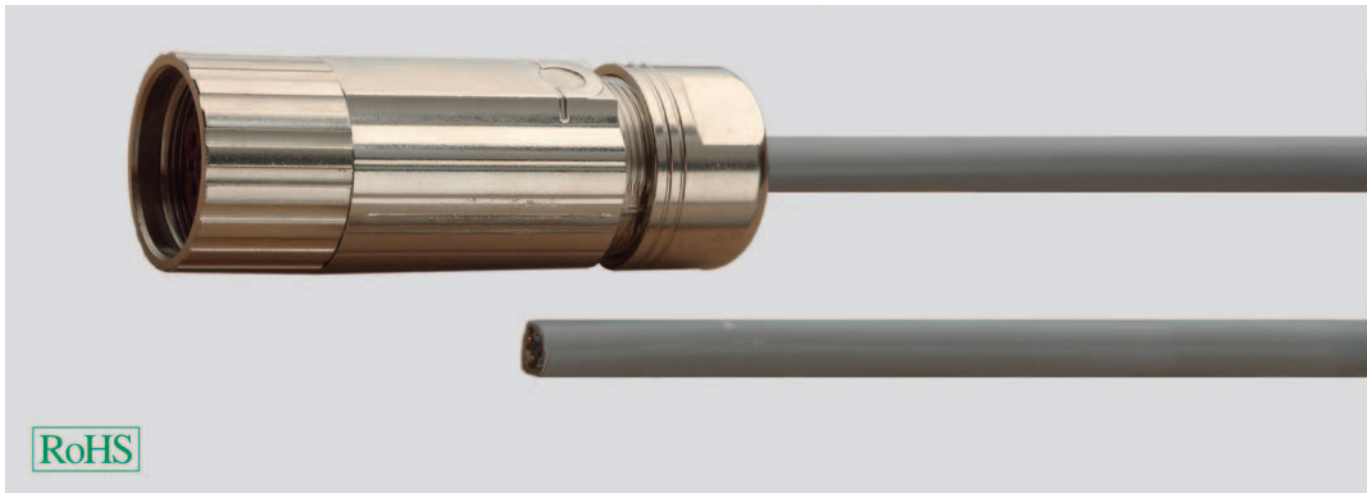
Dimensions and specifications may be changed without prior notice.



# Pre-assembled fan cables

## for fixed laying

Base line for use on LENZE drive systems of the type L-force®



RoHS

### Technical data

- **Temperature range**  
flexing -5°C to +70°C  
fixed installation -40°C to +70°C
- **Minimum bending radius**  
flexing 8x cable Ø  
fixed installation 4x cable Ø
- **Nominal voltage**  
HAR U<sub>0</sub>/U 300/500 V  
UL/CSA 600 V
- **Test voltage** power cores 3 kV
- **Insulation resistance** ≥ 20 MOhm x km

### Approbations

UL/CSA

### Cable structure

#### Power supply cores

- Bare copper conductor, fine wire stranded
- PVC core insulation
- Core identification numbers
- GN-YE conductor
- PVC outer sheath
- Sheath colour grey

### Application

This high quality pre-assembled fan cable is specially manufactured for applications with static installation.

The special PVC outer sheath allows use in many industrial environments of general machine and plant construction.

### Characteristic

Economical alternatives to the cable carrier compatible cable types which otherwise meet all requirements of the servo drive manufacturers. These pre-assembled cables can be produced in any lengths and also with customer-specific modifications.

### Note

Please observe the drive or controller manufacturer's information about maximum permitted cable length. The prefabricated cables listed here are not original parts, but accessories manufactured by the company HELUKABEL® GmbH. The data, standards and approvals relate solely to the bulk goods used.

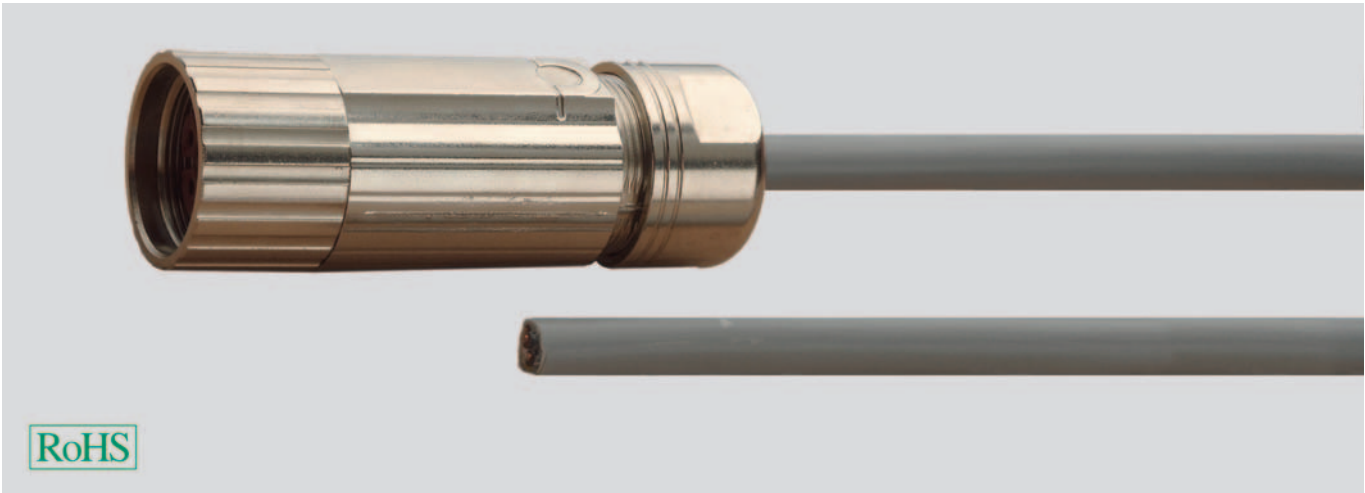
Manufacturer Designation	Helukabel Designation	Helukabel Part no.	Manufacturer Designation	Helukabel Designation	Helukabel Part no.
EYL 0001 A xxxx L01 A00	fan cables 0001AL01A00 PVC	660851	EYL 0001 A xxxx L02 A00	fan cables 0001AL02A00 PVC	660852

Dimensions and specifications may be changed without prior notice.

# Pre-assembled fan cables

## for mobile use

Base line for use on LENZE drive systems of the type L-force®



RoHS

### Technical data

- **Temperature range**  
flexing -5°C to +80°C  
fixed installation -40°C to +80°C
- **Minimum bending radius**  
flexing 8x cable Ø  
fixed installation 4x cable Ø
- **Nominal voltage** UL/CSA 600 V
- **Test voltage** power cores 4 kV
- **Insulation resistance** ≥ 20 MOhm x km

### Approbations

UL/CSA

### Cable structure

- Copper conductors, bare, fine wire stranded
- TPE/PVC core insulation
- Core identification 1, 2, 3
- GN-YE conductor
- PUR outer sheath
- Sheath colour grey

### Application

This high quality pre-assembled fan cable is specially manufactured for applications with mobile use.

The special PUR outer sheath allows use in many industrial environments of general machine and plant construction.

### Characteristic

Particularly suitable for use with small bending radii and high acceleration.

These pre-assembled cables can be produced in any lengths and also with customer-specific modifications.

### Note

Please observe the installation instructions for laying cables in cable carriers and the drive or controller manufacturer's information about maximum permitted cable length.

The prefabricated cables listed here are not original parts, but accessories manufactured by the company HELUKABEL® GmbH.

The data, standards and approvals relate solely to the bulk goods used.

Manufacturer Designation	Helukabel Designation	Helukabel Part no.
EYL 0002 A xxxx L01 A00	fan cables 0001AL01A00 PVC	660853

Manufacturer Designation	Helukabel Designation	Helukabel Part no.
EYL 0002 A xxxx L02 A00	fan cables 0002AL02A00 PVC	660854

Dimensions and specifications may be changed without prior notice.



# Pre-assembled servo motor cables

for fixed laying

Base line for use on SEW drive systems



RoHS

## Technical data

- **Temperature range**  
fixed installation -40°C to +80°C
- **Minimum bending radius**  
fixed installation 20x cable Ø
- **Nominal voltage**  
VDE 0,6/1 kV  
UL 1000 V
- **Test voltage** 4 kV
- **Insulation resistance**  $\geq 20$  MOhm x km

## Approbations

DESINA® (ISO 23570)  
UL/CSA

## Cable structure

### Power supply cores

- Copper conductors, bare
- PP core insulation
- Core identification U1, V2, W3
- GN-YE conductor

### Signal cores

- Copper conductors, bare
- PP core insulation
- Core identification 1, 2, 3
- Cores twisted to triple
- Shielding aluminium coated polyester foil with drain wire + copper screen
- Complete shield of tin-plated copper braiding, coverage approx. 85%
- PVC outer sheath
- Sheath colour orange (RAL 2003)

## Application

This high quality pre-assembled motor connection cable is specially manufactured for applications with static installation. The special PVC outer sheath allows use in many industrial environments of general machine and plant construction.

## Characteristic

Economical alternatives to the cable carrier compatible cable types which otherwise meet all requirements of the servo drive manufacturers. These pre-assembled cables can be produced in any lengths and also with customer-specific modifications.

## Note

Please observe the drive or controller manufacturer's information about maximum permitted cable length. The prefabricated cables listed here are not original parts, but accessories manufactured by the company HELUKABEL® GmbH. The data, standards and approvals relate solely to the bulk goods used.

Helukabel Designation	Helukabel Part no.
motor cable 1991795 PVC 4x1,5	660822
motor cable 1991892 PVC 4x1,5+3x1	660823

Helukabel Designation	Helukabel Part no.
motor cable 1991914 PVC 4x2,5+3x1	660897

Dimensions and specifications may be changed without prior notice.

U

# Pre-assembled servo motor cables

for mobile use

Base line for use on SEW drive systems



## Technical data

- **Temperature range**
  - flexing -20°C to +60°C
  - fixed installation -50°C to +80°C
- **Minimum bending radius**
  - flexing 10x cable Ø
  - fixed installation 3x cable Ø
- **Max. acceleration**
  - 20 m/s<sup>2</sup>
- **Bending cycles**
  - 5 million for ≥ 10x cable Ø
- **Operating voltage**
  - power cores U<sub>0</sub>/U 600/1000 V
  - control cores 1000 V AC
- **Test voltage**
  - power cores 4 kV
  - control cores 4 kV
- **Insulation resistance** ≥ 100 MOhm x km

## Approbations

DESINA® (ISO 23570)  
UL/CSA

## Cable structure

### Power supply cores

- Bare copper, extra fine wire conductor acc. to DIN VDE 0295 cl.6
- high quality PP core insulation
- Core identification U/L1/C/L+V/L2 W/L3/D/L-
- GN-YE conductor

### Signal cores

- Copper conductors, bare, fine wire stranded
- High quality PP core insulation
- Core identification 1, 2, 3
- Cores twisted to triple
- Shield tin-plated copper braiding
- Complete shield of tin-plated copper braiding, coverage approx. 85%
- PUR outer sheath
- Sheath colour orange (RAL 2003)

## Application

This high quality pre-assembled motor connection cable is specially manufactured for applications with high mechanical stress. The special PUR outer sheath allows use in many industrial environments of general machine and plant construction.

## Characteristic

Particularly suitable for use with small bending radii and high acceleration. These pre-assembled cables can be produced in any lengths and also with customer-specific modifications.

## Note

Please observe the installation instructions for laying cables in cable carriers and the drive or controller manufacturer's information about maximum permitted cable length. The prefabricated cables listed here are not original parts, but accessories manufactured by the company HELUKABEL® GmbH. The data, standards and approvals relate solely to the bulk goods used.

Helukabel Designation	Helukabel Part no.
motor cable 1991809 PUR 4x1,5	660824
motor cable 1991825 PUR 4x2,5	660825
motor cable 1991841 PUR 4x4	660826
motor cable 1991868 PUR 4x6	660827
motor cable 1991884 PUR 4x10	660828

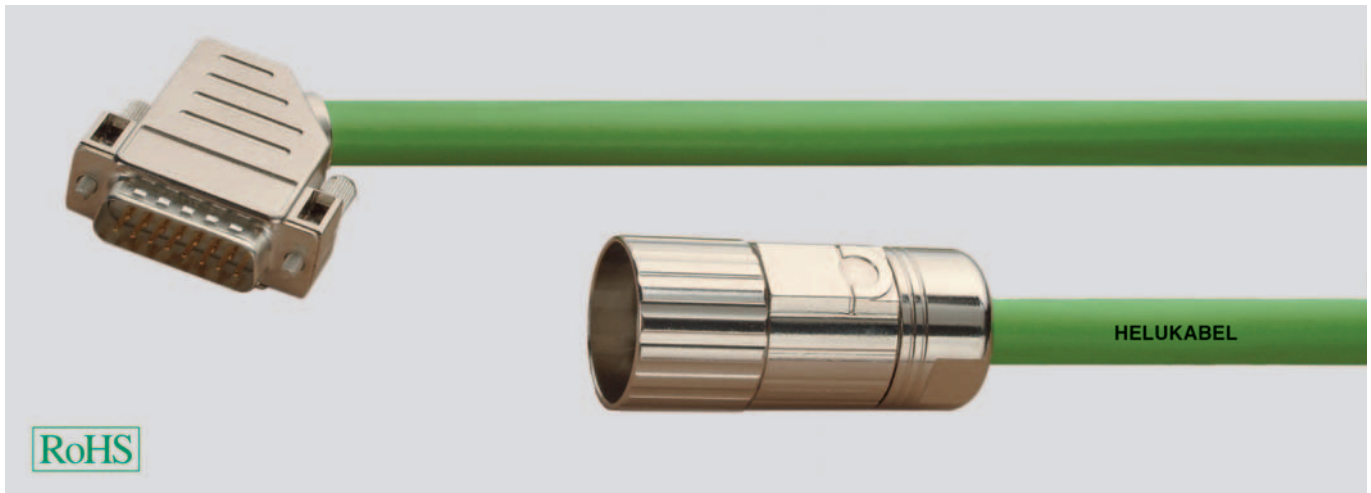
Helukabel Designation	Helukabel Part no.
motor cable 1991906 PUR 4x1,5+3x1	660829
motor cable 1991922 PUR 4x2,5+3x1	660830
motor cable 1991949 PUR 4x4+3x1	660831
motor cable 1991965 PUR 4x6+3x1	660832
motor cable 1991981 PUR 4x10+3x1	660833

Dimensions and specifications may be changed without prior notice.

# Pre-assembled feedback cables

for fixed laying

Base line for use on SEW drive systems



## Technical data

- **Temperature range**  
fixed installation -40°C to +80°C
- **Minimum bending radius**  
fixed installation 20x cable Ø
- **Nominal voltage** max. 350 V,  
acc. to UL 300 V
- **Test voltage**  
core/core 1,5 kV  
core/shield 1 kV

## Approbations

DESINA® (ISO 23570)  
UL/CSA

## Cable structure

### Power supply cores

- Copper conductors, bare
- PP core insulation
- Core identification acc. to DIN 47100
- Complete shield of tin-plated copper braiding with drain wire, coverage approx. 85%
- PVC outer sheath
- Sheath colour green

## Application

This high quality pre-assembled feedback cable is specially manufactured for applications with static installation. The special PVC outer sheath allows use in many industrial environments of general machine and plant construction.

## Characteristic

Economical alternatives to the cable carrier compatible cable types which otherwise meet all requirements of the servo drive manufacturers. These pre-assembled cables can be produced in any lengths and also with customer-specific modifications.

## Note

Please observe the drive or controller manufacturer's information about maximum permitted cable length. The prefabricated cables listed here are not original parts, but accessories manufactured by the company HELUKABEL® GmbH. The data, standards and approvals relate solely to the bulk goods used.

Helukabel Designation	Helukabel Part no.
feedback cables HF 13324535 PVC 6x2x0,25	<b>660834</b>
feedback extension HF 1995391 PVC 6x2x0,25	<b>660835</b>

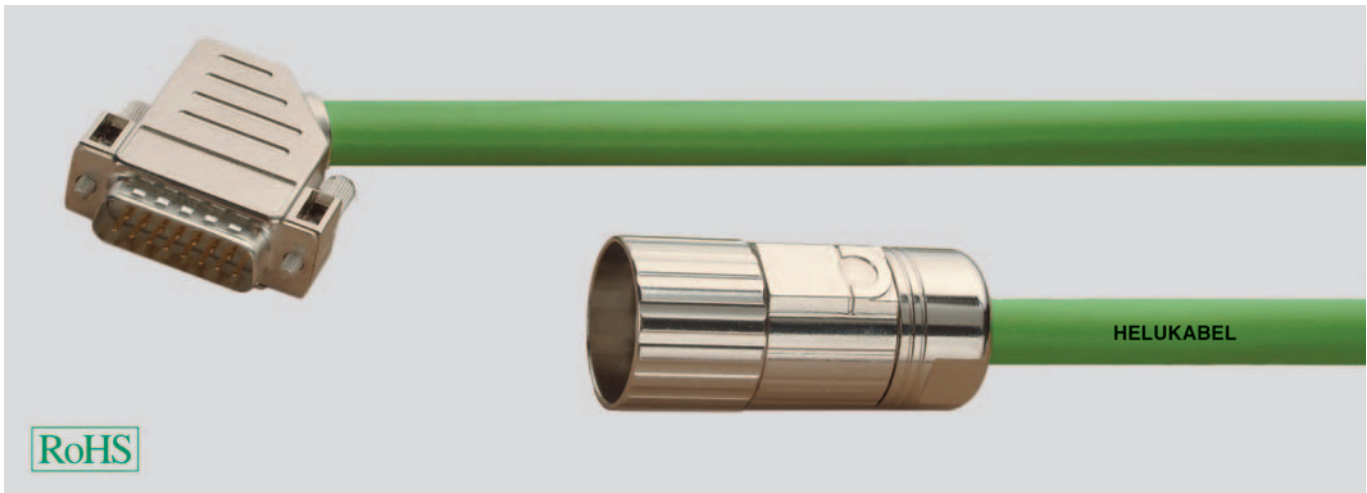
Helukabel Designation	Helukabel Part no.
feedback cables 1994875 PVC 5x2x0,25	<b>660836</b>
feedback extension 1995421 PVC 5x2x0,25	<b>660837</b>

Dimensions and specifications may be changed without prior notice.

# Pre-assembled feedback cables

for mobile use

Base line for use on SEW drive systems



## Technical data

- **Temperature range**  
flexing -20°C to +60°C  
fixed installation -50°C to +80°C
- **Minimum bending radius**  
flexing 10x cable Ø  
fixed installation 5x cable Ø
- **Max. acceleration**  
20 m/s<sup>2</sup>
- **Bending cycles**  
10 million for ≥ 10x cable Ø
- **Nominal voltage** 300 V
- **Test voltage** 1,5 kV

## Approbations

DESINA® (ISO 23570)  
UL/CSA

## Cable structure

- Copper conductors, bare
- PP core insulation
- TPE inner sheath
- Complete shield of tin-plated copper braiding, coverage approx. 80%
- PUR outer sheath
- Sheath colour green
- Core identification acc. to DIN 47100

## Application

This high quality pre-assembled feedback cable is specially manufactured for applications with mobile use. The special PUR outer sheath allows use in many industrial environments of general machine and plant construction.

## Characteristic

Particularly suitable for use with small bending radii and high acceleration. These pre-assembled cables can be produced in any lengths and also with customer-specific modifications.

## Note

Please observe the installation instructions for laying cables in cable carriers and the drive or controller manufacturer's information about maximum permitted cable length.

The prefabricated cables listed here are not original parts, but accessories manufactured by the company HELUKABEL® GmbH. The data, standards and approvals relate solely to the bulk goods used.

Helukabel Designation	Helukabel Part no.
feedback cables HF 13324551 PUR 6x2x0,25	<b>660838</b>
feedback extension HF 1995405 PUR 6x2x0,25	<b>660839</b>

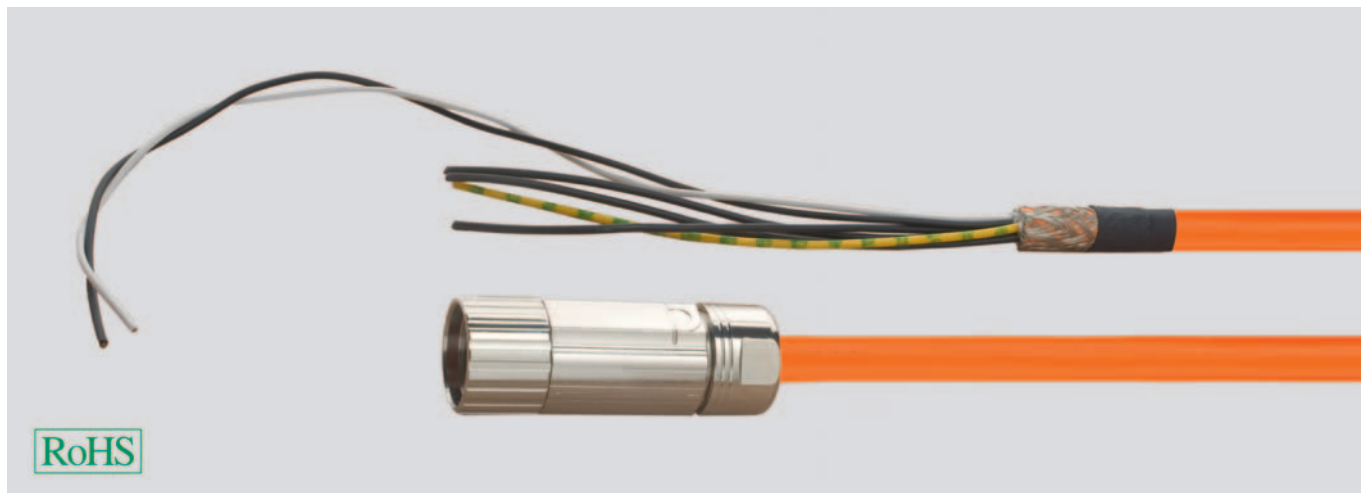
Helukabel Designation	Helukabel Part no.
feedback cables 1994875 PVC 5x2x0,25	<b>660840</b>
feedback extension 1995421 PVC 5x2x0,25	<b>660841</b>

Dimensions and specifications may be changed without prior notice.

# Pre-assembled servo motor cables

for fixed laying

Base line for use on SEW drive systems



## Technical data

- **Temperature range**  
flexing 0°C to +60°C  
fixed installation -20°C to +80°C
- **Minimum bending radius**  
flexing 20x cable Ø  
fixed installation 9x cable Ø
- **Max. acceleration**  
2 m/s<sup>2</sup>
- **Bending cycles**  
50.000 for ≥ 20x cable Ø
- **Operating voltage**  
power supply cores 600/1000 V
- **Test voltage** power cores 4 kV
- **Insulation resistance** ≥ 20 MOhm x km

## Approbations

DESINA® (ISO 23570)  
UL/CSA

## Cable structure

### Brake motor cable

#### Power supply cores

- Bare copper, extra fine wire conductor acc. to DIN VDE 0295 cl.5
- high quality PP core insulation
- Core identification 1, 2, 3
- GN-YE conductor

#### Brake cores

- Copper conductors, bare
- High quality PP core insulation
- Core identification black, white
- Shielding aluminium/polyester foil, screened with tin-plated copper wires

### Motor cable

#### Power supply cores

- Bare copper, acc. to IEC 60228 cl.6
- Core Insulation PVC
- Core identification U/L1/C/L+  
V/L2  
W/L3/D/L-
- GN-YE conductor
- Complete shield of tin-plated copper braiding, coverage approx. 80%
- PVC outer sheath
- Sheath colour orange (RAL 2003)

## Application

This high quality pre-assembled motor connection cable is specially manufactured for applications with static installation. The special PVC outer sheath allows use in many industrial environments of general machine and plant construction.

## Characteristic

Economical alternatives to the cable carrier compatible cable types which otherwise meet all requirements of the servo drive manufacturers. These pre-assembled cables can be produced in any lengths and also with customer-specific modifications.

## Note

Please observe the drive or controller manufacturer's information about maximum permitted cable length. The prefabricated cables listed here are not original parts, but accessories manufactured by the company HELUKABEL® GmbH. The data, standards and approvals relate solely to the bulk goods used.

Helukabel Designation	Helukabel Part no.
motor cable 1995502 PVC 4x1,5	<b>660842</b>
motor cable 05904552 PVC 4x2,5	<b>660843</b>

Helukabel Designation	Helukabel Part no.
motor cable 13324853 PVC 4x1,5+2x1	<b>660844</b>
motor cable 13332139 PVC 4x2,5+2x1	<b>660845</b>

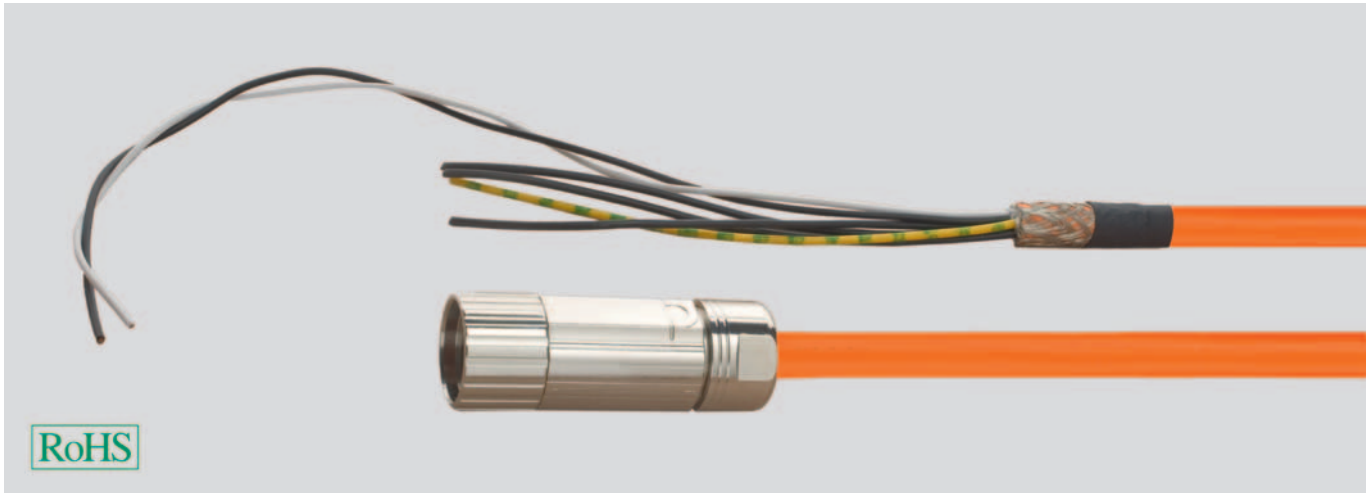
Dimensions and specifications may be changed without prior notice.



# Pre-assembled servo motor cables

for mobile use

Base line for use on SEW drive systems



RoHS

## Technical data

- **Temperature range**  
flexing 0°C to +60°C  
fixed installation -30°C to +80°C
- **Minimum bending radius**  
flexing 12x cable Ø  
fixed installation 7x cable Ø
- **Max. acceleration**  
4 m/s<sup>2</sup>
- **Bending cycles**  
10 million for ≥ 12x cable Ø
- **Operating voltage**  
power supply cores 600/1000 V
- **Test voltage**  
power cores 3 kV  
control cores 1,5 kV
- **Insulation resistance** ≥ 500 MOhm x km

## Approbations

DESINA® (ISO 23570)  
UL/CSA

## Cable structure

### Brake motor cables

#### Power supply cores

- Copper conductors, bare
- Polyolefin polymer core insulation
- Core identification 1, 2, 3
- GN-YE conductor

#### Brake cores

- Copper conductors, bare, fine wire stranded
- Core insulation polyester
- Core identification black, white
- Shielding screened with tin-plated copper wires

### Motor cables

#### Power supply cores

- Copper conductors, bare, fine wire stranded
- Core insulation polyester
- Core identification U/L1/C/L+  
V/L2  
W/L3/D/L-
- GN-YE conductor
- Complete shield of tin-plated copper braiding, coverage approx. 80%
- PUR outer sheath
- Sheath colour orange (RAL 2003)

## Application

This high quality pre-assembled motor connection cable is specially manufactured for applications with high mechanical stress. The special PUR outer sheath allows use in many industrial environments of general machine and plant construction.

## Characteristic

These pre-assembled cables can be produced in any lengths and also with customer-specific modifications.

## Note

Please observe the installation instructions for laying cables in cable carriers and the drive or controller manufacturer's information about maximum permitted cable length.

The prefabricated cables listed here are not original parts, but accessories manufactured by the company HELUKABEL® GmbH. The data, standards and approvals relate solely to the bulk goods used.

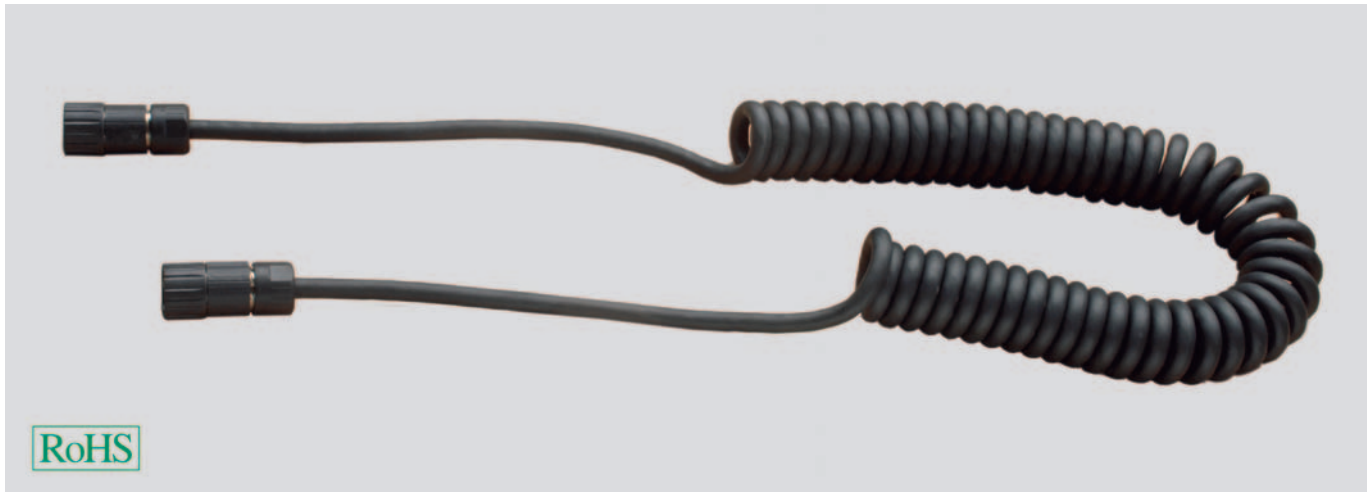
Helukabel Designation	Helukabel Part no.
motor cable 05906245 PUR 4x1,5	660846
motor cable 05906253 PUR 4x2,5	660847

Helukabel Designation	Helukabel Part no.
motor cable 13331221 PUR 4x1,5+2x1	660848
motor cable 13332155 PUR 4x2,5+2x1	660849

Dimensions and specifications may be changed without prior notice.

# Pre-assembled feedback cables

For use on Heidenhain measurement systems



## Technical data

- **Temperature range**  
-20°C to +70°C
- **Max. operating voltage** 50 V

## Cable structure

- Tinned copper conductor, fine wire stranded
  - PVC/PP core insulation
  - Shielding  
Internal shield of tinned copper winding  
External shield of tinned copper winding
  - PUR outer sheath
  - Sheath colour black
- Structure/colour code**  
**((5x0, 14)+4x0, 25+2x0, 25+1x0, 5)**  
 ((WH, BN, GN, YE, GY) BU, BK, RD,  
 RD/BU, WH/BU, WH/GN, BN/GN, GY/PK)

## Application

This pre-assembled sensor cable is suitable for use on Heidenhain measurement systems (hand wheels).

## Characteristic

These pre-assembled cables can be produced in any lengths and also with customer-specific modifications.

## Note

Please observe the drive or controller manufacturer's information about maximum permitted cable length. The prefabricated cables listed here are not original parts, but accessories manufactured by the company HELUKABEL® GmbH. The data, standards and approvals relate solely to the bulk goods used.

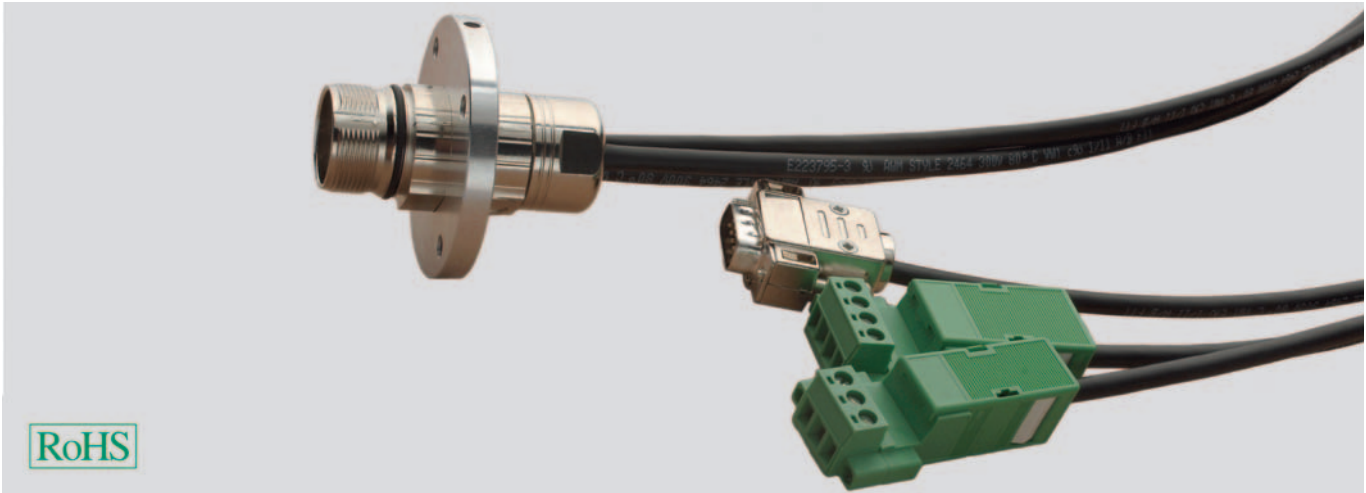
**Helukabel**  
**Designation**  
 spiral cable 312879 PUR sw

**Helukabel**  
**Part no.**  
**660893**

Dimensions and specifications may be changed without prior notice.

# Pre-assembled adapter cables

For use on Heidenhain measurement systems (hand wheels)



## Technical data

- **Temperature range**  
flexing -15°C to +60°C  
fixed installation -30°C to +80°C
- **Minimum bending radius**  
flexing 15x cable Ø  
fixed installation 8x cable Ø
- **Max. operating voltage** 300 V
- **Test voltage** 1,5 kV
- **Insulation resistance**  $\geq 100 \text{ MOhm} \times \text{km}$

## Cable structure

- Tinned copper conductors
  - SR PVC core insulation
  - Complete shield of tin-plated copper braiding
  - PVC outer sheath
  - Sheath colour black
- Structure/colour code**
- International code for UL/CSA cables  
BK, BN, RD, OG, YE, GN

## Application

This pre-assembled sensor cable is suitable for use on Heidenhain measurement systems (hand wheels).

## Characteristic

These pre-assembled cables can be produced in any lengths and also with customer-specific modifications.

## Note

Please observe the drive or controller manufacturer's information about maximum permitted cable length. The prefabricated cables listed here are not original parts, but accessories manufactured by the company HELUKABEL® GmbH. The data, standards and approvals relate solely to the bulk goods used.

**Helukabel**  
**Designation**  
adapter cables 296466 PVC sw

**Helukabel**  
**Part no.**  
**660894**

Dimensions and specifications may be changed without prior notice.









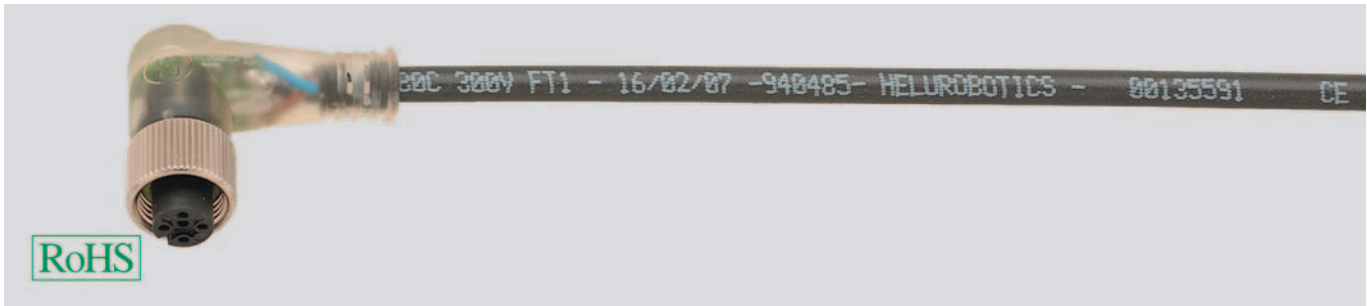
# ROBOFLEX<sup>®</sup>-recycle



## ■ ROBOFLEX RECYCLE

<b>Designation</b>	<b>Properties</b>	<b>Approvals</b>	<b>Page</b>
ROBOFLEX®-recycle	M12 female one-end pre-assembled 3-pin, 4-pin, and 5-pin		<b>880</b>
ROBOFLEX®-recycle	M12 sensor cable 4-pin + PE one end preassembled		<b>882</b>
ROBOFLEX®-recycle	M12 both ends pre-assembled		<b>883</b>
ROBOFLEX®-recycle	M12 5-pin + PE both ends pre-assembled		<b>885</b>
ROBOFLEX®-recycle	M12 plug straight or angled one end preassembled 3-pin, 4-pin, and 5-pin		<b>886</b>
ROBOFLEX®-recycle	M8 female one end preassembled		<b>887</b>
ROBOFLEX®-recycle	M8 both ends pre-assembled		<b>888</b>
ROBOFLEX®-recycle	M8 plug straight or angled one end preassembled 3-pin and 4-pin		<b>890</b>
ROBOFLEX®-recycle	M12 sensor cable screened one end pre-assembled		<b>891</b>
ROBOFLEX®-recycle	M12 sensor cable screened both ends pre-assembled		<b>893</b>
ROBOFLEX®-recycle	Twin cables M12 to M12		<b>895</b>
ROBOFLEX®-recycle	Twin cables M12 to M12		<b>896</b>

# ROBOFLEX®-recycle M12 femal one end pre-assembled 3-, 4- and 5-pin



## Technical data

- **Approval:**  
UL/cUL approved
- **Production**  
in accordance with VDE standards
- **Temperature range:**  
fixed installation -40°C to +105°C  
flexible -30°C to +105°C
- **Nominal voltage:**  
300 V
- **Test voltage:**  
2000 V
- **Minimum bending radius:**  
7.5 x cable diameter (for flexible installation)
- **Traversing speed:**  
max. 3.3 m/s for 5 m of horizontal traverse path length
- **Acceleration:**  
max. 5 m/s<sup>2</sup>
- **Flexing and torsion cycles:**  
min. 10 million.
- **Torsional stress:**  
+/- 360°/m

## Cable structure

- Bare copper litz wire, 42 x 0.10 mm
- Core insulation polyester, black, blue, brown
- Cores stranded in layers
- Sheath, special mix
- weld splatter resistant, dull, low adhesion, flame retardant and self-extinguishing to DIN VDE 0482-332-1-2, DIN EN 60332-1-2/ IEC 60332-1
- Sheath colour: black

### Assembly (3-pin)

colour of cores brown, blue, black  
AD 4,9 +/- 0,2 mm

### Assembly (4-pin)

colour of cores brown, blue, black, white  
AD 5,2 +/- 0,2 mm

### Assembly (5-pin)

colour of cores brown, blue, black, white, grey  
AD 5,5 +/- 0,2 mm

## Properties

- very good resistance to oil as per DIN VDE 0473-811-404/DIN EN 60811-404
- good resistance to acids, alkalis and solvents
- not cross-linked
- weld splatter resistant
- recyclable
- halogen-free
- Silicone and cadmium-free
- Free of substances harmful to paint adhesion Substances
- very high mechanical load capacity
- abrasion resistant
- wear-resistant
- Highly flexible
- UV-resistant
- ROHS conformant
- CE conformant

## Note

\* Design for the standard 2 LEDs in the colours: yellow, green.  
3 LEDs in the colours: white, yellow, green - available upon request.  
\*\* Sensor cable ROBOFLEX®-recycle M12 socket, angled, preassembled on one side, 5 pins. available on request.  
IP67  
A-coded

## socket with LED

Part no.	Cable type / cross-sec. mm <sup>2</sup>	Length m	Plug type	Cop. weight kg / 1000 pcs.
670742	ROBOFLEX®-recycle 3 x 0,34	1,5	socket angled with 2 LED	14,7
670743	ROBOFLEX®-recycle 3 x 0,34	3,0	socket angled with 2 LED	29,4
670744	ROBOFLEX®-recycle 3 x 0,34	5,0	socket angled with 2 LED	49,0
670745	ROBOFLEX®-recycle 3 x 0,34	10,0	socket angled with 2 LED	98,0
670746	ROBOFLEX®-recycle 4 x 0,34	1,5	socket angled with 2 LED	19,7
670747	ROBOFLEX®-recycle 4 x 0,34	3,0	socket angled with 2 LED	39,3
670748	ROBOFLEX®-recycle 4 x 0,34	5,0	socket angled with 2 LED	65,5
670749	ROBOFLEX®-recycle 4 x 0,34	10,0	socket angled with 2 LED	131,0
671543	ROBOFLEX®-recycle 3 x 0,34	1,0	socket straight with 2 LED	9,8
671544	ROBOFLEX®-recycle 3 x 0,34	1,5	socket straight with 2 LED	14,7
671546	ROBOFLEX®-recycle 3 x 0,34	3,0	socket straight with 2 LED	29,4
671547	ROBOFLEX®-recycle 3 x 0,34	5,0	socket straight with 2 LED	49,0
671548	ROBOFLEX®-recycle 3 x 0,34	10,0	socket straight with 2 LED	98,0
671557	ROBOFLEX®-recycle 4 x 0,34	1,0	socket straight with 2 LED	13,1
671550	ROBOFLEX®-recycle 4 x 0,34	1,5	socket straight with 2 LED	19,7
671551	ROBOFLEX®-recycle 4 x 0,34	3,0	socket straight with 2 LED	39,3
671552	ROBOFLEX®-recycle 4 x 0,34	5,0	socket straight with 2 LED	65,5
671553	ROBOFLEX®-recycle 4 x 0,34	10,0	socket straight with 2 LED	131,0
671473	ROBOFLEX®-recycle 5 x 0,34	1,0	socket straight with 2 LED	16,5
671474	ROBOFLEX®-recycle 5 x 0,34	1,5	socket straight with 2 LED	24,8
671476	ROBOFLEX®-recycle 5 x 0,34	3,0	socket straight with 2 LED	49,5
671477	ROBOFLEX®-recycle 5 x 0,34	5,0	socket straight with 2 LED	82,5
671478	ROBOFLEX®-recycle 5 x 0,34	10,0	socket straight with 2 LED	165,0

Continuation ►

**ROBOFLEX®-recycle** M12 femal one end pre-assembled 3-, 4- and 5-pin**socket**

Part no.	Cable type / cross-sec. mm <sup>2</sup>	Length m	Plug type	Cop. weight kg / 1000 pcs.	
670722	ROBOFLEX®-recycle 3 x 0,34	1,5	socket angled	14,7	-
670723	ROBOFLEX®-recycle 3 x 0,34	3,0	socket angled	29,4	-
670724	ROBOFLEX®-recycle 3 x 0,34	5,0	socket angled	49,0	-
670725	ROBOFLEX®-recycle 3 x 0,34	10,0	socket angled	98,0	-
670738	ROBOFLEX®-recycle 4 x 0,34	1,5	socket angled	19,7	-
670739	ROBOFLEX®-recycle 4 x 0,34	3,0	socket angled	39,3	-
670740	ROBOFLEX®-recycle 4 x 0,34	5,0	socket angled	65,5	-
670741	ROBOFLEX®-recycle 4 x 0,34	10,0	socket angled	131,0	-
671438	ROBOFLEX®-recycle 5 x 0,34	1,5	socket angled	24,8	-
671439	ROBOFLEX®-recycle 5 x 0,34	3,0	socket angled	49,5	-
671440	ROBOFLEX®-recycle 5 x 0,34	5,0	socket angled	82,5	-
671441	ROBOFLEX®-recycle 5 x 0,34	10,0	socket angled	165,0	-
670718	ROBOFLEX®-recycle 3 x 0,34	1,5	socket straight	14,7	-
670719	ROBOFLEX®-recycle 3 x 0,34	3,0	socket straight	29,4	-
670720	ROBOFLEX®-recycle 3 x 0,34	5,0	socket straight	49,0	-
670721	ROBOFLEX®-recycle 3 x 0,34	5,0	socket straight	49,0	-
670734	ROBOFLEX®-recycle 4 x 0,34	1,5	socket straight	19,7	-
670735	ROBOFLEX®-recycle 4 x 0,34	3,0	socket straight	39,3	-
670736	ROBOFLEX®-recycle 4 x 0,34	5,0	socket straight	65,5	-
670737	ROBOFLEX®-recycle 4 x 0,34	10,0	socket straight	131,0	-
671434	ROBOFLEX®-recycle 5 x 0,34	1,5	socket straight	24,8	-
671435	ROBOFLEX®-recycle 5 x 0,34	3,0	socket straight	49,5	-
671436	ROBOFLEX®-recycle 5 x 0,34	5,0	socket straight	82,5	-
671437	ROBOFLEX®-recycle 5 x 0,34	10,0	socket straight	165,0	-

Dimensions and specifications may be changed without prior notice.

**ROBOFLEX®-recycle** M12 sensor cable 4-pin + PE one end pre-assembled**Technical data**

- **Approval:**  
UL/cUL approved
- **Production**  
in accordance with VDE standards
- **Temperature range:**  
fixed installation -40°C to +105°C  
flexible -30°C to +105°C
- **Nominal voltage:**  
300 V
- **Test voltage:**  
2000 V
- **Minimum bending radius:**  
7.5 x cable diameter (for flexible installation)
- **Traversing speed:**  
max. 3.3 m/s for 5 m of horizontal  
traverse path length
- **Acceleration:**  
max. 5 m/s<sup>2</sup>
- **Flexing and torsion cycles:**  
min. 10 million.
- **Torsional stress:**  
+/- 360°/m

**Cable structure**

- Bare copper litz wire, 42 x 0.10 mm
- Core insulation polyester, black, blue, brown
- Cores stranded in layers
- Sheath, special mix
- weld splatter resistant, dull, low adhesion, flame retardant and self-extinguishing to DIN VDE 0482-332-1-2, DIN EN 60332-1-2/ IEC 60332-1
- Sheath colour: black

**Assembly (5-pin)**

colour of cores brown, blue, black, white, green/yellow  
AD 5,5 +/- 0,2 mm

**Properties**

- very good resistance to oil as per DIN VDE 0473-811-404/DIN EN 60811-404
- good resistance to acids, alkalis and solvents
- not cross-linked
- weld splatter resistant
- recyclable
- halogen-free
- Silicone and cadmium-free
- Free of substances harmful to paint adhesion Substances
- very high mechanical load capacity
- abrasion resistant
- wear-resistant
- Highly flexible
- UV-resistant
- ROHS conformant
- CE conformant

**Note**

IP67  
A-coded

**plug or socket one end pre-assembled**

Part no.	Cable type / cross-sec. mm <sup>2</sup>	Length m	Plug type	Cop. weight kg / 1000 pcs.
672393	ROBOFLEX®-recycle 5 G 0,34	1,0	plug, straight	16,5
672394	ROBOFLEX®-recycle 5 G 0,34	1,5	plug, straight	24,8
672396	ROBOFLEX®-recycle 5 G 0,34	3,0	plug, straight	49,5
672397	ROBOFLEX®-recycle 5 G 0,34	5,0	plug, straight	82,5
672399	ROBOFLEX®-recycle 5 G 0,34	10,0	plug, straight	165,0
672403	ROBOFLEX®-recycle 5 G 0,34	1,0	plug, angled	16,5
672404	ROBOFLEX®-recycle 5 G 0,34	1,5	plug, angled	24,8
672406	ROBOFLEX®-recycle 5 G 0,34	3,0	plug, angled	49,5
672407	ROBOFLEX®-recycle 5 G 0,34	5,0	plug, angled	82,5
672409	ROBOFLEX®-recycle 5 G 0,34	10,0	plug, angled	165,0
672343	ROBOFLEX®-recycle 5 G 0,34	1,0	socket straight	16,5
672344	ROBOFLEX®-recycle 5 G 0,34	1,5	socket straight	24,8
672346	ROBOFLEX®-recycle 5 G 0,34	3,0	socket straight	49,5
672347	ROBOFLEX®-recycle 5 G 0,34	5,0	socket straight	82,5
672349	ROBOFLEX®-recycle 5 G 0,34	10,0	socket straight	165,0
672353	ROBOFLEX®-recycle 5 G 0,34	1,0	socket angled	16,5
672354	ROBOFLEX®-recycle 5 G 0,34	1,5	socket angled	24,8
672356	ROBOFLEX®-recycle 5 G 0,34	3,0	socket angled	49,5
672357	ROBOFLEX®-recycle 5 G 0,34	5,0	socket angled	82,5
672359	ROBOFLEX®-recycle 5 G 0,34	10,0	socket angled	165,0

**socket one end pre-assembled, 3 LED (gn, rd, ye)**

Part no.	Cable type / cross-sec. mm <sup>2</sup>	Length m	Plug type	Cop. weight kg / 1000 pcs.
672413	ROBOFLEX®-recycle 5 G 0,34	1,0	socket straight with 3 LED	16,5
672414	ROBOFLEX®-recycle 5 G 0,34	1,5	socket straight with LED	24,8
672416	ROBOFLEX®-recycle 5 G 0,34	3,0	socket straight with 3 LED	49,5
672417	ROBOFLEX®-recycle 5 G 0,34	5,0	socket straight with 3 LED	82,5
672419	ROBOFLEX®-recycle 5 G 0,34	10,0	socket straight with 3 LED	165,0
672363	ROBOFLEX®-recycle 5 G 0,34	1,0	socket angled with 3 LED	16,5
672364	ROBOFLEX®-recycle 5 G 0,34	1,5	socket angled with LED	24,8
672366	ROBOFLEX®-recycle 5 G 0,34	3,0	socket angled with 3 LED	49,5
672367	ROBOFLEX®-recycle 5 G 0,34	5,0	socket angled with 3 LED	82,5
672369	ROBOFLEX®-recycle 5 G 0,34	10,0	socket angled with 3 LED	165,0

Dimensions and specifications may be changed without prior notice.

# ROBOFLEX®-recycle M12 both ends pre-assembled



## Technical data

- **Approval:**  
UL/cUL approved
- **Production**  
in accordance with VDE standards
- **Temperature range:**  
fixed installation -40°C to +105°C  
flexible -30°C to +105°C
- **Nominal voltage:**  
300 V
- **Test voltage:**  
2000 V
- **Minimum bending radius:**  
7.5 x cable diameter (for flexible installation)
- **Traversing speed:**  
max. 3.3 m/s for 5 m of horizontal traverse path length
- **Acceleration:**  
max. 5 m/s<sup>2</sup>
- **Flexing and torsion cycles:**  
min. 10 million.
- **Torsional stress:**  
+/- 360°/m

## Cable structure

- Bare copper litz wire, 42 x 0.10 mm
  - Core insulation polyester, black, blue, brown
  - Cores stranded in layers
  - Sheath, special mix
  - weld splatter resistant, dull, low adhesion, flame retardant and self-extinguishing to DIN VDE 0482-332-1-2, IN EN 60332-1-2/ IEC 60332-1
  - Sheath colour: black
- Assembly (3-pin)**  
colour in cores brown, blue, black  
AD 4,9 +/-0,2 mm
- Assembly (4-pin)**  
colour of cores brown, blue, black, white  
AD 5,2 +/-0,2 mm
- Assembly (5-pin)**  
colour of cores brown, blue, black, white, grey  
AD 5,5 +/-0,2 mm

## Properties

- very good resistance to oil as per DIN VDE 0473-811-404/DIN EN 60811-404
- good resistance to acids, alkalis and solvents
- not cross-linked
- weld splatter resistant
- recyclable
- halogen-free
- Silicone and cadmium-free
- Free of substances harmful to paint adhesion Substances
- very high mechanical load capacity
- abrasion resistant
- wear-resistant
- Highly flexible
- UV-resistant
- ROHS conformant
- CE conformant

## Note

\*Design for the standard 2 LEDs in the colours: yellow, green.  
3 LEDs in the colours: white, yellow, green - available upon request.  
\*\* Sensor cable ROBOFLEX®-recycle M12 plug, straight and socket, angled, pre-assembled on both side, 5-pin. available on request.  
IP67  
A-coded

### plug straight / socket angled with LED

Part no.	Cable type / cross-sec. mm <sup>2</sup>	Length m	Plug type	Cop. weight kg / 1000 pcs.
670866	ROBOFLEX®-recycle 3 x 0,34	1,0	plug straight / socket, angled with 2 LED	9,8
670802	ROBOFLEX®-recycle 3 x 0,34	1,5	plug straight / socket, angled with 2 LED	14,7
670803	ROBOFLEX®-recycle 3 x 0,34	3,0	plug straight / socket, angled with 2 LED	29,4
670804	ROBOFLEX®-recycle 3 x 0,34	5,0	plug straight / socket, angled with 2 LED	49,0
670805	ROBOFLEX®-recycle 3 x 0,34	10,0	plug straight / socket, angled with 2 LED	98,0
670867	ROBOFLEX®-recycle 4 x 0,34	1,0	plug straight / socket, angled with 2 LED	13,1
670814	ROBOFLEX®-recycle 4 x 0,34	1,5	plug straight / socket, angled with 2 LED	19,7
670815	ROBOFLEX®-recycle 4 x 0,34	3,0	plug straight / socket, angled with 2 LED	39,3
670816	ROBOFLEX®-recycle 4 x 0,34	5,0	plug straight / socket, angled with 2 LED	65,5
670817	ROBOFLEX®-recycle 4 x 0,34	10,0	plug straight / socket, angled with 2 LED	131,0

### plug straight / socket straight

Part no.	Cable type / cross-sec. mm <sup>2</sup>	Length m	Plug type	Cop. weight kg / 1000 pcs.
671341	ROBOFLEX®-recycle 3 x 0,34	1,0	plug straight / socket straight	9,8
670750	ROBOFLEX®-recycle 3 x 0,34	1,5	plug straight / socket straight	14,7
670751	ROBOFLEX®-recycle 3 x 0,34	3,0	plug straight / socket straight	29,4
670752	ROBOFLEX®-recycle 3 x 0,34	5,0	plug straight / socket straight	49,0
670753	ROBOFLEX®-recycle 3 x 0,34	10,0	plug straight / socket straight	98,0
670771	ROBOFLEX®-recycle 4 x 0,34	1,0	plug straight / socket straight	13,1
670774	ROBOFLEX®-recycle 4 x 0,34	1,5	plug straight / socket straight	19,7
670775	ROBOFLEX®-recycle 4 x 0,34	3,0	plug straight / socket straight	39,3
670776	ROBOFLEX®-recycle 4 x 0,34	5,0	plug straight / socket straight	65,5
670777	ROBOFLEX®-recycle 4 x 0,34	10,0	plug straight / socket straight	131,0
671493	ROBOFLEX®-recycle 5 x 0,34	1,0	plug straight / socket straight	16,5
671494	ROBOFLEX®-recycle 5 x 0,34	1,5	plug straight / socket straight	24,8
671496	ROBOFLEX®-recycle 5 x 0,34	3,0	plug straight / socket straight	49,5
671497	ROBOFLEX®-recycle 5 x 0,34	5,0	plug straight / socket straight	82,5
671499	ROBOFLEX®-recycle 5 x 0,34	10,0	plug straight / socket straight	165,0

Continuation ▶



# ROBOFLEX®-recycle M12 both ends pre-assembled

## plug straight / socket angled

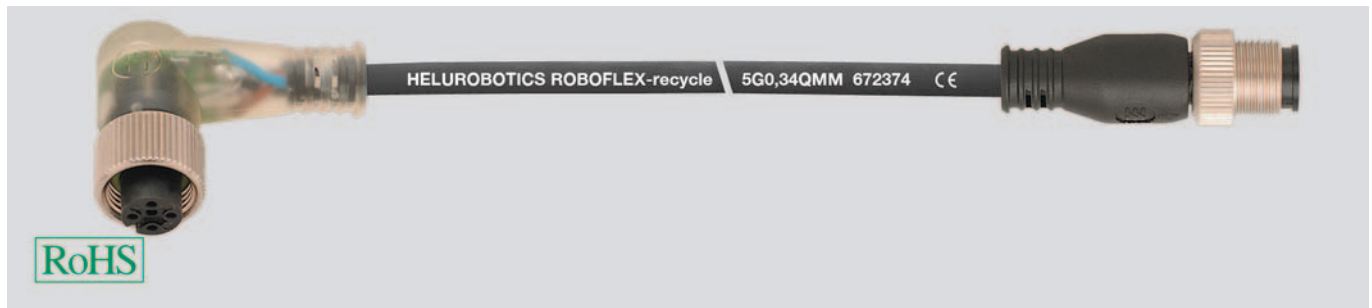
Part no.	Cable type / cross-sec. mm <sup>2</sup>	Length m	Plug type	Cop. weight kg / 1000 pcs.
670757	ROBOFLEX®-recycle 3 x 0,34	1,0	plug straight / socket angled	9,8
670758	ROBOFLEX®-recycle 3 x 0,34	1,5	plug straight / socket angled	14,7
670759	ROBOFLEX®-recycle 3 x 0,34	3,0	plug straight / socket angled	29,4
670760	ROBOFLEX®-recycle 3 x 0,34	5,0	plug straight / socket angled	49,0
670761	ROBOFLEX®-recycle 3 x 0,34	10,0	plug straight / socket angled	98,0
670781	ROBOFLEX®-recycle 4 x 0,34	1,0	plug straight / socket angled	13,1
670782	ROBOFLEX®-recycle 4 x 0,34	1,5	plug straight / socket angled	19,7
670783	ROBOFLEX®-recycle 4 x 0,34	3,0	plug straight / socket angled	39,3
670784	ROBOFLEX®-recycle 4 x 0,34	5,0	plug straight / socket angled	65,5
670785	ROBOFLEX®-recycle 4 x 0,34	10,0	plug straight / socket angled	131,0
671483	ROBOFLEX®-recycle 5 x 0,34	1,0	plug straight / socket angled	16,5
671484	ROBOFLEX®-recycle 5 x 0,34	1,5	plug straight / socket angled	24,8
671486	ROBOFLEX®-recycle 5 x 0,34	3,0	plug straight / socket angled	49,5
671487	ROBOFLEX®-recycle 5 x 0,34	5,0	plug straight / socket angled	82,5
671489	ROBOFLEX®-recycle 5 x 0,34	10,0	plug straight / socket angled	165,0

## plug angled / socket angled

Part no.	Cable type / cross-sec. mm <sup>2</sup>	Length m	Plug type	Cop. weight kg / 1000 pcs.
670766	ROBOFLEX®-recycle 3 x 0,34	1,5	plug angled / socket angled	14,7
670767	ROBOFLEX®-recycle 3 x 0,34	3,0	plug angled / socket angled	29,4
670768	ROBOFLEX®-recycle 3 x 0,34	5,0	plug angled / socket angled	49,0
670769	ROBOFLEX®-recycle 3 x 0,34	10,0	plug angled / socket angled	98,0
670790	ROBOFLEX®-recycle 4 x 0,34	1,5	plug angled / socket angled	19,7
670791	ROBOFLEX®-recycle 4 x 0,34	3,0	plug angled / socket angled	39,3
670792	ROBOFLEX®-recycle 4 x 0,34	5,0	plug angled / socket angled	65,5
670793	ROBOFLEX®-recycle 4 x 0,34	10,0	plug angled / socket angled	131,0
671533	ROBOFLEX®-recycle 5 x 0,34	1,5	plug angled / socket angled	24,8
671534	ROBOFLEX®-recycle 5 x 0,34	3,0	plug angled / socket angled	49,5
671536	ROBOFLEX®-recycle 5 x 0,34	5,0	plug angled / socket angled	82,5
671537	ROBOFLEX®-recycle 5 x 0,34	10,0	plug angled / socket angled	165,0

Dimensions and specifications may be changed without prior notice.

# ROBOFLEX®-recycle M12 4-pin + PE both ends pre-assembled



## Technical data

- **Approval:**  
UL/cUL approved
- **Production**  
in accordance with VDE standards
- **Temperature range:**  
fixed installation -40°C to +105°C  
flexible -30°C to +105°C
- **Nominal voltage:**  
300 V
- **Test voltage:**  
2000 V
- **Minimum bending radius:**  
7.5 x cable diameter (for flexible installation)
- **Traversing speed:**  
max. 3.3 m/s for 5 m of horizontal traverse path length
- **Acceleration:**  
max. 5 m/s<sup>2</sup>
- **Flexing and torsion cycles:**  
min. 10 million.
- **Torsional stress:**  
+/- 360°/m

## Cable structure

- Bare copper litz wire, 42 x 0.10 mm
- Core insulation polyester, black, blue, brown
- Cores stranded in layers
- Sheath, special mix
- weld splatter resistant, dull, low adhesion, flame retardant and self-extinguishing to DIN VDE 0482-332-1-2, DIN EN 60332-1-2/ IEC 60332-1
- Sheath colour: black

## Assembly (5-pin)

colour of cores brown, blue, black, white, green/yellow  
AD 5,5 +/- 0,2 mm

## Properties

- very good resistance to oil as per DIN VDE 0473-811-404/DIN EN 60811-404
- good resistance to acids, alkalis and solvents
- not cross-linked
- weld splatter resistant
- recyclable
- halogen-free
- Silicone and cadmium-free
- Free of substances harmful to paint adhesion Substances
- very high mechanical load capacity
- abrasion resistant
- wear-resistant
- Highly flexible
- UV-resistant
- ROHS conformant
- CE conformant

## Note

IP67  
A-codiert

## both ends pre-assembled

Part no.	Cable type / cross-sec. mm <sup>2</sup>	Length m	Plug type	Cop. weight kg / 1000 pcs.
672303	ROBOFLEX®-recycle 5 G 0,34	1,0	plug straight / socket straight	16,5
672304	ROBOFLEX®-recycle 5 G 0,34	1,5	plug straight / socket straight	24,8
672306	ROBOFLEX®-recycle 5 G 0,34	3,0	plug straight / socket straight	49,5
672307	ROBOFLEX®-recycle 5 G 0,34	5,0	plug straight / socket straight	82,5
672309	ROBOFLEX®-recycle 5 G 0,34	10,0	plug straight / socket straight	165,0
672443	ROBOFLEX®-recycle 5 G 0,34	1,0	plug angled / socket angled	16,5
672444	ROBOFLEX®-recycle 5 G 0,34	1,5	plug angled / socket angled	24,8
672446	ROBOFLEX®-recycle 5 G 0,34	3,0	plug angled / socket angled	49,5
672447	ROBOFLEX®-recycle 5 G 0,34	5,0	plug angled / socket angled	82,5
672449	ROBOFLEX®-recycle 5 G 0,34	10,0	plug angled / socket angled	165,0
672313	ROBOFLEX®-recycle 5 G 0,34	1,0	plug straight / socket angled	16,5
672314	ROBOFLEX®-recycle 5 G 0,34	1,5	plug straight / socket angled	24,8
672316	ROBOFLEX®-recycle 5 G 0,34	3,0	plug straight / socket angled	49,5
672317	ROBOFLEX®-recycle 5 G 0,34	5,0	plug straight / socket angled	82,5
672319	ROBOFLEX®-recycle 5 G 0,34	10,0	plug straight / socket angled	165,0

## both ends pre-assembled, 3 LED (gn, rd, ye)

Part no.	Cable type / cross-sec. mm <sup>2</sup>	Length m	Plug type	Cop. weight kg / 1000 pcs.
672333	ROBOFLEX®-recycle 5 G 0,34	1,0	plug straight / socket straight with 3 LED	16,5
672334	ROBOFLEX®-recycle 5 G 0,34	1,5	plug straight / socket straight with 3 LED	24,8
672336	ROBOFLEX®-recycle 5 G 0,34	3,0	plug straight / socket straight with 3 LED	49,5
672337	ROBOFLEX®-recycle 5 G 0,34	5,0	plug straight / socket straight with 3 LED	82,5
672339	ROBOFLEX®-recycle 5 G 0,34	10,0	plug straight / socket straight with 3 LED	165,0
672373	ROBOFLEX®-recycle 5 G 0,34	1,0	plug angled / socket angled with 3 LED	16,5
672374	ROBOFLEX®-recycle 5 G 0,34	1,5	plug angled / socket angled with 3 LED	24,8
672376	ROBOFLEX®-recycle 5 G 0,34	3,0	plug angled / socket angled with 3 LED	49,5
672377	ROBOFLEX®-recycle 5 G 0,34	5,0	plug angled / socket angled with 3 LED	82,5
672379	ROBOFLEX®-recycle 5 G 0,34	10,0	plug angled / socket angled with 3 LED	165,0
672323	ROBOFLEX®-recycle 5 G 0,34	1,0	plug straight / socket angled with 3 LED	16,5
672324	ROBOFLEX®-recycle 5 G 0,34	1,5	plug straight / socket angled with 3 LED	24,8
672326	ROBOFLEX®-recycle 5 G 0,34	3,0	plug straight / socket angled with 3 LED	49,5
672327	ROBOFLEX®-recycle 5 G 0,34	5,0	plug straight / socket angled with 3 LED	82,5
672329	ROBOFLEX®-recycle 5 G 0,34	10,0	plug straight / socket angled with 3 LED	165,0

Dimensions and specifications may be changed without prior notice.

# ROBOFLEX®-recycle M12 plug straight or angled, pre-assembled on one end, 3-pin, 4-pin and 5-pin



## Technical data

- **Approval:**  
UL/cUL approved
- **Production**  
in accordance with VDE standards
- **Temperature range:**  
fixed installation -40°C to +105°C  
flexible -30°C to +105°C
- **Nominal voltage:**  
300 V
- **Test voltage:**  
2000 V
- **Minimum bending radius:**  
7.5 x cable diameter (for flexible installation)
- **Traversing speed:**  
max. 3.3 m/s for 5 m of horizontal traverse path length
- **Acceleration:**  
max. 5 m/s<sup>2</sup>
- **Flexing and torsion cycles:**  
min. 10 million.
- **Torsional stress:**  
+/- 360°/m

## Cable structure

- Bare copper litz wire, 42 x 0.10 mm
- Core insulation polyester, black, blue, brown
- Cores stranded in layers
- Sheath, special mix
- weld splatter resistant, dull, low adhesion, flame retardant and self-extinguishing to DIN VDE 0482-332-1-2, DIN EN 60332-1-2/ IEC 60332-1
- Sheath colour: black

### Assembly (3-pin)

colour of cores brown, blue, black  
AD 4,9 +/-0,2mm

### Assembly (4-pin)

colour of cores brown, blue, black, white  
AD 5,2 +/-0,2mm

### Assembly (5-pin)

colour of cores brown, blue, black, white, grey  
AD 5,5 +/-0,2mm

## Properties

- very good resistance to oil to DIN VDE 0473-811-404/DIN EN 60811-404
- good resistance to acids, alkalis and solvents
- not cross-linked
- weld splatter resistant
- recyclable
- halogen-free
- Silicone and cadmium-free
- Free of substances harmful to paint adhesion Substances
- very high mechanical load capacity
- abrasion resistant
- wear-resistant
- Highly flexible
- UV-resistant
- ROHS conformant
- CE conformant

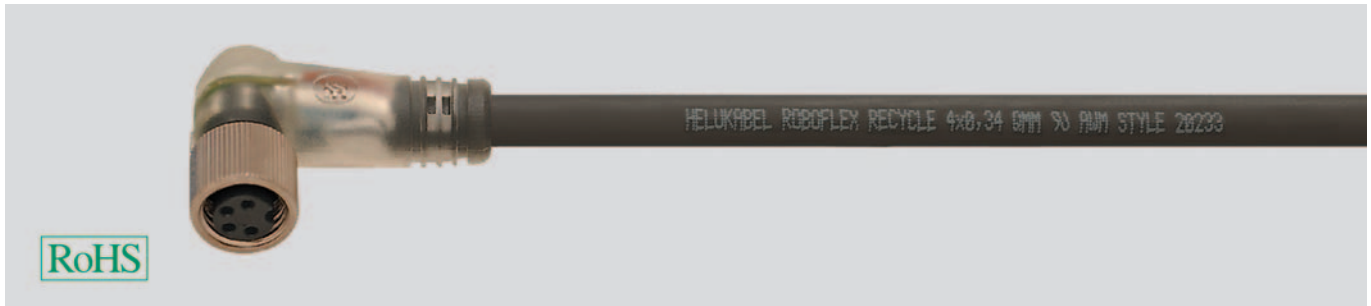
## Note

IP67  
A-coded

Part no.	Cable type / cross-sec. mm <sup>2</sup>	Length m	Plug type	Cop. weight kg / 1000 pcs.	
670710	ROBOFLEX®-recycle 3 x 0,34	1,5	plug, straight	14,7	-
670711	ROBOFLEX®-recycle 3 x 0,34	3,0	plug, straight	29,4	-
670712	ROBOFLEX®-recycle 3 x 0,34	5,0	plug, straight	49,0	-
670713	ROBOFLEX®-recycle 3 x 0,34	10,0	plug, straight	98,0	-
670714	ROBOFLEX®-recycle 3 x 0,34	1,5	plug, angled	14,7	-
670715	ROBOFLEX®-recycle 3 x 0,34	3,0	plug, angled	29,4	-
670716	ROBOFLEX®-recycle 3 x 0,34	5,0	plug, angled	49,0	-
670717	ROBOFLEX®-recycle 3 x 0,34	10,0	plug, angled	98,0	-
670726	ROBOFLEX®-recycle 4 x 0,34	1,5	plug, straight	19,7	-
670727	ROBOFLEX®-recycle 4 x 0,34	3,0	plug, straight	39,3	-
670728	ROBOFLEX®-recycle 4 x 0,34	5,0	plug, straight	65,5	-
670729	ROBOFLEX®-recycle 4 x 0,34	10,0	plug, straight	131,0	-
670730	ROBOFLEX®-recycle 4 x 0,34	1,5	plug, angled	19,7	-
670731	ROBOFLEX®-recycle 4 x 0,34	3,0	plug, angled	39,3	-
670732	ROBOFLEX®-recycle 4 x 0,34	5,0	plug, angled	65,5	-
670733	ROBOFLEX®-recycle 4 x 0,34	10,0	plug, angled	131,0	-
671426	ROBOFLEX®-recycle 5 x 0,34	1,5	plug, straight	24,8	-
671427	ROBOFLEX®-recycle 5 x 0,34	3,0	plug, straight	49,5	-
671428	ROBOFLEX®-recycle 5 x 0,34	5,0	plug, straight	82,5	-
671429	ROBOFLEX®-recycle 5 x 0,34	10,0	plug, straight	165,0	-
671430	ROBOFLEX®-recycle 5 x 0,34	1,5	plug, angled	24,8	-
671431	ROBOFLEX®-recycle 5 x 0,34	3,0	plug, angled	49,5	-
671432	ROBOFLEX®-recycle 5 x 0,34	5,0	plug, angled	82,5	-
671433	ROBOFLEX®-recycle 5 x 0,34	10,0	plug, angled	165,0	-

Dimensions and specifications may be changed without prior notice.

# ROBOFLEX®-recycle M8 femal one end pre-assembled



## Technical data

- **Approval:**  
UL/cUL approved
- **Production**  
in accordance with VDE standards
- **Temperature range:**  
fixed installation -40°C to +105°C  
flexible -30°C to +105°C
- **Nominal voltage:**  
300 V
- **Test voltage:**  
2000 V
- **Minimum bending radius:**  
7.5 x cable diameter (for flexible installation)
- **Traversing speed:**  
max. 3.3 m/s for 5 m of horizontal traverse path length
- **Acceleration:**  
max. 5 m/s<sup>2</sup>
- **Flexing and torsion cycles:**  
min. 10 million.
- **Torsional stress:**  
+/- 360°/m

## Cable structure

- Bare copper litz wire, 42 x 0.10 mm
- Core insulation polyester, black, blue, brown
- Cores stranded in layers
- Sheath, special mix
- weld splatter resistant, dull, low adhesion, flame retardant and self-extinguishing to DIN VDE 0482-332-1-2, DIN EN 60332-1-2/ IEC 60332-1
- Sheath colour: black

### Assembly (3-pin)

colour of cores brown, blue, black  
AD 4,9 +/- 0,2 mm

### Assembly (4-pin)

colour of cores brown, blue, black, white  
AD 5,2 +/- 0,2 mm

## Properties

- very good resistance to oil to DIN VDE 0473-811-404/DIN EN 60811-404
- good resistance to acids, alkalis and solvents
- not cross-linked
- weld splatter resistant
- recyclable
- halogen-free
- Silicone and cadmium-free
- Free of substances harmful to paint adhesion Substances
- very high mechanical load capacity
- abrasion resistant
- wear-resistant
- Highly flexible
- UV-resistant
- ROHS conformant
- CE conformant

## Note

IP67  
A-coded

## socket angled with 2 LED

Part no.	Cable type / cross-sec. mm <sup>2</sup>	Length m	Plug type	Cop. weight kg / 1000 pcs.
670672	ROBOFLEX®-recycle 3 x 0,34	1,5	socket angled with 2 LED	14,7
670673	ROBOFLEX®-recycle 3 x 0,34	3,0	socket angled with 2 LED	29,4
670674	ROBOFLEX®-recycle 3 x 0,34	5,0	socket angled with 2 LED	49,0
670675	ROBOFLEX®-recycle 3 x 0,34	10,0	socket angled with 2 LED	98,0
670688	ROBOFLEX®-recycle 4 x 0,34	1,5	socket angled with 2 LED	19,7
670689	ROBOFLEX®-recycle 4 x 0,34	3,0	socket angled with 2 LED	39,3
670690	ROBOFLEX®-recycle 4 x 0,34	5,0	socket angled with 2 LED	65,5
670691	ROBOFLEX®-recycle 4 x 0,34	10,0	socket angled with 2 LED	131,0

## plug straight

Part no.	Cable type / cross-sec. mm <sup>2</sup>	Length m	Plug type	Cop. weight kg / 1000 pcs.
670668	ROBOFLEX®-recycle 3 x 0,34	1,5	socket straight	14,7
670669	ROBOFLEX®-recycle 3 x 0,34	3,0	socket straight	29,4
670670	ROBOFLEX®-recycle 3 x 0,34	5,0	socket straight	49,0
670671	ROBOFLEX®-recycle 3 x 0,34	10,0	socket straight	98,0
670656	ROBOFLEX®-recycle 3 x 0,34	1,5	socket angled	14,7
670657	ROBOFLEX®-recycle 3 x 0,34	3,0	socket angled	29,4
670658	ROBOFLEX®-recycle 3 x 0,34	5,0	socket angled	49,0
670659	ROBOFLEX®-recycle 3 x 0,34	10,0	socket angled	98,0
670684	ROBOFLEX®-recycle 4 x 0,34	1,5	socket straight	19,7
670685	ROBOFLEX®-recycle 4 x 0,34	3,0	socket straight	39,3
670686	ROBOFLEX®-recycle 4 x 0,34	5,0	socket straight	65,5
670687	ROBOFLEX®-recycle 4 x 0,34	10,0	socket straight	131,0
670693	ROBOFLEX®-recycle 4 x 0,34	1,5	socket angled	19,7
670694	ROBOFLEX®-recycle 4 x 0,34	3,0	socket angled	39,3
670695	ROBOFLEX®-recycle 4 x 0,34	5,0	socket angled	65,5
670696	ROBOFLEX®-recycle 4 x 0,34	10,0	socket angled	131,0

Dimensions and specifications may be changed without prior notice.

# ROBOFLEX®-recycle M8 pre-assembled on both ends



## Technical data

- **Approval:**  
UL/cUL approved
- **Production**  
in accordance with VDE standards
- **Temperature range:**  
fixed installation -40°C to +105°C  
flexible -30°C to +105°C
- **Nominal voltage:**  
300 V
- **Test voltage:**  
2000 V
- **Minimum bending radius:**  
7.5 x cable diameter (for flexible installation)
- **Traversing speed:**  
max. 3.3 m/s for 5 m of horizontal traverse path length
- **Acceleration:**  
max. 5 m/s<sup>2</sup>
- **Flexing and torsion cycles:**  
min. 10 million.
- **Torsional stress:**  
+/- 360°/m

## Cable structure

- Bare copper litz wire, 42 x 0.10 mm
- Cores stranded in layers
- Sheath, special mix
- weld splatter resistant, dull, low adhesion, flame retardant and self-extinguishing to DIN VDE 0482-332-1-2, DIN EN 60332-1-2/IEC 60332-1
- Sheath colour: black

### Assembly (3-pin)

colour of cores brown, blue, black  
AD 4,9 +/- 0,2mm

### Assembly (4-pin)

colour of cores brown, blue, black, white  
AD 5,2 +/- 0,2mm

## Properties

- very good resistance to oil to DIN VDE 0473-811-404/ DIN EN 60811-404
- good resistance to acids, alkalis and solvents
- not cross-linked
- weld splatter resistant
- recyclable
- halogen-free
- Silicone and cadmium-free
- Free of substances harmful to paint adhesion Substances
- very high mechanical load capacity
- abrasion resistant
- wear-resistant
- Highly flexible
- UV-resistant
- ROHS conformant
- CE conformant

## Note

\* Design for the standard 2 LEDs in the colours: yellow, green.  
IP67  
A-coded

## plug straight / socket angled with 2 LED

Part no.	Cable type / cross-sec. mm <sup>2</sup>	Length m	Plug type	Cop. weight kg / 1000 pcs.
670849	ROBOFLEX®-recycle 3 x 0,34	1,0	plug straight / socket, angled with 2 LED	9,8
670850	ROBOFLEX®-recycle 3 x 0,34	1,5	plug straight / socket, angled with 2 LED	14,7
670851	ROBOFLEX®-recycle 3 x 0,34	3,0	plug straight / socket, angled with 2 LED	29,4
670852	ROBOFLEX®-recycle 3 x 0,34	5,0	plug straight / socket, angled with 2 LED	49,0
670853	ROBOFLEX®-recycle 3 x 0,34	10,0	plug straight / socket, angled with 2 LED	98,0
670861	ROBOFLEX®-recycle 4 x 0,34	1,0	plug straight / socket, angled with 2 LED	13,1
670862	ROBOFLEX®-recycle 4 x 0,34	1,5	plug straight / socket, angled with 2 LED	19,7
670863	ROBOFLEX®-recycle 4 x 0,34	3,0	plug straight / socket, angled with 2 LED	39,3
670864	ROBOFLEX®-recycle 4 x 0,34	5,0	plug straight / socket, angled with 2 LED	65,5
670865	ROBOFLEX®-recycle 4 x 0,34	10,0	plug straight / socket, angled with 2 LED	131,0

## plug straight / socket straight

Part no.	Cable type / cross-sec. mm <sup>2</sup>	Length m	Plug type	Cop. weight kg / 1000 pcs.
671356	ROBOFLEX®-recycle 3 x 0,34	1,0	plug straight / socket straight	9,8
670822	ROBOFLEX®-recycle 3 x 0,34	1,5	plug straight / socket straight	14,7
670823	ROBOFLEX®-recycle 3 x 0,34	3,0	plug straight / socket straight	29,4
670824	ROBOFLEX®-recycle 3 x 0,34	5,0	plug straight / socket straight	49,0
670825	ROBOFLEX®-recycle 3 x 0,34	10,0	plug straight / socket straight	98,0
671351	ROBOFLEX®-recycle 4 x 0,34	1,0	plug straight / socket straight	13,1
670834	ROBOFLEX®-recycle 4 x 0,34	1,5	plug straight / socket straight	19,7
670835	ROBOFLEX®-recycle 4 x 0,34	3,0	plug straight / socket straight	39,3
670836	ROBOFLEX®-recycle 4 x 0,34	5,0	plug straight / socket straight	65,5
670837	ROBOFLEX®-recycle 4 x 0,34	10,0	plug straight / socket straight	131,0

Continuation ►



# ROBOFLEX®-recycle M8 pre-assembled on both ends

## plug straight / socket angled

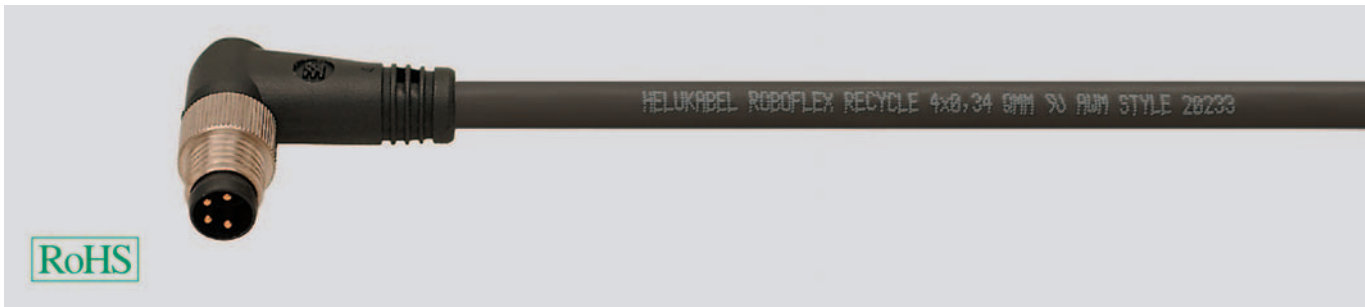
Part no.	Cable type / cross-sec. mm <sup>2</sup>	Length m	Plug type	Cop. weight kg / 1000 pcs.
671332	ROBOFLEX®-recycle 3 x 0,34	1,0	plug straight / socket angled	9,8
670826	ROBOFLEX®-recycle 3 x 0,34	1,5	plug straight / socket angled	14,7
670827	ROBOFLEX®-recycle 3 x 0,34	3,0	plug straight / socket angled	29,4
670828	ROBOFLEX®-recycle 3 x 0,34	5,0	plug straight / socket angled	49,0
670829	ROBOFLEX®-recycle 3 x 0,34	10,0	plug straight / socket angled	98,0
671333	ROBOFLEX®-recycle 4 x 0,34	1,0	plug straight / socket angled	13,1
670838	ROBOFLEX®-recycle 4 x 0,34	1,5	plug straight / socket angled	19,7
670839	ROBOFLEX®-recycle 4 x 0,34	3,0	plug straight / socket angled	39,3
670840	ROBOFLEX®-recycle 4 x 0,34	5,0	plug straight / socket angled	65,5
670841	ROBOFLEX®-recycle 4 x 0,34	10,0	plug straight / socket angled	131,0

## plug angled / socket angled

Part no.	Cable type / cross-sec. mm <sup>2</sup>	Length m	Plug type	Cop. weight kg / 1000 pcs.
671334	ROBOFLEX®-recycle 3 x 0,34	1,0	plug angled / socket angled	9,8
670830	ROBOFLEX®-recycle 3 x 0,34	1,5	plug angled / socket angled	14,7
670831	ROBOFLEX®-recycle 3 x 0,34	3,0	plug angled / socket angled	29,4
670832	ROBOFLEX®-recycle 3 x 0,34	5,0	plug angled / socket angled	49,0
670833	ROBOFLEX®-recycle 3 x 0,34	10,0	plug angled / socket angled	98,0
671335	ROBOFLEX®-recycle 4 x 0,34	1,0	plug angled / socket angled	13,1
670842	ROBOFLEX®-recycle 4 x 0,34	1,5	plug angled / socket angled	19,7
670843	ROBOFLEX®-recycle 4 x 0,34	3,0	plug angled / socket angled	39,3
670844	ROBOFLEX®-recycle 4 x 0,34	5,0	plug angled / socket angled	65,5
670845	ROBOFLEX®-recycle 4 x 0,34	10,0	plug angled / socket angled	131,0

Dimensions and specifications may be changed without prior notice.

# ROBOFLEX®-recycle M8 plug, straight or angled, pre-assembled on one side, 3-pin and 4-pin



## Technical data

- **Approval:**  
UL/cUL approved
- **Production**  
in accordance with VDE standards
- **Temperature range:**  
fixed installation -40°C to +105°C  
flexible -30°C to +105°C
- **Nominal voltage:**  
300 V
- **Test voltage:**  
2000 V
- **Minimum bending radius:**  
7.5 x cable diameter (for flexible installation)
- **Traversing speed:**  
max. 3.3 m/s for 5 m of horizontal traverse  
path length
- **Acceleration:**  
max. 5 m/s<sup>2</sup>
- **Flexing and torsion cycles:**  
min. 10 million.
- **Torsional stress:**  
+/- 360°/m

## Cable structure

- Bare copper litz wire, 42 x 0.10 mm
- Core insulation polyester, black, blue, brown
- Cores stranded in layers
- Sheath, special mix
- weld splatter resistant, dull, low adhesion, flame retardant and self-extinguishing to DIN VDE 0482-332-1-2, DIN EN 60332-1-2/ IEC 60332-1
- Sheath colour: black

### Assembly (3-pin)

colour of cores brown, blue, black

AD 4,9 +/- 0,2 mm

### Assembly (4-pin)

colour of cores brown, blue, black, white

AD 5,2 +/- 0,2 mm

## Properties

- very good resistance to oil as per DIN VDE 0473-811-404/DIN EN 60811-404
- good resistance to acids, alkalis and solvents
- not cross-linked
- weld splatter resistant
- recyclable
- halogen-free
- Silicone and cadmium-free
- Free of substances harmful to paint adhesion Substances
- very high mechanical load capacity
- abrasion resistant
- wear-resistant
- Highly flexible
- UV-resistant
- ROHS conformant
- CE conformant

## Note

IP67

A-coded

Part no.	Cable type / cross-sec. mm <sup>2</sup>	Length m	Plug type	Cop. weight kg / 1000 pcs.
670660	ROBOFLEX®-recycle 3 x 0,34	1,5	plug, straight	14,7
670661	ROBOFLEX®-recycle 3 x 0,34	3,0	plug, straight	29,4
670662	ROBOFLEX®-recycle 3 x 0,34	5,0	plug, straight	49,0
670663	ROBOFLEX®-recycle 3 x 0,34	10,0	plug, straight	98,0
670664	ROBOFLEX®-recycle 3 x 0,34	1,5	plug, angled	14,7
670665	ROBOFLEX®-recycle 3 x 0,34	3,0	plug, angled	29,4
670666	ROBOFLEX®-recycle 3 x 0,34	5,0	plug, angled	29,4
670667	ROBOFLEX®-recycle 3 x 0,34	10,0	plug, angled	98,0
670676	ROBOFLEX®-recycle 4 x 0,34	1,5	plug, straight	19,7
670677	ROBOFLEX®-recycle 4 x 0,34	3,0	plug, straight	39,3
670678	ROBOFLEX®-recycle 4 x 0,34	5,0	plug, straight	65,5
670679	ROBOFLEX®-recycle 4 x 0,34	10,0	plug, straight	131,0
670680	ROBOFLEX®-recycle 4 x 0,34	1,5	plug, angled	19,7
670681	ROBOFLEX®-recycle 4 x 0,34	3,0	plug, angled	39,3
670682	ROBOFLEX®-recycle 4 x 0,34	5,0	plug, angled	65,5
670683	ROBOFLEX®-recycle 4 x 0,34	10,0	plug, angled	131,0

Dimensions and specifications may be changed without prior notice.

# ROBOFLEX®-recycle M12 sensor cable screened one end pre-assembled



## Technical data

- **Approval:**  
UL/cUL approved
- **Production**  
in accordance with VDE standards
- **Temperature range:**  
fixed installation -40°C to +105°C  
flexible -30°C to +105°C
- **Nominal voltage:**  
300 V
- **Test voltage:**  
2000 V
- **Minimum bending radius:**  
7.5 x cable diameter (for flexible installation)
- **Traversing speed:**  
max. 3.3 m/s for 5 m of horizontal traverse path length
- **Acceleration:**  
max. 5 m/s<sup>2</sup>
- **Flexing and torsion cycles:**  
min. 10 million.
- **Torsional stress:**  
+/- 360°/m

## Cable structure

- Bare copper stranded wire, 42 x 0.10 mm
- Cores stranded in layers
- Polyester foil taping
- Screening of tinned copper braid, coverage approx. 85%, D-screen for Robot applications
- Special compound sheath, weld-splatter resistant, recyclable, matt, low-adhesion, flame retardant and self-extinguishing to DIN VDE 0482-332-1-2, DIN EN 60332-1-2/ IEC 60332-1
- Sheath colour: black

### Assembly (3-pin)

- Core insulation polyester, black, brown, blue, black
- Outer diameter 5,2 +/- 0.2 mm

### Assembly (4-pin)

- Core insulation polyester, brown, blue, black, white
- Outer diameter 5.5 +/- 0.2 mm

### Assembly (5-pin)

- Core insulation polyester, brown, blue, black, white, green
- Outer diameter 6,0 +/- 0.2 mm

## Properties

- very good resistance to oil as per DIN VDE 0473-811-404/DIN EN 60811-404
- good resistance to acids, alkalis and solvents
- not cross-linked
- weld splatter resistant
- recyclable
- halogen-free
- Silicone and cadmium-free
- Free of substances harmful to paint adhesion Substances
- very high mechanical load capacity
- abrasion resistant
- wear-resistant
- Highly flexible
- UV-resistant
- ROHS conformant
- CE conformant

## Note

IP67  
A-coded

## plug straight pre-assembled

Part no.	Cable type / cross-sec. mm <sup>2</sup>	Length m	Plug type	Cop. weight kg / 1000 pcs.	
671893	ROBOFLEX®-recycle 3 x 0,34	1,0	plug, straight	19,6	-
671894	ROBOFLEX®-recycle 3 x 0,34	1,5	plug, straight	29,4	-
671896	ROBOFLEX®-recycle 3 x 0,34	3,0	plug, straight	58,8	-
671897	ROBOFLEX®-recycle 3 x 0,34	5,0	plug, straight	98,0	-
671899	ROBOFLEX®-recycle 3 x 0,34	10,0	plug, straight	196,0	-
671903	ROBOFLEX®-recycle 3 x 0,34	1,0	plug, angled	19,6	-
671904	ROBOFLEX®-recycle 3 x 0,34	1,5	plug, angled	29,4	-
671906	ROBOFLEX®-recycle 3 x 0,34	3,0	plug, angled	58,8	-
671907	ROBOFLEX®-recycle 3 x 0,34	5,0	plug, angled	98,0	-
671909	ROBOFLEX®-recycle 3 x 0,34	10,0	plug, angled	196,0	-
671913	ROBOFLEX®-recycle 4 x 0,34	1,0	plug, straight	24,2	-
671914	ROBOFLEX®-recycle 4 x 0,34	1,5	plug, straight	36,3	-
671916	ROBOFLEX®-recycle 4 x 0,34	3,0	plug, straight	72,6	-
671917	ROBOFLEX®-recycle 4 x 0,34	5,0	plug, straight	121,0	-
671919	ROBOFLEX®-recycle 4 x 0,34	10,0	plug, straight	242,0	-
671923	ROBOFLEX®-recycle 4 x 0,34	1,0	plug, angled	24,2	-
671924	ROBOFLEX®-recycle 4 x 0,34	1,5	plug, angled	36,3	-
671926	ROBOFLEX®-recycle 4 x 0,34	3,0	plug, angled	72,6	-
671927	ROBOFLEX®-recycle 4 x 0,34	5,0	plug, angled	121,0	-
671929	ROBOFLEX®-recycle 4 x 0,34	10,0	plug, angled	242,0	-
671933	ROBOFLEX®-recycle 5 x 0,34	1,0	plug, straight	30,0	-
671934	ROBOFLEX®-recycle 5 x 0,34	1,5	plug, straight	45,0	-
671936	ROBOFLEX®-recycle 5 x 0,34	3,0	plug, straight	90,0	-
671937	ROBOFLEX®-recycle 5 x 0,34	5,0	plug, straight	150,0	-
671939	ROBOFLEX®-recycle 5 x 0,34	10,0	plug, straight	300,0	-
671943	ROBOFLEX®-recycle 5 x 0,34	1,0	plug, angled	30,0	-
671944	ROBOFLEX®-recycle 5 x 0,34	1,5	plug, angled	45,0	-
671946	ROBOFLEX®-recycle 5 x 0,34	3,0	plug, angled	90,0	-
671947	ROBOFLEX®-recycle 5 x 0,34	5,0	plug, angled	150,0	-
671949	ROBOFLEX®-recycle 5 x 0,34	10,0	plug, angled	300,0	-

Continuation ▶

U

# ROBOFLEX®-recycle M12 sensor cable screened one end pre-assembled

## socket one end pre-assembled

Part no.	Cable type / cross-sec. mm <sup>2</sup>	Length m	Plug type	Cop. weight kg / 1000 pcs.
671873	ROBOFLEX®-recycle 3 x 0,34	1,0	socket straight	19,6
671874	ROBOFLEX®-recycle 3 x 0,34	1,5	socket straight	29,4
671876	ROBOFLEX®-recycle 3 x 0,34	3,0	socket straight	58,8
671877	ROBOFLEX®-recycle 3 x 0,34	5,0	socket straight	98,0
671879	ROBOFLEX®-recycle 3 x 0,34	10,0	socket straight	196,0
671883	ROBOFLEX®-recycle 3 x 0,34	1,0	socket angled	19,6
671884	ROBOFLEX®-recycle 3 x 0,34	1,5	socket angled	29,4
671886	ROBOFLEX®-recycle 3 x 0,34	3,0	socket angled	58,8
671887	ROBOFLEX®-recycle 3 x 0,34	5,0	socket angled	98,0
671889	ROBOFLEX®-recycle 3 x 0,34	10,0	socket angled	196,0
671833	ROBOFLEX®-recycle 4 x 0,34	1,0	socket straight	24,2
671834	ROBOFLEX®-recycle 4 x 0,34	1,5	socket straight	36,3
671836	ROBOFLEX®-recycle 4 x 0,34	3,0	socket straight	72,6
671837	ROBOFLEX®-recycle 4 x 0,34	5,0	socket straight	121,0
671839	ROBOFLEX®-recycle 4 x 0,34	10,0	socket straight	242,0
671843	ROBOFLEX®-recycle 4 x 0,34	1,0	socket angled	24,2
671844	ROBOFLEX®-recycle 4 x 0,34	1,5	socket angled	36,3
671846	ROBOFLEX®-recycle 4 x 0,34	3,0	socket angled	72,6
671847	ROBOFLEX®-recycle 4 x 0,34	5,0	socket angled	121,0
671849	ROBOFLEX®-recycle 4 x 0,34	10,0	socket angled	242,0
671854	ROBOFLEX®-recycle 5 x 0,34	1,0	socket straight	30,0
671850	ROBOFLEX®-recycle 5 x 0,34	1,5	socket straight	45,0
671851	ROBOFLEX®-recycle 5 x 0,34	3,0	socket straight	90,0
671852	ROBOFLEX®-recycle 5 x 0,34	5,0	socket straight	150,0
671853	ROBOFLEX®-recycle 5 x 0,34	10,0	socket straight	300,0
671859	ROBOFLEX®-recycle 5 x 0,34	1,0	socket angled	30,0
671855	ROBOFLEX®-recycle 5 x 0,34	1,5	socket angled	45,0
671856	ROBOFLEX®-recycle 5 x 0,34	3,0	socket angled	90,0
671857	ROBOFLEX®-recycle 5 x 0,34	5,0	socket angled	150,0
671858	ROBOFLEX®-recycle 5 x 0,34	10,0	socket angled	300,0

Dimensions and specifications may be changed without prior notice.

# ROBOFLEX®-recycle M12 sensor cable screened both ends pre-assembled



## Technical data

- **Approval:**  
UL/cUL approved
- **Production**  
in accordance with VDE standards
- **Temperature range:**  
fixed installation -40°C to +105°C  
flexible -30°C to +105°C
- **Nominal voltage:**  
300 V
- **Test voltage:**  
2000 V
- **Minimum bending radius:**  
7.5 x cable diameter (for flexible installation)
- **Traversing speed:**  
max. 3.3 m/s for 5 m of horizontal traverse path length
- **Acceleration:**  
max. 5 m/s<sup>2</sup>
- **Flexing and torsion cycles:**  
min. 10 million.
- **Torsional stress:**  
+/- 360°/m

## Cable structure

- Bare copper stranded wire, 42 x 0.10 mm
- Cores stranded in layers
- Polyester foil taping
- Screening of tinned copper braid, coverage approx. 85%, D-screen for robot applications
- Special compound sheath, weld-splatter resistant, recyclable, matt, low-adhesion, flame retardant and self-extinguishing to DIN VDE 0482-332-1-2, DIN EN 60332-1-2/IEC 60332-1
- Sheath colour: black

### Assembly (3-pin)

- Core insulation polyester, black, brown, blue, black
- Outer diameter 5,2 +/- 0.2 mm

### Assembly (4-pin)

- Core insulation polyester, brown, blue, black, white
- Outer diameter 5.5 +/- 0.2 mm

### Assembly (5-pin)

- Core insulation polyester, brown, blue, black, white, green
- Outer diameter 6,0 +/- 0.2 mm

## Properties

- very good resistance to oil to DIN VDE 0473-811-404/DIN EN 60811-404
- good resistance to acids, alkalis and solvents
- not cross-linked
- weld splatter resistant
- recyclable
- halogen-free
- Silicone and cadmium-free
- Free of substances harmful to paint adhesion Substances
- very high mechanical load capacity
- abrasion resistant
- wear-resistant
- Highly flexible
- UV-resistant
- ROHS conformant
- CE conformant

## Note

IP67  
A-coded

## plug / socket

Part no.	Cable type / cross-sec. mm <sup>2</sup>	Length m	Plug type	Cop. weight kg / 1000 pcs.	
671953	ROBOFLEX®-recycle 3 x 0,34	1,0	plug straight / socket straight	19,6	-
671954	ROBOFLEX®-recycle 3 x 0,34	1,5	plug straight / socket straight	29,4	-
671956	ROBOFLEX®-recycle 3 x 0,34	3,0	plug straight / socket straight	58,8	-
671957	ROBOFLEX®-recycle 3 x 0,34	5,0	plug straight / socket straight	98,0	-
671759	ROBOFLEX®-recycle 3 x 0,34	10,0	plug straight / socket straight	196,0	-
671963	ROBOFLEX®-recycle 4 x 0,34	1,0	plug straight / socket straight	24,2	-
671964	ROBOFLEX®-recycle 4 x 0,34	1,5	plug straight / socket straight	36,3	-
671966	ROBOFLEX®-recycle 4 x 0,34	3,0	plug straight / socket straight	72,6	-
671967	ROBOFLEX®-recycle 4 x 0,34	5,0	plug straight / socket straight	121,0	-
671969	ROBOFLEX®-recycle 4 x 0,34	10,0	plug straight / socket straight	242,0	-
671973	ROBOFLEX®-recycle 5 x 0,34	1,0	plug straight / socket straight	30,0	-
671974	ROBOFLEX®-recycle 5 x 0,34	1,5	plug straight / socket straight	45,0	-
671976	ROBOFLEX®-recycle 5 x 0,34	3,0	plug straight / socket straight	90,0	-
671977	ROBOFLEX®-recycle 5 x 0,34	5,0	plug straight / socket straight	150,0	-
671979	ROBOFLEX®-recycle 5 x 0,34	10,0	plug straight / socket straight	300,0	-
671983	ROBOFLEX®-recycle 3 x 0,34	1,0	plug straight / socket angled	19,6	-
671984	ROBOFLEX®-recycle 3 x 0,34	1,5	plug straight / socket angled	29,4	-
671986	ROBOFLEX®-recycle 3 x 0,34	3,0	plug straight / socket angled	58,8	-
671988	ROBOFLEX®-recycle 3 x 0,34	5,0	plug straight / socket angled	98,0	-
671989	ROBOFLEX®-recycle 3 x 0,34	10,0	plug straight / socket angled	196,0	-
671993	ROBOFLEX®-recycle 4 x 0,34	1,0	plug straight / socket angled	24,2	-
671994	ROBOFLEX®-recycle 4 x 0,34	1,5	plug straight / socket angled	36,3	-
671996	ROBOFLEX®-recycle 4 x 0,34	3,0	plug straight / socket angled	72,6	-
671997	ROBOFLEX®-recycle 4 x 0,34	5,0	plug straight / socket angled	121,0	-
671999	ROBOFLEX®-recycle 4 x 0,34	10,0	plug straight / socket angled	242,0	-
672003	ROBOFLEX®-recycle 5 x 0,34	1,0	plug straight / socket angled	30,0	-
672004	ROBOFLEX®-recycle 5 x 0,34	1,5	plug straight / socket angled	45,0	-
672006	ROBOFLEX®-recycle 5 x 0,34	3,0	plug straight / socket angled	90,0	-
672007	ROBOFLEX®-recycle 5 x 0,34	5,0	plug straight / socket angled	150,0	-
672009	ROBOFLEX®-recycle 5 x 0,34	10,0	plug straight / socket angled	300,0	-
672013	ROBOFLEX®-recycle 3 x 0,34	1,0	plug angled / socket angled	19,6	-
672014	ROBOFLEX®-recycle 3 x 0,34	1,5	plug angled / socket angled	29,4	-
672016	ROBOFLEX®-recycle 3 x 0,34	3,0	plug angled / socket angled	58,8	-
672017	ROBOFLEX®-recycle 3 x 0,34	5,0	plug angled / socket angled	98,0	-
672019	ROBOFLEX®-recycle 3 x 0,34	10,0	plug angled / socket angled	196,0	-

Continuation ▶



**ROBOFLEX®-recycle** M12 sensor cable screened both ends pre-assembled**plug / socket**

Part no.	Cable type / cross-sec. mm <sup>2</sup>	Length m	Plug type	Cop. weight kg / 1000 pcs.
672023	ROBOFLEX®-recycle 4 x 0,34	1,0	plug angled / socket angled	24,2 -
672024	ROBOFLEX®-recycle 4 x 0,34	1,5	plug angled / socket angled	36,3 -
672026	ROBOFLEX®-recycle 4 x 0,34	3,0	plug angled / socket angled	72,6 -
672027	ROBOFLEX®-recycle 4 x 0,34	5,0	plug angled / socket angled	121,0 -
672029	ROBOFLEX®-recycle 4 x 0,34	10,0	plug angled / socket angled	242,0 -
672033	ROBOFLEX®-recycle 5 x 0,34	1,0	plug angled / socket angled	30,0 -
672034	ROBOFLEX®-recycle 5 x 0,34	1,5	plug angled / socket angled	45,0 -
672036	ROBOFLEX®-recycle 5 x 0,34	3,0	plug angled / socket angled	90,0 -
672037	ROBOFLEX®-recycle 5 x 0,34	5,0	plug angled / socket angled	150,0 -
672039	ROBOFLEX®-recycle 5 x 0,34	10,0	plug angled / socket angled	300,0 -

Dimensions and specifications may be changed without prior notice.

# ROBOFLEX®-recycle Twin cables M12 to M12



## Technical data

- **Approval:**  
UL/cUL approved
- **Production**  
in accordance with VDE standards
- **Temperature range:**  
fixed installation -40°C to +105°C  
flexible -30°C to +105°C
- **Nominal voltage:**  
300 V
- **Test voltage:**  
2000 V
- **Minimum bending radius:**  
7.5 x cable diameter  
(for flexible installation)
- **Traversing speed:**  
max. 3.3 m/s for 5 m of horizontal  
traverse path length
- **Acceleration:**  
max. 5 m/s<sup>2</sup>
- **Flexing and torsion cycles:**  
min. 10 million.
- **Torsional stress:**  
+/- 360°/m

## Cable structure

### Assembly (3-pin)

- Bare copper litz wire, 42 x 0.10 mm
- Core insulation polyester, black, blue, brown
- Cores stranded in layers
- Sheath, special mix
- weld splatter resistant, dull, low adhesion, flame retardant and self-extinguishing to DIN VDE 0482-332-1-2, DIN EN 60332-1-2/ IEC 60332-1
- Sheath colour: black
- Outer diameter 4.9 +/-0.2 mm

### Assembly (4-pin)

- Bare copper litz wire, 42 x 0.10 mm
- Core insulation polyester, black, brown, white, blue
- Cores stranded in layers
- Sheath, special mix
- weld splatter resistant, dull, low adhesion, flame retardant and self-extinguishing to DIN VDE 0482-332-1-2, DIN EN 60332-1-2/ IEC 60332-1
- Sheath colour: black
- Outer diameter 5,2 +/-0.2 mm

## Properties

- very good resistance to oil to DIN VDE 0473-811-404/DIN EN 60811-404
- good resistance to acids, alkalis and solvents
- not cross-linked
- weld splatter resistant
- recyclable
- halogen-free
- Silicone and cadmium-free
- Free of substances harmful to paint adhesion Substances
- very high mechanical load capacity
- abrasion resistant
- wear-resistant
- Highly flexible
- UV-resistant
- ROHS conformant
- CE conformant

## Note

\* Twin cables with sensor cable ROBOFLEX® recycle M12 to M8 and other configurations and lengths - available on request.

Dimensions and specifications may be changed without prior notice.

# ROBOFLEX®-recycle Twin cables M12 to M12



## Technical data

- **Approval:**  
UL/cUL approved
- **Production**  
in accordance with VDE standards
- **Temperature range:**  
fixed installation -40°C to +105°C  
flexible -30°C to +105°C
- **Nominal voltage:**  
300 V
- **Test voltage:**  
2000 V
- **Minimum bending radius:**  
7.5 x cable diameter (for flexible installation)
- **Traversing speed:**  
max. 3.3 m/s for 5 m of horizontal traverse path length
- **Acceleration:**  
max. 5 m/s<sup>2</sup>
- **Flexing and torsion cycles:**  
min. 10 million.
- **Torsional stress:**  
+/- 360°/m

## Cable structure

### Assembly (3-pin)

- Bare copper litz wire, 42 x 0.10 mm
- Core insulation polyester, black, blue, brown
- Cores stranded in layers
- Sheath, special mix
- weld splatter resistant, dull, low adhesion, flame retardant and self-extinguishing to DIN VDE 0482-332-1-2, DIN EN 60332-1-2/ IEC 60332-1
- Sheath colour: black
- Outer diameter 4.9 +/-0.2 mm

### Assembly (4-pin)

- Bare copper litz wire, 42 x 0.10 mm
- Core insulation polyester, black, brown, white, blue
- Cores stranded in layers
- Sheath, special mix
- weld splatter resistant, dull, low adhesion, flame retardant and self-extinguishing to DIN VDE 0482-332-1-2, DIN EN 60332-1-2/ IEC 60332-1
- Sheath colour: black
- Outer diameter 5,2 +/-0.2 mm

## Properties

- very good resistance to oil to DIN VDE 0473-811-404/DIN EN 60811-404
- good resistance to acids, alkalis and solvents
- not cross-linked
- weld splatter resistant
- recyclable
- halogen-free
- Silicone and cadmium-free
- Free of substances harmful to paint adhesion Substances
- very high mechanical load capacity
- abrasion resistant
- wear-resistant
- Highly flexible
- UV-resistant
- ROHS conformant
- CE conformant

## Note

\* Design for the Standard  
2 LEDs in the colours: yellow, green;  
3 LEDs in the colours: white, yellow, green - available upon request.  
\*\* Twin cables with sensor cable ROBOFLEX® recycle M12 to M8 and other configurations and lengths - available on request.

Dimensions and specifications may be changed without prior notice.







Extensions

PVC connecting cables

Rubber connecting cables

**YELLOWFLEX**

PUR connecting cables

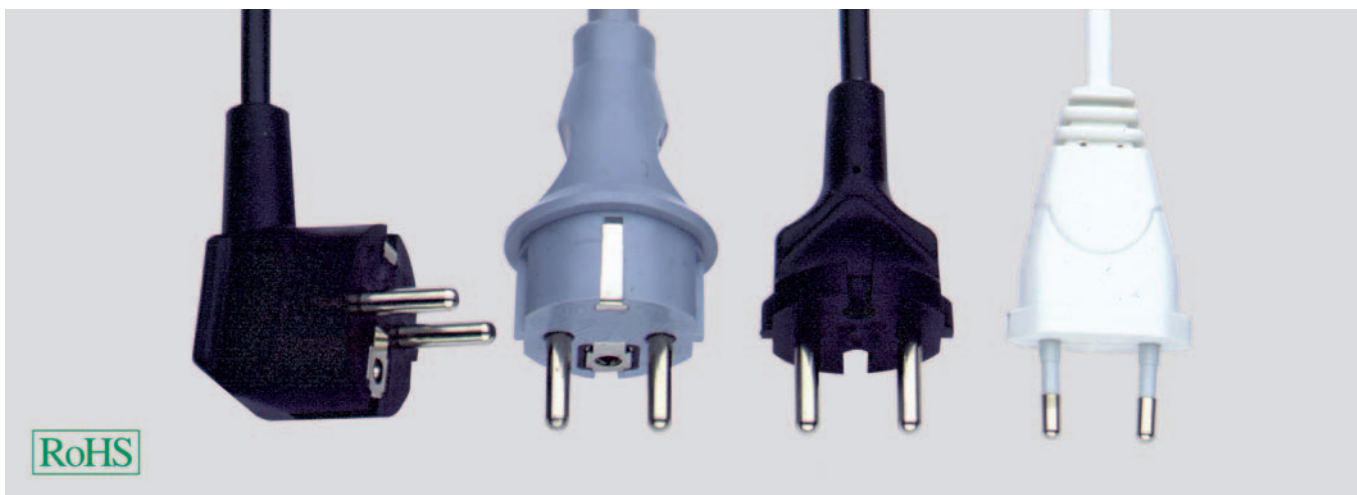
Supply cables



## ■ CONNECTING CABLES & EXTENSIONS

<b>Designation</b>	<b>Properties</b>	<b>Approvals</b>	<b>Page</b>
PVC Connecting cables			<b>900</b>
Rubber Connecting cables			<b>901</b>
YELLOWFLEX Connecting cables	meter marking	<b>ERC</b>	<b>902</b>
PUR Connecting cables	meter marking		<b>903</b>
Extensions/supply cables	CEE extensions, cold equipment cables, PVC extensions		<b>904</b>
Front connector cables for Simatic® S7			<b>905</b>

# PVC connecting cables



## Technical data

- **Temperature range**  
flexing -5°C to +70°C  
fixed installation -40°C to +70°C
- **Nominal voltage**  
H03VV-F: U<sub>0</sub>/U 300/300 V  
H05VV-F: U<sub>0</sub>/U 300/500 V
- **Test voltage** 2000 V
- **Assembly**  
- End 1: Plug  
- End 2: 25 respectively 30 mm  
stripped with wire end ferrule

## Cable structure

- Bare copper-conductor, to  
DIN VDE 0295 cl.5, fine-wire,  
BS 6360 cl.5, IEC 60228 cl.5
- Core insulation of PVC
- Core identification to DIN VDE 0293-308
- Cores stranded in layers
- GN-YE conductor, 3 cores and above
- Outer sheath of PVC
- Sheath colour see table below

## Note

- G = with green-yellow conductor  
x = without green-yellow conductor
- On request also with international approval.
- AWG sizes are approximate equivalent values. The actual cross-section is in mm<sup>2</sup>.

## Application

### H03VV-F

This cable is highly suitable as a hand tool connection for lightweight applications. It is often used as a connecting cable for household appliances.

### H05VV-F

This cable is highly suitable as a hand tool connection for medium-weight applications. It can also be used in wet rooms. As a connecting cable: for machine installation.

Part no. black	white	grey	Cable type / cross-sec. mm <sup>2</sup>	Length m	Plug type	Cop. weight kg / 1000 pcs.	AWG-No.
84412	84416		H03VVH2-F 2 x 0,75	2,0	Euro plug	28,8	19
84413	84417		H03VVH2-F 2 x 0,75	3,0	Euro plug	43,2	19
84420	84421		H03VVH2-F 2 x 0,75	5,0	Euro plug	72,0	19
84414	84418		H03VV-F 2 x 0,75	2,0	Euro plug	28,8	19
84415	84419		H03VV-F 2 x 0,75	3,0	Euro plug	43,2	19
84422	84423		H03VV-F 2 x 0,75	5,0	Euro plug	72,0	19
84424	84425	84428	H03VV-F 2 x 0,75	2,0	Central contour connector	28,8	19
84426	84427	84429	H03VV-F 2 x 0,75	3,0	Central contour connector	43,2	19
86870	84430	84431	H03VV-F 2 x 0,75	5,0	Central contour connector	72,0	19
87127	87128	84432	H05VV-F 2 x 1,0	2,0	Central contour connector	38,0	18
86765	87130	84433	H05VV-F 2 x 1,0	3,0	Central contour connector	57,0	18
86867	84434	84435	H05VV-F 2 x 1,0	5,0	Central contour connector	95,0	18
86764	87575	84436	H03VV-F 3 G 0,75	2,0	PROTECTED PLUG, straight	43,2	19
84437	84438	84439	H03VV-F 3 G 0,75	3,0	PROTECTED PLUG, straight	64,8	19
84440	84441	84442	H03VV-F 3 G 0,75	5,0	PROTECTED PLUG, straight	108,0	19
84400	84406	87725	H03VV-F 3 G 0,75	2,0	PROTECTED PLUG, angled	43,2	19
84401	84407	84446	H03VV-F 3 G 0,75	3,0	PROTECTED PLUG, angled	64,8	19
87748	84447	87277	H03VV-F 3 G 0,75	5,0	PROTECTED PLUG, angled	108,0	19
87137	87139	84451	H05VV-F 3 G 1,0	2,0	PROTECTED PLUG, straight	58,0	18
87138	87140	84452	H05VV-F 3 G 1,0	3,0	PROTECTED PLUG, straight	87,0	18
84453	84454	84455	H05VV-F 3 G 1,0	5,0	PROTECTED PLUG, straight	145,0	18
84402	84408	84459	H05VV-F 3 G 1,0	2,0	PROTECTED PLUG, angled	58,0	18
84403	84409	87410	H05VV-F 3 G 1,0	3,0	PROTECTED PLUG, angled	87,0	18
87074	87141	84460	H05VV-F 3 G 1,0	5,0	PROTECTED PLUG, angled	145,0	18
84464	84465	84466	H05VV-F 3 G 1,5	2,0	PROTECTED PLUG, straight	86,0	16
84467	84468	84469	H05VV-F 3 G 1,5	3,0	PROTECTED PLUG, straight	129,0	16
84470	84471	84472	H05VV-F 3 G 1,5	5,0	PROTECTED PLUG, straight	215,0	16
84404	84410	84475	H05VV-F 3 G 1,5	2,0	PROTECTED PLUG, angled	86,0	16
84405	84411	87503	H05VV-F 3 G 1,5	3,0	PROTECTED PLUG, angled	129,0	16
87142	87143	84476	H05VV-F 3 G 1,5	5,0	PROTECTED PLUG, angled	215,0	16

Dimensions and specifications may be changed without prior notice.

# Rubber connecting cables



## Technical data

### • Temperature range

flexing -30°C to +60°C

### • Nominal voltage

H05RR-F / H05RN-F:  $U_0/U$  300/500 V

H07RN-F:  $U_0/U$  450/750 V

### • Test voltage

H05RR-F / H05RN-F: 2000 V

H07RN-F: 2500 V

### • Assembly

- End 1: Plug

- End 2: 25 respectively 30 mm  
stripped with wire end ferrule

## Cable structure

- Bare copper-conductor, to DIN VDE 0295 cl.5, fine-wire, BS 6360 cl.5, IEC 60228 cl.5
- Core insulation of rubber
- Cores identification to DIN VDE 0293-308
- Cores stranded in layers
- GN-YE conductor, 3 cores and above
- Outer sheath of rubber
- Sheath colour black

## Note

- G = with green-yellow conductor
- x = without green-yellow conductor
- On request also with international approval.
- AWG sizes are approximate equivalent values. The actual cross-section is in mm<sup>2</sup>.

## Application

### H05RR-F

Lightweight rubber-sheathed cable for use as a hand tool connection and lightweight workshop tools for light to medium-weight applications in dry and wet rooms.

### H05RN-F

Medium-weight rubber-sheathed cable for use as a hand tool connection and lightweight workshop equipment for light to medium-weight applications in dry rooms, wet rooms outdoors and in industrial water.

### H07RN-F

Heavyweight rubber-sheathed cable for use on heavy equipment and tools (agricultural, construction industry). For heavyweight applications in dry rooms, wet rooms, outdoors and in industrial water.

Part no. black	Cable type / cross-sec. mm <sup>2</sup>	Length m	Plug type	Cop. weight kg / 1000 pcs.	AWG-No.
84481	H05RR-F 2 x 0,75	3,0	Central contour connector	43,2	18
84482	H05RR-F 2 x 0,75	5,0	Central contour connector	72,0	18
84483	H05RR-F 2 x 0,75	10,0	Central contour connector	144,0	18
87738	H05RR-F 2 x 1,0	3,0	Central contour connector	57,6	17
86961	H05RR-F 2 x 1,0	5,0	Central contour connector	96,0	17
84485	H05RR-F 2 x 1,0	10,0	Central contour connector	192,0	17
86960	H05RR-F 2 x 1,5	3,0	Central contour connector	86,4	16
87406	H05RR-F 2 x 1,5	5,0	Central contour connector	144,0	16
84487	H05RR-F 2 x 1,5	10,0	Central contour connector	288,0	16
87690	H05RR-F 3 G 0,75	3,0	PROTECTED PLUG, straight	64,8	18
84489	H05RR-F 3 G 0,75	5,0	PROTECTED PLUG, straight	108,0	18
84490	H05RR-F 3 G 0,75	10,0	PROTECTED PLUG, straight	216,0	18
84492	H05RR-F 3 G 0,75	3,0	PROTECTED PLUG, angled	64,8	18
84493	H05RR-F 3 G 0,75	5,0	PROTECTED PLUG, angled	108,0	18
84494	H05RR-F 3 G 0,75	10,0	PROTECTED PLUG, angled	216,0	18
86740	H07RN-F 3 G 1,0	3,0	PROTECTED PLUG, straight	86,4	17
87145	H07RN-F 3 G 1,0	5,0	PROTECTED PLUG, straight	144,0	17
87604	H07RN-F 3 G 1,0	10,0	PROTECTED PLUG, straight	288,0	17
84496	H07RN-F 3 G 1,0	3,0	PROTECTED PLUG, angled	86,4	17
84497	H07RN-F 3 G 1,0	5,0	PROTECTED PLUG, angled	144,0	17
84498	H07RN-F 3 G 1,0	10,0	PROTECTED PLUG, angled	288,0	17
86741	H07RN-F 3 G 1,5	3,0	PROTECTED PLUG, straight	129,6	16
87084	H07RN-F 3 G 1,5	5,0	PROTECTED PLUG, straight	216,0	16
84499	H07RN-F 3 G 1,5	10,0	PROTECTED PLUG, straight	432,0	16
84653	H07RN-F 3 G 1,5	3,0	PROTECTED PLUG, angled	129,6	16
84654	H07RN-F 3 G 1,5	5,0	PROTECTED PLUG, angled	216,0	16
84655	H07RN-F 3 G 1,5	10,0	PROTECTED PLUG, angled	432,0	16

Dimensions and specifications may be changed without prior notice.

# YELLOWFLEX - connecting cable meter marking



## Technical data

- Rubber sheathed cable adapted to DIN VDE 0285-525-2-21 / DIN EN 50525-2-21
- **Temperature range** flexing -25°C to +60°C fixed installation -30°C to +60°C
- Permissible **operating temperature** at conductor +60°C
- **Nominal voltage**  $U_0/U$  450/750 V with protected fixed installation  $U_0/U$  600/1000 V
- Highest permissible **operating voltage** in three-phase and one-phase a.c. systems  $U_0/U$  476/825 V in direct current system  $U_0/U$  619/1238 V
- **Test voltage** 2500 V
- **Minimum bending radius** for fixed installation 4x cable Ø for guiding over roller 7,5x cable Ø during winding on drums 5x cable Ø
- **Assembly**
  - End 1: Plug
  - End 2: 30 mm stripped with wire end ferrule

## Cable structure

- Bare copper-conductor, to DIN VDE 0295 cl.5, fine-wire, BS 6360 cl.5, IEC 60228 cl.5
- Core insulation of rubber, EI4 to DIN VDE 0207-363-1 / DIN EN 50363-1
- Core identification to DIN VDE 0293-308
  - up to 5 cores coloured
  - from 6 cores, black with continuous white numbering
- GN-YE conductor, 3 cores and above
- Cores stranded in layers with optimal lay-length
- Outer sheath of special EM2 to DIN VDE 0207-363-2-1/DIN EN 50363-2-1
- Sheath colour yellow (RAL 1021)
- with meter marking

## Properties

- Increased stability
- Tear-resistant

### Resistant to

- Atmospheric influences

### Largely resistant to

- Oils and fats

### Tests

#### • Behaviour in fire

- to DIN VDE 0482-332-1-2
- DIN EN 60332-2-1, IEC 60332-1 (equivalent DIN VDE 0472 part 804 test method B)

## Note

- G = with green-yellow conductor
- x = without green-yellow conductor.
- individual marking

## Application

These robust rubber sheathed cables can be used where high demands are placed flexibility and mechanical stress. For application in dry, moist and wet rooms and in open air, in steel works and rolling mills in heating and air-conditioning systems, in the bottling industry, in machinery and plant construction, in the chemical industry as well as for the professional and the hobby enthusiast. The choice of yellow as the sheath colour ensures additional safety. Can be used in potentially explosive areas acc. to DIN VDE 0165.

CE= The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

Part no. orange	Cable type / cross-sec. mm <sup>2</sup>	Length m	Plug type	Cop. weight kg / 1000 pcs.	AWG-No.
650950	YELLOWFLEX 2 x 1,0	2,0	Central contour connector	38,0	17
650951	YELLOWFLEX 2 x 1,0	3,0	Central contour connector	57,0	17
650952	YELLOWFLEX 2 x 1,0	5,0	Central contour connector	95,0	17
650953	YELLOWFLEX 2 x 1,0	10,0	Central contour connector	190,0	17
650958	YELLOWFLEX 2 x 1,5	2,0	Central contour connector	58,0	16
650959	YELLOWFLEX 2 x 1,5	3,0	Central contour connector	87,0	16
650960	YELLOWFLEX 2 x 1,5	5,0	Central contour connector	145,0	16
650961	YELLOWFLEX 2 x 1,5	10,0	Central contour connector	290,0	16
650954	YELLOWFLEX 3 G 1,0	2,0	PROTECTED PLUG, straight	58,0	17
650955	YELLOWFLEX 3 G 1,0	3,0	PROTECTED PLUG, straight	87,0	17
650956	YELLOWFLEX 3 G 1,0	5,0	PROTECTED PLUG, straight	145,0	17
650957	YELLOWFLEX 3 G 1,0	10,0	PROTECTED PLUG, straight	290,0	17
650962	YELLOWFLEX 3 G 1,5	2,0	PROTECTED PLUG, straight	86,0	16
650963	YELLOWFLEX 3 G 1,5	3,0	PROTECTED PLUG, straight	129,0	16
650964	YELLOWFLEX 3 G 1,5	5,0	PROTECTED PLUG, straight	215,0	16
650965	YELLOWFLEX 3 G 1,5	10,0	PROTECTED PLUG, straight	430,0	16

Dimensions and specifications may be changed without prior notice.

# PUR connecting cables, orange



## Technical data

- **Temperature range**  
-40°C to +80°C
- **Nominal voltage**  
H05BQ-F: U<sub>0</sub>/U 300/500 V  
H07BQ-F: U<sub>0</sub>/U 450/750 V
- **Test voltage**  
H05BQ-F: 2000 V  
H07BQ-F: 2500 V
- **Assembly**
  - End 1: Plug
  - End 2: 30 mm stripped with wire end ferrule

## Cable structure

- Bare copper-conductor, to DIN VDE 0295 cl.5, fine-wire, BS 6360 cl.5, IEC 60228 cl.5
- Core insulation of rubber
- Core identification to DIN VDE 0293-308
- Cores stranded in layers
- GN-YE conductor, 3 cores and above
- Outer sheath of PUR
- Sheath colour orange

## Note

- G = with green-yellow conductor  
x = without green-yellow conductor
- AWG sizes are approximate equivalent values. The actual cross-section is in mm<sup>2</sup>.

## Application

These cables can be used for medium mechanical loads in dry, damp or wet environments, e. g. for connecting agricultural and commercial equipment and heaters provided there is no danger of contact with the hot parts or by radiation of heat. These robust and flexible cables are used for electrical tools such as drills and hand-held circular saws, as well as for portable motors and machinery in agriculture, at building sites, docks and refrigeration plants.

CE= The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

Part no. orange	Cable type / cross-sec. mm <sup>2</sup>	Length m	Plug type	Cop. weight kg / 1000 pcs.	AWG-No.
84656	H05BQ-F 2 x 0,75	2,0	Central contour connector	28,8	18
87802	H05BQ-F 2 x 0,75	3,0	Central contour connector	43,2	18
84657	H05BQ-F 2 x 0,75	5,0	Central contour connector	72,0	18
84658	H05BQ-F 2 x 0,75	10,0	Central contour connector	144,0	18
84663	H05BQ-F 2 x 1,0	2,0	Central contour connector	38,4	17
84664	H05BQ-F 2 x 1,0	3,0	Central contour connector	57,6	17
84665	H05BQ-F 2 x 1,0	5,0	Central contour connector	96,0	17
84666	H05BQ-F 2 x 1,0	10,0	Central contour connector	192,0	17
84669	H07BQ-F 2 x 1,5	2,0	Central contour connector	58,0	16
84670	H07BQ-F 2 x 1,5	3,0	Central contour connector	87,0	16
86989	H07BQ-F 2 x 1,5	5,0	Central contour connector	145,0	16
84671	H07BQ-F 2 x 1,5	10,0	Central contour connector	290,0	16
84659	H05BQ-F 3 G 0,75	2,0	PROTECTED PLUG, straight	43,2	18
84660	H05BQ-F 3 G 0,75	3,0	PROTECTED PLUG, straight	64,8	18
84661	H05BQ-F 3 G 0,75	5,0	PROTECTED PLUG, straight	108,0	18
84662	H05BQ-F 3 G 0,75	10,0	PROTECTED PLUG, straight	216,0	18
84667	H05BQ-F 3 G 1,0	2,0	PROTECTED PLUG, straight	58,0	17
86775	H05BQ-F 3 G 1,0	3,0	PROTECTED PLUG, straight	87,0	17
86774	H05BQ-F 3 G 1,0	5,0	PROTECTED PLUG, straight	145,0	17
84668	H05BQ-F 3 G 1,0	10,0	PROTECTED PLUG, straight	290,0	17
84672	H07BQ-F 3 G 1,5	2,0	PROTECTED PLUG, straight	86,0	16
86782	H07BQ-F 3 G 1,5	3,0	PROTECTED PLUG, straight	129,0	16
87548	H07BQ-F 3 G 1,5	5,0	PROTECTED PLUG, straight	215,0	16
84673	H07BQ-F 3 G 1,5	10,0	PROTECTED PLUG, straight	430,0	16

Dimensions and specifications may be changed without prior notice.



# Extensions / Supply cables

CEE-Extensions / Cold equipment /

## PVC-Extensions



### CEE-Extensions

Part no.	Cable type / cross-sec. mm <sup>2</sup>	Length m	Cable colour	Plug 1	Plug 2	AWG-No.
84688	H07RN-F 5 G 1,5	5,0	black	CEE connector 16A	CEE coupling 16A	16
84689	H07RN-F 5 G 1,5	10,0	black	CEE connector 16A	CEE coupling 16A	16
87164	H07RN-F 5 G 1,5	25,0	black	CEE connector 16A	CEE coupling 16A	16
84690	H07RN-F 5 G 2,5	5,0	black	CEE connector 32A	CEE coupling 32A	14
84691	H07RN-F 5 G 2,5	10,0	black	CEE connector 32A	CEE coupling 32A	14
87416	H07RN-F 5 G 2,5	25,0	black	CEE connector 32A	CEE coupling 32A	14

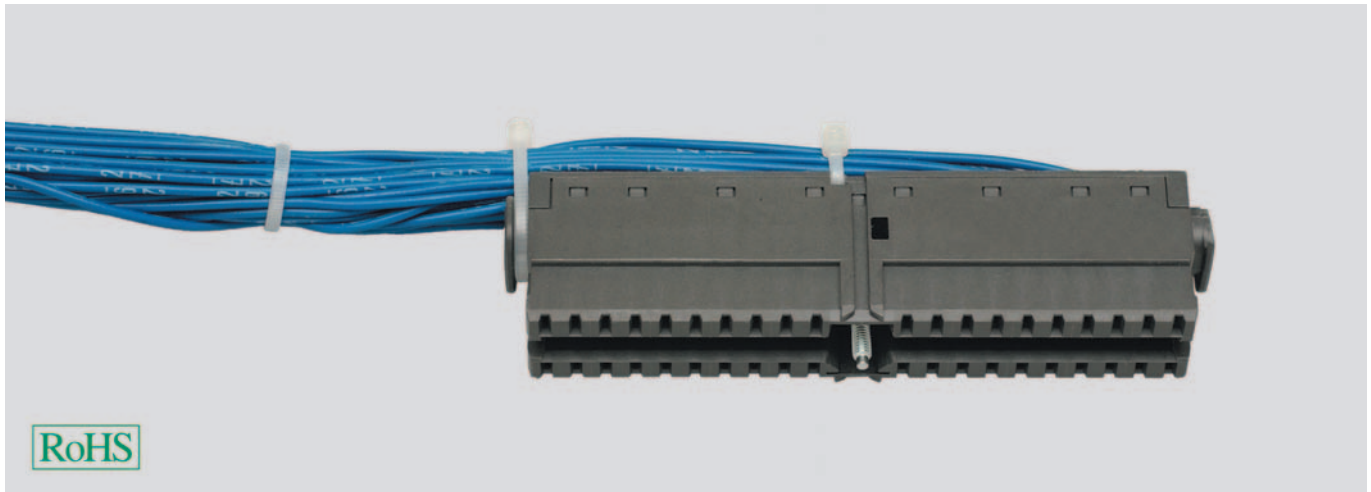


Part no.	Cable type / cross-sec. mm <sup>2</sup>	Length m	Cable colour	Plug 1	Plug 2	AWG-No.
87476	H05VV-F 3 G 0,75	2,0	black	PROTECTED PLUG, angled	Cold device socket	19
86762	H05VV-F 3 G 0,75	2,0	grey	PROTECTED PLUG, angled	Cold device socket	19
84674	H05VV-F 3 G 0,75	3,0	black	PROTECTED PLUG, angled	Cold device socket	19
87845	H05VV-F 3 G 0,75	3,0	grey	PROTECTED PLUG, angled	Cold device socket	19
84675	H05VV-F 3 G 1,0	2,0	grey	PROTECTED PLUG, angled	Cold device socket	17
87196	H05VV-F 3 G 1,0	2,0	black	PROTECTED PLUG, angled	Cold device socket	17
84676	H05VV-F 3 G 1,0	3,0	grey	PROTECTED PLUG, angled	Cold device socket	17
87549	H05VV-F 3 G 1,0	3,0	black	PROTECTED PLUG, angled	Cold device socket	17

Part no.	Cable type / cross-sec. mm <sup>2</sup>	Length m	Cable colour	Plug 1	Plug 2	AWG-No.
87445	H05VV-F 3 G 1,5	2,0	white	PROTECTED PLUG, straight	PROTECTED PLUG coupling	16
87919	H05VV-F 3 G 1,5	3,0	white	PROTECTED PLUG, straight	PROTECTED PLUG coupling	16
84178	H05VV-F 3 G 1,5	5,0	white	PROTECTED PLUG, straight	PROTECTED PLUG coupling	16

Dimensions and specifications may be changed without prior notice.

# Front connecting cables for Simatic® S7



## Cable structure

- Cable cores 0,75 mm<sup>2</sup> in dark blue (RAL 5010)
- Printed characters in white
- Numbers acc. to allocation in the plug
- Original front connector can be completely allocated
- Cores cut flush
- Customised pre-assembly possible

## Properties

### Advantages

- Tremendous time savings
- Quick wiring
- Considerably easier troubleshooting
- Customised pre-assembled cable

### Note

- Other lengths, dimensions, colours and specials conditions possible on request

## Application

These pre-assembled cables with pre-wired front connectors are highly suitable for Simatic® S7 programmable logic controllers (PLC).

As opposed to past days when you had to cut to length, strip, crimp, screw in and mark, pre-wired front connectors offer the customer a host of advantages for the Simatic® S7 system.

Part no.	Connection type	Length m	Cop. weight kg / 1000 pcs.	AWG-No.
<b>Front connector, 20-pole</b>				
650091	Screw fitting version	2,0	324,0	19
650200	Screw fitting version	3,0	468,0	19
650201	Screw fitting version	5,0	756,0	19
84867	Spring version	2,0	324,0	19
84868	Spring version	3,0	468,0	19
84869	Spring version	5,0	756,0	19
650202	Crimp version	2,0	324,0	19
650203	Crimp version	3,0	468,0	19
650088	Crimp version	5,0	756,0	19
<b>Front connector, 40-pole</b>				
650092	Screw fitting version	2,0	648,0	19
650204	Screw fitting version	3,0	936,0	19
650205	Screw fitting version	5,0	1512,0	19
84870	Spring version	2,0	648,0	19
84871	Spring version	3,0	936,0	19
84872	Spring version	5,0	1512,0	19
650206	Crimp version	2,0	648,0	19
650207	Crimp version	3,0	936,0	19
650086	Crimp version	5,0	1512,0	18
<b>Front connector, 48-pole</b>				
650208	Screw fitting version	2,0	746,0	19
650209	Screw fitting version	3,0	1077,0	19
650210	Screw fitting version	5,0	1739,0	19
650211	Spring version	2,0	746,0	19
650212	Spring version	3,0	1077,0	19
650213	Spring version	5,0	1739,0	19
84873	Crimp version	2,0	746,0	19
84874	Crimp version	3,0	1077,0	19
84875	Crimp version	5,0	1739,0	19

Dimensions and specifications may be changed without prior notice.

PUR electronic spiral cables screened

PUR spiral cables

# **PVC spiral cables**

PUR electronic spiral cables unscreened

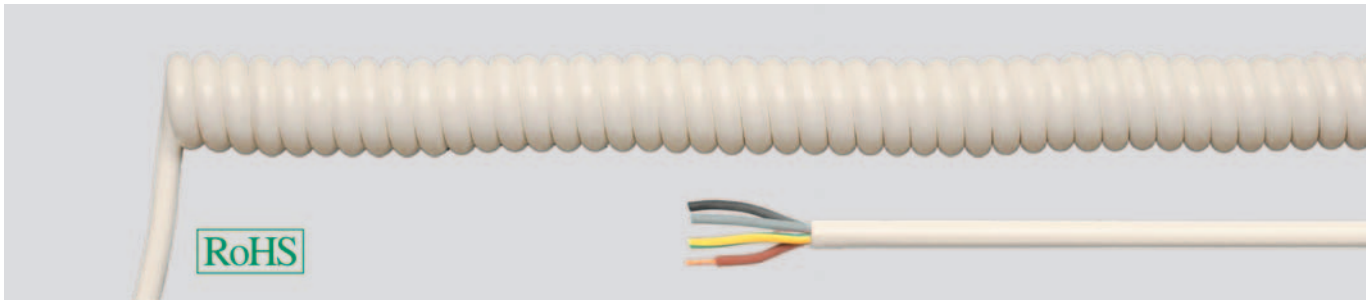
**PUR spiral cables orange**



## ■ SPIRAL CABLES

<b>Designation</b>	<b>Page</b>
PVC spiral cable	<b>908</b>
PUR spiral cable, black	<b>909</b>
PUR spiral cable, orange	<b>911</b>
PUR electronics spiral cable, unscreened	<b>913</b>
PUR electronics spiral cable, screened	<b>915</b>

# PVC spiral cables



## Technical data

- **Temperature range**  
flexing -5°C to +70°C
- **Nominal voltage**  
H03VV-F: U<sub>0</sub>/U 300/300 V  
H05VV-F: U<sub>0</sub>/U 300/500 V
- **Test voltage** 2000 V
- **Expansion ratio** 1:3
- **straight ends**  
in each case 200 mm

## Application

- Lighting industry
- Data installations
- Shops
- Telecommunication

## Cable structure

- Bare copper-conductor, to  
DIN VDE 0295 cl.5, fine-wire,  
BS 6360 cl.5, IEC 60228 cl.5
- Core insulation of PVC
- Core identification to DIN VDE 0293-308
- GN-YE conductor, 3 cores and above
- Cores stranded in layers
- Outer sheath of PVC
- Sheath colour see table below

## Note

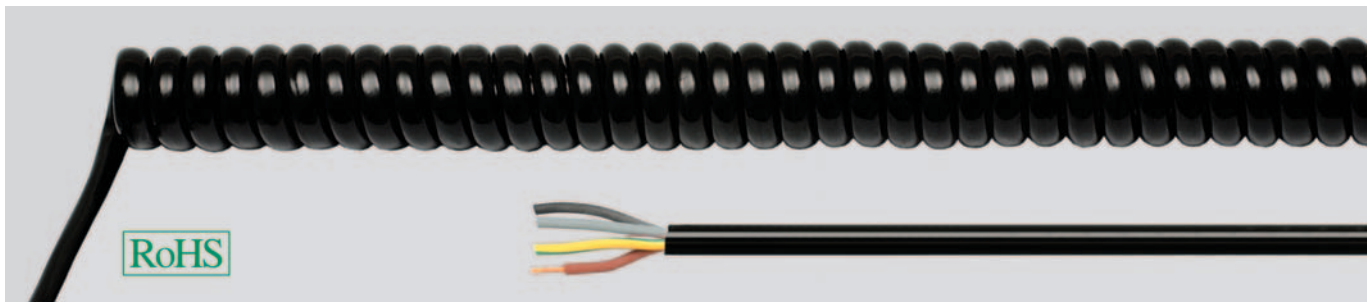
- On request closed spiral lengths up to max. 5000 mm possible.
- As well in axial construction
- AWG sizes are approximate equivalent values. The actual cross-section is in mm<sup>2</sup>.

Part no. black	white	Cross-section mm <sup>2</sup>	Spiral length unexpanded (WL in mm)	Cable Ø approx. mm	Spiral- outer Ø approx. mm	Cop. weight kg / 1000 pcs.	AWG-No.
84500	84700	2 x 0,75	200	6,2	21,4	34,6	18
84502	84702	2 x 0,75	400	6,2	21,4	63,4	18
84504	84704	2 x 0,75	600	6,2	21,4	92,2	18
84506	84706	2 x 0,75	800	6,2	21,4	121,0	18
84508	84708	2 x 0,75	1000	6,2	21,4	149,8	18
84509	84709	2 x 0,75	1200	6,2	21,4	178,6	18
84510	84710	2 x 0,75	1400	6,2	21,4	207,4	18
84517	84717	3 G 0,75	200	6,6	22,2	51,9	18
84519	84719	3 G 0,75	400	6,6	22,2	95,1	18
84521	84721	3 G 0,75	600	6,6	22,2	138,3	18
84523	84723	3 G 0,75	800	6,6	22,2	181,5	18
84525	84725	3 G 0,75	1000	6,6	22,2	224,7	18
84526	84726	3 G 0,75	1200	6,6	22,2	267,8	18
84527	84727	3 G 0,75	1400	6,6	22,2	311,1	18
84534	84734	2 x 1,0	200	6,6	22,2	43,2	17
84536	84736	2 x 1,0	400	6,6	22,2	65,3	17
84538	84738	2 x 1,0	600	6,6	22,2	122,8	17
84540	84740	2 x 1,0	800	6,6	22,2	161,3	17
84542	84742	2 x 1,0	1000	6,6	22,2	199,7	17
84543	84743	2 x 1,0	1200	6,6	22,2	238,1	17
84544	84744	2 x 1,0	1400	6,6	22,2	276,5	17
84585	84785	2 x 1,5	200	7,7	26,4	69,6	16
84587	84787	2 x 1,5	400	7,7	26,4	127,0	16
84589	84789	2 x 1,5	600	7,7	26,4	185,6	16
84591	84791	2 x 1,5	800	7,7	26,4	243,6	16
84593	84793	2 x 1,5	1000	7,7	26,4	301,6	16
84594	84794	2 x 1,5	1200	7,7	26,4	359,6	16
84595	84795	2 x 1,5	1400	7,7	26,4	417,6	16
84602	84802	3 G 1,5	200	8,5	29,0	103,2	16
84604	84804	3 G 1,5	400	8,5	29,0	189,2	16
84606	84806	3 G 1,5	600	8,5	29,0	275,2	16
84608	84808	3 G 1,5	800	8,5	29,0	361,2	16
84610	84810	3 G 1,5	1000	8,5	29,0	447,2	16
84611	84811	3 G 1,5	1200	8,5	29,0	533,2	16
84612	84812	3 G 1,5	1400	8,5	29,0	619,2	16

Dimensions and specifications may be changed without prior notice.



# PUR spiral cables black



## Technical data

- **Temperature range**  
-25°C to +70°C
- **Nominal voltage**  
H05BQ-F: U<sub>0</sub>/U 300/500 V  
H07BQ-F: U<sub>0</sub>/U 450/750 V
- **Test voltage**  
H05BQ-F: 2000 V  
H07BQ-F: 2500 V
- **Expansion ratio** 1:4
- **straight ends**  
in each case 200 mm

## Application

- Machine Construction
- Electrical Tools
- Building Industry
- Handling Equipment
- Entertainment Equipment
- Medical devices
- Measurement instruments
- Rolling doors

## Cable structure

- Bare copper-conductor, to DIN VDE 0295 cl.5, fine-wire, BS 6360 cl.5, IEC 60228 cl.5
- Core insulation of rubber
- Core identification to DIN VDE 0293-308
- GN-YE conductor, 3 cores and above
- Outer sheath of PUR
- Sheath colour black

## Note

- On request closed spiral lengths up to max. 5000 mm possible.
- As well in axial construction
- AWG sizes are approximate equivalent values. The actual cross-section is in mm<sup>2</sup>.

Part no. black	Cross-section mm <sup>2</sup>	Spiral length unexpanded (WL in mm)	Cable Ø approx. mm	Spiral- outer Ø approx. mm	Cop. weight kg / 1000 pcs.	AWG-No.
86303	2 x 0,75	500	6,5	23,0	77,8	18
86306	2 x 0,75	1000	6,5	23,0	149,8	18
86308	2 x 0,75	1400	6,5	23,0	207,4	18
86311	2 x 0,75	2000	6,5	23,0	293,8	18
86315	2 x 0,75	3000	6,5	23,0	437,8	18
86319	3 G 0,75	500	7,1	25,2	116,7	18
86322	3 G 0,75	1000	7,1	25,2	224,7	18
86324	3 G 0,75	1400	7,1	25,2	311,1	18
86327	3 G 0,75	2000	7,1	25,2	440,6	18
86331	3 G 0,75	3000	7,1	25,2	656,6	18
86335	4 G 0,75	500	7,9	28,8	156,6	18
86338	4 G 0,75	1000	7,9	28,8	301,6	18
86340	4 G 0,75	1400	7,9	28,8	417,6	18
86343	4 G 0,75	2000	7,9	28,8	591,6	18
86347	4 G 0,75	3000	7,9	28,8	881,6	18
86351	5 G 0,75	500	8,6	31,2	194,4	18
86354	5 G 0,75	1000	8,6	31,2	374,4	18
86356	5 G 0,75	1400	8,6	31,2	518,4	18
86359	5 G 0,75	2000	8,6	31,2	734,4	18
86363	5 G 0,75	3000	8,6	31,2	1094,4	18
86367	2 x 1,0	500	6,8	24,6	103,7	17
86370	2 x 1,0	1000	6,8	24,6	199,7	17
86372	2 x 1,0	1400	6,8	24,6	276,5	17
86375	2 x 1,0	2000	6,8	24,6	391,7	17
86379	2 x 1,0	3000	6,8	24,6	583,7	17
84903	3 G 1,0	500	7,2	26,4	156,6	17
84906	3 G 1,0	1000	7,2	26,4	301,6	17
84908	3 G 1,0	1400	7,2	26,4	417,6	17
84911	3 G 1,0	2000	7,2	26,4	591,6	17
84915	3 G 1,0	3000	7,2	26,4	881,6	17
86383	4 G 1,0	500	7,8	28,6	207,4	17
86386	4 G 1,0	1000	7,8	28,6	399,4	17
86388	4 G 1,0	1400	7,8	28,6	553,0	17
86391	4 G 1,0	2000	7,8	28,6	783,4	17
86395	4 G 1,0	3000	7,8	28,6	1167,4	17
86399	5 G 1,0	500	9,0	32,0	259,2	17
86402	5 G 1,0	1000	9,0	32,0	499,2	17
86404	5 G 1,0	1400	9,0	32,0	691,2	17
86407	5 G 1,0	2000	9,0	32,0	979,2	17
86411	5 G 1,0	3000	9,0	32,0	1459,2	17

Continuation ▶

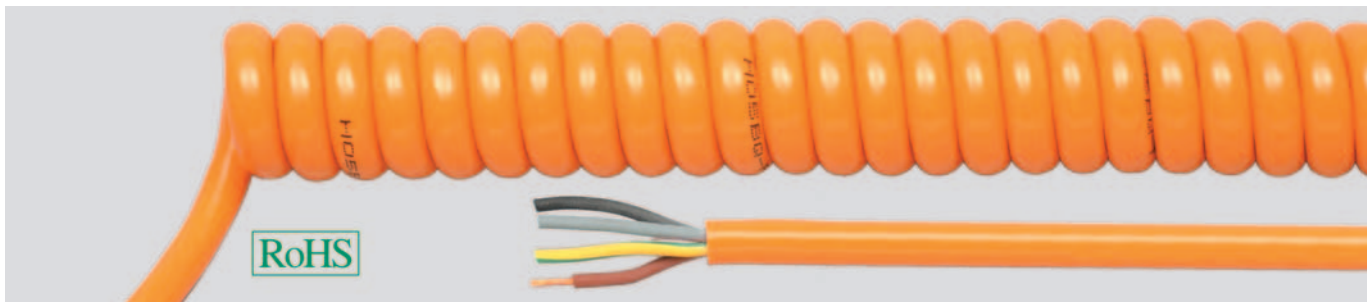
V

# PUR spiral cables black

Part no. black	Cross-section mm <sup>2</sup>	Spiral length unexpanded (WL in mm)	Cable Ø approx. mm	Spiral- outer Ø approx. mm	Cop. weight kg / 1000 pcs.	AWG-No.
86415	7 G 1,0	500	11,1	39,0	361,8	17
86418	7 G 1,0	1000	11,1	39,0	696,8	17
86420	7 G 1,0	1400	11,1	39,0	964,8	17
86423	7 G 1,0	2000	11,1	39,0	1366,8	17
86427	7 G 1,0	3000	11,1	39,0	2036,8	17
86463	2 x 1,5	500	8,5	30,0	156,6	16
86466	2 x 1,5	1000	8,5	30,0	301,6	16
86468	2 x 1,5	1400	8,5	30,0	417,6	16
86471	2 x 1,5	2000	8,5	30,0	591,6	16
86475	2 x 1,5	3000	8,5	30,0	881,6	16
84919	3 G 1,5	500	8,9	32,8	232,2	16
84922	3 G 1,5	1000	8,9	32,8	447,2	16
84924	3 G 1,5	1400	8,9	32,8	619,2	16
84927	3 G 1,5	2000	8,9	32,8	877,2	16
84931	3 G 1,5	3000	8,9	32,8	1307,2	16
84951	5 G 1,5	500	10,9	38,8	388,8	16
84954	5 G 1,5	1000	10,9	38,8	748,8	16
84956	5 G 1,5	1400	10,9	38,8	1036,8	16
84959	5 G 1,5	2000	10,9	38,8	1468,8	16
84963	5 G 1,5	3000	10,9	38,8	2188,8	16
84967	7 G 1,5	500	12,2	46,4	545,4	16
84970	7 G 1,5	1000	12,2	46,4	1050,4	16
84972	7 G 1,5	1400	12,2	46,4	1454,1	16
84975	7 G 1,5	2000	12,2	46,4	2060,4	16
84979	7 G 1,5	3000	12,2	46,4	3070,4	16
86479	3 G 2,5	500	10,6	38,2	388,8	14
86482	3 G 2,5	1000	10,6	38,2	748,8	14
86484	3 G 2,5	1400	10,6	38,2	1036,8	14
86487	3 G 2,5	2000	10,6	38,2	1468,8	14
86491	3 G 2,5	3000	10,6	38,2	2188,8	14

Dimensions and specifications may be changed without prior notice.

# PUR spiral cables orange



## Technical data

- **Temperature range**  
-25°C to +70°C
- **Nominal voltage**  
H05BQ-F: 300/500 V  
H07BQ-F: 450/750 V
- **Test voltage**  
2000/2500 V
- **Expansion ratio** 1:4
- **straight ends**  
in each case 200 mm

## Application

- Machine Construction
- Electrical Tools
- Building Industry
- Handling Equipment
- Entertainment Equipment
- Medical devices
- Measurement instruments
- Rolling doors

## Cable structure

- Bare copper-conductor, to DIN VDE 0295 cl.5, fine-wire, BS 6360 cl.5, IEC 60228 cl.5
- Core insulation of rubber
- Core identification to DIN VDE 0293-308
- GN-YE conductor, 3 cores and above
- Outer sheath of PUR
- Sheath colour orange

## Note

- On request closed spiral lengths up to max. 5000 mm possible.
- As well in axial construction
- AWG sizes are approximate equivalent values. The actual cross-section is in mm<sup>2</sup>.

Part no. orange	Cross-section mm <sup>2</sup>	Spiral length unexpanded (WL in mm)	Cable Ø approx. mm	Spiral- outer Ø approx. mm	Cop. weight kg / 1000 pcs.	AWG-No.
85221	2 x 0,75	300	6,5	23,0	59,0	18
85223	2 x 0,75	500	6,5	23,0	77,8	18
85226	2 x 0,75	1000	6,5	23,0	149,8	18
85229	2 x 0,75	1500	6,5	23,0	221,8	18
85236	2 x 0,75	3000	6,5	23,0	437,8	18
85238	3 G 0,75	300	7,1	25,2	73,5	18
85240	3 G 0,75	500	7,1	25,2	116,7	18
85243	3 G 0,75	1000	7,1	25,2	224,7	18
85246	3 G 0,75	1500	7,1	25,2	332,6	18
85253	3 G 0,75	3000	7,1	25,2	656,6	18
85255	4 G 0,75	300	7,9	28,8	98,6	18
85257	4 G 0,75	500	7,9	28,8	156,6	18
85260	4 G 0,75	1000	7,9	28,8	301,6	18
85263	4 G 0,75	1500	7,9	28,8	446,6	18
85270	4 G 0,75	3000	7,9	28,8	881,6	18
85272	5 G 0,75	300	8,6	31,2	122,4	18
85274	5 G 0,75	500	8,6	31,2	194,4	18
85277	5 G 0,75	1000	8,6	31,2	374,4	18
85280	5 G 0,75	1500	8,6	31,2	554,4	18
85287	5 G 0,75	3000	8,6	31,2	1094,4	18
85289	2 x 1,0	300	6,8	24,6	65,3	17
85291	2 x 1,0	500	6,8	24,6	103,7	17
85294	2 x 1,0	1000	6,8	24,6	199,7	17
85297	2 x 1,0	1500	6,8	24,6	295,7	17
85304	2 x 1,0	3000	6,8	24,6	583,7	17
85306	3 G 1,0	300	7,2	26,4	98,6	17
85308	3 G 1,0	500	7,2	26,4	156,6	17
85311	3 G 1,0	1000	7,2	26,4	301,6	17
85314	3 G 1,0	1500	7,2	26,4	446,6	17
85321	3 G 1,0	3000	7,2	26,4	881,6	17
85323	4 G 1,0	300	7,8	28,6	130,6	17
85325	4 G 1,0	500	7,8	28,6	207,4	17
85328	4 G 1,0	1000	7,8	28,6	399,4	17
85331	4 G 1,0	1500	7,8	28,6	591,4	17
85338	4 G 1,0	3000	7,8	28,6	1167,4	17
85340	5 G 1,0	300	9,0	32,0	163,2	17
85342	5 G 1,0	500	9,0	32,0	259,2	17
85345	5 G 1,0	1000	9,0	32,0	499,2	17
85348	5 G 1,0	1500	9,0	32,0	739,2	17
85355	5 G 1,0	3000	9,0	32,0	1459,2	17

Continuation ▶

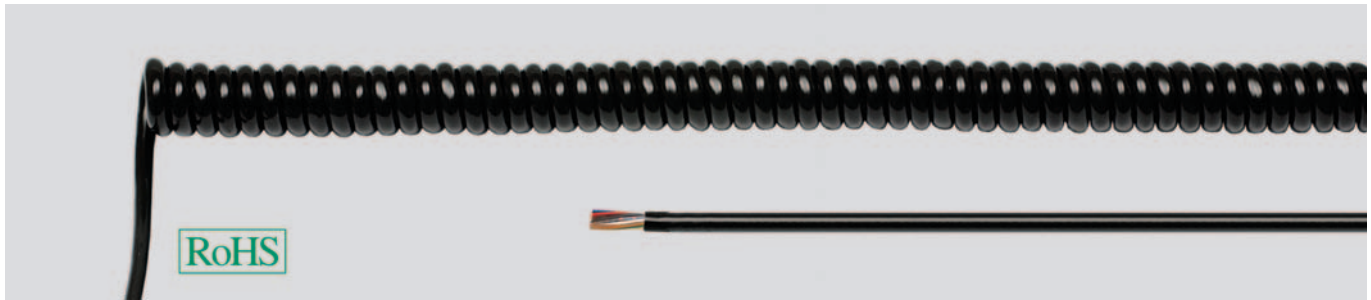
V

# PUR spiral cables orange

Part no. orange	Cross-section mm <sup>2</sup>	Spiral length unexpanded (WL in mm)	Cable Ø approx. mm	Spiral- outer Ø approx. mm	Cop. weight kg / 1000 pcs.	AWG-No.
85357	2 x 1,5	300	8,5	30,0	98,6	16
85359	2 x 1,5	500	8,5	30,0	156,6	16
85362	2 x 1,5	1000	8,5	30,0	301,6	16
85365	2 x 1,5	1500	8,5	30,0	446,6	16
85372	2 x 1,5	3000	8,5	30,0	881,6	16
85374	3 G 1,5	300	8,9	32,8	146,2	16
85376	3 G 1,5	500	8,9	32,8	232,2	16
85379	3 G 1,5	1000	8,9	32,8	447,2	16
85382	3 G 1,5	1500	8,9	32,8	662,2	16
85389	3 G 1,5	3000	8,9	32,8	1307,2	16
85408	5 G 1,5	300	10,9	38,8	244,8	16
85410	5 G 1,5	500	10,9	38,8	388,8	16
85413	5 G 1,5	1000	10,9	38,8	748,8	16
85416	5 G 1,5	1500	10,9	38,8	1108,8	16
85423	5 G 1,5	3000	10,9	38,8	2188,8	16
85425	7 G 1,5	300	12,6	46,4	343,4	16
85427	7 G 1,5	500	12,6	46,4	545,4	16
85430	7 G 1,5	1000	12,6	46,4	1050,4	16
85433	7 G 1,5	1500	12,6	46,4	1555,4	16
85440	7 G 1,5	3000	12,6	46,4	3070,4	16
85442	12 G 1,5	300	16,6	65,2	588,2	16
85444	12 G 1,5	500	16,6	65,2	934,2	16
85447	12 G 1,5	1000	16,6	65,2	1799,2	16
85450	12 G 1,5	1500	16,6	65,2	2664,2	16
85457	12 G 1,5	3000	16,6	65,2	5259,2	16
85459	3 G 2,5	300	10,6	38,2	244,8	14
85461	3 G 2,5	500	10,6	38,2	388,8	14
85464	3 G 2,5	1000	10,6	38,2	748,8	14
85467	3 G 2,5	1500	10,6	38,2	1108,8	14
85474	3 G 2,5	3000	10,6	38,2	2188,8	14
85493	5 G 2,5	300	13,2	48,4	408,0	14
85495	5 G 2,5	500	13,2	48,4	648,0	14
85498	5 G 2,5	1000	13,2	48,4	1248,0	14
85501	5 G 2,5	1500	13,2	48,4	1848,0	14
85508	5 G 2,5	3000	13,2	48,4	3648,0	14

Dimensions and specifications may be changed without prior notice.

# PUR electronic spiral cables unscreened



## Technical data

- **Temperature range**  
-25°C to +70°C
- **Nominal voltage**  
up to 0,14 mm<sup>2</sup> 300 V  
from 0,25 mm<sup>2</sup> 500 V
- **Test voltage**  
1000 V
- **Expansion ratio** 1:4
- **straight ends**  
in each case 200 mm

## Application

- Handling Equipment
- Entertainment Equipment
- Medical devices
- Measurement instruments
- Rolling doors
- In all fields in which  
low-current cables are used

## Cable structure

- Bare copper-conductor, to  
DIN VDE 0295 cl.6, extra fine-wire,  
BS 6360 cl.6, IEC 60228 cl.6
- Core insulation of TPE-E
- Core identification to DIN 47100
- Cores stranded in layers
- Outer sheath of PUR
- Colour black

## Note

- On request closed spiral lengths up to max.  
5000 mm possible.
- As well in axial construction
- AWG sizes are approximate equivalent  
values. The actual cross-section is in mm<sup>2</sup>.

Part no. black	Cross-section mm <sup>2</sup>	Spiral length unexpanded (WL in mm)	Cable Ø approx. mm	Spiral- outer Ø approx. mm	Cop. weight kg / 1000 pcs.	AWG-No.
85550	2 x 0,14	300	3,5	13,0	9,2	26
85551	2 x 0,14	400	3,5	13,0	11,9	26
85552	2 x 0,14	500	3,5	13,0	15,6	26
85555	2 x 0,14	1000	3,5	13,0	28,1	26
85566	4 x 0,14	300	4,0	14,0	18,4	26
85567	4 x 0,14	400	4,0	14,0	23,8	26
85568	4 x 0,14	500	4,0	14,0	29,2	26
85571	4 x 0,14	1000	4,0	14,0	56,2	26
85574	5 x 0,14	300	4,4	15,8	22,8	26
85575	5 x 0,14	400	4,4	15,8	29,5	26
85576	5 x 0,14	500	4,4	15,8	36,2	26
85579	5 x 0,14	1000	4,4	15,8	69,7	26
85582	6 x 0,14	300	4,9	17,8	27,5	26
85583	6 x 0,14	400	4,9	17,8	36,7	26
85584	6 x 0,14	500	4,9	17,8	43,8	26
85587	6 x 0,14	1000	4,9	17,8	84,2	26
85590	7 x 0,14	300	5,2	18,4	32,0	26
85591	7 x 0,14	400	5,2	18,4	42,4	26
85592	7 x 0,14	500	5,2	18,4	50,8	26
85595	7 x 0,14	1000	5,2	18,4	97,8	26
85598	8 x 0,14	300	5,4	19,8	36,7	26
85599	8 x 0,14	400	5,4	19,8	47,5	26
85600	8 x 0,14	500	5,4	19,8	58,3	26
85603	8 x 0,14	1000	5,4	19,8	112,3	26
85638	2 x 0,25	300	3,9	13,8	16,3	24
85639	2 x 0,25	400	3,9	13,8	21,1	24
85640	2 x 0,25	500	3,9	13,8	25,9	24
85643	2 x 0,25	1000	3,9	13,8	49,9	24
85654	4 x 0,25	300	4,6	17,2	36,7	24
85655	4 x 0,25	400	4,6	17,2	42,2	24
85656	4 x 0,25	500	4,6	17,2	51,8	24
85659	4 x 0,25	1000	4,6	17,2	99,8	24
85662	5 x 0,25	300	5,4	19,8	40,8	24
85663	5 x 0,25	400	5,4	19,8	52,8	24
85664	5 x 0,25	500	5,4	19,8	64,8	24
85667	5 x 0,25	1000	5,4	19,8	124,8	24
85670	6 x 0,25	300	5,5	20,0	48,9	24
85671	6 x 0,25	400	5,5	20,0	63,4	24
85672	6 x 0,25	500	5,5	20,0	77,8	24
85675	6 x 0,25	1000	5,5	20,0	149,8	24

Continuation ▶

V

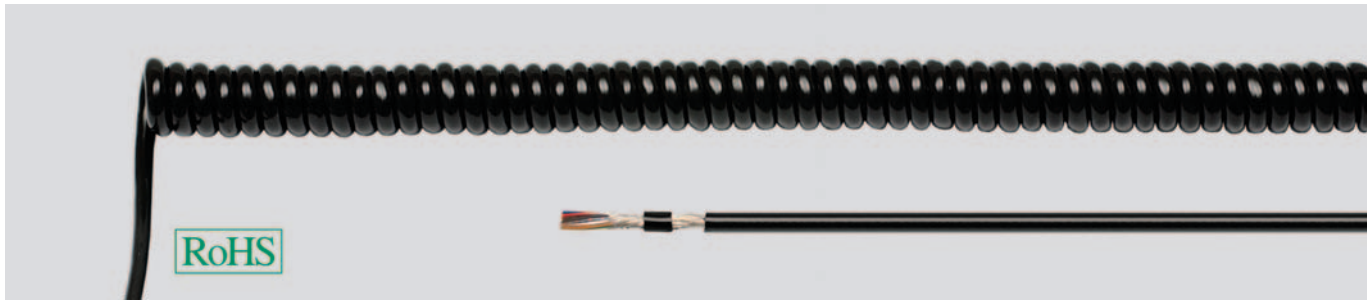


# PUR electronic spiral cables unscreened

Part no. black	Cross-section mm <sup>2</sup>	Spiral length unexpanded (WL in mm)	Cable Ø approx. mm	Spiral- outer Ø approx. mm	Cop. weight kg / 1000 pcs.	AWG-No.
85686	8 x 0,25	300	6,4	23,8	65,3	24
85687	8 x 0,25	400	6,4	23,8	84,5	24
85688	8 x 0,25	500	6,4	23,8	103,7	24
85691	8 x 0,25	1000	6,4	23,8	199,7	24
85702	12 x 0,25	300	6,9	24,8	97,9	24
85703	12 x 0,25	400	6,9	24,8	126,7	24
85704	12 x 0,25	500	6,9	24,8	155,5	24
85707	12 x 0,25	1000	6,9	24,8	299,5	24
85726	2 x 0,5	300	4,6	16,2	32,6	20
85727	2 x 0,5	400	4,6	16,2	42,3	20
85728	2 x 0,5	500	4,6	16,2	51,8	20
85731	2 x 0,5	1000	4,6	16,2	99,8	20
85742	4 x 0,5	300	5,0	18,0	65,3	20
85743	4 x 0,5	400	5,0	18,0	84,5	20
85744	4 x 0,5	500	5,0	18,0	103,7	20
85747	4 x 0,5	1000	5,0	18,0	201,8	20
85758	6 x 0,5	300	6,2	22,4	97,9	20
85759	6 x 0,5	400	6,2	22,4	126,7	20
85760	6 x 0,5	500	6,2	22,4	155,5	20
85763	6 x 0,5	1000	6,2	22,4	299,5	20
85774	8 x 0,5	300	7,4	26,8	130,6	20
85775	8 x 0,5	400	7,4	26,8	169,0	20
85776	8 x 0,5	500	7,4	26,8	207,4	20
85779	8 x 0,5	1000	7,4	26,8	399,4	20
85790	12 x 0,5	300	8,2	29,4	195,8	20
85791	12 x 0,5	400	8,2	29,4	254,3	20
85792	12 x 0,5	500	8,2	29,4	311,1	20
85795	12 x 0,5	1000	8,2	29,4	599,1	20

Dimensions and specifications may be changed without prior notice.

# PUR electronic spiral cables screened



## Technical data

- **Temperature range**  
-25°C to +70°C
- **Nominal voltage**  
up to 0,14 mm<sup>2</sup> 300 V  
from 0,25 mm<sup>2</sup> 500 V
- **Test voltage**  
2000 V
- **Expansion ratio** 1:4
- **straight ends**  
in each case 200 mm

## Application

- Handling Equipment
- Entertainment Equipment
- Medical devices
- Measurement instruments
- Rolling doors
- In all fields in which  
low-current cables are used

## Cable structure

- Bare copper-conductor, to  
DIN VDE 0295 cl.6, extra fine-wire,  
BS 6360 cl.6, IEC 60228 cl.6
- Core insulation of TPE-E
- Core identification to DIN 47100
- Cores stranded in layers
- Overall screening
- Outer sheath of PUR
- Sheath colour black

## Note

- On request closed spiral lengths up to max.  
5000 mm possible.
- As well in axial construction
- AWG sizes are approximate equivalent  
values. The actual cross-section is in mm<sup>2</sup>.

Part no. black	Cross-section mm <sup>2</sup>	Spiral length unexpanded (WL in mm)	Cable Ø approx. mm	Spiral- outer Ø approx. mm	Cop. weight kg / 1000 pcs.	AWG-No.
85900	2 x 0,14	300	3,8	13,6	30,6	26
85901	2 x 0,14	400	3,8	13,6	39,6	26
85902	2 x 0,14	500	3,8	13,6	48,6	26
85905	2 x 0,14	1000	3,8	13,6	93,6	26
600154	3 x 0,14	300	4,1	15,2	44,2	26
600155	3 x 0,14	400	4,1	15,2	55,8	26
600156	3 x 0,14	500	4,1	15,2	67,5	26
600157	3 x 0,14	1000	4,1	15,2	135,0	26
85916	4 x 0,14	300	4,6	16,2	47,6	26
85917	4 x 0,14	400	4,6	16,2	61,6	26
85918	4 x 0,14	500	4,6	16,2	75,6	26
85921	4 x 0,14	1000	4,6	16,2	145,6	26
85924	5 x 0,14	300	4,6	17,2	54,4	26
85925	5 x 0,14	400	4,6	17,2	70,4	26
85926	5 x 0,14	500	4,6	17,2	86,4	26
85929	5 x 0,14	1000	4,6	17,2	166,4	26
85932	6 x 0,14	300	5,2	19,4	64,6	26
85933	6 x 0,14	400	5,2	19,4	83,6	26
85934	6 x 0,14	500	5,2	19,4	102,6	26
85937	6 x 0,14	1000	5,2	19,4	197,6	26
85940	7 x 0,14	300	5,5	20,0	68,0	26
85941	7 x 0,14	400	5,5	20,0	88,0	26
85942	7 x 0,14	500	5,5	20,0	108,0	26
85945	7 x 0,14	1000	5,5	20,0	208,0	26
85948	8 x 0,14	300	5,6	20,2	74,8	26
85949	8 x 0,14	400	5,6	20,2	96,8	26
85950	8 x 0,14	500	5,6	20,2	118,8	26
85953	8 x 0,14	1000	5,6	20,2	228,8	26
85980	2 x 0,25	300	4,5	16,0	51,0	24
85981	2 x 0,25	400	4,5	16,0	66,0	24
85982	2 x 0,25	500	4,5	16,0	81,0	24
85985	2 x 0,25	1000	4,5	16,0	156,0	24
85988	4 x 0,25	300	5,0	18,0	74,8	24
85989	4 x 0,25	400	5,0	18,0	96,8	24
85990	4 x 0,25	500	5,0	18,0	118,8	24
85993	4 x 0,25	1000	5,0	18,0	228,8	24
85996	5 x 0,25	300	5,4	19,8	85,0	24
85997	5 x 0,25	400	5,4	19,8	110,0	24
85998	5 x 0,25	500	5,4	19,8	135,0	24
86001	5 x 0,25	1000	5,4	19,8	260,0	24

Continuation ▶

V

# PUR electronic spiral cables screened

Part no. black	Cross-section mm <sup>2</sup>	Spiral length unexpanded (WL in mm)	Cable Ø approx. mm	Spiral- outer Ø approx. mm	Cop. weight kg / 1000 pcs.	AWG-No.
86004	6 x 0,25	300	5,7	20,4	102,0	24
86005	6 x 0,25	400	5,7	20,4	132,0	24
86006	6 x 0,25	500	5,7	20,4	162,0	24
86009	6 x 0,25	1000	5,7	20,4	312,0	24
86012	8 x 0,25	300	6,5	23,0	119,0	24
86013	8 x 0,25	400	6,5	23,0	154,0	24
86014	8 x 0,25	500	6,5	23,0	189,0	24
86017	8 x 0,25	1000	6,5	23,0	364,0	24
86020	12 x 0,25	300	7,1	26,2	170,0	24
86021	12 x 0,25	400	7,1	26,2	220,0	24
86022	12 x 0,25	500	7,1	26,2	270,0	24
86025	12 x 0,25	1000	7,1	26,2	520,0	24
86036	2 x 0,5	300	5,5	20,0	78,2	20
86037	2 x 0,5	400	5,5	20,0	101,2	20
86038	2 x 0,5	500	5,5	20,0	124,2	20
86041	2 x 0,5	1000	5,5	20,0	239,2	20
86044	4 x 0,5	300	5,8	21,6	153,0	20
86045	4 x 0,5	400	5,8	21,6	198,0	20
86046	4 x 0,5	500	5,8	21,6	243,0	20
86049	4 x 0,5	1000	5,8	21,6	486,0	20
86052	6 x 0,5	300	7,0	26,0	231,2	20
86053	6 x 0,5	400	7,0	26,0	299,2	20
86054	6 x 0,5	500	7,0	26,0	367,2	20
86057	6 x 0,5	1000	7,0	26,0	707,2	20
86060	8 x 0,5	300	8,0	29,0	289,0	20
86061	8 x 0,5	400	8,0	29,0	374,0	20
86062	8 x 0,5	500	8,0	29,0	459,0	20
86065	8 x 0,5	1000	8,0	29,0	884,0	20
86068	12 x 0,5	300	8,8	31,6	380,8	20
86069	12 x 0,5	400	8,8	31,6	492,8	20
86070	12 x 0,5	500	8,8	31,6	604,8	20
86073	12 x 0,5	1000	8,8	31,6	1164,8	20

Dimensions and specifications may be changed without prior notice.



BMV 16 Z



24

CAUTION

ACHTUNG

6 x 0.15





Marine Power Cables FMGSGO

Ships Power Cables MGSGO

Light Marine Telekommunication Cables LFMGSSGO






















Ships Wiring Cables-SY stranded type

**SHIPFLEX® 512**





# SHIPWIRING & MARINE CABLES

Designation	Properties	Approvals	Page
Ships Power Cables MGS GO	halogen-free, with Cu-screen		921
Light Marine Power Cables XLFM KK	with Cu-screen		922
Marine Power Cables LMGS GO	halogen-free, with Cu-screen		923
Ships Telephone Cables FMGCH 250 V (FMGCG*)	halogen-free in accordance with DIN 89 159/98		924
Marine Telecommunication Cables FMGS GO	halogen-free, with Cu-screen		925
Marine Telecommunication Cables FMGS GO 250 V	with single screen high cross-talk attenuation, halogen-free		926
Light Marine Telecommunication Cables LFMGS GO	halogen-free, 2xCu-screen		927
Light Marine Telecommunication Cables LFMGS GO	halogen-free, 2xCu-screen		928
Ships Wiring Cables-SY single core			929
Ships Wiring Cables-SY multicore			930
SHIPFLEX® 512	Drag chain cable, halogen-free, EMC-preferred type, meter marking	  	933
SHIPFLEX® 330	Drag chain cable, halogen-free, EMC-preferred type, meter marking	  	934
SHIPFLEX® 340	Drag chain cable, halogen-free, EMC-preferred type, meter marking	  	935
SHIPFLEX® 109	Cable drag chain, single core, halogen-free. EMC-preferred type (-C-type) meter marked	  	936
SHIPFLEX® 109	Drag chain cable, halogen-free, EMC-preferred type, meter marking	  	937
SHIPFLEX® 113	Drag chain cable, halogen-free, EMC-preferred type, meter marking	  	938
SHIPFLEX® 121	Drag chain cable, halogen-free, EMC-preferred type, meter marking	  	939

## SELECTION TABLE - DRAG CHAIN CABLES

Max. movement distance in m  
 (10 m up to 25-cores)  
 Min. bending radius - flexing  
 (D=outerØ)  
 Max. speed (m/s)  
 Max. acceleration (m/s<sup>2</sup>)  
 Max. cycles  
 Material  
 Nominal voltage U<sub>0</sub>/U<sub>i</sub>  
 Operating voltage  
 Temperature (°C) - flexing  
 Approvals  
 Page  
 UL/CSA  
 equivalent

Drag chain cables for ship & offshore applications												
SHIPFLEX® 512	100	7.5 x D	4	10	11 Mio	TPE/CU/PUR	1000V	-40° to +80°	UL/CSA	<b>933</b>	-	
SHIPFLEX® 330	100	7.5 x D	4	10	11 Mio	TPE/CU/PUR	300V	-40° to +80°	UL/CSA	<b>934</b>	-	
SHIPFLEX® 340	100	7.5 x D	4	10	11 Mio	TPE/CU/PUR	300V	-40° to +80°	UL/CSA	<b>935</b>	-	
SHIPFLEX® 109	100	7.5 x D	4	10	11 Mio	TPE/CU/PUR	1000V	-40° to +80°	UL/CSA	<b>936</b>	-	
SHIPFLEX® 109	100	7.5 x D	4	10	11 Mio	TPE/CU/PUR	1000V	-40° to +80°	UL/CSA	<b>937</b>	-	
SHIPFLEX® 113	100	7.5 x D	4	10	11 Mio	TPE/CU/PUR	1000V	-40° to +80°	UL/CSA	<b>938</b>	-	
SHIPFLEX® 121	100	7.5 x D	4	10	11 Mio	TPE/CU/PUR	1000V	-40° to +80°	UL/CSA	<b>939</b>	-	

A cycle is a double lift: a representative sample has been tested and measured in our Test Workshop. The cycle count is only valid when appropriately and professionally installed (see the installation manual: cable installation in drag chains, see pages 1036 and 1037).

The selection table is intended as an initial orientation.

Please see the relevant page of the catalogue for detailed information on the product properties and the selection tables cables in drag chains, see pages 1030 and 1031.

# Ships Power Cables MGSGO halogen-free, copper screened



## Technical data

- acc. to VG 95218 part 60, with screen and natural insulation integrity in case of fire without a flame retardant barrier
- **Operating temperature** at conductor max. +85°C
- **Nominal voltage**  $U_0/U$  0,6/1 kV
- **Minimum bending radius** 5x cable  $\emptyset$

## Cable structure

- Stranded copper conductors
- Heat-resistant EPR-insulation 3GI3 to DIN VDE 0207 part 20
- Cores stranded in layers with optimal lay-length
- Filling compound covering all cores
- Foil wrapping
- Bare copper braided screen
- Polyester tape
- Outer sheath of elastomer compound to olefin based copolymer
- Sheath colour black

## Properties

- halogen-free and flame retardant
- **Colour code**  
1 core: BK  
2 cores: BN, BU  
3 cores: BN, BK, GY  
4 cores: BU, BN, BK, GY
- **Approved by**  
BWB (Bundesamt für Wehrtechnik und Beschaffung), i.e. German Federal Office for Defense and Procurement)

## Note

- AWG sizes are approximate equivalent values. The actual cross-section is in mm<sup>2</sup>.

## Application

Halogen-free power cables for marine craft are used for fixed installation on ships in all rooms and open decks as control and power cables.

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer $\emptyset$ min. - max. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.	Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer $\emptyset$ min. - max. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
59270	1 x 4	7,5 - 8,5	81,0	155,0	12	59291	3 x 1,5	12,0 - 13,0	125,0	260,0	16
59271	1 x 6	8,4 - 9,4	104,0	185,0	10	59292	3 x 2,5	13,0 - 14,2	161,0	330,0	14
59272	1 x 10	9,5 - 10,5	149,0	245,0	8	59293	3 x 4	14,0 - 15,2	215,0	420,0	12
59273	1 x 16	10,0 - 11,0	214,0	260,0	6	59294	3 x 6	15,5 - 16,8	282,0	530,0	10
59274	1 x 25	12,0 - 13,0	311,0	420,0	4	59295	3 x 10	17,6 - 18,9	417,0	740,0	8
59275	1 x 35	13,0 - 14,0	416,0	530,0	2	59296	3 x 16	20,0 - 21,4	636,0	1090,0	6
59276	1 x 50	15,0 - 16,0	572,0	680,0	1	59297	3 x 25	24,0 - 25,4	924,0	1340,0	4
59277	1 x 70	17,0 - 18,0	779,0	890,0	2/0	59298	3 x 35	26,0 - 28,2	1233,0	1790,0	2
59278	1 x 95	19,5 - 20,5	1034,0	1200,0	3/0	59299	3 x 50	30,0 - 32,2	1703,0	2190,0	1
59279	1 x 120	21,0 - 22,4	1316,0	1340,0	4/0	59300	3 x 70	34,5 - 36,7	2413,0	2990,0	2/0
59280	1 x 150	23,0 - 24,4	1615,0	1770,0	300 kcmil	59301	3 x 95	39,7 - 42,2	3191,0	4220,0	3/0
59281	1 x 185	25,5 - 27,0	1968,0	2180,0	350 kcmil	59302	3 x 120	43,0 - 45,7	3975,0	5090,0	4/0
59282	1 x 240	29,0 - 30,5	2506,0	2610,0	500 kcmil	59303	4 x 4	15,2 - 16,5	284,0	480,0	12
59283	1 x 300	31,5 - 33,5	3345,0	3250,0	600 kcmil	59304	4 x 6	17,0 - 18,3	371,0	670,0	10
59284	2 x 1,5	11,5 - 12,5	105,0	240,0	16	59305	4 x 10	19,4 - 20,9	545,0	910,0	8
59285	2 x 2,5	12,4 - 13,4	132,0	290,0	14	59306	4 x 16	22,0 - 23,5	796,0	1160,0	6
59286	2 x 4	13,4 - 14,7	170,0	350,0	12	59307	4 x 25	26,4 - 28,0	1170,0	1680,0	4
59287	2 x 6	14,7 - 16,0	217,0	440,0	10	59308	4 x 35	29,2 - 31,0	1578,0	2160,0	2
59288	2 x 10	16,2 - 17,7	307,0	570,0	8	59309	4 x 50	33,5 - 35,8	2278,0	2760,0	1
59289	2 x 16	19,0 - 20,3	471,0	780,0	6	59310	4 x 70	38,2 - 40,7	3090,0	3750,0	2/0
59290	2 x 25	22,5 - 24,0	670,0	1070,0	4	59311	4 x 95	44,2 - 46,7	4110,0	4990,0	3/0

Dimensions and specifications may be changed without prior notice. (RW01)



Suitable accessories can be found in Chapter X.

- Cable Gland - HSK-PVDF

# Light Marine Power Cables XLFMKK Cu-screened



## Technical data

- acc. to VG 88778/66
- **Operating temperature**  
at conductor max. +85°C
- **Min. installation temperature**  
-10°C
- **Nominal voltage** 250 V
- **Minimum bending radius**  
5x cable Ø

## Cable structure

- Bare copper-conductor, to  
DIN VDE 0295 cl.2, multi-wire,  
BS 6360 cl.2, IEC 60228 cl.2  
longitudinally watertight
- PVC core insulation with polyamid coating
- Cores laid up in pairs
- Pairs copper screened
- Foil wrapping
- PVC inner sheath
- Bare copper braided screen,  
waterproofed
- PVC outer sheath
- Sheath colour green

## Properties

- **Colour code**  
All sizes are colour coded
- **Approved by**  
BWB (Bundesamt für Wehrtechnik und  
Beschaffung), i.e. German Federal Office  
for Defense and Procurement)

## Note

- AWG sizes are approximate equivalent  
values. The actual cross-section is in mm<sup>2</sup>.

## Application

For fixed installation on marine craft above and below deck.

Part no.	No.pairs x cross-sec. mm <sup>2</sup>	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
59336	2 x 2 x 0,75	16,0	160,0	370,0	18
59337	4 x 2 x 0,75	18,1	277,0	490,0	18

Part no.	No.pairs x cross-sec. mm <sup>2</sup>	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
59338	11 x 2 x 0,75	26,2	658,0	1080,0	18

Dimensions and specifications may be changed without prior notice. (RW01)



Suitable accessories can be found in Chapter X.

- Cable Gland - HSK-PVDF

# Marine Power Cables LMGSGO halogen-free, Cu-screened



## Technical data

- acc. to VG 95218 part 61, with screen and natural insulation integrity in case of fire without a flame retardant barrier
- **Operating temperature** at conductor max. +85°C
- **Nominal voltage** 500 V
- **Minimum bending radius** 5x cable Ø

## Cable structure

- Stranded copper conductor
- Heat resistant EPR-insulation 3GI3, to DIN VDE 0207 part 20
- Core stranded in layers with optimal lay-length
- Halogen-free inner filling sheath
- Copper braided screening
- Foil wrapping
- Outer sheath of elastomer compound to olefin based copolymer
- Sheath colour black

## Properties

- Halogen-free and flame retardant
- **Colour code**  
2 cores: BN, BU  
3 cores: BN, BK, GY  
4 cores: BU, BN, BK, GY  
5 cores: BU, BN, BK, GY, BK  
7-33 cores: all cores black, number coded, core 1 placed centrally.
- **Approved by**  
BWB (Bundesamt für Wehrtechnik und Beschaffung), i.e. German Federal Office for Defense and Procurement)

## Note

- AWG sizes are approximate equivalent values. The actual cross-section is in mm<sup>2</sup>.

## Application

For fixed installation on marine craft above and below deck.

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer Ø min. - max. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
59360	2 x 1,5	7,0 - 7,8	89,0	100,0	16
59361	3 x 1,5	7,2 - 8,2	105,0	120,0	16
59362	4 x 1,5	7,8 - 9,2	131,0	145,0	16
59363	5 x 1,5	8,3 - 9,3	146,0	165,0	16
59364	7 x 1,5	9,3 - 10,3	180,0	215,0	16
59365	10 x 1,5	10,8 - 12,2	244,0	285,0	16
59366	12 x 1,5	12,0 - 13,3	276,0	320,0	16
59367	14 x 1,5	12,7 - 14,0	310,0	375,0	16
59368	16 x 1,5	13,2 - 14,6	342,0	400,0	16
59369	19 x 1,5	13,9 - 14,7	401,0	475,0	16
59370	24 x 1,5	15,5 - 17,2	494,0	595,0	16
59371	27 x 1,5	16,6 - 18,1	539,0	645,0	16
59372	33 x 1,5	17,5 - 19,5	633,0	790,0	16

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer Ø min. - max. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
59373	2 x 2,5	7,7 - 8,6	114,0	130,0	14
59374	3 x 2,5	8,0 - 9,2	144,0	150,0	14
59375	4 x 2,5	8,7 - 10,2	171,0	200,0	14
59376	6 x 2,5	10,3 - 11,7	242,0	275,0	14
59377	7 x 2,5	10,3 - 11,7	266,0	295,0	14

Dimensions and specifications may be changed without prior notice. (RW01)



Suitable accessories can be found in Chapter X.

- Cable Gland - HSK-PVDF



# Ships Telephone Cables FMGCH 250 V

halogen-free according to DIN 89 159/99



## Technical data

- acc.to DIN 89159/ edition 1998 and IEC 60092-375
- **Operating temperature** at conductor max. +85°C
- **Nominal voltage** 250 V
- **Insulation resistance** 1400 MOhm x km
- **Minimum bending radius** 5x cable Ø

## Cable structure

- Bare copper-conductor, to DIN VDE 0295 cl.2, multi-wire, BS 6360 cl.2, IEC 60228 cl.2
- HEPR core insulation (Hard grade EPR)
- Cores per pair blue/white, printed with numbers, starting in center with number 1
- Cores stranded in pairs with optimal lay-length
- Pairs stranded in layers with optimal lay-length
- Common sheath with foil wrapping
- Bare copper braided screen
- Foil wrapping
- Outer sheath of Polyolefin basis-compound
- Sheath colour green

## Properties

- Flame retardant according to SOLAS definition (according to IEC 60332-3 category A)
- **Approved by** Association of German Electrical Engineer Germanischer Lloyd Lloyds Register of Shipping American Bureau of Shipping Det Norske Veritas Bureau Veritas, Russian Maritime Register of Shipping and Registro Italiano Navale are in preparation

## Note

- AWG sizes are approximate equivalent values. The actual cross-section is in mm<sup>2</sup>.

## Application

For measurement, control, regulation, control and alarm systems; radio, positioning and messaging systems. For fixed installation on ships in rooms and on open decks.

Part no.	No.pairs x cross-sec. mm <sup>2</sup>	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
59138	1 x 2 x 0,75	8,5	62,0	90,0	18
59139	2 x 2 x 0,75	9,0	87,0	130,0	18
59140	4 x 2 x 0,75	13,0	153,0	230,0	18
59141	7 x 2 x 0,75	15,5	230,0	340,0	18

Part no.	No.pairs x cross-sec. mm <sup>2</sup>	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
59142	10 x 2 x 0,75	18,5	319,0	470,0	18
59143	14 x 2 x 0,75	21,0	445,0	610,0	18
59144	19 x 2 x 0,75	24,0	525,0	770,0	18
59145	24 x 2 x 0,75	27,0	663,0	950,0	18

Dimensions and specifications may be changed without prior notice. (RW01)



Suitable accessories can be found in Chapter X.

- Cable Gland - HSK-PVDF

# Marine Telecommunication Cables FMGSGO

halogen-free, Cu-screened



## Technical data

- acc. to VG 95218 part 62, with screen and natural insulation integrity in case of fire without a flame retardant barrier
- **Operating temperature** at conductor max. +85°C
- **Nominal voltage** 250 V
- **Minimum bending radius** 5x cable Ø

## Cable structure

- Bare copper conductor, stranded
- Heat resistant EPR-insulation 3GI3, to DIN VDE 0207 part 20
- To four wires twisted
- Filling compound covering all cores, halogen-free
- Screening of copper braid
- Foil wrapping
- Outer sheath of elastomer compound to olefin based copolymer
- Sheath colour black

## Properties

- Halogen-free and flame retardant
- **Colour code**  
All sizes and dimensions are colour coded
- **Approved by**  
BWB (Bundesamt für Wehrtechnik und Beschaffung), i.e. German Federal Office for Defense and Procurement)

## Note

- AWG sizes are approximate equivalent values. The actual cross-section is in mm<sup>2</sup>.

## Application

For fixed installation on Navy ships in locations and on open decks.

Part no.	No.pairs x cross-sec. mm <sup>2</sup>	Outer Ø min. - max. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
59380	2 x 2 x 0,75	6,7 - 7,8	89,0	100,0	18
59381	4 x 2 x 0,75	9,6 - 11,0	142,0	190,0	18
59382	6 x 2 x 0,75	10,8 - 12,3	189,0	235,0	18
59383	8 x 2 x 0,75	11,9 - 13,4	225,0	295,0	18

Part no.	No.pairs x cross-sec. mm <sup>2</sup>	Outer Ø min. - max. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
59384	10 x 2 x 0,75	13,7 - 15,2	272,0	335,0	18
59385	14 x 2 x 0,75	14,9 - 16,5	338,0	475,0	18
59386	16 x 2 x 0,75	16,1 - 17,9	373,0	520,0	18

Dimensions and specifications may be changed without prior notice. (RW01)



Suitable accessories can be found in Chapter X.

- Cable Gland - HSK-PVDF

# Marine Telecommunication Cables FMSGSGO

## 250 V with a single screen, higher cross-talk attenuation, halogen-free



### Technical data

- acc. to VG 95218 part 63
- **Operating temperature**  
at conductor max. +85°C
- **Min. installation temperature**  
-10°C
- **Nominal voltage** 250 V
- **Minimum bending radius**  
5x cable Ø

### Cable structure

- Bare copper conductor, stranded
- Cross-linked polyolefin-insulation
- Cores laid up in pairs
- Foil wrapping
- Each pair with bare copper wire screen
- Each pair with foil wrapping
- Pairs laid up concentrically
- Foil wrapping
- Overall foil wrap
- Bare copper wire braided screen
- Foil wrapping
- Outer sheath of elastomer compound
- Sheath colour black

### Properties

- Oil resistant and flame retardant
- **Colour code for cores**  
Pair/counting pair: BK/BU  
Pair/counting direction pair: BK/BN  
Subsequent pairs: BK/GY
- **Approved by**  
BWB (Bundesamt für Wehrtechnik und Beschaffung), i.e. German Federal Office for Defense and Procurement)

### Note

- AWG sizes are approximate equivalent values. The actual cross-section is in mm<sup>2</sup>.

### Application

For fixed installation on marine craft above and below deck.

Part no.	No.pairs x cross-sec. mm <sup>2</sup>	Outer Ø min. - max. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
59150	2 x 2 x 0,75	11,1 - 12,5	149,0	220,0	18
59151	4 x 2 x 0,75	12,9 - 14,5	277,0	332,0	18
59152	7 x 2 x 0,75	14,9 - 16,4	489,0	475,0	18
59153	11 x 2 x 0,75	19,6 - 21,4	658,0	705,0	18

Part no.	No.pairs x cross-sec. mm <sup>2</sup>	Outer Ø min. - max. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
59154	14 x 2 x 0,75	20,8 - 22,8	731,0	900,0	18
59155	19 x 2 x 0,75	23,4 - 25,4	951,0	1130,0	18
59156	24 x 2 x 0,75	26,4 - 28,4	1181,0	1430,0	18

Dimensions and specifications may be changed without prior notice. (RW01)



Suitable accessories can be found in Chapter X.

- Cable Gland - HSK-PVDF

# Light Marine Telecommunication cables

## LFMGSSGO

halogen-free, 2x Cu-screened



### Technical data

- acc. to VG 95218 part 64, 2x copper screen with natural insulation integrity in case of fire without a flame retardant barrier
- **Operating temperature** at conductor max. +85°C
- **Min. installation temperature** -10°C
- **Nominal voltage** 250 V
- **Minimum bending radius** 6x cable Ø

### Cable structure

- Stranded (7) tinned copper conductor to DIN VDE 0295 cl.2, BS 6360 cl.2 and IEC 60228 cl.2
- Cross-linked polyolefin-insulation
- Core stranded to pairs with optimal lay-length
- Overall halogen-free inner filling
- Tinned copper braided double screen, separated by halogen-free foil
- Foil wrapping
- Outer sheath of elastomer compound
- Sheath colour black

### Properties

- Oil resistant and flame retardant
- **Colour code for cores**  
2-pair (Quad)  
BK/BU/GY/BN  
as of 4-pair  
Pair/counting pair: BK/BU  
Pair/counting direction pair: BK/BN  
Subsequent pairs: BK/GY
- **Approved by**  
BWB (Bundesamt für Wehrtechnik und Beschaffung), i.e. German Federal Office for Defense and Procurement)

### Application

For fixed installation on marine craft above and below decks.

Part no.	No.pairs x cross-sec. mm <sup>2</sup>	Outer Ø min. - max. mm	Cop. weight kg / km	Weight approx. kg / km	
59390	2 x 2 x 0,4	5,8 - 6,8	60,0	83,0	-
59391	4 x 2 x 0,4	7,7 - 8,8	95,0	132,0	-
59392	7 x 2 x 0,4	9,4 - 10,8	146,0	212,0	-

Part no.	No.pairs x cross-sec. mm <sup>2</sup>	Outer Ø min. - max. mm	Cop. weight kg / km	Weight approx. kg / km	
59393	12 x 2 x 0,4	12,8 - 14,5	235,0	320,0	-
59394	19 x 2 x 0,4	13,8 - 15,5	320,0	425,0	-
59395	27 x 2 x 0,4	15,5 - 17,3	414,0	515,0	-

Dimensions and specifications may be changed without prior notice. (RW01)

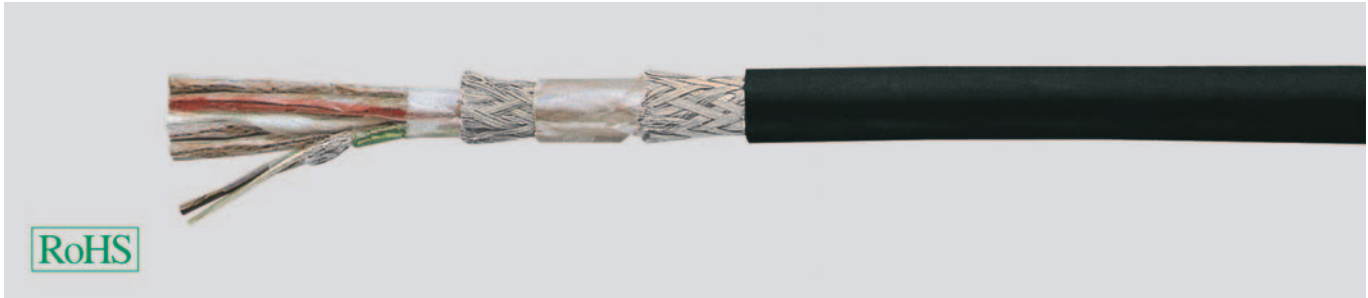


Suitable accessories can be found in Chapter X.

- Cable Gland - HSK-PVDF

# Light Marine Telecommunication Cables

## LFMSGSSGO halogen-free, 2x Cu-screened



### Technical data

- acc. to VG 95218 part 66, 2x copper screen with high cross-talk attenuation and natural insulation integrity in case of fire without a flame retardant barrier
- **Operating temperature** at conductor max. +85°C
- Min. **installation temperature** -10°C
- **Nominal voltage** 250 V
- **Minimum bending radius** 6x cable Ø

### Cable structure

- Stranded (7) tinned copper conductor
- Cross-linked polyolefin-insulation
- Core stranded to triple with optimal lay-length
- Tinned copper braided screen over each triple
- Overall polyester taped inner covering
- Screened triple stranded in layers with optimal lay-length
- Foil wrapping
- Tinned copper braided overall screen
- Halogen-free insulating layer
- Screen of tinned copper braid
- Foil wrapping
- Outer sheath of elastomere compound
- Sheath colour black

### Properties

- Oil resistant and flame retardant
- **Colour code**  
All sizes and dimensions are colour coded
- **Approved by**  
BWB (Bundesamt für Wehrtechnik und Beschaffung), i.e. German Federal Office for Defense and Procurement)

### Application

For fixed installation on marine craft above and below decks.

Part no.	No.pairs x cross-sec. mm <sup>2</sup>	Outer Ø min. - max. mm	Cop. weight kg / km	Weight approx. kg / km	
59396	5 x 3 x 0,4	12,2 - 13,9	248,0	335,0	-

Part no.	No.pairs x cross-sec. mm <sup>2</sup>	Outer Ø min. - max. mm	Cop. weight kg / km	Weight approx. kg / km	
59397	12 x 3 x 0,4	16,9 - 18,9	500,0	620,0	-

Dimensions and specifications may be changed without prior notice. (RW01)



Suitable accessories can be found in Chapter X.

- Cable Gland - HSK-PVDF



# Ships Wiring Cables-SY single cores



## Technical data

- Special PVC single cores acc. to DIN VDE 0250
- **Temperature range**  
flexing +5°C to +70°C  
fixed installation -40°C to +70°C
- **Nominal voltage** 250 V
- **Test voltage** 1500 V
- **Minimum bending radius**  
7,5x cable Ø

## Cable structure

- Bare copper-conductor, to DIN VDE 0295 cl.5, fine-wire, BS 6360 cl.5, IEC 60228 cl.5
- PVC core insulation
- Tinned steel-wire braided screening
- PVC outer sheath
- Sheath colour grey (RAL 7001)

## Properties

- self-extinguishing and flame retardant acc. to DIN VDE 0482-332-1-2, DIN EN 60332-1-2, IEC 60332-1 (equivalent DIN VDE 0472 part 804 test method B)
- Oil resistant according DIN VDE 0250
- **Approved by**  
Germanischer Lloyd

## Note

- AWG sizes are approximate equivalent values. The actual cross-section is in mm<sup>2</sup>.

## Application

A connection and a connection cable for measuring and control devices for communication systems, production lines, conveyor systems for fixed and variable connection in humid, wet and dry areas.

These PVC single cores are also suitable for use in ship building.

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
59450	1 x 6	8,3	57,4	148,0	10
59451	1 x 10	10,3	95,8	221,0	8
59452	1 x 16	10,3	153,4	293,0	6
59453	1 x 25	13,7	239,5	447,0	4

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
59454	1 x 35	15,2	335,0	565,0	2
59455	1 x 50	18,1	479,5	788,0	1
59456	1 x 70	21,1	671,0	1061,0	2/0
59457	1 x 95	22,8	910,0	1355,0	3/0

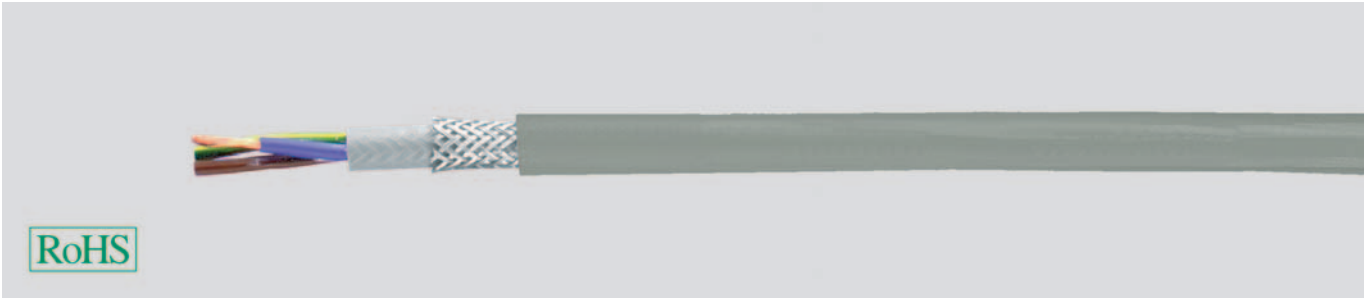
Dimensions and specifications may be changed without prior notice. (RW01)



Suitable accessories can be found in Chapter X.

- Cable Gland - HSK-PVDF

# Ships Wiring Cables-SY stranded type



## Technical data

- Special PVC cables
- **Temperature range**  
flexing +5°C to +70°C  
fixed installation -40°C to +70°C
- **Nominal voltage** 250 V
- **Test voltage** 3000 V
- **Minimum bending radius**  
7,5x cable Ø

## Cable structure

- Bare copper-conductor, to DIN VDE 0295 cl.5, fine-wire, BS 6360 cl.5, IEC 60228 cl.5
- Core insulation of PVC compound type Y12 acc. to DIN VDE 0207 part 4
- Cores colour coded to DIN VDE 0293 or black cores with continuous white numbering
- Core stranded in layers with optimal lay-length
- Inner sheath of PVC
- Galvanized steel-wire braided overall screening
- Outer sheath of PVC compound type YM2 acc. to DIN VDE 0207 part 5
- Sheath colour grey (RAL 7001)

## Properties

- Extensively oil resistant.  
Chemical Resistance - see table Technical Informations
- self-extinguishing and flame retardant acc. to DIN VDE 0482-332-1-2, DIN EN 60332-1-2, IEC 60332-1 (equivalent DIN VDE 0472 part 804 test method B)
- **Approved by**  
Germanischer Lloyd

## Note

- AWG sizes are approximate equivalent values. The actual cross-section is in mm<sup>2</sup>.

## Application

Ideally suited for fixed installation but also for the variable use of manufacturing lines, machine tools, conveyor systems and robotic assembly lines. A line that can also be used in shipbuilding. The galvanized steel braid protects against mechanical stress and simultaneously effectively against electrical interference.

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
59460	2 x 1,5	9,7	28,7	146,0	16
59461	3 x 1,5	10,1	43,1	166,0	16
59462	4 x 1,5	10,8	57,5	198,0	16
59463	5 x 1,5	11,6	71,9	230,0	16
59464	7 x 1,5	13,3	100,6	299,0	16
59465	3 x 2,5	11,6	72,1	231,0	14

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
59466	4 x 2,5	13,3	95,8	298,0	14
59467	5 x 2,5	14,3	120,0	355,0	14
59468	4 x 4	16,2	153,5	358,0	12
59469	5 x 4	17,5	193,0	535,0	12
59470	4 x 6	18,4	230,3	595,0	10
59471	5 x 6	19,7	288,0	714,0	10

Dimensions and specifications may be changed without prior notice. (RW01)



Suitable accessories can be found in Chapter X.

- Cable Gland - HSK-PVDF







# SHIPFLEX® 512 cable for drag chain, halogen-free, EMC preferred type, meter marking



## Technical data

- Special screened drag chain cable
- UL-Style 20234
- **Temperature range**  
flexing -40°C to +80°C  
fixed installation -40°C to +80°C
- **Installation temperature**  
min. -25°C
- **Nominal voltage** UL 1000 V
- **Insulation resistance**  
min. 100 MOhm x km
- **Minimum bending radius**  
7,5x cable Ø
- **Coupling resistance**  
max. 250 Ohm/km
- **Radiation resistance**  
up to 100x10<sup>6</sup> cJ/kg (up to 100 Mrad)

## Cable structure

- Bare copper-conductor, to DIN VDE 0295 cl.6, extra fine-wire, BS 6360 cl.6, IEC 60228 cl.6
- Special core insulation
- Black cores with continuous white numbering to DIN VDE 0293
- GN-YE conductor, 3 cores and above in the outer layer
- Cores stranded in layers with optimal selected lay-length
- Braided screen of tinned copper wires, coverage approx. 85 %, optional aluminium foil under the braid
- **Full polyurethane** outer sheath to UL std. 1581 Tab. 50227
- Sheath colour grey (RAL 7001)
- with meter marking

## Properties

- Flame retardant to DIN VDE 0482-332-1-2, DIN EN 60332-1-2/IEC 60332-1 (equivalent DIN VDE 0472 part 804 test method B)
- Halogen-free to DIN VDE 0482 part 267/ DIN EN 50267-2-1/IEC 60754-1 (equivalent DIN VDE 0472 part 815)
- Oil resistant to IEC 60092-350, appendix F
- Behaviour at low temperature at -40°C to IEC 60092-350, appendix E
- Weather, ozon and UV-resistant
- The materials used in manufacture are cadmium-free and contain no silicone and free from substances harmful to the wetting properties of lacquers

## Note

- AWG sizes are approximate equivalent values. The actual cross-section is in mm<sup>2</sup>.

## Application

HELUKABEL® SHIPFLEX® 512 is a new developed and successfully tested screened special drag chain cable which meets the requirements of the strict standards for application in offshore-areas. For this two - line standard there is a **Lloyds Register approval**. The outer sheath insulation of non-adhesive Polyurethan allows the application in extremely oily and rough environmental conditions. For applications which go beyond standard solutions we recommend that you fill out our especially developed questionnaire for drag chains. Before installation in cable drag chains please read the installation instructions.

**EMC** = Electromagnetic compatibility

To optimize the EMC features we recommend a large round contact of the copper braiding on both ends.

**CE** = The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

Part no.	No. cores x cross-sec. mm <sup>2</sup>	AWG-No.	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km
19864	2 x 0,5	20	6,3	35,0	50,0
19865	3 G 0,5	20	6,5	42,0	60,0
19866	4 G 0,5	20	7,0	47,0	64,0
19867	5 G 0,5	20	7,5	56,0	79,0
19868	7 G 0,5	20	8,5	69,0	101,0
19869	12 G 0,5	20	10,0	108,0	164,0
19870	18 G 0,5	20	11,5	145,0	227,0
19871	25 G 0,5	20	13,5	240,0	331,0
19872	36 G 0,5	20	15,2	318,0	457,0
19873	2 x 0,75	19	7,0	40,0	65,0
19874	3 G 0,75	19	7,2	52,0	71,0
19875	4 G 0,75	19	7,8	60,0	82,0
19876	5 G 0,75	19	8,5	71,0	97,0
19877	7 G 0,75	19	9,6	91,0	141,0
19878	12 G 0,75	19	11,5	142,0	217,0
19879	18 G 0,75	19	13,0	212,0	304,0
19880	25 G 0,75	19	15,8	281,0	420,0
19881	36 G 0,75	19	17,5	350,0	535,0
19882	2 x 1	18	7,4	50,0	69,0
19883	3 G 1	18	7,7	60,0	84,0
19884	4 G 1	18	8,5	71,0	104,0
19885	5 G 1	18	9,0	88,0	130,0
19886	7 G 1	18	10,4	111,0	160,0
19887	12 G 1	18	12,4	184,0	270,0
19888	18 G 1	18	14,3	260,0	391,0
19889	25 G 1	18	17,0	349,0	547,0
19890	36 G 1	18	19,0	510,0	790,0
19891	2 x 1,5	16	8,0	63,0	90,0
19892	3 G 1,5	16	8,3	80,0	109,0
19893	4 G 1,5	16	9,2	97,0	132,0
19894	5 G 1,5	16	10,0	119,0	169,0
19895	7 G 1,5	16	11,6	147,0	219,0

Part no.	No. cores x cross-sec. mm <sup>2</sup>	AWG-No.	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km
19896	12 G 1,5	16	13,8	267,0	363,0
19897	18 G 1,5	16	16,2	374,0	496,0
19898	25 G 1,5	16	19,0	526,0	724,0
19899	36 G 1,5	16	21,5	702,0	1190,0
19900	2 x 2,5	14	9,5	96,0	136,0
19901	3 G 2,5	14	10,3	144,0	179,0
19902	4 G 2,5	14	11,3	149,0	201,0
19903	5 G 2,5	14	12,4	181,0	232,0
19904	7 G 2,5	14	14,4	255,0	357,0
19905	12 G 2,5	14	17,5	441,0	586,0
19906	18 G 2,5	14	20,3	604,0	1064,0
19907	25 G 2,5	14	24,2	793,0	1411,0
19908	36 G 2,5	14	27,2	1034,0	1623,0
19909	3 G 4	12	11,5	174,0	257,0
19910	4 G 4	12	12,4	230,0	324,0
19911	5 G 4	12	13,5	274,0	401,0
19912	6 G 4	12	15,2	295,0	456,0
19913	7 G 4	12	16,3	316,0	511,0
19914	3 G 6	10	13,5	240,0	343,0
19915	4 G 6	10	15,2	305,0	427,0
19916	5 G 6	10	16,5	442,0	562,0
19917	6 G 6	10	17,8	471,0	628,0
19918	7 G 6	10	19,5	505,0	692,0
19919	3 G 10	8	17,1	367,0	731,0
19920	4 G 10	8	19,0	549,0	992,0
19921	5 G 10	8	20,7	607,0	1014,0
19922	6 G 10	8	22,0	711,0	1241,0
19923	7 G 10	8	24,0	820,0	1491,0
19924	3 G 16	6	19,8	692,0	1004,0
19925	4 G 16	6	21,8	840,0	1296,0
19926	5 G 16	6	24,0	1050,0	1658,0

Dimensions and specifications may be changed without prior notice. (RW01)



# SHIPFLEX® 330 cable for drag chain, halogen-free, EMC preferred

type, meter marking



## Technical data

- Special screened drag chain cable
- UL-Style 20233
- **Temperature range**  
flexing -40°C to +80°C  
fixed installation -40°C to +80°C
- **Installation temperature**  
min. -25°C
- **Nominal voltage**  
VDE U<sub>0</sub>/U 300/500 V
- UL 300 V
- **Insulation resistance**  
min. 100 MOhm x km
- **Minimum bending radius**  
7,5x cable Ø
- **Coupling resistance**  
max. 250 Ohm/km
- **Radiation resistance**  
up to 100x10<sup>6</sup> cJ/kg (up to 100 Mrad)

## Cable structure

- Bare copper-conductor, to DIN VDE 0295 cl.6, extra fine-wire, BS 6360 cl.6, IEC 60228 cl.6
- Special core insulation
- coloured cores to DIN 47100
- Cores stranded in layers with optimal selected lay-length
- Core wrapping between the layers of stranding
- Braided screen of tinned copper wires, coverage approx. 85 %, optional aluminium foil under the screen
- **Full polyurethane** outer sheath to UL std. 1581 Tab. 50227
- Sheath colour grey (RAL 7001)
- with meter marking

## Properties

- Flame retardant to DIN VDE 0482-332-1-2, DIN EN 60332-1-2/IEC 60332-1 (equivalent DIN VDE 0472 part 804 test method B)
- Halogen-free to DIN VDE 0482 part 267/ DIN EN 50267-2-1/IEC 60754-1 (equivalent DIN VDE 0472 part 815)
- Oil resistant to IEC 60092-350, appendix F
- Behaviour at low temperature at -40° to IEC 60092-350, appendix E
- Weather, ozon and UV-resistant
- The materials used in manufacture are cadmium-free and contain no silicone and free from substances harmful to the wetting properties of lacquers

## Note

- AWG sizes are approximate equivalent values. The actual cross-section is in mm<sup>2</sup>.

## Application

HELUKABEL® SHIPFLEX® 330 is a new developed and successfully tested special drag chain cable with overall screening which meets the requirements of the strict standards for application in offshore-areas. For this two-line standard there is a **Lloyds Register approval**. The outer sheath insulation of non-adhesive Polyurethan allows the application in extremely oily and rough environmental conditions. For applications which go beyond standard solutions we recommend that you fill out our especially developed questionnaire for drag chains. Before installation in cable drag chains please read the installation instructions.

**EMC** = Electromagnetic compatibility

To optimize the EMC features we recommend a large round contact of the copper braiding on both ends.

CE = The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

Part no.	No. cores x cross-sec. mm <sup>2</sup>	AWG-No.	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km
19846	2 x 0,25	24	5,0	14,9	38,0
19847	3 x 0,25	24	5,2	18,8	44,0
19848	4 x 0,25	24	5,5	21,3	51,0
19849	5 x 0,25	24	5,8	31,0	68,0
19850	7 x 0,25	24	6,7	39,6	82,0
19851	12 x 0,25	24	8,0	59,1	124,0
19852	18 x 0,25	24	9,0	78,4	150,0
19853	25 x 0,25	24	10,8	101,0	204,0
19854	36 x 0,25	24	11,5	126,4	230,0

Part no.	No. cores x cross-sec. mm <sup>2</sup>	AWG-No.	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km
19855	2 x 0,34	22	5,2	18,1	45,0
19856	3 x 0,34	22	5,5	28,7	60,0
19857	4 x 0,34	22	5,8	35,7	76,0
19858	5 x 0,34	22	6,5	39,1	82,0
19859	7 x 0,34	22	7,2	52,7	110,0
19860	12 x 0,34	22	8,5	76,4	166,0
19861	18 x 0,34	22	10,0	99,7	216,0
19862	25 x 0,34	22	12,0	155,0	305,0
19863	36 x 0,34	22	13,0	188,0	340,0

Dimensions and specifications may be changed without prior notice. (RW01)



Suitable accessories can be found in Chapter X.

- Cable Gland - HELUTOP® HT-E

# SHIPFLEX® 340 cable for drag chain, halogen-free, EMC preferred type, meter marking



## Technical data

- Special screened drag chain cable, stranded in pairs
- UL-Style 20233
- **Temperature range**  
flexing -40°C to +80°C  
fixed installation -40°C to +80°C
- **Installation temperature**  
min. -25°C
- **Nominal voltage**  
VDE U<sub>0</sub>/U 300/500 V  
UL 300 V
- **Insulation resistance**  
min. 100 MOhm x km
- **Minimum bending radius**  
7,5x cable Ø
- **Coupling resistance**  
max. 250 Ohm/km
- **Radiation resistance**  
up to 100x10<sup>6</sup> cJ/kg (up to 100 Mrad)

## Cable structure

- Bare copper-conductor, to DIN VDE 0295 cl.6, extra fine-wire, BS 6360 cl.6, IEC 60228 cl.6
- Special coreinsulation
- Colour coded to DIN 47100
- Cores stranded in pairs, pairs stranded torsion-free in layers with optimal lay-length
- Core wrapping between the layers of stranding
- Braided screen of tinned copper wires, coverage approx. 85 %, optional aluminium foil under the screen
- **Full polyurethane** outer sheath to UL std. 1581 Tab. 50227
- Sheath colour grey (RAL 7001)
- with meter marking

## Properties

- Flame retardant to DIN VDE 0482-332-1-2, DIN EN 60332-1-2/ IEC 60332-1 (equivalent DIN VDE 0472 part 804 test method B)
- Halogen-free to DIN VDE 0482 part 267/ DIN EN 50267-2-1/ IEC 60754-1 (equivalent DIN VDE 0472 part 815)
- Oil resistant to IEC 60092-350, appendix F
- Behaviour at low temperature at -40°C to IEC 60092-350, appendix E
- Weather, ozon and UV-resistant
- The materials used in manufacture are cadmium-free and contain no silicone and free from substances harmful to the wetting properties of lacquers

## Note

- AWG sizes are approximate equivalent values. The actual cross-section is in mm<sup>2</sup>.

## Application

HELUKABEL® SHIPFLEX® 340 is a new developed and successfully tested special drag chain cable with overall screening which meets the requirements of the strict standards for application in offshore-areas. For this two - line standard there is a **Lloyds Register approval**. The outer sheath insulation of non-adhesive Polyurethan allows the application in extremely oily and rough environmental conditions. For applications which go beyond standard solutions we recommend that you fill out our especially developed questionnaire for drag chains. Before installation in cable drag chains please read the installation instructions.

**EMC** = Electromagnetic compatibility


To optimize the EMC features we recommend a large round contact of the copper braiding on both ends.

**CE** = The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

Part no.	No.pairs x no.cores x cross-sec. mm <sup>2</sup>	AWG-No.	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km
19927	2 x 2 x 0,25	24	6,8	32,0	60,0
19928	3 x 2 x 0,25	24	7,1	38,0	70,0
19929	4 x 2 x 0,25	24	7,5	43,0	82,0
19930	5 x 2 x 0,25	24	8,0	51,0	99,0
19931	6 x 2 x 0,25	24	8,5	72,0	126,0
19932	7 x 2 x 0,25	24	9,2	75,0	135,0
19933	12 x 2 x 0,25	24	11,4	117,0	189,0
19934	18 x 2 x 0,25	24	13,5	148,0	248,0
19935	25 x 2 x 0,25	24	15,0	233,0	343,0
19936	2 x 2 x 0,34	22	7,4	41,0	81,0
19937	3 x 2 x 0,34	22	7,7	52,0	100,0
19938	4 x 2 x 0,34	22	8,4	59,0	119,0
19939	5 x 2 x 0,34	22	9,1	67,0	135,0
19940	6 x 2 x 0,34	22	10,0	86,0	163,0
19941	7 x 2 x 0,34	22	10,5	94,0	170,0
19942	12 x 2 x 0,34	22	12,2	122,0	220,0
19943	18 x 2 x 0,34	22	14,4	197,0	277,0
19944	25 x 2 x 0,34	22	16,5	238,0	400,0
19945	2 x 2 x 0,5	20	8,0	53,0	100,0
19946	3 x 2 x 0,5	20	8,4	73,0	131,0
19947	4 x 2 x 0,5	20	9,0	77,0	149,0

Part no.	No.pairs x no.cores x cross-sec. mm <sup>2</sup>	AWG-No.	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km
19948	5 x 2 x 0,5	20	9,7	86,0	160,0
19949	6 x 2 x 0,5	20	10,6	103,0	170,0
19950	7 x 2 x 0,5	20	11,5	117,0	191,0
19951	12 x 2 x 0,5	20	13,5	199,0	361,0
19952	18 x 2 x 0,5	20	15,7	265,0	427,0
19953	25 x 2 x 0,5	20	18,2	344,0	740,0
19954	2 x 2 x 0,75	19	9,0	61,0	102,0
19955	3 x 2 x 0,75	19	9,5	87,0	144,0
19956	4 x 2 x 0,75	19	10,3	95,0	160,0
19957	5 x 2 x 0,75	19	11,2	115,0	193,0
19958	6 x 2 x 0,75	19	12,1	137,0	218,0
19959	7 x 2 x 0,75	19	13,0	153,0	298,0
19960	12 x 2 x 0,75	19	16,0	261,0	406,0
19961	18 x 2 x 0,75	19	18,0	374,0	519,0
19962	2 x 2 x 1	18	10,0	73,0	120,0
19963	3 x 2 x 1	18	10,4	94,0	161,0
19964	4 x 2 x 1	18	11,8	118,0	184,0
19965	5 x 2 x 1	18	12,6	139,0	217,0
19966	6 x 2 x 1	18	13,6	188,0	295,0
19967	7 x 2 x 1	18	14,8	204,0	311,0
19968	12 x 2 x 1	18	18,0	324,0	602,0

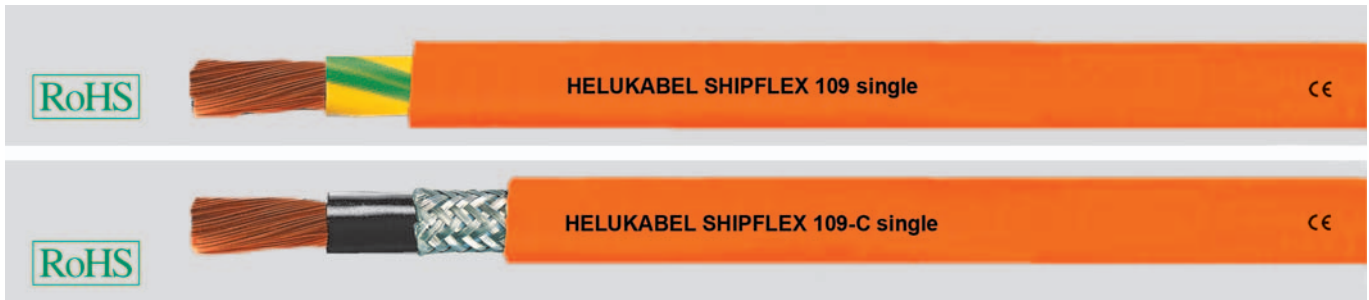
Dimensions and specifications may be changed without prior notice. (RW01)



Suitable accessories can be found in Chapter X.

- Cable Gland - HELUTOP® HT-E

# SHIPFLEX® 109 cable for drag chain, halogen-free, EMC preferred type (-C-Type) , meter marking



### Technical data

- Special drag chain cable
- UL-Style 20234
- **Temperature range**  
flexing -40°C to +80°C  
fixed installation -40°C to +80°C
- **Installation temperature**  
min. -25°C
- **Nominal voltage**  
to VDE U<sub>0</sub>/U 0,6/1 kV  
UL 1000 V
- **Insulation resistance**  
min. 100 MOhm x km
- **Minimum bending radius**  
7,5x cable Ø
- **Coupling resistance**  
(for -C-type)  
max. 250 Ohm/km
- **Radiation resistance**  
up to 100x10<sup>6</sup> cJ/kg (up to 100 Mrad)

### Cable structure

- Bare copper-conductor, to DIN VDE 0295 cl.6, extra fine-wire, BS 6360 cl.6, IEC 60228 cl.6
- Special core insulation
- Colour black or green-yellow
- Screened type with braided screen of tinned copper wires, coverage approx. 85 %
- **Full polyurethane** outer sheath to UL std. 1581 Tab. 50227
- Sheath colour orange (RAL 2003)
- with meter marking

### Properties

- Flame retardant to DIN VDE 0482-332-1-2, DIN EN 60332-1-2/IEC 60332-1 (equivalent DIN VDE 0472 part 804 test method B)
- Halogen-free to DIN VDE 0482 part 267/ DIN EN 50267-2-1/IEC 60754-1 (equivalent DIN VDE 0472 part 815)
- Oil resistant to IEC 60092-350, appendix F
- Behaviour at low temperature at -40°C to IEC 60092-350, appendix E
- Weather, ozon and UV-resistant
- The materials used in manufacture are cadmium-free and contain no silicone and free from substances harmful to the wetting properties of lacquers

### Note

- AWG sizes are approximate equivalent values. The actual cross-section is in mm<sup>2</sup>.

### Application

HELUKABEL® SHIPFLEX® 109 Single is a new developed and successfully tested special drag chain cable which meets the requirements of the strict standards for application in offshore-areas. For this two - line standard there is a **Lloyds Register approval** . The outer sheath insulation of non-adhesive Polyurethane allows the application in extremely oily and rough environmental conditions. For applications which go beyond standard solutions we recommend that you fill out our especially developed questionnaire for drag chains. Before installation in cable drag chains please read the installation instructions.

CE= The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

#### SHIPFLEX® 109 unscreened

Part no.	No. cores x cross-sec. mm <sup>2</sup>	AWG-No.	Core colour	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km
21388	1 x 6	10	black	6,9	58,0	108,0
21374	1 G 6	10	Green-yellow	6,9	58,0	108,0
21389	1 x 10	8	black	8,3	96,0	170,0
21375	1 G 10	8	Green-yellow	8,3	96,0	170,0
21390	1 x 16	6	black	9,5	154,0	240,0
21376	1 G 16	6	Green-yellow	9,5	154,0	240,0
21391	1 x 25	4	black	11,3	240,0	370,0
21377	1 G 25	4	Green-yellow	11,3	240,0	370,0
21392	1 x 35	2	black	12,7	336,0	490,0
21378	1 G 35	2	Green-yellow	12,7	336,0	490,0
21393	1 x 50	1	black	15,0	480,0	665,0
21379	1 G 50	1	Green-yellow	15,0	480,0	665,0
21394	1 x 70	2/0	black	16,3	672,0	910,0
21380	1 G 70	2/0	Green-yellow	16,3	672,0	910,0
21395	1 x 95	3/0	black	18,8	912,0	1190,0
21381	1 G 95	3/0	Green-yellow	18,8	912,0	1190,0
21396	1 x 120	4/0	black	20,9	1152,0	1530,0
21382	1 G 120	4/0	Green-yellow	20,9	1152,0	1530,0
21397	1 x 150	300 kcmil	black	23,2	1440,0	1720,0
21383	1 G 150	300 kcmil	Green-yellow	23,2	1440,0	1720,0
21398	1 x 185	350 kcmil	black	25,7	1776,0	2280,0
21384	1 G 185	350 kcmil	Green-yellow	25,7	1776,0	2280,0
21399	1 x 240	500 kcmil	black	28,2	2304,0	2895,0
21404	1 G 240	500 kcmil	Green-yellow	28,2	2304,0	2895,0

#### SHIPFLEX® 109 screened

Part no.	No. cores x cross-sec. mm <sup>2</sup>	AWG-No.	Core colour	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km
19798	1 x 6	10	black	7,6	72,0	140,0
21330	1 G 6	10	Green-yellow	7,6	72,0	140,0
19799	1 x 10	8	black	9,1	130,0	225,0
21331	1 G 10	8	Green-yellow	9,1	130,0	225,0
19800	1 x 16	6	black	10,2	190,0	295,0
21332	1 G 16	6	Green-yellow	10,2	190,0	295,0
19801	1 x 25	4	black	12,1	260,0	415,0
21333	1 G 25	4	Green-yellow	12,1	260,0	415,0
19802	1 x 35	2	black	13,5	405,0	610,0
21334	1 G 35	2	Green-yellow	13,5	405,0	610,0
19803	1 x 50	1	black	15,9	560,0	817,0
21335	1 G 50	1	Green-yellow	15,9	560,0	817,0
19804	1 x 70	2/0	black	17,3	780,0	1065,0
21336	1 G 70	2/0	Green-yellow	17,3	780,0	1065,0
19805	1 x 95	3/0	black	19,5	1030,0	1340,0
21337	1 G 95	3/0	Green-yellow	19,5	1030,0	1340,0
19806	1 x 120	4/0	black	21,8	1285,0	1735,0
21338	1 G 120	4/0	Green-yellow	21,8	1285,0	1735,0
19807	1 x 150	300 kcmil	black	24,1	1430,0	1910,0
21339	1 G 150	300 kcmil	Green-yellow	24,1	1430,0	1910,0
19808	1 x 185	350 kcmil	black	26,5	1940,0	2610,0
21406	1 G 185	350 kcmil	Green-yellow	26,5	1940,0	2610,0
19809	1 x 240	500 kcmil	black	29,2	2530,0	3274,0
21410	1 G 240	500 kcmil	Green-yellow	29,2	2530,0	3274,0

Dimensions and specifications may be changed without prior notice. (RW01)



Suitable accessories can be found in Chapter X.

- Cable Gland - HELUTOP® HT-E

# SHIPFLEX® 109 cable for drag chain, halogen-free, EMC preferred type, meter marking



## Technical data

- Special screened drag chain cable
- UL-Style 20234
- **Temperature range**  
flexing -40°C to +80°C  
fixed installation -40°C to +80°C
- **Installation temperature**  
min. -25°C
- **Nominal voltage**  
to VDE U<sub>0</sub>/U 0,6/1 kV  
UL 1000 V
- **Insulation resistance**  
min. 200 MOhm x km
- **Minimum bending radius**  
7,5x cable Ø
- **Coupling resistance**  
max. 250 Ohm/km
- **Radiation resistance**  
up to 100x10<sup>6</sup> cJ/kg (up to 100 Mrad)

## Cable structure

- Bare copper-conductor, to DIN VDE 0295 cl.6, extra fine-wire, BS 6360 cl.6, IEC 60228 cl.6
- Special core insulation
- Black cores imprinted with U1, V2, W3
- GN-YE conductor depends on conductor cross-section may cut into thirds
- Cores stranded together with optimal lay-length
- Core wrapping between the layers of stranding
- Braided screening of tinned copper wires, coverage approx. 85%
- **Full polyurethane** outer sheath to UL std. 1581 Tab. 50227
- Sheath colour orange (RAL 2003)
- with meter marking

## Properties

- Flame retardant to DIN VDE 0482-332-1-2, DIN EN 60332-1-2/IEC 60332-1 (equivalent DIN VDE 0472 part 804 test method B)
- Halogen-free to DIN VDE 0482 part 267/ DIN EN 50267-2-1/IEC 60754-1 (equivalent DIN VDE 0472 part 815)
- Oil resistant to IEC 60092-350, appendix F
- Behaviour at low temperature at -40°C to IEC 60092-350, appendix E
- Weather, ozon and UV-resistant
- The materials used in manufacture are cadmium-free and contain no silicone and free from substances harmful to the wetting properties of lacquers

## Note

- AWG sizes are approximate equivalent values. The actual cross-section is in mm<sup>2</sup>.

## Application

HELUKABEL® SHIPFLEX® 109 is a new developed and successfully tested special drag chain cable with overall screening which meets the requirements of the strict standards for application in offshore-areas. For this two-line standard there is a **Lloyds Register approval**. The outer sheath insulation of non-adhesive Polyurethan allows the application in extremely oily and rough environmental conditions. For applications which go beyond standard solutions we recommend that you fill out our especially developed questionnaire for drag chains. Before installation in cable drag chains please read the installation instructions.

**EMC** = Electromagnetic compatibility

To optimize the EMC features we recommend a large round contact of the copper braiding on both ends.

**CE** = The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

Part no.	No.cores x cross-sec. mm <sup>2</sup>	AWG-No.	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km
19810	4 G 1	18	9,0	84,0	124,0
19811	4 G 1,5	16	10,5	105,0	175,0
19812	4 G 2,5	14	11,7	157,0	265,0
19813	4 G 4	12	13,4	231,0	390,0
19814	4 G 6	10	15,6	332,0	570,0
19815	4 G 10	8	19,2	527,0	804,0
19816	4 G 16	6	23,9	794,0	1450,0

Part no.	No.cores x cross-sec. mm <sup>2</sup>	AWG-No.	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km
19817	4 G 25	4	27,6	1180,0	1660,0
19818	4 G 35	2	32,7	1600,0	2400,0
19819	4 G 50	1	37,0	2165,0	2600,0
19820	4 G 70	2/0	43,0	3196,0	4600,0
19969	3 G 95	3/0	41,0	3090,0	4480,0
19821	4 G 95	3/0	48,0	4606,0	5350,0

Dimensions and specifications may be changed without prior notice. (RW01)



Suitable accessories can be found in Chapter X.

- Cable Gland - HELUTOP® HT-E

# SHIPFLEX® 113 cable for drag chain, halogen-free, EMC preferred type, meter marking



### Technical data

- Special screened drag chain cable
- UL-Style 20234
- **Temperature range**  
flexing -40°C to +80°C  
fixed installation -40°C to +80°C
- **Installation temperature**  
min. -25°C
- **Nominal voltage**  
to VDE U<sub>0</sub>/U 0,6/1 kV  
UL 1000 V
- **Insulation resistance**  
min. 20 MOhm x km
- **Minimum bending radius**  
7,5x cable Ø
- **Coupling resistance**  
max. 250 Ohm/km
- **Radiation resistance**  
up to 100x10<sup>6</sup> cJ/kg (up to 100 Mrad)

### Cable structure

- Bare copper-conductor, to DIN VDE 0295 cl.6, extra fine-wire, BS 6360 cl.6, IEC 60228 cl.6
- Special core insulation
- Black power supply cores with imprint U1, V2, W3
- GN-YE conductor, depends of the diameter of the conductor
- Black control cores with white numbers 5,6
- Screening of the control cores in pairs wrapped with plastic aluminium foil, and tinned copper braided screening, approx. coverage 85%
- Control cores stranded in pairs and laid up in layers together with the power supply cores with optimal lay length and stabilising filler
- Core wrapping between the layers of stranding
- Braided screening of tinned copper wires, optimal coverage approx. 85 %
- **Full polyurethane** outer sheath to UL std. 1581 Tab. 50227
- Sheath colour orange (RAL 2003)
- with meter marking

### Properties

- Flame retardant to DIN VDE 0482-332-1-2, DIN EN 60332-1-2/IEC 60332-1 (equivalent DIN VDE 0472 part 804 test method B)
- Halogen-free to DIN VDE 0482 part 267/ DIN EN 50267-2-1/IEC 60754-1 (equivalent DIN VDE 0472 part 815)
- Oil resistant to IEC 60092-350, appendix F
- Behaviour at low temperature at -40°C to IEC 60092-350, appendix E
- Weather, ozon and UV-resistant
- The materials used in manufacture are cadmium-free and contain no silicone and free from substances harmful to the wetting properties of lacquers

### Application

HELUKABEL® SHIPFLEX® 113 is a new developed and successfully tested screened special drag chain cable which meets the requirements of the strict standards for application in offshore-areas. This kind of cable combines the feeding cores with the control cores. For this two-line standard there is a **Lloyds Register approval**. The outer sheath insulation of non-adhesive Polyurethan allows the application in extremely oily and rough environmental conditions. For applications which go beyond standard solutions we recommend that you fill out our especially developed questionnaire for drag chains. Before installation in cable drag chains please read the installation instructions.

**EMC** = Electromagnetic compatibility

To optimize the EMC features we recommend a large round contact of the copper braiding on both ends.

CE= The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
19822	(4 G 1,5 + (2 x 1,0))	11,5	138,0	254,0	-
19827	(4 G 1,5 + (2 x 1,5))	12,0	148,0	265,0	-
19823	(4 G 2,5 + (2 x 1,0))	13,0	176,0	328,0	-
19828	(4 G 2,5 + (2 x 1,5))	14,0	187,0	339,0	-
19824	(4 G 4 + (2 x 1,0))	14,5	258,0	460,0	-
19829	(4 G 4 + (2 x 1,5))	15,0	268,0	475,0	-
19825	(4 G 6 + (2 x 1,0))	17,0	348,0	596,0	-

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
19830	(4 G 6 + (2 x 1,5))	17,0	358,0	607,0	-
19826	(4 G 10 + (2 x 1,0))	20,0	574,0	912,0	-
19831	(4 G 10 + (2 x 1,5))	20,5	584,0	924,0	-
19832	(4 G 16 + (2 x 1,5))	24,0	825,0	1205,0	-
19833	(4 G 25 + (2 x 1,5))	28,5	1283,0	1510,0	-
19834	(4 G 35 + (2 x 1,5))	32,0	1850,0	2005,0	-
19835	(4 G 50 + (2 x 1,5))	37,0	2540,0	2890,0	-

Dimensions and specifications may be changed without prior notice. (RW01)



Suitable accessories can be found in Chapter X.

- Cable Gland - HELUTOP® HT-E



# SHIPFLEX® 121 cable for drag chain, halogen-free, EMC preferred type, meter marking



## Technical data

- Special screened drag chain cable
- UL-Style 20234
- **Temperature range**  
flexing -40°C to +80°C  
fixed installation -40°C to +80°C
- **Installation temperature**  
min. -25°C
- **Nominal voltage**  
to VDE U<sub>0</sub>/U 0,6/1 kV  
UL 1000 V
- **Insulation resistance**  
min. 200 MOhm x km
- **Minimum bending radius**  
7,5x cable Ø
- **Coupling resistance**  
max. 250 Ohm/km
- **Radiation resistance**  
up to 100x10<sup>6</sup> cJ/kg (up to 100 Mrad)

## Cable structure

- Bare copper-conductor, to DIN VDE 0295 cl.6, extra fine-wire, BS 6360 cl.6, IEC 60228 cl.6
- Special core insulation
- Black power supply cores with imprint U1, V2, W3
- GN-YE conductor, depends of the diameter of the conductor
- Black control cores with white numbers 5,6 and 7,8
- Screening of the control cores in pairs wrapped with plastic aluminium foil, and tinned copper braided screening, coverage approx. 85%
- Control cores stranded in pairs and laid up in layers together with the power supply cores with optimal lay length and stabilising filler
- Core wrapping between the layers of stranding
- Braided screening of tinned copper wires, coverage approx. 85 %
- **Full polyurethane** outer sheath to UL std. 1581 Tab. 50227
- Sheath colour orange (RAL 2003)
- with meter marking

## Properties

- Flame retardant to DIN VDE 0482-332-1-2, DIN EN 60332-1-2/IEC 60332-1 (equivalent DIN VDE 0472 part 804 test method B)
- Halogen-free to DIN VDE 0482 part 267/ DIN EN 50267-2-1/IEC 60754-1 (equivalent DIN VDE 0472 part 815)
- Oil resistant to IEC 60092-350, appendix F
- Behaviour at low temperature at -40°C to IEC 60092-350, appendix E
- Weather, ozon and UV-resistant
- The materials used in manufacture are cadmium-free and contain no silicone and free from substances harmful to the wetting properties of lacquers

## Application

HELUKABEL® SHIPFLEX® 121 is a new developed and successfully tested screened special drag chain cable which meets the requirements of the strict standards for application in offshore-areas. This kind of cable combines the feeding cores with the control cores. For this two - line standard there is a **Lloyds Register approval**. The outer sheath insulation of non-adhesive Polyurethan allows the application in extremely oily and rough environmental conditions. For applications which go beyond standard solutions we recommend that you fill out our especially developed questionnaire for drag chains. Before installation in cable drag chains please read the installation instructions.

**EMC** = Electromagnetic compatibility

To optimize the EMC features we recommend a large round contact of the copper braiding on both ends.

CE = The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
19836	(4 G 1 + 2 x (2 x 0,75))	12,5	148,0	254,0	-
19837	(4 G 1,5 + 2 x (2 x 0,75))	13,0	170,0	290,0	-
19838	(4 G 2,5 + 2 x (2 x 1,0))	15,0	229,0	336,0	-
19839	(4 G 4 + (2 x 1,5) + (2 x 1,0))	17,0	318,0	485,0	-
19840	(4 G 6 + (2 x 1,5) + (2 x 1,0))	18,5	445,0	615,0	-

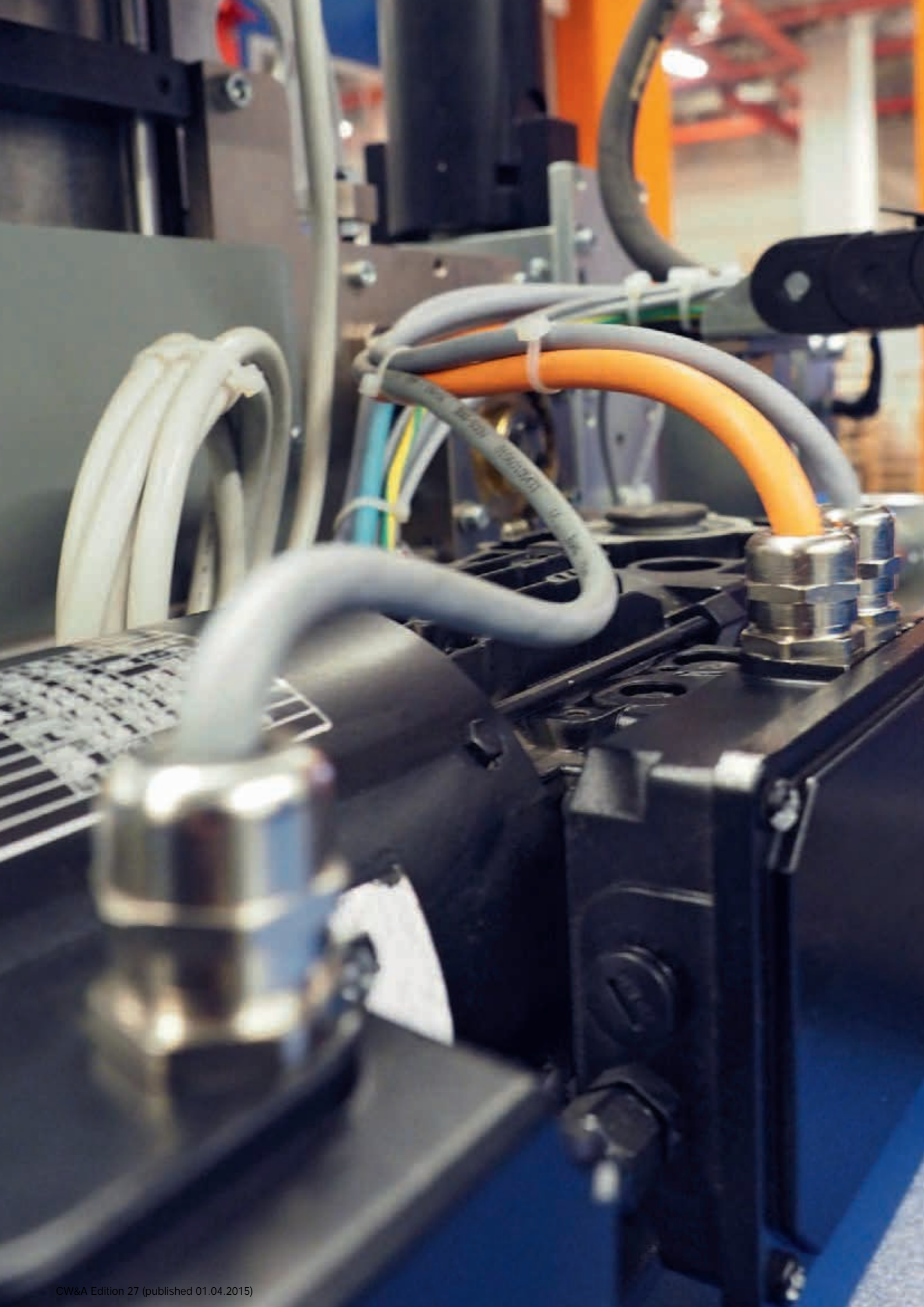
Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
19841	(4 G 10 + (2 x 1,5) + (2 x 1,0))	22,0	610,0	915,0	-
19842	(4 G 16 + 2 x (2 x 1,5))	25,0	904,0	1226,0	-
19843	(4 G 25 + 2 x (2 x 1,5))	29,0	1323,0	1595,0	-
19844	(4 G 35 + 2 x (2 x 1,5))	33,0	1621,0	2196,0	-
19845	(4 G 50 + 2 x (2 x 1,5))	37,0	2585,0	2995,0	-

Dimensions and specifications may be changed without prior notice. (RW01)



Suitable accessories can be found in Chapter X.

- Cable Gland - HELUTOP® HT-E



## ■ CABLE ACCESSORIES

Cable glands 942

---

Cable protection tube systems 968

---

Shrink tubes 976

---

Cable ties 980

---

Core end sleeves & cable lugs 986

---

PV-male and female cable couplers 1000

---

Tools 1002

---





HELUTOP® HT












HSK-PVDF

**HELUTOP® MS-EP4**

KVA-XXL-MS

HELUTOP® HT-Clean

# CABLE GLANDS

Designation	Properties	Approvals	Page
HELUTOP® HT	Cable gland		944
HELUTOP® HT-MS	Cable gland		946
HT-E	Cable gland		948
HELUTOP® MS-EP	EMC cable gland		949
HELUTOP® MS-EP4	EMC cable gland		950
HELUTOP® HT-Clean	Stainless steel cable gland		951
HELUTOP® HT-Clean EMV	Stainless steel cable gland		952
HELUTOP® HT-PA-EX	Cable gland, hazardous area		953
HELUTOP® HT-MS-EX-d	Cable gland, hazardous area, pressure resistant		954
HELUTOP® HT-MS Plus	Cable gland		955
HSK-PVDF	Cable gland		956
KVA-XXL-MS	Cable gland		958
KVA-XXL-MS-E	EMC cable gland		959
STK-F	Flat cable gland		960
STS-F	Flat cable gland		961
KMK-PA-MB	Lock nut with collar		962
KM	Lock nut		963
KM-INOX	Lock nut		965
KM-EMV	EMC lock nut		966



# HELUTOP® HT cable gland



## HELUTOP® HT

The plastic cable gland with vibration protection.

### Application

- Plant and machine construction
- Robot construction
- Automation technology
- Vehicle construction and shipbuilding
- Rail technology
- Installation technology
- Control cabinet construction

### Material

Polyamide PA 6  
Seal: Chloroprene-rubber (CR)

- halogen-free
- phosphor-free
- silicone-free
- cadmium-free

### Properties

- Optimum strain relief through clamping plates
- Easy to assemble
- Large clamping areas

### Note

Details on the individual tests appear in section Technical Information.

### Technical data

Protection class: IP 68 - 5 bar / IP 69K

Temperature range: -20°C up to +100°C

Test standard: EN50262



### Dimensions

- G Thread size
- GL Thread length
- SW Spanner size

### metric thread

Part no. light grey RAL 7035	Part no. dark grey RAL 7001	Part no. black RAL 9005	Size Metr.	Cable Ø from / to mm	Thread length mm	Spanner size mm	Unit
93908	93923	93937	M12 x 1,5	3,0 - 6,5	6,0	15	100
93909	93924	93938	M16 x 1,5	4,0 - 8,0	8,0	19	50
907275	907276	907277	M16 x 1,5	5,0 - 10,0	8,0	19	50
92667	92668	92669	M16 x 1,5	5,0 - 10,0	10,0	22	50
93910	93925	93939	M20 x 1,5	6,0 - 12,0	10,0	24	50
93911	93926	93940	M25 x 1,5	11,0 - 17,0	8,0	29	50
93912	93927	93941	M32 x 1,5	15,0 - 21,0	10,0	36	25
93913	93928	93942	M40 x 1,5	19,0 - 28,0	10,0	46	20
93914	93929	93943	M50 x 1,5	30,0 - 38,0	18,0	60	10
93915	93930	93944	M63 x 1,5	34,0 - 44,0	18,0	65	10

### metric thread - with reducing seal

Part no. light grey RAL 7035	Part no. dark grey RAL 7001	Part no. black RAL 9005	Size Metr.	Cable Ø from / to mm	Thread length mm	Spanner size mm	Unit
903532	903542	903552	M12 x 1,5	2,0 - 5,0	8,0	15	100
903533	903543	903553	M16 x 1,5	2,0 - 6,0	8,0	19	50
903534	903544	903554	M20 x 1,5	5,0 - 9,0	10,0	24	50
903535	903545	903555	M25 x 1,5	9,0 - 13,0	8,0	29	50
903536	903546	903556	M32 x 1,5	11,0 - 15,0	10,0	36	25
903537	903547	903557	M40 x 1,5	16,0 - 23,0	10,0	46	20
903538	903548	903558	M50 x 1,5	25,0 - 31,0	18,0	60	10
903539	903549	903559	M63 x 1,5	29,0 - 35,0	18,0	65	10

Continuation ►

**HELUTOP® HT** cable gland**PG thread**

Part no. light grey RAL 7035	Part no. dark grey RAL 7001	Part no. black RAL 9005	Size PG	Cable Ø from / to mm	Thread length mm	Spanner size mm	Unit	
99300	99310	99320	7	3,0 - 6,5	8,0	15	100	-
99301	99311	99321	9	4,0 - 8,0	8,0	19	50	-
99302	99312	99322	11	5,0 - 10,0	8,0	22	50	-
99303	99313	99323	13,5	6,0 - 12,0	9,0	24	50	-
99304	99314	99324	16	10,0 - 14,0	10,0	27	50	-
99305	99315	99325	21	13,0 - 18,0	11,0	33	25	-
99306	99316	99326	29	18,0 - 25,0	11,0	42	20	-
99307	99317	99327	36	22,0 - 32,0	13,0	53	10	-
99308	99318	99328	42	30,0 - 38,0	13,0	60	10	-
99309	99319	99329	48	34,0 - 44,0	14,0	65	10	-

**NPT thread**

Part no. light grey RAL 7035	Part no. dark grey RAL 7001	Part no. black RAL 9005	Size NPT	Cable Ø from / to mm	Thread length mm	Spanner size mm	Unit	
92780	92790	92800	3/8"	5,0 - 10,0	15,0	22	50	-
92781	92791	92801	1/2"	6,0 - 12,0	15,0	24	50	-
92782	92792	92802	1/2"	10,0 - 14,0	15,0	27	50	-
92783	92793	92803	3/4"	13,0 - 18,0	15,0	33	25	-
92784	92794	92804	1"	18,0 - 25,0	18,0	42	20	-

Dimensions and specifications may be changed without prior notice.

**HELUTOP® HT-MS** cable gland**HELUTOP® HT-MS**

The nickel-coated brass cable gland.

**Application**

- Plant and machine construction
- Robot construction
- Automation technology
- Vehicle construction and shipbuilding
- Rail technology
- Installation technology
- Control cabinet construction

**Material**

Brass, nickel plated  
Clamp: Polyamide PA 6  
Seal: Chloroprene-rubber (CR)  
O-ring: NBR

**Properties**

- Optimum strain relief through clamping plates
- Easy to assemble
- Large clamping areas

**Note**

Details on the individual tests appear in section "Technical Information".

**Technical data**

Protection class: IP 68 - 5 bar / IP 69K

Temperature range: -40°C up to +100°C

Test standard: EN50262

**Dimensions**

G Thread size  
GL Thread length  
SW Spanner size

**metric thread**

Part no.	Size Metr.	Cable Ø from / to mm	Thread length mm	Spanner size mm	Unit	
90760	M12 x 1,5	3,0 - 6,5	6,0	14	50	-
99960	M16 x 1,5	5,0 - 10,0	7,0	20	50	-
90762	M20 x 1,5	6,0 - 12,0	8,0	22	50	-
99961	M25 x 1,5	11,0 - 17,0	8,0	27	25	-
94624	M32 x 1,5	15,0 - 21,0	8,0	34	20	-
99962	M40 x 1,5	19,0 - 28,0	9,0	43	5	-
99963	M50 x 1,5	30,0 - 38,0	9,0	58	5	-
90767	M63 x 1,5	34,0 - 44,0	14,0	64 / 68	5	-
906199	M63 x 1,5	44,0 - 55,0	10,0	75	5	-

**metric thread - with reducing seal**

Part no.	Size Metr.	Cable Ø from / to mm	Thread length mm	Spanner size mm	Unit	
903560	M12 x 1,5	2,0 - 5,0	6,0	14	50	-
903561	M16 x 1,5	3,0 - 7,0	7,0	20	50	-
903562	M20 x 1,5	5,0 - 9,0	8,0	22	50	-
903563	M25 x 1,5	9,0 - 13,0	8,0	27	25	-
903564	M32 x 1,5	11,0 - 15,5	8,0	34	20	-
903565	M40 x 1,5	16,0 - 23,0	9,0	43	5	-
903566	M50 x 1,5	25,0 - 31,0	9,0	58	5	-
903567	M63 x 1,5	29,0 - 35,0	14,0	64 / 68	5	-

Continuation ▶

**HELUTOP® HT-MS** cable gland**PG thread**

Part no.	Size PG	Cable Ø from / to mm	Thread length mm	Spanner size mm	Unit	
90750	7	3,0 - 6,5	5,0	14	50	-
90751	9	4,0 - 8,0	6,0	17	50	-
90752	11	5,0 - 10,0	6,0	20	50	-
90753	13,5	6,0 - 12,0	6,5	22	50	-
90754	16	10,0 - 14,0	6,5	24	25	-
90755	21	13,0 - 18,0	7,0	30	25	-
90756	29	18,0 - 25,0	8,0	40	20	-
90757	36	22,0 - 32,0	9,0	50	5	-
90758	42	32,0 - 38,0	14,0	58	5	-
90759	48	37,0 - 44,0	14,0	64	5	-

**NPT thread**

Part no.	Size NPT	Cable Ø from / to mm	Thread length mm	Spanner size mm	Unit	
99965	3/8"	5,0 - 10,0	15,0	20	50	-
99966	1/2"	6,0 - 12,0	15,0	22	50	-
99967	3/4"	13,0 - 18,0	15,0	27	25	-
99968	1"	18,0 - 25,0	17,0	34	10	-

Dimensions and specifications may be changed without prior notice.

**HT-E cable gland**

stainless steel

**HELUTOP® HT-E**

The stainless steel cable gland for heavy load.

**Application**

- Plant and machine construction
- Robot construction
- Automation technology
- Vehicle construction and shipbuilding
- Rail technology
- Installation technology
- Control cabinet construction

**Material**

Stainless steel 1.4305 / AISI 303  
Clamp: Polyamide PA 6  
Seal: Chloroprene-rubber (CR)  
O-ring: NBR

**Properties**

- Optimum strain relief through clamping plates
- Highly corrosion-resistant
- Highly durable
- Easy to assemble
- Large clamping areas

**Note**

Details on the individual tests appear in section "Technical Information".

**Technical data**

Protection class: IP 68 - 5 bar

Temperature range: -40°C up to +100°C

Test standard: EN50262

**Dimensions**

G Thread size  
GL Thread length  
SW Spanner size

**metric thread**

Part no.	Size Metr.	Cable Ø from / to mm	Thread length mm	Spanner size mm	Unit	
99980	M12 x 1,5	3,0 - 6,5	6,0	14	50	-
99981	M16 x 1,5	5,0 - 10,0	7,0	22	50	-
99982	M20 x 1,5	6,0 - 12,0	8,0	22	50	-
99983	M25 x 1,5	11,0 - 17,0	8,0	27	25	-
99984	M32 x 1,5	15,0 - 21,0	8,0	36	25	-
99985	M40 x 1,5	19,0 - 28,0	9,0	46	20	-
99986	M50 x 1,5	30,0 - 38,0	9,0	60	12	-
99987	M63 x 1,5	34,0 - 44,0	14,0	65 / 68	12	-

**PG thread**

Part no.	Size PG	Cable Ø from / to mm	Thread length mm	Spanner size mm	Unit	
99970	7	3,0 - 6,5	6,0	14	50	-
99971	9	4,0 - 8,0	6,0	17	50	-
99972	11	5,0 - 10,0	6,0	22	50	-
99973	13,5	6,0 - 12,0	6,5	22	50	-
99974	16	10,0 - 14,0	6,5	24	25	-
99975	21	13,0 - 18,0	7,2	30	25	-
99976	29	18,0 - 25,0	8,0	41	20	-
99977	36	22,0 - 32,0	9,0	50	15	-
99978	42	30,0 - 38,0	12,0	60	12	-
99979	48	34,0 - 44,0	14,0	65	12	-

**NPT thread**

Part no.	Size NPT	Cable Ø from / to mm	Thread length mm	Spanner size mm	Unit	
99800	3/8"	5,0 - 10,0	11,5	20	50	-
99801	1/2"	6,0 - 12,0	13,0	22	50	-
99802	3/4"	13,0 - 18,0	13,0	30	25	-
99803	1"	18,0 - 25,0	13,0	40 / 43	10	-

Dimensions and specifications may be changed without prior notice.



**HELUTOP® MS-EP** EMC cable gland**HELUTOP® MS-EP**

The EMC- and earthing gland with integrated contact system for safe, quick assembly and contacting.

**Application**

- Plant and machine construction
- Robot construction
- Automation technology
- Vehicle construction and shipbuilding
- Rail technology
- Installation technology
- Control cabinet construction

**Material**

Brass, nickel plated  
Contact system: Copper-Beryllium  
Clamp: Polyamide PA 6  
Seal: Chloroprene-rubber (CR)  
O-ring: NBR

**Properties**

- Optimum strain relief through clamping plates
- No damage of shield during assembly or disassembly by moving contact ring
- Contact made automatically when the gland is closed
- Excellent shield damping and current deflection
- High savings achieved in time and assembly costs

**Note**

Details on the individual tests appear in section "Technical Information".

**Technical data**

Protection class: IP 68 - 5 bar

Temperature range: -40°C up to +100°C

Test standard: EN50262

Contact system: patented

**Dimensions**

G Thread size  
GL Thread length  
SW Spanner size

**metric thread**

Part no.	Size Metr.	Cable Ø from / to mm	Thread length mm	Spanner size mm	Unit	
99950	M12 x 1,5	3,0 - 6,5	6,0	14	50	-
99951	M16 x 1,5	5,0 - 10,0	7,0	20	50	-
99952	M20 x 1,5	6,0 - 12,0	8,0	22	50	-
99953	M25 x 1,5	11,0 - 17,0	8,0	27	25	-
99954	M32 x 1,5	15,0 - 21,0	8,0	34	25	-
99955	M40 x 1,5	19,0 - 28,0	9,0	43	20	-
99956	M50 x 1,5	27,0 - 38,0	9,0	58	5	-
99957	M63 x 1,5	34,0 - 44,0	14,0	64 / 68	5	-

Dimensions and specifications may be changed without prior notice.

**HELUTOP® MS-EP4** EMC cable gland**HELUTOP® MS-EP4**

The EMC- cable gland with integrated contact system.

**Application**

- Plant and machine construction
- Robot construction
- Automation technology
- Vehicle construction and shipbuilding
- Rail technology
- Installation technology
- Control cabinet construction

**Material**

Brass, nickel plated  
 Contact system: Copper-Beryllium  
 Clamp: Polyamide PA 6  
 Seal: Chloroprene-rubber (CR)  
 O-ring: NBR

**Properties**

- Easy installation
- Secure contact
- High vibration resistance

**Note**

Details on the individual tests appear in section "Technical Information".

**Technical data**

Protection class: IP 68 - 5 bar

Temperature range: -40°C up to +100°C

Contact system: patented

**Dimensions**

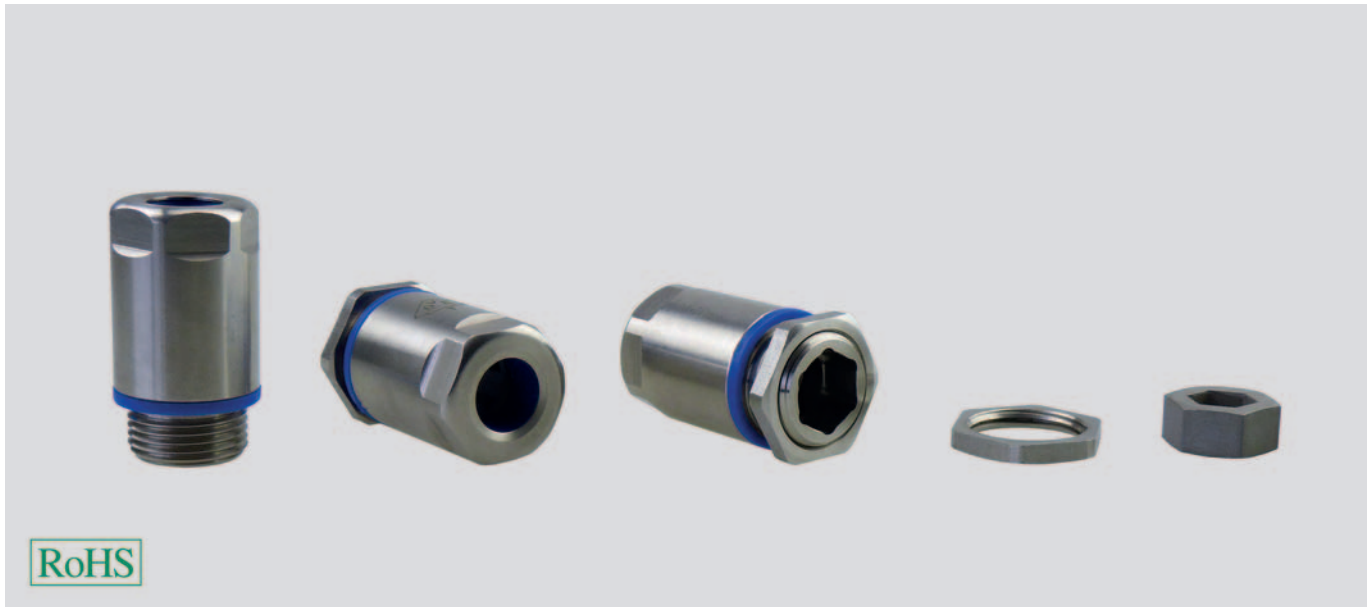
G Thread size  
 GL Thread length  
 SW Spanner size

**metric thread**

Part no.	Size Metr.	Cable Ø from / to mm	Thread length mm	Spanner size mm	Unit	
905181	M12 x 1,5	3,0 - 6,5	6,0	14	50	-
905182	M16 x 1,5	5,0 - 10,0	6,0	20	50	-
905183	M20 x 1,5	6,0 - 12,0	6,0	22	50	-
905184	M20 x 1,5	7,5 - 14,0	8,0	24	50	-
905185	M25 x 1,5	10,0 - 18,0	8,0	30	25	-
905186	M32 x 1,5	16,0 - 25,0	9,0	40	20	-
905187	M40 x 1,5	22,0 - 32,0	9,0	50	20	-
905188	M50 x 1,5	30,0 - 38,0	9,0	58	10	-
905189	M63 x 1,5	34,0 - 44,0	14,0	64 / 68	5	-
905248	M63 x 1,5	37,0 - 53,0	10,0	75	5	-

Dimensions and specifications may be changed without prior notice.

# HELUTOP® HT-Clean Stainless steel cable gland



## HELUTOP® HT-Clean

Highest requirements to cleanliness and cleaning.

### Application

- Food industry - milk and meat products
- Packaging of food machines
- Beverage industry
- Pharmaceutical industry
- Clean room technology
- Biotechnology
- Chemical industry

### Material

Stainless steel 1.4305 / AISI 303  
Strain relief: POM  
Grommet: **TPE according to FDA 21 CFR 177.2600**

### Properties

- the smooth surface prevents to adhere harmful micro organisms
- easy, fast and less expensive cleaning because of the smooth surface
- suitable for high pressure steam cleanin
- resistant against chemical cleaning supplies
- no threads are exposed
- high tightness
- no enter from water and dirt from outside
- reliable strain relief due to strain relief element separated from grommet

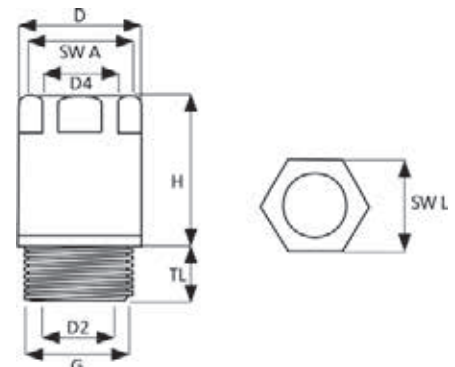
### Note

- For tightening from outside you have to use the listed tightening tool
- The cable gland can be assembled with a commercial socket wrench
- **Delivery including counternut**

### Technical data

Protection class: IP 68-5 bar, 30 min. according to EN 60529;  
IP 69K according to DIN 40050-9

Temperature range: -20°C up to +100°C  
Temperature range temporary: -40°C up to +150°C



### Dimensions

D Outer diameter of upper part  
D2 Inner diameter of thread  
D4 Inner diameter of upper part  
H Height without thread  
TL Thread length  
SW Spanner size

## HELUTOP® Clean

Part no.	Size Metr.	Cable Ø from / to mm	Thread length mm	Spanner size mm	Outer Ø of upper part mm	Inner Ø of upper part mm	Inner Ø of thread mm	Height without thread mm	Recommended Cap Counternut Nm	Unit
906914	M12 x 1,5	3,0 - 6,5	6,0	14	15,6	6,8	7	21,5	2,5	1
906915	M16 x 1,5	5,0 - 10,0	7,0	18	20,2	10,3	10	23	4	1
906916	M20 x 1,5	6,0 - 12,0	10,0	22	24,1	12,3	13	27	5	1
906917	M25 x 1,5	12,0 - 17,0	14,0	28	30,1	17,3	17	30	6	1

### Counternut

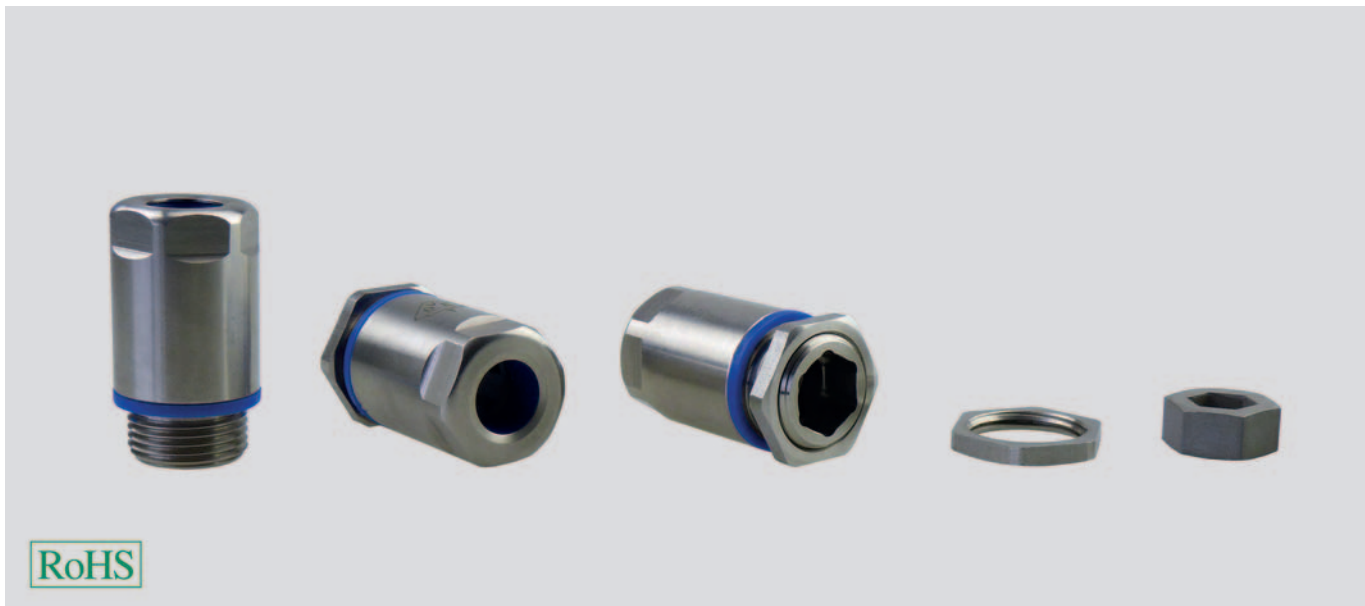
Spanner size mm	Height without thread mm	Recommended Cap Counternut Nm
15	2,8	6
19	3	9
24	3,5	12
30	4	14

### Tightening Tool

Part no.	Size Metr.	Spanner size mm	Height mm	Unit
906921	M12 x 1,5	5 / 7	5	1
906922	M16 x 1,5	6 / 10	5	1
906923	M20 x 1,5	8 / 13	8	1
906924	M25 x 1,5	10 / 17	8	1

Dimensions and specifications may be changed without prior notice.

# HELUTOP® HT-Clean-EMV (EMC) Stainless steel cable gland



## HELUTOP® HT-Clean EMC

Highest requirements to cleanliness and cleaning.

### Application

- Food industry - milk and meat products
- Packaging of food machines
- Beverage industry
- Pharmaceutical industry
- Clean room technology
- Biotechnology
- Chemical industry

### Material

Stainless steel 1.4305 / AISI 303  
Strain relief: POM  
Grommet: **TPE according to FDA 21 CFR 177.2600**

### Properties

- the smooth surface prevents to adhere harmful micro organisms
- easy, fast and less expensive cleaning because of the smooth surface
- suitable for high pressure steam cleanin
- resistant against chemical cleaning supplies
- no threads are exposed
- high tightness
- no enter from water and dirt from outside
- reliable strain relief due to strain relief element separated from grommet

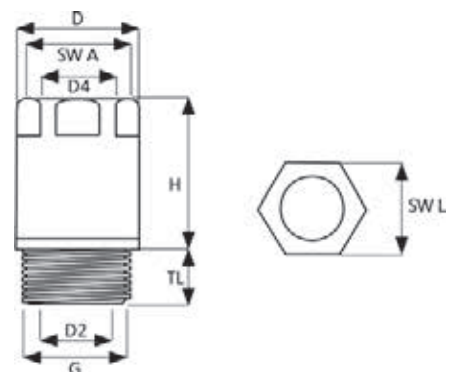
### Note

- For tightening from outside you have to use the listed tightening tool
- The cable gland can be assembled with a commercial socket wrench
- **Delivery including Counternut**

### Technical data

Protection class: IP 68-5 bar, 30 min. according to EN 60529;  
IP 69K according to DIN 40050-9

Temperature range: -20°C up to +100°C  
Temperature range temporary: -40°C up to +150°C



### Dimensions

- D Outer diameter of upper part
- D2 Inner diameter of thread
- D4 Inner diameter of upper part
- H Height without thread
- TL Thread length
- SW Spanner size

## HELUTOP® Clean-EMV (EMC)

Part no.	Size Metr.	Cable Ø from / to mm	Thread length mm	Spanner size mm	Outer Ø of upper part mm	Inner Ø of upper part mm	Inner Ø of thread mm	Height without thread mm	Recommended Cap Counternut Nm	Unit
906918	M16 x 1,5	5,0 - 10,0	7,0	18	20,2	10,3	10	28,5	4	1
906919	M20 x 1,5	6,0 - 12,0	10,0	22	24,1	12,3	13	33	5	1
906920	M25 x 1,5	12,0 - 17,0	14,0	28	30,1	17,3	17	38	6	1

## Counternut Clean-EMV (EMC)

Spanner size mm	Height without thread mm	Recommended Cap Counternut Nm
19	3	9
24	3,5	12
30	4	14

## Tightening Tool

Part no.	Size Metr.	Spanner size mm	Height mm	Unit
906921	M12 x 1,5	5 / 7	5	1
906922	M16 x 1,5	6 / 10	5	1
906923	M20 x 1,5	8 / 13	8	1
906924	M25 x 1,5	10 / 17	8	1

Dimensions and specifications may be changed without prior notice.

**HELUTOP® HT-PA-EX** explosive area**HELUTOP® HT-PA-EX**

For use in explosive areas.

**Application**

- Zone 1, Zone 2, Zone 21, Zone 22, IIA, IIB, IIC

**Material**

Polyamide PA 6  
Seal: NBR  
O-ring: NBR

- halogen-free
- phosphor-free
- silicone-free
- cadmium-free

**Note****Certificate of Conformity:**

IMQ 08 ATEX 012 X

**Marking:** EX II 2GD Ex e II, Ex tD A21

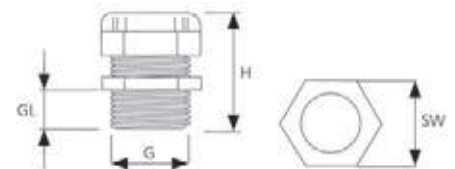
For intrinsically safe area type "i", in blue on request.

**Technical data**

Protection class: IP 66 / IP 68 (EN 60529)

Temperature range: -20°C up to +80°C

Test standard: EN60079-0:2006 /  
EN60079-7:2007 / EN60079-11:2007 /  
EN61241-0:2006 / EN61241-1:2004

**Dimensions**

G Thread size  
GL Thread length  
SW Spanner size

Part no. black	Size Metr.	Cable Ø from / to mm	Thread length mm	Spanner size mm	Height mm	Unit
906689	M12 x 1,5	3,0 - 6,5	8,0	15	31	100
906936	M12 x 1,5	3,0 - 6,5	15,0	15	31	100
906690	M16 x 1,5	4,5 - 10,0	10,0	19	38	50
906937	M16 x 1,5	4,5 - 10,0	15,0	19	43	50
906691	M20 x 1,5	6,0 - 12,0	10,0	24	41	50
906938	M20 x 1,5	6,0 - 12,0	15,0	24	46	50
906692	M20 x 1,5	10,0 - 14,0	10,0	27	42	50
906939	M20 x 1,5	10,0 - 14,0	15,0	27	46,5	50
906693	M25 x 1,5	13,0 - 18,0	10,0	33	47	25
906940	M25 x 1,5	13,0 - 18,0	15,0	33	47	25
906694	M25 x 1,5	11,0 - 17,0	8,0	29	42,5	50
906695	M32 x 1,5	15,0 - 21,0	10,0	36	50	25
906696	M32 x 1,5	18,0 - 25,0	15,0	42	58,5	25
906697	M40 x 1,5	19,0 - 28,0	10,0	46	55	20
906698	M40 x 1,5	22,0 - 32,0	18,0	53	68	10
906699	M50 x 1,5	30,0 - 38,0	18,0	60	69	10
906700	M63 x 1,5	34,0 - 44,0	18,0	65	71	10

Dimensions and specifications may be changed without prior notice.



# HELUTOP® HT-MS-EX-d cable gland



Brass, explosive area, pressure resistant



## HELUTOP® HT-MS-EX-d

For use in explosive areas

### Application

- Zone 1, Zone 2, Zone 21, Zone 22, IIA, IIB, IIC

### Material

Brass, nickel plated  
 Clamp: Polyamide PA 6  
 Seal: Chloroprene-rubber (CR)  
 O-ring: NBR

### Note

#### Certificate of Conformity:

IMQ 11 ATEX 038X

#### Marking:

Ex-d, Ex-e, EX II 2GD, Exd IIC Gb, Exe IIC Gb,  
 Ex t IIIC DB  
 Stainless steel 1.4404 and other temperature  
 ranges available on request.

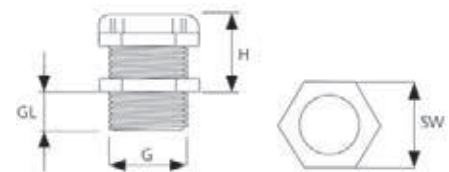
**Unit: 1 pcs**

### Technical data

Protection class: IP 66 / IP 68 (EN 60529)

Temperature range: -30°C up to +120°C

Test standard: EN60079-0:2009 /  
 EN60079-1:2007 / EN60079-7:2007 /  
 EN60079-11:2010 / EN60079-31:2009



### Dimensions

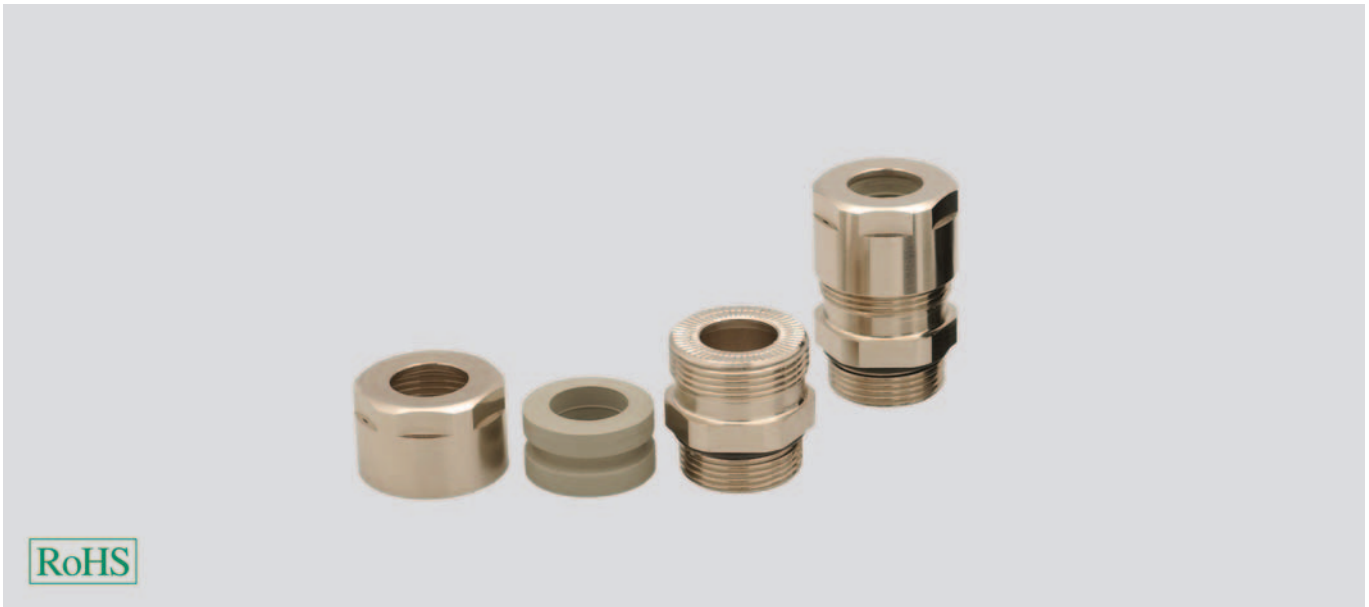
G Thread size  
 GL Thread length  
 SW Spanner size

Part no.	Size Metr.	Cable Ø from / to mm	Thread length mm	Spanner size mm	Height mm
906941	M16 x 1,5	3,0 - 12,0	16,0	22	24
906942	M20 x 1,5	3,0 - 12,0	16,0	22	24
906943	M20 x 1,5	10,0 - 16,0	16,0	28	29
906944	M25 x 1,5	10,0 - 18,0	16,0	28	24
906945	M25 x 1,5	14,0 - 20,0	16,0	35	34
906946	M32 x 1,5	14,0 - 24,0	16,0	35	27
906947	M32 x 1,5	22,0 - 28,0	16,0	45	37
906948	M40 x 1,5	22,0 - 32,0	18,0	45	27
906949	M40 x 1,5	26,0 - 34,0	18,0	50	37
906950	M50 x 1,5	26,0 - 35,0	18,0	55 / 50	28
906951	M50 x 1,5	35,0 - 44,0	18,0	55 / 58	45
906952	M63 x 1,5	35,0 - 45,0	18,0	68 / 58	35
906953	M63 x 1,5	45,0 - 57,0	18,0	75 / 80	44
906954	M75 x 1,5	46,0 - 62,0	20,0	80	44
906955	M75 x 1,5	60,0 - 70,0	20,0	95	55
906956	M90 x 1,5	60,0 - 75,0	20,0	95	55
906957	M90 x 1,5	75,0 - 85,0	20,0	105	57
906958	M100 x 1,5	75,0 - 85,0	20,0	105	57
906982	M110 x 1,5	85,0 - 95,0	20,0	115	57

Dimensions and specifications may be changed without prior notice.

# HELUTOP® HT-MS Plus cable gland

for increased strain relief



## HELUTOP® HT-MS Plus

The nickel-coated brass cable gland for very high density and strain relief.

### Application

- Plant and machine construction
- Automation technology
- Vehicle construction and shipbuilding
- Installation technology
- Control cabinet construction

### Material

Brass, nickel plated  
Seal: NBR  
O-ring: NBR

### Properties

- Optimum strain relief through clamping plates (strain relief B to EN 50262 over the entire clamping region)
- Easy to assemble
- Large clamping areas

### Note

For rotating the cap nut use tool. Note tightening torque!  
Details on the individual tests appear in section "Technical Information".

### Technical data

Protection class: IP 68 - 40 bar / IP 69K  
Temperature range: -40°C up to +120°C

Test standard: EN50262



### Dimensions

G Thread size  
GL Thread length  
SW Spanner size

### metric thread

Part no.	Size Metr.	Sealing insert colour	Cable Ø from / to mm	Thread length mm	Spanner size mm	Unit	
905720	M16 x 1,5	grey	4,0 - 11,0	8,0	21	100	-
905721	M20 x 1,5	grey	5,0 - 13,0	10,0	24	100	-
905722	M25 x 1,5	grey	6,5 - 15,5	10,0	28	50	-
905723	M25 x 1,5	grey	10,0 - 20,0	10,0	30	50	-

Dimensions and specifications may be changed without prior notice.



# HSK-PVDF cable gland

Polyvinylidene fluoride



## HSK-PVDF

Polyvinylidene fluoride for use in the chemical industry, at high temperatures, under long-term UV exposure.

The cable gland to meet stringent requirements in technology.

## Material

PVDF  
Clamp: PVDF  
Seal: FKM

- phosphor-free
- silicone-free
- cadmium-free

## Properties

- Easy to assemble
- Completely water-tight
- Optimum strain relief
- Large clamping areas

## Technical data

Protection class: IP 68 - 10 bar / IP 69K (within the specific clamping range with additional o-ring)

Temperature range: -35°C up to +150°C

Test standard: EN50262



## Dimensions

G Thread size  
GL Thread length  
SW Spanner size

### metric thread

Part no. natural	Size Metr.	Cable Ø from / to mm	Thread length mm	Spanner size mm	Unit
97527	M12 x 1,5	3,0 - 6,5	8,0	15	50
97528	M16 x 1,5	4,0 - 8,0	8,0	19	50
97529	M20 x 1,5	6,0 - 12,0	9,0	24	50
97530	M25 x 1,5	13,0 - 18,0	11,0	33	50
97531	M32 x 1,5	18,0 - 25,0	11,0	42	25

### metric thread - with reducing seal

Part no. natural	Size Metr.	Cable Ø from / to mm	Thread length mm	Spanner size mm	Unit
99630	M12 x 1,5	2,0 - 5,0	8,0	15	50
99631	M16 x 1,5	2,0 - 6,0	8,0	19	50
99632	M20 x 1,5	5,0 - 9,0	9,0	24	50
99633	M25 x 1,5	9,0 - 16,0	11,0	33	50
99634	M32 x 1,5	13,0 - 20,0	11,0	42	25

Continuation ►

**HSK-PVDF** cable gland

Polyvinylidene fluoride

**PG thread**

Part no. natural	Size PG	Cable Ø from / to mm	Thread length mm	Spanner size mm	Unit	
97184	7	3,0 - 6,5	8,0	15	50	-
96748	9	4,0 - 8,0	8,0	19	50	-
97185	11	5,0 - 10,0	8,0	22	50	-
97186	13,5	6,0 - 12,0	9,0	24	50	-
97187	16	10,0 - 14,0	10,0	27	50	-
97188	21	13,0 - 18,0	11,0	33	50	-
97189	29	18,0 - 25,0	11,0	42	25	-
97190	36	22,0 - 32,0	13,0	53	10	-
97191	42	32,0 - 38,0	13,0	60	5	-
97192	48	37,0 - 44,0	14,0	65	5	-

**NPT thread**

Part no. natural	Size NPT	Cable Ø from / to mm	Thread length mm	Spanner size mm	Unit	
91675	3/8"	4,0 - 8,0	15,0	19 / 22	50	-
91676	1/2"	6,0 - 12,0	13,0	24	50	-
91677	1/2"	10,0 - 14,0	13,0	27	50	-
91678	3/4"	13,0 - 18,0	14,0	33	50	-

Dimensions and specifications may be changed without prior notice.

**KVA-XXL-MS** cable gland

for particularly large cable diameters

**KVA-XXL-MS**

Cable gland made of brass for very large cable diameters.

**Application**

- Plant and machine construction
- Robot construction
- Automation technology
- Vehicle construction and shipbuilding
- Installation technology
- Control cabinet construction

**Material**

Brass, nickel plated  
Seal: TPE-V  
O-ring: NBR

**Properties**

- Large-area cable sealing
- Easy to assemble
- Large clamping range

**Technical data**

Protection class: IP 68 - 10 bar

Temperature range: -40°C up to +135°C

Test standard: EN50262

**Dimensions**

G Thread size  
GL Thread length  
SW Spanner size

**metric thread**

Part no.	Size Metr.	Cable Ø from / to mm	Thread length mm	Spanner size mm	Unit
905957	M63 x 1,5	42,0 - 48,0	10,0	70	1
93569	M63 x 1,5	45,0 - 51,0	10,0	70	1
92779	M72 x 2,0	46,0 - 52,0	15,0	80	1
93727	M72 x 2,0	51,0 - 55,0	15,0	80	1
905958	M75 x 1,5	51,0 - 55,0	15,0	80	1
905959	M75 x 1,5	54,0 - 58,0	15,0	80	1
93105	M80 x 2,0	58,0 - 64,0	15,0	95	1
905960	M80 x 2,0	63,0 - 70,0	15,0	95	1
905961	M90 x 2,0	69,0 - 75,0	20,0	110	1
905962	M90 x 2,0	74,0 - 80,0	20,0	110	1
905963	M100 x 2,0	79,0 - 85,0	20,0	110	1
905964	M105 x 2,0	84,0 - 90,0	20,0	120	1
905965	M110 x 2,0	89,0 - 95,0	20,0	120	1
905966	M115 x 2,0	89,0 - 95,0	20,0	120	1

Dimensions and specifications may be changed without prior notice.



**KVA-XXL-MS-E** EMC cable gland

for particularly large diameters

**KVA-XXL-MS-E**

EMC and sealing cable gland made by brass for particularly large cable diameters.

**Application**

- Plant and machine construction
- Robot construction
- Automation technology
- Vehicle construction and shipbuilding
- Installation technology
- Control cabinet construction

**Material**Brass, nickel plated  
Contact system: stainless steel 1.4310**Properties**

- Large-area cable sealing
- Easy to assemble
- Large clamping range

**Technical data**

Protection class: IP 68 - 10 bar

Temperature range: -40°C up to +135°C

**Dimensions**G Thread size  
GL Thread length  
SW Spanner size**metric thread**

Part no.	Size Metr.	Cable Ø from / to mm	Outer Ø Shielding from / up to mm	Thread length mm	Spanner size mm	Unit
98257	M63 x 1,5	40,0 - 45,0	36,0 - 41,0	10,0	65	1
96560	M63 x 1,5	45,0 - 51,0	36,0 - 45,0	10,0	70	1
94218	M63 x 1,5	45,0 - 51,0	40,0 - 48,0	10,0	70	1
98725	M63 x 1,5	51,0 - 55,0	40,0 - 48,0	10,0	80	1
94189	M72 x 2,0	40,0 - 45,0	36,0 - 41,0	15,0	70	1
94847	M72 x 2,0	45,0 - 51,0	40,0 - 48,0	15,0	70	1
905498	M72 x 2,0	51,0 - 55,0	40,0 - 48,5	15,0	80	1
94208	M72 x 2,0	51,0 - 55,0	46,0 - 54,0	15,0	80	1
94188	M72 x 2,0	54,0 - 58,0	40,0 - 48,0	15,0	80	1
93728	M75 x 1,5	42,0 - 48,0	40,0 - 48,0	15,0	70	1
91600	M75 x 1,5	45,0 - 51,0	40,0 - 48,0	15,0	70	1
90068	M75 x 1,5	54,0 - 58,0	46,0 - 54,0	15,0	80	1
97066	M80 x 2,0	58,0 - 64,0	46,0 - 54,0	15,0	95	1
98908	M80 x 2,0	63,0 - 70,0	46,0 - 54,0	15,0	95	1
905303	M80 x 2,0	63,0 - 70,0	46,0 - 58,0	15,0	95	1

Dimensions and specifications may be changed without prior notice.

# STK-F flat cable gland



## STK-F

The plastic flat cable gland.

### Application

- Plant and machine construction
- Robot construction
- Automation technology
- Vehicle construction and shipbuilding
- Rail technology
- Installation technology
- Control cabinet construction

### Material

Polyamide  
Seal: SBR  
Thrust washers: Galvanised steel

- halogen-free
- phosphor-free
- silicone-free
- cadmium-free

### Note

Protection classification IP 65 with an additional O-ring on the external thread.

### Technical data

Protection class: IP 54

Temperature range: -30°C up to +80°C



### Dimensions

G Thread size  
GL Thread length  
SW Spanner size

### metric thread

Part no. light grey RAL 7035	Size Metr.	Cable thickness from / to mm	Cable width from / to mm	Thread length mm	Spanner size mm	Unit
904996	M25 x 1,5	3,0 - 8,0	9,0 - 21,0	11,0	32	50
904997	M32 x 1,5	4,0 - 11,5	14,0 - 30,0	11,0	42	50
905067	M40 x 1,5	4,0 - 11,5	14,0 - 30,0	11,0	42	20
904998	M50 x 1,5	4,0 - 11,5	24,0 - 40,0	11,0	60	20
905068	M63 x 1,5	5,0 - 12,0	34,0 - 50,0	11,0	65	5

Dimensions and specifications may be changed without prior notice.

# STS-F flat cable gland



## STS-F

The brass flat cable gland.

### Application

- Plant and machine construction
- Robot construction
- Automation technology
- Vehicle construction and shipbuilding
- Rail technology
- Installation technology
- Control cabinet construction

### Material

Brass, nickel plated  
Seal: SBR  
Thrust rings: Galvanised steel  
Thrust washers: Galvanised steel

### Note

Protection classification IP 65 with an additional O-ring on the external thread.

### Technical data

Protection class: IP 54  
Temperature range: -30°C up to +80°C



### Dimensions

G Thread size  
GL Thread length  
SW Spanner size

### metric thread

Part no.	Size Metr.	Cable thickness from / to mm	Cable width from / to mm	Thread length mm	Spanner size mm	Unit
94484	M20 x 1,5	1,0 - 5,0	3,0 - 16,0	6,0	24 / 22	50
94485	M25 x 1,5	3,0 - 8,0	9,0 - 21,0	7,0	30 / 28	50
94486	M32 x 1,5	4,0 - 11,5	14,0 - 30,0	8,0	39 / 37	25
94487	M40 x 1,5	4,0 - 11,5	24,0 - 40,0	8,0	50 / 47	10
94488	M50 x 1,5	5,0 - 12,0	29,0 - 45,0	9,0	57 / 54	5
94489	M63 x 1,5	5,0 - 12,0	34,0 - 50,0	10,0	66 / 60	5

### PG thread

Part no.	Size PG	Cable thickness from / to mm	Cable width from / to mm	Thread length mm	Spanner size mm	Unit
90100	16	1,0 - 5,0	3,0 - 16,0	6,5	24 / 22	50
90101	21	3,0 - 8,0	9,0 - 21,0	7,0	30 / 28	50
90102	29	4,0 - 11,5	14,0 - 30,0	8,0	40 / 37	25
90103	36	4,0 - 11,5	24,0 - 40,0	9,0	50 / 47	20
90104	42	5,0 - 12,0	29,0 - 45,0	10,0	57 / 54	10
90105	48	5,0 - 12,0	34,0 - 50,0	10,0	64 / 60	5

Dimensions and specifications may be changed without prior notice.

# KMK-PA-MB counternut with collar



## KMK-PA-MB

The counternut made of polyamide.  
The counternut with collar has a bigger sealing area - sealing with an additional O-ring will be simplified.

### Application

- Plant and machine construction
- Automation technology
- Vehicle construction and shipbuilding
- Installation technology
- Control cabinet construction

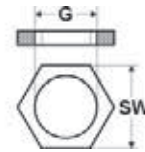
### Material

Polyamide PA 6

- halogen-free
- phosphor-free
- silicone-free
- cadmium-free

### Technical data

Temperature range: -40°C up to +100°C



### Dimensions

G Thread size inside  
SW Spanner size

### metric thread – female

Part no. light grey RAL 7035	Part no. dark grey RAL 7001	Part no. black RAL 9005	Size Metr.	Spanner size mm	Unit	
97816	94260	98163	M12 x 1,5	18	100	-
97817	94261	98164	M16 x 1,5	22	100	-
97818	94262	98165	M20 x 1,5	26	100	-
97819	94263	98166	M25 x 1,5	32	100	-
97820	94264	98167	M32 x 1,5	41	100	-
97821	94265	98168	M40 x 1,5	50	50	-
97822	94266	98169	M50 x 1,5	60	50	-
97823	94267	98170	M63 x 1,5	75	25	-

### PG thread – female

Part no. light grey RAL 7035	Part no. dark grey RAL 7001	Part no. black RAL 9005	Size PG	Spanner size mm	Unit	
90710	94250	96458	7	19	100	-
90711	94251	96228	9	22	100	-
90712	94252	96459	11	24	100	-
90713	94253	96460	13,5	27	100	-
90714	94254	96461	16	30	100	-
90715	94255	96176	21	36	100	-
90716	94256	96177	29	46	50	-
90717	94257	96462	36	60	25	-
90718	94258	96463	42	65	25	-
90719	94259	96464	48	70	25	-

### NPT thread – female

Part no. light grey RAL 7035	Part no. dark grey RAL 7001	Part no. black RAL 9005	Size NPT	Spanner size mm	Unit	
97317	90870	90875	3/8"	22	100	-
97316	90871	90876	1/2"	27	100	-
97315	90872	90877	3/4"	33	100	-
98366	90873	90878	1"	47	50	-

Dimensions and specifications may be changed without prior notice.

# KM counternut



## KM

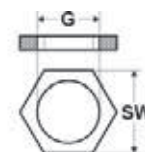
The counternut from galvanic nickel-coated brass.

## Material

Brass, nickel plated

## Technical data

Temperature range: up to +200°C



## Dimensions

G Thread size inside  
SW Spanner size

### metric thread - female

Part no.	Size Metr.	Spanner size mm	Unit	
90175	M12 x 1,5	15,0	100	-
90176	M16 x 1,5	19,0	100	-
90177	M20 x 1,5	24,0	100	-
90178	M25 x 1,5	30,0	100	-
90179	M32 x 1,5	36,0	100	-
90180	M40 x 1,5	46,0	50	-
90181	M50 x 1,5	60,0	25	-
90182	M63 x 1,5	70,0	25	-

### metric thread - female - KM-XXL - for large cable diameters

Part no.	Size Metr.	Spanner size mm	Unit	
98314	M72 x 2,0	80,0	1	-
90067	M75 x 1,5	80,0	1	-
90489	M80 x 2,0	95,0	1	-

### PG thread - female

Part no.	Size PG	Spanner size mm	Unit	
90610	7	15,0	100	-
90611	9	18,0	100	-
90612	11	21,0	100	-
90613	13,5	23,0	100	-
90614	16	26,0	100	-
90615	21	32,0	100	-
90616	29	41,0	100	-
90617	36	51,0	50	-
90618	42	60,0	50	-
90619	48	64,0	50	-

### NPT thread - female

Part no.	Size Inches	Spanner size mm	Unit	
905870	1/2"	27,0	50	-
905871	3/4"	32,0	50	-
905872	1"	36,0	25	-
905873	1 1/4"	46,0	25	-
905874	1 1/2"	54,0	10	-
905875	2"	70,0	10	-

Continuation ▶



**KM** counternut**BSP thread - female**

Part no.	Size BSP	Spanner size mm	Unit	
90186	G 3/8"	19,0	100	-
90187	G 1/2"	24,0	100	-
90189	G 3/4"	30,0	100	-
90190	G 1"	38,0	100	-
90193	G 1 1/2"	51,0	50	-
90195	G 2"	66,0	50	-

**BSP thread - female - KM-XXL - for large cable diameters**

Part no.	Size BSP	Spanner size mm	Unit	
90197	G 2 1/2"	80,0	1	-
90198	G 3"	95,0	1	-
90199	G 4"	125,0	1	-
97785	G 5"	150,0	1	-

Dimensions and specifications may be changed without prior notice.

# KM-INOX counternut

stainless steel



## KM-INOX

The counternut made of stainless steel.

## Material

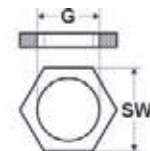
Stainless steel 1.4305 / AISI 303

## Technical data

Temperature range: up to +200°C

## Application

- Plant and machine construction
- Robot construction
- Automation technology
- Vehicle construction and shipbuilding
- Rail technology
- Installation technology
- Control cabinet construction



## Dimensions

G Thread size inside  
SW Spanner size

### metric thread - female

Part no.	Size Metr.	Spanner size mm	Unit	
920605	M12 x 1,5	15,0	100	-
920606	M16 x 1,5	19,0	100	-
920607	M20 x 1,5	24,0	100	-
920608	M25 x 1,5	30,0	100	-
920609	M32 x 1,5	36,0	50	-
920610	M40 x 1,5	46,0	50	-
920611	M50 x 1,5	60,0	10	-
920612	M63 x 1,5	70,0	10	-

### PG thread - female

Part no.	Size PG	Spanner size mm	Unit	
92970	7	17,0	100	-
92971	9	19,0	100	-
92972	11	22,0	100	-
92973	13,5	24,0	100	-
92974	16	27,0	100	-
92975	21	32,0	100	-
92976	29	41,0	50	-
92977	36	60,0	25	-

Dimensions and specifications may be changed without prior notice.

**KM-EMV**

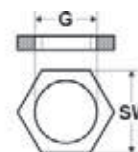
- The counternut with cutting edges for secure fixing of EMC cable glands
- for cutting through painted surfaces to ensure optimum contact with equipotential bonding
- increased vibration resistance

**Material**

Brass, nickel plated

**Technical data**

Temperature range: up to +200°C

**Dimensions**

G Thread size inside  
SW Spanner size

**metric thread - female**

Part no.	Size Metr.	Spanner size mm	Unit	
90165	M12 x 1,5	15,0	100	-
90166	M16 x 1,5	19,0	100	-
90167	M20 x 1,5	24,0	100	-
90168	M25 x 1,5	30,0	100	-
90169	M32 x 1,5	36,0	100	-
90170	M40 x 1,5	46,0	50	-
90171	M50 x 1,5	60,0	50	-
90172	M63 x 1,5	70,0	25	-

**metric thread - female - KM-EMV-XXL - for large cable diameters**

Part no.	Size Metr.	Spanner size mm	Unit	
99875	M72 x 2,0	80,0	1	-
93209	M75 x 1,5	80,0	1	-
98698	M80 x 2,0	95,0	1	-

**PG thread - female**

Part no.	Size PG	Spanner size mm	Unit	
97243	7	15,0	100	-
97244	9	18,0	100	-
97166	11	21,0	100	-
97167	13,5	23,0	100	-
97168	16	26,0	100	-
97169	21	32,0	100	-
97170	29	41,0	50	-
97171	36	51,0	25	-
97245	42	60,0	25	-
97246	48	64,0	25	-

Dimensions and specifications may be changed without prior notice.
















# HTP Anaconda Sealtite<sup>®</sup> EF

**HELUcond PA6 UL**



## ■ CABLE PROTECTION TUBE SYSTEMS

Designation	Properties	Approvals	Page
HELUcond PA6-L	Polyamide corrugated tube		970
HELUcond PA6 UL	Polyamide corrugated tube		971
Type S	Steel spring with PVC jacket	 	972
Anaconda Sealtite® EF	for standard applications	  	973
Anaconda Sealtite® HTDL	hot and cold	  	974
HTP	hose		975

# HELUcond PA6-L corrugated tubes, polyamide

weak stress



## HELUcond PA6-L

Cable protection tube for weak to medium stress applications.  
Capacity/100mm NW 17: approx. 250 N

### Application

- Plant and machine construction
- Automation technology
- Vehicle construction and shipbuilding
- Installation technology
- Control cabinet construction

### Material

Mod. Polyamide PA 6

Flammability acc. to UL 94: V2

- halogen-free
- phosphor-free

### Properties

resistant to a multitude of

- fuels
- mineral oils
- greases
- weak bases
- weak acids

### Note

Suitable connection glands:  
HELUquick, HSSV.

### Technical data

Temperature range: -40°C up to +120°C  
Temperature range temporary up to +150°C

### fine profile

Part no. grey	Part no. black	trade size mm	Inner Ø mm	Outer Ø mm	Per metres	
99610	99620	7,5	6,8	10,0	50	-
99611	99621	10,0	10,0	12,8	50	-
99612	99622	12,0	12,5	15,7	50	-
99613	99623	14,0	14,4	18,5	50	-
99614	99624	17,0	16,8	21,1	50	-
99615	99625	23,0	23,4	28,4	50	-
99616	99626	29,0	29,2	34,5	25	-
99617	99627	37,0	34,0	41,8	25	-
99618	99628	50,0	46,0	53,8	25	-

Dimensions and specifications may be changed without prior notice.



# HELUcond PA6-UL corrugated tubes, polyamide

for heavy duty applications



## HELUcond PA6-UL-F/B

Heavy-duty cable protection tube for heavy-duty mechanical applications.

Capacity/100mm NW 16/17: approx. 750 N

### Application

- Plant and machine construction
- Robot construction
- Automation technology
- Vehicle construction and shipbuilding
- Rail technology
- Installation technology
- Control cabinet construction

### Material

Mod. Polyamide PA 6

Flammability acc. to UL 94: V0

- halogen-free
- cadmium-free

### Properties

resistant to a multitude of

- fuels
- mineral oils
- greases
- weak bases
- weak acids

### Note

UL recognized / UR  
Suitable connection glands:  
HELUquick, HSSV.

### Technical data

Temperature range: -40°C up to +140°C  
Temperature range temporary up to +160°C

#### fine profile / PA6-UL-F

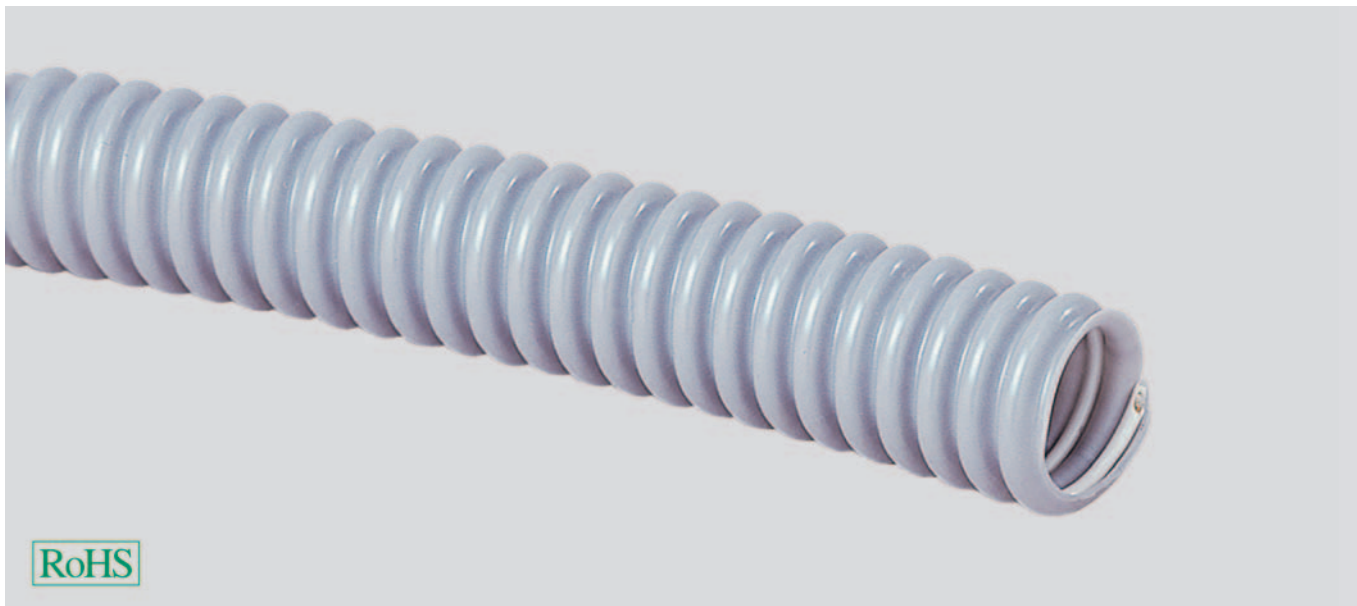
Part no. grey	Part no. black	trade size mm	Inner Ø mm	Outer Ø mm	Per metres	
920384	920394	7,5	6,4	10,0	50	-
920385	920395	10,0	9,0	13,0	50	-
920386	920396	12,0	11,0	15,8	50	-
920387	920397	17,0	16,6	21,0	50	-
920388	920398	23,0	21,6	28,5	50	-

#### coarse profile / PA6-UL-B

Part no. grey	Part no. black	trade size mm	Inner Ø mm	Outer Ø mm	Per metres	
920389	920399	16,0	15,3	21,0	50	-
920390	920400	21,0	21,6	28,5	50	-
920391	920401	29,0	27,5	34,5	25	-
920392	920402	36,0	35,0	42,5	25	-
920393	920403	48,0	45,5	54,5	25	-

Dimensions and specifications may be changed without prior notice.

# Type S spiral spring by steel with outer sheath by PVC



## Type S

Cable protection tube type S with integrated spring steel wire, extremely flexible, expandable and compressible.

## Application

- Plant and machine construction
- Automation technology
- Installation technology
- Control cabinet construction

## Material

PVC

- silicone-free
- cadmium-free

## Note

Suitable connection glands:  
USK, LK-I, US and LI

## Technical data

Temperature range: -25°C up to +80°C  
Temperature range temporary up to +100°C

Part no. grey	Inner Ø mm	Outer Ø mm	Per metres	
91219	7,0	10,0	50	-
91220	10,0	14,0	50	-
91221	13,0	17,0	50	-
91222	15,0	19,0	50	-
91223	16,0	21,0	50	-
91224	22,0	27,0	50	-
91225	29,0	36,0	25	-
91226	38,0	45,0	25	-
91228	48,0	56,0	25	-

## small package

Part no. grey	Inner Ø mm	Outer Ø mm	Per metres	
91270	7,0	10,0	10	-
91271	10,0	14,0	10	-
91272	13,0	17,0	10	-
91273	15,0	19,0	10	-
91274	16,0	21,0	10	-
91275	22,0	27,0	10	-
91276	29,0	36,0	10	-
91277	38,0	45,0	10	-
91279	48,0	56,0	10	-

Dimensions and specifications may be changed without prior notice.

**Anaconda Sealtite® EF** for standard applications**EF**

Universal applications.  
Protection tube from reinforced, galvanised steel band with spiral wound, latched profile, a continuous cord seal and extruded plastic sheath. This complex construction method keeps the plastic sheath and the internal tube flush together.

**Material**

Galvanised steel

Outer sheath material: PVC

**Note**

Suitable connection glands:  
LT straight, LT angled, T&B straight, T&B angled.  
Dimensions 2 1/2", 3", 4", 5" and 6" available on request.

**Technical data**

Protection class: IP 67

Temperature range: -25°C up to +70°C  
Temperature range temporary up to +90°C

Part no. grey	Part no. black	Trade size inch	Inner Ø mm	Outer Ø mm	Per metres	
91229	96939	1/4"	6,4	11,5	50	-
91230	96248	5/16"	10,1	14,4	50	-
91231	96249	3/8"	12,6	17,8	75	-
91232	97153	1/2"	16,0	21,1	60	-
91233	96718	3/4"	21,0	26,4	50	-
91234	96250	1"	26,5	33,1	30	-
91235	96251	1 1/4"	35,1	41,8	30	-
91236	97175	1 1/2"	40,3	47,8	15	-
91237	96252	2"	51,6	59,9	15	-

**small package**

Part no. grey	Part no. black	Trade size inch	Inner Ø mm	Outer Ø mm	Per metres	
94915	94930	5/16"	10,1	14,4	10	-
94916	94931	3/8"	12,6	17,8	10	-
94917	94932	1/2"	16,0	21,1	10	-
94918	94933	3/4"	21,0	26,4	10	-

Dimensions and specifications may be changed without prior notice.



**Anaconda Sealtite® HTDL** hot or cold**HTDL**

UL/CSA approval, good EMC properties.  
Protection tube from reinforced, galvanized steel band with spiral wound, latched profile, a continuous copper conductor and extruded plastic sheath.

This complex construction method keeps the plastic sheath and the internal tube flush together.

**Material**

Galvanised steel  
UV-resistant

Outer sheath material: PVC

**Note**

Suitable connection glands:  
LT straight, LT angled, T&B straight, T&B angled.  
Up to 1 1/4" with copper conductor.

**Technical data**

Protection class: IP 67

Temperature range: -45°C up to +105°C

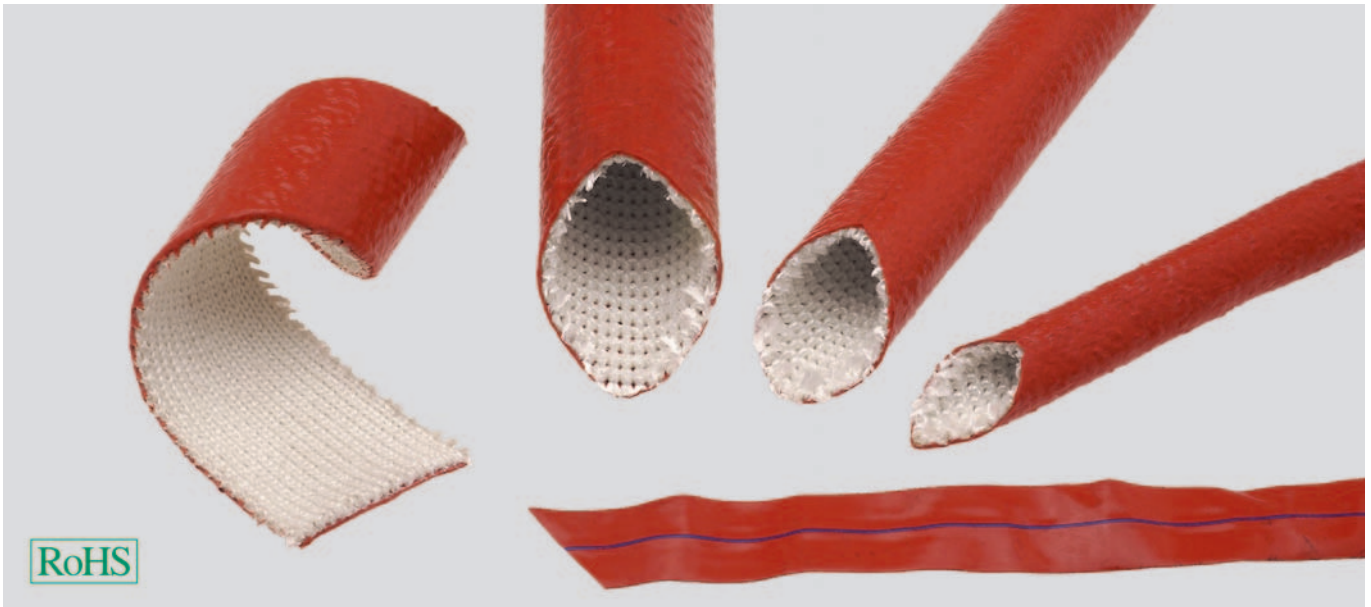
Temperature range temporary up to +120°C

Part no. black	Trade size inch	Inner Ø mm	Outer Ø mm	Per metres	
98149	3/8"	12,6	17,8	60	-
98150	1/2"	16,1	21,1	60	-
98151	3/4"	21,1	26,4	45	-
98152	1"	26,8	33,1	30	-
98153	1 1/4"	35,4	41,8	15	-
98154	1 1/2"	40,3	47,8	15	-
98155	2"	51,6	59,9	15	-

Dimensions and specifications may be changed without prior notice.

**HTP** protection tube

high temperature protection

**HTP**

This product is extremely heat resistant. HTP has a high insulation factor and, due to the iron oxide containing silicone sheath, is resistant to small quantities of liquid steel. HTP also protects against burn injuries from steam tubes, hot air or hot water lines.

**Material**

Interior sheath of knitted glass-fibre braid  
Silicone sheath (contains iron oxide)  
Colour: orange

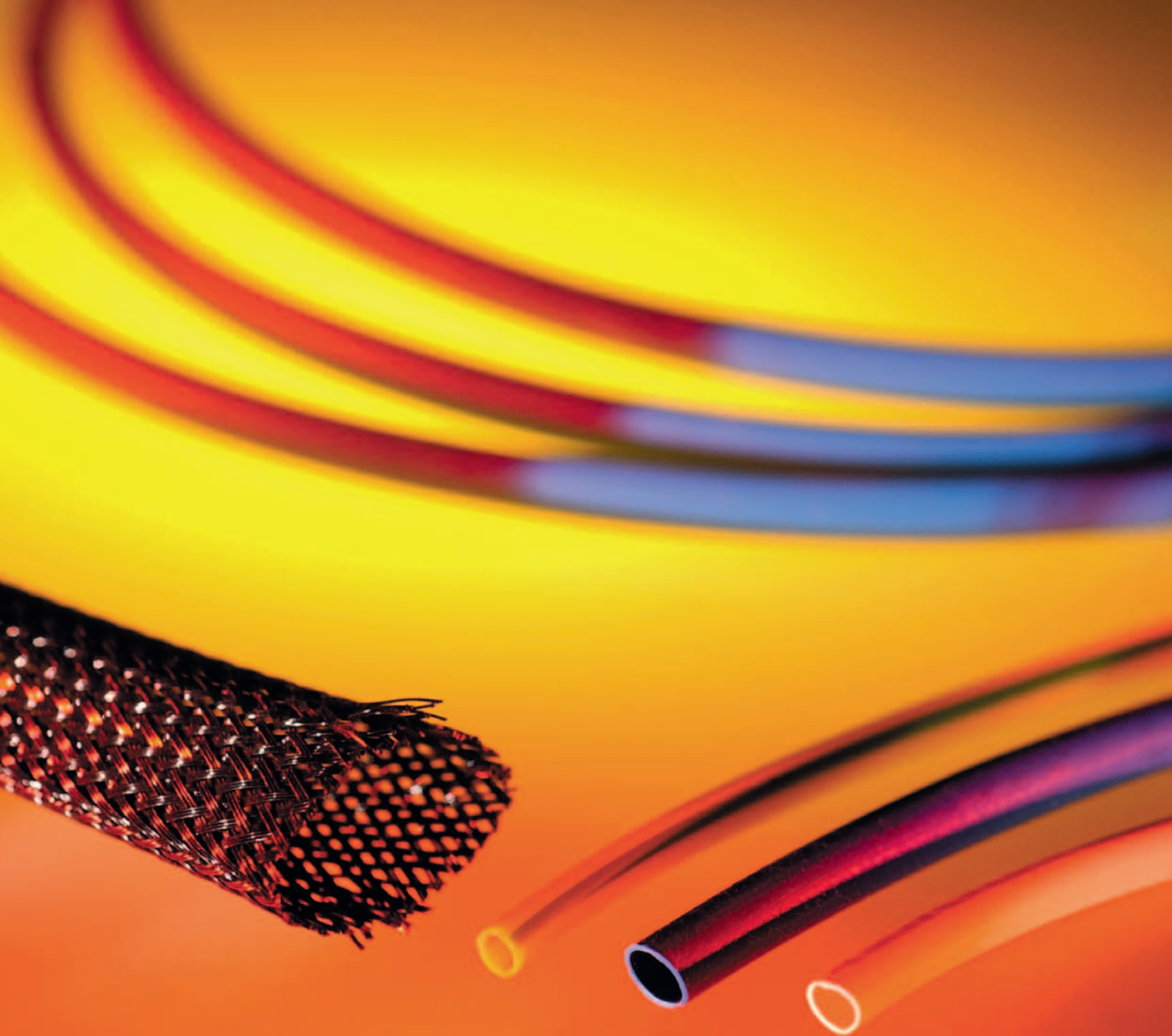
**Technical data**

Permanent load: +260°C  
Short-time load: +1090°C  
(up to approx. 20 minutes)  
Loading moment: +1640°C  
(approx. 15-30 seconds)

**protection tube**

Part no.	Inner Ø mm	Width mm	Per metres
93630	6,0	-	15,0
93632	10,0	-	15,0
904924	13,0	-	15,0
93634	19,0	-	15,0
93635	22,0	-	15,0
93636	25,0	-	15,0
93637	32,0	-	15,0
93638	38,0	-	15,0
93639	44,0	-	15,0
93640	57,0	-	15,0
93641	64,0	-	15,0
93642	76,0	-	15,0
93643	89,0	-	15,0
93644	102,0	-	15,0

Dimensions and specifications may be changed without prior notice.



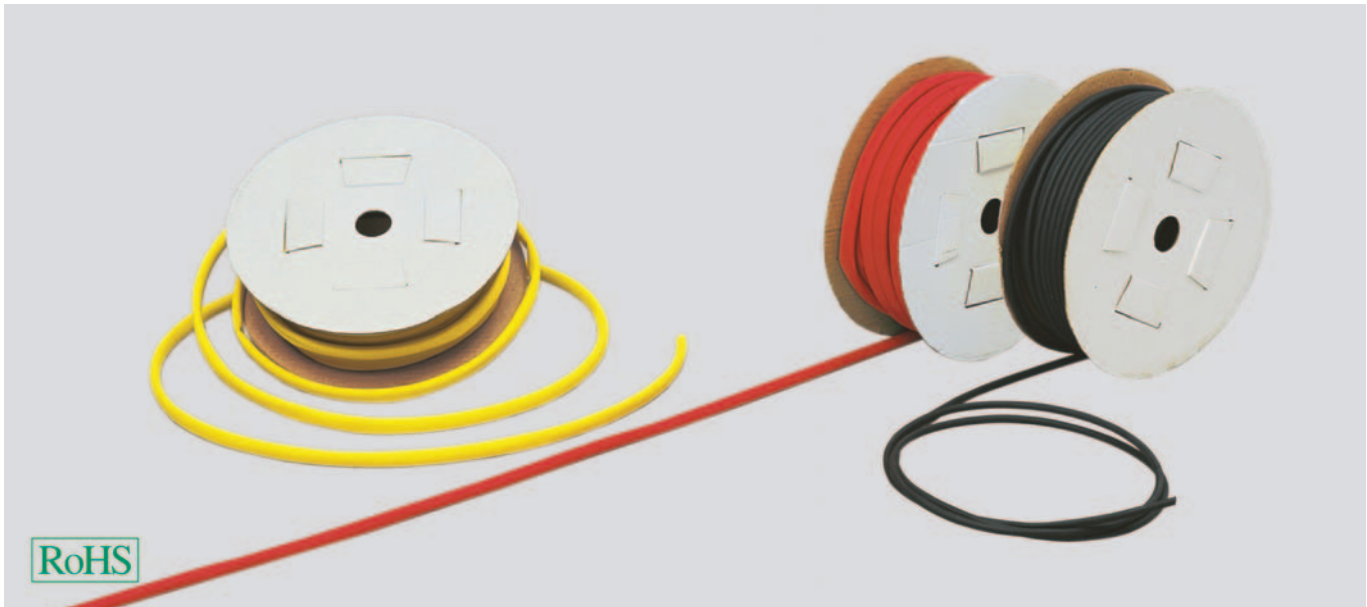
# SPSP

# ■ SHRINK TUBES

Designation	Properties	Approvals	Page
SPSP	Heat-shrink tube 2:1		978

**SPSP - spools** heat shrink 2:1

polyolefine

**SPSP spools**

Polyolefine shrunk tube for repairing insulation and sealing electrical components.

**Application**

- Plant and machine construction
- Robot construction
- Automation technology
- Vehicle construction and shipbuilding
- Rail technology
- Installation technology
- Control cabinet construction

**Material**

PO (Polyolefine)

**Note**

Replace the "x" in the table with the following figures to obtain the product number of your required colour.

Colour code:

0=white

1=blue

2=yellow

3=red

4=transparent

6=brown

7=orange

8=grey

9=green

**Technical data**

Temperature range: -55°C up to +135°C

**black**

Part no.	Inner Ø before shrinkage mm	Wall thickness mm	Inner Ø after shrinkage mm	Content m	Unit
91777	1,2	0,4	0,6	20,0	1
91778	1,6	0,4	0,8	20,0	1
91779	2,4	0,5	1,2	20,0	1
91780	3,2	0,5	1,6	20,0	1
91781	4,8	0,5	2,4	20,0	1
91782	6,4	0,6	3,2	10,0	1
91783	9,5	0,6	4,7	10,0	1
91784	12,7	0,6	6,4	10,0	1
91785	19,1	0,8	9,5	10,0	1
91786	25,4	0,9	12,7	10,0	1

**green/yellow**

Part no.	Inner Ø before shrinkage mm	Wall thickness mm	Inner Ø after shrinkage mm	Content m	Unit
92335	2,4	0,5	1,2	20,0	1
92345	3,2	0,5	1,6	20,0	1
92355	4,8	0,5	2,4	20,0	1
92365	6,4	0,6	3,2	10,0	1
92375	9,5	0,6	4,7	10,0	1
92385	12,7	0,6	6,4	10,0	1
92395	19,1	0,8	9,5	10,0	1
92405	25,4	0,9	12,7	10,0	1

Continuation ►



**SPSP - spools** heat shrink 2:1

polyolefine

coloured

Part no.	Inner Ø before shrinkage mm	Wall thickness mm	Inner Ø after shrinkage mm	Content m	Unit	
9231x	1,2	0,4	0,6	20,0	1	-
9232x	1,6	0,4	0,8	20,0	1	-
9233x	2,4	0,5	1,2	20,0	1	-
9234x	3,2	0,5	1,6	20,0	1	-
9235x	4,8	0,5	2,4	20,0	1	-
9236x	6,4	0,6	3,2	10,0	1	-
9237x	9,5	0,6	4,7	10,0	1	-
9238x	12,7	0,6	6,4	10,0	1	-
9239x	19,1	0,8	9,5	10,0	1	-
9240x	25,4	0,9	12,7	10,0	1	-

Dimensions and specifications may be changed without prior notice.



T-WS

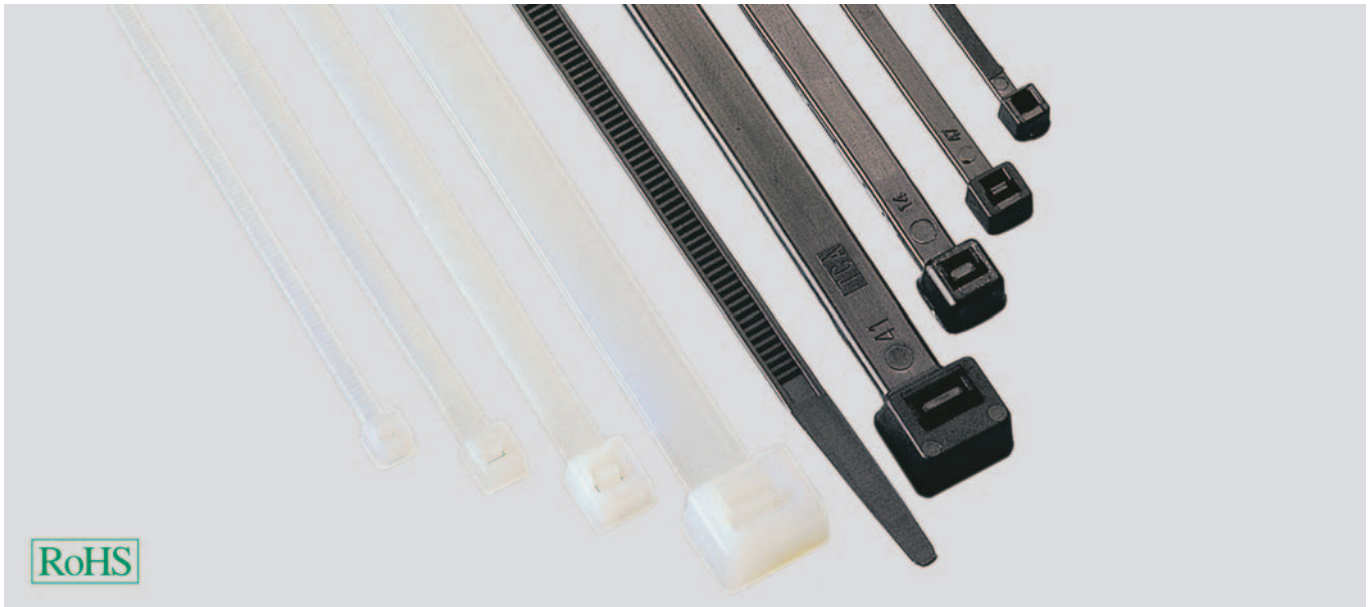
T

T-SK/SKU

## ■ CABLE TIES

<b>Designation</b>	<b>Properties</b>	<b>Page</b>
T	Cable tie	<b>982</b>
T-SK/SKU	Cable tie with steel lug lock	<b>983</b>
T-WS	Cable tie	<b>984</b>

# T cable tie



## Cable binders

Cable ties with plastic lug for directionality and mounting cables and lines.

## Application

- Plant and machine construction
- Robot construction
- Automation technology
- Vehicle construction and shipbuilding
- Rail technology
- Installation technology
- Control cabinet construction

## Material

Polyamide 6.6

- halogen-free
- silicone-free

## Technical data

Temperature range: -40°C up to +80°C

Flammability acc. to UL 94: V2

Part no. transparent	Part no. black	Type	Length mm	Width mm	Bundle Ø mm	Capacity N	Unit	
90150	90140	T 2-20	100,0	2,5	20,0	80,0	100	-
90151	90141	T 2-50	200,0	2,5	50,0	80,0	100	-
90152	90142	T 3-35	140,0	3,5	35,0	130,0	100	-
90153	90143	T 3-50	200,0	3,5	55,0	130,0	100	-
90154	90144	T 3-75	280,0	3,5	76,0	130,0	100	-
90157	90147	T 5-85	200,0	4,5	47,0	220,0	100	-
90156	90146	T 5-75	280,0	4,5	76,0	220,0	100	-
90158	90148	T 5-100	360,0	4,5	109,0	220,0	100	-
90159	90149	T 8-100	360,0	7,5	100,0	530,0	100	-
96491	96492	T 9-165	550,0	8,9	155,0	790,0	100	-
97219	97223	T 9-230	775,0	8,9	230,0	790,0	100	-

Dimensions and specifications may be changed without prior notice.

# T-SK/SKU cable tie with steel lug lock



## T-SK/SKU

Cable tie with steel lug made of corrosion resistant, non-magnetic steel for bundling and mounting cables and lines etc.

## Material

Polyamide 6.6

- halogen-free
- silicone-free
- self-extinguishing

## Technical data

Temperature range: -40°C up to +85°C

Flammability acc. to UL 94: V2

## Properties

- high requirements to flexibility and resistance, also at low temperatures and dry climate
- high tension due to extra wide steel lugs

### T-SK

Part no.	Type	Length mm	Width mm	Bundle Ø mm	Capacity	Unit
907016	T-SK 2-24	100	2,5	24	180	1000
907017	T-SK 2-55	200	2,5	55	180	1000
907018	T-SK 3-36	140	3,5	36	280	1000
907019	T-SK 3-55	200	3,5	55	280	1000
907020	T-SK 3-80	280	3,5	80	280	1000
907021	T-SK 4-51	186	4,5	51	400	1000
907022	T-SK 4-76	290	4,5	76	400	1000
907023	T-SK 4-101	360	4,5	101	400	1000
907037	T-SK 7-95	340	7,0	95	700	500

### T-SKU UV-stabilized

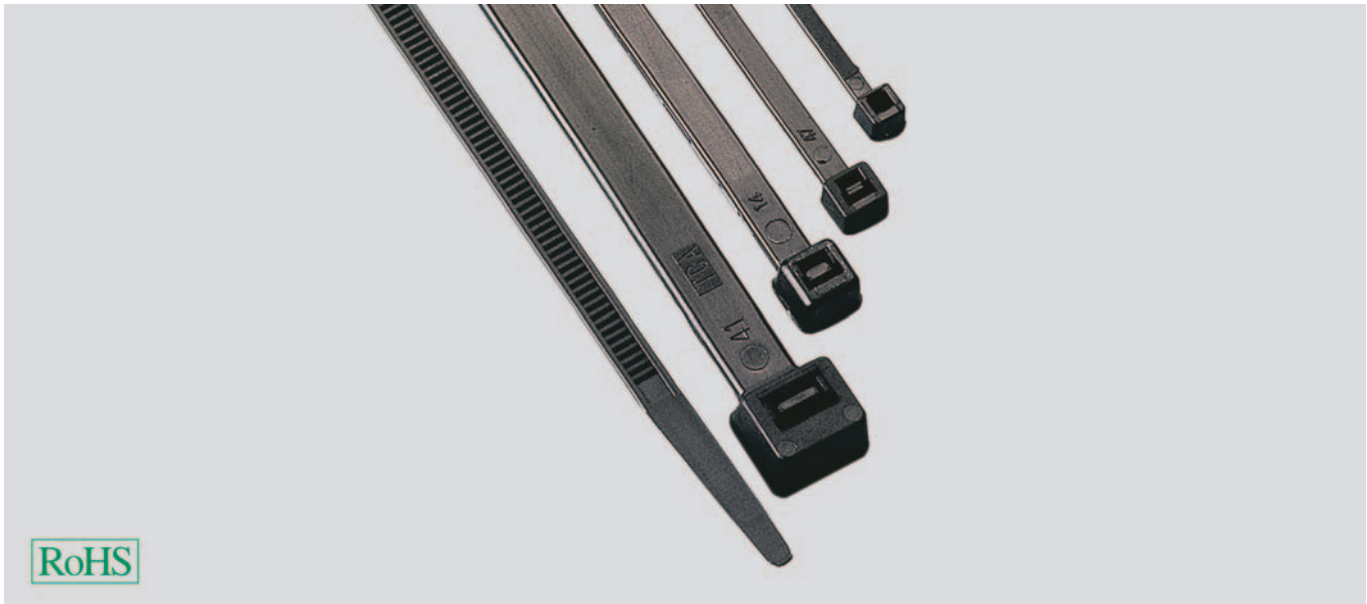
Part no.	Type	Length mm	Width mm	Bundle Ø mm	Capacity	Unit
907024	T-SKU 2-24	100	2,5	24	180	1000
907025	T-SKU 2-55	200	2,5	55	180	1000
907026	T-SK 3-36	140	3,5	36	280	1000
907027	T-SKU 3-55	200	3,5	55	280	1000
907028	T-SKU 3-80	280	3,5	80	280	1000
907029	T-SKU 4-51	186	4,5	51	400	1000
907030	T-SKU 4-76	290	4,5	76	400	1000
907031	T-SKU 4-101	360	4,5	101	400	1000
907038	T-SKU 7-95	340	7,0	95	700	500

Dimensions and specifications may be changed without prior notice.



**T-WS** cable tie

weather-proof

**Cable tie T-WS**

Cable tie with plastic lug for bundling and mounting cables and lines.

**Application**

- Outdoor use

**Material**

Polyamide 6.6  
UV-resistant

- halogen-free

**Properties**

- weather- stabilised

**Technical data**

Temperature range: -40°C up to +85°C  
Temperature range temporary up to +105°C

Flammability acc. to UL 94: V2

Part no. black	Type	Length mm	Width mm	Bundle Ø mm	Capacity N	Unit	
905525	T-WS 25/100 BK	100,0	2,5	22,0	80,0	100	-
905527	T-WS 25/140 BK	145,0	2,5	35,0	80,0	100	-
905526	T-WS 25/205 BK	205,0	2,5	55,0	80,0	100	-
905528	T-WS 28/330 BK	330,0	2,8	95,0	110,0	100	-
905529	T-WS 35/150 BK	150,0	3,5	35,0	135,0	100	-
905530	T-WS 35/190 BK	190,0	3,5	50,0	135,0	100	-
905531	T-WS 35/290 BK	285,0	3,5	80,0	135,0	100	-
905532	T-WS 40/175 BK	175,0	4,0	40,0	180,0	100	-
905535	T-WS 46/150 BK	150,0	4,6	35,0	225,0	100	-
905533	T-WS 46/200 BK	210,0	4,7	55,0	355,0	100	-
905536	T-WS 46/245 BK	245,0	4,6	65,0	225,0	100	-
906682	T-WS 46/390 BK	390,0	4,7	110,0	355,0	100	-
905537	T-WS 47/300 BK	300,0	4,7	85,0	355,0	100	-
905542	T-WS 76/225 BK	225,0	7,6	55,0	535,0	100	-
905539	T-WS 76/300 BK	300,0	7,6	80,0	535,0	100	-
905543	T-WS 76/365 BK	365,0	7,6	100,0	670,0	100	-
906683	T-WS 76/380 BK	387,0	7,6	100,0	535,0	100	-
905541	T-WS 76/460 BK	460,0	7,6	130,0	535,0	100	-
906684	T-WS 76/760 BK	760,0	7,6	225,0	535,0	100	-
906685	T-WS 88/820 BK	820,0	8,8	245,0	780,0	100	-
906686	T-WS 89/530 BK	525,0	8,9	150,0	780,0	100	-
905546	T-WS 132/535 BK	535,0	13,2	150,0	1115,0	100	-

Dimensions and specifications may be changed without prior notice.








HELU-S-RK-CU

HELU-S-RK-F-CU

HELU-S-PK-AL-DIN



## ■ CORE END SLEEVES & CABLE LUGS

Designation	Properties	Approvals	Page
HELU-S-RK-CU			988
HELU-S-RK-CU-UL			989
HELU-S-RK-F-CU			991
HELU-S-PK-CU-DIN			993
HELU-S-PK-AL-DIN	Aluminum compression cable lug - straight, strain-relieved, uninsulated		995
ADI	Core end sleeves		996
ADU	Core end sleeves		998
AV	Core connectors for telecommunications cables and signal cables		999

**HELU-S-RK-CU** Tubular cable lug - straight

uninsulated

**Tubular cable lug HELU-S-RK-CU**

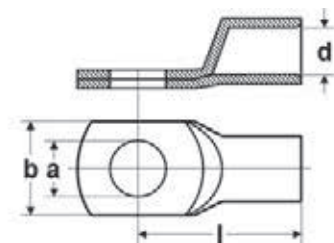
Uninsulated tubular cable lugs in eye type design.

**Material**Socket: Copper according to DIN EN 13600  
Surface: tin plated**Technical data**

Temperature range: up to +120°C

**Note**

Also available in angulated version (45° and 90°).

**Dimensions**

- a Diameter of the boring
- d Inner diameter of the cable insertion
- b Flange width
- l Length till middle of the boring

Part no.	Type	Cross-section mm <sup>2</sup>	a mm	d mm	b mm	l mm	Code type	Weight kg / 1000 items	Unit
907303	HELU-S-RK-CU 0,75-3	0,75	3,2	1,4	6,5	12,5	-	0,7	100
907304	HELU-S-RK-CU 0,75-4	0,75	4,3	1,4	8,5	14,0	-	0,8	100
907305	HELU-S-RK-CU 0,75-5	0,75	5,3	1,4	10,0	15,0	-	1,0	100
907306	HELU-S-RK-CU 1,5-3	1,5	3,2	1,9	6,5	14,0	-	1,2	100
907307	HELU-S-RK-CU 1,5-4	1,5	4,3	1,9	8,5	15,0	-	1,4	100
907308	HELU-S-RK-CU 1,5-5	1,5	5,3	1,9	10,0	16,0	-	1,5	100
907309	HELU-S-RK-CU 1,5-6	1,5	6,4	1,9	11,0	18,0	-	1,7	100
907310	HELU-S-RK-CU 2,5-4	2,5	4,3	2,4	8,5	15,0	-	1,6	100
907311	HELU-S-RK-CU 2,5-5	2,5	5,3	2,4	10,0	16,0	-	1,8	100
907312	HELU-S-RK-CU 2,5-6	2,5	6,4	2,4	11,0	18,0	-	1,9	100
907313	HELU-S-RK-CU 2,5-8	2,5	8,4	2,4	13,0	20,0	-	2,2	100
907314	HELU-S-RK-CU 4-4	4,0	4,3	3,0	8,5	17,0	-	2,2	100
907315	HELU-S-RK-CU 4-5	4,0	5,3	3,0	10,0	18,0	-	2,4	100
907316	HELU-S-RK-CU 4-6	4,0	6,3	3,0	11,0	20,0	-	2,6	100
907317	HELU-S-RK-CU 4-8	4,0	8,4	3,0	14,0	22,0	-	3,0	100

Dimensions and specifications may be changed without prior notice.





# HELU-S-RK-CU-UL Tubular cable lug - straight

uninsulated



## Tubular cable lug straight HELU-S-RK-CU-UL

Uninsulated tubular cable lugs in eye type design.

### Material

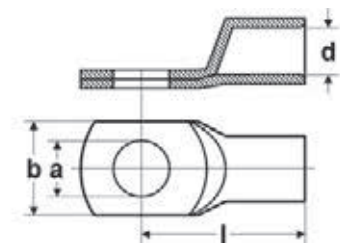
Socket: Copper according to DIN EN 13600  
Surface: tin plated

### Note

Also available in angulated version (45° and 90°).

### Technical data

Temperature range: up to +120°C



### Dimensions

- a Diameter of the boring
- d Inner diameter of the cable insertion
- b Flange width
- l Length till middle of the boring

Part no.	Type	Cross-section mm <sup>2</sup>	a mm	d mm	b mm	l mm	Code type	Weight kg / 1000 items	Unit
907318	HELU-S-RK-CU-UL 6-4	6,0	4,3	3,5	10,0	19,0	-	4,6	100
907319	HELU-S-RK-CU-UL 6-5	6,0	5,3	3,5	10,0	20,0	-	4,7	100
907320	HELU-S-RK-CU-UL 6-6	6,0	6,4	3,5	11,0	21,5	-	5,4	100
907321	HELU-S-RK-CU-UL 6-8	6,0	8,4	3,5	15,0	24,0	-	5,9	100
907322	HELU-S-RK-CU-UL 6-10	6,0	10,5	3,5	18,0	26,0	-	6,4	100
907323	HELU-S-RK-CU-UL 6-12	6,0	13,0	3,5	19,0	27,5	-	6,4	100
907324	HELU-S-RK-CU-UL 10-4	10,0	4,3	4,5	12,0	20,0	-	4,3	100
907325	HELU-S-RK-CU-UL 10-5	10,0	5,3	4,5	12,0	21,0	-	4,8	100
907326	HELU-S-RK-CU-UL 10-6	10,0	6,4	4,5	12,0	22,5	-	5,1	100
907327	HELU-S-RK-CU-UL 10-8	10,0	8,4	4,5	15,0	25,0	-	5,8	100
907328	HELU-S-RK-CU-UL 10-10	10,0	10,5	4,4	18,0	27,0	-	6,3	100
907329	HELU-S-RK-CU-UL 10-12	10,0	13,0	4,5	20,0	28,5	-	6,3	100
907330	HELU-S-RK-CU-UL 16-4	16,0	4,3	5,5	12,0	24,0	-	8,2	100
907331	HELU-S-RK-CU-UL 16-5	16,0	5,3	5,5	12,0	25,0	-	8,9	100
907332	HELU-S-RK-CU-UL 16-6	16,0	6,4	5,5	12,0	26,5	-	9,6	100
907333	HELU-S-RK-CU-UL 16-8	16,0	8,4	5,5	15,0	29,0	-	10,3	100
907334	HELU-S-RK-CU-UL 16-10	16,0	10,5	5,5	18,0	31,0	-	11,0	100
907335	HELU-S-RK-CU-UL 16-12	16,0	13,0	5,5	19,0	32,0	-	10,8	100
907336	HELU-S-RK-CU-UL 25-5	25,0	5,3	7,0	15,0	33,5	-	13,5	100
907337	HELU-S-RK-CU-UL 25-6	25,0	6,4	7,0	15,0	31,5	-	13,1	100
907338	HELU-S-RK-CU-UL 25-8	25,0	8,4	7,0	16,0	33,0	-	12,9	100
907339	HELU-S-RK-CU-UL 25-10	25,0	10,5	7,0	18,0	34,5	-	14,6	100
907340	HELU-S-RK-CU-UL 25-12	25,0	13,0	7,0	20,0	36,0	-	15,5	100
907341	HELU-S-RK-CU-UL 25-14	25,0	15,0	7,0	22,0	39,0	-	16,6	100
907342	HELU-S-RK-CU-UL 25-16	25,0	17,0	7,0	24,0	42,0	-	17,3	100
907343	HELU-S-RK-CU-UL 35-6	35,0	6,4	8,5	17,0	33,0	-	20,7	100
907344	HELU-S-RK-CU-UL 35-8	35,0	8,4	8,5	17,0	34,0	-	21,8	100
907345	HELU-S-RK-CU-UL 35-10	35,0	10,5	8,5	20,0	36,5	-	21,9	100
907346	HELU-S-RK-CU-UL 35-12	35,0	13,0	8,5	22,0	37,5	-	23,3	100
907347	HELU-S-RK-CU-UL 35-14	35,0	15,0	8,5	23,0	40,0	-	24,4	100

Continuation ▶



**HELU-S-RK-CU-UL** Tubular cable lug - straight

uninsulated

Part no.	Type	Cross-section mm <sup>2</sup>	a mm	d mm	b mm	l mm	Code type	Weight kg / 1000 items	Unit
907348	HELU-S-RK-CU-UL 35-16	35,0	17,0	8,5	28,0	44,0	-	26,0	100
907349	HELU-S-RK-CU-UL 50-6	50,0	6,4	10,0	20,0	37,0	-	30,1	100
907350	HELU-S-RK-CU-UL 50-8	50,0	8,4	10,0	20,0	39,0	-	30,4	100
907351	HELU-S-RK-CU-UL 50-10	50,0	10,5	10,0	20,0	40,5	-	31,3	100
907352	HELU-S-RK-CU-UL 50-12	50,0	13,0	10,0	23,0	42,0	-	31,3	100
907353	HELU-S-RK-CU-UL 50-14	50,0	15,0	10,0	23,0	44,0	-	35,1	100
907354	HELU-S-RK-CU-UL 50-16	50,0	17,0	10,0	27,0	46,0	-	35,5	100
907355	HELU-S-RK-CU-UL 50-20	50,0	21,0	10,0	30,5	52,5	-	38,9	100
907356	HELU-S-RK-CU-UL 70-6	70,0	6,4	12,0	24,0	40,5	-	41,1	25
907357	HELU-S-RK-CU-UL 70-8	70,0	8,4	12,0	24,0	42,5	-	44,6	25
907358	HELU-S-RK-CU-UL 70-10	70,0	10,5	12,0	24,0	43,5	-	46,4	25
907359	HELU-S-RK-CU-UL 70-12	70,0	13,0	12,0	24,0	45,0	-	47,3	25
907360	HELU-S-RK-CU-UL 70-14	70,0	15,0	12,0	25,0	46,0	-	49,1	25
907361	HELU-S-RK-CU-UL 70-16	70,0	17,0	12,0	28,0	48,5	-	49,6	25
907362	HELU-S-RK-CU-UL 70-20	70,0	21,0	12,0	29,0	52,0	-	52,9	25
907363	HELU-S-RK-CU-UL 95-6	95,0	6,4	13,5	26,0	43,0	-	49,5	25
907364	HELU-S-RK-CU-UL 95-8	95,0	8,4	13,5	26,0	46,0	-	53,6	25
907365	HELU-S-RK-CU-UL 95-10	95,0	10,5	13,5	26,0	47,0	-	55,1	25
907366	HELU-S-RK-CU-UL 95-12	95,0	13,0	13,5	26,0	48,0	-	55,1	25
907367	HELU-S-RK-CU-UL 95-14	95,0	15,0	13,5	26,0	51,5	-	58,9	25
907368	HELU-S-RK-CU-UL 95-16	95,0	17,0	13,5	28,0	51,0	-	58,5	25
907369	HELU-S-RK-CU-UL 95-20	95,0	21,0	13,5	30,0	55,0	-	61,3	25
907370	HELU-S-RK-CU-UL 120-8	120,0	8,4	15,0	29,0	49,5	-	68,8	25
907371	HELU-S-RK-CU-UL 120-10	120,0	10,5	15,0	29,0	52,0	-	79,9	25
907372	HELU-S-RK-CU-UL 120-12	120,0	13,0	15,0	29,0	51,5	-	78,4	25
907373	HELU-S-RK-CU-UL 120-14	120,0	15,0	15,0	30,0	53,0	-	78,6	25
907374	HELU-S-RK-CU-UL 120-16	120,0	17,0	15,0	30,0	55,0	-	80,7	25
907375	HELU-S-RK-CU-UL 120-20	120,0	21,0	15,0	35,0	60,0	-	89,0	25
907376	HELU-S-RK-CU-UL 150-8	150,0	8,4	16,8	31,0	55,5	-	78,9	25
907377	HELU-S-RK-CU-UL 150-10	150,0	10,5	16,8	31,0	56,5	-	83,7	25
907378	HELU-S-RK-CU-UL 150-12	150,0	13,0	16,8	31,0	56,0	-	80,7	25
907379	HELU-S-RK-CU-UL 150-14	150,0	15,0	16,8	31,0	57,0	-	83,0	25
907380	HELU-S-RK-CU-UL 150-16	150,0	17,0	16,8	31,0	58,0	-	83,6	25
907381	HELU-S-RK-CU-UL 150-20	150,0	21,0	16,8	35,0	63,0	-	87,5	25
907382	HELU-S-RK-CU-UL 185-8	185,0	8,4	19,0	35,0	58,0	-	103,7	25
907383	HELU-S-RK-CU-UL 185-10	185,0	10,5	19,0	35,0	59,0	-	106,1	25
907384	HELU-S-RK-CU-UL 185-12	185,0	13,0	19,0	35,0	58,5	-	106,0	25
907385	HELU-S-RK-CU-UL 185-14	185,0	15,0	19,0	35,0	61,0	-	107,2	25
907386	HELU-S-RK-CU-UL 185-16	185,0	17,0	19,0	35,0	63,0	-	108,6	25
907387	HELU-S-RK-CU-UL 185-20	185,0	21,0	19,0	35,0	66,0	-	113,3	25
907388	HELU-S-RK-CU-UL 240-8	240,0	8,4	21,0	38,0	67,0	-	124,0	25
907389	HELU-S-RK-CU-UL 240-10	240,0	10,5	21,0	38,0	67,0	-	129,7	25
907390	HELU-S-RK-CU-UL 240-12	240,0	13,0	21,0	38,0	67,0	-	130,2	25
907391	HELU-S-RK-CU-UL 240-14	240,0	15,0	21,0	38,0	69,0	-	133,6	25
907392	HELU-S-RK-CU-UL 240-16	240,0	17,0	21,0	38,0	69,5	-	135,6	20
907393	HELU-S-RK-CU-UL 240-20	240,0	21,0	21,0	38,0	71,0	-	138,0	25
907394	HELU-S-RK-CU-UL 300-10	300,0	10,5	24,0	44,0	79,5	-	204,5	20
907395	HELU-S-RK-CU-UL 300-12	300,0	13,0	24,0	44,0	82,0	-	211,8	20
907396	HELU-S-RK-CU-UL 300-14	300,0	15,0	24,0	44,0	84,0	-	221,9	20
907397	HELU-S-RK-CU-UL 300-16	300,0	17,0	24,0	44,0	85,0	-	219,4	20
907398	HELU-S-RK-CU-UL 300-20	300,0	21,0	24,0	44,0	85,0	-	224,0	20
907399	HELU-S-RK-CU-UL 400-10	400,0	10,5	27,5	49,0	92,0	-	279,0	15
907400	HELU-S-RK-CU-UL 400-12	400,0	13,0	27,5	49,0	92,0	-	278,5	15
907401	HELU-S-RK-CU-UL 400-16	400,0	17,0	27,5	49,0	92,0	-	276,5	15
907402	HELU-S-RK-CU-UL 400-20	400,0	21,0	27,5	49,0	92,0	-	266,1	15
907403	HELU-S-RK-CU-UL 500-12	500,0	13,0	31,0	55,5	113,0	-	493,8	5
907404	HELU-S-RK-CU-UL 500-16	500,0	17,0	31,0	55,5	113,0	-	493,8	5
907405	HELU-S-RK-CU-UL 500-20	500,0	21,0	31,0	55,5	113,0	-	485,6	5
907406	HELU-S-RK-CU-UL 600-16	630,0	17,0	34,0	60,0	115,0	-	513,5	5
907407	HELU-S-RK-CU-UL 600-20	630,0	21,0	34,0	60,0	115,0	-	506,0	5

Dimensions and specifications may be changed without prior notice.

# HELU-S-RK-F-CU Tubular cable lugs for fine stranded wires - straight uninsulated



## Tubular cable lug HELU-S-RK-F-CU

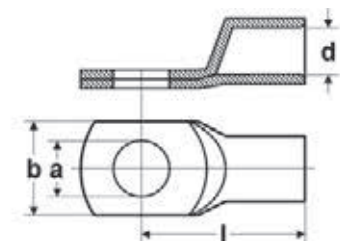
Uninsulated, straight tubular cable lugs in eye type design for fine stranded wires. The expanded sleeve facilitates cable inlet.

## Material

Socket: Copper according to DIN EN 13600  
Surface: tin plated

## Technical data

Temperature range: up to +120°C



## Dimensions

- a Diameter of the boring
- d Inner diameter of the cable insertion
- b Flange width
- l Length till middle of the boring

Part no.	Type	Cross-section mm <sup>2</sup>	a mm	d mm	b mm	l mm	Code type	Weight kg / 1000 items	Unit
907409	HELU-S-RK-F-CU 10-5	10,0	5,3	5,0	12,0	23,0	-	7,0	100
907410	HELU-S-RK-F-CU 10-6	10,0	6,4	5,0	12,0	25,0	-	7,6	100
907411	HELU-S-RK-F-CU 10-8	10,0	8,4	5,0	15,0	28,0	-	8,9	100
907412	HELU-S-RK-F-CU 10-10	10,0	10,5	5,0	18,0	31,0	-	9,8	100
907413	HELU-S-RK-F-CU 10-12	10,0	13,0	5,0	20,0	32,0	-	10,0	100
907414	HELU-S-RK-F-CU 16-5	16,0	5,3	6,0	14,0	25,5	-	9,4	100
907415	HELU-S-RK-F-CU 16-6,4	16,0	6,4	6,0	14,0	27,0	-	10,0	100
907416	HELU-S-RK-F-CU 16-8	16,0	8,4	6,0	15,0	29,5	-	11,2	100
907417	HELU-S-RK-F-CU 16-10	16,0	10,5	6,0	18,0	32,0	-	11,2	100
907418	HELU-S-RK-F-CU 16-12	16,0	13,0	6,0	20,0	33,0	-	11,8	100
907419	HELU-S-RK-F-CU 25-6	25,0	6,4	7,7	16,0	32,0	-	14,7	100
907420	HELU-S-RK-F-CU 25-8	25,0	8,4	7,7	16,0	34,0	-	14,3	100
907421	HELU-S-RK-F-CU 25-10	25,0	10,5	7,7	18,0	35,0	-	15,3	100
907422	HELU-S-RK-F-CU 25-12	25,0	13,0	7,7	20,0	36,0	-	16,1	100
907423	HELU-S-RK-F-CU 25-16	25,0	17,0	7,7	26,0	40,5	-	19,1	100
907424	HELU-S-RK-F-CU 35-6	35,0	6,4	9,2	18,0	36,0	-	20,7	100
907425	HELU-S-RK-F-CU 35-8	35,0	8,4	9,2	18,0	36,0	-	20,7	100
907426	HELU-S-RK-F-CU 35-10	35,0	10,5	9,2	18,0	38,0	-	21,4	100
907427	HELU-S-RK-F-CU 35-12	35,0	13,0	9,2	23,0	40,0	-	22,2	100
907428	HELU-S-RK-F-CU 35-16	35,0	17,0	9,2	26,0	45,0	-	24,2	100
907429	HELU-S-RK-F-CU 50-6	50,0	6,4	11,2	22,0	42,0	-	32,5	100
907430	HELU-S-RK-F-CU 50-8	50,0	8,4	11,2	22,0	42,0	-	32,2	100
907431	HELU-S-RK-F-CU 50-10	50,0	10,5	11,2	22,0	43,0	-	33,3	100
907432	HELU-S-RK-F-CU 50-12	50,0	13,0	11,2	23,0	44,0	-	33,9	100
907433	HELU-S-RK-F-CU 50-14	50,0	15,0	11,2	25,0	45,5	-	36,0	100
907434	HELU-S-RK-F-CU 50-16	50,0	17,0	11,2	28,0	48,5	-	36,5	100

Continuation ▶

**HELU-S-RK-F-CU** Tubular cable lugs for fine stranded wires - straight

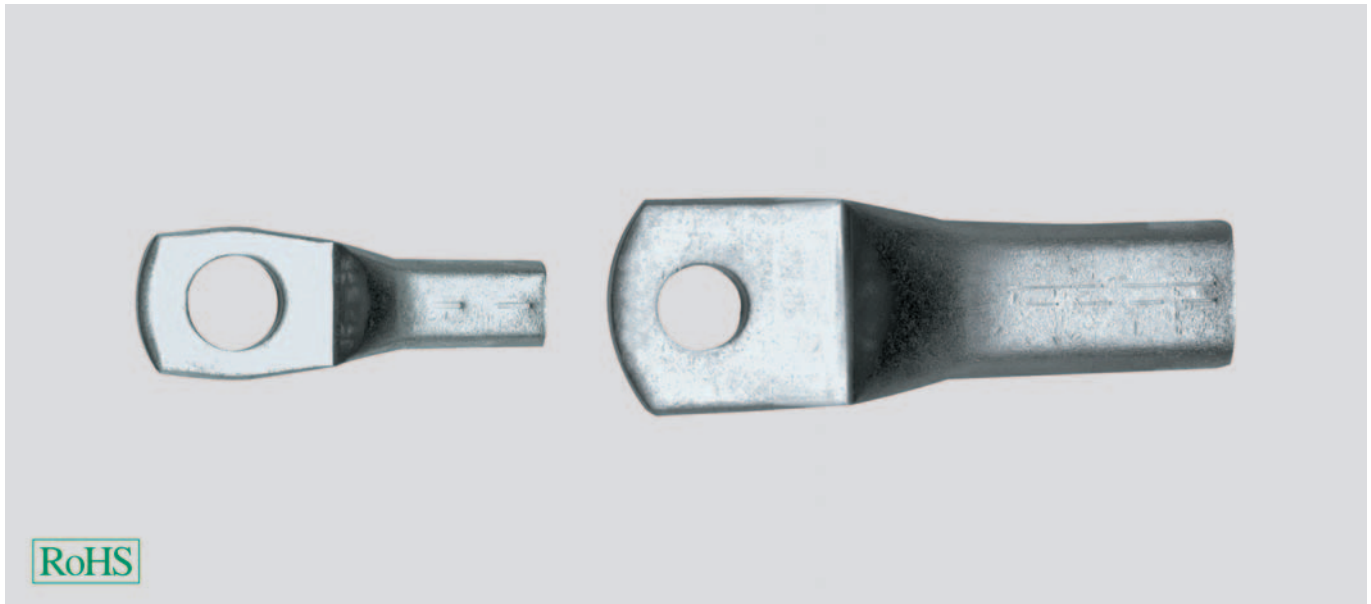
uninsulated

Part no.	Type	Cross-section mm <sup>2</sup>	a mm	d mm	b mm	l mm	Code type	Weight kg / 1000 items	Unit
907435	HELU-S-RK-F-CU 70-6	70,0	6,4	13,5	25,0	46,0	-	44,3	50
907436	HELU-S-RK-F-CU 70-8	70,0	8,4	13,5	25,0	45,5	-	48,0	50
907437	HELU-S-RK-F-CU 70-10	70,0	10,5	13,5	25,0	47,0	-	48,4	50
907438	HELU-S-RK-F-CU 70-12	70,0	13,0	13,5	26,0	47,0	-	48,4	50
907439	HELU-S-RK-F-CU 70-16	70,0	17,0	13,5	28,0	50,0	-	50,5	50
907440	HELU-S-RK-F-CU 70-20	70,0	21,0	13,5	31,0	54,5	-	55,2	50
907441	HELU-S-RK-F-CU 95-6	95,0	6,4	15,5	29,0	50,5	-	65,0	50
907442	HELU-S-RK-F-CU 95-8	95,0	8,4	15,5	29,0	50,5	-	66,2	50
907443	HELU-S-RK-F-CU 95-10	95,0	10,5	15,5	29,0	53,0	-	71,5	50
907444	HELU-S-RK-F-CU 95-12	95,0	13,0	15,5	29,0	52,5	-	71,1	50
907445	HELU-S-RK-F-CU 95-16	95,0	17,0	15,5	29,0	55,0	-	71,9	50
907446	HELU-S-RK-F-CU 95-20	95,0	21,0	15,5	35,0	60,0	-	76,1	50
907447	HELU-S-RK-F-CU 120-10	120,0	10,5	16,8	31,0	56,5	-	80,7	50
907448	HELU-S-RK-F-CU 120-12	120,0	13,0	16,8	31,0	56,0	-	80,7	50
907449	HELU-S-RK-F-CU 120-16	120,0	17,0	16,8	31,0	58,0	-	83,6	50
907450	HELU-S-RK-F-CU 120-20	120,0	21,0	16,8	35,0	63,0	-	87,5	50
907451	HELU-S-RK-F-CU 150-10	150,0	10,5	19,0	35,0	59,0	-	104,0	25
907452	HELU-S-RK-F-CU 150-12	150,0	13,0	19,0	35,0	58,5	-	106,2	25
907453	HELU-S-RK-F-CU 150-16	150,0	17,0	19,0	35,0	63,0	-	111,9	25
907454	HELU-S-RK-F-CU 150-20	150,0	21,0	19,0	35,0	66,0	-	116,1	25
907455	HELU-S-RK-F-CU 185-10	185,0	10,5	21,0	38,0	67,0	-	130,3	25
907456	HELU-S-RK-F-CU 185-13	185,0	13,0	21,0	38,0	67,0	-	121,5	25
907457	HELU-S-RK-F-CU 185-16	185,0	17,0	21,0	38,0	69,5	-	128,8	25
907458	HELU-S-RK-F-CU 185-20	185,0	21,0	21,0	38,0	71,0	-	139,5	25
907459	HELU-S-RK-F-CU 240-12	240,0	13,0	24,0	44,0	82,0	-	214,0	20
907460	HELU-S-RK-F-CU 240-16	240,0	17,0	24,0	44,0	85,0	-	219,4	20
907461	HELU-S-RK-F-CU 240-20	240,0	21,0	24,0	44,0	85,0	-	222,0	20

Dimensions and specifications may be changed without prior notice.

**HELU-S-PK-CU-DIN** Tubular compression cable lugs - straight

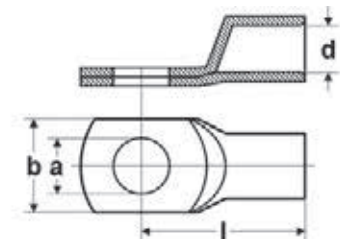
uninsulated

**Tubular cable lugs**  
**HELU-S-PK-CU-DIN**

Uninsulated tubular cable lugs in eye type design for conductor arrangement RM, to DIN 46235.

**Material**Socket: Copper according to DIN EN 13600  
Surface: tin plated or optionally uncoated**Note**

- Code type indicates the required hexagonal clamping insert.

**Diameter**

- a Diameter of the boring
- d Inner diameter of the cable insertion
- b Flange width
- l Length till middle of the boring

Part no.	Type	Cross-section mm <sup>2</sup>	a mm	d mm	b mm	l mm	Code type	Weight kg / 1000 items	Unit	
907677	HELU-S-PK-CU-DIN 6-5	6,0	5,3	3,7	8,5	24,0	5	3,1	100	-
907678	HELU-S-PK-CU-DIN 6-6	6,0	6,4	3,7	3,7	24,0	5	3,4	100	-
907680	HELU-S-PK-CU-DIN 10-5	10,0	5,3	4,4	10,0	27,0	6	3,5	100	-
907681	HELU-S-PK-CU-DIN 10-6	10,0	6,4	4,4	10,0	27,0	6	3,7	100	-
907685	HELU-S-PK-CU-DIN 16-6	16,0	6,4	5,5	13,0	36,0	8	12,7	100	-
907686	HELU-S-PK-CU-DIN 16-8	16,0	8,4	5,5	13,0	37,0	8	13,0	100	-
907687	HELU-S-PK-CU-DIN 16-10	16,0	10,5	5,5	16,5	38,0	8	13,2	100	-
907689	HELU-S-PK-CU-DIN 25-6	25,0	6,4	7,0	14,0	39,0	10	16,2	100	-
907690	HELU-S-PK-CU-DIN 25-8	25,0	8,4	7,0	17,0	39,0	10	17,3	100	-
907691	HELU-S-PK-CU-DIN 25-10	25,0	10,5	7,0	17,0	40,5	10	17,7	100	-
907692	HELU-S-PK-CU-DIN 25-12	25,0	13,0	7,0	18,0	40,5	10	17,2	100	-
907695	HELU-S-PK-CU-DIN 35-8	35,0	8,4	8,2	18,0	42,0	12	31,9	100	-
907696	HELU-S-PK-CU-DIN 35-10	35,0	10,5	8,2	20,0	42,5	12	31,7	100	-
907697	HELU-S-PK-CU-DIN 35-12	35,0	13,0	8,2	21,0	44,0	12	31,1	100	-
907701	HELU-S-PK-CU-DIN 50-8	50,0	8,4	9,8	20,0	52,0	14	50,0	100	-
907702	HELU-S-PK-CU-DIN 50-10	50,0	10,5	9,8	22,0	52,0	14	49,4	100	-
907703	HELU-S-PK-CU-DIN 50-12	50,0	13,0	9,8	23,0	52,0	14	49,1	100	-
907705	HELU-S-PK-CU-DIN 50-16	50,0	17,0	9,8	28,0	55,5	14	50,4	100	-
907707	HELU-S-PK-CU-DIN 70-8	70,0	8,4	11,3	24,0	56,0	16	65,4	50	-
907708	HELU-S-PK-CU-DIN 70-10	70,0	10,5	11,3	24,0	56,0	16	65,4	50	-
907709	HELU-S-PK-CU-DIN 70-12	70,0	13,0	11,3	24,0	56,5	16	65,7	50	-
907711	HELU-S-PK-CU-DIN 70-16	70,0	17,0	11,3	29,0	57,0	16	69,2	50	-
906524	HELU-S-PK-CU-DIN 95-10	95,0	10,5	13,5	28,0	65,5	18	95,5	50	-
906525	HELU-S-PK-CU-DIN 95-12	95,0	13,0	13,5	28,0	65,5	18	94,5	50	-
907715	HELU-S-PK-CU-DIN 95-12	95,0	17,0	13,5	30,0	65,5	18	94,4	50	-
907716	HELU-S-PK-CU-DIN 95-14	95,0	21,0	13,5	33,0	71,0	18	98,6	50	-
906526	HELU-S-PK-CU-DIN 120-10	120,0	10,5	15,5	31,0	70,0	20	114,0	50	-
906527	HELU-S-PK-CU-DIN 120-12	120,0	13,0	15,5	31,0	70,5	20	114,3	50	-
907719	HELU-S-PK-CU-DIN 120-8	120,0	17,0	15,5	31,5	70,0	20	113,6	50	-
907720	HELU-S-PK-CU-DIN 120-10	120,0	21,0	15,5	36,0	72,0	20	115,1	50	-
907722	HELU-S-PK-CU-DIN 120-14	150,0	10,5	17,0	34,0	79,0	22	164,6	25	-
906528	HELU-S-PK-CU-DIN 150-12	150,0	13,0	17,0	34,0	78,5	22	165,3	25	-
906529	HELU-S-PK-CU-DIN 150-16	150,0	17,0	17,0	34,0	78,0	22	163,5	25	-
907724	HELU-S-PK-CU-DIN 120-20	150,0	21,0	17,0	38,0	78,0	22	163,4	25	-
907726	HELU-S-PK-CU-DIN 150-10	185,0	10,5	19,0	37,0	83,0	25	185,0	25	-
906530	HELU-S-PK-CU-DIN 185-12	185,0	13,0	19,0	37,0	82,5	25	189,5	25	-
906531	HELU-S-PK-CU-DIN 185-16	185,0	17,0	19,0	37,0	82,0	25	194,1	25	-

Continuation ▶

X



# HELU-S-PK-CU-DIN Tubular compression cable lugs - straight

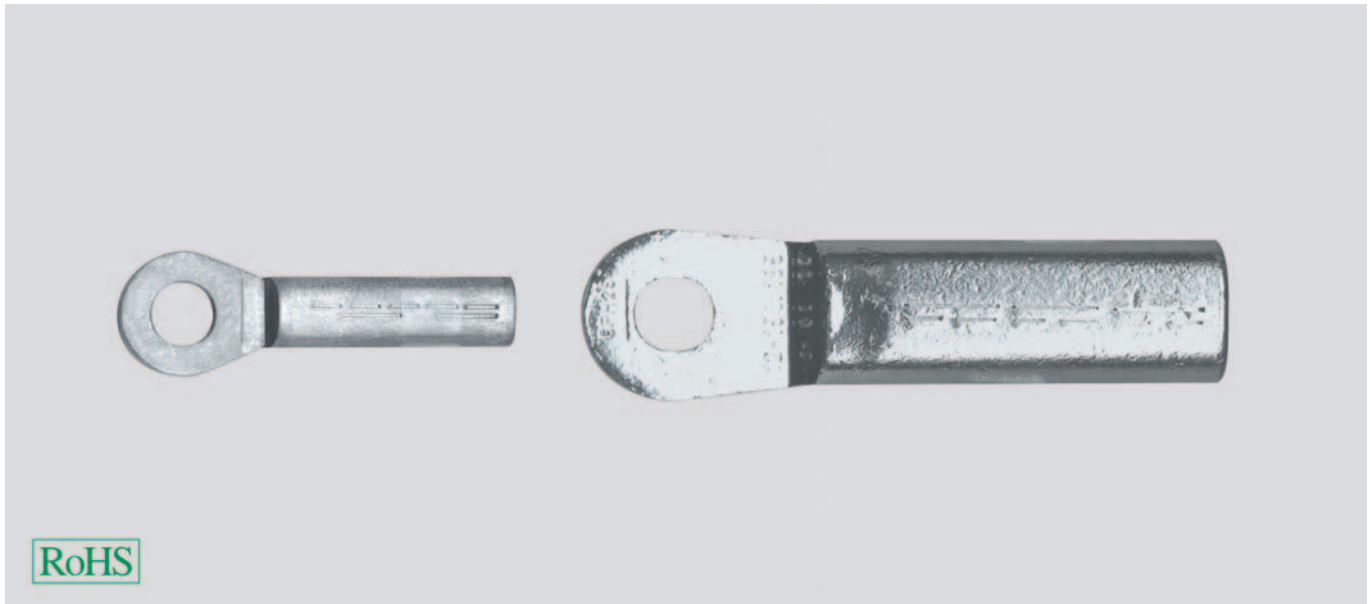
uninsulated

Part no.	Type	Cross-section mm <sup>2</sup>	a mm	d mm	b mm	l mm	Code type	Weight kg / 1000 items	Unit
907728	HELU-S-PK-CU-DIN 150-14	185,0	21,0	19,0	40,0	83,0	25	190,1	25
906532	HELU-S-PK-CU-DIN 240-12	240,0	13,0	21,5	42,5	92,0	28	266,5	20
906533	HELU-S-PK-CU-DIN 240-16	240,0	17,0	21,5	42,5	92,0	28	274,5	20
907731	HELU-S-PK-CU-DIN 185-8	240,0	21,0	21,5	45,0	92,0	28	276,7	20
906534	HELU-S-PK-CU-DIN 300-16	300,0	17,0	24,5	48,5	100,0	32	341,6	10
906535	HELU-S-PK-CU-DIN 300-20	300,0	21,0	24,5	48,5	100,0	32	344,6	10
906536	HELU-S-PK-CU-DIN 400-16	400,0	17,0	27,5	55,0	117,0	38	717,5	5
906537	HELU-S-PK-CU-DIN 400-20	400,0	21,0	27,5	55,0	117,0	38	706,4	5
906538	HELU-S-PK-CU-DIN 500-20	500,0	21,0	31,0	60,0	130,0	42	876,6	5
907744	HELU-S-PK-CU-DIN 300-14	625,0	21,0	34,5	63,0	135,0	44	820,5	5
907747	HELU-S-PK-CU-DIN 400-10	800,0	21,0	40,0	75,0	165,0	100	1455,5	2
907749	HELU-S-PK-CU-DIN 400-14	1000,0	21,0	44,0	83,0	167,0	58	1890,0	2

Dimensions and specifications may be changed without prior notice.

# HELU-S-PK-AL-DIN Tubular compression cable lugs

uninsulated



## Tubular cable lug HELU-S-PK-AL-DIN

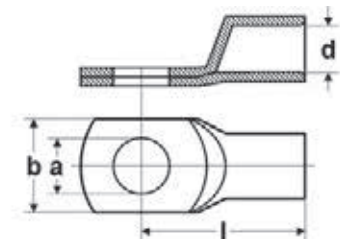
Uninsulated, straight tubular cable lugs in eye type design made by aluminum. High definition version for reliable crimping. Designed for conductor type RM acc. to DIN 48201 and circular reshaped conductors.

## Material

AL 99,5  
Surface: bare

## Note

- Code type indicates the required hexagonal clamping insert.
- Sleeves are prefilled with compound and sealed with plastic plugs



## Dimensions

- a Diameter of the boring  
d Inner diameter of the cable inclusion  
b Flange width  
l Length till middle of the boring

Part no.	Type	Cross-section RM/SM - SE mm <sup>2</sup>	a mm	d mm	b mm	l mm	Code type	Weight kg / 1000 items	Unit	
907865	HELU-S-PK-AL-DIN 16-8	16,0 - 25,0	8,4	5,6	16,0	52,0	12	9,6	50	-
907866	HELU-S-PK-AL-DIN 16-10	16,0 - 25,0	10,5	5,6	18,0	52,0	12	9,7	50	-
907867	HELU-S-PK-AL-DIN 25-8	25,0 - 35,0	8,4	6,8	16,0	60,0	12	14,8	50	-
907868	HELU-S-PK-AL-DIN 25-10	25,0 - 35,0	10,5	6,8	18,0	60,0	12	15,3	50	-
907869	HELU-S-PK-AL-DIN 35-8	35,0 - 50,0	8,4	8,0	20,0	67,0	14	24,5	50	-
907870	HELU-S-PK-AL-DIN 35-10	35,0 - 50,0	10,5	8,0	20,0	67,0	14	24,5	50	-
907871	HELU-S-PK-AL-DIN 35-12	35,0 - 50,0	13,0	8,0	20,0	67,0	14	23,5	50	-
907872	HELU-S-PK-AL-DIN 50-8	50,0 - 70,0	8,4	10,0	23,0	74,0	16	32,9	25	-
907873	HELU-S-PK-AL-DIN 50-10	50,0 - 70,0	10,5	10,0	23,0	74,0	16	28,8	25	-
907874	HELU-S-PK-AL-DIN 50-12	50,0 - 70,0	13,0	10,0	23,0	74,0	16	33,8	25	-
907875	HELU-S-PK-AL-DIN 70-10	70,0 - 95,0	10,5	11,5	28,0	84,0	18	47,7	25	-
907876	HELU-S-PK-AL-DIN 70-12	70,0 - 95,0	13,0	11,5	28,0	87,0	18	47,3	25	-
907877	HELU-S-PK-AL-DIN 95-10	95,0 - 120,0	10,5	13,2	32,0	90,0	22	70,1	10	-
907878	HELU-S-PK-AL-DIN 95-12	95,0 - 120,0	13,0	13,2	32,0	90,0	22	78,2	10	-
907879	HELU-S-PK-AL-DIN 95-16	95,0 - 120,0	17,0	13,2	32,0	90,0	22	76,2	10	-
907880	HELU-S-PK-AL-DIN 120-10	120,0 - 150,0	10,5	14,7	32,0	98,0	22	83,8	10	-
907881	HELU-S-PK-AL-DIN 120-12	120,0 - 150,0	13,0	14,7	32,0	98,0	22	87,9	10	-
907882	HELU-S-PK-AL-DIN 120-16	120,0 - 150,0	17,0	14,7	32,0	98,0	22	86,4	10	-
906459	HELU-S-PK-AL-DIN 150-10	150,0 - 185,0	10,5	16,3	35,0	104,0	25	99,8	10	-
906436	HELU-S-PK-AL-DIN 150-12	150,0 - 185,0	13,0	16,3	35,0	104,0	25	102,3	10	-
906461	HELU-S-PK-AL-DIN 150-16	150,0 - 185,0	13,0	16,3	35,0	104,0	25	100,8	10	-
906462	HELU-S-PK-AL-DIN 150-20	150,0 - 185,0	21,0	16,3	35,0	104,0	25	100,2	10	-
907883	HELU-S-PK-AL-DIN 185-10	185,0 - 240,0	10,5	18,5	40,0	109,0	28	133,9	10	-
906463	HELU-S-PK-AL-DIN 185-12	185,0 - 240,0	13,0	18,5	40,0	109,0	28	133,9	10	-
906464	HELU-S-PK-AL-DIN 185-16	185,0 - 240,0	17,0	18,5	40,0	109,0	28	137,5	10	-
906465	HELU-S-PK-AL-DIN 185-20	185,0 - 240,0	21,0	18,5	40,0	109,0	28	137,5	10	-
907884	HELU-S-PK-AL-DIN 240-10	240,0 - 300,0	10,5	21,0	46,0	119,0	32	182,8	10	-
906466	HELU-S-PK-AL-DIN 240-12	240,0 - 300,0	13,0	21,0	46,0	119,0	32	179,4	10	-
906467	HELU-S-PK-AL-DIN 240-16	240,0 - 300,0	17,0	21,0	46,0	119,0	32	176,2	10	-
906468	HELU-S-PK-AL-DIN 240-20	240,0 - 300,0	21,0	21,0	46,0	119,0	32	179,0	10	-
906469	HELU-S-PK-AL-DIN 300-12	300,0 - 25,0	13,0	23,3	50,0	125,0	38	205,4	5	-
906470	HELU-S-PK-AL-DIN 300-16	300,0 - 25,0	17,0	23,3	50,0	125,0	38	201,4	5	-
906471	HELU-S-PK-AL-DIN 300-20	300,0 - 25,0	21,0	23,3	50,0	125,0	38	194,3	5	-
906472	HELU-S-PK-AL-DIN 400-12	400,0 - 25,0	13,0	26,0	55,0	120,0	38	283,0	5	-
906473	HELU-S-PK-AL-DIN 400-16	400,0 - 25,0	17,0	26,0	55,0	120,0	38	273,3	5	-
906474	HELU-S-PK-AL-DIN 400-20	400,0 - 25,0	21,0	26,0	55,0	120,0	38	240,0	5	-
906475	HELU-S-PK-AL-DIN 500-12	500,0 - 25,0	13,0	29,0	63,0	140,0	44	380,0	5	-
906476	HELU-S-PK-AL-DIN 500-16	500,0 - 25,0	17,0	29,0	63,0	140,0	44	378,0	5	-
906477	HELU-S-PK-AL-DIN 500-20	500,0 - 25,0	21,0	29,0	63,0	140,0	44	373,5	5	-

Dimensions and specifications may be changed without prior notice.

**ADI** core end sleeves

insulated

**ADI**

Insulated core end sleeves prevent stripped wires from fanning. The hopper-shaped plastic collar enables them to be pushed easily onto the wires. To DIN, ZF, and Telemecanique colour code.

**Material**

Socket: copper  
Surface: tinned

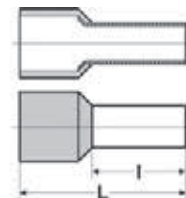
Insulating shroud: polypropylene

**Note**

Assignment to cable cross section according to DIN 46228: up to 50mm<sup>2</sup> to nominal size and DIN color code - over 50mm<sup>2</sup> no specification; Assignment to suitable size possible.

**Technical data**

Temperature range: up to +105°C  
Temperature range temporary up to +120°C

**Dimensions**

L Total length  
l Stick length

Part no.	Size mm <sup>2</sup>	Colour	Colour code	Total length mm	Stick length mm	Unit	
91850	0,14 / normal	brown	Telemecanique	10,4	6,0	500	-
91851	0,14 / long	brown	Telemecanique	12,4	8,0	500	-
91852	0,25 / normal	violet	Telemecanique	10,4	6,0	500	-
91853	0,25 / normal	light blue	Z+F	10,4	6,0	500	-
91854	0,25 / long	violet	Telemecanique	12,4	8,0	500	-
91855	0,25 / long	light blue	Z+F	12,4	8,0	500	-
91856	0,34 / normal	pink	Telemecanique	10,4	6,0	500	-
91857	0,34 / normal	turquoise	Z+F	10,4	6,0	500	-
91858	0,34 / long	pink	Telemecanique	12,4	8,0	500	-
91859	0,34 / long	turquoise	Z+F	12,4	8,0	500	-
91860	0,5 / short	white	DIN	12,0	6,0	500	-
91861	0,5 / short	orange	Z+F	12,0	6,0	500	-
91350	0,5 / normal	white	DIN	14,0	8,0	500	-
91383	0,5 / normal	orange	Z+F	14,0	8,0	500	-
91862	0,5 / semi-long	white	DIN	16,0	10,0	500	-
91863	0,5 / semi-long	orange	Z+F	16,0	10,0	500	-
91864	0,75 / short	light blue	Telemecanique	12,4	6,0	500	-
91865	0,75 / short	white	Z+F	12,4	6,0	500	-
94023	0,75 / short	grey	DIN	12,4	6,0	500	-
91351	0,75 / normal	light blue	Telemecanique	14,6	8,0	500	-
91384	0,75 / normal	white	Z+F	14,6	8,0	500	-
93030	0,75 / normal	grey	DIN	14,6	8,0	500	-
91866	0,75 / semi-long	light blue	Telemecanique	16,4	10,0	500	-
91867	0,75 / semi-long	white	Z+F	16,4	10,0	500	-
91868	0,75 / semi-long	grey	DIN	16,4	10,0	500	-
91869	0,75 / long	light blue	Telemecanique	18,4	12,0	500	-
91870	0,75 / long	white	Z+F	18,4	12,0	500	-

Continuation ►

**ADI** core end sleeves

insulated

Part no.	Size mm <sup>2</sup>	Colour	Colour code	Total length mm	Stick length mm	Unit	
91871	0,75 / long	grey	DIN	18,4	12,0	500	-
91872	1,0 / short	red	DIN	12,4	6,0	500	-
91873	1,0 / short	yellow	Z+F	12,4	6,0	500	-
91352	1,0 / normal	red	DIN	14,6	8,0	500	-
91385	1,0 / normal	yellow	Z+F	14,6	8,0	500	-
91874	1,0 / semi-long	red	DIN	16,4	10,0	500	-
91875	1,0 / semi-long	yellow	Z+F	16,4	10,0	500	-
91876	1,0 / long	red	DIN	18,4	12,0	500	-
91877	1,0 / long	yellow	Z+F	18,4	12,0	500	-
91353	1,5 / normal	black	DIN	14,6	8,0	500	-
91386	1,5 / normal	red	Z+F	14,6	8,0	500	-
91878	1,5 / semi-long	black	DIN	16,4	10,0	500	-
91879	1,5 / semi-long	red	Z+F	16,4	10,0	500	-
91880	1,5 / long	black	DIN	24,4	18,0	500	-
91881	1,5 / long	red	Z+F	24,4	18,0	500	-
91354	2,5 / normal	grey	Telemecanique	15,2	8,0	500	-
91387	2,5 / normal	blue	DIN	15,2	8,0	500	-
91882	2,5 / semi-long	grey	Telemecanique	19,0	12,0	500	-
91883	2,5 / semi-long	blue	DIN	19,0	12,0	500	-
91884	2,5 / long	grey	Telemecanique	25,0	18,0	500	-
91885	2,5 / long	blue	DIN	25,0	18,0	500	-
91355	4,0 / normal	orange	Telemecanique	16,5	10,0	500	-
91388	4,0 / normal	grey	DIN	16,5	10,0	500	-
91886	4,0 / semi-long	orange	Telemecanique	19,5	12,0	500	-
91887	4,0 / semi-long	grey	DIN	19,5	12,0	500	-
91888	4,0 / long	orange	Telemecanique	25,5	18,0	500	-
91889	4,0 / long	grey	DIN	25,5	18,0	500	-
91356	6,0 / normal	green	Telemecanique	20,0	12,0	100	-
91389	6,0 / normal	black	Z+F	20,0	12,0	100	-
93031	6,0 / normal	yellow	DIN	20,0	12,0	100	-
91890	6,0 / long	green	Telemecanique	26,0	18,0	100	-
91891	6,0 / long	black	Z+F	26,0	18,0	100	-
91892	6,0 / long	yellow	DIN	26,0	18,0	100	-
91357	10,0 / normal	brown	Telemecanique	21,5	12,0	100	-
91390	10,0 / normal	ivory	Z+F	21,5	12,0	100	-
93032	10,0 / normal	red	DIN	21,5	12,0	100	-
91893	10,0 / long	brown	Telemecanique	27,5	18,0	100	-
91894	10,0 / long	ivory	Z+F	27,5	18,0	100	-
94024	10,0 / long	red	DIN	27,5	18,0	100	-
91895	16,0 / normal	ivory	Telemecanique	22,2	12,0	100	-
91896	16,0 / normal	green	Z+F	22,2	12,0	100	-
91897	16,0 / normal	blue	DIN	22,2	12,0	100	-
91898	16,0 / long	ivory	Telemecanique	28,2	18,0	100	-
91899	16,0 / long	green	Z+F	28,2	18,0	100	-
91900	16,0 / long	blue	DIN	28,2	18,0	100	-
91359	25,0 / normal	black	Telemecanique	29,0	16,0	50	-
91392	25,0 / normal	brown	Z+F	29,0	16,0	50	-
93034	25,0 / normal	yellow	DIN	29,0	16,0	50	-
91901	25,0 / long	black	Telemecanique	35,0	22,0	50	-
91902	25,0 / long	brown	Z+F	35,0	22,0	50	-
91903	25,0 / long	yellow	DIN	35,0	22,0	50	-
91393	35,0 / normal	red	DIN	30,0	16,0	50	-
91394	35,0 / normal	beige	Z+F	30,0	16,0	50	-
91904	35,0 / long	red	DIN	39,0	25,0	50	-
91905	35,0 / long	beige	Z+F	39,0	25,0	50	-
91395	50,0 / normal	blue	DIN	36,4	20,0	50	-
91396	50,0 / normal	oliv	Z+F	36,4	20,0	50	-
91906	50,0 / long	blue	DIN	41,0	25,0	50	-
91907	50,0 / long	oliv	Z+F	41,0	25,0	50	-
91908	70,0 / normal	yellow	DIN	37,0	21,0	25	-
91397	70,0 / long	yellow	DIN	43,0	27,0	25	-
91909	95,0 / normal	red	DIN	44,0	25,0	25	-
91910	120,0 / normal	blue	DIN	48,0	27,0	25	-
91911	150,0 / normal	yellow	DIN	58,0	32,0	25	-

Dimensions and specifications may be changed without prior notice.

**ADU** core end sleeves

non insulated

**ADU**

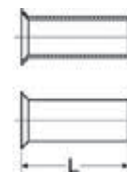
Non-insulated core end sleeves prevent stripped wires from fanning. The hopper-shaped socket enables them to be pushed easily onto the wires.

**Material**

Socket: copper

**Note**

Assignment to cable cross section according to DIN 46228: up to 50mm<sup>2</sup> to nominal size - over 50mm<sup>2</sup> no specificatin; Assignment to suitable size possible.

**Dimensions**

L Total length

Part no.	Size mm <sup>2</sup>	Length mm	Unit	
91368	0,5	6,0	1000	-
91370	0,5	10,0	1000	-
91371	0,75	6,0	1000	-
91372	0,75	8,0	1000	-
91373	1,0	6,0	1000	-
91374	1,0	10,0	1000	-
91375	1,5	7,0	1000	-
91376	1,5	10,0	1000	-
93096	2,5	7,0	1000	-
93097	2,5	10,0	1000	-
93099	4,0	9,0	1000	-
94000	4,0	12,0	1000	-
94001	6,0	10,0	250	-
94002	6,0	12,0	250	-
94003	6,0	15,0	250	-
94004	10,0	12,0	250	-
94005	10,0	15,0	250	-
94006	10,0	18,0	250	-
94007	16,0	12,0	250	-
94008	16,0	15,0	250	-
94009	16,0	18,0	250	-
94010	25,0	12,0	100	-
94011	25,0	15,0	100	-
94012	25,0	18,0	100	-
94013	25,0	25,0	100	-
94014	25,0	32,0	100	-
94015	35,0	18,0	100	-
94016	35,0	25,0	100	-
94018	35,0	32,0	100	-
94019	50,0	18,0	100	-
94020	50,0	22,0	100	-
94021	70,0	25,0	100	-
94022	70,0	32,0	100	-
91030	95,0	25,0	50	-
91031	95,0	32,0	50	-
96841	120,0	32,0	50	-

Dimensions and specifications may be changed without prior notice.



## AV core connectors for communication and signal cables



### AV core connectors

Core connectors type **AV** connect plastic-insulated telecommunication and signal cable cores. They are characterised by their space-saving and assembly-friendly structure. Satisfy the requirements of DIN 47627 (solder-free core connections in sleeves for telecommunication cables). When clamping with the **AVZ** tool, the vertical forces are transferred evenly to the core connectors, thus guaranteeing reliable contacting of the copper lines to be processed.

### Properties

- high electrical insulation values
- high mechanical and thermal strength
- impact-proof plastic housing
- corrosion protection through grease charge
- improved contacting through U-contact principle
- core diameters up to 2.0 mm possible
- larger application range from 0.4 - 0.9 mm conductor diameter
- stripping, connection and insulation in one action

### Scope of delivery

Colour: transparent

### Note

The parallel-clamping core binding pliers or equivalent are suitable for flush clamping core connectors.  
Use core connection pliers AVZ or equal tool.

### AV core connectors

Part no.	Type	No. cores	Conductor Ø from - to mm	Unit	
93147	AV2	2	0,4 - 0,9	100	-
93148	AV3	3	0,4 - 0,9	100	-
93149	AVT3	3	0,4 - 0,9	100	-

### AVZ core connecting pliers

Part no.	Type	No. cores	Conductor Ø from - to mm	Unit	
93150	AVZ	-	-	1	-

Dimensions and specifications may be changed without prior notice.

# PV cable coupler MC4



# PV-male and female cable coupler MC4



## PV- male and female cable coupler MC4

With Snap-in lock

## Material

Polyamide  
Contact:Cu, tinned, rotated

## Technical data

Protection classification:IP 67  
Safety class: II  
Temperature range: -40°C up to +90°C  
Rated voltage:1000 V (IEC)  
Rated current:22A (2,5 mm<sup>2</sup>), 30A (4mm<sup>2</sup>, 6mm<sup>2</sup>)  
Contact resistance of plug connectors:0.35 mOhm

### MC4 male cable coupler

Part no.	Designation	Cross section mm <sup>2</sup>	Cable Ø mm	Unit
905206	PV-male cable coupler MC4	2,5	3 - 6	50
905208	PV-male cable coupler MC4	2,5	5,5 - 9	50
905210	PV-male cable coupler MC4	4 - 6	3 - 6	50
904963	PV-male cable coupler MC4	4 - 6	5,5 - 9	50
905863	PV-male cable coupler MC4	10	5,5 - 9	50

### MC4 female cable coupler

Part no.	Designation	Cross section mm <sup>2</sup>	Cable Ø mm	Unit
905207	PV-female cable coupler MC4	2,5	3 - 6	50
905209	PV-female cable coupler MC4	2,5	5,5 - 9	50
905211	PV-female cable coupler MC4	4 - 6	3 - 6	50
904964	PV-female cable coupler MC4	4 - 6	5,5 - 9	50
905864	PV-female cable coupler MC4	10	5,5 - 9	50

Dimensions and specifications may be changed without prior notice.



HELUTOOL 250 pocket

# Multistrip 10

**Outside cleaning cutter HAMX**

Chamfer cutter HUFS

Cable stripping Knife HKM 1



<b>Designation</b>	<b>Properties</b>	<b>Page</b>
Multistrip 10	Stripper	<b>1004</b>
DUO Stripper 200	Peeling and stripping	<b>1005</b>
Skinning tool HAM 1		<b>1006</b>
HELUTOOL 250 pocket, 190	Drum unwinder	<b>1007</b>
HELUTOOL MZ	Circlip pliers	<b>1008</b>
Outside cleading cutter HAMX		<b>1009</b>
Cable stripper for vulcanized semi conductive layer HFBS		<b>1010</b>
Inside cleading cutter (universal) HIMS II		<b>1011</b>
Chamfer cutter HUF5		<b>1012</b>
Cable stripping knife HKM1		<b>1013</b>
MS-Skinning-Complete-Set		<b>1014</b>



# Multistrip 10 stripper



## Stripper Multistrip 10

- Self adjusting
- For single and multi-core lines made of PVC, rubber etc.
- Adjustable stripping length up to 18mm
- Robust metal clamps
- Ergonomic two-component handle
- Length 195 mm
- Weight 200 g

### Stripper

Part no.	Type	Cross-section min. - max. mm <sup>2</sup>	Unit
904731	Multistrip 10	0,03 - 10,0	1

Dimensions and specifications may be changed without prior notice.

# DUO Stripper 200 peeling and stripping



## Duo Stripper 200

The Duo Stripper 200, one tool with 2 functions:  
Peeling and stripping.

- Peels all standard round cables from 4-28mm, with adjustable cutting depth and rotating knife for automatic conversion from round to longitudinal sections.
- Stripping from 0.5 to 6.0mm<sup>2</sup>.

### peeling and stripping

Part no.	Type	Unit
91924	DUO 200	1

Dimensions and specifications may be changed without prior notice.

# Skinning tool HAM1

for round cables



## Skinning tool HAM 1

- For PVC-insulated round cables and a plurality of PUR-insulated cables up to 25mmØ.
- Suitable for longitudinal and round section. The depth of the cut is adjustable from 0 to 5mm. The cutting blade can be used double-sided.
- Length: 50 mm
- Weight: 0,16 kg

## Note

Replacement cutting blade for HAM 1, Part 906234

## Scope of delivery

HAM 1 incl. plastic box

## Skinning tool HAM 1

Part no.	Type	Cross-section mm <sup>2</sup>	Unit
906233	HAM1	-	1

## Spare blade for skinning tool HAM 1

Part no.	Type	Cross-section mm <sup>2</sup>	Unit
906234	-	-	1

Dimensions and specifications may be changed without prior notice.

# HELUTOOL 250 pocket, 190 drum unwinder



## Drum unwinder HELUTOOL

For simple reeling of cable drums.

- Dynamic brake for constant traction: retarding effect corresponds to the weight bearing on.
- Small weight
- Small size
- Can be used with broken drums

### drum unwinder

Part no.	Type	Weight app. kg	Load capacity kg	Diameter app. mm	Reel width mm	Unit
903716	HELUTOOL 250 pocket	1,0	190	250	-	1
93529	HELUTOOL 190	7,0	380	500	-	1

Dimensions and specifications may be changed without prior notice.

# HELUTOOL MZ circlip pliers



## HELUTOOL MZ

assembly pliers for cable glands

- fast and reliable installation of cable glands
- automatic progressively adjustable size of the jaw
- ratchet-like function with pivoting angle 60°
- with fixed adjustment for continuous working
- good applicable even in constricted working areas
- stable for professional use
- extremely handy
- two-components-plastic handles

### circlip pliers

Part no.	Type	Unit	
904892	MZ 13/23	1	-
904893	MZ 24/36	1	-

Dimensions and specifications may be changed without prior notice.



# Outside cleading cutter HAMX

with rapid clamping system for low voltage- and medium voltage conductors



## Outside cleading cutter HAMX

The outside cleading cutter with rapid clamping system can be used to strip the outer sheath from low voltage and medium voltage conductors with an outside diameter of 16 up to 54 mm.

A switch lever between longitudinal section and round cut as well as an additional claw for breaking the insulation are available. The positioning on the cable is made by a clamping system. The cut depth is adjustable from 0-5 mm in steps of 0,1 mm. The feed rate is made by a ratchet wrench. The maximum rotation diameter is 300 mm.

The components are produced from aluminium and stainless steel. The moldings are made of impact-resistant plastic material. The blades are from alloyed steel according to EN 10020 with a hardness of least 58 HRC.

Weight: 1,32 kg

## Note

Spare blade with screw and hex-wrench for HAMX, part no. 906236

## Scope of delivery

HAMX-device, ratchet wrench and nylon case

## Outside cleading cutter HAMX

Part no.	Type	Cross-section mm <sup>2</sup>	Unit
906235	HAMX	-	1

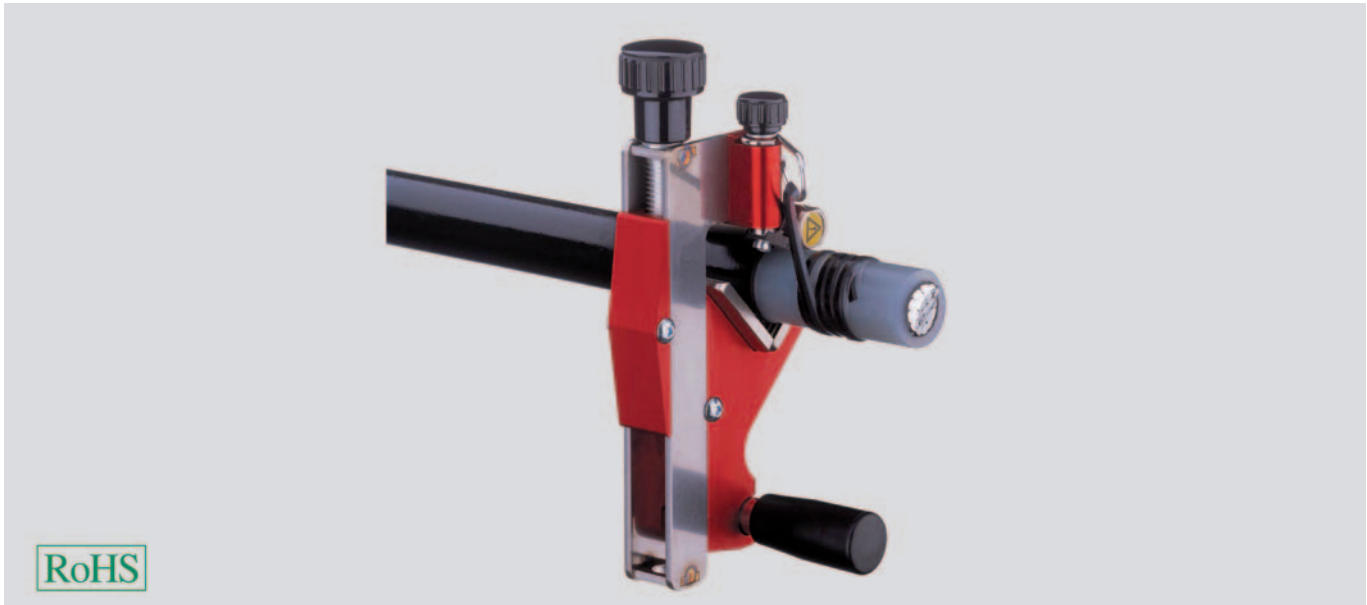
## Spare blade for skinning tool HAMX

Part no.	Type	Cross-section mm <sup>2</sup>	Unit
906236	-	-	1

Dimensions and specifications may be changed without prior notice.

# Cable stripper for vulcanized semi conductive layer HFBS

for stripping the vulcanized semi conductive layer



## Cable stripper for vulcanized semi conductive layer HFBS

The device is for stripping the vulcanized semi conductive layer of low voltage and medium voltage conductors. The maximum layer thickness is 1,5 mm. The stripper can be used for insulation diameter of 10 up to 52 mm. The positioning on the cable is made by a clamping system. The stripping process can be started and stopped in every position of the cable. A switch lever to activate/inactivate the axial traverse speed is available. The device has optimum gliding properties through coated contact surfaces. The maximum rotation diameter is 200 mm.

The components are made of aluminium, steel and brass, with anodized, chromium-plated and nickel-plated surfaces. The form parts are of impact resistant plastic. The blades are from alloyed steel with a hardness of least 55 HRC. Length: 170 mm  
Weight: 0,79 kg

## Note

- Spare blade 17° for HFBS, part no. 906238
- Spare tube silicone paste 100ml, part no. 906239

## Scope of delivery

HFBS-device, silicone paste, allen wrench 2,5 mm, plastic case

### Cable stripper for HFBS

Part no.	Type	Cross-section mm <sup>2</sup>	Unit
906237	HFBS	-	1

### Spare blade for HFBS

Part no.	Type	Cross-section mm <sup>2</sup>	Unit
906238	-	-	1

### Spare tube silicone paste

Part no.	Type	Cross-section mm <sup>2</sup>	Unit
906239	-	-	1

Dimensions and specifications may be changed without prior notice.

# Inside cleading cutter (universal) HIMS II

for medium voltage conductors



## Inside cleading cutter (universal) HIMS II

- The inside cleading cutter HIMS II can be used for stripping-off the primary insulation on the ends of medium voltage conductors of 6 up to 45 kV with outside diameters of 15 up to 52 mm and a maximum insulation thickness of 15 mm.
- The positioning on the cable is made by a clamping system. Spiral and circle cuts are possible. The cut depth is adjustable of 0 up to 15 mm and the feed rate is selectable in 5 steps. The stripping can be stopped in every position of the cable. The stripping length is unlimited. The device has optimum gliding properties through coated contacts surfaces. The maximum rotation diameter is 220 mm.
- The components are made of aluminium, steel and brass, with anodized, chromium-plated and nickel-plated surfaces. The blades are from alloyed steel with a hardness of least 55 HRC.
- Length: 170 mm
- Weight: 1 kg

## Note

- Spare blade for HIMS, part no. 906241
- Spare tube silicone paste 100ml, part no. 906239

## Scope of delivery

HIMS II device, silicone paste, allen wrench 2,5 mm, plastic case

### Inside cleading cutter HIMS II

Part no.	Type	Cross-section mm <sup>2</sup>	Unit
906240	HIMS II	-	1

### Spare blade for HIMS II

Part no.	Type	Cross-section mm <sup>2</sup>	Unit
906241	-	-	1

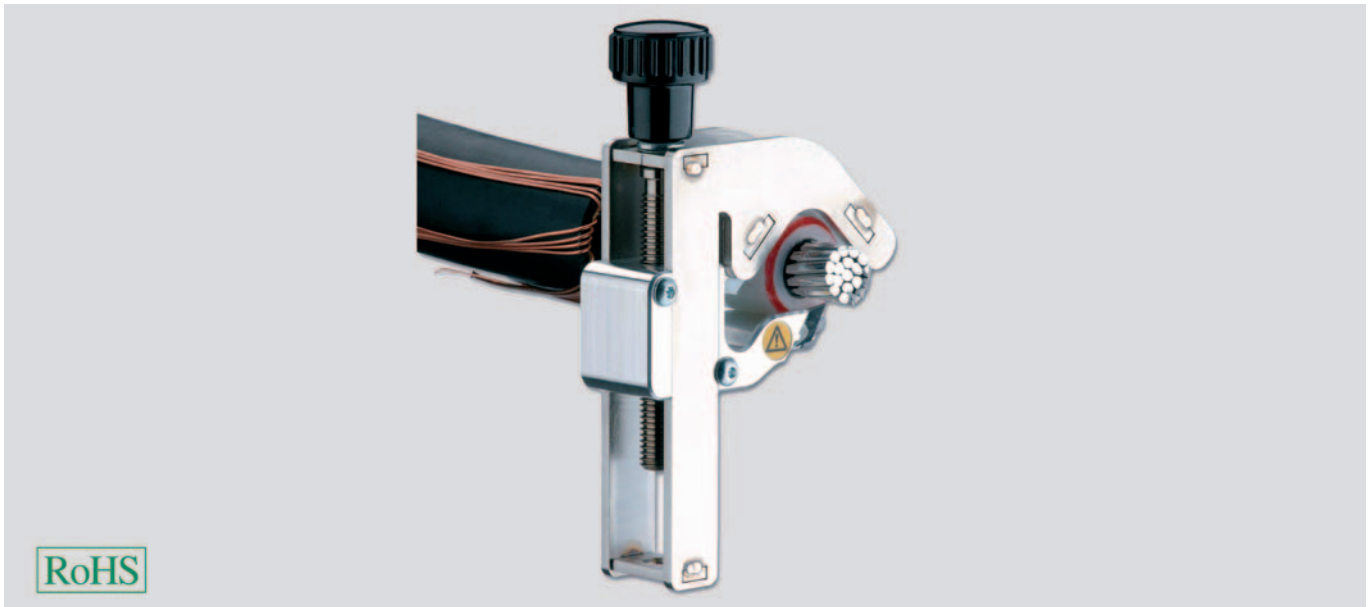
### Spare tube silicone paste

Part no.	Type	Cross-section mm <sup>2</sup>	Unit
906239	-	-	1

Dimensions and specifications may be changed without prior notice.

# Chamfer cutter HUFS

for medium voltage conductors



## Inside cleading cutter (universal) HUFS

- chamfer cutter HUFS is for chamfering the primary insulation of medium voltage conductors with outside diameter from 15 up to 60 mm.
- positioning on the cable is made by a clamping system. The device has PTFE-plates for optional gliding properties on the cable. A silicone paste is not necessary.
- size of the chamfer: 2 mm x 60°
- maximum totation diameter is 220 mm
- the device is light and has a robust construction form. The components are made of aluminium and steel. The blades are from alloyed steel with a hardness of least 55 HRC.
- Length: 145 mm
- Weight: 0,39 kg

## Note

Spare blade for HIMS, part no. 906243

## Scope of delivery

HUFS-device, allen wrench 2,5 mm, nylon case

### Chamfer cutter HUFS

Part no.	Type	Cross-section mm <sup>2</sup>	Unit
906242	HUFS	-	1

### Spare blade for HUFS

Part no.	Type	Cross-section mm <sup>2</sup>	Unit
906243	-	-	1

Dimensions and specifications may be changed without prior notice.

# Cable stripping knife HKM1



## Cable stripping knife HKM 1

- Cable stripping knife with special grinding. The special blade prevented a damage of the conductor. The knife has blade protection, sinking into the handle
- changeable blade is made of stainless steel according to DIN EN 10020, hardness minimum 50 HRC
- high-quality, ergonomically formed handle is out of impact plastic (PA)
- admission of the VDE up to 1000 volt according to EN/IEC 60900:2004 and GS-sign
- Length: 200 mm
- Weight: 0,1 kg

## Note

Spare blade with moulded plastic insert for HKM 1, part no. 906246

## Cable stripping knife HKM 1

Part no.	Type	Cross-section mm <sup>2</sup>	Unit
906245	HKM 1	-	1

## Spare blade for HKM 1

Part no.	Type	Cross-section mm <sup>2</sup>	Unit
906246	-	-	1

Dimensions and specifications may be changed without prior notice.



# MS-Skinning-Complete-Set



## MS-Skinning-Complete-Set

Skinning-Complete-Set for medium voltage cables contains everything you need for stripping.

- Skinning tool HAM1
- Outside cleading cutter HAMX
- Cable stripper for vulcanized semi conductive layer HFBS
- Inside cleading cutter (universal) HIMS II
- Chamfer cutter HUFS
- Spare tube silicone paste
- Dimensions: 38 x 31 x 9 cm
- Weight: 3,73 kg

Part no.	Type	Unit
906244	-	1

Dimensions and specifications may be changed without prior notice.

## ■ TERMINATION & CONNECTION SLEEVES

### Termination & connection sleeves:

- Telecommunication cables
- Low-voltage
- Medium-voltage
- Accessories/component parts

**YOU WILL FIND ADDITIONAL  
ACCESSORIES IN THE CABLE  
ACCESSORIES CATALOG!**



## ■ HELUTEC SIGNAL & POWER CONNECTORS

### HELUTEC signal & power connectors

- Helutec® Series 617/623/627
- Helutec® Series  
917/923/932/940/958
- Helutec® Series 723
- Helutec® Series 615/915
- Helutec® Series 926
- Tools and accessories

**YOU WILL FIND ADDITIONAL  
ACCESSORIES IN OUR HELUTEC  
BROCHURE!**

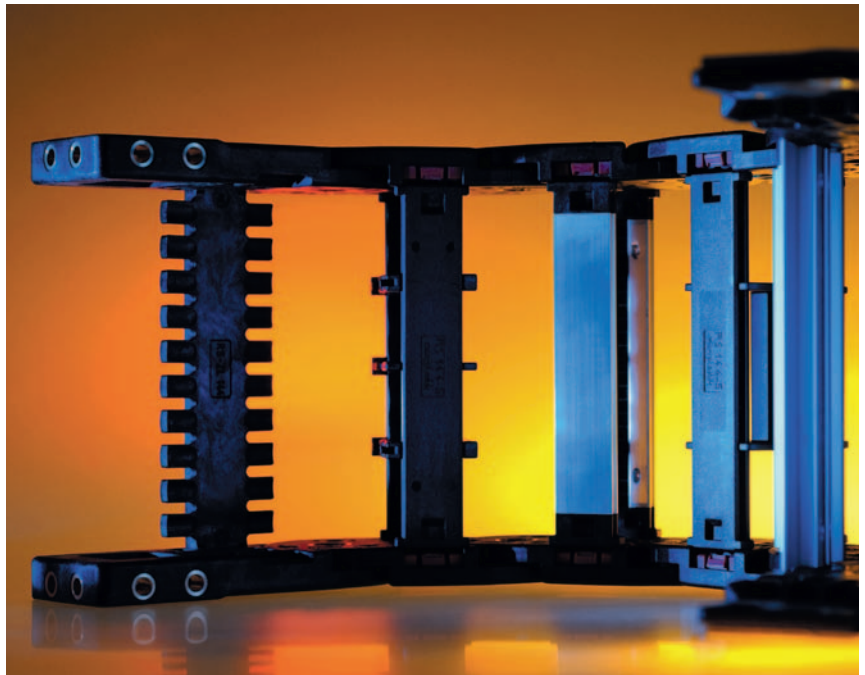


## ■ CABLE DRAG CHAINS

### Cable drag chains:

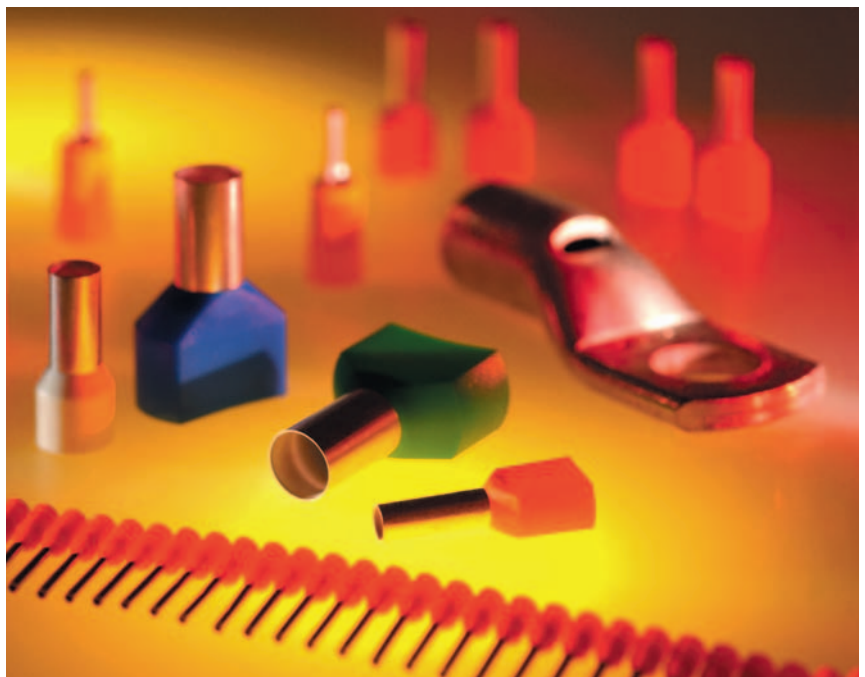
- Open chains
- Closed chains
- Accessories
- Installation instructions
- Selection tables

**YOU WILL FIND ADDITIONAL  
ACCESSORIES IN THE CABLE  
ACCESSORIES CATALOG!**

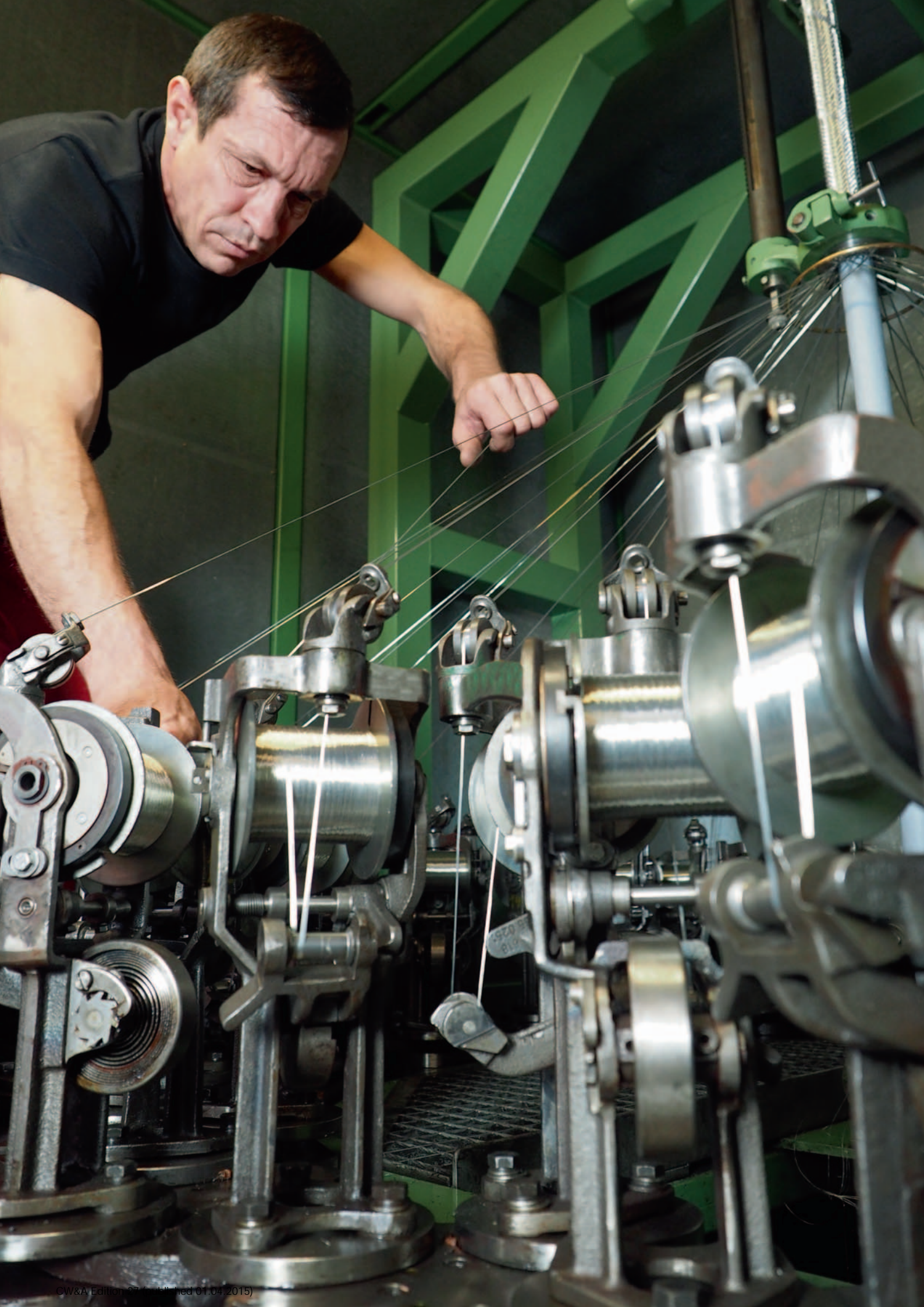


## ■ CABLE LUGS

**YOU WILL FIND OUR SPECIAL WIND  
TURBINE  
COMPRESSION CABLE LUGS  
IN THE CATALOG FOR WIND  
TURBINES!**











**SELECTION TABLE - Cables in drag chains**

Index

Part no.	Page	Part no.	Page
11494	60	12328	65
11495 - 11497	52	12345 - 12371	378
11498	60	12372 - 12405	379
11499 - 11500	52	12410 - 12436	378
1501	60	12437 - 12470	379
11502	52	12471 - 12517	384
11519	60	12518 - 12543	385
	52	12550 - 12620	389
	60	12630 - 12671	430
	52	12680 - 12722	
	60	12723 - 12746	
		12747 - 12804	
		12805 - 12846	
		12850 - 12877	
		12907	101
			426
			435



**SELECTION TABLE - CABLES & WIRES**

Torsion cables	UL 10678 / 21179 (GRJUS, CE)	UL 10269, 2570, GRJUS, CE	UL 10269, 2570, GRJUS, CE	UL 10553, 20234, GRJUS, 60332-3 CE, VDE	UL 10553, 20234, GRJUS, 60332-3 CE, VDE	UL 10553, 20234, GRJUS, CE, VDE	UL 10553, 20234, GRJUS, CE, VDE
Wk 103w-T	1000 v	1000 v	1000 v				
Wk 103w EMV D-T							
Wk 103k-T							
Wk 103k EMV D-Torsion							
Wk 135-T							
Wk 135 EMV D-T							
Wk 137-T FT4							
Wk 137 EMV D-T							
Wk 300w-T							
Wk 305-T							
407814 F-WIND-T							
Wk 101 H							
Wk fire alarm cable-T							
Wk NTSCHERWOLU-T							
Wk DLO 2 K							
Wk Powerline							
Wk THERMIFLEX							
Wk (T)							
Tower & Infrastructure							



**Questionnaire for energy drag chains**

Company \_\_\_\_\_

First name, Name \_\_\_\_\_

Street, No. \_\_\_\_\_

Postal Code, Place \_\_\_\_\_

Phone / Fax \_\_\_\_\_

E-Mail \_\_\_\_\_

Installation site \_\_\_\_\_

Kind of machine \_\_\_\_\_

In operation since \_\_\_\_\_

Sender \_\_\_\_\_

**1. Drag Chain-Parameter**

1 Chain length/chain width  m/mm

2 Chain pitch  mm

3 Bending radius  mm

4 Guide stays existing  yes  no

5 Frame stays existing  yes  no

6 layout/installation  horizontal  vertical

**2. Installation and Movement-Parameter**

1 Movement distance (max.)  m

2 Speeds  m/s

3 Acceleration  m/s<sup>2</sup>

4 Frequency per time unit  x/h

5 Average movement distance/cycle  m

6 Daily working duration  h

7 Feeding at mid of moving distance  yes  no

8 Additional weight/chain  kg

**3. Cable-Parameter**

1 Cable length (total)

**Enquiry Special Cable**

Phone +49 7150 9209-0  
 Fax +49 7150 81786  
 E-Mail: anfrage-spezialkabel@helukabel.de

**Enquiry**

yearly requirement approx. \_\_\_\_\_ m

Delivery required \_\_\_\_\_

Size \_\_\_\_\_

**Application**

a)  indoor  outdoor

b)  stationary  for flexing

c)  Drag chain  speed \_\_\_\_\_ m/s

Temperatures ambient \_\_\_\_\_ °C

Make-up Type of Cable \_\_\_\_\_

Acceleration \_\_\_\_\_ m/s<sup>2</sup>

load \_\_\_\_\_

cyclic  non-cyclic

continuous \_\_\_\_\_ °C



## ■ TECHNICAL INFORMATION

Selection tables 1020

---

Assembly instructions 1036

---

Questionnaire 1040

---

Technical explanations 1047

---

Glossary of terms 1151

---

Part number index 1158

---

# SELECTION TABLE - flexible control cable

Operational criteria		Cable and conductor description																																	
△ fixed installation ▲ fixed installation/flexing ▲ flexing		JZ-500	JZ-500 COLD	JZ-500 black	Single 600-I/O	Single 600-CY -I/-O	JZ-600	JZ-500-C black	JZ-600-Y-CY	JZ-600 UL/CSA	JZ-600-Y-CY UL/CSA	JZ-750	JB-500	JB-750	JZ-500 orange	JB-750 yellow	SY-JZ	SY-JB	JZ-602	JZ-602-CY	JZ-602 PUR DC / AC	JZ-602-PUR	JZ-602-C-PUR	JZ-603	JZ-603-CY	JZ-500 PUR	JZ-500-FC-PUR	PURö-JZ	F-C-PURö-JZ						
Page		30	34	32	498	499	40	32	60	362	378	38	42	43	33	44	55	64	356	373	386	384	389	358	375	67	76	68	78						
Technical Data	Standards	according to DIN / VDE	•	•			•	•	•			•	•	•	•	•		•	•								•	•	•	•					
		adapted with VDR Reg No.	•											•		•																			
		adapted with HAR approbation																							•	•									
		adapted with UL approbation				•	•					•	•								•	•	•	•	•	•	•								
		adapted with CSA approbation				•	•					•	•								•	•	•	•	•	•	•								
	Temperature range	+ 100 °C																																	
		+ 90 °C																			▽	▽					▽	▽							
		+ 80 °C	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽								▽	▽	▽	▽	▽			
		+ 75 °C																																	
		+ 70 °C																								▽	▽								
		+ 60 °C																																	
		- 5 °C				▲	▲				▲		▲	▲							▲	▲	▲	▲	▲	▲	▲	▲	▲						
		- 15 °C	▲		▲					▲		▲	▲		▲	▲	▲	▲	▲	▲									▲						
		- 20 °C													▲	▲	▲	▲	▲	▲												▲	▲		
		- 25 °C																																	
- 30 °C		▲																																	
- 40 °C	△	△	△	△	△	△	△	△	△	△	△	△	△	△	△	△	△	△	△	△	△	△	△	△	△	△	△	△	△	△	△	△			
- 50 °C																																			
Nominal voltage	250 V																																		
	300 / 300 V																																		
	300 / 500 V	•	•	•				•					•		•											•	•	•	•	•	•	•	•		
	600 V acc. UL/CSA																				•	•	•	•	•	•	•	•	•	•	•	•	•		
	450 / 750 V																																		
600 / 1000 V																																			
Cable structure	Core insulation	PVC / special PVC	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•			
		PUR																																	
		special material																																	
		rubber																																	
	Core identification	numbering according to DIN VDE 0293	•	•	•			•	•	•	•	•	•			•		•		•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	
		colour code according to DIN VDE 0293																																	
	Screening	Cu-braiding						•		•	•	•																							
		steel wire braiding																																	
	Outer sheath	PVC / special PVC	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	
		PUR																																	
special material																																			
Sheath colour	grey	•										•	•	•						•	•	•	•	•	•	•	•	•	•	•	•	•	•		
	black		•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•																
	orange																																		
	yellow																																		
	green																																		
	blue																																		
	transparent																																		
Application	Application in drag chains	see selection table cable in drag chains on page 1030 to 1031																																	
	for intrinsic safety power circuit																																		
	warning indication																																		
	interlocking purposes																																		
	open air	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	
Properties	halogen-free	see selection table flexible control cable halogen-free on page 1022																																	
	chemicals resistant	see selection table chemical resistance on page 1100 and 1101																																	
	EMV-preferred type						•			•	•										•		•		•	•	•	•	•	•	•	•	•		
	resistant to weathering effects	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	
	abrasion resistance																																		



# SELECTION TABLE - flexible control cable halogen-free

Operational criteria		Cable and conductor description																																
△ fixed installation ▲ fixed installation / flexing ▲ flexing		MEGAFLEX® 500	MEGAFLEX® 500-C	MEGAFLEX® 600	MEGAFLEX® 600-C	PUR 750	PUR-C-PUR	UNIPUR®	UNIPUR® CP	KOMPOFLEX® JZ-500	KOMPOFLEX® JZ-500-C	SIHF	SIHF/GL-P	SIHF-C-Si	SIHF UL/CSA	SIHF-C-Si UL/CSA	THERMFLEX® 180 EWKF	THERMFLEX® 180 EWKF-C	H05SS-F / H05SST-F	HELUTHERM® 145 MULTI	HELUTHERM® 145 MULTI-C	JZ 500 HMH	JZ 500 HMH-C	JB 750 HMH	JB 750 HMH-C	JZ 600 HMH	JZ 600 HMH-C	DATAFLAMM®	DATAFLAMM®-C	DATAFLAMM®-C-PAAR	(H)03 Z1Z1-F	(H)05 Z1Z1-F		
Page		394	398	396	400	75	84	73	82	112	113	223	235	232	476	478	225	234	226	221	230	86	96	93	102	91	100	130	145	146	94	95		
Technical Data	Standards	according to DIN / VDE	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•		
		adapted with VDR Reg No.						•																										
		adapted with HAR approbation																			•											•	•	
		adapted with UL approbation	•	•	•	•										•	•																	
		adapted with CSA approbation	•	•	•	•										•	•																	
	Temperature range	+ 180 °C											▼	▼	▼	▼	▼	▼	▼	▼														
		+ 150 °C after UL/CSA														▼	▼																	
		+ 145 °C																			△	△												
		+ 120 °C																			▼	▼												
		+ 90 °C							▼	▼	▼	▼																						
		+ 80 °C	▼	▼	▼	▼	▼	▼																										
		+ 70 °C																							▼	▼	▼	▼	▼	▼	▼	▼	▼	▼
		+ 5 °C																																
		- 5 °C						▲																										
		- 15 °C																							▲	▲	▲	▲	▲					
		- 20 °C																							▲	▲	▲	▲	▲					
		- 25 °C																	▲	▲														
- 30 °C	▲	▲	▲	▲						▲	▲																							
- 35 °C																						▲	▲											
- 40 °C	△	△	△	△	▲	△	▲	▲	△	△													△	△	△	△	△	△	△	△	△	△		
- 50 °C after UL/CSA															▲	▲						△	△											
- 55 °C																																		
- 60 °C												▲	▲	▲	▲	▲	△	△	▲															
Nominal voltage	Operating peak voltage																																	
	300 / 300 V																																	
	300 / 500 V	•	•			•		•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•								•		
	600 V acc. UL/CSA																																	
	450 / 750 V					•		•	•												•	•				•	•							
	600 / 1000 V			•	•																							•	•					
Cable structure	core insulation	Special Elastomer							•	•																								
		PUR					•	•																										
		Silicon											•	•	•	•	•	•	•	•														
		PE																											•	•	•			
		Special Polymer	•	•	•	•					•	•										•	•	•	•	•	•	•	•	•	•	•	•	
	Core identification	numbering according to DIN VDE 0293	•	•	•	•	•		•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•		•	•						
		colour code according to DIN VDE 0293					•	•	•	•																							•	•
		colour code according to DIN 47100																																
		JB colour code (varicoloured cores)																																
	Screening	Cu-braiding		•		•		•		•		•			•		•		•				•		•		•		•		•			
steel wire braiding													•																					
Outer sheath	Silicon												•	•	•	•	•	•	•															
	Special Polymer	•	•	•	•					•	•										•	•	•	•	•	•	•	•	•	•	•	•		
	PUR					•	•	•	•																									
Sheath colour	grey	•	•				•	•	•														•	•	•	•		•	•	•	•	•		
	black			•	•					•	•																•	•	•	•	•	•	•	
	yellow									•	•																						•	•
	orange									•	•																						•	•
	red-brown											•	•	•																			•	•
Application	Application in drag chains	see selection table cable in drag chains on page 1030 and 1031																																
	open air	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•		
Properties	chemicals resistant	•	•	•	•																													
	EMV-preferred type					•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	
	resistant to weathering effects	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	
	abrasion resistance	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	

# CABLES HALOGEN-FREE

Type	Page
<b>A</b>	
AIRPORT 400 Hz	824, 825
Audio	770
<b>B</b>	
BUS-Leitungen A-BUS EPDM	747
BUS-Leitungen A-BUS EPDM Long Distance	748
BUS-Leitungen A-BUS PUR UL/CSA	749
BUS-Leitungen A-BUS PUR UL/CSA Long Distance	750
BUS-Leitungen AS-Interface	752
BUS -Leitungen CAN Bus	740 - 741
BUS-Leitungen DeviceNet™ FRNC	754
BUS-Leitungen DeviceNet™ PUR hochflexibel	756
BUS -Leitungen E-BUS ERD	762
BUS-Leitungen HMCB 800 Schleppkette	726
BUS-Leitungen I-BUS halogenfrei	743
BUS-Leitungen I-BUS Schleppkette	744
BUS-Leitungen Koax 50 Ohm, PUR	730
BUS-Leitungen Profibus ET200X + ECOFAST	710
BUS-Leitungen Profibus L2 Außen + Robust	706
BUS-Leitungen Profibus L2 Schleppkette	709
BUS-Leitungen Profibus L2 Torsion	713
BUS-Leitungen Profibus SHIPLINE	711
BUS-Leitungen Profibus SK FRNC + Robust	718
BUS-Leitungen Profibus SK Außen	717
BUS-Leitungen SafetyBUS FRNC + PUR	758
BUS-Leitungen USB Bus S	727
BUS-Leitungen USB Bus 3.0	729
BUS-Leitungen CAN Bus	733
<b>D</b>	
DATAFLAMM®	130
DATAFLAMM®-C	145
DATAFLAMM®-C-PAAR	146
<b>F</b>	
Fernmelde-Schiffskabel FMGCH	924
Fernmelde-Marinekabel FMGSGO	925
Fernmelde-Marinenkabel FMGSGO	926
<b>G</b>	
GALVANICABLE®	317
<b>H</b>	
(H)03Z1Z1-F	94
(H)05Z1Z1-F	95
H05Z-K / H07Z-K	300
H07ZZ-F	90
Halogenfreie RG-Koaxialkabel	341
HELUKABEL® BS 6724	511
HELUSOUND® 600 FRNC	788
HELUTHERM® 1200 / 1200-ES	315
HELUTHERM® 145	495, 496
HELUTHERM® 145 MULTI	221
HELUTHERM® 145 MULTI-C	230
HELUTHERM® 600 / 600-ES	313
HELUTHERM® 800 / 800-ES	314
HELUTRAIN 3GKW	834
HELUTRAIN 4GKW	835
HELUWIND® Thermflex 145	819
HELUWIND® WK 101 H	815
HELUWIND® WK 135-Torsion	810
HELUWIND® WK 137-Torsion	811
HELUWIND® WK 305-Torsion	813

Type	Page
HELUWIND® WK Brandmeldekabel Torsion	816
HELUWIND® WK (N)A2XH	820
<b>I</b>	
Industrial Ethernet 100S SF/UTP 4-ADER	694, 695
Industrial Ethernet 100T S-FTP TORDIERFLEX	698
Industrial Ethernet 100IND SF/UTP	693
Industrial Ethernet 200IND SF/UTP Robustflex	692
Industrial Ethernet 200S SF/UTP 4-ADER	696, 697
Industrial Ethernet 250S SF/UTP Schleppkette	691
Industrial Ethernet 600 IND SF/UTP Shipline	688
Industrial Ethernet 600IND SF/UTP ROBUST	687
Industrial Ethernet 600IND SF/UTP Robustflex	689
Industrial Ethernet PROFinet B SHIPLINE	702
Industrial Ethernet PROFinet C Torsion	704
Industrial Ethernet PROFinet Typ C	703
Industrial Ethernet PROFinet Typ B hybrid	701
<b>J</b>	
J-2Y(St)H	533
JB-750 HMH	93
JB-750 HMH-C	102
JE-H(St)H	579, 580
JE-H(St)HRH	581
JE-LiHCH	154
J-H(St)H	531, 532
JZ-500 HMH	86
JZ-500 HMH-C	96
JZ-600 HMH	91
JZ-600 HMH-C	100
<b>K</b>	
KOMPOFLEX® JZ-500	112
KOMPOFLEX® JZ-500-C	113
KOMPOSPEED® JZ-HF-500	184
KOMPOSPEED® JZ-HF-500-C	185
KOMPOSPEED® 600 / 600-C	322
<b>L</b>	
LAN-Kabel 100 F/UTP FE60	660
LAN-Kabel 100 F/UTP flex	659
LAN-Kabel 200 SF/UTP flex	664
LAN-Kabel 200 SF/UTP	662
LAN-Kabel 200 SF/UTP duplex	663
LAN-Kabel 450 F/FTP	666
LAN-Kabel 450 F/FTP duplex	667
LAN-Kabel 500 F/FTP duplex	669
LAN-Kabel 500 U/FTP flex	670
LAN-Kabel 500 F/FTP	668
LAN-Kabel 600 S/FTP	671
LAN-Kabel 600 S/FTP duplex	672
LAN-Kabel 600 S/FTP flex	673
LAN-Kabel 1000 S-STP duplex	678
LAN-Kabel 1200 S/FTP	677
LAN-Kabel 1200 S/FTP duplex	678
Leicht Fernmelde-Marinenkabel LFMGSSGO	927
Leichte Fernmelde-Marinenkabel LFMGSSGO	928
LWL-Innenkabel Bündelbar I-D(ZN)H	611
LWL-Außenkabel A-DF(ZN)2Y	626
LWL-Außenkabel A-DF(ZN)2Y(SR)2Y	632
LWL-Außenkabel A-DF(ZN)2Y4Y	628
LWL-Außenkabel A-DF(ZN)B2Y	627
LWL-Außenkabel A-DQ(ZN)2Y, verseilt	620



# CABLES HALOGEN-FREE

Type	Page
LWL-Außenkabel A-DQ(ZN)2Y, zentral	619
LWL-Außenkabel A-DQ(ZN)B2Y, zentral	621
LWL-Außenkabel A-DQ(ZN)B2Y, verseilt	622, 623
LWL-Außenkabel A-DQ(ZN)(SR)2Y	631
LWL-Außenkabel hybrid A-DSF(L)(ZN)2Y	634
LWL-Außenkabel A-DQ2Y, verseilt	630
LWL-Außenkabel A-DQ2Y, zentral	629
LWL-Außenkabel A-DQ(ZN)B2Y	625
LWL-Breakoutkabel flexibel HCS AT-V(ZN)HH	643
LWL-Breakoutkabel robust HCS AT-VQH(ZN)B2Y	646
LWL-Breakoutkabel robust flexibel HCS I-V(ZN)Y11Y	645
LWL-Breakoutkabel I-V(ZN)HH	609
LWL-Installationskabel I-VH, I-V11Y, I-VHH, I-V11Y11Y	608
LWL-Kabel flexibel HCS I-VH, I-VHH	642
LWL-Kabel mit Funktionserhalt A/I-D(ZN)BH(SR)H	618
LWL-Luftkabel ADSS	635
LWL-Minibreakoutkabel I-V(ZN)H	610
LWL-Universalkabel A/I-DQ(ZN)BH HCS	647
LWL-Universal-Minibreakoutkabel A/I-VQ(ZN)BH	612
LWL-Universalkabel A/I-DQ(ZN)BH	613
LWL-Universalkabel A/I-DQ(ZN)BH OM3 + OM4	614
LWL-Universalkabel A/I-DQ(ZN)BH zentral	615
LWL-Universalkabel A/I-DQ(ZN)BH verseilt	616
LWL-Kabel mit Funktionserhalt A/I DQ(ZN)BH	617
<b>M</b>	
MEGAFLEX® 500	88, 394
MEGAFLEX® 500-C	98, 398
MEGAFLEX® 600	396
MEGAFLEX® 600-C	400
MULTIFLEX 512®-PUR	169
MULTIFLEX 512®-PUR UL/CSA	431
MULTIFLEX 512®-C-PUR	174
MULTIFLEX 512®-C-PUR UL/CSA	437
Multimedia-Kabel 1500 S/FTP	681
Multimedia-Kabel 1500 S/FTP duplex	682
MULTISPEED® 500-C-PUR	176
MULTISPEED® 500-C-PUR UL/CSA	439
MULTISPEED® 500-C-TPE	179
MULTISPEED® 500-C-TPE UL/CSA	443
MULTISPEED® 500-PUR	171
MULTISPEED® 500-PUR UL/CSA	433
MULTISPEED® 500-TPE	177
MULTISPEED® 500-TPE UL/CSA	441
MULTISPEED® 600-PUR -J/-O	504
MULTISPEED® 600-C-PUR -J/-O	505
MULTISPEED® TRONIC-PUR	448
MULTISPEED® TRONIC-C-PUR	450
MULTITHERM® 400	229
MULTITHERM® 400-ES	236
<b>N</b>	
(N)A2XH	561
(N)HXCH-FE 180/E 30	569
(N)HXCH-FE 180/E 90	577
(N)HXH-FE 180/E 30	567
(N)HXH-FE 180/E 90	575
N2HX	557
N2XCH	559
N2XCH-FE 180/E 30	565
N2XCH-FE 180/E 90	573
N2XH-FE 180/E 30	563

Type	Page
N2XH-FE 180/E 90	571
N2XSEH 3x	603
Neon Light Cables	309
NHMH-J	520
NHMH-O	519
NHXHM-O/-J	521
NSHXAF0 3kV	320
<b>P</b>	
PUR-750	75
PUR-C-PUR	84
PUR Single Core	299
<b>R</b>	
RD-H(St)H	155
ROBOFLEX® 150,... 151,... 152,... 153	265
ROBOFLEX® recycle	262
ROBOFLEX® recycle, konfektioniert	880 - 896
<b>S</b>	
SENSORFLEX®-H	192
SHIPFLEX® 109	936, 937
SHIPFLEX® 113	938
SHIPFLEX® 121	939
SHIPFLEX® 330	934
SHIPFLEX® 340	935
SHIPFLEX® 512	933
SiF / SiFF	307
SiF/GL, SiD, SiD/GL	308
SiHF	223
SiHF UL/CSA	476
SiHF/GL-P	235
SiHF-C-Si	232
SiHF-C-Si UL/CSA	478
SOLARFLEX®-X PV1-F	798
SOLARFLEX®-X PV1-F NTS	799
SOLARFLEX®-X PV1-F TWIN	800
Starkstrom-Marinekabel MGSGO	921
Stakstrom-Marinekabel LMGSGO	923
SUPER-PAAR-TRONIC-C-PUR®	191
SUPER-PAAR-TRONIC 340-C-PUR	451
SUPERTRONIC®-330 PURö	447
SUPERTRONIC® 330 C-PURö	449
SUPERTRONIC®-C-PURö	190
<b>T</b>	
THERMFLEX® 180 EWKF	225
THERMFLEX® 180 EWKF-C	234
TOPFLEX® 611-PUR	199
TOPFLEX® 611-C-PUR	200
TOPFLEX®-EMV-UV-2XSLCH-J	213
TOPFLEX®-EMV-UV-3 PLUS 2XSLCH-J	215
TOPFLEX® MOTOR 109	217
TOPSERV® 110 / 120	201
TROMMPUR®	254
TROMMPUR®-H	483
<b>U</b>	
UL-Style 3135	497
UNIPUR®	73
UNIPUR®-CP	82

# ■ CABLES ACCORDING TO INTERNATIONAL APPROVALS

Type	UL/CSA	EAC
<b>A</b>		
A07RN-F		244
<b>D</b>		
DATAFLAMM®		130
DATAFLAMM®-C		145
DATAFLAMM®-C-PAAR		146
<b>E</b>		
EDV-PIMF-CY		147
Earth Conductors ESUY and ESY		316
<b>F</b>		
F-C-PURö-JZ		78
F-CY-OZ (LiY-CY)		48
F-CY-JZ		50
FIVENORM	490	490
<b>G</b>		
GALVANICABLE®		317
Rubber/Neoprene Control Cable	480	
<b>H</b>		
(H)05VV5-F ((N) YSLYÖ-JZ)		37
(H)05VVC4V5-K ((N)YSLYCYÖ-JZ)		59
H01N2-D/-E		318
H03VV-F		45
H05VV5-F (NYSLYÖ-JZ)		35
H05BQ-F / H07BQ-F (NGMH11YÖ)		72
H05RR-F / H05RN-F		241
H05V-K		289
H05V-K / (H)07V-K		293
H05V-U / (H)05V-U / (H)07V-U		294
H05SS-F / H05SST-F		226
H05VVC4V5-K (NYSLYCYÖ-JZ)		57
H05VV-F		46, 47
H05VV-F/SJT	368, 369	368, 369
H05VV-F/UL	370	
H05Z-K / H07Z-K		300
H07RN8-F		272
H07RN-F		242
H07RN-F/SOOW	481	
H07V2-K		304
H07V-K / (H)07V-K		291
H07V-R		295
H07ZZ-F		90
HELUFLO® -FEP-6Y		310
HELUFLO® -FEP-6Y		227
HELUFLO® -PTFE-5Y		311
HELUSPREADER YSLTÖ-J		250
HELUTHERM® 120		220
HELUTHERM® 145	495, 496	305
HELUTHERM® 145 MULTI		221
HELUTHERM® 145 MULTI-C		230
HELUTRAIN 3GKW		834
HELUTRAIN 4GKW		835
HELUWIND® WK 103k EMV D-T	809	
HELUWIND® WK 103w EMV D-T	808	
HELUWIND® WK 135-Torsion	810	
HELUWIND® WK 137-Torsion	811	
<b>J</b>		
JB-500		42
JB-750		43

Type	UL/CSA	EAC
JB-750 yellow		44
JZ-500		30
JZ-500 black		32
JZ-500-C black		52
JZ-500-FC-PUR		76
JZ-500 HMH		86
JZ-500 HMH-C		96
JZ-500 PUR		67
JZ-600		40
JZ-600 UL/CSA	362	
JZ-600 HMH		91
JZ-600 HMH-C		100
JZ-600 PUR	387	
JZ-600-Y-CY		60
JZ-600-Y-CY UL/CSA	378	
JZ-600-YC-PUR	390	
JZ-602	356	356
JZ-602 RC	423	423
JZ-602 RC -CY	427	427
JZ-602 RC -PUR	430	
JZ-602 RC -C-PUR	436	
JZ-602-C-PUR	389	389
JZ-602-CY	373	373
JZ-602-PUR	384	384
JZ-602-PUR DC/AC	386	
JZ-603	358	358
JZ-603-CY	375	375
JZ-604 TC TRAY CABLE	364	364
JZ-604-FCY TC TRAY CABLE	380	380
JZ-604-YCY TC TRAY CABLE	381	381
JZ-750		38
JZ-HF		160
JZ-HF-CY		163
JZ-HF-FCY	426	
<b>K</b>		
KOMPOFLEX® JZ-500		112
KOMPOFLEX® JZ-500-C		113
KOMPOSPEED® 600 / 600-C		322
KOMPOSPEED® JZ-HF-500		184
KOMPOSPEED® JZ-HF-500-C		185
<b>L</b>		
LIFT-TRAGO® -30 / -60		247
LiY Single Core		298
LiYv		287
LiYW / H05V2-K		303
<b>M</b>		
MEGAFLEX® 500	88, 394	88, 394
MEGAFLEX® 500-C	98, 398	98, 398
MEGAFLEX® 600	396	
MEGAFLEX® 600-C	400	
MULTIFLEX 512®-C-PUR		174
MULTIFLEX 512®-C-PUR UL/CSA	437	
MULTIFLEX 512®-PUR		169
MULTIFLEX 512®-PUR UL/CSA	431	
MULTIFLEX 600	424	424
MULTISPEED® 500-C-PUR		176
MULTISPEED® 500-C-PUR UL/CSA	439	
MULTISPEED® 500-C-PVC		165

# CABLES ACCORDING TO INTERNATIONAL APPROVALS

Type	UL/CSA	EAC
<b>M</b>		
MULTISPEED® 500-C-PVC UL/CSA	429	
MULTISPEED® 500-C-TPE		179
MULTISPEED® 500-C-TPE UL/CSA	443	
MULTISPEED® 500-PUR		171
MULTISPEED® 500-PUR UL/CSA	433	
MULTISPEED® 500-PVC		162
MULTISPEED® 500-PVC UL/CSA	425	
MULTISPEED® 500-TPE		177
MULTISPEED® 500-TPE UL/CSA	441	
MULTISPEED® 600-PUR -J/-O	504	
MULTISPEED® 600-C-PUR -J/-O	505	
MULTISPEED®-TRONIC-PUR	448	
MULTISPEED®-TRONIC-C-PUR	450	
MULTITHERM 400		229
MULTITHERM 400 -ES		236
<b>N</b>		
(N)A2XH		561
(N)HXCH-FE 180/E 30		569
(N)HXCH-FE 180/E 90		577
(N)HXH-FE 180/E 30		567
(N)HXH-FE 180/E 90		575
N2XH		557
N2XCH		559
N2XCH-FE 180/E 30		565
N2XH-FE 180/E 30		563
N2XH-FE 180/E 90		571
NANOFLEX® HC 500		116
NANOFLEX® HC 500-C		117
NANOFLEX® HC TRONIC		118
NANOFLEX® HC TRONIC-C		120
NAYCWY		547
NAYY		544
NEO-Flat		277
NEO-Flat-C		279
NEOPREN Command Cable		245
NHXMH-O/-J		521
NSGAFÖU 3kV		319
NSHTÖU		256
NSHXAFÖ 3kV		320
NSSHÖU		246
NYCWY		542
NYCY		540
NYM-J/-O PVC Sheated Cable		517
NYY		538
<b>O</b>		
OB-BL-PAAR-CY		107
OZ-BL		105
OZ-BL-CY		106
<b>P</b>		
PAAR-CY-OZ		135
PAAR-TRONIC		126
PAAR-TRONIC-CY		133
PAAR-TRONIC-CY-CY (LiYCY-CY)		136
PAAR-TRONIC-Li-2YCY		139
PAAR-TRONIC-Li-2YCYV		138
PUR-750		75

Type	UL/CSA	EAC
PURö-JZ		68
PURö-JZ-HF		167
PURö-JZ-HF-FCP	435	
PURö-JZ-HF-YCP		172
PUR-Yellow		71
PUR-ORANGE		70
PVC-Single Core		494
PVC-Flat		276
PVC-Flat-CY		278
<b>R</b>		
RD-H(St)H		155
RD-Y(St)Y		148
RD-Y(St)Yv / RD-Y(St)YY		149
RE-2Y(St)Yv		150
RE-2Y(St)Yv PiMF		151
ROBOFLEX® 150,... 151,... 152,... 153		265
ROBOFLEX® 2001 / 2001-C		264
ROBOFLEX® recycle	262	
<b>S</b>		
SENSORFLEX® / VERTEILERFLEX two-approvals	411	
SHIPFLEX® 109	936	
SHIPFLEX® 113	938	
SHIPFLEX® 121	939	
SHIPFLEX® 330	934	
SHIPFLEX® 340	935	
SHIPFLEX® 512	933	
SIF / SIFF		307
SIF/GL, SiD, SiD/GL		308
SIHF		223
SIHF UL/CSA	476	
SIHF/GL-P		235
SIHF-C-Si		232
SIHF-C-Si UL/CSA	478	
Single 600-CY -J/-O	499	499
Single 600-J/-O	498	498
Single 602-RC -J/O	501	501
Single 602-RC-CY -J/O	502	502
SOLARFLEX®-X PV1-F		798
Command Cable UL (LiYY)	403, 404	
Command Cable UL (LiYY-TP)	407	
Command Cable UL (LiYCY)	413, 415	
Command Cable UL (LiYCY-TP)	418	
SUPER-PAAR-TRONIC 340-C-PUR	451	
SUPER-PAAR-TRONIC-C-PUR®		191
SUPERTRONIC®-310-PVC	445	
SUPERTRONIC®-310-C-PVC	446	
SUPERTRONIC®-330 PURö	447	
SUPERTRONIC®-330 C-PURö	449	
SUPERTRONIC®-C-PURö		190
SUPERTRONIC®-C-PVC		188
SUPERTRONIC®-PURö		189
SUPERTRONIC®-PVC		187
SY-JB		64
SY-JZ		55
<b>T</b>		
Tauchflex-FL		271
Tauchflex-R		270

# ■ CABLES ACCORDING TO INTERNATIONAL APPROVALS

Type	UL/CSA	EAC
THERMFLEX® 180 EWKF		225
THERMFLEX® 180 EWKF-C		234
THHN/THWN	493	
THREENORM	488	488
TOPFLEX® 301/301-C	506	
TOPFLEX® 302/302-UL	500	
TOPFLEX® 304/304-C	503	
TOPFLEX® - EMV-2YSLCY-J		204
TOPFLEX® - EMV-3 PLUS 2YSLCY-J		205
TOPFLEX® - EMV-UV-2YSLCYK-J		206
TOPFLEX® - EMV-UV-2YSLCYK-J UL/CSA	453	
TOPFLEX® - EMV-UV-2YSLC11Y-J UL/CSA	461	
TOPFLEX® - EMV-UV-3 PLUS 2YSLCYK-J		207
TOPFLEX® - EMV-UV-3 PLUS 2YSLCYK-J UL/CSA	455	
TOPFLEX® 600 VFD	458	458
TOPFLEX® 600-C-PVC		198
TOPFLEX® 600-PVC		197
TOPFLEX® 611-C-PUR		200
TOPFLEX® 611-PUR		199
TOPFLEX® 650 VFD	459	459
TOPFLEX® 1000 VFD	460	
TOPFLEX® MOTOR-EMV 1/1	462	
TOPFLEX® MOTOR-EMV 3/3	463	
TOPFLEX® MOTOR-EMV 103	457	
TOPGEBER 511 PVC	467	467
TOPGEBER 512 PUR	470	470
TOPSERV® 110 / 120		201
TOPSERV® 600 VFD	472	472
TOPSERV® 650 VFD	473	473
TOPSERV® Hybrid	474	
TOPSERV® PVC	465	
TOPSERV® PUR	468	468
TRAGO / Lift-2S		248
TRAYCONTROL® 300	405	405
TRAYCONTROL® 300 TP	409	409
TRAYCONTROL® 300-C	416	416
TRAYCONTROL® 300-C TP	420	420
TRAYCONTROL® 500	359	359
TRAYCONTROL® 500-C	376	376
TRAYCONTROL® 530	361	
TRAYCONTROL® 600	366	366
TRAYCONTROL® 600-C	382	382
TRAYCONTROL® 670 HDP/670-C HDP	392	
TROMMPUR®		254
TROMMPUR®-H	483	483
TRONIC (LiYY)		124
TRONIC-CY (LiY-CY)		131
<b>U</b>		
UL-Style 1007, CSA TR 64	485	485
UL-Style 1015	487	487
UL-Style 1569, CSA TR 64	486	486
UL-Style 3135	497	497
UNIPUR®		73
UNIPUR®-CP		82

Type	UL/CSA	EAC
<b>Y</b>		
Y-CY-JB		62
Y-CY-JZ		53
YELLOWFLEX		240
YELLOWFLEX - connecting cable		902
Yö-C-PURö-JZ		80

# ■ HELUKABEL UL-LISTED CABLES



Standard Flame Tested Voltage (V) Temperature °C Flame Test Class/Group Voltage (V) Temperature °C Oil Res Sun Res Chemical Res Flexible = F High Flexible = HF Page

		USA				CANADA				USA + CANADA				
Multi Core		Technical Properties												
TRAYCONTROL® 300	CM	x	300	105	FT 4	I / II	300	105	x (II)		x	F	405	
TRAYCONTROL® 500	2277	x	1000	90	FT 4	I / II	1000	90	x (II)		x	F	359	
TRAYCONTROL® 530	2277	x	1000	90	FT 4	I / II	1000	90	x (II)		x	F	361	
TRAYCONTROL® 600	2277	x	1000	90	FT 4	I / II	1000	90	x (I)	x	x	F	366	
TRAYCONTROL® 670 HDP	2277	x	1000	105	FT 4	I / II	1000	105	x (II)	x	x	F	392	
JZ-604 TC	1277	x	600	90	FT 4	I / II	600	90	x (II)	x	x	F	364	
MULTIFLEX® 600	2277	x	1000	90	FT 4	I / II	1000	90	x (II)	x	x	HF	441	
TOPFLEX® 600 VFD	2277	x	1000	90	FT 4	I / II	1000	90	x (II)	x	x	F	458	
TOPFLEX® 650 VFD	2277	x	1000	105	FT 4	I / II	1000	105	x (II)	x	x	F	459	
TOPFLEX® 1000 VFD	2277	x	1000	90	FT 4	I / II	1000	90	x (II)	x	x	F	460	
TOPSERV® 600 VFD	2277	x	1000	105	FT 4	I / II	1000	105	x (II)		x	HF	472	
TOPSERV® 650 VFD	2277	x	1000	105	FT 4	I / II	1000	105	x (II)		x	HF	473	
HELUKAT® 155 UL	444			75	FT 1			75					655	
HELUKAT® 200 UL	444			75	FT 1			75				F	661	
HELUKAT® 300 UL	444			75	FT 1			75				F	665	
PROFInet Type A	CMG*		600*	75	FT 4		600*	75*	x	x			699	
PROFInet Type B	CMG*			75	FT 4		600*	75*	x	x		F	701	
PROFInet Type C	CMX*	x		75	FT 1			75	x		x	HF	704	
Profibus L2 Torsion + Festoon	444*			75*	FT 4*			75*	x*	x*		F+HF*	713	
Profibus SK	CMG*		600*	75*	FT 4*		600*	75*	x*	x*		F+HF*	717	
DeviceNet	CMG*			75*	FT 4*			75*	x*	x*		F+HF*	753	
Single Core														
UL-Style 1015	1015	x	600	105	FT 1	I	600	105				F	487	
FIVENORM	1063	x	600	105	FT 1	I	600	105				F	490	
THHN/THWN	1408	x	600	90	FT 1	I	600	90	x	x	x		493	

\* - Construction Dependent  
X - Passes Test; X (I) - Oil Res I; X (II) - Oil Res II

### UL-listed Cables:

UL-listed cables are suitable to the factory wiring of electrical equipment and machinery, as well as for "field wiring" on site. UL-listed cables already have approval for use, i.e. confirmed compliance with applicable safety regulations by UL standards. The construction must no longer be verified in the field.



# ■ HELUKABEL UL-LISTED CABLES



TC-ER ITC/PLTC DIR BUR Flexing MTW AWM HAZ LOC CMX CM CMG TC TEW CIC AWM CE Seite

	USA						USA + CANADA				CANADA						
Multi Core	Ratings																
TRAYCONTROL® 300		X					X	X**		X	X	X			X	X	405
TRAYCONTROL® 500	X	X**	X	X	X	X	X	X				X		X	X	X	359
TRAYCONTROL® 530	X	X**	X	X	X	X	X	X				X		X	X	X	361
TRAYCONTROL® 600	X	X**	X	X	X	X	X	X				X		X	X	X	366
TRAYCONTROL® 670 HDP	X	X**	X	X	X	X	X	X				X		X	X	X	392
JZ-604 TC	X		X	X	X	X						X			X	X	364
MULTIFLEX® 600	X	X**	X	X	X	X	X	X				X		X	X	X	441
TOPFLEX® 600 VFD	X	X**	X	X	X	X	X	X				X		X	X	X	458
TOPFLEX® 650 VFD	X	X**	X	X	X	X	X	X				X		X	X	X	459
TOPFLEX® 1000 VFD	X	X**	X	X	X	X	X	X				X		X	X	X	460
TOPSERV® 600 VFD	X	X**	X	X	X	X	X	X				X		X	X	X	472
TOPSERV® 650 VFD	X	X**	X	X	X	X	X	X				X		X	X	X	473
HELUKAT® 155 UL									X								655
HELUKAT® 200 UL									X								661
HELUKAT® 300 UL									X								665
PROFInet Type A		X*					X					X*					699
PROFInet Type B		X*		X			X		X*		X*				X*		701
PROFInet Type C				X					X								704
Profibus L2 Torsion + Festoon				X			X		X*		X*						713
Profibus SK				X			X		X		X				X*		717
DeviceNet		X*		X					X		X						753
Single Core																	
UL-Style 1015				X	X	X							X		X	X	487
FIVENORM				X	X	X							X		X	X	490
THHN/THWN					X	X									X	X	493

X - Passes Test  
 \* - Construction Dependent  
 \*\* - Location Dependent

# SELECTION TABLE - Cables in drag chains

Control Cable, screened and unscreened	max. Movement Distance in m (10 m to 25-cores)						min. Bending Radius (D=OuterØ)				Speed max. m/s					Acceleration max. m/s <sup>2</sup>			Cycle max. in Mio	Page
	5	10	15	30	100	450	5 x D	7,5 x D	10 x D	15 x D	2	3	4	5	10	50	9	10		
JZ-602 RC-C-PUR	x	x	x					x			x	x			x		x			436
Single 602-RC-J /-O	x							x			x				x		x			501
Single 602-RC-CY-J /-O	x							x			x				x		x			502
JZ-602 RC	x	x						x			x				x		x			423
JZ-602 RC-PUR	x	x	x					x			x	x			x		x			430
JZ-602 RC-CY	x	x							x		x				x		x			427
JZ-602 RC-C-PUR	x	x	x						x		x	x			x		x			436
JZ-HF	x	x						x			x				x		x			160
JZ-HF-CY	x	x							x		x				x		x			163
MULTIFLEX 600	x	x						x			x				x		x			424
MULTIFLEX 600-C	x	x							x		x				x		x			428
PURö-JZ-HF	x	x	x					x			x	x			x		x	x		167
PURö-JZ-HF-YCP	x	x	x						x		x	x			x		x	x		172
MULTIFLEX 512®-PUR	x	x	x	x	x		x				x	x	x		x		x	x	x	169
MULTIFLEX 512®-C-PUR	x	x	x	x	x			x			x	x	x		x		x	x	x	174
MULTIFLEX 512®-PUR UL/CSA	x	x	x	x	x		x				x	x	x		x		x	x	x	431
MULTIFLEX 512®-C-PUR UL/CSA	x	x	x	x	x			x			x	x	x		x		x	x	x	439
JZ-HF-FCY	x	x							x		x				x		x			426
PURö-JZ-HF-FCP	x	x	x						x		x	x			x		x			435
MULTISPEED® 600-PUR-J /-O	x	x	x	x	x	x	x				x	x	x	x	x	x	x	x	x	504
MULTISPEED® 600-C-PUR-J /-O	x	x	x	x	x	x	x				x	x	x	x	x	x	x	x	x	505
MULTISPEED® 500-PVC	x	x	x	x	x			x			x	x	x	x	x	x	x			162
MULTISPEED® 500-PVC UL/CSA	x	x	x	x	x			x			x	x	x	x	x	x	x			425
MULTISPEED® 500-PUR	x	x	x	x	x	x		x			x	x	x	x	x	x	x	x	x	171
MULTISPEED® 500-PUR UL/CSA	x	x	x	x	x	x		x			x	x	x	x	x	x	x	x	x	433
MULTISPEED® 500-TPE	x	x	x	x	x	x	x				x	x	x	x	x	x	x	x	x	177
MULTISPEED® 500-TPE UL/CSA	x	x	x	x	x	x	x				x	x	x	x	x	x	x	x	x	441
MULTISPEED® 500-C-PVC	x	x	x	x	x			x			x	x	x	x	x	x	x			165
MULTISPEED® 500-C-PVC UL/CSA	x	x	x	x	x			x			x	x	x	x	x	x	x			429
MULTISPEED® 500-C-PUR	x	x	x	x	x	x		x			x	x	x	x	x	x	x	x	x	176
MULTISPEED® 500-C-PUR UL/CSA	x	x	x	x	x	x		x			x	x	x	x	x	x	x	x	x	439
MULTISPEED® 500-C-TPE	x	x	x	x	x	x	x				x	x	x	x	x	x	x	x	x	179
MULTISPEED® 500-C-TPE UL/CSA	x	x	x	x	x	x	x				x	x	x	x	x	x	x	x	x	443
SUPERTRONIC®-PVC	x						x				x				x		x			187
SUPERTRONIC®-C-PVC	x							x			x				x		x			188
SUPERTRONIC®-310-PVC	x						x				x				x		x			445
SUPERTRONIC®-310-C-PVC	x							x			x				x		x			446
SUPERTRONIC®-PURö	x						x				x	x			x		x			189

Other Technical Details can be found in the Product Pages of our Catalogue. The table indicates the main application. In case of moving cables at higher speeds, over longer distances or higher cycling rates please contact our Technical Support. Phone +49 7150 9209-0 or techsupport@helukabel.de. A cycle is a double lift: a representative sample has been tested and measured in our Test Workshop. The cycle count is only valid when appropriate and professionally installed (see the installation manual: cable installation in drag chains).

max. Movement Distance in m  
(10 m to 25-cores)

min. Bending Radius  
(D=OuterØ)

Speed max. m/s

Acceleration max. m/s<sup>2</sup>

Cycle max. in Mio

Page

Control Cable, screened and unscreened	5	10	15	30	100	450	5 x D	7,5 x D	10 x D	15 x D	2	3	4	5	10	50	9	10	11		
SUPERTRONIC®-C-PURö	x	x	x					x				x	x	x		x		x			190
SUPERTRONIC®-330 PURö	x	x	x				x					x	x	x		x		x	x	x	447
SUPERTRONIC®-330 C-PURö	x	x	x					x				x	x	x		x		x	x	x	449
SUPER-PAAR-TRONIC®-C-PUR	x	x	x	x					x			x	x	x		x	x	x			191
SUPER-PAAR-TRONIC 340-C-PUR	x	x	x	x					x			x	x	x		x	x	x	x	x	451
MULTISPEED®-TRONIC-PUR	x	x	x	x	x	x		x				x	x	x	x	x	x	x	x	x	448
MULTISPEED®-TRONIC-C-PUR	x	x	x	x	x	x		x				x	x	x	x	x	x	x	x	x	450
TOPGEBER 512 PUR	x	x	x	x					x			x	x	x		x	x	x	x	x	470
Tachofeedback-Leitung-C-PUR	x	x	x	x					x			x	x	x		x	x	x			203
Inkrementalgeber-Leitung-C-PUR	x	x	x	x					x			x	x	x		x	x	x			203
TOPFLEX® PUR	x	x	x	x					x			x	x	x		x		x			203
TOPSERV® 109 PUR	x	x	x	x				x				x	x	x		x		x	x	x	468
TOPSERV® 113 PUR	x	x	x	x				x				x	x	x		x		x	x	x	468
TOPSERV® 121 PUR	x	x	x	x				x				x	x	x		x		x	x	x	468
TOPFLEX® 300	x							x				x				x		x			321
TOPFLEX® 301	x							x				x				x		x	x		506
TOPFLEX® 301-C	x							x				x				x		x	x		506
TOPFLEX® 304	x						x					x				x		x			503
TOPFLEX® 304-C	x						x					x				x		x			503
SENSORFLEX® H	x	x	x	x				x				x	x	x	x	x		x	x	x	192
TOPSERV® 600 VFD	x	x						x				x				x		x			472
TOPSERV® 650 VFD	x	x						x				x				x		x			473
TOPFLEX® 611-PUR	x	x	x	x				x				x	x	x		x	x	x	x	x	199
TOPFLEX® 611-C-PUR	x	x	x	x					x			x	x	x		x	x	x	x	x	200
TOPSERV® 110	x	x	x	x				x				x	x			x		x	x	x	201
TOPSERV® 120	x	x	x	x				x				x	x			x		x	x	x	201
BIOFLEX-500®-JZ-HF	x	x	x	x	x				x			x	x	x		x		x	x	x	181
BIOFLEX-500®-JZ-HF-C	x	x	x	x	x					x		x	x	x		x		x	x	x	182
KOMPOSPEED® 600	x	x	x	x	x		x					x	x	x		x		x	x	x	322
KOMPOSPEED® 600-C	x	x	x	x	x			x				x	x	x		x		x	x	x	322
KOMPOSPEED® JZ-HF-500	x	x	x	x	x			x				x	x	x		x		x	x		184
KOMPOSPEED® JZ-HF-500-C	x	x	x	x	x			x				x	x	x		x		x	x		185
SHIFLEX® 512	x	x	x	x	x			x				x	x	x		x		x	x	x	933
SHIFLEX® 330	x	x	x	x	x			x				x	x	x		x		x	x	x	934
SHIFLEX® 340	x	x	x	x	x			x				x	x	x		x		x	x	x	935
SHIFLEX® 109	x	x	x	x	x			x				x	x	x		x		x	x	x	936
SHIFLEX® 113	x	x	x	x	x			x				x	x	x		x		x	x	x	938
SHIFLEX® 121	x	x	x	x	x			x				x	x	x		x		x	x	x	939

Other Technical Details can be found in the Product Pages of our Catalogue. The table indicates the main application. In case of moving cables at higher speeds, over longer distances or higher cycling rates please contact our Technical Support. Phone +49 7150 9209-0 or techsupport@helukabel.de. A cycle is a double lift: a representative sample has been tested and measured in our Test Workshop. The cycle count is only valid when appropriately and professionally installed (see the installation manual: cable installation in drag chains).

# SELECTION TABLE - low voltage joints

Cable	joints																										
	NSVM-S 3x1,5-10	NSVM-S 4x1,5-10	NSVM-S 5x1,5-6	NSVM-S 3x6-25	NSVM-S 4x6-25	NSVM-S 5x6-16	NSVM-S 1x16-35	NSVM-S 3x16-50	NSVM-S 4x16-50	NSVM-S 5x16-35	NSVM-S 1x35-95	NSVM-S 3x35-150	NSVM-S 4x35-150	NSVM-S 3x70-150	NSVM-S 1x95-100	NSVM-S 1x95-300	NSVM-S 3x95-300	NSVM-S 4x95-300	NSVM-S 4x16/16-4x35/16	NSVM-S 4x50/25-4x95/50	NSVM-S 4x95/50-4x240/120	NSVM-SVK 7x1,5-2,5	NSVM-SVK 14x1,5-2,5	NSVM-SVK 21x1,5-2,5	NSVM-SVK 40x1,5-2,5	NSVM-SVK 75x1,5-2,5	
NY-Y-J 1X16RE							•																				
NY-Y-J 1X25RM							•																				
NY-Y-J 1X35RM							•																				
NY-Y-J 1X50RM												•															
NY-Y-J 1X70RM												•															
NY-Y-J 1X95RM												•															
NY-Y-J 1X120RM																	•										
NY-Y-J 1X150RM																	•										
NY-Y-J 1X185RM																	•										
NY-Y-J 1X240RM																	•										
NY-Y-J 1X300RM																	•										
NY-Y-J 3X1,5RE		•																									
NY-Y-J 3X2,5RE		•																									
NY-Y-J 3X4RE		•																									
NY-Y-J 3X6RE		•																									
NY-Y-J 3X10RE		•																									
NY-Y-J 3X16RE				•																							
NY-Y-J 3X25RM				•																							
NY-Y-J 3X50SM												•															
NY-Y-J 3X70SM												•															
NY-Y-J 3X95SM												•															
NY-Y-J 3X120SM												•															
NY-Y-J 3X25RM/16RE								•																			
NY-Y-J 3X35SM/16RE								•																			
NY-Y-J 3X50SM/25RM								•																			
NY-Y-J 3X70/35SM													•														
NY-Y-J 3X95/50SM													•														
NY-Y-J 3X120/70SM													•														
NY-Y-J 3X150/70SM													•														
NY-Y-J 3X185/95SM																		•									
NY-Y-J 3X240/120SM																		•									
NY-Y-J 4X1,5RE		•																									
NY-Y-J 4X2,5RE		•																									
NY-Y-J 4X4RE		•																									
NY-Y-J 4X6RE		•																									
NY-Y-J 4X10RE		•																									
NY-Y-J 4X16RE					•																						
NY-Y-J 4X25RM					•																						
NY-Y-J 4X35SM								•																			
NY-Y-J 4X50SM								•																			
NY-Y-J 4X70SM													•														
NY-Y-J 4X95SM													•														
NY-Y-J 4X120SM													•														
NY-Y-J 4X150SM													•														
NY-Y-J 4X185SM																		•									
NY-Y-J 4X240SM																		•									
NY-Y-J 5X1,5RE			•																								
NY-Y-J 5X2,5RE			•																								
NY-Y-J 5X4RE			•																								
NY-Y-J 5X6RE			•																								
NY-Y-J 5X10RE						•																					
NY-Y-J 5X16RE						•																					
NY-Y-J 5X25RM										•																	
NY-Y-J 7X1,5RE																							•				
NY-Y-J 10X1,5RE																								•			
NY-Y-J 12X1,5RE																								•			
NY-Y-J 14X1,5RE																								•			
NY-Y-J 16X1,5RE																									•		
NY-Y-J 19X1,5RE																									•		
NY-Y-J 21X1,5RE																									•		
NY-Y-J 24X1,5RE																										•	

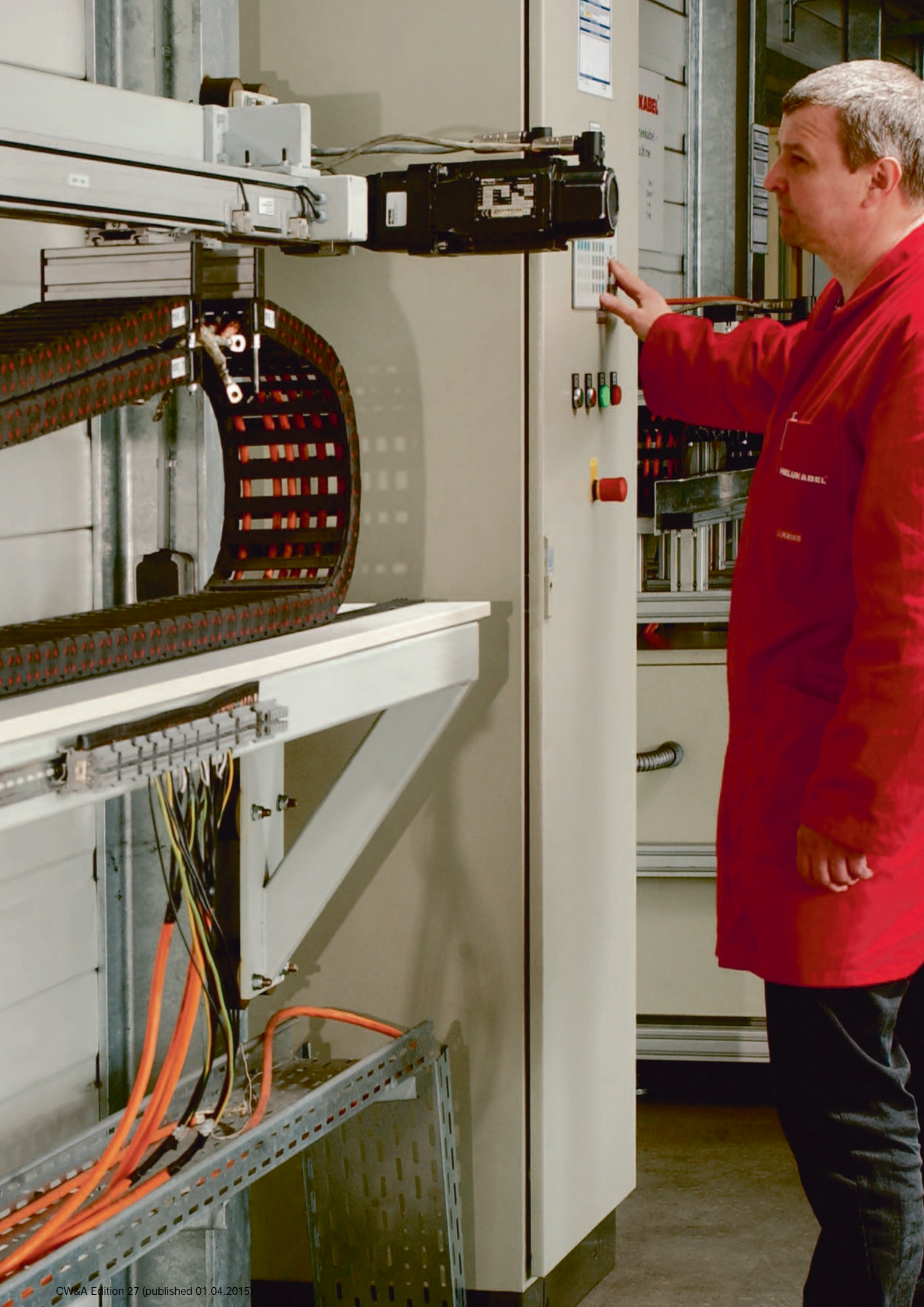
# SELECTION TABLE - low voltage joints

Cable	joints																											
	NSVM-S 3x1,5-10	NSVM-S 4x1,5-10	NSVM-S 5x1,5-6	NSVM-S 3x6-25	NSVM-S 4x6-25	NSVM-S 5x6-16	NSVM-S 1x16-35	NSVM-S 3x16-50	NSVM-S 4x16-50	NSVM-S 5x16-35	NSVM-S 1x35-95	NSVM-S 3x35-150	NSVM-S 4x35-150	NSVM-S 3x70-150	NSVM-S 1x95-100	NSVM-S 1x95-300	NSVM-S 3x95-300	NSVM-S 4x95-300	NSVM-S 4x16/16-4x35/16	NSVM-S 4x50/25-4x95/50	NSVM-S 4x95/50-4x240/120	NSVM-SVK 7x1,5-2,5	NSVM-SVK 14x1,5-2,5	NSVM-SVK 21x1,5-2,5	NSVM-SVK 40x1,5-2,5	NSVM-SVK 75x1,5-2,5		
NY-Y-J 30X1,5RE																												
NY-Y-J 40X1,5 QMM																												
NY-Y-J 7X2,5RE																												
NY-Y-J 10X2,5RE																												
NY-Y-J 12X2,5RE																												
NY-Y-J 14X2,5RE																												
NY-Y-J 16X2,5RE																												
NY-Y-J 19X2,5RE																												
NY-Y-J 21X2,5RE																												
NY-Y-J 24X2,5RE																												
NY-Y-J 30X2,5RE																												
NY-Y-J 40X2,5RE																												
NY-Y-O 1X16RE																												
NY-Y-O 1X25RM																												
NY-Y-O 1X35RM																												
NY-Y-O 1X50RM																												
NY-Y-O 1X70RM																												
NY-Y-O 1X95RM																												
NY-Y-O 1X120RM																												
NY-Y-O 1X150RM																												
NY-Y-O 1X185RM																												
NY-Y-O 1X240RM																												
NY-Y-O 1X300RM																												
NY-Y-O 1X400RM																												
NY-Y-O 3X1,5RE																												
NY-Y-O 4X1,5RE																												
NY-Y-O 4X2,5RE																												
NY-Y-O 4X4RE																												
NY-Y-O 4X6RE																												
NY-Y-O 4X10RE																												
NY-Y-O 4X16RE																												
NY-Y-O 4X25RM																												
NY-Y-O 4X35SM																												
NY-Y-O 4X50SM																												
NY-Y-O 4X70SM																												
NY-Y-O 4X95SM																												
NY-Y-O 4X120SM																												
NY-Y-O 4X150SM																												
NY-Y-O 4X185SM																												
NY-Y-O 4X240SM																												
NY-Y-O 5X1,5RE																												
NY-Y-O 5X2,5RE																												
NY-Y-O 5X4RE																												
NY-Y-O 7X1,5RE																												
NY-Y-O 14X1,5RE																												
NY-Y-O 7X2,5RE																												
NY-Y-O 10X2,5RE																												
NY-Y-O 12X2,5RE																												
NY-Y-O 14X2,5RE																												
NY-Y-O 16X2,5RE																												
NY-Y-O 19X2,5RE																												
NY-Y-J 52X2,5RE																												
NY-Y-O 24X2,5RE																												
NY-Y-O 30X2,5RE																												
NY-Y-O 40X2,5RE																												
NY-Y-J 61X1,5RE																												
NYCY 0,6/1KV 3X1,5																												
NYCY 0,6/KV 3X2,5 RE																												
NYCY 0,6/1KV 3X4RE																												
NYCY 0,6/1KV 3X6RE																												
NYCY 0,6/1KV 3X10RE																												



# SELECTION TABLE - low voltage joints

Cable	joints																											
	NSVM-S 3x1,5-10	NSVM-S 4x1,5-10	NSVM-S 5x1,5-6	NSVM-S 3x6-25	NSVM-S 4x6-25	NSVM-S 5x6-16	NSVM-S 1x16-35	NSVM-S 3x16-50	NSVM-S 4x16-50	NSVM-S 5x16-35	NSVM-S 1x35-95	NSVM-S 3x35-150	NSVM-S 4x35-150	NSVM-S 3x70-150	NSVM-S 1x95-100	NSVM-S 1x95-300	NSVM-S 3x95-300	NSVM-S 4x95-300	NSVM-S 4x16/16-4x35/16	NSVM-S 4x50/25-4x95/50	NSVM-S 4x95/50-4x240/120	NSVM-SVK 7x1,5-2,5	NSVM-SVK 14x1,5-2,5	NSVM-SVK 21x1,5-2,5	NSVM-SVK 40x1,5-2,5	NSVM-SVK 75x1,5-2,5		
NYCY 0,6/1KV 3X16RE								•																				
NYCY 0,6/1KV 4X1,5RE		•																										
NYCY 0,6/1KV 4X2,5RE		•																										
NYCY 0,6/1KV 4X4RE		•																										
NYCY 0,6/1KV 4X6RE		•																										
NYCY 0,6/1KV 4X10RE		•																										
NYCY 0,6/1KV 4X16RE																				•								
NYCY 0,6/1KV 5X1,5RE			•																									
NYCY 0,6/1KV 5X2,5RE			•																									
NYCY 0,6/1KV 5X4RE			•																									
NYCY 0,6/1KV 5X6RE			•																									
NYCY 0,6/1KV 5X10/RE						•																						
NYCY-J 3X300/150SM																			•									
NYCWY 0,6/1KV 3X10	•																											
NYCWY 0,6/1KV 3X16								•																				
NYCWY 0,6/1KV 3X25RM								•																				
NYCWY 0,6/1KV 3X35SM								•																				
NYCWY 0,6/1KV 3X50SM								•																				
NYCWY 0,6/1KV 3X70SM														•														
NYCWY 0,6/1KV 3X95SM														•														
NYCWY 0,6/1KV 3X120S														•														
NYCWY 0,6/1KV 3X150S														•														
NYCWY 0,6/1KV 3X185S																		•										
NYCWY 0,6/1KV 3X240S																		•										
NYCWY 0,6/1KV 3X25R								•																				
NYCWY 0,6/1KV 3X35SM								•																				
NYCWY 0,6/1KV 3X50SM								•																				
NYCWY 0,6/1KV 3X70SM														•														
NYCWY 0,6/1KV 3X95 S														•														
NYCWY 0,6/1KV 3X120														•														
NYCWY 0,6/1KV 3X150														•														
NYCWY 0,6/1KV 3X185																		•										
NYCWY 0,6/1KV 4X10RE					•																							
NYCWY 0,6/1KV 4X16RE																				•								
NYCWY 0,6/1KV 4X25RM																				•								
NYCWY 0,6/1KV 4X35SM																				•								
NYCWY 0,6/1KV 4X50SM																					•							
NYCWY 0,6/1KV 4X70SM																						•						
NYCWY 0,6/1KV 4X95SM																						•						
NYCWY 0,6/1KV 4X120S																							•					
NYCWY 0,6/1KV 4X150S																							•					
NYCWY 0,6/1KV 4X185S																							•					
NYCWY 0,6/1KV 4X240S																							•					
NYCY-J 3X150SM													•															
NYCY-J 3X185SM																				•								
NYCY-J 3X240SM																				•								
NYCY-O 3X150SM													•															
NYCY-O 3X185SM																				•								
NYCY-O 3X240SM																				•								
NYCWY 0,6/1KV 3X240																		•										
NYCY-J 5 X 35 QMM										•																		
NAYY-J 4 X 16 QMM									•																			
NAYY-J 4 X 25 QMM									•																			
NAYY-J 4 X 35 QMM									•																			
NAYY-J 4 X 50 QMM									•																			
NAYY-J 4 X 70 QMM													•															
NAYY-J 4 X 95 QMM													•															
NAYY-J 4 X 120 QMM													•															
NAYY-J 4 X 150 QMM													•															
NAYY-J 4 X 185 QMM																			•									
NAYY-J 4 X 240 QMM																			•									

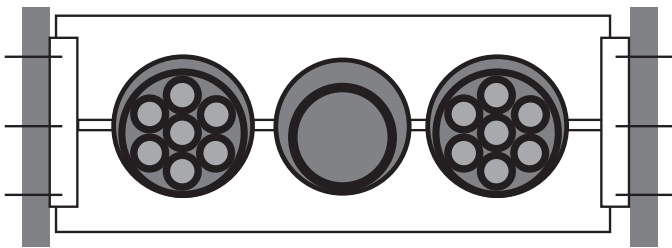


# ■ INSTALLATION MANUAL

## Cable installation in drag chains

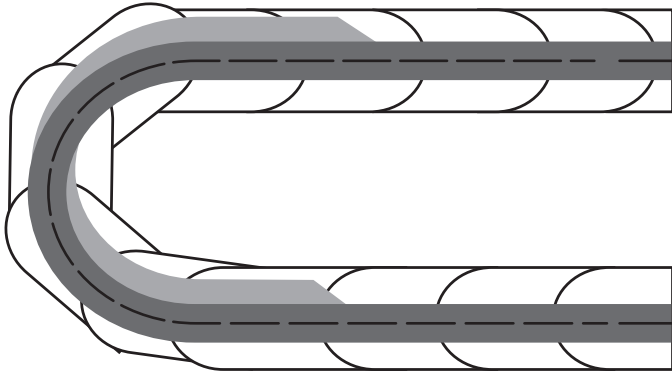
The control cables in drag chains undertake an important task for the controlling and power technique, must be good synchronized with each other in the power chain systems. Further the installation of the cables and protection tubes in the power drag

chains must be conducted with great care. An efficient usage upon accurate and exact cable installation. The following basic points should be noticed:



1. Where flat and round cables are mixed in one drag tray, then these should be installed loosely next to one another. The guide stays should be installed between the cables laid side by side. Try and avoid placing different sizes of round cables next to one another. Due to the limited space relationship cables arranged one above the other, frame stays are to be installed.

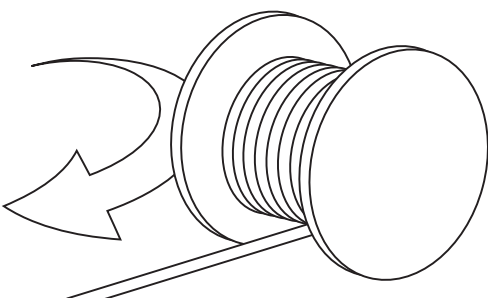
2. The cables must be installed with guide stays, dividers or in separate hole stays so as to move freely in the drag tray guides. As free space for the cables in the guide stay should be at least 10% of the cable Ø.



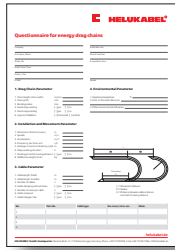
3. Always ensure that the cable can follow the drag trays motions without appearing to be forced.

4. If the cables are to be installed in the drag tray in layers then it is important to check upon installation that the cables are laid in such a way that they do not block each other when the drag tray alters direction.

5. Cables should always be installed in nonkinking and nontwisting flat position into the drag trays. The cables must be reeled down tangential from the reels or drums; the cables should not be lifted up in twisted or looping form over head. Before the installation, the cables must be laid in straight and non-twisted form on plane surface. The cables must have an additional length of at least 10% of the whole length so that these can be laid freely without twisting in drag chains.

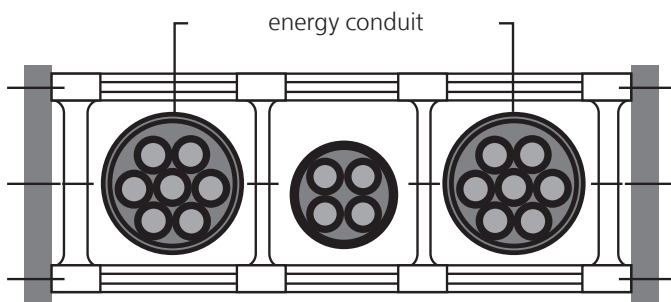






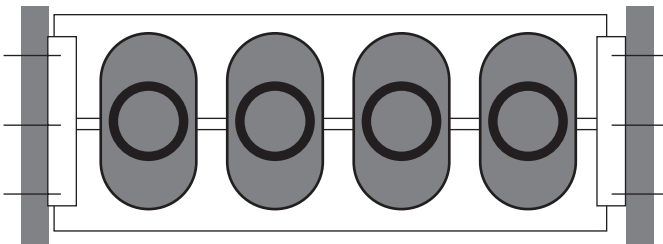
## Download Questionnaire for Energy Drag Chain Systems:

You can download the Questionnaire for Energy Drag Chain Systems simply under: [www.helukabel.de/Questionnaire-Energy.pdf](http://www.helukabel.de/Questionnaire-Energy.pdf)

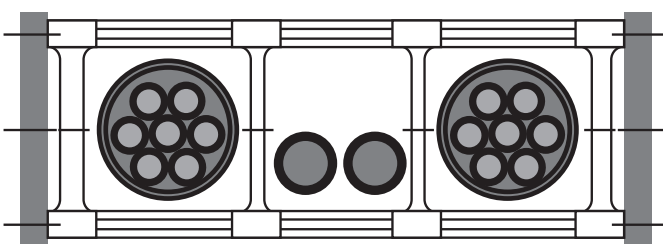


6. In case that is not possible to lay the cables as described under 6.1, in order to lay several multi core high flexible cables with an outer diameter  $< 10 \text{ mm}$ , we recommend the use of a guiding tube, in which these cables should loosely laid. This tube is than integrated into the drag system. The cross section of this tube has to be much larger as the sum of the cross sections of the cables. For the free movement of the flexible energy conduits, the guide or divider stays must be installed.

7. In case that pressure- or hydraulic tubes are integrated in a power drag system, those should be able to expand and to shrink under alternating charges without interrupting the functionality of the drag system.



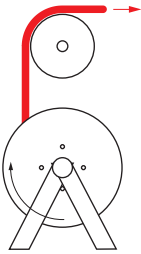
8. In order to maintain a balanced running of the drag chain it is necessary to ensure that the weight of the cables inside is divided up evenly, with the heavier cables installed on the edges and the lighter types in the middle. All cables must be securely fixed at one end of the drag chain. Thus assuring that the cores are securely fastened to one side with the other, open, side allowing enough slack to take up the drag chain's motion. Generally it is recommended, if possible, not to use cables with a multi layer construction, e.g.  $> 25$  cores, but to split the necessary number of conductors over several cables.



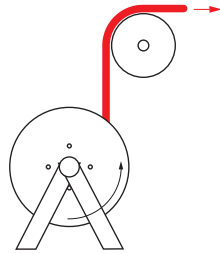
# ■ ASSEMBLY INSTRUCTION

## Laying reel cables - NSHTÖU / (N)SHTÖU

Correct



Incorrect

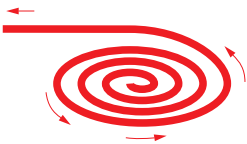


1. The cables are to be pulled from the reeling drum without twisting, using a drawing cable and cable grip. Deflecting or pulling the cable over edges should be avoided.

2. The cables must always be attached to the equipment drum without torsion.

3. Select the largest possible distance between the reeling drum and operating drum.

Correct

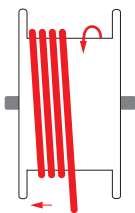


Incorrect

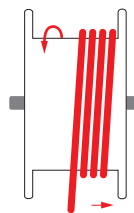


4. In the case of rings, the cable should be unwound tangential.

Correct

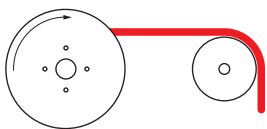


Incorrect

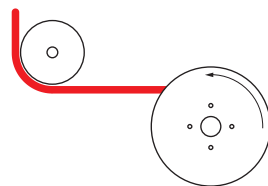


5. The cables are to be rolled onto the operating drums so that the cable moves to the left when started.

Correct

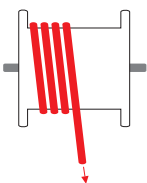


Incorrect



6. The S-shaped deflection of cables is to be avoided.

Correct



Incorrect

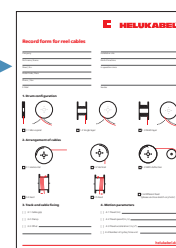


7. 2-3 windings on the operating drum must remain when the cable is extended.

8. In order to avoid crushing when fixing the cable to the end, a cable grip is to be used.

### Download Questionnaire for reel cables:

You can download the Questionnaire for reel cables simply under:  
[www.helukabel.de/Questionnaire-Reel-Cables.pdf](http://www.helukabel.de/Questionnaire-Reel-Cables.pdf)





NSHTOU ((

NSHTOU ((

NSHTOU

## Questionnaire for energy drag chains

Company \_\_\_\_\_

First name, Name \_\_\_\_\_

Street, No. \_\_\_\_\_

Postal Code, Place \_\_\_\_\_

Phone / Fax \_\_\_\_\_

E-Mail \_\_\_\_\_

Installation site \_\_\_\_\_

Kind of machine \_\_\_\_\_

In operation since \_\_\_\_\_

Sender \_\_\_\_\_

### 1. Drag Chain-Parameter

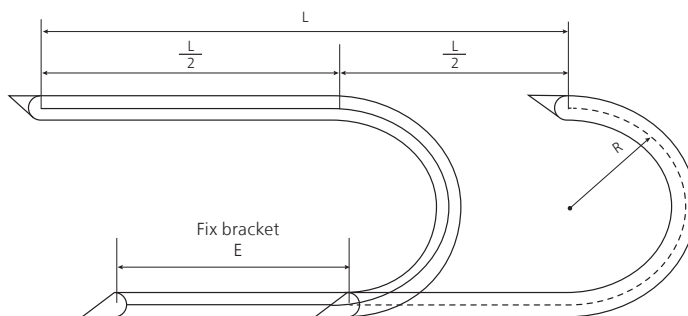
1. Chain length/chain width      m/mm \_\_\_\_\_
2. Chain pitch                      mm      \_\_\_\_\_
3. Bending radius                  mm      \_\_\_\_\_
4. Guide stays existing             yes    no
5. Frame stays existing             yes    no
6. Layout/Installation               horizontal  vertical

### 2. Installation and Movement-Parameter

1. Movement distance (max.)      m      \_\_\_\_\_
2. Speeds                              m/s      \_\_\_\_\_
3. Acceleration                      m/s<sup>2</sup>      \_\_\_\_\_
4. Frequency per time unit        x/h      \_\_\_\_\_
5. Average movement distance/cycle m      \_\_\_\_\_
6. Daily working duration        h      \_\_\_\_\_
7. Feeding at mid of moving distance  yes    no
8. Additional weight/chain        kg      \_\_\_\_\_

### 3. Cable-Parameter

1. Cable length (total)              m      \_\_\_\_\_
2. Cable length (mobile)            m      \_\_\_\_\_
3. Number of cables                  n      \_\_\_\_\_
4. Cable clamping without strain    yes    no
5. Number of cores per cable      n      \_\_\_\_\_
6. Cable screened                    yes    no
7. Cable halogen-free                 yes    no



L = Movement distance  
 R = Radius  
 E = Distance between cable entrance and mid of moving distance

No.	Part-No.	Cable type	No. cores/cross-sec.	Notes
1.				
2.				
3.				
4.				

[helukabel.de](http://helukabel.de)

## Record form for reel cables

Company \_\_\_\_\_

First name, Name \_\_\_\_\_

Street, No. \_\_\_\_\_

Postal Code, Place \_\_\_\_\_

Phone / Fax \_\_\_\_\_

E-Mail \_\_\_\_\_

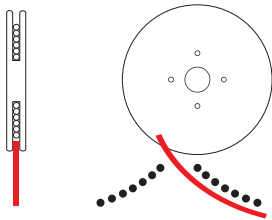
Installation site \_\_\_\_\_

Kind of machine \_\_\_\_\_

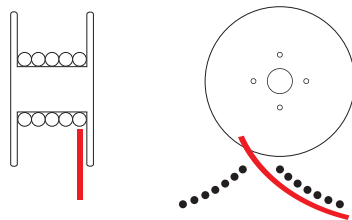
In operation since \_\_\_\_\_

Sender \_\_\_\_\_

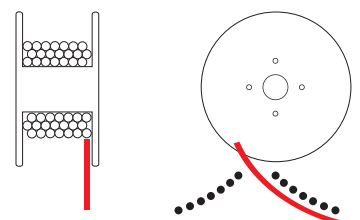
### 1. Drum configuration



1.1 Monospiral

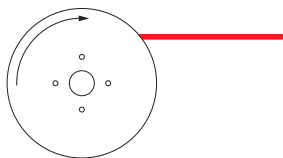


1.2 Single layer

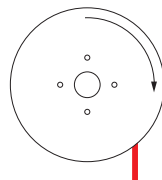


1.3 Multi layer

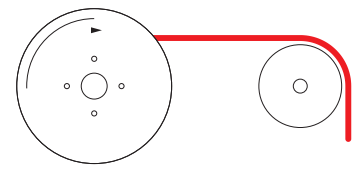
### 2. Arrangement of cables



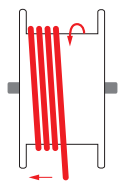
2.1 Horizontal



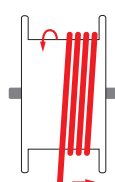
2.2 Vertical



2.3 With deflection



2.4 Feed



2.5 Feed

2.6 Different feed  
(please enclose sketch or photo)

### 3. Track end cable fixing

[ ] 3.1 Cable grip \_\_\_\_\_

[ ] 3.2 Clamp \_\_\_\_\_

[ ] 3.3 Other \_\_\_\_\_

\_\_\_\_\_

### 4. Motion parameters

[ ] 4.1 Travel (m) \_\_\_\_\_

[ ] 4.2 Travel speed (m/s) \_\_\_\_\_

[ ] 4.3 Travel acceleration (m/s<sup>2</sup>) \_\_\_\_\_

[ ] 4.4 Number of cycles/time unit \_\_\_\_\_



## Enquiry Spiral Cable

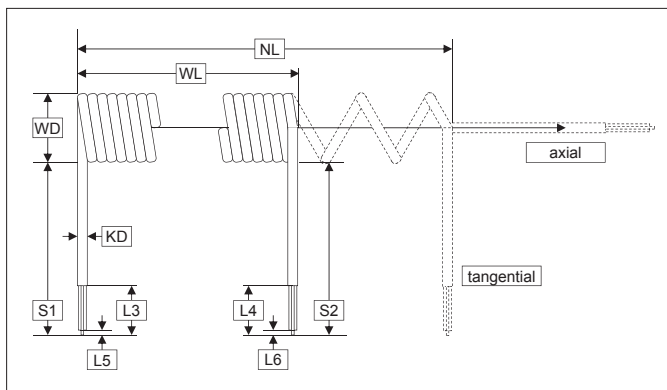
Phone +49 7150 9209-176 / -785 / -355

Fax +49 7150 959225

E-Mail: spiralkabel@helukabel.de

Sender (stamp) \_\_\_\_\_

**Enquiry** No. \_\_\_\_\_ Requirement \_\_\_\_\_ pcs [ ] once [ ] continuous  
 Date \_\_\_\_\_ yearly requirement approx. \_\_\_\_\_ pcs



... also available with ready moulded or mounted plugs



**If you should require a special design please enclose a sketch**

- 1. Sheath type [ ] PVC [ ] PUR [ ] \_\_\_\_\_
- 2. Outer sheath colour \_\_\_\_\_
- 3. Type No. of cores x cross section \_\_\_\_\_ x \_\_\_\_\_ mm<sup>2</sup>
- 4. Screen [ ] yes: \_\_\_\_\_
- 5. Spiral length (WL closed) \_\_\_\_\_
- 6. Max. elongation (extended spiral) \_\_\_\_\_
- 7. Spiral outer diameter WD \_\_\_\_\_
- 8. Internal diameter KD \_\_\_\_\_
- 9. End lengths (axial or tangential) \_\_\_\_\_  
 S1 \_\_\_\_\_ mm<sup>2</sup> S2 \_\_\_\_\_ mm<sup>2</sup>

Comments \_\_\_\_\_

### Characteristics PVC (Polyvinylchlorid)

PVC spiral cables offer a high degree of economy. They are suitable for installation wherever a light duty cable is required.

### Characteristics PUR (Polyurethan)

Good resistance to chemicals and cold conditions. Good performance characteristics in all weather conditions, excellent mechanical properties such as tear and abrasion resistance, excellent oil resistance.



## Enquiry Special Cable

Phone +49 7150 9209-0

Fax +49 7150 81786

E-Mail: anfrage-spezialkabel@helukabel.de

Sender (stamp)

**Enquiry** yearly requirement approx. \_\_\_\_\_ m  once  continuous  
 Delivery required \_\_\_\_\_ Make-up  Coil \_\_\_\_\_ m  Drum  
 Size \_\_\_\_\_ Type of Cable \_\_\_\_\_

**Application** a)  indoor  outdoor  
 b)  stationary  for flexing  with reversed bending  with torsion  
 c)  Drag chain: speed \_\_\_\_\_ m/s Acceleration \_\_\_\_\_ m/s<sup>2</sup> Tracing range \_\_\_\_\_ m  
 load \_\_\_\_\_  cyclic  non-cyclic  
 Temperatures ambient \_\_\_\_\_ °C continuous \_\_\_\_\_ °C intermitted \_\_\_\_\_ °C Min/Std \_\_\_\_\_

**Construction**  
**1. Conductor**  Copper  Aluminium  bare  tinned  silvered  nickel-plated  
 solid  flexible  highly flexible  (Stranded wire \_\_\_\_\_ ø mm for single wire)  
 No. of cores x cross section \_\_\_\_\_ x \_\_\_\_\_ mm<sup>2</sup> No. of wires x diam. \_\_\_\_\_ x \_\_\_\_\_ mm  
 No. of cores x cross section \_\_\_\_\_ x \_\_\_\_\_ mm<sup>2</sup> No. of wires x diam. \_\_\_\_\_ x \_\_\_\_\_ mm

**2. Insulation**  PVC  PE  Cell-PE  PUR  TPE-E  Silicone  
 PP  ETFE  FEP  PTFE  halogen free  Rubber  
 thermopl. rubber  \_\_\_\_\_

**3. Colourcode**  black with white numbers  with protected conductor green-yellow  colours acc. to DIN 47100  
 colours acc. to VDE  colourful  \_\_\_\_\_

**4. Screening**  Single core  Pairs  which core/pair \_\_\_\_\_  
 Cu-bare  Cu-tinned  Cu-silvered  Cu-nickel-plated  
 as  Braiding (C)  Alu-Foile (St)  Serving (D) Covering approx. \_\_\_\_\_ %  
 Drain wire bare/tinned \_\_\_\_\_ mm ø Stranded drain wire bare/tinned \_\_\_\_\_ mm ø  
 with/without protection against elec. shock, hazard under screen with/without foil/insulation over screen

**5. Support Element**  Hemp  Polypropylen  galv. Steel  Kevlar  \_\_\_\_\_  
 Tensile load \_\_\_\_\_ N

**6. Centre** \_\_\_\_\_ mm ø  PVC  Polypropylen  \_\_\_\_\_

**7. Stranding Cores**  twisted in pair  layer stranding  all  (which) \_\_\_\_\_

**8. Inner sheath**  PVC  Rubber  Silicone  Fleece  Foil  halogen-free  
 \_\_\_\_\_

**9. Overall Screen**  Cu-bare  Cu-tinned  Cu-silvered  Cu-nickel-plated  Braiding  Serving  
 Alu-Foil Covering \_\_\_\_\_ % with/without drain wire/stranded drain wire \_\_\_\_\_ mm ø/mm<sup>2</sup>

**10. Armouring**  Steel wire galv.  SWA  SWB

**11. Outer sheath**  PVC  PUR  PE  Rubber  ETFE  FEP  
 PTFE  Silicone  Neoprene  halogen-free  
 thermopl. rubber  \_\_\_\_\_ Outer-ø \_\_\_\_\_ mm Colour \_\_\_\_\_  
 Outerprinting/text \_\_\_\_\_

**Electrical Characters** Operating voltage \_\_\_\_\_ V Test voltage \_\_\_\_\_ V  
 Capacity Cond./Cond. \_\_\_\_\_ pF/m Capacity Cond./shield \_\_\_\_\_ pF/m

**Standards**  VDE  UL  CSA  BS  CCC  \_\_\_\_\_







## Enquiry Fibre optic special cables

Phone +49 7150 9209 181

Fax +49 7150 970819

E-Mail: dnb@helukabel.de

Sender (stamp)

**Enquiry**

Quantity approx. \_\_\_\_\_m

one time

Continuous

Needed delivery date \_\_\_\_\_

Dimensions \_\_\_\_\_

Cable type \_\_\_\_\_

**Application**

a)  indoor  outdoor  indoor/outdoor

b)  fixed installation  mobil use

c) Temperature ambient \_\_\_\_°C constant load \_\_\_\_°C shorttime \_\_\_\_°C

**Fibre type**

G 50/125

G 62,5/125

E 9/125

S 200/230

980/1000 POF

**Fibre spec.**

attenuation \_\_\_\_\_

specification \_\_\_\_\_

bandwidth \_\_\_\_\_

**Cable structure**

a)  Tight buffer  Loose tube filled  Bundle core filled

Compact fiber  Loose tube unfilled  Bundle core unfilled

b) Metal element  yes  no

c)  Centrale bundle core  Stranded bundle core

d) Filler \_\_\_\_\_

e) Armouring \_\_\_\_\_

f) Outer jacket  PVC  PE  PA  PUR  FRNC

g) Laminated jacket  yes  no

**Properties**

Min. bending radius \_\_\_\_\_ Max. tensile load \_\_\_\_\_

Max. transverse pressure \_\_\_\_\_ Caloric load \_\_\_\_\_

**Fibre colour**

acc. DIN

acc. your demands

**Tube colour**

acc. DIN

acc. your demands

**Jacket printing**

\_\_\_\_\_

**Remarks**

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_



# Project planning sheet for pre-assembled cables

Phone +49 7150 9209 355  
Fax +49 7150 5355  
E-Mail: [konfektion@helukabel.de](mailto:konfektion@helukabel.de)

Sender (stamp)

### Customer data

Company name \_\_\_\_\_  
Address \_\_\_\_\_  
Post code, City \_\_\_\_\_  
Contact \_\_\_\_\_  
Fon \_\_\_\_\_  
Fax \_\_\_\_\_  
Email \_\_\_\_\_

### Data for the pre-assembled cable

Designation \_\_\_\_\_  
Annual requirement \_\_\_\_\_  
Batch sizes/scale quantities \_\_\_\_\_  
Date of delivery \_\_\_\_\_

### Sold by the metre

Designation/description \_\_\_\_\_  
Sheath material \_\_\_\_\_  
Sheath colour \_\_\_\_\_  
Approvals \_\_\_\_\_  
Usage conditions \_\_\_\_\_  
Lengths \_\_\_\_\_  
Supplier \_\_\_\_\_  
Supplier article number \_\_\_\_\_

### Side A

#### Male connector

Designation/description \_\_\_\_\_  
Quality class \_\_\_\_\_  
Supplier \_\_\_\_\_  
Supplier article number \_\_\_\_\_

### Side B

#### Male connector

Designation/description \_\_\_\_\_  
Quality class \_\_\_\_\_  
Supplier \_\_\_\_\_  
Supplier article number \_\_\_\_\_

#### Machined open end

Designation/description \_\_\_\_\_  
Stripping dimensions/  
core lengths \_\_\_\_\_  
Contacts/Male connector \_\_\_\_\_  
Supplier \_\_\_\_\_  
Supplier article number \_\_\_\_\_

#### Machined open end

Designation/description \_\_\_\_\_  
Stripping dimensions/  
core lengths \_\_\_\_\_  
Contacts/Male connector \_\_\_\_\_  
Supplier \_\_\_\_\_  
Supplier article number \_\_\_\_\_

#### cut flush      labelled      not labelled

Lettering system \_\_\_\_\_  
Supplier \_\_\_\_\_  
Supplier article number \_\_\_\_\_

#### cut flush      labelled      not labelled

Lettering system \_\_\_\_\_  
Supplier \_\_\_\_\_  
Supplier article number \_\_\_\_\_

Special test parameters \_\_\_\_\_  
Packaging \_\_\_\_\_

Special test parameters \_\_\_\_\_  
Packaging \_\_\_\_\_



# Project planning sheet for pre-assembled cables

Phone +49 7150 9209 355  
Fax +49 7150 5355  
E-Mail: [konfektion@helukabel.de](mailto:konfektion@helukabel.de)

Sender (stamp)

## Male connector description

### Connection diagram

- Mating face view
- Working side view

### Cores not used

- insulate
- cut off

### Cable outlet

- straight
- angled in PIN direction

### Coding setting

- in direction

### Screen machining

**outer    inner**

- cut off
  - on case
  - on PIN
  - implement with core
  - insulate outer screen against inner screen
  - connect inner screens
  - insulate inner screens against each other
  - cut off outer screen, encase with sheath
  - screen window
- Width \_\_\_\_\_
- Position \_\_\_\_\_

### Special features

Assignment			
PIN	Core No./ colour	PIN	Core No./ colour

### Connection diagram

- Mating face view
- Working side view

### Cores not used

- insulate
- cut off

### Cable outlet

- straight
- angled in PIN direction

### Coding setting

- in direction

### Screen machining

**outer    inner**

- cut off
  - on case
  - on PIN
  - implement with core
  - insulate outer screen against inner screen
  - connect inner screens
  - insulate inner screens against each other
  - cut off outer screen, encase with sheath
  - screen window
- Width \_\_\_\_\_
- Position \_\_\_\_\_

### Special features



# ■ TECHNICAL INFORMATION

Technical Information	Page
AWG-Wires and AWG-stranded conductors, Conductor make-up, cross-section, resistance and weight	1118 – 1119
Cable lengths (m) to KTG-Drums capacity of pool drums	1147
Caloric load values of halogenated cables and insulated wires	1113
Caloric load values of halogen-free and halogenated cables and insulated wires	1114
Caloric load values of halogen-free Security Cables and insulated wires	1110 – 1112 + 1115 – 1116
Caloric load values (heat of combustion)	1109
Capacity of KTG-Pool drums	1146
Characteristics of insulating and sheath materials	1128 – 1129
Chemical Resistance Table	1100 – 1101
Chemical Resistance of Fluorinated polymeric materials	1103
Chemical Resistance of PUR (Polyurethane)	1102
Chemical Resistance of Silicone	1105
Code-designation for harmonized cables and flexible cords	1054 – 1055
Code-designation-explanations for cables and insulated wire	1059
Colour Abbreviations according to DIN VDE and IEC	1099
Colour code according to DIN 47100 with/ without colour repetition from core no. 45. and above	1089
Colour code according to DIN VDE 0293	1088
Colour code installation cable	1098
Colour code switchboard cable	1097
Colour code Telephone outdoor cable	1099
Colour code according to international standard	1091 – 1093
Colour code for single wire vehicle cables	1094
Colour code HELUKABEL®-JB	1095
Colour code HELUKABEL®-OB	1096
Comparison of harmonized cables with IEC, DIN VDE	1056
Conductor resistance (extracted from DIN VDE 0295, IEC 60228)	1060
Conversion factor for Medium Voltage Power Cables, 6 – 30 kV	1087
Copper and Alu-Price Calculation	1048 – 1049
Current carrying capacity and indications for calculation of Power Cables and Wires	1063
Current ratings Conversion factors for deviating ambient temperature	1078
Current ratings Conversion factors for grouping of multicore cables or cables on troughs and trays	1080
Current ratings Conversion factors for grouping of single core cables or cables on troughs and trays	1079
Current ratings Conversion factors for grouping on the wall, on the floor, in insulation tubes or in conduit and under the ceiling	1077
Current ratings (general) for flexible cables, for non-existing cable types in the previous tables	1072
Current ratings for cables from 0,6/1 kV, Special rubber-insulated single core cables, multicore rubber cables and trailing cables	1071
Current ratings for cables and insulated wires up to 1000 V and heat resistant cables	1070
Current ratings for HELUTHERM® 145	1073
Current ratings for installation conditions A1, A2, B1 and B2, Cables for fixed installation within buildings	1066 + 1068
Current ratings for installation conditions C, E, F and G, Cables for fixed installation within buildings	1067 + 1069
Current ratings for NYY, NAYY, NYCY, NYCWY, NAYCWY 0,6/1 kV and N2XY, NA2XY, N2XCY, NA2XCY 0,6/1 kV	1075 – 1076
Current ratings for silicone cables and wires	1074
Current ratings for UL-CSA cables	1121
Definitions: Classes of Stress (Duty) in Flexible Cables and Insulated Wires	1127
Designation code for harmonized cables	1053
Designation code for power cables	1057
Designation code for telephone cables, jumper wires and stranded hook-up wires	1058
Electrical characteristics of XLPE-insulated Medium Voltage Power Cables, 6 – 30 kV	1082 – 1086
European Directives WEEE, RoHS and ElektroG	1150
Explanatory notes on CE marking	1148 – 1149
Fluorinated polymeric materials: PTFE, FEP, PFA, ETFE	1104
Formulas of electrotechnic and electronic, Formulas of power engineering	1144 – 1145
Glossary of Terms: Cables and Wires	1135 – 1142
Halogen-free Security Cables and Wires	1106 – 1108
Harmonized Identification	1052
Heat-resistance	1109
Index British Standard	1124 – 1125
Information and Installation Instructions for UL and CSA cables	1117
Installation Methods and Operating Conditions – Power cables and insulated wires for fixed installation –	1064
International abbreviations	1126
International Certification Marks and Testing Institute	1143
Laying Conditions for Power Cables	1065
List of UL-Styles (Multicore cables)	1123
List of UL-Styles (single core cables)	1122
Nominal voltage and Operating voltage	1062
Pair-Colour code according to DIN 47100 with colour repetition	1090
Pair-Colour code according to international standard	1093
Power ratings for XLPE-insulated Medium Voltage Power Cables single core 6/10 kV, 12/20 kV, 18/30 kV	1081
Reference to DIN VDE Standards	1050 – 1051
Resistance of substances against solvents, oils and fats	1105
Safety Requirements in the Use of Cables and Insulated Wires	1130 – 1134
Strand make-up (according to DIN VDE 0295, IEC 60228)	1061
US-American and British units, Conversion of usual measuring units	1120

# ■ COPPER AND ALU-PRICE CALCULATION

The material price for cables and wires is usually based on a copper price of 150,00 EUR/100 kg. For invoicing, as copper surcharge – the difference to the daily copper rate will be calculated.

The **Formula for calculating** the copper surcharge:

$$\text{Copper surcharge in EUR/km} = \text{Copper value (kg/km)} \times \frac{(\text{DEL} + 1\% \text{ delivery charge}) - \text{copper basis}}{100}$$

## DEL

The DEL (German electrolytic copper for guiding purpose) is the Stock Exchange Quotation for 99,5% pure copper. The value is given per EUR/100 kg in the economic part of daily newspapers.

Example: DEL quotation = 500,00 i. e.,  
100 kg copper cost 500,00 EUR and  
1% delivery charge is added to the daily quotation for cables and wires.

## Copper basis

In our catalogue, for almost all cables and wires, a certain portion of copper price is already included.

- Standard cables – copper basis = EUR 150,0/100 kg
- Telephone cables – copper basis = EUR 100,0/100 kg
- Power cables – copper basis = EUR 0, – /100 kg (copper base = 0)

## Copper value

The copper number, which is a factor in calculating cost, can be taken from our data sheets.

Example: JZ-500 8 x 0,75 mm<sup>2</sup>, Part-No. 10040  
Copper value 58 kg/km

Calculation example: for

JZ-500 8 x 0,75 mm<sup>2</sup>

DEL 500,00 EUR/100 kg (assuming value)

Copper basis 150,0 EUR/100 kg

Copper value 58 kg/km

$$\begin{aligned} \text{Copper surcharge} &= \frac{(500,00 + 5,00) - 150,0}{100} \times 58 \text{ kg/km} \quad (\text{calculated value } 5,00 = 1\% \text{ of } 500,00) \\ &= 205,90 \text{ EUR/km} \end{aligned}$$

## The net price including copper is calculated as follows:

Gross price  
. / . individual discount  
+ Copper surcharge

**Note:** The copper surcharge is indicated separately in our invoices.

Continuation ►



# ■ COPPER AND ALU-PRICE CALCULATION

Calculation examples:

- Assumption:
- DEL-Quotation 500,00 EUR/100 kg for copper
  - Daily rate 200,00 EUR/100 kg for aluminium
  - Individual discount, e. g. 20%

## 1. NYJ-J 3 x 70/35 sm,

**0,6/1 kV, Part no. 32038**

Quantity ordered 1000 m

Copper base = 0  
minus 20% (discount)

13360,00 EUR/km

2672,00 EUR/km

10688,00 EUR/km

+ Copper surcharge:

$\frac{(500,00 + 5,00) - 0}{100}$  x Copper value

equal, 5,00 EUR/kg x 2352 kg/km =

11877,60 EUR/km

22565,60 EUR/km

## 2. NYCWY 3 x 70/35 sm,

**0,6/1 kV, Part No. 32268**

Quantity ordered 1000 m

Copper base = 0  
minus 20% (discount)

21220,00 EUR/km

4244,00 EUR/km

16976,00 EUR/km

+ Copper surcharge (Conductor + screen):

$\frac{(500,00 + 5,00) - 0}{100}$  x Copper value

equal, 5,05 EUR/kg x 2410 kg/km =

12170,50 EUR/km

29146,50 EUR/km

## 3. NA2XSY 1 x 70 sm/16,

**12/20 kV, Part No. 32454**

Quantity ordered 1000 m

– Aluminium conductor  
– Copper screen

Copper base = 0  
minus 20% (discount)

9500,00 EUR/km

1900,00 EUR/km

7600,00 EUR/km

+ Copper surcharge (screen):

$\frac{(500,00 + 5,00) - 0}{100}$  x Copper value

equal, 5,05 EUR/kg x 182 kg/km =

919,10 EUR/km

+ Aluminium (Conductor):

Aluminium value x daily rate  
203 kg/km x 2,00 EUR/kg

406,00 EUR/km

8925,10 EUR/km

# ■ REFERENCE TO DIN VDE STANDARDS

## Power Installations

- DIN VDE 0100
  - Erection of power installations with rated voltages below 1000
  - General requirements, scope
  - Protective measures and protection against electric shock
  - Protection of cables against overcurrent
  - Choice of protective measures, protection against fire
  - Selection and erection of equipment – cable, wires and wiring systems
  - Erection electrical equipment – switch- and controlgear
  - Luminaires and lighting equipment
  - Rooms containing a bath tub or shower basin
  - Roofed swimming pools (swimming baths) and open air swimming baths
  - Rooms containing electrical sauna-heaters – Installations site
  - Agricultural and horticultural premises
  - Electrical installations in hospitals and locations for medical use outside hospitals
  - Power installations and safety power supply in communal facilities, stores and shops and exhibition rooms, multi-storey buildings, Restaurants, closed car parks and working or business premises
  - Fire-hazards locations
  - Lifting and hoisting devices
  - Laying of cables in hollow walls and in buildings made up mainly flammable building materials
  - Cable entries into buildings in public cable network
  - Humid and wet areas, outdoor installation
- DIN VDE 0100 part 100
- DIN VDE 0100 part 410
- DIN VDE 0100 part 430
- DIN VDE 0100 part 482
- DIN VDE 0100 part 520/part 530
- DIN VDE 0100 part 559
- DIN VDE 0100 part 701 to part 705
- DIN VDE 0100 - 710
- DIN VDE 0100 - 718
- DIN VDE 0100 part 720
- DIN VDE 0100 part 726 up to 0 part 737
- DIN VDE 0101
- DIN VDE 0105
- DIN VDE 0113
- DIN VDE 0118
- DIN VDE 0165
- DIN VDE 0166
- DIN VDE 0168
- DIN VDE 0170/0171
- DIN VDE 0185
- DIN VDE 0207 part 1 up to part 24
- DIN VDE 0250 part 1 up to part 819
- DIN VDE 0253
  - Erection of power installations with rated voltages above 1 kV
  - Operation of power installations
  - Electrical equipment of industrial machines
  - Erection of electrical installations in mines
  - Installation of electrical apparatus in hazardous areas
  - Electrical installations and apparatus thereof for use in atmospheres potentially endangered by explosive material
  - Erection of electrical installation in open cast mines quarries and similar plants
  - Electrical apparatus for potentially explosive atmospheres
  - Lightning protection system, protection of structures against lightning
  - Insulating and sheathing compounds for cables and flexible cords
  - Cables, wires and flexible cords for power installation
  - Heating – cables

## Power guides

- DIN VDE 0262
  - XLPE (cross linked PE) insulated and PVC sheathed installations cable up to 0,6/1 kV
- DIN VDE 0265
  - Cables with plastic-insulated lead-sheath for power installation
- DIN VDE 0266 part 3 and part 4
  - Halogen-free cables with improved characteristics in the case of fire, with reduced fire propagation and continuance of isolation for use in the containment of nuclear power plants

# ■ REFERENCE TO DIN VDE STANDARDS

## Power guides

- DIN VDE 0271 – PVC-insulated cables and sheathed power cables for rated voltages up to and including 3,6/6 (7,2) kV
- DIN VDE 0276 part 603 – Distribution cables of nominal voltages  $U_0/U$  0,6/1 kV
- DIN VDE 0276 part 604 – Power cables of nominal voltages  $U_0/U$  0,6/1 kV with special fire performance for use in power stations
- DIN VDE 0276 part 604/605 – Additional test methods
- DIN VDE 0276 part 620 – Distribution cables of nominal voltages  $U_0/U$  3,6 kV to 20,8/36 kV
- DIN VDE 0276 part 1000 – Current-carrying capacity, general; conversion factors
- DIN VDE 0285 - 525 - x-xx – PVC-cables, wires and flexible cords for power installation
- DIN VDE 0285 - 525 - x-xx – Rubber cables and flexible cords for power installation, heat-resistant silicon rubber insulated cable, halogen-free insulated cable arc welding cable, rubber insulated lift cable, rubber-sheathed flexible cables
- DIN VDE 0284 – Mineral insulated cables with a rated voltages not exceeding 750 V
- DIN VDE 0289 part 1 to part 101 – Definitions for cables, wires and flexible cords for power installation
- DIN VDE 0292 – Code designation for harmonized cables and flexible cords for power installations
- DIN VDE 0293 – Core identification for cables and flexible cords used in power installation
- DIN VDE 0295 – Conductors of cables, wires and flexible cords for power installation
- DIN VDE 0298 part 1 to part 300 – Application of cables and flexible cords in power installations

## Testing, measurement

- DIN VDE 0472 part 1 to part 818 – Testing of cables, wires and flexible cords
- DIN VDE 0473 up to part 811 – Insulating and sheathing materials of electric cables; Common test methods
- DIN VDE 0482 up to part 268 – Measurement of smoke density of cables

## Telecommunications, Switchboard and Installations-cable

- DIN VDE 0800 part 1 to part 10 – Telecommunications
- DIN VDE 0811 – Ribbon cables with round conductors, with a pitch of 1,27 mm
- DIN VDE 0812 – Equipment wires and stranded equipment wires of telecommunications system
- DIN VDE 0813 – Switchboard cables for telecommunications system
- DIN VDE 0814 – Cords for telecommunications system
- DIN VDE 0815 – Wiring cables for telecommunications system (indoor cable)
- DIN VDE 0816 part 1 to part 3 – Outdoor cables for telecommunications system
- DIN VDE 0817 – Cables with stranded conductors for increased mechanical stress for telecommunications system
- DIN VDE 0818 – Self-supporting telecommunication aerial cables on overhead power lines above 1 kV
- DIN VDE 0839 – Electromagnetic compatibility
- DIN VDE 0881 – Equipment wires and flexible equipment wires with extended temperature
- DIN VDE 0891 part 1 to part 10 – Special directions and guidings principles of cables and insulated wires
- DIN VDE 0899 part 1 up to part 5 – Special specification for optical fiber, single cores, indoor and outdoor cables

## ■ HARMONIZED IDENTIFICATION

The harmonized identifications for cables and wires come to an agreement with the CENELEC-structure (HAR-agreement) are determined by the certification institute. These identifications conform the harmonized standards. The harmonized identification must be visible on the core or the sheath in form of an imprint or embossing, or contained with a three-coloured black-red-yellow protected identification thread of different colour lengths (dimension in cm).

### Harmonized identification

Kind of imprint or embossing	Colour of identification thread black red yellow (dimension in cm)			Country	Certification institute	
					Name	Designation
CEBEC <HAR>	1	3	1	Belgium	Comité Electrotechnique Belge	CEBEC
<VDE> <HAR>	3	1	1	Germany	Verband Deutscher Elektrotechniker e.V. VDE Prüf- und Zertifizierungsinstitut	VDE
USE <HAR>	3	3	1	France	Union Technique de l'Electricité	UTE
IEMMEQU <HAR>	1	3	5	Italy	Instituto Italiano de Marchio Qualità	IMQ
BASEC <HAR>	1	1	3	Great Britain and North Ireland	British Approvals Service for Cables	BASEC
KEMA-KEUR <HAR>	1	3	3	Netherlands	N.V. tot Keuring van Elektrotechnische Materialen	KEMA
SEMKO <HAR>	1	1	5	Sweden	Svenska Elektriska Materielkontrollanstalten	SEMKO
<ÖVE> <HAR>	3	1	5	Austria	Österreichischer Verband für Elektrotechnik	ÖVE
<DEMKO> <HAR>	3	1	3	Denmark	Danmarks Elektriske Materialkontroll	DEMKO
<NSAI> <HAR> <IIRS> <HAR>	3	3	5	Ireland	National Standards Authority of Ireland old: Institute for Industrial Research and Standards	NSAI (IIRS)
NEMKO <HAR>	1	1	7	Norway	Norges Elektriske Materiellkontroll	NEMKO
<UNE> <HAR> ((<UNE>))	3	1	7	Spain	up to 31. 12. 1992: Asociación Electrotécnica y Electrónica Española	AEE
AENOR <HAR>	3	1	9		from 01.01.1993: Asociación Española de Normalización y Certificación	AENOR
ELOT <HAR>	3	3	7	Greece	Hellenic Organization for Standardization	ELOT
<IPQ> <HAR>	1	1	9	Portugal	Instituto Português da Qualidade	IPQ
SEV <HAR>	1	3	9	Switzerland	Schweizerischer Elektrotechnischer Verein	SEV
FIMKO	1	3	7	Finnland	FIMKO LTD	FIMKO
MEEI <HAR>	3	3	9	Hungarian	Magyar Elektrotechnikai Ellenörző Intézet	MEEI

# ■ DESIGNATION CODE FOR HARMONIZED CABLES

Construction reference

H 05 V V5 - F 25 G 0,75

## Identifications of destination

- A** authorised national standards
- H** harmonized standards

## Nominal voltage U

- 01** 100 V
- 03** 300/300 V
- 05** 300/500 V
- 07** 450/750 V

## Insulation material

- B** (EPR) Ethylene-propylene-rubber
- G** (EVA) Ethylene-Vinylacetat-Copolymer
- N2** (CR) Chloroprene rubber for welding cables
- R** (EPR) Ethylene propylene rubber
- S** (SiR) Silicone rubber
- V** (PVC) Polyvinyl chloride
- V2** (PVC) Polyvinyl chloride heat-resistant
- V3** (PVC) Polyvinyl chloride low-temperature
- V4** (PVC) Polyvinyl chloride cross-linked
- Z** (PE) Polyethylene cross-linked

## Structural elements

- C4** Cooper-Screen braiding over laid-up cores
- Q4** (PA) Additional polyimide core jacket
- T** Additional textile braiding over laid-up cores
- T6** Additional textile braiding over individual cores

## Sheath/jacket material

- B** (EPR) Ethylene-propylene rubber
- J** Glass fibre braid
- N** (CR) Chloroprene rubber
- N2** (CR) Chloroprene rubber for welding cables
- N4** (CR) Chloroprene rubber heat-resistant
- Q** (PUR) Polyurethane
- R** (NR a./o. SR) Natural- a./o. synthetic rubber
- T** Textile braid
- T2** Textile braid with flame retardant compound
- V** (PVC) Polyvinyl chloride
- V2** (PVC) Polyvinyl chloride heat-resistant
- V3** (PVC) Polyvinyl chloride low-temperature
- V4** (PVC) Polyvinyl chloride cross-linked
- V5** (PVC) Polyvinyl chloride oil resistant

## Special structural features

- D3** Stress-relieving elements (support wire)
- D5** Centre core (no supporting element)
- FM** Telecommunications cores integrated in power cables
- H** Flat, separable cable (twin cable)
- H2** Flat, non-separable cable (two-core sheathed cable)
- H6** Flat, non-separable cable (multi- and multiple sheathed cable)
- H7** Two-layer insulating jacket
- H8** Spiral cables

## Conductor type

- D** Finely stranded, for welding cables
- E** (very) finely stranded, for welding cables
- F** Finely stranded, for cables for flexible installation
- H** (Very) finely stranded, for flexible cables
- K** Finely stranded, for cables for fixed installation
- R** Multiple-wire, round, class 2
- U** Single-wire, round, class 1
- Y** Tinsel wire, DIN 47104

## Number of cores

## Earth core

- G** With earth core
- X** Without earth core

## Conductor nominal cross section in mm<sup>2</sup>

### Examples:

#### H07V-U 2,5 black

Harmonized PVC-insulated single-core sheathed cable, 2,5 mm<sup>2</sup> single-core, nominal voltage 750 V

#### H07RN-F 3G 1,5

Harmonized rubber-sheathed-cable for medium tensile loads, three-core 1,5 mm<sup>2</sup>, finely stranded, green-yellow earth core, nominal voltage 750 V



# ■ CODE-DESIGNATION FOR HARMONIZED CABLES AND FLEXIBLE CORDS

## Kind of Standards

Code-designation	Classified to Standards
<b>H</b>	cables and wires to harmonized documents
<b>A</b>	authorised national standards

### Conductor material

without designation	Copper
<b>- A</b>	Aluminium
<b>- Z</b>	Conductor of special material and/or special shape

### Type and shape of conductor

<b>- D</b>	fine wire stranded conductor for welding cables
<b>- E</b>	extra fine wire stranded conductor for welding cables
<b>- F</b>	fine wire stranded conductor for flexible cables according to DIN VDE 0295, class 5
<b>- H</b>	extra fine wire stranded conductor for flexible cables according to DIN VDE 0295, class 6
<b>- K</b>	fine wire stranded conductor for fixed installation (if not specified, equivalent to DIN VDE 0295, classe 5)
<b>- M</b>	Milliken conductor
<b>- R</b>	conductor of multistranded wires
<b>- S</b>	sector-shaped conductor of multistranded wires
<b>- U</b>	round conductor of single wire
<b>- W</b>	sector-shaped conductor of single wire
<b>- Y</b>	tinsel conductor
<b>- Z</b>	conductor of special material and/or special shape

### Core numbers and cross-section of conductor

<b>Number</b>	number of cores n
<b>X</b>	Multiplication sign without green-yellow core
<b>G</b>	Multiplication sign for green-yellow core
<b>Y</b>	tinsel conductor, whereby the cross-section is not specified

### Insulation and sheath materials

<b>B</b>	Ethylene-propylene-rubber for Temp. of +90°C
<b>B2</b>	Ethylene-propylene rubber, hardend
<b>B3</b>	Butyl rubber (isobutylene-isoprene rubber)
<b>E</b>	Polyethelene
<b>E2</b>	Polyethelene, high density
<b>E4</b>	Polytetrafluorethylene
<b>E5</b>	Perfluor (Ethylene-propylene – copolymers)
<b>E6</b>	Ethylene-tetrafluorethylene – copolymers
<b>E7</b>	Polypropylene

## Insulation and sheath materials

### Code-designation Materials

<b>G</b>	Ethylene-vinylacetate – copolymers
<b>J</b>	braiding of glass fibre
<b>J2</b>	wrapping of glass fibre
<b>M</b>	mineral insulation
<b>N</b>	chloroprene-rubber (or equivalent material)
<b>N2</b>	special compound of chloroprene-rubber
<b>N4</b>	Sulfonated chlor or chlorinated polyethelene
<b>N5</b>	Nitril-rubber
<b>N6</b>	Florinated rubber
<b>N7</b>	PVC-Nitril-rubber compound
<b>N8</b>	Special-polychloroprene-rubber, water resistant
<b>P</b>	Cables with impregnated paper insulation for multicore belted cable
<b>Q</b>	Polyurethane
<b>Q2</b>	Polyethyleneterephthalate
<b>Q3</b>	Polystyrole
<b>Q4</b>	Polyamide
<b>Q5</b>	Polyimide
<b>Q6</b>	Polyvinylidene fluoride
<b>R</b>	Ethylene-propylene rubber or equivalent synthetic elastomer for +60°C temperature of +60°C, for permanent temperature of +60°C
<b>S</b>	Silicon-rubber
<b>T</b>	textile braiding over twisted cores, impregnated/unimpregnated
<b>T2</b>	textile braiding with flamme retardant impregnated composition
<b>T3</b>	layer of textile as core wrapping or tape
<b>T4</b>	layer of textile as core wrapping or tape with flame retardant impregnated composition
<b>T5</b>	corrosion protection
<b>T6</b>	textile braiding over individual core or multicore cable, impregnated/unimpregnated
<b>V</b>	PVC soft
<b>V2</b>	PVC soft, resistant to increased temperature, +90°C
<b>V3</b>	PVC soft, for low temperatures
<b>V4</b>	PVC soft, cross-linked
<b>V5</b>	PVC soft, oil resistant
<b>X</b>	cross-linked polyethelene
<b>Z</b>	cross-linked compound to a basis of polyolefine, for low corrosiv gas and low smoke emission in case of fire
<b>Z1</b>	Thermoplastic compound to a basis of polyole-fine, for low corrosiv gas and low smoke emission in case of fire

# ■ CODE-DESIGNATION FOR HARMONIZED CABLES AND FLEXIBLE CORDS

## Metal sheath, concentric conductor and screens

### Code-

### designation Metal sheath

<b>A2</b>	Aluminium sheath, pressed or welded, smooth
<b>A3</b>	Aluminium sheath, pressed or welded, corrugated
<b>A4</b>	Aluminium sheath over individual core
<b>A5</b>	Aluminium sheath of Band
<b>C2</b>	Copper sheath
<b>C3</b>	Copper sheath, corrugated
<b>F</b>	Steel sheath
<b>F3</b>	Steel sheath, corrugated
<b>K</b>	Zinc sheath
<b>L</b>	Alloyed lead sheath for general use
<b>L2</b>	non-alloyed lead sheath, normal pure lead
<b>L4</b>	alloyed lead sheath over individual core
<b>L5</b>	non-alloyed lead sheath over individual core
<b>L6</b>	alloyed lead sheath, but other composition than above

### Concentric conductors

<b>A</b>	concentric aluminium conductor
<b>A6</b>	concentric aluminium conductor, meander-shaped
<b>C</b>	concentric copper-conductor
<b>C6</b>	concentric copper-conductor, meander-shaped
<b>C9</b>	divided concentric copper conductor

### Screens

<b>A7</b>	Aluminium screen
<b>A8</b>	Aluminium screen of individual core
<b>C4</b>	Copper screen as braid over the stranded cores
<b>C5</b>	Copper screen braiding over individual core
<b>C7</b>	Copper screen of tape, round or profile-wires over twisted cores
<b>C8</b>	Copper screen as C7, over individual core
<b>D</b>	screen of one or more thin steel tapes, laying direkt over twisted cores, in contact with a stranded plain conductor

## Armouring

### Code-

### designation Armouring

<b>Z2</b>	Armouring of round steel wires, galvanized/ ungalvanized
<b>Z3</b>	Armouring of flat steel wires, galvanized/ ungalvanized
<b>Z4</b>	Armouring of steel tape, galvanized/ ungalvanized
<b>Z5</b>	Braiding of steel wires, galvanized, ungalvanized
<b>Z6</b>	Supporting braid of steel wires
<b>Z7</b>	Armouring of sectional steel wires
<b>Y2</b>	Armouring of round aluminium wires
<b>Y3</b>	Armouring of flat aluminium wires
<b>Y5</b>	Armouring of special materials
<b>Y6</b>	Armouring of steel wires and/or steel tape and copper wires

### Special constructive supporting elements

<b>D2</b>	Supporting elements of textile or steel wires over cable core
<b>D3</b>	Textil supporting elements of one or more elements, stranded in the core of circular cable or placed in a flat cable
<b>D4</b>	self-supporting cables and wires, where the conductor permits the strain-relieving function
<b>D5</b>	central core element (not as supporting element), used for lift cable
<b>D7</b>	as D3, the supporting element however is connected externally
<b>D8</b>	as D7, however a section horizontal to the axis of the cable forming the number "8"

### Special versions

#### without

<b>designation</b>	round cable construction
<b>H</b>	flat type as seperable cables with or without sheath
<b>H2</b>	flat type of cables unseperable
<b>H3</b>	building cable, flat webbed
<b>H4</b>	multicore flat cable with one plain conductor
<b>H5</b>	two or more single core stranded, non-sheathed cables
<b>H6</b>	flat cables according to HD 359 or EN 50214 with 3 or more cores
<b>H7</b>	Cable with two-sheathed extruded insulation
<b>H8</b>	Coiled conductor

# ■ COMPARISON OF HARMONIZED CABLES WITH IEC AND DIN VDE

## PVC-insulated powercables according to DIN VDE 0285-525 in comparison with IEC

Designation	according to VDE	short designation new	short designation old VDE 0250	nominal cross-section (mm <sup>2</sup> )	nominal voltage U <sub>0</sub> /U (V)	comparative design to IEC
PVC-wiring cables single wire fine wires	0285-525-2-31	H05V-U H05V-K	NYFA, NYA NYFAF, NYAF	0,5 to 1	300/500	227 IEC 05 227 IEC 06
PVC-insulated cables single wire multi-stranded wires fine wires	0285-525-2-31	H07V-U H07V-R H07V-K	NYA NYA NYAF	1,5 to 10 1,5 to 400 1,5 to 240	450/750	227 IEC 01 227 IEC 01 227 IEC 02
PVC-sheathed cables 03VV round flat	0285-525-2-11	H03VV-F H03VVH2-F	NYLHY round NYLHY flat	0,5+0,75 0,5+0,75	300/300	227 IEC 43 227 IEC 43
PVC-sheathed cables 05VV round flat	0285-525-2-11	H05VV-F H05VVH2-F	NYMHY round NYMHY flat	0,75 to 2,5 0,75	300/500	227 IEC 53 227 IEC 53
PVC-control cable	0285-525-2-51	H05VV5-F H05VVC4V5-K	NYSLYÖ NYSLYCYÖ	0,5 to 2,5 0,5 to 2,5	300/500	227 IEC 75 227 IEC 74
PVC-Flat-cable 05VVH6 PVC-Flat-cable 07VVH6	0283-2	H05VVH6-F H07VVH6-F	NYFLY NYFLY	0,75 to 1 1,5 to 25	300/500 450/750	- -

## Rubber-insulated power cables according to DIN VDE 0285-525 in comparison with IEC

Designation	according to VDE	short designation new	short designation old VDE 0250	nominal cross-section (mm <sup>2</sup> )	nominal voltage U <sub>0</sub> /U (V)	comparative design to IEC
Heat-resistant rubberinsulated cable	0285-525-2-42	H07G-U H07G-K	N4GA N4GAF	1,5+2,5 0,5 to 95	450/750	- -
Heat-resistant siliconrubber cable	0285-525-2-41	H05SJ-K	N2GAFU	0,5 to 95	300/500	245 IEC 03
Rubber sheathed flexible cord 05RR	0285-525-2-21	H05RR-F	NLH, NMH	0,75 to 2,5	300/500	245 IEC 53
Rubber sheathed flexible cord 05RN	0285-525-2-21	H05RN-F	NYMHöu	0,75+1	300/500	245 IEC 57
Rubber sheathed flexible cord 07RN	0285-525-2-21	H07RN-F	NMHöu NSHöu	1 to 400	450/750	245 IEC 65 245 IEC 66

### IEC-definition

IEC 227: Polyvinylchloride insulated flexible cables and cords with circular conductors and a rated voltage not exceeding 750 V

IEC 245: Rubber insulated flexible cables and cords with circular conductors and a rated voltage not exceeding 750 V

# ■ DESIGNATION CODE FOR POWER CABLES

Construction reference

## Identifications of designation

**N** DIN VDE standard  
**(N)** similar to DIN VDE standard

## Conductor material

**A** aluminium conductor  
**-** copper conductor

## Insulating materials

**Y** PVC  
**2X** cross-linked PE (XLPE)  
**-** impregnated paper

## Concentric conductor (screen)

**C** concentric conductor of copper  
**CW** concentric conductor of copper in waveconal formation  
**CE** concentric conductor of copper over each individual core  
**S** screen of copper wires  
**SE** screen of copper wires over each individual core  
**H** conductive layers  
**(F)** longitudinally water-proof screen

## Armouring

**B** steel tape armouring  
**F** armour of galvanized flat steel wires  
**G** counter helix of galvanized steel tape  
**R** armour of galvanized round steel wires

## Sheath Material

**A** oversheath made of fibrous material **Y** PVC  
**K** lead sheath **2Y** PE  
**KL** aluminium sheath

## Protective Conductor

**I** with protective conductor  
**O** without protective conductor

## Number of cores

## Conductor cross section in mm<sup>2</sup>

## Conductor type

**r ...** circular conductor **..m** stranded conductor  
**s ...** sector conductor **..h** hollow circular conductor  
**o ...** oval conductor **/V** compact conductor  
**e ...** circular, solid conductor

## Rating Voltage

0,6/1 kV  
 3,6/6 kV  
 6,0/10 kV  
 12/20 kV  
 18/30 kV

## Examples

### NA2XS2Y 1x 35 RM/16 6/10 kV

Single core XLPE-insulated cable with PE-sheath according to standard, circular, stranded aluminium conductor with nominal crosssection 35 mm<sup>2</sup>, covered with copper-screen 16 mm<sup>2</sup> and rating voltage (U<sub>0</sub> /U) 6/10 kV

### NYJ 12x 1,5 RE 0,6/1 kV

Cable according to standard, PVC-insulated, sheath PVC, with green-yellow marked core, 12 cores with nominal cross-section 1,5 mm<sup>2</sup>, circular conductor, solid, rating voltage 0,6/1 kV

# DESIGNATION CODE FOR TELEPHONE CABLES, JUMPER WIRES AND STRANDED HOOK-UP WIRES

Construction reference

## Basic cable type with additional information

<b>A</b>	outdoor cable	<b>IE</b>	installation cable for industrial electronic
<b>AB</b>	outdoor cable with lightning protection requirements	<b>IE-H</b>	installation cable for industrial electronic, halogen-free
<b>AJ</b>	outdoor cable with induction protection requirements	<b>S</b>	switchboard cable
<b>G</b>	mining cable	<b>T</b>	distribution cable
<b>I</b>	installation cable	<b>YV/Li...</b>	jumper wires/hook-up wires

## Insulation

<b>P</b>	dry paper	<b>3Y</b>	Styroflex
<b>Y</b>	PVC (Polyvinylchloride)	<b>5Y</b>	PTFE
<b>2Y</b>	PE (Polyethylene)	<b>6Y</b>	FEP
<b>02Y</b>	foamed PE (cellular)	<b>7Y</b>	ETFE
<b>02YS</b>	foam-skin insulation		

## Screening

<b>C</b>	screen of braided copper wires	<b>(ms)</b>	magnetic screen steel tape
<b>D</b>	copper screen, helically stranded	<b>(St)</b>	screen of plastic coated metallic foil
<b>F</b>	filling of cable core with petrol-jelly	<b>(Z)</b>	high tensile steel wire braiding
<b>(K)</b>	screen of copper tape with PE-inner sheath		
<b>(L)</b>	aluminium tape		

## Sheath Material

<b>L</b>	smooth aluminium sheath	<b>M</b>	lead sheath
<b>(L)2Y</b>	copolymer coated aluminium moisture barrier sheath	<b>Mz</b>	lead alloy sheath
<b>LD</b>	corrugated aluminium sheath	<b>W</b>	corrugated steel sheath

## Protective coating

<b>Y</b>	PVC sheath	<b>2Y</b>	PE sheath
<b>Yv</b>	reinforced protective sheath of PVC	<b>2Yv</b>	reinforced protective PE sheath
<b>Yw</b>	PVC sheath heat-resistant	<b>E</b>	compound with embedded plastic tape
<b>Yu</b>	PVC flame resistant (non-flammable)	<b>C</b>	protective covering of jute and compound

## Number of stranding elements

<b>.. x1x</b>	single core	<b>.. x4x</b>	quad
<b>.. x2x</b>	pair (double cores)	<b>.. x5x</b>	five-core
<b>.. x3x</b>	triple		

## Conductor diameter in mm

## Type of stranding components

<b>F</b>	star quad with phantom circuit in railway cables	<b>St V</b>	star quad for transmission of $f = 550$ kHz
<b>S</b>	signal core in railway signal cable	<b>St VI</b>	star quad for transmission of $f = 17$ MHz
<b>St0</b>	star quad general	<b>DM</b>	Dieselhorst-Martin quad
<b>St</b>	star quad with phantom circuit for long distance	<b>TF</b>	carrier frequency star quad
<b>St I</b>	star quad without phantom circuit	<b>P</b>	twisted pair
<b>St II</b>	star quad like St III, but with increased capacitance unbalances	<b>PiMF</b>	pair in metal foil
<b>St III</b>	star quad in local (Subscriber) cable	<b>ViMF</b>	quad in metal foil
<b>St IV</b>	star quad for transmission of $f = 120$ kHz	<b>BdiMF</b>	unit in metal foil
		<b>Kx</b>	coaxial cable

## Stranding layout

<b>Lg</b>	layer stranding concentric
<b>Bd</b>	unit stranding

## Armouring wire

<b>A</b>	layer of Al-wires for inductive protection	<b>2B 0,5</b>	2 layers steel tape, thickness 0,5 mm
<b>b</b>	armouring	<b>D</b>	layer of copper wires for inductive protection
<b>B</b>	armouring of steel band for inductive protection	<b>(T)</b>	strain bearing of steel wires for aerial cable
<b>1B 0,3</b>	1 layer steel tape, thickness 0,3 mm		



# CODE-DESIGNATION-EXPLANATIONS FOR CABLES AND INSULATED WIRE

A-	Outdoor cable	-OZ	cable without green-yellow earth core and cores with imprinted numbers
A	approved national design	ö	oil-resistant
AB	Outdoor cable with lighting protection	02Y	Foam-PE, insulation (cellular PE)
AD	Outdoor cable with differential protection	Q	Steel wire braiding
AJ-	Outdoor cable with induction protection	(R...)	round wire, diameter in mm
ASLH	self-supporting communication cables for high voltage overhead lines	RAGL-	Compensating cable for thermocoupling
B	armouring	RD-	Rhenomatic cable
B	spinning of textile yarn	RE	Computer cable
b	armouring	RG-	Coaxial cable according MIL specification
(1B...)	one layer of steel tape... thickness of the steel tape in mm	re	round, single wire
(2B...)	two layers of steel tape... thickness of the steel tape in mm	rm	round, multiwire
BD	unit-type stranding	RS-	computer switchboard cable
BLK	bare copper-conductor without insulation	S	silk whipping
BZ	bronze conductor	S	signal cables for railways
C	screen of copper wire braiding	(S...)	nominal value of mutual capacitance (nF /km)
C	screen of copper wire spinning	-S	signal cable for German Railway
C	outer protection of jute and viscous compound	S-	Switchboard cable
Cu	copper wire	SL	flexible sheathed cable
(-Cu)	total cross-section of copper screens (mm <sup>2</sup> )	2S	two layers of silk whipping
D	screen of copper wires	St	star quad for phantom circuits
(D)	screen of helically applied copper wires	St I	star quad in telephone cables for larger distance
DM	Dieselhorst-Martin quad	St III	star quad in local cables
Dreier	three cores in triple stranded	(St)	static screen
E	copper drain wire	Staku	copper clad steel wire
E(e)	protective covering of viscous compound with embedded layer of plastic tape	Staku-Li	copper clad steel stranded wires
e	single wire, solid	...t	termite protection
F	cable cores assembly with petrol-jelly	T	supporting element for overhead cable
F	foil wrapping	T-	fan out cable
F	flat cable	TF	carrier frequency of pairs or quads triple
F	star quad for railway cable	TiC	triple in copper wire braid
F	star quad for phantom circuits	TiMF	triple in metal foil
(F...)	flat wire armouring... thickness in mm	U	braiding of textile fibres
OF	jelly filled cable core, filling compound of hard substances	VGD	gold-plated
FR	flame retardant	VN	nickel-plated; VS silver-plated
f	flexible, fine wire stranding	VZK	galvanized; VZN tinned
ff	extra fine wire stranding	W	corrugated steel sheath
G	insulation or sheath material of rubber (NR) or (SBR)	W	high heat resistant
G-	Mining cable	W	corrugated steel sheath
GJ	Mining cable with induction protection	X	cross-linked polyvinylchlorid (X-PVC) or other materials
GS	glass fibre whipping or braiding	XPE	cross-linked polyethylene (X-PE)
2G	insulation or jacket of silicone rubber, (SIR)	2X	cross-linked polyethylene
3G	insulation or jacket of ethylene propylene rubber, (EPR)	7X	cross-linked Ethylentetrafluorethylen (X-ETFE)
4G	insulation or jacket of ethylene vinylacetate rubber (EVA)	10X	cross-linked Polyvinylidenfluorid (X-PVDF)
5G	insulation or jacket of chloroprene rubber (CR)	Y	PVC, polyvinylchloride
6G	insulation or jacket of chlorosulphonated polyethylene (CSM), Hypalon	Yu	PVC, polyvinylchloride, non-flammable, flame-retardant
7G	insulation or jacket of Fluoroelastomer (FKM)	Yv	PVC, polyvinylchloride, with reinforced sheath
8G	insulation or jacket of Nitrile rubber (NBR)	YV	Equipment wires with tinned conductor
9G	PE-C rubber (CM)	Yw	PVC, polyvinylchlorid, heat resistant upto 90°C
53G	CM, chlorinated Polyethylene	2Y	Polyethylene (PE)
H	insulation or jacket of halogen-free compound	2Yv	Polyethylene, reinforced sheath
H	Harmonized Documents	02Y	Cellular polyethylene
(H...)	maximal value of mutual capacitance (nF /km)	02YS	insulation of cellular polyethylene with outer PE-skin
(HS)	semi-conducting tape of layer	2YHO	insulation of air-spaced polyethylene
HX	cross-linked, halogen-free polymer compound	3Y	insulation polystyrene (PS), Styroflex
...IMF	individual stranding element (pairs or single cores etc.) in metal foil and drain wire	4Y	insulation or jacket of polyamide (PA)
IMF	several stranding elements in metalfoil and drain wire	5Y	insulation or jacket of polytetrafluorethylen (PTFE), HELUFLON®
-J	cable with green-yellow earth core	5YX	Perfluoralkoxy (PFA)
-JZ	cable with green-yellow earth core and cores with imprinted numbers	6Y	Perfluoroethylene-propylene (FEP), HELUFLON®
K	copper-tape	7Y	insulation or jacket of ethylentetrafluorethylen (ETFE)
(K)	inner sheath and longitudinally folded copper tape	8Y	insulation of polyimid (PI), Kapton®
LA	tinsel conductor (flat copper wire stranded over the thread of synthetic fibres)	9Y	polypropylen (PP)
LD	corrugated aluminium sheath	10Y	PVDF, Polyvinylidene fluoride
Lg	in layers stranding	11Y	polyurethan (PUR)
Li	stranded wires conductor	12Y	TPE-E, TPE
(L)Y	laminated sheath Al-tape and PVC-jacket	13Y	TPE-EE, TPE on base of Polyester-Ester
(L)2Y	laminated sheath Al-tape and PE-jacketl	31Y	TPE-S, TPE on base of Polystyrol
2L	double enamel coating as insulation	41Y	TPE-A, TPE on base of Polyamide
M	plastic-sheath cable	51Y	PFA, Perfluor-Alkoxyalkane
M	lead sheath	71Y	ECTFE, Monochlortrifluorethylen
Mz	alloyed lead sheath	91Y	TPE-O, TPE on base of Polyester-Ester
(mS)	magnetic shield	-Z	core imprinted with numbers
N	VDE standard	Z	twin cable
(N)	in adapted to VDE standard	(Z)	high-tensile braid of steel wires
NC	non-corrosiv, smoke-gase	(ZG)	high-tensile element of glass fibre yarn
NF	natural colour	(ZN)	high-tensile of non-metallic elements
-O	cable without green-yellow earth core		

# ■ NOMINAL VOLTAGE AND OPERATING VOLTAGE

## Nominal voltage

Voltage of cables and wires, by which the construction and the tests in respect of electrical characteristics are to be referred.

According to DIN VDE 0298 and IEC 183 the cables are specified  $U_0/U$ , where

$U_0$  = cable nominal voltage between the conductor and the metal covering or earth and  
 $U$  = cable nominal voltage between the phase conductors, for 3-phase  $U = \sqrt{3} U_0$ .

According to IEC regulations, the maximum permissible voltage  $U_m$  is given in brackets.

The identification is:  $U_0/U (U_m)$ .

As the insulation of plastic insulated cables are measured with a nominal voltage  $U_0/U = 0,6/1$  kV and all radial field cables for the voltage  $U_0$ , these cables are suitable for installation:

- in single phase systems, in which the both phase conductors are insulated, with nominal voltage  $U_N = 2 U_0$
- in single phase systems, in which one phase conductor is earthed, with the nominal voltage  $U_N = U_0$

## Operating voltage

Voltage between conductors of a power system or between a conductor and earth under specified condition in a given time during an undisturbed operation.

### Coordination of cable **Nominal voltages**

Nominal-voltages $U_0/U$ kV	for 3-phase system kV	for 1-phase alternating current	
		both phase conductors insulated kV	one phase conductor earthed kV
0,6/1	1	1,2	0,6
3,6/6	6	7,2	3,6
6/10	10	12	6
12/20	20	24	12
18/30	30	36	18

### Coordination of maximum permissible **Operating voltages**

Nominal voltages $U_0/U$ kV	maximum voltage for 3-phase system kV	maximum voltage for 1-phase alternating current	
		both phase conductors insulated kV	one phase conductor earthed kV
0,6/1	1,2	1,4	0,7
3,6/6	7,2	8,3	4,1
6/10	12	14	7
12/20	24	28	14
18/30	36	42	21

### Note:

Cable with  $U_0/U$  0,6/1 kV is allowed for **Direct Current Systems**, of those the maximum operating voltage conductor/conductor 1,8 kV or conductor/earth 0,9 kV not to be exceeded.

# ■ CURRENT CARRYING CAPACITY AND INDICATIONS FOR CALCULATION OF POWER CABLES AND WIRES

The guidelines for current carrying capacities of copper and aluminium are valid DIN VDE 0298 part 4 as well as DIN VDE 0276 part 603 and for the conversion factors DIN VDE 0276 part 1000.

The current carrying capacity of a cable should be limited in such a degree that at all locations in a cable system which causes the generated heats under given proportions to lead safely in the environment.

The heat flow depends on the inner heat-resistance between conductor and outer surface of the cable and as well as from the heat emission to the surroundings.

The following recommended values are the current carrying capacity of cables for laying in earth and in air at normal operating conditions. Hints for the deviated operating conditions, see DIN VDE 0298 table 4 and DIN VDE 0276 part 603 and part 1000.

## Indications for Calculation

### ● For laying in earth

- Deviating operating conditions with both conversion factors are to be considered, as these depend on both of specific heat-resistance and the grade of load.
- EVU-load (load grade) is the maximum load factor of 0,7. The conversion factors for the load grades 0,5, 0,6, 0,85 and 1,0 are to be taken in tables DIN VDE 0276 part 603 and part 1000. Intermediate values can be interpolated (1,0 used for permanent load).
- Laying depth 0,7 m. The load capacity decreases with increasing of the laying depth. Usual depth of laying is 0,7 to 1,2 m.
- As normal value of the specific ground thermal resistivity in moist areas is selected with  $1,0 \text{ K} \cdot \text{m}/\text{W}$ . For dry areas the choiced value is  $2,5 \text{ K} \cdot \text{m}/\text{W}$ , under consideration of the applied usual bedding materials of sands.
- For favourable ground conditions or with thermal resisted bedding materials, lower value under well consolidation can be achieved. For individual case, the values and upon that the resulted current carrying loads are to be determined.

### ● For laying in air

- The values stated in the tables for outdoor laying in the air are defined for permanent operation.
  - The arrangement of the cables is corresponded the presentation in table 3, DIN VDE 0276 part 1000.
  - Conversion factors for other laying conditions and the heaping of cables are shown in table 10 and 11, DIN VDE 0276 part 1000.
  - The current carrying capacities of multi-core cables can be calculated by using the current load value for 3-core cables according to table 13 with help of the conversion factors.
  - By using the cable channels or cable board underlays etc. the air temperature will be increased. In this case the conversion factors according to table 12 for deviating air temperature should be used.
  - For outdoor installation in air, the ambient temperature is based on  $30^\circ \text{C}$ .
- Radiation of heats and solar influence must be taken into consideration, where a good air circulation is needed.
  - A sufficient large distance is to retain between the cables and the heating elements, because badly insulated heating elements often raise additionally the temperature of the cable.

- Distance between the cable from the wall, floor or ceiling = 2 cm
- Distance between the cables being laid one above the other =  $2 \times D$
- Distance between the cable systems being laid one above the other = 20 cm
- Distance between the cables being laid side by side =  $2 \times D$

### ● Specific ground thermal resistivity

- very moist area =  $0,7 \text{ K} \cdot \text{m}/\text{W}$
- moist area =  $1,0 \text{ K} \cdot \text{m}/\text{W}$
- dry area =  $2,0 \text{ K} \cdot \text{m}/\text{W}$
- very dry area =  $3,0 \text{ K} \cdot \text{m}/\text{W}$

# ■ INSTALLATION METHODS AND OPERATING CONDITIONS

– Power cables and insulated wires for fixed installation –

## Installation method type A1

- Single core cables in insulation tube in a thermally insulated wall.

## Installation method A2

- Multicore cables or multicore plastic sheathed cables in the insulation tube in a thermally insulated wall, whereby the walls for the methods of installation employed comprise an outer weatherproof board, thermal insulation and an inner board of wood or materials similar to wood, having a temperature lag of  $0,1 \text{ m}^2 \cdot \text{K}/\text{W}$ . The plastic or metal insulation tube is mounted such that this is very close to the inner wall without actually being in contact with the wall.

## Installation method B1

- Single core cables in insulation tube on a wooden wall.

## Installation method B2

- Multicore cables or multicore plastic-sheathed cables in insulation tube on a wooden wall.

For both installation methods, the insulation tube must be secured such that the space between conduit and the wall surface is less than 0,3 times the diameter of the insulation tube. The plastic or metal insulation tube can be installed directly on the masonry construction or plastered surface, whereby the current carrying capacity of the cables or wires can then be higher.

This problem is still being investigated by CENELEC.

## Installation method C

- Single core or multicore cables, or single core or multicore plastic-sheathed cables, on a wooden wall.

The cables or insulated wires shall be mounted such that the space from the wall surface is less than 0,3 times the outer diameter of the cable or insulated wire. The current carrying capacity can be increased when installed directly on or in the masonry construction as well as underneath the plaster.

This problem is still being investigated by CENELEC.

## Installation methods E, F and G

- Single core or multicore cables, or single core or multicore plastic-sheathed cables, installed in the open air.

The cable or insulated wire shall be installed such that the dissipation of heat is not impeded, whereby allowance shall be made for heating by other sources and for irradiation by sunshine. Natural convection shall not be obstructed. The space from the cable or insulated wire by each bordering surface shall be 0,3 times that of the outside diameter. A space equal to that of the outside diameter is sufficient for single core cables and plastic-sheathed wires in order to meet the current carrying requirements for an installation in the open-air.

# ■ LAYING CONDITIONS FOR POWER CABLES

As laying depth, the mathematical distance to the cable axis – for triangular bunched laying the distance of the bundle axis to the earth surface with 70 cm is choised. With increased laying depth the load ratings will be mathematically reduced. Hereby the same temperature and the same thermal earth resistances are to be presumed. Normal operation conditions and indications for deviating operation conditions.

## Normal operation conditions

Laid in <b>Earth</b>		Laid in <b>Air</b>		Indications
1 Multicore cable		1 Multicore cable		Conversions factors see the following tables
1 Single core cable in direct current-system		1 Single core cable in direct current system		
3 Single core cables in 3-phase system, side by side, with a space of 7cm		3 Single core cables in 3-phase system, side by side, with a space of a cable ø		as of collective laying conditions see the following tables
3 Single core cables in 3-phase system, in bundle form <sup>1)</sup>		3 Single core cables in 3-phase system in bundle form <sup>1)</sup>		
Bedding in sand or earth shove and if necessary covering with bricks, cement plates or with flat to light curved thin covering of plastic		<ul style="list-style-type: none"> <li>– Laid in open air, i.e. unhindered heat radiation will be ensured at: Distance of cable from wall, floor or ceiling <math>\geq 2</math> cm</li> <li>– For cables laying side by side: Space at least two times of the cable ø</li> <li>– For cables laying one above the other: Vertical space of the cable atleast two times of the cable ø cable length at least 30 cm</li> <li>– Consideration of thermal loss in cable, the increased air temperature of sufficient big and ventilated rooms</li> <li>– Protection against direct heatradiation of sunlight etc.</li> <li>– Air temperature 30°C</li> </ul>	<ul style="list-style-type: none"> <li>• Conversion factors for laying in earth:                             <ul style="list-style-type: none"> <li>– covering hood with air cavat <math>y = 0,9</math></li> <li>laid in conduit = 0,85</li> </ul> </li> <li>• Conversion factors for laying in air:                             <ul style="list-style-type: none"> <li>– alternating ambient temperatures</li> <li>– as of collecting laying conditions</li> <li>– for laying in conduits</li> <li>– see tables and indications according to DIN VDE 0298</li> </ul> </li> </ul>	
<b>Ambient conditions</b> <ul style="list-style-type: none"> <li>– Ground temperature at installation depth: 20°C</li> <li>– Soil-thermal resistivity of moist area: 1,0 K · m/W</li> <li>– Soil-thermal resistivity of dry area: 2,5 K · m/W</li> </ul>				
<b>Connecting and earthing</b> of metal sheaths or screens on both ends		<ul style="list-style-type: none"> <li>– Adequate big or ventilated rooms, due to that the power loss of the cable not be noticeable increased</li> </ul>		
		<b>Connecting and earthing</b> of metal sheaths or screens on both sides		

<sup>1)</sup> in "bunched" or triangle touching arrangement

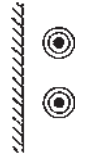

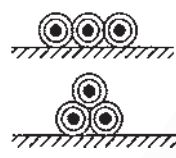



# ■ CURRENT RATINGS FOR HELUTHERM® 145

Operating temperature at conductor 120° C

For permanent operating to the ambient temperature of 30° C. Conversion factors for the deviating site operation conditions – see tables below.

Sufficiently large or ventilated rooms in which the ambient temperature is not noticeably increased by the heat losses from the cables. Protection should be taken from the solar radiation etc.

Installation				
	in open air	on face without inter-contact	on surface with inter-contact	in tubes, conduits, cabinets
Conversion factors for grouping	–	to table 1	to table 2	to table 3
Cross-section, mm <sup>2</sup>	Current ratings in Ampere (A) up to 30° C ambient temperature			
0,25	13	12	9	7
0,33	17	15	11	9
0,50	19	18	12	10
0,75	24	23	17	13
1,0	31	30	20	17
1,5	39	36	25	20
2,5	51	48	33	26
4	68	65	45	36
6	88	84	58	46
10	121	116	80	64
16	160	152	106	85
25	211	200	140	111
35	261	248	172	138
50	320	304	211	169
70	411	391	272	217
95	502	476	331	265
120	587	558	387	310
150	680	646	449	359
185	781	743	516	413
240	931	884	614	492

## Conversion factors for grouping

Number of single core cables for 2-phase or 3-phase systems		1	2	3	4	5	6	7	8	9	10	12
Table 1	Factor	1,00	0,94	0,90	0,90	0,90	0,90	0,90	0,90	0,90	0,90	0,90
Table 2	Factor	1,00	0,85	0,79	0,75	0,73	0,72	0,72	0,71	0,70	–	–
Table 3	Factor	1,00	0,80	0,70	0,65	0,60	0,57	0,54	0,52	0,50	0,48	0,45

## Conversion factors for deviating ambient temperatures

Temperature in °C	20	30	40	50	60	70	80	90	95	100	105	110	115
Factor	1,05	1,00	0,94	0,88	0,82	0,75	0,67	0,58	0,53	0,47	0,41	0,33	0,24

# ■ CURRENT RATINGS FOR SILICONE CABLES AND WIRES

The indicated values stated in the following table are considered as guiding values. These are to be selected each particularly for the individual application.

Heat-resistance at an ambient **temperature up to 150°C**

	<b>Group 1</b>	<b>Group 2</b>	<b>Group 3</b>
Nominal-cross-section	current-carrying capacity A	current-carrying capacity A	current-carrying capacity A
0,25	2,8	–	5
0,5	6	7	10
0,75	9	12	15
1,0	12	15	19
1,5	16	18	24
2,5	21	26	32
4	28	34	42
6	36	44	54
10	49	61	73
16	65	82	98
25	85	108	129
35	105	135	158
50	140	168	198
70	175	207	245
95	210	250	292
120	250	292	344
150	–	335	391
185	–	382	448
240	–	453	528
300	–	523	608

**Group 1:** One or more single core cables laid in duct.

**Group 2:** Multicore cables, flexible cables laid in open or ventilated conduits.

**Group 3:** Single core cables laid in open air with a spacing at least equal to cable diameter.

Power ratings for

**ambient temperature over 150°C**

The following conversion factors are valid:

Temperature °C	current-carrying capacity values in %
up to 150	100
over 150 to 155	91
over 155 to 160	82
over 160 to 165	71
over 165 to 170	58
over 170 to 175	41

# ■ ELECTRICAL CHARACTERISTICS OF XLPE-INSULATED MEDIUM VOLTAGE POWER CABLES, 6 – 30 kV

## Conductor resistance 20°C

cross-section mm <sup>2</sup>	maximum value	
	Cu-conductor Ohm/km	Alu-conductor Ohm/km
25	0,727	1,20
35	0,524	0,868
50	0,387	0,641
70	0,268	0,443
95	0,193	0,320
120	0,153	0,253
150	0,124	0,206
185	0,0991	0,164
240	0,0754	0,125
300	0,0601	0,100
400	0,0470	0,0778
500	0,0366	0,0605

## Conversion factors for the conductor temperatures

Temperature at °C	60	65	70	80	90
Cu-conductor	1,157	1,177	1,196	1,236	1,275
Alu-conductor	1,161	1,181	1,202	1,242	1,282

## Conversion formula:

$$R_{\delta} = R_{20} \cdot \frac{234,5 + \delta}{254,5} \quad \text{for Cu-conductor}$$

$$R_{\delta} = R_{20} \cdot \frac{228 + \delta}{248} \quad \text{for Alu-conductor}$$

Conductor temperature at °C =  $\delta$







Conductor resistance at  $\delta$  °C in Ohm/km =  $R_{\delta}$

Conductor resistance at 20 °C in Ohm/km =  $R_{20}$







# ELECTRICAL CHARACTERISTICS OF XLPE-INSULATED MEDIUM VOLTAGE POWER CABLES, 6 – 30 kV

## Effective resistance at 50 Hz (Alternating-current resistance)







### Copper conductor

Nominal voltage	6/10 kV		12/20 kV		18/30 kV	
Cross-section	approx Ohm/km					
mm <sup>2</sup>						
35	0,671	0,673	0,671	0,672	–	–
50	0,497	0,498	0,496	0,498	0,496	0,497
70	0,345	0,346	0,345	0,346	0,344	0,346
95	0,249	0,251	0,249	0,250	0,249	0,250
120	0,198	0,200	0,198	0,200	0,198	0,199
150	0,163	0,165	0,163	0,165	0,162	0,164
185	0,132	0,134	0,131	0,133	0,131	0,133
240	0,102	0,104	0,101	0,103	0,101	0,103
300	0,082	0,085	0,082	0,084	0,082	0,084
400	0,068	0,071	0,067	0,070	0,067	0,069
500	0,055	0,058	0,055	0,058	0,054	0,057

### Aluminium conductor

Nominal voltage	6/10 kV		12/20 kV		18/30 kV	
Cross-section	approx Ohm/km					
mm <sup>2</sup>						
35	1,12	1,12	1,12	1,12	–	–
50	0,825	0,826	0,825	0,826	0,824	0,826
70	0,571	0,572	0,571	0,572	0,571	0,572
95	0,413	0,415	0,413	0,414	0,413	0,414
120	0,327	0,329	0,327	0,329	0,327	0,328
150	0,269	0,271	0,268	0,270	0,268	0,270
185	0,215	0,217	0,215	0,217	0,214	0,216
240	0,165	0,167	0,165	0,167	0,164	0,166
300	0,133	0,135	0,133	0,135	0,133	0,135
400	0,106	0,109	0,106	0,109	0,106	0,108
500	0,085	0,088	0,084	0,087	0,084	0,087

## Inductive resistance at 50 Hz







Nominal voltage	6/10 kV		12/20 kV		18/30 kV	
Cross-section	Ohm/km					
mm <sup>2</sup>						
35	0,144	0,158	0,153	0,168	–	–
50	0,136	0,150	0,145	0,159	0,154	0,169
70	0,129	0,143	0,138	0,152	0,147	0,161
95	0,123	0,137	0,131	0,145	0,139	0,154
120	0,118	0,132	0,126	0,140	0,134	0,148
150	0,114	0,128	0,121	0,135	0,129	0,143
185	0,110	0,124	0,117	0,131	0,125	0,139
240	0,105	0,120	0,112	0,126	0,120	0,134
300	0,102	0,116	0,108	0,123	0,115	0,130
400	0,097	0,111	0,103	0,117	0,110	0,124
500	0,094	0,108	0,100	0,114	0,106	0,120

# ■ ELECTRICAL CHARACTERISTICS OF XLPE-INSULATED MEDIUM VOLTAGE POWER CABLES, 6 – 30 kV

## Mutual capacitance

Nominal voltage	6/10 kV	12/20 kV	18/30 kV
Cross-section			
mm <sup>2</sup>	μF/km	μF/km	μF/km
35	0,22	0,16	–
50	0,25	0,18	0,14
70	0,28	0,20	0,15
95	0,31	0,22	0,17
120	0,34	0,23	0,18
150	0,37	0,25	0,19
185	0,40	0,27	0,20
240	0,44	0,30	0,22
300	0,48	0,32	0,24
400	0,55	0,36	0,27
500	0,60	0,40	0,29

## Inductance

Nominal voltage	6/10 kV		12/20 kV		18/30 kV	
Cross-section						
mm <sup>2</sup>	mH/km	mH/km	mH/km	mH/km	mH/km	mH/km
35	0,45	0,76	0,48	0,76	–	–
50	0,42	0,73	0,45	0,74	0,48	0,75
70	0,39	0,70	0,43	0,70	0,45	0,71
95	0,38	0,67	0,41	0,68	0,43	0,68
120	0,36	0,65	0,39	0,65	0,42	0,66
150	0,35	0,63	0,38	0,63	0,41	0,64
185	0,34	0,61	0,36	0,62	0,39	0,63
240	0,32	0,59	0,35	0,59	0,37	0,60
300	0,31	0,57	0,33	0,58	0,36	0,59
400	0,30	0,55	0,33	0,55	0,34	0,56
500	0,29	0,53	0,31	0,53	0,33	0,54



# ELECTRICAL CHARACTERISTICS OF XLPE-INSULATED MEDIUM VOLTAGE POWER CABLES, 6 – 30 kV

## Short-circuit current carrying capacity up to 30 kV

Conductor temperature: 90° C

Short-circuit temperature: 250° C

### Cable with Cu-conductors

Cross-section mm <sup>2</sup>	short-circuit time in s (seconds)														
	0,1	0,2	0,3	0,4	0,5	0,6	0,7	0,8	0,9	1,0	1,5	2,0	3,0	4,0	5,0
	permissible short-circuit in kA														
25	11,3	8,0	6,5	5,7	5,1	4,6	4,3	4,0	3,8	3,6	2,9	2,5	2,1	1,8	1,6
35	15,8	11,2	9,1	7,9	7,1	6,5	6,0	5,6	5,3	5,0	4,1	3,5	2,9	2,5	2,2
50	22,6	16,0	13,1	11,3	10,1	9,2	8,5	8,0	7,5	7,2	5,8	5,1	4,1	3,6	3,2
70	31,7	22,4	18,3	15,8	14,2	12,9	12,0	11,2	10,6	10,0	8,2	7,1	5,8	5,0	4,5
95	43,0	30,4	24,8	21,5	19,2	17,5	16,2	15,2	14,3	13,6	11,1	9,6	7,8	6,8	6,1
120	54,3	38,4	31,3	27,1	24,3	22,2	20,5	19,2	18,1	17,2	14,0	12,1	9,9	8,6	7,7
150	67,8	48,0	39,2	33,9	30,3	27,7	25,6	24,0	22,6	21,5	17,5	15,2	12,4	10,7	9,6
185	83,7	59,2	48,3	41,8	37,4	34,2	31,6	29,6	27,9	26,5	21,6	18,7	15,3	13,2	11,8
240	108,5	76,7	62,7	54,3	48,5	44,3	41,0	38,4	36,2	34,3	28,0	24,3	19,8	17,2	15,3
300	135,7	95,9	78,3	67,8	60,7	55,4	51,3	48,0	45,2	42,9	35,0	30,3	24,8	21,5	19,2
400	180,9	127,9	104,4	90,4	80,9	73,8	68,4	64,0	60,3	57,2	46,7	40,4	33,0	28,6	25,6
500	226,1	159,9	130,5	113,1	101,1	92,3	85,5	79,9	75,4	71,5	58,4	50,6	41,3	35,8	32,0

### Cable with Alu-conductors

Cross-section mm <sup>2</sup>	short-circuit time in s (seconds)														
	0,1	0,2	0,3	0,4	0,5	0,6	0,7	0,8	0,9	1,0	1,5	2,0	3,0	4,0	5,0
	permissible short-circuit in kA														
25	7,4	5,3	4,3	3,7	3,3	3,0	2,8	2,6	2,5	2,4	1,9	1,7	1,4	1,2	1,1
35	10,4	7,4	6,0	5,2	4,7	4,2	3,9	3,7	3,5	3,3	2,7	2,3	1,9	1,6	1,5
50	14,9	10,5	8,6	7,4	6,6	6,1	5,6	5,3	5,0	4,7	3,8	3,3	2,7	2,4	2,1
70	20,8	14,7	12,0	10,4	9,3	8,5	7,9	7,4	6,9	6,6	5,4	4,7	3,8	3,3	2,9
95	28,2	20,0	16,3	14,1	12,6	11,5	10,7	10,0	9,4	8,9	7,3	6,3	5,2	4,5	4,0
120	35,7	25,2	20,6	17,8	16,0	14,6	13,5	12,6	11,9	11,3	9,2	8,0	6,5	5,6	5,0
150	44,6	31,5	25,7	22,3	19,9	18,2	16,9	15,8	14,9	14,1	11,5	10,0	8,1	7,1	6,3
185	55,0	38,9	31,7	27,5	24,6	22,5	20,8	19,4	18,3	17,4	14,2	12,3	10,0	8,7	7,8
240	71,3	50,4	41,2	35,7	31,9	29,1	27,0	25,2	23,8	22,6	18,4	16,0	13,0	11,3	10,1
300	89,2	63,1	51,5	44,6	39,9	36,4	33,7	31,5	29,7	28,2	23,0	19,9	16,3	14,1	12,6
400	118,9	84,1	68,6	59,5	53,2	48,5	44,9	42,0	39,6	37,6	30,7	26,6	21,7	18,8	16,8
500	148,6	105,1	85,8	74,3	66,5	60,7	56,2	52,5	49,5	47,0	38,4	33,2	27,1	23,5	21,0

# ELECTRICAL CHARACTERISTICS OF XLPE-INSULATED MEDIUM VOLTAGE POWER CABLES, 6 – 30 kV

## Short-circuit to ground

Nominal voltage	6/10 kV	12/20 kV	18/30 kV
cross-section mm <sup>2</sup>	A/km	A/km	A/km
35	1,2	1,7	—
50	1,4	1,9	2,3
70	1,5	2,1	2,5
95	1,7	2,4	2,7
120	1,9	2,6	2,9
150	2,0	2,7	3,1
185	2,2	3,0	3,3
240	2,4	3,3	3,7
300	2,6	3,5	4,0
400	3,0	4,0	4,4
500	3,3	4,3	4,8

## Short-circuit current carrying capacity of copper screens Short-circuit temperature: 350°C

short-circuit time in seconds	load of short-circuit current in kA		
	up to 16 mm <sup>2</sup>	25 mm <sup>2</sup>	35 mm <sup>2</sup>
	kA	kA	kA
s			
0,1	9,7	15,1	21,2
0,2	6,9	10,7	15,1
0,3	5,7	8,9	12,5
0,4	5,0	7,7	10,9
0,5	4,5	7,0	9,8
0,6	4,2	6,4	9,0
0,7	3,9	6,0	8,4
0,8	3,5	5,6	7,9
0,9	3,4	5,3	7,5
1,0	3,3	5,1	7,2
1,5	2,7	4,2	5,9
2,0	2,3	3,6	5,1
3,0	1,9	2,9	4,2
4,0	1,7	2,6	3,6
5,0	1,5	2,3	3,2

## Coordination of screen-cross-section

conductor cross-section mm <sup>2</sup>	screen-cross-section mm <sup>2</sup>
35 to 120	16
150 to 300	25
400 and 500	35

# ■ CONVERSION FACTOR FOR MEDIUM VOLTAGE POWER CABLES, 6 – 30 kV

## Load rating for cables laid in ground Load factor 0,7 and 1,0

### Fundamental conditions\*

Ground temperature	20° C
Thermal resistivity	1,0 K · m/W
Distance between cables or systems	7 cm
Single core cables laid in trefoil touching arrangement	

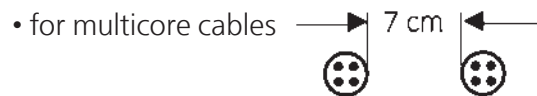
### Load factor 0,7

Type of insulation	Cable design	Nominal voltage	Number of cables or systems				
			2	4	6	8	10
PVC Three-core cables	Multicore cables	0,6/1 to 3,6/6 kV	0,86	0,71	0,64	0,60	0,57
		to 6/10 kV	0,87	0,71	0,63	0,59	0,54
	Single core cables	0,6/1 to 3,6/6 kV	0,85	0,70	0,63	0,59	0,56
		to 6/10 kV	0,83	0,66	0,57	0,53	0,49
VPE Three-core cables	Multicore cables	0,6/1 to 18/30 kV	0,85	0,70	0,63	0,59	0,56
	0,6/1	to 18/30 kV	0,85	0,70	0,63	0,58	0,56

### Load factor 1,0

Type of insulation	Cable design	Nominal voltage	Number of cables or systems					
			1	2	4	6	8	10
PVC	Multicore cables	0,6/1 to 3,6/6 kV	0,81	0,66	0,52	0,46	0,43	0,40
		to 6/10 kV	0,82	0,67	0,51	0,45	0,41	0,37
	Single core cables	0,6/1 to 3,6/6 kV	0,79	0,65	0,51	0,46	0,42	0,40
		to 6/10 kV	0,78	0,62	0,47	0,40	0,36	0,33
VPE	Multicore cables	0,6/1 to 18/30 kV	0,83	0,67	0,53	0,47	0,44	0,41
	Single core cables	0,6/1 to 18/30 kV	0,81	0,66	0,52	0,47	0,43	0,41

### Build-up of systems:



## ■ COLOUR CODE ACCORDING TO DIN 47100

with colour repetition from core no. 45 and above

### Electronic control and computer cable: **single cores** stranding

The insulation of the conductor gives the first basic colour. The codes of the multi-coloured identification are combined with a basic colour and colour rings. The second and third colour is printed on the basic colour as a form of ring.

The ring width is 2–3 mm. A less unsharpness on the edge of the identification colour and a minor pledging of both half-rings are permitted.

The cores are to be counted continuously through all layers at the same direction, beginning with the outer layer towards inside.

No. Basic-Ring-colours	No. Basic-Ring-colours	No. Basic-Ring-colours	No. Basic-Ring-colours
1 white	17 white-grey	33 green-red	45 white
2 brown	18 grey-brown	34 yellow-red	46 brown
3 green	19 white-pink	35 green-black	47 green
4 yellow	20 pink-brown	36 yellow-black	48 yellow
5 grey	21 white-blue	37 grey-blue	49 grey
6 pink	22 brown-blue	38 pink-blue	50 pink
7 blue	23 white-red	39 grey-red	51 blue
8 red	24 brown-red	40 pink-red	52 red
9 black	25 white-black	41 grey-black	53 black
10 violet	26 brown-black	42 pink-black	54 violet
11 grey-pink	27 grey-green	43 blue-black	55 grey-pink
12 red-blue	28 yellow-grey	44 red-black	56 red-blue
13 white-green	29 pink-green		57 white-green
14 brown-green	30 yellow-pink		58 brown-green
15 white-yellow	31 green-blue		59 white-yellow
16 yellow-brown	32 yellow-blue		60 yellow-brown
			61 white-grey

## ■ COLOUR CODE ADAPTED\* TO DIN 47100

without colour repetition

No. Basic-Ring-colours	No. Basic-Ring-colours	No. Basic-Ring-colours	No. Basic-Ring-colours
1 white	17 white-grey	33 green-red	45 white-brown-black
2 brown	18 grey-brown	34 yellow-red	46 yellow-green-black
3 green	19 white-pink	35 green-black	47 grey-pink-black
4 yellow	20 pink-brown	36 yellow-black	48 red-blue-black
5 grey	21 white-blue	37 grey-blue	49 white-green-black
6 pink	22 brown-blue	38 pink-blue	50 brown-green-black
7 blue	23 white-red	39 grey-red	51 white-yellow-black
8 red	24 brown-red	40 pink-red	52 yellow-brown-black
9 black	25 white-black	41 grey-black	53 white-grey-black
10 violet	26 brown-black	42 pink-black	54 grey-brown-black
11 grey-pink	27 grey-green	43 blue-black	55 white-pink-black
12 red-blue	28 yellow-grey	44 red-black	56 pink-brown-black
13 white-green	29 pink-green		57 white-blue-black
14 brown-green	30 yellow-pink		58 brown-blue-black
15 white-yellow	31 green-blue		59 white-red-black
16 yellow-brown	32 yellow-blue		60 brown-red-black
			61 black-white

\* deviation to DIN, without colour repetition, from core no. 45 and above

# ■ PAIR-COLOUR CODE ACCORDING TO DIN 47100

with colour repetition

## Electronic control and computer cable: **pair** stranding

The insulation of the conductor gives the first basic colour. The codes of the multi-coloured identification are combined with a basic colour and colour rings. The second colour is printed on the basic colour as a form of ring. The ring width is 2–3 mm. A less unsharpness on the edge of the identification colour and a minor pledging of both half-rings are permitted.

The cores are to be counted continuously through all layers at the same direction, beginning with the outer layer towards inside.

Pair-stranding				colour
Pair-no.	core			
1	23	45	a	white
			b	brown
2	24	46	a	green
			b	yellow
3	25	47	a	grey
			b	pink
4	26	48	a	blue
			b	red
5	27	49	a	black
			b	violet
6	28	50	a	grey-pink
			b	red-blue
7	29	51	a	white-green
			b	brown-green
8	30	52	a	white-yellow
			b	yellow-brown
9	31	53	a	white-grey
			b	grey-brown
10	32	54	a	white-pink
			b	pink-brown
11	33	55	a	white-blue
			b	brown-blue

Pair-stranding				colour
Pair-no.	core			
12	34	56	a	white-red
			b	brown-red
13	35	57	a	white-black
			b	brown-black
14	36	58	a	grey-green
			b	yellow-grey
15	37	59	a	pink-green
			b	yellow-pink
16	38	60	a	green-blue
			b	yellow-blue
17	39	61	a	green-red
			b	yellow-red
18	40	62	a	green-black
			b	yellow-black
19	41	63	a	grey-blue
			b	pink-blue
20	42	64	a	grey-red
			b	pink-red
21	43	65	a	grey-black
			b	pink-black
22	44	66	a	blue-black
			b	red-black

### Colour code as per DIN 47002

YV-Equipment wires

(for twin colour cables, the base colour is underlined>)

ws	white	br	brown
gn	green	ge	yellow
gr	grey	rs	pink
bl	blue	rt	red
sw	black	vi	violet
wsbr	<u>white</u> -brown	wsgn	<u>white</u> -green
wsge	<u>white</u> -yellow	wsbl	<u>white</u> -blue
wsrt	<u>white</u> -red	wssw	<u>white</u> -black
brgn	<u>brown</u> -green	brge	<u>brown</u> -yellow
brbl	<u>brown</u> -blue	brsw	<u>brown</u> -black
gnge	<u>green</u> -yellow	gnrt	<u>green</u> -red
gns	<u>green</u> -black	gebl	<u>yellow</u> -blue
gert	<u>yellow</u> -red	gesw	<u>yellow</u> -black
grrt	<u>grey</u> -red	grsw	<u>grey</u> -black
rssw	<u>pink</u> -black	rsvi	<u>pink</u> -violet
blrt	<u>blue</u> -red	rtsw	<u>red</u> -black
virt	<u>violet</u> -red		

### Colour code for YR-Bell Sheathed Cables

2 x 0,8:	bk, bu
3 x 0,8:	bk, bu, bn
4 x 0,8:	bk, bu, bn, ye
5 x 0,8:	bk, bu, bn, ye, gn
6 x 0,8:	bk, bu, bn, ye, gn, vt
8 x 0,8:	bk, bu, bn, ye, gn, vt, wh, og
10 x 0,8:	bk, bu, bn, ye, gn, vt, wh, og, tr, gy
12 x 0,8:	bk, bu, bn, ye, gn, vt, wh, og, tr, gy, rd, lbu
14 x 0,8:	bk, bu, bn, ye, gn, vt, wh, og, tr, gy, rd, lbu, cog, lgn
16 x 0,8:	bk, bu, bn, ye, gn, vt, wh, og, tr, gy, rd, lbu, cog, lgn, lrd, lye



## ■ COLOUR CODE ACCORDING TO INTERNATIONAL STANDARD

Electronic control UL-version: **single cores** stranding

The insulation of the conductor gives the first basic colour. The codes of the multi-coloured identification are combined with a basic colour and colour rings. The second colour is printed on the basic colour as a form of ring.

The ring width is 2–3 mm. A less unsharpness on the edge of the identification colour and a minor pledging of both half-rings are permitted.

The cores are to be counted continuously through all layers at the same direction, beginning with the inside layer towards outer.

No. Basic-Ring-colours	No. Basic-Ring-colours	No. Basic-Ring-colours	No. Basic-Ring-colours
1 black	16 white-green	31 green-red	46 grey-brown
2 brown	17 white-blue	32 green-orange	47 grey-red
3 red	18 white-violet	33 green-blue	48 grey-orange
4 orange	19 white-grey	34 green-violet	49 grey-yellow
5 yellow	20 brown-black	35 green-grey	50 grey-green
6 green	21 brown-red	36 green-white	51 grey-blue
7 blue	22 brown-orange	37 yellow-black	52 grey-violet
8 violet	23 brown-yellow	38 yellow-brown	53 grey-white
9 grey	24 brown-green	39 yellow-red	54 orange-black
10 white	25 brown-blue	40 yellow-orange	55 orange-brown
11 white-black	26 brown-violet	41 yellow-blue	56 orange-red
12 white-brown	27 brown-grey	42 yellow-violet	57 orange-yellow
13 white-red	28 brown-white	43 yellow-grey	58 orange-green
14 white-orange	29 green-black	44 yellow-white	59 orange-blue
15 white-yellow	30 green-brown	45 grey-black	60 orange-violet

## ■ PAIR-COLOUR CODE ACCORDING TO INTERNATIONAL STANDARD

Electronic control UL-version: **pair** stranding

The insulation of the conductor gives the first basic colour. The codes of the multi-coloured identification are combined with a basic colour and colour rings. The second colour is printed on the basic colour as a form of ring. The ring width is 2–3 mm. A less unsharpness on the edge of the identification colour and a minor pledging of both half-rings are permitted.

The cores are to be counted continuously through all layers at the same direction, beginning with the inside layer towards outer.

Pair-stranding			Pair-stranding			Pair-stranding		
Pair-no.	core	colour	Pair-no.	core	colour	Pair-no.	core	colour
1	a	black	9	a	black	17	a	brown
	b	brown		b	white		b	white
2	a	black	10	a	brown	18	a	red
	b	red		b	red		b	orange
3	a	black	11	a	brown	19	a	red
	b	orange		b	orange		b	yellowz
4	a	black	12	a	brown	20	a	red
	b	yellow		b	yellow		b	green
5	a	black	13	a	brown	21	a	red
	b	green		b	green		b	blue
6	a	black	14	a	brown	22	a	red
	b	blue		b	blue		b	violet
7	a	black	15	a	brown	23	a	red
	b	violet		b	violet		b	grey
8	a	black	16	a	brown	24	a	red
	b	grey		b	grey		b	white

# ■ COLOUR CODES ACCORDING TO INTERNATIONAL STANDARDS

## TRAYCONTROL 300 / TRAYCONTROL 300-C (AWG 28-22)

No.	Basic-ring-colour	No.	Basic-ring-colour	No.	Basic-ring-colour
1	black	18	white/violet	35	white/red/orange
2	brown	19	white/grey	36	white/red/yellow
3	red	20	white/black/brown	37	white/red/green
4	orange	21	white/black/red	38	white/red/blue
5	yellow	22	white/black/orange	39	white/red/violet
6	green	23	white/black/yellow	40	white/red/grey
7	blue	24	white/black/green	41	white/orange/yellow
8	violet	25	white/black/blue	42	white/orange/green
9	grey	26	white/black/violet	43	white/orange/blue
10	white	27	white/black/grey	44	white/orange/violet
11	white/black	28	white/brown/red	45	white/orange/grey
12	white/brown	29	white/brown/orange	46	white/yellow/green
13	white/red	30	white/brown/yellow	47	white/yellow/blue
14	white/orange	31	white/brown/green	48	white/yellow/violet
15	white/yellow	32	white/brown/blue	49	white/yellow/grey
16	white/green	33	white/brown/violet	50	white/green/blue
17	white/blue	34	white/brown/grey		

## TRAYCONTROL 300 / TRAYCONTROL 300-C (AWG 20-16)

No.	Basic-ring-colour	No.	Basic-ring-colour	No.	Basic-ring-colour
1	black	18	white/green	35	white/red/red
2	red	19	white/yellow	36	white/red/green
3	white	20	white/blue	37	white/red/blue
4	green	21	white/brown	38	white/red/brown
5	orange	22	white/orange	39	white/red/violet
6	blue	23	white/grey	40	white/green/black
7	brown	24	white/violet	41	white/green/red
8	yellow	25	white/black/red	42	white/green/green
9	violet	26	white/black/green	43	white/green/blue
10	grey	27	white/black/yellow	44	white/green/brown
11	pink	28	white/black/blue	45	white/green/violet
12	hellbrown	29	white/black/brown	46	white/blue/black
13	red/green	30	white/black/orange	47	white/blue/red
14	red/yellow	31	white/black/grey	48	white/blue/green
15	red/black	32	white/black/violet	49	white/blue/blue
16	white/black	33	white/black/black	50	white/blue/brown
17	white/red	34	white/red/black		

# ■ PAIR-COLOUR CODES ACCORDING TO INTERNATIONAL STANDARDS

## TRAYCONTROL 300 TP / TRAYCONTROL 300 TP-C (AWG 20-18)

Pair-stranding Pair-no.	core	colour	Pair-stranding Pair-no.	core	colour	Pair-stranding Pair-no.	core	colour
1	a	black	10	a	red	19	a	white
	b	red		b	blue		b	blue
2	a	black	11	a	red	20	a	white
	b	white		b	yellow		b	brown
3	a	black	12	a	red	21	a	white
	b	green		b	brown		b	orange
4	a	black	13	a	red	22	a	white
	b	blue		b	orange		b	yellow
5	a	black	14	a	green	23	a	blue
	b	brown		b	blue		b	brown
6	a	black	15	a	green	24	a	blue
	b	yellow		b	white		b	orange
7	a	black	16	a	green	25	a	blue
	b	orange		b	brown		b	yellow
8	a	red	17	a	green			
	b	green		b	orange			
9	a	red	18	a	green			
	b	white		b	yellow			

## TRAYCONTROL 300 TP / TRAYCONTROL 300 TP-C (AWG 26-22)

Pair-stranding Pair-no.	core	colour	Pair-stranding Pair-no.	core	colour	Pair-stranding Pair-no.	core	colour
1	a	white	10	a	black	19	a	brown
	b	black		b	brown		b	orange
2	a	white	11	a	black	20	a	brown
	b	brown		b	red		b	yellow
3	a	white	12	a	black	21	a	brown
	b	red		b	orange		b	green
4	a	white	13	a	black	22	a	brown
	b	orange		b	yellow		b	blue
5	a	white	14	a	black	23	a	brown
	b	yellow		b	green		b	violet
6	a	white	15	a	black	24	a	brown
	b	green		b	blue		b	grey
7	a	white	16	a	black	25	a	red
	b	blue		b	violet		b	orange
8	a	white	17	a	black			
	b	violet		b	grey			
9	a	white	18	a	brown			
	b	grey		b	red			

# COLOUR CODE FOR SINGLE WIRE VEHICLE CABLES

## one-colour

black, white, blue, orange, brown, green, violet, red, pink, yellow, grey

## two-colours

● preferred colours

base colour	marking colour longitudinal stripe	base colour	marking colour longitudinal stripe
white	grey	red	white
white	red	red	yellow
white	brown	red	grey
white	blue	red	green
white	black	red	blue
		red	black
yellow	grey	brown	white
yellow	red	brown	yellow
yellow	brown	brown	green
yellow	blue	brown	black
yellow	black	brown	
grey	green	blue	white
grey	red	blue	yellow
grey	brown	blue	green
		blue	red
green	white	black	white
green	grey	black	yellow
green	brown	black	green
green	blue	black	red
green	black	black	

## three-colours

● preferred colours

base colour	1. marking colour longitudinal stripe	2. marking colour longitudinal stripe
grey	green	yellow
grey	red	yellow
grey	brown	yellow
red	white	yellow
red	yellow	yellow
red	grey	yellow
red	green	yellow
red	blue	yellow
red	black	yellow
brown	white	yellow
brown	yellow	yellow
brown	green	yellow
brown	black	yellow
blue	white	yellow
blue	yellow	yellow
blue	green	yellow
blue	red	yellow
black	white	yellow
black	yellow	yellow
black	green	yellow
black	red	yellow

**Minimum quantities** for one or two-coloured combinations per cross-section and colour combination:

0,5 to 2,5 mm<sup>2</sup> = 3 km

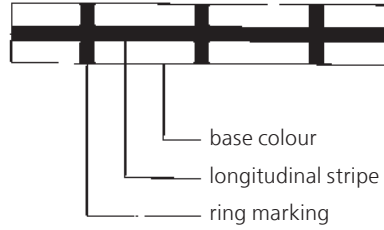
4,0 to 25,0 mm<sup>2</sup> = 1 km. Remaining cross-sections on request

For three-coloured combination we manufacture **only** on request.

**Minimum quantities** per cross-sections and colour combinations:

0,5 to 2,5 mm<sup>2</sup> = 5 km

4,0 to 25,0 mm<sup>2</sup> = 3 km. Remaining cross-sections on request.



● further colour combinations

base colour	marking colour longitudinal stripe	base colour	marking colour longitudinal stripe
white	yellow	brown	grey
white	green	brown	violet
white	violet	brown	blue
yellow	white	blue	grey
yellow	green	blue	violet
yellow	violet	blue	brown
grey	white	black	grey
grey	yellow	black	violet
grey	violet	black	brown
green	yellow	orange	white
green	red	orange	yellow
green	violet	orange	grey
		orange	green
		orange	green
		orange	violet
		orange	blue
		orange	orange
		orange	black
violet	white		
violet	yellow		
violet	grey		
violet	green		
violet	brown		
violet	blue		
violet	black		

● further colour combinations

base colour	1. marking colour longitudinal stripe	2. marking colour longitudinal stripe
grey	white	yellow
grey	yellow	yellow
grey	violet	yellow
red	brown	yellow
violet	white	yellow
violet	yellow	yellow
violet	grey	yellow
violet	green	yellow
violet	brown	yellow
violet	blue	yellow
violet	black	yellow
brown	grey	yellow
brown	violet	yellow
brown	blue	yellow
blue	grey	yellow
blue	violet	yellow
blue	brown	yellow
black	grey	yellow
black	violet	yellow
black	brown	yellow
orange	white	yellow
orange	yellow	yellow
orange	grey	yellow
orange	green	yellow
orange	violet	yellow
orange	blue	yellow
orange	black	yellow

# ■ COLOUR CODE HELUKABEL® -JB

## Colour coded Control Cables **JB** and **SY-JB** with green-yellow protective conductor

The combination of colour identification up to 102 cores consists of 11 basic colours. For core-no. 12 and more, one or two additional colour rings or longitudinal stripes are printed on the basic colour. The ring width is approximately 2 mm.

### 3- to 5-core cables

Colour identification according to VDE 0293 for flexible cables

- 3 cores = green-yellow/brown/blue
- 4 cores = green-yellow/brown/black/grey
- 5 cores = green-yellow/blue/brown/black/grey

### 6- and more core cables

Colour identification as per following table.

The insulation of the conductor gives the first basic colour. The second and the third colour is printed on the basic colour as a form of ring or longitudinal stripe. The cores are to be counted continuously through all layers at the same direction, beginning with inner layer towards outside. Green-yellow conductor has to be arranged in the outer layer as the last core.

#### No. Basic-Ring-Colour

- 0 green-yellow
- 1 white
- 2 black
- 3 blue
- 4 brown
- 5 grey
- 6 red
- 7 violet
- 8 pink
- 9 orange
- 10 transparent
- 11 beige
- 12 black-white
- 13 blue-white
- 14 brown-white
- 15 grey-white
- 16 red-white
- 17 violet-white
- 18 pink-white
- 19 orange-white
- 20 transparent-white
- 21 beige-white
- 22 blue-black
- 23 brown-black
- 24 grey-black
- 25 red-black
- 26 violet-black
- 27 pink-black
- 28 orange-black
- 29 transparent-black
- 30 beige-black
- 31 brown-blue
- 32 grey-blue
- 33 red-blue
- 34 pink-blue
- 35 orange-blue

#### No. Basic-Ring-Colour

- 36 transparent-blue
- 37 beige-blue
- 38 grey-brown
- 39 red-brown
- 40 violet-brown
- 41 pink-brown
- 42 orange-brown
- 43 transparent-brown
- 44 beige-brown
- 45 red-grey
- 46 violet-grey
- 47 pink-grey
- 48 orange-grey
- 49 transparent-grey
- 50 beige-grey
- 51 orange-red
- 52 transparent-red
- 53 beige-red
- 54 pink-violet
- 55 orange-violet
- 56 transparent-violet
- 57 beige-violet
- 58 transparent-pink
- 59 beige-pink
- 60 transparent-orange
- 61 beige-orange
- 62 blue-white-black
- 63 brown-white-black
- 64 grey-white-black
- 65 red-white-black
- 66 violet-white-black
- 67 pink-white-black
- 68 orange-white-black

#### No. Basic-Ring-Colour

- 69 transparent-white-black
- 70 beige-white-black
- 71 brown-white-blue
- 72 grey-white-blue
- 73 red-white-blue
- 74 violet-white-blue
- 75 pink-white-blue
- 76 orange-white-blue
- 77 transparent-white-blue
- 78 beige-white-blue
- 79 grey-white-brown
- 80 red-white-brown
- 81 violet-white-brown
- 82 pink-white-brown
- 83 orange-white-brown
- 84 transparent-white-brown
- 85 beige-white-brown
- 86 red-white-grey
- 87 violet-white-grey
- 88 pink-white-grey
- 89 orange-white-grey
- 90 transparent-white-grey
- 91 beige-white-grey
- 92 blue-white-red
- 93 brown-white-red
- 94 violet-white-red
- 95 pink-white-red
- 96 orange-white-red
- 97 brown-white-violet
- 98 orange-white-violet
- 99 brown-black-blue
- 100 grey-black-blue
- 101 red-black-blue



# ■ COLOUR CODE HELUKABEL® -OB

## Colour coded Control Cables **OB** and **SY-OB** without green-yellow protective conductor

The combination of colour identification up to 101 cores consists of 11 basic colours. For core-no. 12 and more, one or two additional colour rings or longitudinal stripes are printed on the basic colour. The ring width is approximately 2 mm.

### 2- to 5-core cables

Colour identification according to VDE 0293 for flexible cables

- 2 cores = brown/blue
- 3 cores = brown/black/grey
- 4 cores = blue/brown/black/grey
- 5 cores = blue/brown/black/grey/black

### 6- and more core cables

Colour identification as per following table. The insulation of the conductor gives the first basic colour. The second and the third colour is printed on the basic colour as a form of ring or longitudinal stripe.

The cores are to be counted continuously through all layers at the same direction, beginning with inner layer towards outside.

#### No. Basic-Ring-colour

- 1 white
- 2 black
- 3 blue
- 4 brown
- 5 grey
- 6 red
- 7 violet
- 8 pink
- 9 orange
- 10 transparent
- 11 beige
- 12 black-white
- 13 blue-white
- 14 brown-white
- 15 grey-white
- 16 red-white
- 17 violet-white
- 18 pink-white
- 19 orange-white
- 20 transparent-white
- 21 beige-white
- 22 blue-black
- 23 brown-black
- 24 grey-black
- 25 red-black
- 26 violet-black
- 27 pink-black
- 28 orange-black
- 29 transparent-black
- 30 beige-black
- 31 brown-blue
- 32 grey-blue
- 33 red-blue
- 34 pink-blue
- 35 orange-blue

#### No. Basic-Ring-colour

- 36 transparent-blue
- 37 beige-blue
- 38 grey-brown
- 39 red-brown
- 40 violet-brown
- 41 pink-brown
- 42 orange-brown
- 43 transparent-brown
- 44 beige-brown
- 45 red-grey
- 46 violet-grey
- 47 pink-grey
- 48 orange-grey
- 49 transparent-grey
- 50 beige-grey
- 51 orange-red
- 52 transparent-red
- 53 beige-red
- 54 pink-violet
- 55 orange-violet
- 56 transparent-violet
- 57 beige-violet
- 58 transparent-pink
- 59 beige-pink
- 60 transparent-orange
- 61 beige-orange
- 62 blue-white-black
- 63 brown-white-black
- 64 grey-white-black
- 65 red-white-black
- 66 violet-white-black
- 67 pink-white-black
- 68 orange-white-black

#### No. Basic-Ring-colour

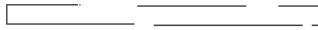
- 69 transparent-white-black
- 70 beige-white-black
- 71 brown-white-blue
- 72 grey-white-blue
- 73 red-white-blue
- 74 violet-white-blue
- 75 pink-white-blue
- 76 orange-white-blue
- 77 transparent-white-blue
- 78 beige-white-blue
- 79 grey-white-brown
- 80 red-white-brown
- 81 violet-white-brown
- 82 pink-white-brown
- 83 orange-white-brown
- 84 transparent-white-brown
- 85 beige-white-brown
- 86 red-white-grey
- 87 violet-white-grey
- 88 pink-white-grey
- 89 orange-white-grey
- 90 transparent-white-grey
- 91 beige-white-grey
- 92 blue-white-red
- 93 brown-white-red
- 94 violet-white-red
- 95 pink-white-red
- 96 orange-white-red
- 97 brown-white-violet
- 98 orange-white-violet
- 99 brown-black-blue
- 100 grey-black-blue
- 101 red-black-blue

# ■ COLOUR CODE SWITCHBOARD CABLE

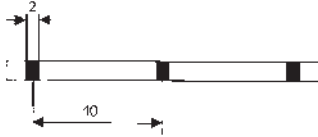
## S-YY Lg

Core identification

Dimensions in mm



single coloured  
no ring marking



with ring marking,  
ring width and ring  
distance

The cores are identified in colour-groups with each 4, 5, 6, 10 different core colour combinations which is repeated continuously according to the following scheme:

No. of cores in each colour-group	Core colours
4	blue, red, grey, green
5	blue, red, grey, green, brown
6	blue, red, grey, green, brown, black
10	blue, red, grey, green, brown, black, yellow, white, pink, violet

### Example

S-YY 30 (5 x6) x1x 0,6 Lg  
= 5x colour-groups with 6 different core colours.

The colour-groups of same identification codes are only permitted to apply in a cable. In each layer, the blue core of the first completed colour-group is identified with red colour ring markings.

The remaining cores of the previous colour-group are laying before the blue cores with red markings.

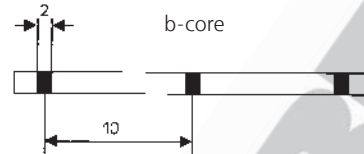
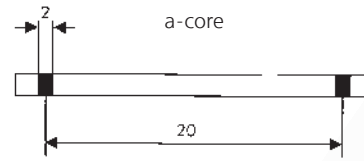
**Counting:** from outside towards inside.

The cores of the switchboard cable are stranded in layers. The cores are to be counted continuously through all layers at the same direction, beginning with outer layer towards inside.

## S-Y(St)Y Bd

Core identification

Dimensions in mm



The colour identifications of the a- and b-cores of switchboard cables are coded with a basic colour and colour rings.

### Identification of ring- and basic colours

No. of Unit	Serial no. of twisted elements	Ring-colours a-core	Basic colour a- and b-core					
1	1	2	3	4	5	blue yellow green brown black	white	
2	6	7	8	9	10			
3	11	12	13	14	15			
4	16	17	18	19	20			
5	21	22	23	24	25			
6	26	27	28	29	30	blue yellow green brown black	grey	
7	31	32	33	34	35			
8	36	37	38	39	40			
9	41	42	43	44	45			
10	46	47	48	49	50			
		blue	yellow	green	brown	black		
		Ring-colours b-core						

all c-cores: red;  
all d-cores: pink;  
all e-cores: black

Cables with more than 50 twisted elements, the identifications code of 51 and above elements are to be counted again from serial no. 1.

The twisted elements are pairs, triples, five-core units  
Pairs a- and b-cores

triple a-, b- and c-cores

five-core units a-, b-, c-, d- and e-cores

The cores of 5 twisted elements with same ring markings of a-cores are bunched to a unit.

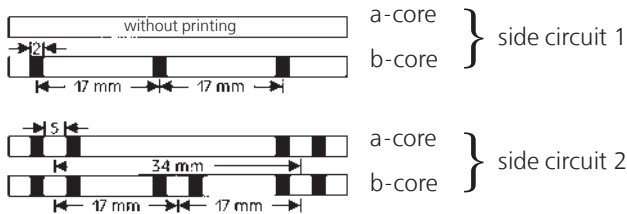
**Counting:** from outside towards inside.

The units are to be counted continuously through all layers at the same direction with correct colour countings, beginning with outer layer towards inside.

# COLOUR CODE INSTALLATION CABLE

## J-YY...Bd, J-HH...Bd, J-Y(St)Y...Bd, J-H(St)H...Bd and J-2Y(St)Y...Bd

The Insulating coverings of single cores of a star quad are marked with black rings:



The cores of 5 star quads of a sub unit are counted according to the sequence of basic colours:

- Quad 1: basic colour of all cores red
- Quad 2: basic colour of all cores green
- Quad 3: basic colour of all cores grey
- Quad 4: basic colour of all cores yellow
- Quad 5: basic colour of all cores white

The marker of units are identified with a red helix, the others with white or uncoloured. The quads of sub units are counted according to the sequence of basic colours. The units are counted continuously through all layers beginning in the inner layer.

## J-Y(St)Y...Lg

2-paired installation cables are stranded to a star quad.

- circuit 1 a-core red, b-core black
- circuit 2 a-core white, b-core yellow

3- and multi-paired installation cables

- a-core of 1. pair in each layer is red other pairs are white
- b-core blue, yellow, green, brown, black in continuous repeat

Counting: from outside to inside

## JE-Y(St)Y...Bd, JE-LiYCY...Bd, JE-H(St)... and JE-HCH...Bd

### Pair-colour-identification

The insulating cores are identified with different basic colours which are repeated sequentially in each unit.

Basic colours of pairs

Pair	1	2	3	4
a-core	blue	grey	green	white
b-core	red	yellow	brown	black

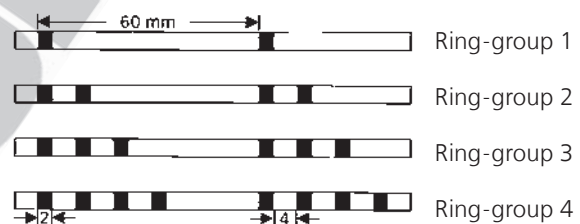
2-paired cables: the cores are stranded to a star quad:

- circuit 1: a-core blue b-core red
- circuit 2: a-core grey b-core yellow

Each unit is assigned to one group of ring. All cores in each unit are marked with coloured rings and ring-groups.

Counting direction in all units is from inside to outside.

### Ring-colour and Ring-group



### Unit-identification

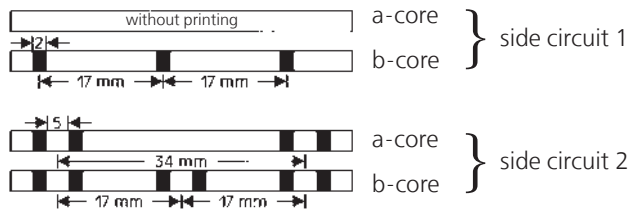
Unit-No.	Ring-colour	Ring-group	Colour-identification tape
1		I	
2	pink	II	
3		III	-
4		IIII	
5		orange	I
6	II		
7	III		-
8	IIII		
9	violet	I	
10		II	
11		III	-
12		IIII	
13	pink	I	
14		II	blue
15		III	
16		IIII	
17	orange	I	
18		II	red
19		III	
20		IIII	

Cables with more than 12 units contain coloured plastic helix in addition to ring code.

# ■ COLOUR CODE TELEPHONE OUTDOOR CABLE

## A-2Y(L)2Y...Bd and A-2YF(L)2Y...Bd

The Insulating coverings of single cores of a quad are to be marked with black rings:



The insulating cores of five star quads of a sub-unit must have the following colours:

- Quad 1: basic colours of all conductors red
- Quad 2: basic colours of all conductors green
- Quad 3: basic colours of all conductors grey
- Quad 4: basic colours of all conductors yellow
- Quad 5: basic colours of all conductors white

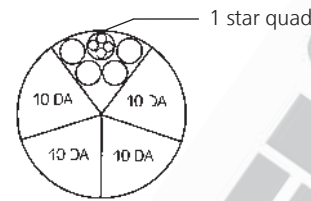
The first sub- or main-unit in each layer is to be marked by an open helix of plastic tape of red (marker). All other sub- or main-units must be whipped with an open helix of white or uncoloured plastic tape.

The quads of a sub-unit are to be counted according to the sequence of basic colours.

In cables with more than 5 star quads, the sub- and main-units must be counted continuously beginning with maker-unit at inner layer towards outside.

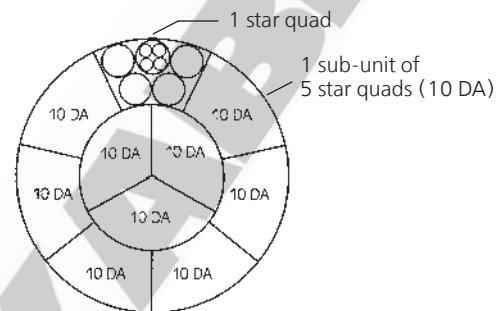
### Design of a main-unit:

Consist of 5 sub-units = 50 pairs (DA)



### Design of a main-unit:

Consist of 10 sub-units = 100 pairs (DA)



# ■ COLOUR ABBREVIATIONS ACCORDING TO VDE AND IEC

It is planned to use in future an uniform common colour abbreviations according to IEC 60757 (identical to CENELEC-harmonized document HD 457).

The following table shows the comparison of German and IEC colour abbreviations:

colour	German abbreviation		Abbreviation according to IEC 60757
	new	old	
black	SW	sw	BK
brown	BR	br	BN
red	RT	rt	RD
orange	OR	or	OG
yellow	GE	ge	YE
green	GN	gn	GN
blue	BL	bl	BU
violet	VI	vi	VT
grey	GR	gr	GY
white	WS	ws	WH
pink	RS	rs	PK
turquoise	TK	tk	TQ

IEC = International Electrotechnical Commission

Chemical Resistance	Concentration (%)	Temperature up to ... °C	PVC										PE	PUR	H	Silicone	Neoprene Rubber	HELLUFLO®
			JZ-500/600/750-JB, OZ-BL, PVC-flat, TRONIC (LIYY), SUPERTRONIC-PVC	LI-TPC-Y, PAAR-CY-OZ, CEI 20-22, Bus cables PVC, RD-Y(SI)Y, RE-2Y(SI)Y, Data cables PVC	JZ-HF, JZ-HF-CY, JZ-603, JZ-603-CY, ND5W5-F, H05W5-F, H 05WC4V5-K	Trago, Lift, 2S, JZ 604 TC, JZ 604-FCY TC, JZ 604-YCY TC	JZ-602, JZ-602-CY, TRONIC-CY, LIYCY, JZ-602 RC, PAAR-TRONIC-CY, SY-JZ, SY-JB, JZ-602 RC-CY	F-CY-JZ, Y-CY-JZ, JZ-HF-CY, J-Y(Y)Y, J-Y(Y)Y, S-Y(Y)Y, TOPFLEX-PVC	ESUY, LIY, PVC-Single cores, EDV-PIMF-CY, ESX, LIYDY, TUBEFLEX/-CY	H 05 V-K, H 07 V-K, H 03 W-F, H05 W-F	HELUTHERM 120, HELUTHERM 105, H05V2-K, H07V2-K, FIVENORM	Coaxial-cable (PE), LZ-BUS-cable (PE) A-2Y(L)Z, A-2YF(L)Z, HELUCOM® ... 2Y	PUR6-JZ, PUR6-JF, TOPFLEX-PUR, ROBOFLEX, SUPERTRONIC-PUR, MULTIFLEX-PUR, TOPSERV®	J-H(SI)H, Security Cable-E 30/E 90, HELUCOM-H JZ-500-HMH/WXMHX, N2XH, RG-H	SIHF-SiHF/GL-P-SiF-SiD-SiFF-SiF/GL, SiD/GL, SiHF-C-Si, FZ-LS, FZ-LSI	Neoprene-Round/Flat, NSHTÖU, AIRPORT 400 Hz H01N2-D/E, H 05/H 07-, A 05/A 07 RN-F	FEP-6Y, PTFE-5Y, Compensating cables-FEP	
<b>Substance</b>																		
<b>Inorganic chemicals</b>																		
Alums	colts.	20	●	●	●	●	●	●	●	●	●	●	○	●	○	●	●	
Aluminium salts	each	20	●	●	●	●	●	●	●	●	●	●	○	●	○	●	●	
Ammonia, wat.	10	20	●	●	●	●	●	●	●	●	●	●	○	●	○	●	●	
Ammonium acetate, wat.	each	20	●	●	●	●	●	●	●	●	●	●	○	●	○	●	●	
Ammonium carbonate, wat.	each	20	●	●	●	●	●	●	●	●	●	●	○	●	○	●	●	
Ammonium chloride, wat.	each	20	●	●	●	●	●	●	●	●	●	●	○	●	○	●	●	
Barium salts	each	20	●	●	●	●	●	●	●	●	●	●	○	●	○	●	●	
Boric acid	100	20	●	●	●	●	●	●	●	●	●	●	○	●	○	●	●	
Calcium chloride, wat.	colts.	20	●	●	●	●	●	●	●	●	●	●	○	●	○	●	●	
Calcium chloride, wat.	10 – 40	20											●					
Calcium nitrate, wat.	colts.	20	●	●	●	●	●	●	●	●	●	●	○	●	○	●	●	
Chromium salts, wat.	colts.	20	●	●	●	●	●	●	●	●	●	●	○	●	○	●	●	
Potassium carbonate, wat.		20	●	●	●	●	●	●	●	●	●	●	○	●	○	●	●	
Potassium chlorate, wat.	colts.	20	●	●	●	●	●	●	●	●	●	●	○	●	○	●	●	
Potassium chloride, wat.	colts.	20	●	●	●	●	●	●	●	●	●	●	○	●	○	●	●	
Potassium dicromate, wat.		20	●	●	●	●	●	●	●	●	●	●	○	●	○	●	●	
Potassium iodide, wat.		20	●	●	●	●	●	●	●	●	●	●	○	●	○	●	●	
Potassium nitrate, wat.	colts.	20	●	●	●	●	●	●	●	●	●	●	○	●	○	●	●	
Potassium permanganate, wat.		20	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	
Potassium sulphate, wat.		20	●	●	●	●	●	●	●	●	●	●	○	●	○	●	●	
Copper salts	colts.	20	●	●	●	●	●	●	●	●	●	●	○	●	○	●	●	
Megnesium salts	colts.	20	●	●	●	●	●	●	●	●	●	●	○	●	○	●	●	
Sodium bicarbonate (Natron), wat.		20	●	●	●	●	●	●	●	●	●	●	○	●	○	●	●	
Sodium bisulphite (Soda), wat.		20	●	●	●	●	●	●	●	●	●	●	○	●	○	●	●	
Sodium chloride (Cook salt), wat.		20	●	●	●	●	●	●	●	●	●	●	○	●	○	●	●	
Sodium thiosulfat, wat.		20	●	●	●	●	●	●	●	●	●	●	○	●	○	●	●	
Soda Lye	50	20	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	
Nickel salts, wat.	colts.	20	●	●	●	●	●	●	●	●	●	●	○	●	○	●	●	
Nitrobenzene	100	50	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	
Phosphoric acid	50	20	●	●	●	●	●	●	●	●	●	●	○	●	○	●	●	
Mercury	100	20	●	●	●	●	●	●	●	●	●	●	○	●	○	●	●	
Mercury salts	colts.	20	●	●	●	●	●	●	●	●	●	●	○	●	○	●	●	
Nitric acid	30	20	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	
Hydrochlorid acid	conc.	20	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	
Sulfur dioxide		20	●	●	●	●	●	●	●	●	●	●	○	●	○	●	●	
Carbon disulfide		20	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	
Sulfuric acid	50	50	●	●	●	●	●	●	●	●	●	●	○	●	○	●	●	
Hydrogen sulfide		20	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	
Sea water		20	●	●	●	●	●	●	●	●	●	●	○	●	○	●	●	
Silver salts, wat.		20	●	●	●	●	●	●	●	●	●	●	○	●	○	●	●	
Cleaning fluid lye	2	100	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	
Water (dest.)		20	●	●	●	●	●	●	●	●	●	●	○	●	○	●	●	
Hydrogen peroxide, wat.		20	●	●	●	●	●	●	●	●	●	●	○	●	○	●	●	
Zinc salts, wat.		20	●	●	●	●	●	●	●	●	●	●	○	●	○	●	●	
Stannous chloride		20	●	●	●	●	●	●	●	●	●	●	○	●	○	●	●	

● resistant  
 ○ conditionally resistant  
 ○ not resistant  
 \* for individual case, please verify

each = each concentration  
 colts. = cold saturated  
 wat. = watery, liquid

The information mentioned in this summary is given to the best of our own knowledge and based upon our long standing experience. But we would like to direct your attention to the fact, that the information is given without obligation. A final judgement can only be made in practice.



Chemical Resistance	Concentration (%)	Temperature up to ...°C	PVC										PE	PUR	H	Silicone	Neoprene Rubber	HELU-FLON®		
			JZ-500/600/750, JB, OZ, BL, PVC-Flat, TRONIC (LIYY), SUPERTRONIC-PVC	Li-TPC-Y, PAAR-CY-OZ, CEI 20-22, Bus cables PVC, RD-Y(S)Y, RE-2Y(S)Y, Data cables PVC	JZ-HF, JZ-HF-CY, JZ-603, JZ-603-CY, N05W5-F, H05W5-F, H05WC4V5-K	Trago, Lift-2S, JZ 604 TC, JZ 604-FCY TC, JZ 604-YCY TC	JZ-602, JZ-602-CY, TRONIC-CY, LYCY, JZ-602 RC, PAAR-TRONIC-CY, SY-JZ, SY-JB, JZ-602 RC-CY	F-CY, JZ, Y-CY, JZ, JZ-HF-CY, J-Y(S)Y, J-Y, JE-Y(S)Y S-Y, S-Y(S)Y, TOPFLEX-PVC	ESUY, LiY, PVC-Single cores, EDV-PIMF-CY ES, LIFDY, TUBFLEX/-CY	H 05 V-K, H 07 V-K, H 03 W-F, H05 W-F	HELUTHERM 120, HELUTHERM 105, H05V2-K, H07V2-K, FIVENORM	Coaxial-cable (PE), L2-BUS-cable (PE) A-2Y(L)2Y, A-2YF(L)2Y, HELUCOM® ... 2Y	PUR0-JZ, PURO-JZ-HF, TOPFLEX-PUR, ROBOFLEX, SUPERTRONIC-PUR, MULTIFLEX-PUR, TOPSERV®	J-H(S)H, Security Cable...E 30/E 90, HELUCOM-H JZ-500-HMH/MXMHX, NZXH, RG-H	SIHF, SIHF/GL-P, SIF, SID, SIFF, SIF/GL, SID/GL, SIHF-C-SI, FZ-LS, FZ-LSI	Neoprene-Round/Flat, NSHTOU, AIRPORT 400 Hz H01N2-D/E, H 05/H07-, A 05/A 07 RN-F	FEP-6Y, PTFE-SY, Compensating cables-FEP			
Substance	Organic chemicals																			
Aceton		20	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
Formic acid	30	20	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
Aniline		50	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
Petrol		20	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
Benzene		50	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
Succinic acid, wat.	colds.	20	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Brake fluid		100	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
Butane		20	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Butter		50	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Chlorobenze		30	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
Chloroprene		20	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
Diethylether		20	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
Diethylprestone		50	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Diesel oil			○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
Glacial acetic acid	20	50	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
Acetic acid	20		○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
Ethyl alcohol	100	20	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
Ethyl chloride		50	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
Ethylene glycol		100	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
Freon		20	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
Gear oil		100	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Glycerin	each	50	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Hydraulic oil		20	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
Isopropyl alcohol	100	20	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
Kerosene		20	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
Machin oil		20	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
Methanol		20	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
Methyl alcohol	100		○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
Methylen chloride		20	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
Lactic acid	10		○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
Mineral oil			○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
Motor oil		120	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
Olive oil		50	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Oxal acid	colds.	20	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Paraffin oil			○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
Vegetable oils			●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Vegetable fats			●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Cutting oil			○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
Tar acid		20	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Carbon tetrachloride	100	20	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Toluene			○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
Trichloroethylene	100	20	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
Tartaric acid, wat.			●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Citric acid			●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●

- resistant
- conditionally resistant
- not resistant
- \* for individual case, please verify
- <sup>1)</sup> PUR-material is resistant

each = each concentration  
 colds. = cold saturated  
 wat. = watery, liquid

The information mentioned in this summary is given to the best of our own knowledge and based upon our long standing experience. But we would like to direct your attention to the fact, that the information is given without obligation. A final judgement can only be made in practice.



# CHEMICAL RESISTANCE OF PUR (POLYURETHANE)

Substance	Concentration (%)	Classification of requirement	Substance	Concentration (%)	Classification of requirement
Aceton		○	Magnesium chloride	30	●
Alums		○	Methanol	< 5	●
Aluminium chloride	10	●	Mythyl acetate		○
Formic acid	30	○	Mythyl chloride		○
Ammonia	10	●	Methylethylketon		●
Ammonium carbonate		○	Mythylglycol		○
Ammonium chloride		●	Mythylglycolacetate		○
Aniline		○	Lactic acid	10	○
ASTM-Oil I		●	Mineral oil		●*
ASTM-Oil II		●	Motor oil		○
ASTM-Oil III		●	Sodium chloride	10	●
ASTM-Fuel No. I		●	Sodium perchlorate solut.		○
ASTM-Fuel No. II		●	Soda lye	10	●
ASTM-Fuel No. III		●	Olive oil		●
Benzene		○	Ozone		●
Brake fluid ATE		○	Paraffin oil		●
Butanol		○	Perchlore ethylene		○
Butyl acetate		○	Petroleum ether		●
Calcium chloride	40	●	Petroleum		●
Chlorobenzene		○	Vegetable oils		●
Chloroform		○	Vegetable fats		●
Chloroprene		○	Phosphoric acid	50	○
Chromic acid		○	Nitric acid	30	○
Cyclohexan		●	Hydrochlorid acid, concen.		○
Cyclohexanon		○	Cutting oil		●*
Diethylether		●	Carbon disulfide		○
Diethylprestone		●	Sulfuric acid		○
Diesel oil		●	Sea water		●
Dimethylformamide		○	Silver salts	20	●
Ferric-III-chloride	10	●	Tetrachloroethylene		○
Acetic acid 20-80	10	●	Carbon tetrachloride	100	○
Ethanol	100	●	Tetrahydrofuran		○
Ethyl ether		●	Toluene		○
Ethylacetate		○	Trichlorethylene		○
Ethylencoloride		●	Tataric acid	< 10	●
Freon 12		●	Xylon		○
Freon 22		●			
Hydraulic oil SAE 90		●*			
Glycerin		●			
Glycol		●			
Isopropanol		○			
Potash lye	10	●			
Bichromate of potash		●			
Potassium nitrate		●			
Potassium permanganate		○			
Kerosene		●			

resistant ●  
 vastly resistant ●  
 conditionally resistant ●  
 not resistant ○

\*for individual case, please verify

The information mentioned in this summary is given to the best of our own knowledge and based upon our long standing experience. But we would like to direct your attention to the fact, that the information is given without obligation. A final judge-ment can only be made in practice.

# ■ CHEMICAL RESISTANCE OF FLUORINATED POLYMERIC MATERIALS

● The **Fluorinated polymeric** is resistant against following chemical materials

Abietin acid	Esachloroethane	Pentachloro benzamide
Acetone	Ethyl Exoate	Perchloro ethylene
Acetone phenon	Ethyl ether	Permanganate
Acetic anhydride	Ethyl alcohol	Petrol Phenol
Acetic acid	Ethyl acetate	Phosphorus pentachloride
Acryl hydride	Ethylene bromide	Phosphoric acid
Allylic acetate	Ethylene glycol	Phthalic acid
Allylic metacrylacid		Pinene
Aluminium chloride	Ferric chloride	Piperidine
Ammonia, liquid	Fluoride naphthalene	Potassium
Ammonium chloride	Fluoride nitrobenzene	Potassium acetate
Aniline	Fomaldehyde	Potassium hydroxide
	Formic acid	Polyacryonitril
	Furan	Pyridine
Benzene chloride	Hexane hydrazine	Stannous chloride
Benzonitrile	Hydrochlorid acid	Sodium hydroxide
Benzyl alcohol	Hydrogen superoxide	Sodium hydrochloride
Borax		Sodium peroxide
Bromine	Iron phosphide	Solvents
Butyl acetate		Soaps
Butyl	Lead	Sulfur
		Sulfuric acid
Calcium chloride	Magnesium chloride	Tetra bromothane
Carbon bisulfide	Mercury	Tetrachlorethane
Cetane	Metacryl acid	Triethanolamine
Chlorine	Methanol	Trichloroacetic acid
Chlorobenze	Methyl ethyl keton	Trichloroethylene
Chloroform	Methyl metacryl acid	Tricresylic phosphate
Chloroprene	Methylenchloride	Toluene
Chlorosulfonic acid		
Chromic acid	Naphtalene	
Cyclohexan	Naphthole	Vinylmetacrylate
Cyclohexanon	N-Butylamine	
	Nitric acid	Washing mediums
	Nitromethane	Water
Diethyl Carbonate	Nitrogen tetroxyde	
Dibutyl-Phthalide	not synthetic nitrobenze	Xylol
Dibutyl-Sebacat	N-octadecyal alcohol	
Di-isobutyl Adipt	2-Nitro butanol	Zinc chloride
Dimethyl ether	2-Nitro-Methyl propanol	
Dimethyl Formamide		
Dimethyl hydrazine		
Dioxane		
	Oils, from vegetables	
	Oils, from animals	
	Ozone	

● The following chemical substance attack no **Fluorinated polymeric**

Ethyl alcohol	Soda
Vapour	Crude petroleum
Hydrofluoric acid	Nitric acid concentr.
Aviation gasoline	Sea water
Hydraulic liquid-Skydrol	Sulfuric acid (30%)
Isopropyl alcohol	Transformer Oil
Carbon chlorid	Turbine fuel JP 4

The information mentioned in this summary is given to the best of our own knowledge and based upon our longstanding experience. But we would like to direct your attention to the fact, that the information is given without obligation. A final judgement can only be made in practice.

# ■ FLUORINATED POLYMERIC MATERIALS: PTFE, FEP, PFA, ETFE

The chemical resistance of polymers with a high fluorine content is exceptionally high. The electrical insulating and dielectric properties of these materials are also very good.

Fluoropolymere Werkstoffe sind: HELUFLON®-PTFE, HELUFLON®-FEP, HELUFLON®-PFA, HELUFLON®-ETFE

- HELUFLON®-PTFE – Polytetrafluoroethylene (5Y)
- HELUFLON®-FEP – Tetrafluoroethylene –perfluoropropylene –copolymer (6Y)
- HELUFLON®-PFA – Tetrafluoroethylene –perfluoroalkoxy –copolymer (51Y)
- HELUFLON®-ETFE – Ethylene–tetrafluoroethylene –copolymer (7Y)

Fluoropolymere is resistant against nearly all known chemical compounds.

Fluoropolymere has a smooth surface of extremely low surface tension which is why virtually nothing adheres to this material.

Fluoropolymere is moisture rejecting, doesn't swell and is not be damaged by welding.

Fluoropolymere is used, where conventional material wouldn't resist the environmental conditions. Fluoropolymere is applied in the civil and military sector as well as in the aviation- and astronautics technology.

Fluorcarbonresins have following important characteristics::

- high heat-resistance during permanent operation
  - HELUFLON®-FEP up to 205 °C
  - HELUFLON®-PTFE up to 260 °C
- outstanding resistant against dielectric strength
- constant dielectric characteristics
- no moisture absorption
- resistant against nearly all chemical products
- insensitive to environmental influences, weatherproof and resistant to irradiation from the sun and temperature fluctuations
- good mechanical characteristics, no formation of cracks, wear-resistant
- low coefficient of friction
- no action of light (also uv)

## Characteristics

Insulation material	Material initial code	Nominal temperature permanent (°C) approx. 25000 h	Nominal temperature temporary (°C) (hours)	Break-down temperature, melting point (°C)	Dielectric number at 60 Hz (20°C)	Density 10 <sup>3</sup> kg/ m <sup>3</sup> (20°C)	Specific resistance Ohm · cm (20°C)	Break-down resistance kV/ mm (20°C)	Tension MPa (20°C)	Breaking point % (20°C)	Porosity % (20°C)	Environmental resistance	Flammability	Resistance to chemicals	Radiation resistance <sup>1)</sup> x10 <sup>4</sup> GY
<b>ETFE</b>	7Y	-100 +150	+180	+270	2,6	1,70	10 <sup>16</sup>	36	45	150 – 300	0,02	very good	n.e.f.	very good	200
<b>FEP</b>	6Y	-100 +205	+230	+290	2,1	2,15	10 <sup>18</sup>	25	20 – 25	250 – 300	0,01	very good	n.e.f.	very good	0,02
<b>PTFE</b>	5Y	-190 +260	+300	+327	2,0	2,18	10 <sup>18</sup>	20	35 – 45	350 – 400	0,01	very good	n.e.f.	very good	0,02
<b>PFA</b>	51Y	-190 +260	+280	+310	2,1	2,20	10 <sup>16</sup>	25	30	300	0,01	very good	n.e.f.	very good	0,02

<sup>1)</sup> Values shown include high dosage and ca. 50% rest smoldering values

n.e.f. = no flammable

## Insulation and jacket type abbreviations

DIN/VDE	Material
7Y	ETFE
6Y	FEP
5Y	PTFE
51Y	PFA

# CHEMICAL RESISTANCE OF SILICONE

Substance	Test period 7 days Temperature °C	Classification of requirement
Acetamide	150	●
Acetone	20	⦿
Aniline	100	●
Petrol	20	⦿
Brake fluid AT	100	●
Butanol	117	⦿
Butylacetate	20	⦿
Calcium hydroxide, (saturated)	20	●
Chlorbenzene	20	⦿
Cloroform	20	○
Clophene	150	●
Vapour up to 2,5 atü	138	●
Diphenyl	150	⦿
Diesel oil	20	⦿
Dinamo oil	150	⦿
Mineral oil	20	⦿
Acetic acid	20	●
Hydrofluor acid 5%	20	○
Gear oil DTE BB	150	●
Gear oil DTE HH	150	●
Gear oil DTE extra heavy	150	●
Gear oil Type SEA 90	150	●
Prestone	20	●
Glycerin	100	●
Hexa ethoxydisiloxane	20	⦿
High pressure compressor oil	150	●
Isopropyl alcohol	82	⦿
Potassium 20%	20	●
Potassium hydroxide 50%	20	●
Potassium permanganate solution	20	●
Carbolineum	20	●
Cooking salt solution 10%	20	●
Carbon tetrachloride	20	⦿
Compressor oil, light	150	●
Ball bearing fat	150	●
Linseed oil	100	●

- Iresistant
- ⦿ conditionally resistant
- not resistant

Substance	Test period 7 days Temperature °C	Classification of requirement
Methanol	65	⦿
Methylen chloride	20	○
Mineral oil ASTM No. 1	150	●
Mineral oil ASTM No. 3	150	⦿
Mineral oil SEA 10	150	●
Mineral oil SEA 20	150	●
Mineral oil SEA 30	150	●
Motor oil viscose static	150	●
Sodium 20%	20	●
Soda 50%	20	●
Nitrobenzene	20	●
Oleic acid	150	○
Olive oil	150	●
Perchlor	20	○
Petroleum ether	20	○
Petroleum	20	⦿
Phenol	60	●
Phosphoric acid 30%	20	●
Pyridine	20	⦿
Regulator oil	150	○
Castor oil	150	●
Hydrochlorid acid 10%	20	●
Nitric acid conc.	20	○
Nitric acid 10%	20	⦿
Sulfuric acid, conc.	20	○
Sulfuric acid, 10%	20	●
Shock absorber oil	20	●
Styrol	20	⦿
Turbentine oil	20	⦿
Toluene	20	○
Transformer oil	150	⦿
Tri	20	○
Tri glycol	20	●
Vaseline	150	●
Water	100	●

The information mentioned in this summary is given to the best of our own knowledge and based upon our long standing experience. But we would like to direct your attention to the fact, that the information is given without obligation. A final judgement can only be made in practice.

# RESISTANCE OF SUBSTANCES AGAINST SOLVENTS, OILS AND FATS

Substance	PVC Y	PA 4 Y	PTFE 5 Y	FEP 6 Y	ETFE 7 Y
Alcohol, methylated spirit	○	⦿	●	●	●
Brake fluid for vehicles	○	⦿	●	●	●
Bromide chloridfluormethane	○	○	●	●	●
Jet gasoline IP4	○	⦿	●	●	●
de-icing and icing protective agent	○	⦿	●	●	●
Aircraft lubricating grease	⦿	⦿	●	●	⦿
Hydraulic oil on bas of mineral oil	⦿	●	●	●	⦿
Hydraulic liquid (chlor-free silicone liquid)	○	○	●	●	●
Hydraulic liquid (synthetic)	○	⦿	●	●	●
Methylethylketon	○	○	●	●	●
Otto-gasoline, diesel gasoline	○	⦿	●	●	●
Lubricating oil for recebrocating engine SAE 10 W	⦿	⦿	●	●	⦿
Lubricating oil for jet engine (synthetic)	⦿	⦿	●	●	⦿
Toluene-Isooctane (Toluene 30%, Isooctane 70%)	○	⦿	●	●	●
Trichlorethane	○	○	●	●	●
Urine	●	●	●	●	●

- Iresistant
- ⦿ conditionally resistant
- not resistant

- PVC = Polyvinylchloride Y
- PA = Polyamid 4 Y
- PTFE = Polytetrafluorethylene 5 Y

- FEP = Fluorethylenepropylene 6 Y
- ETFE = Tetrafluorethylene 7 Y



# ■ HALOGEN-FREE SECURITY CABLES AND WIRES

## What are halogens?

Halogens "formation of salt" are the elements as fluorine, chlorine, bromine and iodine.

Fluorine and chlorine are important for cables and wires as atoms in the plastic molecules, for example fluorine plastics or PVC (polyvinyl chloride) are of significance; and bromine as component of flame protection additives.

## When is a cable halogen-free ?

The burning behaviour of cables and wires is very important for the installation in buildings and also in control plants.

## Thereby the following points are very important:

- Behaviour under flame influence i. e. the inflammability as well as the propagation of fire
- Subsequent damage by formation of corrosive and toxic gases
- Development of smoke density (darkening of emergency exits hindered the fire extinguishing works)

Cables produced of not halogen-free (halogenated) materials such as mainly the materials with chlorine in the molecule-chain: Polyvinyl chloride (PVC), chloroprene rubber (CR), chlorinated polyethylene (CM), chlorosulfonated polyethylene (CSM) and fluorhydrocarbons.

Polytetrafluorethylene (PTFE)  
Fluorethylenpropylene (FEP)  
Perfluoralkoxypolymeric (PFA)

These materials have a better behaviour in case of fire.

These are hardly combustible or not flammable and vastly self-extinguishing. Due to this effect and in case of fire the released molecules constituents chlorine and fluorine, which hinder the admittance of oxygen to the fire location and suffocate the flame.

The remarkable disadvantages of these materials are existing in the fact that the released chlorine and fluorine atoms composite themselves with hydrogen which is decomposed from plastic material as well as with hydraulic acid or hydrofluoric acid from the existing air.

These compositions are extremely corrosive and also toxic. In consequence the damages by corrosion are often higher than the actual damage caused by fire.

Halogen-free cables contain no halogens, i. e. the insulation and sheath materials of these cables are composed with polymers on the basis of pure hydrocarbons. By burning such kind of materials, produce no corrosive and toxic gases but only water vapour and carbondioxide.

Polymers like polyethelene (PE) or polypropylene (PP) are halogen-free. These materials are easy flammable and not self-extinguishing.

Halogen-free cables for the security requirements must be hardly flammable and self-extinguishing. This happens by using the special polymer compounds, containing the considerable percentage of flame protective materials.

Such kind of protective materials consist for example, of an aluminium hydroxide which on one side cools the fire location by setting free of crystal water and on the other side the released water vapour hinders the admittance of oxygen and thereby this suffocates the flame. By using of additional supporting tapes and filling yarns of glass web, mica and similar materials the functionality for example of E 90 can be realised with the suitable cable accessories.

## Application

The application of halogen-free security cables and wires are specified more and more with increasing numbers for the buildings where people gather or everywhere, where safety conciousness to protect the human life and valuable materials take a special significance. For example,

- Hospitals, airports, in multi-storey buildings, stores and shops, hotels, theaters, cinemas, schools etc.
- Fire warning plants, alarm systems, ventilation systems, escalators, lifts, safety lights, operation and intensive stations, maintenance equipment
- Underground railways and other railway plants
- Data processing installations
- Power stations and industrial plants with high valuable machines and materials or risky potentials
- Mining works
- Shipbuilding and offshore plants
- Emergency power supply works

## HELUKABEL-Security Cables and Wires and the advantages

- Flame retardant and hardly combustibility so that no flame propagation in case of fire can be resulted
- Halogen-free; no evolution of corrosive gases
- In case of burning, the halogen-free cables emits low smoke

# ■ HALOGEN-FREE SECURITY CABLES AND WIRES

- The danger of toxic gases caused by fire is far inferior
- Low caloric load
- Remarkable longer electrical functionality and flame influence
- Insulation integrity for at least 30 minutes as well as 180 minutes at 800°C under fire condition
- Suitable for emergency service up to 180 minutes
- Radiation resistance up to  $200 \times 10^6$  cJ/kg (up to 200 Mrad)

These characteristics are obtained by using of a flexible halogen-free basis material – aluminium hydroxide Al(OH)<sub>3</sub>.

## Caloric load values (heat of combustion)

For designing a building the criterions of the caloric load values are very important. The caloric load values of the modern halogen-free cables are reduced by corresponding additives.

The specific heating values of the non-metallic raw materials for cables are specified to DIN 51900. The values of the caloric load or heat of combustion for electrical cables are given per running meter in the following tables.

Combustible cable insulations or open building materials of class B1 are regarded as harmless so far as the resulted caloric load is distributed as proportionale as possible and is valid  $\leq 7$  kWh/m<sup>2</sup>

The conversion of the values:

$$\begin{aligned} 1 \text{ MJ/m}^2 & \triangleq 0,278 \text{ kWh/m}^2 \\ 1 \text{ kWh/m}^2 & \triangleq 3,6 \text{ MJ/m}^2 \end{aligned}$$

## Regulations

According to DIN VDE 0108 supplement 1:

- The total caloric load of the cables are allowed up to 14 kWh per m<sup>2</sup> of the field areas if only halogen-free cables with improved characteristics in the case of fire are used.

If you use PVC cables the total caloric load is only up to 7 kWh per m<sup>2</sup>

## Tests

The characteristics of the security cables are tested according to DIN VDE specifications:

## Behaviour in fire

According to IEC 60332-1, IEC 60332-2, IEC 60332-3.

## • Test method A – test on single cable △ IEC 60332-2

- Test sample of 600 mm cable length shall be in a position vertically hanging. A propane gas burner (Ø 8 mm) shall be at an angle of 45° to the axis and the flame of approx. 100 mm below the lower edge of the sample. Flame influence max. 20 s.
- The test is passed, if the sample has not burned or the flame extinguished by itselfs and the damage by fire doesnt reach the remotest upper side of the sample.

## • PVC self-extinguishing and flame retardant according to VDE 0482-332-1-2 DIN EN 60332-1-2 / IEC 60332-1 (equivalent to DIN VDE 0472 Teil 804 test method B).

- Test sample of 600 mm cable length shall be in a position vertically hanging. A propane gas burner (Ø 8 mm) shall be at an angle of 45° to the axis and the flame of approx. 100 mm below the lower edge of the sample. Flame influence, depending on cable weight, 1 to 2 minutes.
- The test is passed, if the sample has not burned or the flame extinguished by itselfs and the damage by fire doesnt reach the remotest upper side of the sample.

## • Test method C – test on bunched cables similar IEC 60332-3, HD 405.3, DIN EN 60332-3, VDE 0482-332-3

- Test samples of 360 cm cable length are laying parallel side-by-side attached to a test-ladder, which is hanging vertically with a distance of 150 mm to the furnace. The sample should be flamed with a flame length of 60 cm on the test sample at approx. temperature 800°C by a burner width of approx. 250 mm. The test duration should be 20 minutes.
- The test is passed, if the sample has not burned or the flame extinguished by itself and the damage by fire does not reach the remotest upper side of the sample.

## Corrosivity of cumbustion gases

According to VDE 0482 part 267/DIN EN 50267-2-2 / IEC 60754-2 (is equivalent to DIN VDE 0472 part 813). For the performance of the test procedure the insulation and sheath materials are to be put in the moveable furnace, preheated to 750 to 800°C. The burning gas is conducted through two gas-washing bottles.

- The test shall be regarded as passed when the measured pH-value is  $\geq 4,3$  and the electrical conductivity  $\leq 100 \mu\text{S}\cdot\text{cm}^{-1}$ .
- During this test all the not desired components of the materials are precipitated such as all halogens, sulphur and nitrogen.

# ■ HALOGEN-FREE SECURITY CABLES AND WIRES

## Continuance of insulation effect under direct fire conditions

According to DIN VDE 0472 part 1 814  $\Delta$  IEC 60331

Test sample of 1200 mm cable length is fixed in a horizontal position, 75 mm over the gas burner. The rated voltage of 3 A fuse is fixed between the core groups. The burner flame is so to regulate that the temperature on cable should be  $800 \pm 50^\circ\text{C}$ . The measuring can be effected until the fuse is blown. Test voltage 400 V for power cables and wires  
Test voltage 110 V for telecommunication cables

- The test shall be regarded as passed when no 3 A fuse has blown during the test period between 20 to 180 minutes.

## Non-Halogen verification

According to VDE 0482 part 267 / DIN EN 50267-2-1 / IEC 60754-1 (is equivalent to DIN VDE 0472 part 815).

The corrosion test of gases caused by fire is carried out to the test materials, not of complete cable samples. The proof of halogen is effected by chemical analysis.

Materials with a content of:

$\leq 0,2\%$  chlorine and

$\leq 0,1\%$  fluorine

are regarded as halogen-free.

## Smoke density

According to VDE 0482 part 1034-1+2 / IEC 61034-1+2 / DIN EN 61034-1+2 / BS 7622 Teil 1+2 (is equivalent to DIN VDE 0472 part 816).

The test of smoke density is effected to a single cable, laid in a horizontal position within a room of 3 meter cube. The photometrically measured absorption of light is a measuring unit (in %) of light transmittance for the smoke density.

The test is regarded as passed when the light absorption appears within 40 minutes and the following values shall be obtained for light transmission.

Cable $\varnothing$	Transmission of Light
> 3–5 mm	40%
> 5–10 mm	50%
> 10–20 mm	60%
> 20–40 mm	60%
> 40	70%

## Functionality of electric cable systems

According to DIN 4102 part 12 (system test)  
DIN 4102 part 12 describes the requirements and measurements necessary in achieving circuit integrity of a complete electric cable system in case of fire.

## Cable systems

Regarded as cable systems are power cables, insulated power cables and wires, telecommunication installation cables for telephone and data transmission and rail-distributors including their corresponding connecting devices such as the necessary ducts and conduits, coatings and coverings, connecting elements, supporting devices, cable trays and clamps.

## Functionality

According to DIN VDE 4102 part 12

The functionality is given, when during the test under fire no short circuit and no interruption of current flow occur in the tested electrical cable system.

According to this standard, the security cables are always to be tested together with the corresponding supporting devices, clamps, holder and mounting accessories.

Note: The above defined functionality has no relationship with the continuance of insulation effect under fire conditions according to DIN VDE 0472 part 814.

## Test

During this test under fire a complete cable installation will be tested in a large combustion chamber, i. e. cables and wires including clamps, supporting devices, holders, dowels etc.

Test voltage for power cables:	380 V
Test voltage for telecommunication cables:	110 V
Current load:	3 A

The combustion chamber is to be heated up according to ETK (Standard temperature curve).

The test period is distinguished in 3 classes:

- E30 for the functionality  $\geq 30$  minutes
- E60 for the functionality  $\geq 60$  minutes
- E90 for the functionality  $\geq 90$  minutes

Raise of temperature in combustion chamber:

- For E30 to approx.  $820^\circ\text{C}$
- For E60 to approx.  $870^\circ\text{C}$
- For E90 to approx.  $980^\circ\text{C}$

After passing the functionality test, this will be certified with the class identification as E30, E60 or E90.

Note: At the moment the class E60, which is specified in DIN-VDE standards, is not applied for economical and technical reasons.

## HEAT-RESISTANCE CLASSES

Class	Insulating material	Impregnation material	max. continuous temperature	Cable type
Y	Cotton, Synthetic and natural silk, Polyamide fibres, Paper, Polyvinylchloride (PVC), Polyethylene (PE), Vulkanised rubber	–	90°C	HELUKABEL® PVC + Neoprene cables
A	Cotton, Synthetic and natural silk, Polyamide, Paper, heat-resistant impregnated textiles, Polyester resin	Bitumous varnish Synthetic resin varnish Insulating oil and synthetic dielectrical fluids	105°C	HELUTHERM® single cores, control cables UL + CSA-approved
(E)	Special wire enamel, Special synthetic foils, Compressed material with cellulose fillers, Paper and cotton tapes	Synthetic resin varnish and Polyester resin, both with a permissible continuous withstand temperature of > 120°C	105°C (short time operation 120°C)	HELUTHERM® 120
B	Glass fibre, Micaproducts, Special synthetic foils, Compressed materials with mineral fillers	As under E but with a permissible continuous withstand temperature of > 130°C	145°C	HELUTHERM® 145
F	Glass fibre, Micaproducts, Aromatic polyamides, Impregnated glass fibre braides	Resins with a permissible continuous withstand temperature of > 155°C	155°C	HELUTHERM® 145
H	Glass fibre, Micaproducts, Aromatic polyamides, Silicone rubber, Polyamide foils, PTFE	Silicone resins with a permissible continuous withstand temperature of > 180°C	180°C	Silicone + HELUFLON® tinned conductors
C	Mica, Porcelain, Glass, Quartz, and similar fire resistant materials	As under H but with a permissible continuous withstand temperature of > 225°C	> 180°C	HELUFLON® PTFE+FEP with tinned or nickel plated conductors, HELUTHERM® 400/600/800/1200

## CALORIC LOAD VALUES (HEAT OF COMBUSTION)

For designing a building the criterions of the caloric load values are very important. The caloric load values of the modern halogen-free cables are reduced by corresponding additives.

The specific heating values of the non-metallic raw materials for cables are specified to DIN 51900. The values of the caloric load or heat of combustion for electrical cables are given per running meter in the following tables.

The tables are subdivided according to the different cable designs, with halogen-free or halogenated insulation, number of cores with different cross-sections.

With these tables of the caloric load values of our cables we will give you the possibility to accomodate your calculations for the application of these cables.

### Regulations:

The total caloric load of the cables are allowed up to 14 kWh per m<sup>2</sup> of the field areas if only halogen-free cables with improved characteristics in the case of fire are used. If you use PVC cables the total caloric load is only up to 7 kWh per m<sup>2</sup>.

– The caloric load values – Hu (calculated value):

PVC-core insulation	Hu	6,3 kWh/kg
PVC-sheath material	Hu	5,7 kWh/kg
PVC (lower limint)	Hu	5,6 kWh/kg
H-core insulation	Hu	4,8 kWh/kg
H-sheath material	Hu	4,2 kWh/kg
PE in general	Hu	12,2 kWh/kg
PP in general	Hu	12,8 kWh/kg

The conversion of the values:

$$1 \text{ MJ/m}^2 \triangleq 0,278 \text{ kWh/m}^2, 1 \text{ kWh/m}^2 \triangleq 3,6 \text{ MJ/m}^2$$



# CALORIC LOAD VALUES OF HALOGEN-FREE SECURITY CABLES AND INSULATED WIRES

Type	dimension n x mm <sup>2</sup>	caloric load kWh/m	Type	dimension n x mm <sup>2</sup>	caloric load kWh/m	Type	dimension n x mm <sup>2</sup>	Brandlast- kWh/m	
<b>NHXAF</b>	1 x 0,75	0,031	<b>N2XH</b>	3 x 1,5 re	0,48	<b>N2XCH</b>	4 x 25/rm 16	1,94	
	1 x 1,0	0,033		3 x 2,5 re	0,56		4 x 35/rm 16	2,27	
	1 x 1,5	0,049		3 x 4 re	0,65		4 x 50/rm 25	2,77	
	1 x 2,5	0,059		3 x 6 re	0,73		7 x 1,5/re 1,5	0,50	
	1 x 4	0,074		3 x 10 re	0,86		7 x 2,5/re 2,5	0,57	
	1 x 6	0,090		3 x 16 rm	1,19		10 x 1,5/re 2,5	0,66	
	1 x 10	0,112		3 x 25 rm	1,65		10 x 2,5/re 4	0,77	
	1 x 16	0,137		3 x 35 rm	1,95		12 x 1,5/re 2,5	0,74	
	1 x 25	0,204		3 x 50 rm	2,31		12 x 2,5/re 4	0,86	
	1 x 35	0,235					14 x 1,5/re 2,5	0,81	
	1 x 50	0,323		4 x 1,5 re	0,54		14 x 2,5/re 4	0,95	
	1 x 70	0,381		4 x 2,5 re	0,63		19 x 1,5/re 4	1,02	
	1 x 95	0,504		4 x 4 re	0,73		19 x 2,5/re 6	1,19	
	<b>NHXMH</b>	2 x 1,5 re		0,30	4 x 6 re		0,82	24 x 1,5/re 6	1,25
		2 x 2,5 re		0,35	4 x 10 re		0,99	24 x 2,5/re 10	1,47
					4 x 16 rm		1,43	30 x 1,5/re 6	1,47
		3 x 1,5 re		0,33	4 x 25 rm		1,97	30 x 2,5/re 10	1,77
3 x 2,5 re		0,38	4 x 35 rm	2,31	40 x 1,5/re 10	1,90			
3 x 4 re		0,49	4 x 50 rm	2,89	40 x 2,5/re 10	2,23			
3 x 6 re		0,60	4 x 70 rm	3,00	1 x 2,5 re	0,22			
3 x 10 re		0,78	4 x 95 rm	3,90	1 x 4 re	0,35			
			4 x 120 rm	4,77	1 x 6 re	0,38			
4 x 1,5 re		0,37	4 x 150 rm	6,81	1 x 10 re	0,43			
4 x 2,5 re		0,42			1 x 16 rm	0,50			
4 x 4 re		0,49	5 x 1,5 re	0,62	1 x 25 rm	0,68			
4 x 6 re		0,68	5 x 2,5 re	0,70	1 x 35 rm	0,76			
4 x 10 re		0,90	5 x 4 re	0,82	1 x 50 rm	0,90			
			5 x 6 re	0,91	1 x 70 rm	1,09			
5 x 1,5 re		0,42	5 x 10 re	1,11	1 x 95 rm	1,29			
5 x 2,5 re		0,49	5 x 16 rm	1,68	1 x 120 rm	1,49			
5 x 4 re	0,70	5 x 25 rm	2,35	1 x 150 rm	1,84				
5 x 6 re	0,79	5 x 35 rm	2,81	1 x 185 rm	2,24				
5 x 10 re	1,04	5 x 50 rm	3,42	1 x 240 rm	2,67				
				1 x 300 rm	3,67				
				2 x 1,5 re	0,68				
				2 x 2,5 re	0,74				
				2 x 4 re	0,84				
				2 x 6 re	0,95				
				2 x 10 re	1,13				
				2 x 16 rm	1,34				
				2 x 25 rm	1,94				
				2 x 35 rm	2,16				
				3 x 1,5 re	0,72				
				3 x 2,5 re	0,79				
				3 x 4 re	0,90				
				3 x 6 re	1,03				
				3 x 10 re	1,23				
				3 x 16 rm	1,47				
				3 x 25 rm	1,92				
				3 x 35 rm	2,47				
				3 x 50 rm	3,03				
				3 x 70 rm	3,90				
				3 x 95 rm	4,76				
				3 x 120 rm	4,63				
				3 x 150 rm	5,67				
				3 x 185 rm	6,94				
				3 x 240 rm	8,84				
				4 x 1,5 re	0,85				
				4 x 2,5 re	0,94				
				4 x 4 re	1,07				
				4 x 6 re	1,22				
				4 x 10 re	1,46				
				4 x 16 rm	1,74				
				4 x 25 rm	2,57				
				4 x 35 rm	2,96				
				4 x 50 rm	3,72				
				4 x 70 rm	4,85				
				4 x 95 rm	5,83				
<b>N2XH</b>	1 x 2,5 re	0,14	<b>N2XCH</b>	2 x 1,5/re 1,5	0,44				
	1 x 4 re	0,17		2 x 2,5/re 2,5	0,49				
	1 x 6 re	0,18		2 x 4/re 4	0,59				
	1 x 10 re	0,21		2 x 6/re 6	0,66				
	1 x 16 rm	0,29		2 x 10/re 10	0,80				
	1 x 25 rm	0,39				3 x 1,5/re 1,5	0,48		
	2 x 35 rm	0,46				3 x 2,5/re 2,5	0,55		
	1 x 50 rm	0,53				3 x 4/re 4	0,64		
	1 x 70 rm	0,55				3 x 6/re 6	0,72		
	1 x 95 rm	0,63				3 x 10/re 10	0,85		
	1 x 120 rm	0,72				3 x 16/rm 16	1,18		
	1 x 150 rm	0,90				3 x 25/rm 16	1,59		
	1 x 185 rm	1,08				3 x 35/rm 16	1,91		
	1 x 240 rm	1,22				3 x 50/rm 25	2,27		
	1 x 300 rm	1,32				4 x 1,5/re 1,5	0,54		
						4 x 2,5/re 2,5	0,62		
						4 x 4/re 4	0,72		
				4 x 6/re 6	0,82				
				4 x 10/re 10	1,00				
				4 x 16/rm 16	1,37				



# CALORIC LOAD VALUES OF HALOGEN-FREE SECURITY CABLES AND INSULATED WIRES

Type	dimension n x mm <sup>2</sup>	caloric load kWh/m
<b>(N)HXH-E 30 orange</b>	4 x 120 rm	7,26
	4 x 150 rm	8,92
	4 x 185 rm	10,38
	4 x 240 rm	11,76
	5 x 1,5 re	0,99
	5 x 2,5 re	1,09
	5 x 4 re	1,25
	5 x 6 re	1,43
	5 x 10 re	1,72
	5 x 16 rm	2,05
	5 x 25 rm	3,05
	7 x 1,5 re	1,16
	7 x 2,5 re	1,29
	10 x 1,5 re	1,47
	10 x 2,5 re	1,63
	12 x 1,5 re	1,84
	12 x 2,5 re	2,05
	14 x 1,5 re	2,09
	14 x 2,5 re	2,42
	19 x 1,5 re	2,52
19 x 2,5 re	2,79	
24 x 1,5 re	3,30	
24 x 2,5 re	3,66	
30 x 1,5 re	3,77	
30 x 2,5 re	4,19	
<b>(N)HXCH-E 30 orange</b>	2 x 1,5/ 1,5 re	0,58
	2 x 2,5/ 2,5 re	0,64
	2 x 4 / 4 re	0,75
	2 x 6 / 6 re	0,85
	2 x 10 /10 re	1,00
	3 x 1,5/ 1,5 re	0,63
	3 x 2,5/ 2,5 re	0,71
	3 x 4 / 4 re	0,84
	3 x 6 / 6 re	0,95
	3 x 10 / 10 re	1,12
	3 x 16 / 16 re	1,35
	3 x 25 / 16 rm	2,09
	3 x 35 / 16 rm	2,74
	3 x 50 / 25 rm	3,04
	3 x 70 / 35 rm	3,90
	3 x 95 / 50 rm	4,62
	3 x 120 / 70 rm	5,66
	3 x 150 / 70 rm	7,19
	3 x 185 / 95 rm	8,71
	3 x 240 /120 rm	10,57
4 x 1,5/ 1,5 re	0,78	
4 x 2,5/ 2,5 re	0,82	
4 x 4 / 4 re	0,96	
4 x 6 / 6 re	1,09	
4 x 10 / 10 re	1,30	
4 x 16 / 16 rm	1,56	
4 x 25 / 16 rm	2,40	
4 x 35 / 16 rm	2,74	
4 x 50 / 25 rm	3,50	
4 x 70 / 35 rm	4,49	
4 x 95 / 50 rm	5,35	
4 x 120 / 70 rm	6,51	
4 x 150 / 70 rm	8,35	
4 x 185 / 95 rm	10,13	
4 x 240 /120 rm	12,32	

Type	dimension n x mm <sup>2</sup>	caloric load kWh/m
<b>(N)HXCH-E 30 orange</b>	7 x 1,5/ 2,5 re	1,04
	7 x 2,5/ 2,5 re	1,33
	7 x 4 / 4 re	1,49
	10 x 1,5/ 2,5 re	1,55
	10 x 2,5/ 4 re	1,71
	10 x 4 / 6 re	1,92
	12 x 1,5/ 2,5 re	1,72
	12 x 2,5/ 4 re	1,90
	12 x 4 / 6 re	2,14
	16 x 1,5/ 4 re	2,22
	16 x 2,5/ 6 re	2,41
	21 x 1,5/ 6 re	2,58
	21 x 2,5/ 6 re	2,74
	24 x 1,5/ 6 re	2,80
	24 x 2,5/10 re	3,19
	30 x 1,5/ 6 re	3,26
	30 x 2,5/10 re	3,69
	40 x 1,5/10 re	4,17
	40 x 2,5/10 re	4,68
	<b>(N)HXH-E 90 orange</b>	3 x 1,5 re
3 x 2,5 re		0,61
3 x 4 re		0,67
3 x 6 re		0,85
3 x 10 re		0,99
3 x 16 rm		1,23
3 x 25 rm		1,60
3 x 35 rm		1,83
3 x 50 rm		2,30
3 x 70 rm		3,03
3 x 95 rm		3,98
3 x 120 rm		4,70
3 x 150 rm		5,63
3 x 185 rm		6,95
3 x 240 rm		8,44
4 x 1,5 re		0,67
4 x 2,5 re		0,73
4 x 4 re		0,82
4 x 6 re		0,91
4 x 10 re		1,06
4 x 16 rm	1,49	
4 x 25 rm	1,95	
4 x 35 rm	2,30	
4 x 50 rm	2,88	
4 x 70 rm	3,80	
4 x 95 rm	4,96	
4 x 120 rm	5,74	
4 x 150 rm	6,97	
4 x 185 rm	8,58	
5 x 1,5 re	0,79	
5 x 2,5 re	0,88	
5 x 4 re	0,99	
5 x 6 re	1,10	
5 x 10 re	1,29	
5 x 16 rm	1,59	
5 x 25 rm	2,42	
5 x 35 rm	2,84	
7 x 1,5 re	0,92	
10 x 1,5 re	1,25	
12 x 1,5 re	1,40	
19 x 1,5 re	1,96	
24 x 1,5 re	2,47	
27 x 1,5 re	2,69	

Type	dimension n x mm <sup>2</sup>	caloric load kWh/m
<b>(N)HXCH-E 90 orange</b>	3 x 1,5/re 1,5	0,86
	3 x 2,5/re	0,95
	3 x 4 /re 4	1,06
	3 x 6 /re	1,17
	3 x 10 /re 10	1,36
	3 x 16 /rm 16	1,68
	3 x 25 /rm 16	2,18
	3 x 35 /rm 16	2,53
	3 x 50 /rm 25	3,19
	3 x 70 /rm 35	4,04
	3 x 95 /rm 50	4,73
	3 x 120 /rm 70	5,69
	3 x 150 /rm 70	6,80
	3 x 185 /rm 95	8,44
	3 x 240 /rm 120	10,04
	4 x 1,5/ 1,5 re	0,99
	4 x 2,5/ 2,5 re	1,08
	4 x 4 / 4 re	1,22
	4 x 6 / 6 re	1,36
	4 x 10 / 10 re	1,58
4 x 16 / 16 rm	1,96	
4 x 25 / 16 rm	2,60	
4 x 35 / 16 rm	3,11	
4 x 50 / 25 rm	3,81	
4 x 70 / 35 rm	4,92	
4 x 95 / 50 rm	6,02	
4 x 120 / 70 rm	6,90	
4 x 150 / 70 rm	8,39	
4 x 185 / 95 rm	10,20	
4 x 240 /120 rm	13,00	
7 x 1,5/1,5	1,29	
10 x 1,5/2,5	1,71	
12 x 1,5/2,5	1,86	
16 x 1,5/4	2,26	
21 x 1,5/6	2,74	
24 x 1,5/6	3,42	
<b>NYSEY 6/10 kV</b>	3 x 35/16	10,56
	3 x 50/16	11,67
	3 x 70/16	12,78
	3 x 95/16	14,72
	3 x 120/16	16,12
<b>NA2XSEY 6/10 kV</b>	3 x 35/16	10,28
	3 x 50/16	11,67
	3 x 70/16	13,06
	3 x 95/16	14,72
	3 x 120/16	16,68

# CALORIC LOAD VALUES OF HALOGEN-FREE SECURITY CABLES AND INSULATED WIRES

Type	dimension n x mm <sup>2</sup>	caloric load kWh/m
<b>NHXHX black</b>	1 x 2,5	0,22
	1 x 4	0,28
	1 x 6	0,28
	1 x 10	0,28
	1 x 16	0,39
	1 x 25	0,53
	1 x 35	0,58
	1 x 50	0,69
	1 x 70	0,81
	1 x 95	1,03
	1 x 120	1,14
	1 x 150	1,39
	2 x 1,5	0,69
	2 x 2,5	0,78
	2 x 4	0,89
	2 x 6	1,00
	2 x 10	1,19
	3 x 1,5	0,78
	3 x 2,5	0,86
	3 x 4	1,00
	3 x 6	1,08
	3 x 10	1,28
	3 x 16	1,53
	3 x 25	2,25
	3 x 35	2,56
	3 x 50	3,19
	3 x 70	3,94
3 x 95	5,14	
3 x 120	5,89	
3 x 150	7,25	
4 x 1,5	0,89	
4 x 2,5	1,00	
4 x 4	1,14	
4 x 6	1,28	
4 x 10	1,50	
4 x 16	1,86	
4 x 25	2,64	
4 x 35	3,00	
4 x 50	3,92	
4 x 70	4,81	
4 x 95	6,25	
4 x 120	7,14	
4 x 150	7,14	
5 x 1,5	1,03	
5 x 2,5	1,14	
5 x 4	1,31	
5 x 6	1,47	
5 x 10	1,83	
5 x 16	2,17	
5 x 25	3,14	
7 x 1,5	1,17	
7 x 2,5	1,31	
7 x 4	1,50	
12 x 1,5	1,69	
12 x 2,5	2,00	
12 x 4	2,31	
19 x 1,5	2,36	
19 x 2,5	2,69	
19 x 4	3,14	
24 x 1,5	2,86	
24 x 2,5	3,28	
24 x 4	3,97	

Type	dimension n x mm <sup>2</sup>	caloric load kWh/m
<b>NHXHX black</b>	37 x 1,5	3,92
	37 x 2,5	4,69
	37 x 4	5,53
<b>NHXCHX black</b>	3 x 1,5/ 1,5	0,78
	3 x 4 / 4	1,00
	3 x 6 / 6	1,11
	3 x 10 / 10	1,33
	3 x 16 / 10	1,58
	3 x 16 / 16	1,58
	3 x 25 / 16	2,31
	3 x 25 / 25	2,31
	3 x 35 / 16	2,61
	3 x 35 / 35	2,61
	3 x 50 / 25	3,33
	3 x 50 / 50	3,33
	3 x 70 / 35	4,11
	3 x 70 / 70	4,11
	3 x 95 / 50	5,33
	3 x 95 / 95	5,33
	3 x 120 / 70	6,11
	3 x 120 / 120	6,11
	3 x 150 / 70	7,50
	3 x 150 / 150	7,50
4 x 1,5/ 1,5	0,89	
4 x 2,5/ 2,5	1,03	
4 x 4 / 4	1,17	
4 x 6 / 6	1,31	
4 x 10 / 10	1,53	
4 x 16 / 16	1,89	
4 x 25 / 16	2,69	
4 x 35 / 16	3,06	
4 x 50 / 25	4,00	
4 x 70 / 35	4,89	
4 x 95 / 50	6,44	
4 x 120 / 70	7,36	
4 x 150 / 70	8,97	
<b>NHMH</b>	1 x 1,5	0,16
	1 x 2,5	0,19
	1 x 4	0,23
	1 x 6	0,26
	1 x 10	0,33
	1 x 16	0,41
	2 x 1,5	0,30
	2 x 2,5	0,34
	2 x 4	0,43
	2 x 6	0,51
	2 x 10	0,74
	3 x 1,5	0,33
	3 x 2,5	0,40
	3 x 4	0,52
	3 x 6	0,64
	3 x 10	0,87
	4 x 1,5	0,41
4 x 2,5	0,48	
4 x 4	0,67	
4 x 6	0,77	
4 x 10	1,02	
4 x 16	1,37	
4 x 25	1,98	
4 x 35	2,35	

Type	dimension n x mm <sup>2</sup>	caloric load kWh/m
<b>NHMH</b>	5 x 1,5	0,45
	5 x 2,5	0,52
	5 x 4	0,77
	5 x 6	0,89
	5 x 10	1,15
	5 x 16	1,67
	5 x 25	2,40
	7 x 1,5	0,55
7 x 2,5	0,68	

# CALORIC LOAD VALUES OF HALOGENATED CABLES AND INSULATED WIRES

Type	dimension n x mm <sup>2</sup>	caloric load kWh/m
<b>NYY</b>	1 x 2,5	0,22
	1 x 4	0,33
	1 x 6	0,33
	1 x 10	0,33
	1 x 16	0,42
	1 x 25	0,58
	1 x 35	0,67
	1 x 50	0,81
	1 x 70	0,92
	1 x 95	1,17
	1 x 120	1,31
	1 x 150	1,58
	2 x 1,5	0,69
	2 x 2,5	0,78
	2 x 4	1,00
	2 x 6	1,11
	2 x 10	1,31
	3 x 1,5	0,75
	3 x 2,5	0,83
	3 x 4	1,08
	3 x 6	1,22
	3 x 10	1,42
	3 x 16	1,69
	3 x 25	2,14
	3 x 35	2,47
	3 x 50	2,60
	3 x 70	3,08
	3 x 95	4,06
	3 x 120	4,47
	3 x 150	5,42
	4 x 1,5	0,83
	4 x 2,5	0,94
	4 x 4	1,25
	4 x 6	1,42
	4 x 10	1,67
	4 x 16	2,03
	4 x 25	2,89
	4 x 35	2,61
	4 x 50	3,31
	4 x 70	4,08
	4 x 95	5,11
	4 x 120	5,69
	4 x 150	6,97
	5 x 1,5	0,94
	5 x 2,5	1,08
	5 x 4	1,44
	5 x 6	1,64
	5 x 10	2,00
	5 x 16	2,39
	5 x 25	3,42
	7x 1,5	1,08
	7x 2,5	1,22
	7x 4	1,67
	12 x 1,5	1,56
	12 x 2,5	1,78
	12 x 4	2,53
	19 x 1,5	2,06
	19 x 2,5	2,44
	19 x 4	3,42
	24 x 1,5	2,56
	24 x 2,5	2,94
	24 x 4	4,33
	37 x 1,5	3,39
	37 x 2,5	4,00
	37 x 4	6,03

Type	dimension n x mm <sup>2</sup>	caloric load kWh/m
<b>NYCY, NYCWY</b>	3 x 1,5/ 1,5	0,78
	3 x 2,5/ 2,5	0,86
	3 x 4 / 4	1,11
	3 x 6 / 6	1,25
	3 x 10 / 10	1,47
	3 x 16 / 10	1,75
	3 x 16 / 16	1,75
	3 x 25 / 16	2,53
	3 x 25 / 25	2,53
	3 x 35 / 16	2,22
	3 x 35 / 35	2,22
	3 x 50 / 25	2,78
	3 x 50 / 50	2,78
	3 x 70 / 35	3,28
	3 x 70 / 70	3,28
	3 x 95 / 50	4,28
	3 x 95 / 95	4,28
	3 x 120 / 70	4,72
	3 x 120 /120	4,72
	3 x 150 / 70	5,72
	3 x 150 /150	5,72
	4 x 1,5/ 1,5	0,86
	4 x 2,5/ 2,5	0,97
	4 x 4 / 4	1,28
	4 x 6 / 6	1,44
	4 x 10 / 10	1,69
	4 x 16 / 16	2,08
	4 x 25 / 16	2,92
	4 x 35 / 16	2,67
	4 x 50 / 25	3,44
	4 x 70 / 35	4,17
	4 x 95 / 50	5,33
	4 x 120 / 70	5,94
	4 x 150 / 70	7,22
<b>A-2Y(L)2Y Bd</b>	2 x 2 x 0,6	0,84
	4 x 2 x 0,6	1,17
	6 x 2 x 0,6	1,25
	10 x 2 x 0,6	1,38
	20 x 2 x 0,6	1,92
	30 x 2 x 0,6	2,32
	40 x 2 x 0,6	2,62
	50 x 2 x 0,6	3,02
	100 x 2 x 0,6	4,71
	150 x 2 x 0,6	6,17
	200 x 2 x 0,6	7,69
	250 x 2 x 0,6	8,88
	300 x 2 x 0,6	10,20
	350 x 2 x 0,6	11,88
	400 x 2 x 0,6	13,19
	500 x 2 x 0,6	15,45
	600 x 2 x 0,6	18,57
	700 x 2 x 0,6	20,82
	800 x 2 x 0,6	24,18
	1000 x 2 x 0,6	28,33

Type	dimension n x mm <sup>2</sup>	caloric load kWh/m
<b>NYM</b>	1 x 1,5	0,17
	1 x 2,5	0,22
	1 x 4	0,25
	1 x 6	0,28
	1 x 10	0,36
	1 x 16	0,42
	1 x 25	0,58
	2 x 1,5	0,42
	2 x 2,5	0,53
	2 x 4	0,67
	2 x 6	0,75
	2 x 10	1,17
	3 x 1,5	0,44
	3 x 2,5	0,58
	3 x 4	0,72
	3 x 6	0,92
	3 x 10	1,28
	3 x 16	1,53
	3 x 25	2,39
	3 x 35	2,78
	4 x 1,5	0,53
	4 x 2,5	0,67
	4 x 4	0,92
	4 x 6	1,08
	4 x 10	1,50
	4 x 16	1,86
	4 x 25	2,89
	4 x 35	3,28
	5 x 1,5	0,58
	5 x 2,5	0,75
	5 x 4	1,11
	5 x 6	1,28
	5 x 10	1,83
	5 x 16	2,31
	5 x 25	3,42
	6 x 1,5	0,67
	7x 1,5	0,67

# CALORIC LOAD VALUES OF HALOGEN-FREE AND HALOGENATED CABLES AND INSULATED WIRES

Type	dimension n x mm <sup>2</sup>	caloric load kWh/m
<b>JE-H (St) H Bd</b>	2 x 2 x 0,6	0,12
	4 x 2 x 0,6	0,18
	6 x 2 x 0,6	0,23
	10 x 2 x 0,6	0,33
	20 x 2 x 0,6	0,64
	30 x 2 x 0,6	0,81
	40 x 2 x 0,6	1,05
	50 x 2 x 0,6	1,34
	60 x 2 x 0,6	1,50
	80 x 2 x 0,6	2,01
100 x 2 x 0,6	2,53	
<b>JE-H (St) H Bd</b>	2 x 2 x 0,8	0,28
	4 x 2 x 0,8	0,39
	8 x 2 x 0,8	0,58
	12 x 2 x 0,8	0,86
	20 x 2 x 0,8	1,17
	40 x 2 x 0,8	2,08
<b>J-H (St)H Bd</b>	2 x 2 x 0,6	0,12
	4 x 2 x 0,6	0,18
	6 x 2 x 0,6	0,23
	10 x 2 x 0,6	0,33
	20 x 2 x 0,6	0,72
	30 x 2 x 0,6	0,81
	40 x 2 x 0,6	1,05
	50 x 2 x 0,6	1,34
	60 x 2 x 0,6	1,50
	80 x 2 x 0,6	2,01
100 x 2 x 0,6	2,53	
<b>J-H (St) H Bd</b>	2 x 2 x 0,8	0,16
	4 x 2 x 0,8	0,29
	6 x 2 x 0,8	0,35
	10 x 2 x 0,8	0,55
	20 x 2 x 0,8	1,21
	30 x 2 x 0,8	1,36
	40 x 2 x 0,8	1,67
	50 x 2 x 0,8	2,19
	60 x 2 x 0,8	2,44
	80 x 2 x 0,8	3,18
100 x 2 x 0,8	4,07	
<b>J-HLiHCH Bd</b>	2 x 2 x 0,5 mm <sup>2</sup>	1,0
	4 x 2 x 0,5 mm <sup>2</sup>	1,4
	8 x 2 x 0,5 mm <sup>2</sup>	2,1
	12 x 2 x 0,5 mm <sup>2</sup>	3,1
	20 x 2 x 0,5 mm <sup>2</sup>	4,2
	32 x 2 x 0,5 mm <sup>2</sup>	6,4
	40 x 2 x 0,5 mm <sup>2</sup>	7,5
<b>J-H (St) H Bd E 30 bis E 90 red Fire warning installation cable</b>	2 x 2 x 0,8	0,20
	4 x 2 x 0,8	0,34
	8 x 2 x 0,8	0,72
	12 x 2 x 0,8	0,89
	16 x 2 x 0,8	1,08
	20 x 2 x 0,8	1,36
	32 x 2 x 0,8	2,03
	40 x 2 x 0,8	2,59
	52 x 2 x 0,8	3,06
	<b>J-H (St) HRH Bd E 30 bis E 90 red Fire warning installation cable</b>	2 x 2 x 0,8
4 x 2 x 0,8		0,66
8 x 2 x 0,8		1,27
12 x 2 x 0,8		1,56
16 x 2 x 0,8		1,81
20 x 2 x 0,8		2,26
32 x 2 x 0,8		3,23
40 x 2 x 0,8		4,15
52 x 2 x 0,8	4,68	

Type	dimension n x mm <sup>2</sup>	caloric load kWh/m
<b>J-HH Bd</b>	2 x 2 x 0,6	0,22
	4 x 2 x 0,6	0,33
	6 x 2 x 0,6	0,39
	10 x 2 x 0,6	0,53
	16 x 2 x 0,6	0,81
	20 x 2 x 0,6	0,97
	24 x 2 x 0,6	1,11
	30 x 2 x 0,6	1,36
	40 x 2 x 0,6	1,72
	50 x 2 x 0,6	2,00
	60 x 2 x 0,6	2,39
	80 x 2 x 0,6	3,06
	100 x 2 x 0,6	3,72
<b>J-E-LiHH Bd</b>	4 x 1 x 0,5 mm <sup>2</sup>	0,28
	8 x 1 x 0,5 mm <sup>2</sup>	0,45
	16 x 1 x 0,5 mm <sup>2</sup>	0,78
	24 x 1 x 0,5 mm <sup>2</sup>	1,08
	32 x 1 x 0,5 mm <sup>2</sup>	1,36
	40 x 1 x 0,5 mm <sup>2</sup>	1,64
<b>I-YY Bd</b>	2 x 2 x 0,6	0,11
	4 x 2 x 0,6	0,17
	6 x 2 x 0,6	0,22
	10 x 2 x 0,6	0,28
	16 x 2 x 0,6	0,39
	20 x 2 x 0,6	0,44
	24 x 2 x 0,6	0,50
	30 x 2 x 0,6	0,67
	40 x 2 x 0,6	0,81
	50 x 2 x 0,6	0,94
	60 x 2 x 0,6	1,17
	80 x 2 x 0,6	1,42
	100 x 2 x 0,6	1,69
<b>J-E-Y (St) Y Bd</b>	2 x 2 x 0,8	0,19
	4 x 2 x 0,8	0,28
	8 x 2 x 0,8	0,42
	12 x 2 x 0,8	0,58
	16 x 2 x 0,8	0,72
	20 x 2 x 0,8	0,83
	24 x 2 x 0,8	0,94
	28 x 2 x 0,8	1,17
	32 x 2 x 0,8	1,28
	36 x 2 x 0,8	1,39
	40 x 2 x 0,8	1,50
	44 x 2 x 0,8	1,61
	48 x 2 x 0,8	1,83
	52 x 2 x 0,8	1,94
	56 x 2 x 0,8	2,06
	60 x 2 x 0,8	2,14
	64 x 2 x 0,8	2,25
68 x 2 x 0,8	2,36	
72 x 2 x 0,8	2,47	
76 x 2 x 0,8	2,72	
80 x 2 x 0,8	2,83	

Type	dimension n x mm <sup>2</sup>	caloric load kWh/m
<b>J-YY Bd</b>	2 x 2 x 0,6	0,11
	4 x 2 x 0,6	0,17
	6 x 2 x 0,6	0,22
	10 x 2 x 0,6	0,28
	16 x 2 x 0,6	0,39
	20 x 2 x 0,6	0,44
	24 x 2 x 0,6	0,50
	30 x 2 x 0,6	0,67
	40 x 2 x 0,6	0,81
	50 x 2 x 0,6	0,94
	60 x 2 x 0,6	1,17
	80 x 2 x 0,6	1,42
	100 x 2 x 0,6	1,69
<b>J-Y (St) Y, JE-Y (St) Y</b>	1 x 2 x 0,6	0,15
	2 x 2 x 0,6	0,17
	3 x 2 x 0,6	0,20
	4 x 2 x 0,6	0,23
	5 x 2 x 0,6	0,26
	6 x 2 x 0,6	0,28
	8 x 2 x 0,6	0,29
	10 x 2 x 0,6	0,33
	12 x 2 x 0,6	0,38
	14 x 2 x 0,6	0,40
	16 x 2 x 0,6	0,43
	20 x 2 x 0,6	0,47
	24 x 2 x 0,6	0,52
30 x 2 x 0,6	0,69	
40 x 2 x 0,6	0,77	
50 x 2 x 0,6	0,92	
60 x 2 x 0,6	1,20	
80 x 2 x 0,6	1,41	
100 x 2 x 0,6	1,83	
<b>J-Y (St) Y, JE-Y (St) Y</b>	1 x 2 x 0,8	0,19
	2 x 2 x 0,8	0,25
	3 x 2 x 0,8	0,31
	4 x 2 x 0,8	0,38
	5 x 2 x 0,8	0,43
	6 x 2 x 0,8	0,50
	8 x 2 x 0,8	0,56
	10 x 2 x 0,8	0,75
	12 x 2 x 0,8	0,81
	14 x 2 x 0,8	0,87
	16 x 2 x 0,8	1,00
	20 x 2 x 0,8	1,13
	24 x 2 x 0,8	1,45
30 x 2 x 0,8	1,70	
40 x 2 x 0,8	2,08	
50 x 2 x 0,8	2,65	
60 x 2 x 0,8	2,84	
80 x 2 x 0,8	3,92	
100 x 2 x 0,8	4,94	

# CALORIC LOAD VALUES OF HALOGEN-FREE SECURITY CABLES AND INSULATED WIRES

Type	dimension n x mm <sup>2</sup>	caloric load kWh/m
<b>HELUTHERM® 145</b>	1 x 0,25	0,00884
	1 x 0,33	0,00973
	1 x 0,50	0,01231
	1 x 0,75	0,01600
	1 x 1,0	0,01958
	1 x 1,5	0,02931
	1 x 2,5	0,04157
	1 x 4	0,05014
	1 x 6	0,05952
	1 x 10	0,10655
	1 x 16	0,13120
	1 x 25	0,21506
	1 x 35	0,25086
	1 x 50	0,33443
	1 x 70	0,40502
	1 x 95	0,53553
	1 x 120	0,61629
1 x 150	0,77025	
1 x 185	0,94133	
1 x 240	1,18313	

<b>HELUTHERM® MULTI 145</b>	1 x 0,50	0,04
	2 x 0,50	0,08
	3 x 0,50	0,09
	4 x 0,50	0,11
	5 x 0,50	0,14
	6 x 0,50	0,16
	7 x 0,50	0,19
	8 x 0,50	0,24
	10 x 0,50	0,27
	12 x 0,50	0,25
	14 x 0,50	0,28
	16 x 0,50	0,32
	19 x 0,50	0,41
	21 x 0,50	0,45
	24 x 0,50	0,48
	25 x 0,50	0,48
	27 x 0,50	0,46
	30 x 0,50	0,51
	33 x 0,50	0,57
	37 x 0,50	0,68
1 x 0,75	0,05	
2 x 0,75	0,09	
3 x 0,75	0,11	
4 x 0,75	0,13	
5 x 0,75	0,17	
6 x 0,75	0,20	
7 x 0,75	0,22	
8 x 0,75	0,29	
10 x 0,75	0,32	
12 x 0,75	0,30	
14 x 0,75	0,34	
16 x 0,75	0,38	
19 x 0,75	0,48	
21 x 0,75	0,54	
24 x 0,75	0,59	
25 x 0,75	0,58	
27 x 0,75	0,55	
30 x 0,75	0,61	
33 x 0,75	0,66	
37 x 0,75	0,85	

Type	dimension n x mm <sup>2</sup>	caloric load kWh/m
<b>HELUTHERM® MULTI 145</b>	1 x 1	0,05
	2 x 1	0,11
	3 x 1	0,13
	4 x 1	0,16
	5 x 1	0,19
	6 x 1	0,23
	7 x 1	0,29
	8 x 1	0,34
	10 x 1	0,38
	12 x 1	0,35
	14 x 1	0,40
	16 x 1	0,44
	19 x 1	0,59
	21 x 1	0,66
	24 x 1	0,70
	25 x 1	0,69
	27 x 1	0,66
30 x 1	0,70	
33 x 1	0,83	
37 x 1	1,03	

1 x 1,5	0,06
2 x 1,5	0,14
3 x 1,5	0,16
4 x 1,5	0,20
5 x 1,5	0,25
6 x 1,5	0,32
7 x 1,5	0,38
8 x 1,5	0,47
10 x 1,5	0,51
12 x 1,5	0,46
14 x 1,5	0,52
16 x 1,5	0,60
19 x 1,5	0,83
21 x 1,5	0,92
24 x 1,5	1,01
25 x 1,5	0,98
27 x 1,5	0,93
30 x 1,5	1,00
33 x 1,5	1,12
37 x 1,5	1,37
1 x 2,5	0,07
2 x 2,5	0,17
3 x 2,5	0,21
4 x 2,5	0,27
5 x 2,5	0,34
6 x 2,5	0,41
7 x 2,5	0,51
8 x 2,5	0,63
10 x 2,5	0,65
12 x 2,5	0,59
14 x 2,5	0,72
16 x 2,5	0,80
19 x 2,5	1,04
21 x 2,5	1,24
24 x 2,5	1,32
25 x 2,5	1,29
27 x 2,5	1,22
30 x 2,5	1,31
33 x 2,5	1,47
37 x 2,5	1,88

Type	dimension n x mm <sup>2</sup>	caloric load kWh/m
<b>HELUTHERM® MULTI 145</b>	1 x 4	0,10
	2 x 4	0,29
	3 x 4	0,27
	4 x 4	0,35
	5 x 4	0,45
	6 x 4	0,54
	7 x 4	0,68
	8 x 4	0,80
	10 x 4	0,90
	12 x 4	0,81
	14 x 4	0,94

1 x 6	0,16
2 x 6	0,46
3 x 6	0,52
4 x 6	0,57
5 x 6	0,71
6 x 6	0,88
7 x 6	1,02
1 x 10	0,15
2 x 10	0,53
3 x 10	0,58
4 x 10	0,74
5 x 10	0,87
6 x 10	1,00
7 x 10	1,25
1 x 16	0,17
2 x 16	0,64
3 x 16	0,73
4 x 16	0,89
5 x 16	1,07
6 x 16	1,23
7 x 16	1,58
1 x 25	0,24
2 x 25	1,01
3 x 25	1,08
4 x 25	1,30
5 x 25	1,64
6 x 25	2,04
7 x 25	2,46
1 x 35	0,29
2 x 35	1,28
3 x 35	1,32
4 x 35	1,64
5 x 35	2,04
1 x 50	0,36
2 x 50	1,76
3 x 50	1,81
4 x 50	2,15
5 x 50	2,53
1 x 70	0,42
2 x 70	2,28
3 x 70	2,25
4 x 70	2,77
5 x 70	3,36
1 x 95	0,55
2 x 95	2,72
3 x 95	2,81
4 x 95	3,42
5 x 95	4,11



# CALORIC LOAD VALUES OF HALOGEN-FREE SECURITY CABLES AND INSULATED WIRES

Type	dimension n x mm <sup>2</sup>	caloric load kWh/m	Type	dimension n x mm <sup>2</sup>	caloric load kWh/m
<b>HELUTHERM® MULTI-C 145</b>	1 x 0,50	0,05	<b>HELUTHERM® MULTI-C 145</b>	1 x 2,5	0,11
	2 x 0,50	0,12		2 x 2,5	0,29
	3 x 0,50	0,12		3 x 2,5	0,32
	4 x 0,50	0,15		4 x 2,5	0,36
	5 x 0,50	0,18		5 x 2,5	0,45
	6 x 0,50	0,21		6 x 2,5	0,55
	7 x 0,50	0,24		7 x 2,5	0,69
	8 x 0,50	0,27		8 x 2,5	0,82
	10 x 0,50	0,31		10 x 2,5	0,87
	12 x 0,50	0,30		12 x 2,5	0,83
	14 x 0,50	0,35		14 x 2,5	1,01
	16 x 0,50	0,39		16 x 2,5	1,17
	19 x 0,50	0,48		19 x 2,5	1,47
	21 x 0,50	0,54		21 x 2,5	1,61
	1 x 0,75	0,05		1 x 4	0,13
	2 x 0,75	0,14		2 x 4	0,36
	3 x 0,75	0,15		3 x 4	0,39
	4 x 0,75	0,18		4 x 4	0,49
	5 x 0,75	0,21		5 x 4	0,56
	6 x 0,75	0,25		6 x 4	0,66
	7 x 0,75	0,31		7 x 4	0,84
8 x 0,75	0,35	8 x 4	1,04		
10 x 0,75	0,39	10 x 4	1,16		
12 x 0,75	0,38	12 x 4	1,10		
14 x 0,75	0,43	14 x 4	1,23		
16 x 0,75	0,49	16 x 4	1,42		
19 x 0,75	0,62	1 x 6	0,15		
21 x 0,75	0,69	2 x 6	0,43		
1 x 1	0,07	3 x 6	0,48		
2 x 1	0,16	4 x 6	0,60		
3 x 1	0,17	5 x 6	0,71		
4 x 1	0,20	6 x 6	0,82		
5 x 1	0,24	7 x 6	1,06		
6 x 1	0,30	1 x 10	0,22		
7 x 1	0,36	2 x 10	0,67		
8 x 1	0,41	3 x 10	0,77		
10 x 1	0,46	4 x 10	0,99		
12 x 1	0,44	5 x 10	1,21		
14 x 1	0,50	6 x 10	1,41		
16 x 1	0,57	7 x 10	1,68		
19 x 1	0,74	1 x 16	0,28		
21 x 1	0,82	1 x 25	0,35		
1 x 1,5	0,08				
2 x 1,5	0,22				
3 x 1,5	0,21				
4 x 1,5	0,28				
5 x 1,5	0,33				
6 x 1,5	0,41				
7 x 1,5	0,48				
8 x 1,5	0,58				
10 x 1,5	0,66				
12 x 1,5	0,63				
14 x 1,5	0,72				
16 x 1,5	0,80				
19 x 1,5	1,08				
21 x 1,5	1,19				
24 x 1,5	1,32				
25 x 1,5	1,30				
27 x 1,5	1,27				
30 x 1,5	1,37				
33 x 1,5	1,53				
36 x 1,5	1,71				
37 x 1,5	1,85				

# ■ INFORMATION AND INSTALLATION INSTRUCTIONS

## for UL and CSA cables

UL/CSA cables must be protected against mechanical, thermal and chemical damages.

### Installation in switchboards and control boards

- Inside switchboards, flexible single core cables must be installed in cable channels of plastics
- As american cables are not so flexible, the minimum bending radius must be taken into consideration during flexible installation.

### For connections on machinery and equipment

- Permissible tube and conduit  $\varnothing$ :  
minimum- $\varnothing = 1/2''$  (inch)  
maximum- $\varnothing = 4''$  (inch)  
Minimum wall-thickness of the conduit = 1,9 mm
- Normal steel armoured tubes with transition socket PG-NPT is used. Further metal cable channels must also be used.
- The cables are permitted to be filled with only max. 50% cross-section of the cable channel.
- Flexible single cores must be installed in PVC tubes inside the conduits.
- If connectors are used, both the main and the control cables should be installed separately.

### Delivery program:

- PVC tubes
- Metal tubes and glands
- Fixing material
- Steel armoured tubes.

### Cable Channels

- Cable channels in switchboards must be made out of a flame resistant PVC and must have enough spare space.
- Cable channels on machineries and equipment must be made out of metal. They must also be closed and oil resistant.

### Cable identification

- Cable identification is achieved through continuous numbers, letters or number/letter combination. The beginning and end of the cable have the same identification system.

### Cable connections to apparatus

#### • Main and Control cables

It is depending on the type of connection to the apparatus if screw or press clamps are used.

- In USA, it is normal to install cables without using cable lugs or cable crushing socket. The connection is only possible with the UL-wires sizes. These sizes are not designed with fine wire stranding make-up.

### Conductor cross-section

#### General rules

- |                           | <b>minimum cross-section for</b> |
|---------------------------|----------------------------------|
| • Motor Cables            | AWG 14                           |
| • Control Cables          |                                  |
| – in switchboards         | AWG 18                           |
| – in the installed system | AWG 16                           |

This rule does not apply to electronic devices and systems.

In case, the electronic cables and other circuits are installed together, all cables must be set for maximum voltage.

### Colour identification

- **Black**  
For main circuits, control- and subcircuits, direct connected to main voltage.
- **Blue**  
For direct voltage- (d. c.), control- and subcircuits, which are connected to the main circuit.
- **Red**  
For alternating voltage (a. c.), control and subcircuits.
- **Yellow or brown**  
For interlock circuits from an external power source.
- **White or grey**  
For current conveying earthed conductors at main, control and subcircuits.
- **Green or green-yellow**  
For insulated earth-connectors as protective conductor.

### Motor-driving voltages

200 / 230 / 460 / 575 V, 60 Hz

### Driving voltage

Normally the driving voltage is 120 V, 60 Hz or lower. Transformers must be operated with separate windings.

# AWG-WIRES AND AWG-STRANDED CONDUCTORS

Conductor make-up, cross-section, resistance and weight

AWG No.	AWG-make-up n x AWG	conductor make-up mm	cross- section mm <sup>2</sup>	conductor outer-Ø mm	conductor resistance Ohm/km	conductor weight kg/km
36	solid	solid	0,013	0,127	1460,0	0,116
36	7/44	7 x 0,05	0,014	0,152	1271,0	0,125
34	solid	solid	0,020	0,160	918,0	0,178
34	7/42	7 x 0,064	0,022	0,192	777,0	0,196
32	solid	solid	0,032	0,203	571,0	0,284
32	7/40	7 x 0,078	0,034	0,203	538,0	0,302
32	19/44	19 x 0,05	0,037	0,229	448,0	0,329
30	solid	solid	0,051	0,254	365,0	0,45
30	7/38	7 x 0,102	0,057	0,305	339,0	0,507
30	19/42	19 x 0,064	0,061	0,305	286,7	0,543
28	solid	solid	0,080	0,330	232,0	0,71
28	7/36	7 x 0,127	0,087	0,381	213,0	0,774
28	19/40	19 x 0,078	0,091	0,406	186,0	0,81
27	7/35	7 x 0,142	0,111	0,457	179,0	0,988
26	solid	solid	0,128	0,409	143,0	1,14
26	10/36	10 x 0,127	0,127	0,533	137,0	1,13
26	19/38	19 x 0,102	0,155	0,508	113,0	1,38
26	7/34	7 x 0,160	0,141	0,483	122,0	1,25
24	solid	solid	0,205	0,511	89,4	1,82
24	7/32	7 x 0,203	0,227	0,610	76,4	2,02
24	10/34	10 x 0,160	0,201	0,582	85,6	1,79
24	19/36	19 x 0,127	0,241	0,610	69,2	2,14
24	41/40	41 x 0,078	0,196	0,582	84,0	1,74
22	solid	solid	0,324	0,643	55,3	2,88
22	7/30	7 x 0,254	0,355	0,762	48,4	3,16
22	19/34	19 x 0,160	0,382	0,787	45,1	3,4
22	26/36	26 x 0,127	0,330	0,762	52,3	2,94
20	solid	solid	0,519	0,813	34,6	4,61
20	7/28	7 x 0,320	0,562	0,965	33,8	5,0
20	10/30	10 x 0,254	0,507	0,889	33,9	4,51
20	19/32	19 x 0,203	0,615	0,940	28,3	5,47
20	26/34	26 x 0,160	0,523	0,914	33,0	4,65
20	41/36	41 x 0,127	0,520	0,914	32,9	4,63
18	solid	solid	0,823	1,020	21,8	7,32
18	7/26	7 x 0,404	0,897	1,219	19,2	7,98
18	16/30	16 x 0,254	0,811	1,194	21,3	7,22
18	19/30	19 x 0,254	0,963	1,245	17,9	8,57
18	41/34	41 x 0,160	0,824	1,194	20,9	7,33
18	65/36	65 x 0,127	0,823	1,194	21,0	7,32
16	solid	solid	1,310	1,290	13,7	11,66
16	7/24	7 x 0,511	1,440	1,524	12,0	12,81
16	65/34	65 x 0,160	1,310	1,499	13,2	11,65
16	26/30	26 x 0,254	1,317	1,499	13,1	11,72
16	19/29	19 x 0,287	1,229	1,473	14,0	10,94
16	105/36	105 x 0,127	1,330	1,499	13,1	11,84
14	solid	solid	2,080	1,630	8,6	18,51
14	7/22	7 x 0,643	2,238	1,854	7,6	19,92
14	19/27	19 x 0,361	1,945	1,854	8,9	17,31
14	41/30	41 x 0,254	2,078	1,854	8,3	18,49
14	105/34	105 x 0,160	2,111	1,854	8,2	18,79

Continuation ►

# AWG-WIRES AND AWG-STRANDED CONDUCTORS

Conductor make-up, cross-section, resistance and weight

AWG No.	AWG-make-up n x AWG	conductor make-up mm	cross- section mm <sup>2</sup>	conductor outer-Ø mm	conductor resistance Ohm/km	conductor weight kg/km
12	solid	solid	3,31	2,05	5,4	29,46
12	7/20	7 x 0,813	3,63	2,438	4,8	32,30
12	19/25	19 x 0,455	3,09	2,369	5,6	27,50
12	65/30	65 x 0,254	3,292	2,413	5,7	29,29
12	165/34	165 x 0,160	3,316	2,413	5,2	29,51
10	solid	solid	5,26	2,59	3,4	46,81
10	37/26	37 x 0,404	4,74	2,921	3,6	42,18
10	49/27	49 x 0,363	5,068	2,946	3,6	45,10
10	105/30	105 x 0,254	5,317	2,946	3,2	47,32
8	49/25	49 x 0,455	7,963	3,734	2,2	70,87
8	133/29	133 x 0,287	8,604	3,734	2,0	76,57
8	655/36	655 x 0,127	8,297	3,734	2,0	73,84
6	133/27	133 x 0,363	13,764	4,676	1,5	122,49
6	259/30	259 x 0,254	13,123	4,674	1,3	116,79
6	1050/36	1050 x 0,127	13,316	4,674	1,3	118,51
4	133/25	133 x 0,455	21,625	5,898	0,80	192,46
4	259/27	259 x 0,363	26,804	5,898	0,66	238,55
4	1666/36	1666 x 0,127	21,104	5,898	0,82	187,82
2	133/23	133 x 0,574	34,416	7,417	0,50	306,30
2	259/26	259 x 0,404	33,201	7,417	0,52	295,49
2	665/30	665 x 0,254	33,696	7,417	0,52	299,89
2	2646/36	2646 x 0,127	33,518	7,417	0,52	298,31
1	133/22	133 x 0,643	43,187	8,331	0,40	384,37
1	259/25	259 x 0,455	42,112	8,331	0,41	374,80
1	817/30	817 x 0,254	41,397	8,331	0,42	368,43
1	2109/34	2109 x 0,160	42,403	8,331	0,41	377,39
1/0	133/21	133 x 0,724	54,75	9,347	0,31	487,28
1/0	259/24	259 x 0,511	53,116	9,347	0,32	472,73
2/0	133/20	133 x 0,813	69,043	10,516	0,25	614,48
2/0	259/23	259 x 0,574	67,021	10,516	0,25	596,49
3/0	259/22	259 x 0,643	84,102	11,786	0,20	748,51
3/0	427/24	427 x 0,511	87,570	11,786	0,19	779,37
4/0	259/21	259 x 0,724	106,626	13,259	0,16	948,97
4/0	427/23	427 x 0,574	110,494	13,259	0,15	983,39

## AWG-WIRES (SOLID-CONDUCTOR)

AWG No.	Wire-Ø mm
44	0,050
41	0,070
40	0,079
39	0,089
38	0,102
37	0,114
36	0,127
35	0,142
34	0,160
33	0,180
32	0,203
31	0,226
30	0,254
29	0,287

AWG No.	Wire-Ø mm
28	0,320
27	0,363
26	0,404
25	0,455
24	0,511
23	0,574
22	0,643
21	0,724
20	0,813
19	0,912
18	1,024
17	1,151
16	1,290
15	1,450

AWG No.	Wire-Ø mm
14	1,628
13	1,829
12	2,052
11	2,304
10	2,588
9	2,906
8	3,268
7	3,665
6	4,115
5	4,620
4	5,189
3	5,827
2	6,543
1	7,348

AWG No.	Wire-Ø mm
1/0	8,252
2/0	9,266
3/0	10,404
4/0	11,684

# US-AMERICAN AND BRITISH UNITS

Conversion of usual measuring units

## Units for cables and wires

In the US the measurements are mainly used in AWG-numbers (AWG = American Wire Gauge).  
The AWG-numbers conform the british B&S-numbers (B&S = Brown & Sharp)

AWG No.	Cross-section mm <sup>2</sup>	Dia-meter mm	Conductor resistance Ohm/km	AWG No.	Cross-section mm <sup>2</sup>	Dia-meter mm	Conductor resistance Ohm/km
1000 MCM*	507	25,4	0,035	14	2,08	1,63	8,79
750	380	22,0	0,047	15	1,65	1,45	11,20
600	304	19,7	0,059	16	1,31	1,29	14,70
500	254	20,7	0,07	17	1,04	1,15	17,80
400	203	18,9	0,09	18	0,8230	1,0240	23,0
350	178	17,3	0,10	19	0,6530	0,9120	28,3
300	152	16,0	0,12	20	0,5190	0,8120	34,5
250	127	14,6	0,14	21	0,4120	0,7230	44,0
4/0	107,20	11,68	0,18	22	0,3250	0,6440	54,8
3/0	85,00	10,40	0,23	23	0,2590	0,5730	70,1
2/0	67,50	9,27	0,29	24	0,2050	0,5110	89,2
0	53,40	8,25	0,37	25	0,1630	0,4550	111,0
1	42,40	7,35	0,47	26	0,1280	0,4050	146,0
2	33,60	6,54	0,57	27	0,1020	0,3610	176,0
3	26,70	5,83	0,71	28	0,0804	0,3210	232,0
4	21,20	5,19	0,91	29	0,0646	0,2860	282,0
5	16,80	4,62	1,12	30	0,0503	0,2550	350,0
6	13,30	4,11	1,44	31	0,0400	0,2270	446,0
7	10,60	3,67	1,78	32	0,0320	0,2020	578,0
8	8,366	3,26	2,36	33	0,0252	0,1800	710,0
9	6,63	2,91	2,77	34	0,0200	0,1600	899,0
10	5,26	2,59	3,64	35	0,0161	0,1430	1125,0
11	4,15	2,30	4,44	36	0,0123	0,1270	1426,0
12	3,30	2,05	5,41	37	0,0100	0,1130	1800,0
13	2,62	1,83	7,02	38	0,00795	0,1010	2255,0
				39	0,00632	0,0897	2860,0

4/0 is also stated: 0000; 1 mil = 0,001 inch = 0,0254 mm  
\* for bigger cross-section the sizes in MCM (circular mils)

1 CM = 1 Circ. mil. = 0,0005067 mm<sup>2</sup>  
1 MCM = 1000 Circ. mils = 0,5067 mm<sup>2</sup>

## General measuring units

### Length

1 mil	= 0,0254 mm
1 in (inch)	= 25,4 mm
1 ft (foot)	= 0,3048 m
1 yd (yard)	= 0,9144 m
1 ch (chain)	= 20,1 m
1 mile (land mile)	= 1,609 km
1 mile (nautic mile)	= 1,852 km
1 mm	= 0,039370 inches
1 m	= 39,370079 inches

### Area

1 CM (circ. mil)	= 0,507 · 10 <sup>-3</sup> mm <sup>2</sup>
1 MCM	= 0,5067 mm <sup>2</sup>
1 sq. inch (sq. inch)	= 645,16 mm <sup>2</sup>
1 sq. ft. (sq. foot)	= 0,0929 m <sup>2</sup>
1 square yard	= 0,836 m <sup>2</sup>
1 acre	= 4047 m <sup>2</sup>
1 square mile	= 2,59 km <sup>2</sup>

### Density

1 cu. in. (cubic inch)	= 16,39 cm <sup>3</sup>
1 cu. ft. (cubic foot)	= 0,0283 m <sup>3</sup>
1 cu. yd. (cubic yard)	= 0,7646 m <sup>3</sup>
1 gal. (US gallon)	= 3,785 l
1 gal. (brit gallon)	= 4,546 l
1 US pint	= 0,473 l
1 US quart	= 0,946 l
1 US barrel	= 158,8 l

### Temperature

F (Fahrenheit)	= (1,8 · C) + 3°
C (Celsius)	= 0,5556 · (F-32°)

### Weight

1 grain	= 64,8 mg
1 dram	= 1,77 g

1 oz (ounce)	= 28,35 g
1 lb (pound)	= 0,4536 Kp
1 stone	= 6,35 Kp
1 qu (quarter)	= 12,7 Kp
1 US-cwt (hundred-weight)	= 45,36 Kp
1 US ton (short ton)	= 0,907 t
1 brit. ton (long ton)	= 1,016 t

### Force

1 lb	= 4,448 N
1 brit. ton	= 9954 N
1 pdl (Poundal)	= 0,1383 N
1 kp	= 9,81 N
1 N	= 0,102 kp

### Velocity

1 mile/h	= 1,609 km/h
1 Knoten	= 1,852 km/h
1 ft/s	= 0,305 m/s
1 ft/min	= 5,08 · 10 <sup>-3</sup> m/s

### Energy

1 lb/mile	= 0,282 kg/m
1 lb/yd	= 0,496 kg/m
1 lb/foot	= 1,488 kg/m

### Radiation absorbed dose

1 Gray	= 1 J/kg
1 rad	= 10 <sup>-2</sup> J/kg = 1 Centi Gy
1 Centi	= 0,01 Gy
1 rad	= 100 Joule
1 Mrad	= cJ/kg = 0,01Gy
1 Mrad	= 1 · 10 <sup>6</sup> cJ/kg

### Pressure

1 psi (lb/sq.)	= 68,95 mbar
	= 6,895 · 10 <sup>-3</sup> Nmm <sup>2</sup>

1 lb/sq. ft.	= 0,478 mbar
1 pdl/sq. ft.	= 1,489 N/m <sup>2</sup>
1 in Hg	= 33,86 mbar
1 ft H <sub>2</sub> O	= 29,89 mbar
1 in H <sub>2</sub> O	= 2,491 mbar
1 N/mm <sup>2</sup>	= 145 psi
	= 10 bar

1 kp/mm <sup>2</sup>	= 1422 psi
1 at	= 736 Torr
	= 1 kp/cm <sup>2</sup>
1 Torr	= 1 mm Hg
1 bar	= 0,1 H Pa
1 Pa	= 1 N/m <sup>2</sup>

### Density

1 lb/cu. ft.	= 16,02 kg/m <sup>3</sup>
1 lb/cu. in.	= 27,68 t/m <sup>3</sup>

### Horse power

1 hp · h	= 1,0139 PS · h
	= 2,684 · 10 <sup>6</sup> Joule
	= 746 W · h
1 BTU (brit. therm. unit)	= 1055 Joule

### Electrical units

1 ohm/1000 yd	= 1,0936 Ω/km
1 ohm/1000 ft	= 3,28 Ω/km
1 μF/mile	= 0,62 μF/km
1 megohm/mile	= 1,61 MΩ/km
1 μuf/foot	= 3,28 pF/m
1 decibel/mile	= 71,5 mN/m

### Power rate

1 PS	= 0,736 kW
1 kW	= 1,36 PS
1 hp	= 0,7457 kW
1 kW	= 1,31 hp



# CURRENT RATINGS FOR UL-CSA CABLES

Ambient temperature 30 °C

## Abstract of NEC Tabelle 310.15(B)(17)

Allowable ampacity (in Ampere) of **conductors**, rated 0 – 2000 Volts, in free air.

Conductor size	Temperature Rating of Conductor		
	60 °C (140 °F)	75 °C (167 °F)	90 °C (194 °F)
AWG or kcmil (MCM)			
18	–	–	18
16	–	–	24
14*	25	30	35
12*	30	35	40
10*	40	50	55
8	60	70	80
6	80	95	105
4	105	125	140
3	120	145	165
2	140	170	190
1	165	195	220
1/0	195	230	260
2/0	225	265	300
3/0	260	310	350
4/0	300	360	405
250	340	405	455
300	375	445	500
350	420	505	570
400	455	545	615
500	515	620	700
600	575	690	780

## Abstract of NEC Tabelle 310.15(B)(16)

Allowable ampacity (in Ampere) of insulated conductors, rated 0 – 2000 Volts. NOT MORE THAN **three Conductors** in **raceway** or cable ore Earth (direct burial).

Conductor size	Temperature Rating of Conductor		
	60 °C (140 °F)	75 °C (167 °F)	90 °C (194 °F)
AWG or kcmil (MCM)			
18	–	–	14
16	–	–	18
14*	15	20	25
12*	20	25	30
10*	30	35	40
8	40	50	55
6	55	65	75
4	70	85	95
3	85	100	115
2	95	115	130
1	110	130	145
1/0	125	150	170
2/0	145	175	195
3/0	165	200	225
4/0	195	230	260
250	215	255	290
300	240	285	320
350	260	310	350
400	280	355	380
500	320	380	430
600	350	420	475

\* **Note** Unless otherwise specifically permitted elsewhere in the NEC, the overcurrent protection for conductor types market with an \* shall not exceed 15 amperes for AWG 14, 20 amperes for AWG 12 and 30 amperes for AWG 10, after any correction factors for ambient temperature and numbers of conductors have been applied.

Correction factors for ambient temperatures other than 30 °C				Correction factors for more than three current-carrying conductors in a raceway or cable.	
Ambient temperature in °C	60 °C (140 °F)	75 °C (167 °F)	90 °C (194 °F)	Number of current-carrying conductors	Correction factor
21 – 25	1,08	1,05	1,04	4 up to 6	0,80
26 – 30	1,00	1,00	1,00	7 up to 9	0,70
31 – 35	0,91	0,94	0,96	10 up to 20	0,50
36 – 40	0,82	0,88	0,91	21 up to 30	0,45
41 – 45	0,71	0,82	0,87	31 up to 40	0,40
46 – 50	0,58	0,75	0,82	41 and more	0,35
51 – 55	0,41	0,67	0,76		
56 – 60	–	0,58	0,71		
61 – 70	–	0,33	0,58		
71 – 80	–	–	0,41		

# LIST OF UL-STYLES (single core cables)

UL-Style No.	Insulation Material	Voltage Volt	Temp. °C	Insulation thickness mm	AWG Size
1001	PVC/Nylon	300	80	0,23	30 – 16
1002	PVC	600	60	0,76	26 – 16
1003	PE, FRPE	300	60	0,76	26 – 16
1004	PVC/Nylon	–	80	0,20	30 – 16
1005	PVC/Nylon	–	90	0,20	26 – 16
1006	PVC/Nylon	–	105	0,20	26 – 16
1007	PVC	300	80	0,38	32 – 16
1011	PVC	600	80	0,76	28 – 9
1013	PVC	600	90	0,76	28 – 9
1015	PVC	600	105	0,76	28 – 9
1017	PVC	600	80	1,14	22 – 8
1019	PVC	600	80	1,52	8 – 2
1020	PVC	600	80	2,05	1 – 4/0
1022	PVC	600	80	2,78	–
1023	PVC	600	80	3,17	–
1024	PVC	600	90	1,14	18 – 8
1025	PVC/Nylon	600	90	1,14	8 – 6
1026	PVC	600	90	1,52	8 – 6
1027	PVC	600	90	1,91	1 – 4/0
1028	PVC	600	105	1,14	22 – 8
1029	PVC/Nylon	600	105	1,14	8 – 6
1030	PVC	1000	80	0,76	26 – 10
1031	PVC/Nylon	1000	80	0,76	26 – 10
1032	PVC	1000	90	0,76	26 – 10
1033	PVC/Nylon	1000	90	0,76	26 – 10
1037	PVC	300	60	0,30	24 – 20
1039	PVC	300	80	0,38	22 – 16
1040	P/B	300	80	–	22 – 16
1041	PVC	300	60	0,76	20 – 16
1043	PVC	300	80	0,76	20 – 16
1045	PVC	300	90	0,76	20 – 16
1049	PVC	300	80	1,14	20 – 16
1053	PVC	600	60	1,52	18 – 10
1054	PVC	600	80	1,52	18 – 10
1055	PVC	600	90	1,52	20 – 10
1056	PVC	600	105	1,52	20 – 10
1060	PVC	600	105	1,91	10 – 10
1061	SR PVC	300	80	0,23	30 – 16
1063	PVC	300	60	–	20 – 18
1095	PVC	300	80	0,30	30 – 16
1096	PVC/Nylon	300	80	–	26 – 10
1098	PE	2000	60	0,86	18
1099	PVC	300	80	0,38	28
1107	PE, FRPE	300	60	0,38	30 – 16
1108	PVC	300	80	–	26 – 16
1109	PVC, XPVC	300	90	0,38	26 – 16
1110	PVC; XPVC	300	105	0,38	26 – 16
1113	PE	600	60	–	26 – 16
1115	PVC	300/600	80	0,38	30 – 16
1116	PVC/Nylon	600	80	–	22 – 8
1118	PVC	300	90	0,38	26 – 16
1119	PVC	600	90	0,76	26 – 16
1120	PVC	600	105	0,76	30 – 4/0
1122	SR PVC	300	80	0,23	30
1123	PVC	300	80	0,76	22 – 20
1124	PVC	300	80	0,76	22 – 20
1158	PVC	300	60	0,76	22 – 9
1159	PVC	300	60	1,14	8
1160	PVC	300	60	0,38	22 – 16
1161	PVC	600	60	0,76	22 – 9
1162	PVC	600	60	1,14	22 – 9
1164	PTFE	300	150	0,33	32 – 10
1180	PTFE	300	200	0,38	28 – 10
1181	PVC/Nylon	600	60	0,76	18 – 16
1185	PVC	300	80	0,38	30 – 4/0
1195	PVC	300	80	0,38	26 – 14
1198	PTFE	600	150	0,51	26 – 10
1199	PTFE	600	200	0,51	26 – 10
1206	PVC	300	80	0,33	30 – 16
1208	PVC	300	80	0,33	26 – 16
1227	FEP	not specified*	105	0,20	32 – 14
1228	PVC	600	90	1,14	18 – 8
1229	PVC	600	90	1,52	8 – 2
1230	PVC	600	105	0,76	26 – 8
1231	PVC	600	105	1,14	18 – 8
1232	PVC	600	105	1,52/2,03	8 – 4/0
1233	PVC	600	80	1,52	18 – 8
1235	PVC	600	105	1,52	18 – 8
1237	PVC	600	80	1,14	22 – 19
1239	PVC	600	105	1,14	22 – 19
1270	PVC	600	90	1,14	18 – 9
1271	PVC	600	90	1,52	8 – 2
1272	PVC	600	90	1,91	1 – 4/0
1279	PVC	600	80	1,52	7 – 2
1280	PVC	600	80	1,14	18 – 8
1283	PVC	600	105	1,52	8 – 2
1284	PVC	600	105	1,91	1 – 4/0
1287	PVC	600	105	1,91	18 – 12
1306	PVC	600	80	2,29	8
1308	PVC	600	105	2,29	8

\* not specified

UL-Style No.	Insulation Material	Voltage Volt	Temp. °C	Insulation thickness mm	AWG Size
1316	PVC/Nylon	600	105	0,38	26 – 12
1317	PVC/Nylon	600	105	0,51	10
1318	PVC/Nylon	600	105	0,76	8 – 6
1319	PVC/Nylon	600	105	1,02	4 – 2
1320	PVC/Nylon	600	105	1,27	1 – 4/10
1321	PVC/Nylon	600	105	1,78	250 – 1000
1322	PVC	600	90	1,91	14 – 10
1327	PVDF	–	105	0,25	30 – 16
1329	PVC	600	105	1,91	14 – 10
1330	FEP	600	200	variable	30 – 4/0
1331	FEP	600	105	variable	30 – 4/0
1332	FEP	300	200	0,38	30 – 10
1333	FEP	300	150	0,38	30 – 10
1335	PVC	600	90	0,76	22 – 10
1336	PVC	600	90	1,14	8
1337	PVC	600	90	1,52	6 – 2
1338	PVC	600	90	1,98	8 – 4/0
1366	PVC/PVC	600	90	variable	26 – 9
1394	PTFE	–	200	0,15	14 – 10
1400	PVC	600	90	1,14	14 – 10
1401	PVC	600	90	1,52	8
1402	PVC/Nylon	600	90	0,76	22 – 10
1405	PVC/Nylon	600	90	1,98	1 – 4/10
1408	PVC/Nylon	600	90	0,38	22 – 12
1409	PVC/Nylon	600	90	0,51	10
1410	PVC/Nylon	600	90	0,76	8 – 6
1411	PVC/Nylon	600	90	1,02	4 – 2
1412	PVC/Nylon	600	90	1,27	1 – 4/10
1413	PVC/Nylon	600	90	1,52	250 – 500
1414	PVC/Nylon	600	90	1,78	600 – 1000
1429	XPVC	150	80	0,25	32 – 16
1430	XPVC	300	105	0,38	30 – 16
1435	PE	300	80	0,41	26 – 16
1436	PE	300	80	0,79	26 – 16
1437	PE	300	80	1,63	26 – 16
1438	PE	300	80	1,14	26 – 16
1439	PE	300	80	0,81	26 – 16
1444	PVC	1000	90	1,14	18 – 10
1452	PVC/Nylon	1000	90	0,38	18 – 12
1453	PVC/Nylon	1000	90	0,51	10
1498	PCV	600	80	0,76	22 – 9
1499	PVC	600	90	0,76	22 – 9
1500	PVC	600	105	0,76	22 – 9
1508	ETFE	30	105	0,15	32 – 20
1517	ETFE	–	105	0,15	32 – 20
1523	ETFE	–	105	0,13	32 – 20
1533	PVC	–	80	0,23	30 – 10
1536	XPVC	–	80	0,25	30 – 10
1538	FEP	125	105	0,15	32 – 20
1542	PE-PVC	10000	80	–	24 – 10
1546	PE-PVC	600	–	–	20
1558	ETFE	–	125	0,10	32 – 20
1568	PVC	150	80	0,23	30 – 16
1569	PVC	300	105	0,38	28 – 10
1570	ETFE	600	250	–	24 – 8
1575	PVC	48	60	0,76	18 – 8
1581	PVC	300	80	0,38	14
1586	ETFE	–	105	0,20	32 – 6
1591	FEP	300	150	0,41	26 – 16
1592	FEP	300	200	0,41	26 – 16
1605	PVC	30	60	0,10	min. 46
1609	ETFE	125	105	0,13	32 – 6
1610	ETFE	not specified**	105	0,25	32 – 10
1612	PVDF	125	150	–	–
1618	PVC	300	80	0,38	–
1624	PVC	160	80	0,25	30 – 16
1662	PVC	300	80	variable	18 – 1/10
1680	PVC	–	105	–	18 – 1/10
1683	PVC	–	80	–	3/0
1692	PVC	30	80	2,54	min. 42
17107	PFA	30	200	0,127	32 – 20
1708	PFA	not specified**	200	0,127	32 – 20
1722	TPR	600	125	VAR	22 – 4/0
1729	PVC	300	80	0,22	32 – 16
1792	PE, PVC	30	80	0,05	min. 40
1847	FEP	30	105	0,08	min. 40
1848	FEP	300	150 o. 200	0,38	min. 24
1860	PFA	150	200	0,25	32 – 16
1888	TPR	300	125	0,41	–
1908	PVC	300	80	0,38	26 – 4/0
1909	PVC	600	80	0,76	26 – 4/0
1926	PE o. FRPE	300	60+80	0,17	30 – 16
1948	PVC	60	60	0,10	min. 46
1967	PVC	30	60+80	0,38	20 – 4/0
1968	PVC	–	60+80	0,38	20 – 4/0
1986	FEP	30	80	0,05	min. 50
1990	ETFE	600	105	0,50	30 – 4/0
1999	Zell. FEP	300	150	0,45	min. 36
10009	Zell. FEP	300	150	0,45	min. 36
10011	PFA	30	80	0,0254	min. 40
10030	PFA	300	250	0,025	30 – 10
10032	PFA	600	250	0,38	30 – 10
10050	FEP	600	150	0,457	30 – 4/0

# LIST OF UL-STYLES (Multicore cables)

UL-Style No.	Insulation Material	Voltage Volt	Temp. °C	Insulation thickness mm	AWG Size
2006	PVC	300	80	1,14	20 – 16
2007	PVC	300	90	1,14	20 – 16
2012	PVC	300	80	1,52	18 – 16
2015	PVC	300	80	1,52	18 – 16
2030	PVC	600	80	1,91	14 – 10
2031	PVC	600	90	1,91	14 – 10
2032	PVC	600	105	1,91	14 – 10
2089	PVC	300	60	–	20 – 18
2090	PVC	300	60	–	20 – 18
2091	PVC	300	60	–	20 – 18
2092	PE	300	60	–	26 – 16
2093	PE	300	60	–	26 – 16
2094	PE	300	60	–	26 – 16
2095	PVC	300	90	–	32 – 16
2096	PVC	300	80	–	30 – 16
2097	PVC	300	80	–	30 – 18
2098	PVC	300	90	–	26 – 16
2099	PVC	300	90	–	26 – 16
2100	PVC	300	90	–	26 – 16
2101	PVC	300	105	0,38	30 – 16
2102	PVC	300	105	–	30 – 16
2103	PVC	300	105	0,38	30 – 16
2106	PE	600	60	–	26 – 12
2107	PE	600	60	–	26 – 12
2108	PE	600	60	–	26 – 12
2112	PVC	300	80	0,38	26 – 16
2113	PVC	300	80	0,38	26 – 16
2114	PVC	300	80	0,38	26 – 16
2115	PVC	600	80	–	26 – 16
2116	PVC	600	80	–	26 – 16
2117	PVC	600	80	–	26 – 16
2121	PVC	300/600	90	0,38	26 – 16
2122	PVC	300/600	90	0,38	26 – 16
2123	PVC	300/600	90	0,38	26 – 16
2124	PVC	600	90	0,76	28 – 9
2125	PVC	600	90	0,76	28 – 9
2126	PVC	600	90	0,76	28 – 9
2127	PVC	600	105	0,76	28 – 9
2128	PVC	600	105	0,76	29 – 9
2129	PVC	600	105	0,76	28 – 9
2243	PVC	300	105	1,14	20 – 16
2261	PVC	300	105	0,76	18
2262	PE	600 (isol.)	60	0,76	26 – 16
		300 (Jacket)			
2263	PE	600 (isol.)	60	0,76	26 – 16
		300 (Jacket)			
2264	PE	600 (isol.)	60	0,76	26 – 16
		300 (Jacket)			
2265	PVC	300	80	0,38	26 – 16
2266	PVC	300	80	–	26 – 16
2267	PVC	300	80	–	36 – 30
2268	PVC	300	80	–	26 – 16
2269	PVC	300	80	–	26 – 16
2270	PVC	300	80	–	26 – 16
2271	as for SVT	300	60	as for SVT	26 – 16
2272	as for SVT	300	60	as for SVT	26 – 16
2273	as for SVT	300	60	as for SVT	26 – 16
2274	as for SVT	300	60	as for SVT	26 – 16
2275	as for SVT	300	60	as for SVT	26 – 16
2276	as for SVT	300	60	as for SVT	26 – 16
2277	as for SVT	300	60	as for SVT	26 – 16
2278	as for SVT	300	60	as for SVT	26 – 16
2279	as for SVT	300	60	as for SVT	26 – 16
2280	as for SVT	300	60	as for SVT	26 – 16
2317	PE	600	60	–	26 – 16
2351	PE	600	80	–	26 – 16
2352	PE	300	80	–	26 – 16
2353	PE	300	80	–	26 – 16
2354	PE	600	80	–	26 – 16
2355	PE	600	80	–	26 – 16
2376	PVC	300	105	–	–
2384	variable	30	60	–	30
2385	VAR	30	60	–	30
2386	VAR	30	60	–	30
2387	VAR	30	60	–	30
2388	PVC	30	60	–	–
2405	PVC	300	80	–	30 – 16
2439	PE	600	80	–	26 – 16
2448	variable	30	60	–	30
2461	PVC	30	60	–	26 – 16
2462	PVC	300	60	–	–
2463	PVC	600	80	–	26 – 10

\* not specified

UL-Style No.	Insulation Material	Voltage Volt	Temp. °C	Insulation thickness mm	AWG Size
2464	variable	300	80	–	–
2468	PVC	300	80	0,38	32 – 16
2474	PVC	600	105	–	26 – 16
2477	PVC	600	60	–	33 – 16
2483	PVC	600	105	–	26 – 16
2489	PVC	600	60	–	18
2490	AWM	not specified*	60	AWM	min. 36
2493	PP	600	60	–	30 – 16
2498	PE	300	80	–	28 – 16
2501	PVC	600	105	–	30
2502	variable	30	80	–	–
2504	PVC	600	105	–	20 – 14
2507	PVC	600	60	–	26 – 16
2516	PVC	600	105	–	30 – 9
2517	PVC	300	105	–	32 – 16
2532	PVC	30	60	–	30 – 16
2535	PVC	30	80	–	30 – 16
2548	PE	300	80	–	–
2549	PVC	300	90	–	30 – 16
2550	AWM	600	90	AWM	min. 40
2551	AWM	30	105	AWM	min. 40
2560	PVC	30	60	–	30
2564	PVC	125	75	–	22
2567	PVC	600	60	–	–
2570	PVC	600	80	–	30 – 9
2571	PVC	–	80	–	30 – 16
2574	AWM	30	105	AWM	min. 40
2576	PVC	150	80	–	30 – 9
2582	PE	150	60	–	30 – 16
2584	PVC	125	80	–	30 – 9
2586	PVC	600	105	–	30 – 9
2587	PVC	600	90	–	30 – 9
2589	AWM	30	105	AWM	see AWM Requirements
2598	VAR	300	60	–	30 – 16
2606	PE	300	60	–	30
2610	labeled Style 1007	300	80	labeled Style 1007	see 1007 Requirements
2614	AWM	30	105	AWM	min. 40
2623	PE	30	80	–	30 – 20
2626	AWM	30	80	AWM	not specified*
2629	PE	300	80	–	30 – 16
2630	AWM	125	90	AWM	30 – 9
2631	AWM	not specified*	90	AWM	min. 40
2637	AWM	30	90	AWM	min. 40
2653	AWM	600	90	AWM	36 – 6
2654	AWM	300	90	AWM	36 – 6
2655	PVC	300	80	–	33 – 10
2656	AWM	600	80	AWM	36 – 6
2660	AWM	not specified*	60	AWM	–
2661	AWM	300	105	AWM	36 – 6
2662	PVC	600	105	–	33 – 10
2668	AWM	30	60	AWM	min. 40
2678	PVC	30	105	–	–
2704	PVC	30	60	–	30
2778	AWM	150	60	AWM	30 – 16
2789	AWM	30	60	AWM	see AWM
2833	AWM	30	60	AWM	–
2835	PP	30	80	–	22
2919	PP	30	80	–	28 – 18
2920	AWM	30	60	AWM	min. 40
2921	AWM	30	60	AWM	min. 40
2930	AWM	not specified*	105	AWM	min. 40
2931	AWM	125	105	AWM	min. 40
2937	AWM	300	80	AWM	AWM
3071	S/GB	600	200	0,76	18 – 14
3075	S/GB	600	200	0,76	10 – 2
3173	XLPE	600	125	0,76	26 – 9
3199	XLPE	300	105	0,38	22 – 16
3212	SiR	600	150	1,14	26 – 10
3213	SiR	600	150	1,52	8 – 2
3214	SiR	600	150	1,91	1 – 4/0
3239	SiR	VAR	150	VAR	24 – 10
3265	XLPE	150	125	0,25	28 – 20
3266	XLPE	300	125	0,38	26 – 16
3271	XLPE	600	125	VAR	24 – 12
3272	XLPE	600	125	VAR	22 – 4
3291	XPVC	300	105	–	26 – 16
20063	PE	300	80	0,5	28 – 16
20083	PE	300	80	AWM	various AWG
20601	AWM	300	80	AWM	AWM

## INDEX BRITISH STANDARD

91	Electric cables, soldering buckets
125	Electric conductors, copper & copper-cadmium, for overhead transmission
215	Electric conductors, aluminium & steel-cored aluminium
801	Cable sheaths, lead and lead alloy
1441	Galvanised steel wire, for submarine cables
1442	Galvanised steel wire, for land cables
1791	Electric conductors, copper, cotton-covered
1843	Insulated cables, twin compensating cables, thermocouples, colour codes
1990	Communication transmission lines, wood poles
2316	Coaxial cables, radio frequency
2848	Cable sheaths, flexible
3242	Electric conductors, aluminium alloy, stranded, for power transmission
3573	Communication cables, polyolefin insulated & sheathed copper-conductor cables
3858	Electric cables, sleeves, binding & identification
3988	Electric conductors, aluminium solid conductors, for insulated cables
4066	Superseded by BSEN 50266-1:2001
4553	Insulated cables, PVC-insulated, split concentric copper
4565	Electric conductors, steel wire for reinforcing aluminium conductors
4579	Electric cables, mechanical & compression joints in connectors
4653	Electric conductors, copper, paper covered
4799	Electric conductors, copper glass fibre lapped
4801	Electric conductors, copper, glass fibre braided
4808	Communication cables, LE, PVC insulated & sheathed
4927	Electric conductors, copper, textile covered
50266	Test methods for cables under fire conditions
5055	Insulated cables, PVC & elastomer-insulated, for discharge-tube installations
5099	Cable sheaths, spark testing
5308	Insulated cables, instrumentation, intrinsically safe
5372	Electric cables, terminations for 3 & 4 core insulated cables, dimensions
5425	Communication cables, coaxial
5467	Power cables, armoured thermosetting-polymer insulated, for electricity supply
5593	Sheathed cables, aluminium-sheathed CONSAC cables
5819	Communication cables for interconnection between video recorder and television receivers
6004	Insulated cables, PVC insulated, non-armoured
6007	Insulated cables, rubber-insulated, non-armoured
6116	Flexible cables, elastomer-insulated flexible trailing cables, for mines and quarries
6141	Flexible conductors, for high temperature zones
6195	Flexible cables, insulated, for coil leads
6207	Mineral-insulated cables, copper sheathed, with copper conductors
6231	Single-core cables, PVC insulated, for switchgear and controlgear
6234	Insulated cables, polyethylene
6346	Power cables, PVC-insulated, for electricity supply
6360	Electric conductors, insulated cables
6387	Electric cables, fire-resistant, tests
6425	Electric cables, combustion gases, test methods
6469	Insulated cables, insulation and sheaths, test methods
6480	Power cables, impregnated paper-insulated, lead or lead alloy sheathed electric cables
6485	Electric conductors, PVC covered overhead power line conductors
6500	Flexible cables, insulated cords and cables
6622	Power cables, thermosetting-polymer insulated, high voltage
6708	Flexible cables, trailing cables, mining equipment
6724	Thermosetting polymer insulated, for electricity supply, low smoke
6726	Flexible conductors, for festoon and temporary lighting
6746	Cable sheaths, PVC

## INDEX BRITISH STANDARD

6862	Electric cables, road vehicles
6883	Insulated cables, elastomer insulated cables, for ships
6899	Cable sheaths, rubber
6946	Electric cables, metal channel support systems
6977	Multicore cables, insulated flexible cables, for lifts
7211	Power cables, thermosetting polymer insulated, non-armoured, low smoke
7365	Electric conductors, hard drawn aluminium wire, for overhead lines
7919	Electric cables, flexible cables rated up to 450/750v for use with appliances and equipment intended for industrial and similar environments
9530	Electric cables, cable fitting accessories, assessed quality, for circular electrical connectors
4737	Insulated cables, PVC-insulated, for intruder alarm systems
5425	Coaxial cables, for wideband distribution systems
638	Flexible cables, arc welding
6746C	Insulated cables, PVC insulation, colour chart
Aero 2E21	Pren type electric cables, for aircraft
Aero G177	Insulated cables, Nyvin type for aircraft
Aero G189	Tersil electric cables, for aircraft, imperial units
Aero G192	Specification for Efglas type electric cables with copper conductors, for aircraft
Aero G195	Insulated cables, Minyvin type, for aircraft, imperial units
Aero G206	Fepsil-type cables, for aircraft
Aero G210	Specification for PTFE insulated equipment wires (with silver plated copper conductors)
Aero G212	Electric cables, for aircraft
Aero G215	Insulated cables, thermocouple extension cables, for aircraft
Aero G221	Insulated cables, Minyvin-type, for aircraft, metric units
Aero G222	Insulated cables, Efglas-type, for aircraft, metric units
Aero G227	Tersil electric cables, for aircraft, metric units
Aero G230	Specification for general requirements for aircraft electrical cables (second series)
Aero G231	Electric conductors, copper and copper alloy, for aircraft cables
Aero G232	Insulated cables, lightweight thin-wall, wrapped for aircraft
Aero G233	Insulated cables, lightweight thin-wall, extruded for aircraft
Aero G235	Insulated cables, lightweight thin-wall, wrapped, silver plated copper conductors for aircraft
Aero G236	Insulated cables, lightweight thin-wall, wrapped, nickel plated copper conductors for aircraft
Aero G237	Insulated cables, lightweight thin-wall, extruded, nickel plated copper conductors for aircraft
Aero G238	Insulated cables, lightweight thin-wall, wrapped, nickel plated copper conductors for aircraft
Aero G241	Electric cables, fire-proof, for aircraft
Aero G242	Communication cables, for aircraft data bus interconnecting systems
Aero G243	Electric cables, ignition, for aircraft engines
Aero G291	Insulated cables, Efglas-type, for aircraft, imperial units
AU231	Specification for seven-core connecting cable for road vehicles
AU237	Flexible conductors, jumper lead sets, for automotive starting
AU7	Electric cables, automotive, colour codes
AU88	Electric cables, automobile, light duty, ratings
AU88a	Recommendations for ratings for light duty cables for automobile use
PD2379	Electric cables, manufacturers' identification threads, Commonwealth, South Africa, colour register



# INTERNATIONAL ABBREVIATIONS

<b>AFNOR</b>	<b>A</b> ssociation <b>F</b> rançaise de <b>NOR</b> malisation (France)	<b>IEEE</b>	<b>I</b> nstitute of <b>E</b> lectrical and <b>E</b> lectronics <b>E</b> ngineers
<b>ANSI</b>	<b>A</b> merican <b>N</b> ational <b>S</b> tandards <b>I</b> nstitute (USA)	<b>ISDN</b>	<b>I</b> ntegrated <b>S</b> ervices <b>D</b> igital <b>N</b> etwork (International)
<b>AS</b>	<b>A</b> ustralian <b>S</b> tandard (Australia)	<b>ISO</b>	<b>I</b> nternational <b>O</b> rganization for <b>S</b> tandardization (International)
<b>ASTM</b>	<b>A</b> merican <b>S</b> tandard of <b>T</b> esting <b>M</b> aterials (USA)	<b>KEMA</b>	<b>K</b> euring van <b>E</b> lektrotechnische <b>M</b> aterialien (Netherlands)
<b>BS</b>	<b>B</b> ritish <b>S</b> tandard (Great Britain)	<b>LCIE</b>	<b>L</b> aboratoire <b>C</b> entral des <b>I</b> ndustries <b>E</b> lectriques (France)
<b>BSI</b>	<b>B</b> ritish <b>S</b> tandard <b>I</b> nstitution (Great Britain)	<b>MIL</b>	<b>M</b> ilitary <b>S</b> pecification (USA)
<b>BV</b>	<b>B</b> ureau <b>V</b> eritas (France)	<b>NEC</b>	<b>N</b> ational <b>E</b> lectrical <b>C</b> ode (USA)
<b>CATV</b>	<b>C</b> ommunity <b>A</b> ntenna <b>T</b> elelevision (International)	<b>NEMA</b>	<b>N</b> ational <b>E</b> lectrical <b>M</b> anufacturers <b>A</b> ssociation (USA)
<b>CEBEC</b>	<b>C</b> omité <b>E</b> lectrotechnique <b>B</b> elge (Belgium)	<b>NEMKO</b>	<b>N</b> orges <b>E</b> lektriske <b>M</b> ateriellkontroll (Norway)
<b>CEE</b>	<b>I</b> nternational <b>C</b> ommission on Ruls for the Approval of <b>E</b> lectrical <b>E</b> quipment (International Commission)	<b>NEN</b>	<b>N</b> ederlands <b>N</b> ormalisatie-Instituut (Netherlands)
<b>CEI</b>	<b>C</b> ommission <b>E</b> lectrotechnique <b>I</b> nternationale (International)	<b>NF</b>	<b>N</b> ormes <b>F</b> rançaises (France)
<b>CEMP</b>	<b>C</b> entre d' <b>E</b> tude des <b>M</b> atières <b>P</b> lastiques (France)	<b>NFC</b>	<b>N</b> ormes <b>F</b> rançaises <b>C</b> lass <b>C</b> (France)
<b>CEN</b>	<b>C</b> omité <b>E</b> uropéen de <b>N</b> ormalisation <b>E</b> lectrotechniques	<b>ÖVE</b>	<b>Ö</b> sterreichischer <b>V</b> erband für <b>E</b> lektrotechnik (Austria)
<b>CENELEC</b>	<b>C</b> omité <b>E</b> uropéen de <b>N</b> ormalisation <b>E</b> lectrotechniques	<b>SAE</b>	<b>S</b> ociety of <b>A</b> utomotive <b>E</b> ngineers
<b>CNET</b>	<b>C</b> entre <b>N</b> ational d' <b>E</b> tude de <b>T</b> élécommunication (France)	<b>SEK</b>	<b>S</b> venska <b>E</b> lektriska <b>K</b> ommissionen (Sweden)
<b>CNOMO</b>	<b>C</b> omité de <b>N</b> ormalisation des <b>M</b> oyens de <b>P</b> roduction	<b>SEMKO</b>	<b>S</b> venska <b>E</b> lektriska <b>M</b> aterielkontroll-anstalten (Sweden)
<b>CSA</b>	<b>C</b> anadian <b>S</b> tandards <b>A</b> ssociation (Canada)	<b>SETI</b>	<b>S</b> ähkötarkastuslatios (Finland)
<b>DEMKO</b>	<b>D</b> anmarks <b>E</b> lektriske <b>M</b> aterielkontrol (Denmark)	<b>SEV</b>	<b>S</b> chweizerischer <b>E</b> lektrotechnischer <b>V</b> erein (Switzerland)
<b>DIN</b>	<b>D</b> eutsches <b>I</b> nstitut für <b>N</b> ormung (Germany)	<b>SNV</b>	<b>S</b> chweizerischer <b>N</b> ormenverband (Switzerland)
<b>DKE</b>	<b>D</b> eutsche <b>E</b> lektrotechnische <b>K</b> ommission im DIN und VDE (Germany)	<b>TGL</b>	<b>DDR-Standards</b> : Technische Normen, Gütevorschriften und Lieferbedingungen (ehemalige GDR)
<b>EAC</b>	<b>Eur</b> Asian <b>C</b> onformity (GOST)	<b>UL</b>	<b>U</b> nderwriters <b>L</b> aboratories Inc. (USA)
<b>EN</b>	<b>E</b> uropean <b>S</b> tandards (Germany)	<b>UNI</b>	<b>U</b> nificazione <b>N</b> azionale <b>I</b> taliana (Italy)
<b>FAR</b>	<b>F</b> ederal <b>A</b> ir <b>R</b> egulation (USA)	<b>UTE</b>	<b>U</b> nion <b>T</b> echnique de l' <b>E</b> lectricité (France)
<b>FTZ</b>	<b>F</b> ernmeldetechnisches <b>Z</b> entralamt (Germany)	<b>VDE</b>	<b>V</b> erein <b>D</b> eutscher <b>E</b> lektroingenieure (Germany)
<b>GOST</b>	<b>U</b> SSR- <b>S</b> tandards	<b>VDEW</b>	<b>V</b> ereinigung <b>D</b> eutscher <b>E</b> lektrizitätswerke e. V. (Germany)
<b>HD</b>	<b>H</b> armonisierungs- <b>D</b> okumente (International)	<b>ZVEH</b>	<b>Z</b> entralverband der <b>D</b> eutschen <b>E</b> lektrohandwerke e. V. (Germany)
<b>HN</b>	<b>H</b> armonisation des <b>N</b> ormes (France)	<b>ZVEI</b>	<b>Z</b> entralverband der <b>E</b> lektrotechnik- und <b>E</b> lektronik <b>I</b> ndustrie e. V. (Germany)
<b>IEC</b>	<b>I</b> nternational <b>E</b> lectrotechnical <b>C</b> ommission (International)		
<b>IEE</b>	<b>I</b> nstitution of <b>E</b> lectrical <b>E</b> ngineers (Great Britain)		

# ■ DEFINITIONS: CLASSES OF STRESS (DUTY) IN FLEXIBLE CABLES AND INSULATED WIRES

The application of a flexible cable in certain areas as, or in, operating materials as well as for certain combinations of external influences that can occur in these areas, is described by the collective term "stress" or "duty". Suitable flexible cables and insulated wires are defined in the applicable equipment standards for the devices in question. On the basis of mechanical influences, as well the general expressions used, the term "stress" or "duty" is divided into the following categories.

## **Normal stress / Ordinary duty**

– Normal stress is present when the cables are subject to low mechanical stresses in the areas of application, and the risk of mechanical damage is low, as is the case to be expected in the normal use of small to medium size equipment in domestic and commercial as well as in light industrial premises.

Such equipment includes amongst others, vacuum cleaners, toasters, washing machines, refrigerators.

## **Low stress / Light duty**

– Low stress is then present when the risk of mechanical damage and mechanical stress is low in the areas of application, as is the case to be expected for normal use of lightweight hand-held devices and lightweight operating materials in domestic households.

Included in such equipment are radios, floor lamps, hairdryers, small desktop office equipment.

## **Very low stress / Extra light duty**

– Very low stress is then present when the risk of mechanical damage and mechanical stress is very low and can be considered negligible, i.e. under those influences that are to be expected for lightweight appliances in households and offices; Cases of applications where the cables having a greater mechanical protection would restrict the freedom of movement by the appliance. Included in such types of appliances are electric clocks and electric shavers.

## **High stress / Heavy duty**

– High stress is then present when the risk of mechanical damage or a mechanical stress is of medium severity appreciable, e.g. for normal use of equipment in moderately heavy branches of industry or agricultural workshops, and the temporary use of such at building sites.

Included in such equipment are, amongst others, moderately heavy portable machinery and motors at a building site or in agricultural workings, large hot-water boiling installations, hand-held lamps, hoists, and fixed installations in temporary buildings.

## **High stress (Heavy duty) in multi-core cables**

– Applications as for high stress, though primarily for use in areas of manufacturing facilities including tool-making machinery, or mechanical handling equipment. The cables can be used inside or outside buildings for an ambient temperatures ranging from between  $-25^{\circ}\text{C}$  and  $+50^{\circ}\text{C}$  and the stabilised conductor temperatures do not exceed  $+60^{\circ}\text{C}$  Examples are for connecting a control unit to a production machine, connections between a control unit and a machine, e.g. in hoists or cranes where the cable length does not normally exceed 10 m. Longer cable lengths are permissible for fixed inter-connections.

## **Application: Indoor and outdoor use**

The terms are in conjunction with the limiting conditions, such as for example, minimum and maximum operating temperatures, or the influence of the ambient temperatures, understood as being limited by the design and intended usage. This context is defined by "the intended environment".

### **Indoor use**

– The cables are installed or connected to an apparatus device and can be used permanently in the building at all times, namely in "the intended environment". The building can be used for commercial, industrial or residential purposes.

### **Outdoor use for a limited period**

– The cables may be used outdoors as "the intended environment" for short periods of time, e.g. connected to electric lawnmowers or drills.

### **Permanent outdoor use**

– The cables are designed to resist the various stresses that can occur outdoors in "the intended environment" (including weather conditions).

# CHARACTERISTICS\* OF INSULATING AND SHEATH MATERIALS

Designation			Electrical					Thermic						
VDE Initial-code	Ab- brevi- ations	Materials	Density g/m <sup>3</sup>	Break- down- voltage KV/mm (20°C)	Spezific volume resistivity Ohm·cm 20°C	Dielectric constant 50 Hz/20°C	Dielectric loss- factor tan δ	Working temperature		Melt- temperature +°C	Flame- resistance	Oxygen index LOI (% O <sub>2</sub> )	Heating value H <sub>0</sub> MJ·kg <sup>-1</sup>	
								permanent °C	short time °C					
Thermoplastic	Y	PVC	Polyvinylchloride compounds	1,35–1,5	25	10 <sup>13</sup> –10 <sup>15</sup>	3,6–6	4 x 10 <sup>-2</sup> to 1 x 10 <sup>-1</sup>	- 30 + 70	+100	>140	self-extin- guishing	23–42	17–25
	Yw	PVC	Heat-resistant 90°C	1,3–1,5	25	10 <sup>12</sup> –10 <sup>15</sup>	4–6,5		- 20 + 90	+120	>140		24–42	16–22
	Yw	PVC	Heat-resistant 105°C	1,3–1,5	25	10 <sup>12</sup> –10 <sup>15</sup>	4,5–6,5		- 20 +105	+120	>140			16–20
	Yk	PVC	Cold resistant	1,2–1,4	25	10 <sup>12</sup> –10 <sup>15</sup>	4,5–6,5		- 40 + 70	+100	>140			17–24
	2Y	LDPE	Low density Polyethylene	0,92–0,94	70	10 <sup>17</sup>	2,3	2 x 10 <sup>-4</sup>	- 50 + 70	+100	105–110	flam- mable	≅22	42–44
	2Y	HDPE	High density Polyethylene	0,94–0,98	85	10 <sup>17</sup>	2,3	3 x 10 <sup>-4</sup>	- 50 +100	+120	130			
	2X	VPE	Cross-linked Polyethylene	0,92	50	10 <sup>12</sup> –10 <sup>16</sup>	4–6	2 x 10 <sup>-3</sup>	- 35 + 90	+100	–			
	O2Y		Foamed Polyethylene	~0,65	30	10 <sup>17</sup>	~1,55	5 x 10 <sup>-4</sup>	- 40 + 70	+100	105			
	3Y	PS	Polystrole	1,05	30	10 <sup>16</sup>	2,5	1 x 10 <sup>-4</sup>	- 50 + 80	+100	>120	≅22	40–43	
	4Y	PA	Polyamide	1,02–1,1	30	10 <sup>15</sup>	4	2 x 10 <sup>-2</sup> to 1 x 10 <sup>-3</sup>	- 60 +105	+125	210	≅22	27–31	
	9Y	PP	Polypropylene	0,91	75	10 <sup>16</sup>	2,3–2,4	4 x 10 <sup>-4</sup>	- 10 + 90	+140	160	42–44		
	11Y	PUR	Polyurethane	1,15–1,2	20	10 <sup>10</sup> –10 <sup>12</sup>	4–7	2,3 x 10 <sup>-2</sup>	- 55 + 80	+100	150	20–26	20–26	
	TPE-E (12Y)		Polyester Elastomer	1,2–1,4	40	>10 <sup>10</sup>	3,7–5,1	1,8 x 10 <sup>-2</sup>	- 50 +100	+140	190	≅29	20–25	
	TPE-O		Polyolefine Elastomer	0,89–1,0	30	>10 <sup>14</sup>	2,7–3,6		+130	150	≅25	23–28		
Elastomere	G	NR SBR	Natural rubber Styrol-butadiene- rubber-compounds	1,5–1,7	20	10 <sup>12</sup> –10 <sup>15</sup>	3–5	1,9 x 10 <sup>-2</sup>	- 65 + 60	+120	–	flam- mable	≅22	21–25
	2G	SiR	Silicone rubber	1,2–1,3	20	10 <sup>15</sup>	3–4	6 x 10 <sup>-3</sup>	- 60 +180	+260	–	high flash point	25–35	17–19
	3G	EPR	Ethylen-propylene rubber-compounds	1,3–1,55	20	10 <sup>14</sup>	3–3,8	3,4 x 10 <sup>-3</sup>	- 30 + 90	+160	–	flam- mable	≅22	21–25
	4G	EVA	Ethylen-vinylacetat copolymer-compunds	1,3–1,5	30	10 <sup>12</sup>	5–6,5	2 x 10 <sup>-2</sup>	- 30 +125	+200	–		19–23	
	5G	CR	Polychloroprene compounds	1,4–1,65	20	10 <sup>10</sup>	6–8,5	5 x 10 <sup>-2</sup>	- 40 +100	+140	–	self-extin- guishing	30–35	14–19
	6G	CSM	Chlorsulfonated Polyethylene compunds	1,3–1,6	25	10 <sup>12</sup>	6–9	2,8 x 10 <sup>-2</sup>	- 30 + 80	+140	+160		19–23	
High temp. materials	10Y	PVDF	Polyvinylidene fluoride Kynar/Dyflor	1,7–1,9	25	10 <sup>14</sup>	9–7	1,4 x 10 <sup>-2</sup>	- 40 +135	+160	>170	self-extin- guishing	40–45	15
	7Y	ETFE	Ethylene-Tetrafluor ethylene	1,6–1,8	36	10 <sup>16</sup>	2,6	8 x 10 <sup>-4</sup>	-100 +150	+180	>265	self-extin- guishing	30–35	14
	6Y	FEP	Fluorine ethylene propylene	2,0–2,3	25	10 <sup>18</sup>	2,1	3 x 10 <sup>-4</sup>	-100 +205	+230	>225	self-extin- guishing	>95	5
	5YX	PFA	Perfluoralkoxy-pimeric	2,0–2,3	25	10 <sup>18</sup>	2,1	3 x 10 <sup>-4</sup>	-190 +260	+280	>290	self-extin- guishing	>95	5
	5Y	PTFE	Polytetrafluorethylene	2,0–2,3	20	10 <sup>18</sup>	2,1	3 x 10 <sup>-4</sup>	-190 +260	+300	>325	self-extin- guishing	>95	5
halogen-free compounds	H	not cross- linked	halogen-free polymer-compounds	1,4–1,6	25	10 <sup>12</sup> –10 <sup>14</sup>	3,4–5	~10 <sup>-3</sup>	- 30 + 70	+100	>130	self-extin- guishing	≅40	17–22
	HX	cross- linked	halogen-free polymer-compounds	1,4–1,6	25	10 <sup>13</sup> –10 <sup>14</sup>	3,4–5	10 <sup>-2</sup> –10 <sup>-3</sup>	- 30 + 90	+150	–	self-extin- guishing	≅40	16–25

\* The characteristics valid for unprocessed material

# CHARACTERISTICS\* OF INSULATING AND SHEATH MATERIALS

Thermic			Mechanical					Halogen	Weather		Designation											
Thermal conductivity W·K <sup>-1</sup> ·m <sup>-1</sup>	Corrosive gases in case of fire	Radiation-resistance-max Mrad	tensile strength N/mm <sup>2</sup>	Elongation at break %	Shore-hardness	Corrosion behaviour	Abrasion resistance	halogen-free	Weather resistance	Cold resistance	VDE-Initial-code	Ab- bre- viation	Material									
0,17	Hydrogen chloride	80	10-25	130-350	70-95 (A)	medium	0,4	no	medium in black	moderate-good	Y	PVC	Polyvinylchloride-compounds									
											Yw	PVC	Heat-resistant 90°C									
											Yw	PVC	Heat-resistant 105°C									
											YK	PVC	Cold resistant									
	0,3	no	100	10-20	400-600	43-50 (D)	medium	0,1	yes	good	2Y	LDPE	Low density Polyethylene									
	0,4										2Y	HDPE	High density Polyethylene									
	0,3										2X	VPE	Cross-linked Polyethylene									
	0,25										O2Y		Foamed Polyethylene									
	0,25	no	80	55-65	300-400	35-50 (D)	good	0,4		medium-good	moderate-good	3Y	PS	Polystrole								
	0,23	no	10	50-60	50-170	-	very good	1,0-1,5	yes	good	good	4Y	PA	Polyamide								
0,19	9Y											PP	Polypropylene									
0,25	100 (500)											30-45	500-700	70-100 (A)	very good	1,5	yes <sup>2)</sup>	very good	very good	11Y	PUR	Polyurethane
0,5	10											30	>300	85 (A) 70 (D)	good	1,5	yes			TPE-E (12Y)	Polyester Elastomer	
1,5	10	20	55 (A) 70 (D)	TPE-O	Polyolefine Elastomer																	
-	no	100	5-10	300-600	60-70 (A)	moderate	1,0	yes	moderate	very good	G	NR SBR	Natural rubber Styrol-butadiene-rubber-compounds									
0,22		50									40-80 (A)	2G	SiR	Silicone rubber								
-		200									200-400	65-85 (A)	3G	EPR	Ethylene-Propylene rubber-compounds							
-		100									8-12	250-350	70-80 (A)	4G	EVA	Ethylene-vinylacetat copolymer-compunds						
-		Hydrogen chloride									50	10-20	400-700	55-70 (A)	medium	1,5	no	very good	moderate-good	5G	CR	Polychloroprene compounds
-	350-600		60-70 (A)	6G	CSM	Chlorsulfonated Polyethylene compunds																
0,17	Hydro-fluoric	10	50-80	150	75-80 (D)	very good	0,01	no	very good	very good	10Y	PVDF	Polyvinylidene fluoride Kynar/Dyflor									
0,24	yes	10	40-50	150	70-75 (D)	very good	0,02		very good	very good	7Y	ETFE	Ethylene-Tetrafluor ethylene									
0,26	yes	1	15-25	250	55-60 (D)	very good	0,01		very good	very good	6Y	FEP	Fluorine ethylene propylene									
0,21	yes	0,1	25-30	250	55-60 (D)	very good	0,01		very good	very good	5YX	PFA	Perfluoralkoxypolymeric									
0,26	yes	0,1	80	50	55-60 (D)	very good	0,01		very good	very good	5Y	PTFE	Polytetrafluorethylene									
0,17	no	100	8-13	150-250	65-95 (A)	medium	0,2-1,5	yes	medium in black: good	average	H	not cross-linked	halogen-free polymer-compounds									
0,20	no	200	8-13	150-250		medium					HX	cross-linked	halogen-free polymer-compounds									

Thermoplastic

Elastomere

High temp. materials

halogen-free compunds

<sup>1)</sup> The propellent may be e.g. Fluor-Chlor-Hydrcarbon

<sup>2)</sup> depend on the type compound

# ■ SAFETY REQUIREMENTS IN THE USE OF CABLES AND INSULATED WIRES

## **Fundamental requirements**

The cables and insulated wires shall be of adequate safety for proper use in the intended manner such that these do not constitute any unacceptable risk to life or damage to property. The prevention of danger to persons and property during usage and storage of operating equipment means safety to include the detection of stress, risk and potential faults, as well as their rectification or a limitation to a minimum risk level.

Unless otherwise specified, cables and insulated wires should only be used for the conductance and distribution of electricity.

## **General requirements**

The choice in the selection of cables and insulated wires should be such that the voltages and currents prevailing in the operating equipment, a system or device used shall meet all operating conditions to be expected.

The cables shall be constructed, installed, protected, used and maintained to prevent danger as far as its reasonably practical.

## **Limiting conditions**

The limiting conditions in the DIN VDE and HD specifications shall be taken into account. An acceptable service life will be attained by compliance with the limiting conditions, depending on the circuit designed under defined conditions for use. The usable life of a permanently installed cable for power distribution is longer than that of a flexible cable.

The influence by all of the factors given in the following sections must be considered as an interrelationship and not on an individual basis.

## **Selection of cables and insulated wires**

The choice in the selection of cables and insulated wires shall be made such that these are suitable for the operating conditions as well as for all other external influences and compliance with the respective protection class.

a) Operating conditions are, for example:

- voltage
- protective measures
- grouping of cables
- current
- method of installation
- accessibility

b) External influences are, for example:

- ambient temperature
- presence of rain, water vapour or the accumulation of water
- presence of corrosive, contaminating or other chemical substances
- mechanical stresses (such as holes or sharp edges from metal constructions for example)
- animal world (such as rodents)
- plant world (such as fungal growths)
- irradiation (such as sunlight).

Note: The colour black provides a higher degree of protection than other colours.



# ■ SAFETY REQUIREMENTS IN THE USE OF CABLES AND INSULATED WIRES

## Requirements for cables

- for permanent installation, and
- for flexible applications

### Requirements for fixed installation

In the normal case, cables for permanent installation have solid single wire or stranded conductors. In certain circumstances, e.g. for greater ease of installation, the conductor may be Class 5 according to DIN VDE 0295. Cables should not be in contact with, or close to, hot surfaces if the cables are not intended for such conditions. Cables should not be buried directly in the earth and should be fastened by a suitable means while making allowance for the maximum spacing between fixing points.

The cable should not be damaged by any mechanical restraint used for its support. Cables which have been in use over longer periods of time may become damaged by movement. This can be caused by the natural effects of ageing on the physical properties of the materials used for the insulation sheath and jacket which can become brittle with time.

### For flexible applications

Flexible cables are made up conductors consisting of multiplicity of small wires and are either stranded or bunched. These cables meet either Class 5 or Class 6 of DIN VDE 0295.

Flexible cables should be used for connections to mobile operating equipment. The length of the connecting cable must be chosen such that response by the short-circuit protecting device is assured. The cable length should be as short as is needed for the practical application so as to reduce the risk of mechanical damage. In cases of applications where flexible PVC-sheathed cables are permissible, the use of spiral cables can be considered for shortening the effective length.

Flexible PVC-sheathed cables are not necessarily suitable for processing further to spiral cables. Multicore control cables shall be protected against permanent bending stress. Abrasion, notches and sharp bends are to be avoided.

Except for cables for connections to permanently installed operating equipment, flexible cables should not be permanently fixed (with the exception of heavy-duty cable designs for permanent installation in temporary facilities) unless these are contained in an enclosure affording mechanical protection. For a fixed installation, at least one cable should be used for "normal" stress.

Flexible cables should not be subjected to excessive straining from tensile forces, compression, twisting or kicking. This applies in particular at the point of entry into the device, and strain relief or the point of connection to the fixed wiring. These should not be damaged by any strain relief or clamping device at points to the permanent installation.

Flexible cables should not be placed under floorcoverings or carpets because there is the danger that this can cause thermal insulating effects, leading to increased temperatures, or that the weight of furniture from traffic can damage the cables.

Flexible cables should neither be in contact with, or close to, hot surfaces nor extend into the immediate vicinity of such, as they are not suitable for this purpose.

On account of their characteristics, this also applies in particular for PVC-sheathed and/or jacketed cables. The suitability of flexible cables for outdoor applications, either for short periods or continuous operation, is defined in the tables of the HD 516 and in DIN VDE Part 300.

Flexible PVC-sheathed cables are not suitable for permanent use in outdoor applications.

The types of structures for PVC-sheathed cables for short-term use in outdoor applications should not however be operated in conditions others than these, e.g. at temperatures lower than the specified temperature.

# ■ SAFETY REQUIREMENTS IN THE USE OF CABLES AND INSULATED WIRES

Cables without a jacket may neither be used as a substitute for a jacketed cable nor as an extension cable. These shall principally not be used for connecting Class 2 equipment unless the cable in the constructional standard has been defined as a cable for extra light duty and the equipment standard explicitly permits this cable type.

The corresponding VDE and HD regulations shall be observed for the cables used in deep mining operations, in quarrying as well as for moveable equipment, such as in cranes with spring-loaded reeling devices for example.

## **Voltage**

The rated voltage for a cable is the reference voltage for which the cable is designed and which serves to define the electrical testing requirements.

The rated voltage is expressed as the ratio of two values,  $U_0 / U$ , whereby  $U_0$  is the effective value (r.m.s.) of the voltage between any insulated conductor and the "earth" (metal covering of the cable or surrounding medium)

$U$  is the effective value (r.m.s.) between any two phase conductors of a multicore cable or of a system of single core cables. In an alternating current system, the rated voltage of a cable shall be at least equal to the nominal voltage to the value  $U_0$  and  $U$ . In direct current system, the rated voltage of the system shall not be higher than 1,5 times that of the nominal voltage of the cable.

Note:

The operating voltage of a system may permanently exceed the rated voltage for the cable by 10 %.

## **Current carrying capacity**

The nominal cross-section of each conductor should be selected such that the current carrying capacity is not less than the maximum continuous current that flows through the conductor under normal conditions of operation. The limiting temperature with respect to the current carrying capacity should not be exceeded for the cable insulation and sheath concerned.

Included in the defined conditions is also the method of installation for the cable used. The regulations for the permissible current rating shall be observed here for the current.

Correction factors may also be included in the values given for the load rating to allow for other conditions, such as for example:

1. cable grouping
2. type of overcurrent protection
3. ambient temperature
4. reeled / drummed cables
5. thermal insulation
6. frequency of the current (if other than 50 Hz)
7. effects of harmonic waves

Serious damage can be caused if cables are operated for longer periods of time above those limits given in the tables and can lead to early failure or considerable deterioration in the cable characteristics.

## **Thermal influences**

Cables should be selected, located and installed so that the intended heat dissipation is not inhibited and they do not present a fire hazard to adjacent materials.

The limiting temperatures for the individual cables are given separately in our catalogue. Under no circumstances may these values be exceeded by an interaction of internal joulean heat (to the material of the cable, connections and terminals) by the ambient conditions.

# ■ SAFETY REQUIREMENTS IN THE USE OF CABLES AND INSULATED WIRES

## **Mechanical stress**

Allowance shall be made for all possible mechanical stress that can arise during a normal installation process for laying cable in order to assess the risk of mechanical damage to cables.

## **Tension**

The following values for tension should not be exceeded for each conductor in use. This applies up to a maximum value of 1000 N for the tensile stress of all conductors unless HELUKABEL® has approved limits deviating from this value. 50 N/mm<sup>2</sup> by permanent operation for fixed installation.

15 N/mm<sup>2</sup> for flexible cables under static tension for fixed installation that are used in current circuits.

It is recommended for those cases where the above values are exceeded, that a separate strain-relieving element or similar protection should be used. The connection of such a strain-relieving element to the cable shall be made such that the cable is not damaged.

If flexible cables are subjected to dynamic tensile stress (including those due to the mass inertia, e.g. for reeling drums), the permissible tension or the fatigue life should be agreed between the user and HELUKABEL®.

## **Bending stress**

The internal bending radius of a cable should be chosen such that the cable is not damaged by this.

The choice of bending radii smaller than specified shall be concurred with HELUKABEL®.

Attention shall be given when stripping the insulation that the conductor is not damaged by this as the bending characteristics will otherwise seriously deteriorate.

The bending radii given apply for ambient temperatures of  $(20 \pm 10)^\circ\text{C}$ . The recommendations from HELUKABEL® shall be enquired for ambient temperatures other than those given.

Bending too close to any internal and/or external anchorage shall be avoided.

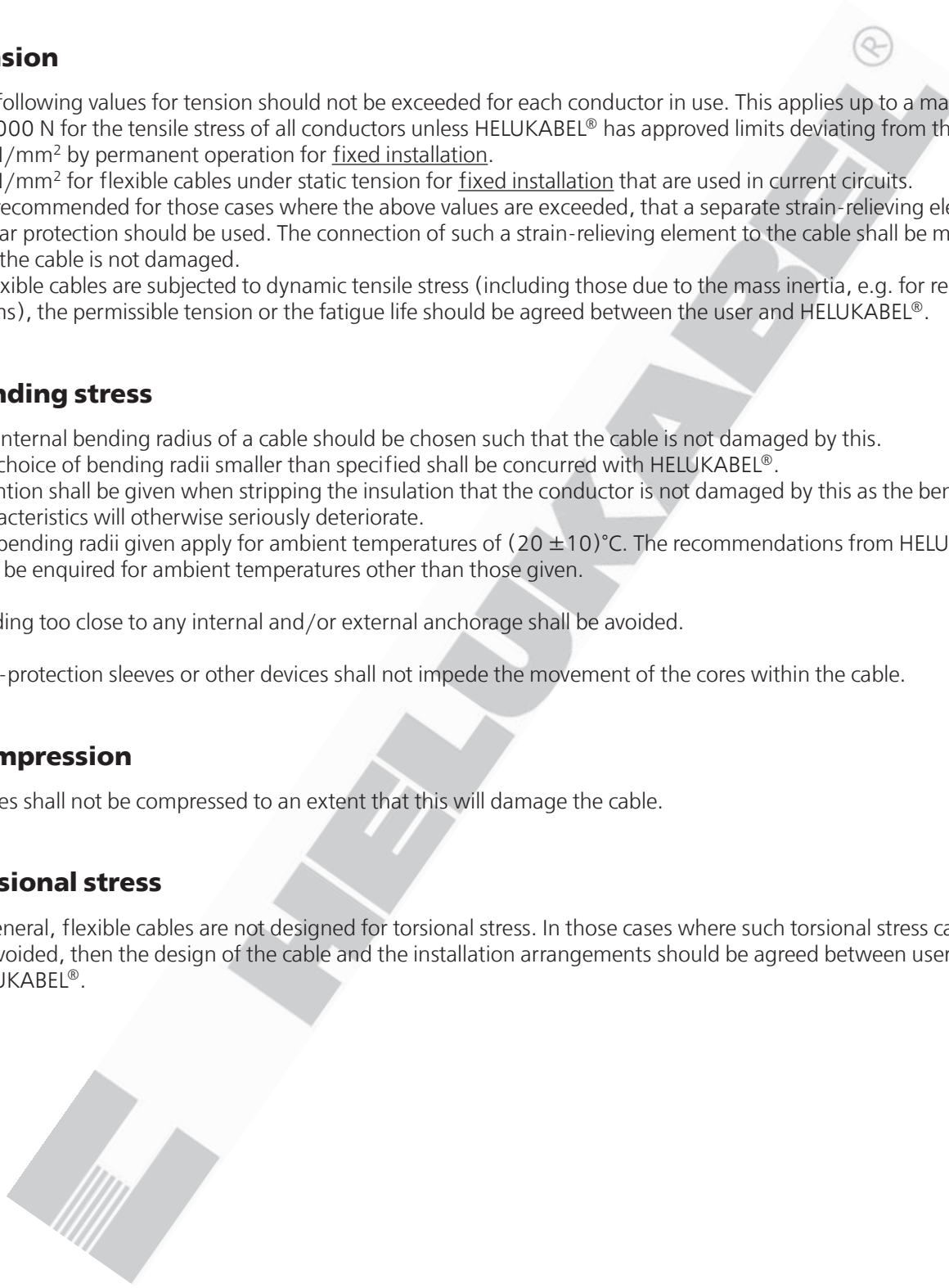
Kink-protection sleeves or other devices shall not impede the movement of the cores within the cable.

## **Compression**

Cables shall not be compressed to an extent that this will damage the cable.

## **Torsional stress**

In general, flexible cables are not designed for torsional stress. In those cases where such torsional stress cannot be avoided, then the design of the cable and the installation arrangements should be agreed between user and HELUKABEL®.



# ■ SAFETY REQUIREMENTS IN THE USE OF CABLES AND INSULATED WIRES

## **Compatibility**

The following points shall be considered in the selection and installation of cables:

- The avoidance of interference mechanical and electrical influences between adjacent circuits.
- Dissipation of heat from cables, or the chemical/physical influences from the materials used for the cables on bordering materials, such as for example, constructional and decorative materials, insulation tubes, supports, etc.
- Mutual interference by adjacent materials and the materials used for the cables. This applies for instance, for an absorption of plasticiser from PVC-sheathed cables by certain materials that are used for thermal insulation purposes, for strapping materials or for the equipment.

## **Dynamic stress**

The possibility should be taken into consideration of damage to cables and fastenings for these, by the dynamic forces that can be caused by any current including short-circuit currents.

## **Storage/Handling/Transportation**

Cables that are not intended for outdoor applications should be stored in dry indoor environments.

A number of constructional types of flexible cables are particularly susceptible to moisture, such as screened cables for example.

The ends of the cables should be sealed for the application and the expected duration of outdoor storage in order to prevent the penetration of moisture. The temperatures given in the tables in HD 516 S2 for storage shall be taken into account.

If the temperature of the cable falls below recommended values, then all types of mechanical stresses, in particular vibrations, shock, impact, bending and torsional twist shall be avoided.

# ■ GLOSSARY OF TERMS: CABLES AND WIRES

## A

**Acceptance angle** - The half-angle of the cone within which incident light is totally internally reflected by the fiber core. It is equal to  $\arcsin(NA)$ .

$$\Theta = \arcsin \sqrt{n_1^2 - n_2^2}$$

**Aerial cable** - A cable suspended in the air on poles or other overhead structure.

**Appliance Wire and Cable** - A classification covering insulated wire and cable for internal wiring of appliances and equipment.

**Armoured Cable** - A cable provided with a wrapping of metal for mechanical protection.

**ASA** - Abbreviation for American Standards Association. Former name of ANSI.

**ASME** - Abbreviation for American Society of Mechanical Engineers.

**ASTM** - Abbreviation for the American Society for Testing and Materials.

**ATM (Asynchronous Transfer Mode)** - A new emerging data standard that uses many of the same data rates as Fiber Channel and SONET.

**Attenuation** - The power drop or signal loss in a circuit, expressed in decibels (db). Generally attenuation increases (signal level decreases) with both frequency and cable length.

**AWG** - Abbreviation for American Wire Gauge. A standard measurement of the size of a conductor.

**AWM** - Designation for Appliance Wiring Material.

## B

**Bit** - A binary digit, smallest element of information in binary system.

**Bit (Binary Digit)** - A basic unit for the data of a digital transmitting system. A group of 8 Bit is usually expressed as one Byte.

**Bit rate** - The number of bits of data transmitted over a phone line per second.

**B & S Gauge** - Standard for Brown & Sharpe Gauge. The wire diameter standard is same as AWG.

**Breakdown Voltage** - The voltage at which the insulation between two conductors will break down. Performed as a type test in the laboratory.

**British Standard Wire Gauge** - A modification of the Birmingham Wire Gauge and the legal standard of Great Britain for all wires. It is variously known as Standard Wire

Gauge (SWG), New British Standard (NBS), English Legal Standard, and Imperial Wire Guide.

**Building Wire** - Insulated wires used in building for light and power, 600 volts or less, usually not exposed to outdoor environment.

**Buffer** - A protective coating over an optical fibre. A soft material extruded tightly over the fibre coating, mechanically isolates individual fibres.

**BUS** - A network which functions like a signal line and is shared by a number of nodes.

## C

**Cable** - Multicore stranded insulated wires under protective sheath to conduct electrical energy e.g. power cable, telecommunication cable, installation cable, data cable etc.

**Cable Core** - The portion of an insulated cable lying under the protective covering.

**Cable Sheath** - A protecting covering over the cable core to prevent outer damages.

**Capacitance (Capacity)** - That property of a system of conductors and a dielectric which permits the storage of electricity when potential difference exists between the conductors. A capacitance value is always positive.

**Capacitive Coupling** - Electrical interaction between two conductors caused by the capacitance between them.

**CATV** - Acronym for Community Antenna Television.

**CEBEC** - Belgium approval agency; Comite Electrotechnique Belge Service de la Marque.

**CEE** - European standards agency; International Commission on Rules for the Approval of Electrical Equipment.

**Cellular insulation** - Insulating material in foamed or sponge form with the cells closed or interconnected.

**CENELEC** - European standards agency; European Committee for Electrotechnical Norms.

**Chromatic dispersion** - The speed of an optical pulse travelling in a fiber changes if its wavelength changes. Chromatic dispersion can be measured by the measurement of travel time at different wavelength.

**Circuit** - The entire route of an electrical current. A complete path over which electrons can flow from the negative terminals of a voltage source through parts and wires to the positive terminals of the same voltage source.

**Circuit Sizes** - A popular term for building wire sizes 14 through 10 AWG.



# ■ GLOSSARY OF TERMS: CABLES AND WIRES

**Circular Mil (CM)** - Used to define cross-sectional areas of conductors. Area of a circle 1/1000 inches in a diameter. 1 mil (0,001 inch) is equal to square mil x 0,78540.

**Cladding** - A low-refractive index, glass or plastic that surrounds the core of a fiber. Optical cladding promotes total internal reflection for the propagation of light in a fiber.

**Coaxial Cable** - A cable consisting of two cylindrical conductors with a common axis, separated by a dielectric. The outer conductor or shield is commonly used to prevent external radiation from affecting the current flowing in the inner conductor.

**Coherent waves** - The phenomenon related to the existence of a correlation between the phases of the corresponding components of two waves or between the values of the phase of a given component of one wave at two instants in time or two points in space.

**Colour Code** - A system of identifying different insulated cores by means of colours, numbers, printing etc.

**Concentric lay** - Cable core composed of a central core surrounded by one or more layers of helically laid insulated wires or cores.

**Conductor** - A material capable of easily carrying an electrical conductivity. A wire or combination of wires not insulated from one another, suitable for carrying electric current.

**Control Cable** - A multi-conductor cable made for operation in control of signal circuits.

**Copolymer** - A compound resulting from the polymerization of two different monomers.

**Copperweld** - Copper covered steel wire. Copper and steel welded together. The trade name of Flexo Wire Division (Copperweld Steel Corp.) for their copper-clad steel conductors.

**Cord** - A small, flexible insulated cable.

**Cord Set** - Portable cords fitted with a wiring device at one or both ends. Cord is a small flexible insulated conductor or group of conductors, normally not larger than AWG 10 - up to 4 cores.

**Core** - In cables, a component or assembly of components over which other materials are applied, such as additional components, shield, sheath, or armour.

**Corona** - A discharge due to ionization of air around a conductor with a potential gradient exceeding a certain critical value. A high voltage electrical discharge that attacks insulation.

**Crimp** - Act of compressing a connector barrel around a cable in order to make an electrical connection.

**Cross-linked** - Setting up the chemical links between the molecular chains. A form of polyethylen material whose moleculars are more closely linked to produce a greater balance of physical and electrical properties. (XLPE - compound)

**Crosstalk** - Interference caused by audio frequencies. Undesired electrical currents in conductors caused by electromagnetic or electrostatic coupling from other conductors or from external sources. Also, leakage of optical power from one optical conductor to another.

**CSA** - Abbreviation for Canadian Standards Association, a non-profit independent organization which operates a listing service for electrical and electronic materials and equipment. The Canadian counterpart of the Underwriter's Laboratories.

**Current** - Flow of electricity measured in amperes. Practical unit is the ampere which represents the transfer of one coulomb per second.

**Current rating** - The maximum continuous electrical flow of current recommended by a given wire in a given situation, expressed in amperes.

**Cut off wavelength** - For a singlemode fiber, the wavelength above which the fiber exhibits singlemode operation.

## D

**dB** - see decibel

**D. C.** - Abbreviation for direct current (D – C), Electricity that flows in one direction only.

**Decibel (dB)** - One-tenth of a bel. Unit to express differences of power level. Example: The decibel is 10 times the common logarithm of the power ratio. It is used to express power gain in amplifiers or power loss in passive circuits or cables.

**DEMKO** - Approval agency of Denmark. Denmark's Elektriske Material Kontrol.

**Dielectric Breakdown** - The voltage required to cause an electrical failure or breakthrough of the insulation.

**Dielectric Strength** - The maximum voltage insulation can withstand without rupture. Usually expressed as a voltage gradient, e. g. volts per mil.

**Dispersion** - A general term for those phenomena that cause a broadening or spreading of light as it propagates through an optical fiber. The three types are modal, material, and waveguide.

**Drain Wire** - An uninsulated wire used as an earth connection. This is generally laid over the component or under the screening, braiding etc.

**Duct** - An underground or overhead tube or conduit for carrying electrical cables.

# ■ GLOSSARY OF TERMS: CABLES AND WIRES

## E

**EIA** - Abbreviation for Electronic Industries Association.

**Elastomer** - Any material that will return to its original size after stretching. Elastomer is a rubber or rubber-like material which will stretch repeatedly to 200 percent or more and return rapidly with force to its approximate original shape.

**Electromagnetic Coupling** - Energy transfer by means of a varying magnetic field.

**Electromagnetic Induction** - The production of a voltage in a coil due to a change in the number of magnetic lines of force (flux linkages) passing through the coil.

**Elongation** - The fractional increase in the length of a material stressed in tension.

**EMC** - Electromagnetic Compatibility (EMV).

**EMF** - Abbreviation for Electro Motive Force – force determining flow of electricity (voltage).

**EMI** - Any electrical or electromagnetic interference that causes undesirable response, degradation, or failure in electronic equipment. Optical fibers neither emit or receive EMI.

**EMV** - Designation for electromagnetic compatibility (EMC).

**EPR** - Ethylene-propylene copolymer rubber. The copolymer is chemically cross-linked.

**ETFE** - Ethylene tetrafluoroethylene

## F

**FDDI** - Fiber Distributed Data Interface. Very high speed Computer Network working with fiber optics.

**FEP** - Fluorinated ethylene propylene

**Ferrule** - A component of a connector that holds fiber in place and aids in its alignment, usually cylindrical in shape with a hole through the center.

**Filled Cable** - A telephone cable construction in which the cable core is filled with a material that will prevent moisture from entering or passing through the cable.

**Fine Stranded Wire** - Stranded wire with component strands of 36 AWG or smaller.

**Flame Resistance** - The ability of a material not to propagate flame once the heat source is removed.

**Flammability** - The measure of the material's ability to support combustion.

**Flat Cable** - A cable in flat form, where the cores lying parallel longitudinally but essentially with flat surfaces.

**Foamed Plastics** - Insulations having a cellular structure.

**Foils** - A thin supporting film of continuous sheet such as plastic foil, metal foil, laminated foil etc. for static shielding, contacts and other electrical applications.

**FR-1** - A flammability rating established by Underwriters Laboratories for wires and cables that pass a specially designed vertical flame test. This designation has been replaced by VW-1.

**FRNC** - Flame Retardant Non Corrosive

## G

**Gauge** - A term used to denote the physical size of a wire.

**Graded-index fiber** - An optical fiber whose core has a nonuniform index of refraction. The core is composed of concentric rings of glass whose refractive indices decrease from the center axis. The purpose is to reduce modal dispersion and thereby increase fiber bandwidth.

**Ground Conductor** - An electrical conductor for the connection to the earth, making a complete electrical circuit.

## H

**Helix** - A continuous spiral winding.

**Henry** - The unit of inductance (H).

**Hertz (Hz)** - A unit of measurements of the frequency equal to one cycle per second.

**High Temperature Wire and Cable** - Electrical wire and cables having thermal operating characteristics of 150°C and higher.

**Hi-Pot** - A test designed to determine the highest voltage that can be applied to a conductor without electrically breaking down the insulation.

**High Voltage** - Generally, a wire or cable with an operating voltage of 600 volts and above.

**Hook-up Wire** - Single conductor used to hook-up electrical parts of instruments for low current and voltage (under 1000 volts).

**Hybrid Cable** - Multi-conductor cable containing two or more types of components.

**Hypalon** - Du Pont's trade name for their chlorosulfonated polyethylene, an ozone resistant synthetic rubber (90°C).

**Hz** - Abbreviation for Hertz.

## I

# ■ GLOSSARY OF TERMS: CABLES AND WIRES

**ICEA** - Abbreviation for Insulated Cable Engineers Association.

**IEC** - European Standardization agency; International Electrotechnical Commission.

**IEEE** - Abbreviation for Institute of Electrical and Electronics Engineers.

**Impedance** - Resistance to flow of an alternating current at a particular frequency, expressed in ohms. It is a combination of resistance R and reactance X, measured in ohms.

**Index profile** - A graded-index optical fiber, the refractive index as a function of radius.

**Induction** - An influence exerted by a charged body or by a magnetic field on adjacent bodies without apparent communication.

**Inductive Coupling** - Crosstalk resulting from the action of the electromagnetic field of one conductor on the other.

**Insulation** - A non-conducting substance, named as dielectric, surrounding the conductor.

**Interface** - The two surfaces on the contact side of both halves of a multiple-contact connector which face each other when the connector is assembled. Common interconnection point for devices, e.g. RS232 Interface: Mouse-Personalcomputer.

**ISDN** - Integrated Services Digital Network. A standard protocol for digital telecommunications transmissions.

## J

**Jacket** - An overall covering of a cable, called also sheath – which protects against the environment and stress.

**Jumper** - A short length of conductor used to make a temporary connection between terminals, around a break in a circuit, or around an instrument.

## K

**KEMA KEUR** - Approval agency of Netherlands. Keuring van Elektrotechnische Materialien.

**KV** - Abbreviation for kilovolt = 1000 volts.

**KVA** - Abbreviation for kilovolt ampere = 1000 volts x amperes.

**KW** - Abbreviation for kilowatt = 1000 watt.

**Kynar** - Fluorocarbon insulation rated -65°C to +135°C, typically used as insulation for wire wrapwire. A Pennwalt trade name for polyvinylidene fluoride.

## L

**Laser** - Light Amplification by Stimulated Emission of Radiation. An electro-optic device that produces coherent light with a narrow range of wavelengths, typically centered around 780 nm, 1310 nm, or 1550 nm.

**Laminated Tape** - A tape consisting of two or more layers of different materials bonded together.

**LAN = Local Area Network** - A network located in a localised area e.g. in an office, building, complex buildings whose communication technology provides a high-bandwidth, low-cost medium to which many nodes can be connected.

**LED** - Light Emitting Diode.

**LOCA** - Abbreviation for Loss of Coolant Accident, a system malfunction associated with nuclear generating stations.

**Loop Resistance** - The total resistance of two conductors in a closed circuit, measured round trip from one end.

**Loss Factor** - The loss factor of an insulating material is equal to the product of its dissipation and dielectric constant.

## M

**MCM** - Cross-section of greater AWG-sizes. 1 MCM = 1000 circular mils = 0,5067 mm<sup>2</sup>.

**Meg or Mega** - Prefix meaning 1 million = 1.000000 = 10<sup>6</sup>.

**Megarad** - A unit for measuring radiation dosage. 1 megarad = one million rads = 10<sup>6</sup> rad or 10<sup>6</sup> cJ/kg.

**Mho** - The unit of conductivity. The reciprocal of an ohm.

**MHz** - One million cycles per second = megahertz = 10<sup>6</sup> Hz.

**Modem** - Abbreviation for Modulator/Demodulator. Device which allows to transmit electrical data via analogues transmission paths with limited bandwidth, e. g. Computer data via telephone lines.

**MTW** - An acronym for thermoplastic insulated Machine Tool Wire.

**Multi-conductor** - A combination of two or more conductors in a cable under jacket.

**Multimode-Fiber** - A type of optical fiber that supports more than one propagation mode.

**Mutal Capacitance** - Capacitance between two conductors when all other conductors are connected together to shield and ground.

**Mylar** - Du Pont trademark for polyester material.

# ■ GLOSSARY OF TERMS: CABLES AND WIRES

## N

**National Electric Code Article 725** - The NEC Article which covers remote control, signal and communication power limited circuits that are not an integral part of the device or appliance.

**National Electric Code Article 760** - The NEC Article which covers the fire and burglar alarms installation of wire and equipment operating at 600 Volts or less.

**National Electric Code (NEC)** - A set of regulations governing construction and installation of electrical wiring and apparatus in the United States, established by the American National Board of Fire Underwriters.

**NEMA** - National Electrical Manufacturers Association.

**NEMKO** - Approval agency of Norway. Norges Elektriske Materiekkontroll.

**Neoprene** - A synthetic rubber of thermosetting material with good resistance to oil, chemical, and flame, known as polychloroprene - mostly used as jacketing.

**Neper** - An electrical unit similar to decibel, used to express the ratio between two amount of power existing at two distinct points. 1 Neper = 8,686 decibels.

**NFPA** - Abbreviation for National Fire Protection Association. Administrative Sponsor of the National Electric Code (ANSI Standards Committee CI).

**Numerical Aperture NA** - The "light-gathering ability" of a fiber, defining the maximum angle to the fiber axis at which light will be accepted and propagated through the fiber.  $NA = \sin \theta$ , where  $\theta$  is the acceptance angle.

$$NA = \sin \theta_{\max} = \sqrt{n_1^2 - n_2^2}$$

**Nylon** - A group of polyamide polymers, used for wire and cable jacketings with good chemical and abrasion resistance.

## O

**Ohm** - The electrical unit of resistance. The value of resistance through which a potential difference of one volt will maintain a current of one ampere.

**Optical Fiber** - Any filament or fiber, made of dielectric materials, that guides light, whether or not it is used to transmit signals. Synonym: optical waveguide.

**OSHA** - Abbreviation for Occupational Safety and Health Act. Specifically the Williams-Steiger law passed in 1970 covering all factors relating to safety in places of employment.

**OVE** - Approval agency of Austria.

**Overlap** - A certain portion of a foil or band which laps over the leading edge of a helical or longitudinally wrapping tape.

**Ozone** - A faintly blue gaseous, reactive form of oxygen, obtained by the silent discharge of electricity in ordinary oxygen or in air.

**Ozone Index** - Percentage of oxygen necessary to support combustion in gas mixture.

## P

**Pair** - 2 insulated wires twisted together in a certain length to built a single circuit of transmission line.

**Patch Cable** - A cable with plugs or terminals on each end of the conductors to temporarily connect circuits of equipment together. In the IBM Cabling System, a length of Type 6 cable with data connectors on both ends.

**Patch Cord** - A flexible piece of electrical cord terminated at both ends with plugs, used for interconnecting circuits on a pasteboard.

**Patch Panel** - Distribution area to rearrange fiber connections and circuits.

**pH** - The measure of acidity or alkalinity of a substance. PH values are described from 0 to 14. Value 7 indicate the neutrality. Numbers below 7 result increasing acidity and number greater than 7 increasing alkalinity.

**Pick** - Distance between two adjacent crossover points of braiding wires or filaments, measured in picks per inch.

**Pigtail** - A short length of optical fiber, permanently fixed to a component, used to couple power between the component and a transmission fiber.

**Plenum** - The air return way of a central air handling system, either ductwork or open space over a dropped ceiling.

**Plenum Cable** - Cable approved by Underwriters Laboratories for installation in plenums without the need for conduit.

**Plug** - The part of the two mating halves of a connector which is movable when not fastened to the other mating half.

**Polychloroprene** - Chemical name of neoprene. A rubber-like compound for jacketing and also for insulating where cables are subject to rough usage, oils, moisture, solvents, greases and chemicals.

**Polyester (PETP)** - A resin formed by the reaction between a dibasic acid and a dihydroxy alcohol. Polyethylene terephthalate, used extensively as a moisture resistant cable core wrap.



# ■ GLOSSARY OF TERMS: CABLES AND WIRES

**Polyethylene (PE)** - This material is basically pure hydrocarbon resins with excellent dielectric properties, i. e. low dielectric constant, low dielectric loss across the frequency spectrum, mechanically rugged and resists abrasion and cold flow. The insulating materials derived from polymerization of ethylene gas.

**Polyerm** - A material of high molecular weight formed by polymerization of lower molecular weight molecules.

**Polyolefin** - A group of thermoplastics based upon the unsaturated hydrocarbons, known as olefins. When combined with butylene or styrene polymers, the form compounds such as polyethylene and polypropylene.

**Polypropylene (PP)** - A thermoplastic similar to polyethylene but stiffer and having higher softening point (temperature); excellent electrical properties.

**Polyurethane (PUR)** - Class of polymers known for good abrasion and solvent resistance. A copolymer of urethane is similar in properties to neoprene, usually used as a coldcuring moulding compound.

**Polyvinyl Chloride (PVC)** - This is a group of thermoplastic compounds composed of polymers of polyvinyl chloride or its polymer, vinylacetate, in combination with certain stabilizers, fillers, plasticizers, pigments etc., widely used for wire and cable insulations and several jackets.

**Power Cables** - Cables of several sizes, construction, and insulation, single or multi-conductor, designed to distribute primary power to various types of equipment, such as cables  $\geq 0,6/1$  kV.

**Power Factor** - The ratio between the true power in watts and the apparent power in volts – amperes.

**Primary Coating** - The plastic coating applied directly to the cladding surface of the fiber during manufacture to preserve the integrity of the surface.

**Printed Wiring** - A printed circuit intended to provide point-to-point electrical connections.

**Propagation** - Delay time required for an electrical wave to travel between two points on a transmission line.

## R

**Rayleigh Scattering** - The scattering of light that results of from small inhomogeneities in material density or composition.

**Reel** - A revolvable flanged device made of wood or metal, Used for winding of wires or cables.

**Refractive index** - The ratio of the velocity of light in a vacuum to its velocity in the medium. Synonym: Index of Refraction.

**Resistance** - Property of an electric circuit which determines for a given current the rate at which electric energy is converted into a heat and has a value, is measured in ohms.

**RG/U** - Abbreviation for Radio Government, Universal. RG is the military designation for coaxial cable in Mil-C-17. R = Radio, G = Guide, U = Utility.

**Ribbon Cable** - A flat cable consisting of two or more insulated conductors laid parallel in one plane and held together by means of adhesive or woven textile yarns.

**RMS (Root Mean Square)** - The effective value of an alternating current or voltage.

**Rubber (Wire Insulation)** - Term used to describe wire insulations made of thermosetting elastomers, occur naturally or may be made synthetically.

## S

**S** - Rubber insulated heavy duty flexible cable, stranded copper wires with separator. Two or more colour coded, stranding with filler, wrapped with separator, rubber jacket. 600 V.

**Semi-Rigid** - A cable containing a flexible inner core and a relatively inflexible sheathing.

**Semi-Rigid PVC** - A hard semi-flexible polyvinylchloride compound with low plasticizer content, (shore A  $\geq 97$ ), for Termi-Point – connecting technique.

**Semi-Solid** - An insulation cross-section having a partially open space between the conductor and the insulation perimeter.

**SEMKO** - Approval agency of Sweden.

**Separator** - A layer of insulating material which is placed between a conductor and its dielectric, between a cable jacket and the component it covers, or between various components of a multiple-conductor cable.

**Silicone** - A thermosetting elastomer with excellent heat-resistant. Polymeric materials in which the recurring chemical groups contain silicon and oxygen atoms at links in the main chain.

**Simplex** - Transmission only in one direction.

**Singlemode-Fiber** - A small-core optical fiber that supports only one mode of light propagation above the cutoff wavelength. Typical diameter is 9 – 10 mm, the dispersion very low. Singlemode fibers are proper for long distance transmissions.

**SJ** - Junior hard service, rubber-insulated pendant or portable cord. Same construction as type S, but 300 V. Jacket thickness different.



# ■ GLOSSARY OF TERMS: CABLES AND WIRES

**SJO** - Same as SJ, but neoprene, oil resistant compound outer jacket. Can also be made „waterresistant“ 300 V, 60°C.

**SJT** - Junior hard service thermoplastic or rubberinsulated conductors with overall thermoplastic jacket. 300 V, 60°C to 105°C.

**SJTO** - Same as SJT but oil resistant thermoplastic outer jacket. 60°C.

**SO** - Hard service cord, same construction as type S except oil resistant neoprene jacket. 600 V, 60°C to 90°C.

**SOOW** – like SO, but oil and water-resistant.

**Solid Conductor** - A conductor consisting of a single wire.

**SONET** - Synchronous Optical Network.

**SP-1** - All rubber, parallel-jacketed, two-conductor light duty cord for pendant or portable use in damp locations. 300 V.

**SP-2** - Same as SP-1, but heavier construction, with or without third conductor for grounding purposes. 300 V.

**SP-3** - Same as SP-2, but heavier construction for refrigerators or room air conditioners. 300 V.

**SPT-1** - Same as SP-1, except all-thermoplastic. 300 V. With or without third conductor for grounding.

**SPT-2** - Same as SP-2, except all-thermoplastic. 300 V. With or without third conductor for grounding.

**SPT-3** - Same as SP-3, except all-thermoplastic. 300 V. With or without third conductor for grounding.

**Spark Test** - A test designed to locate pinholes in an insulated wire by application of an electrical potential across the material for a very short period of time while the wire is drawn through an electrode field.

**Splice** - An interconnection method for joining the ends of two optical fibers in a permanent or semipermanent fashion. Maybe thermally fused or mechanically applied.

**ST** - Hard service cord, jacketed, same as type S, except all-plastic design. 600 V, 60°C to 105°C.

**Step index Fiber** - An optical fiber, either multi-mode or singlemode, in which the core refractive index is uniform throughout so that a sharp step in refractive index occurs at the core-to-cladding interface.

**STO** - Same as ST but with oil resistant thermoplastic outer jacket. 600 V, 60°C.

**SV** - Vacuum cleaner cord, two or three-conductor, rubber-insulated. Overall rubber jacket. For light duty in damp locations. 300 V, 60°C.

**SVO** - Same as SV except neoprene jacket. 300 V, 60°C.

**SVT** - Same as SV except all-plastic, construction. With or without third conductor for grounding purposes only. 300 V, 60°C to 90°C.

## T

**Tape Wrap** - A spirally applied tape over an insulated or uninsulated wire.

**Tear Strength** - The force required to initiate or continue a tear in a material under specified conditions.

**Temperature Rating** - The maximum temperature at which an insulating material may be used in continuous operation without loss of its basic properties.

**TEW** - Canadian Standard Association type appliance wires. Solid or stranded single conductor, plastic-insulated. 600 V, 105°C.

**TF** - Fixture wire, thermoplastic-covered solid or 7 strands. 60°C.

**TFE** - Tetrafluoroethylene.

**TFF** - Same as TF but flexible stranding. 60°C.

**THHN** - 90°C, 600 V nylon jacketed building wire.

**Thermocouple Lead Wire** - An insulated pair of wires used from the couple to a junction box.

**Thermoplastic** - A material which softens when heated and becomes firm on cooling.

**THW** - Thermoplastic vinyl insulated building wire. Flame-retardant, moisture and heat-resistant 75°C. Dry and wet locations.

**THWN** - Same as THW but with nylon jacket overall. 75°C.

**Transmission** - Transfer of electric energy from one location to another through conductors or by radiation or induction fields.

**Tray Cable** - A factory-assembled multi-conductor or multipair control cable approved under the National Electrical Code for installation in cable trays.

**Triaxial Cable** - A three-conductor cable constructed in three coincident axes, of which one conductor in the centre, second circular conductor concentric with the first and the third circular conductor insulated from the concentric with the first and second, usually with insulation, a braiding and a outer jacket.

**TW** - Thermoplastic vinyl-jacketed building wire, moisture resistant 60°C.

**Twisted Pairs** - A cable composed of two small insulated conductors twisted together without a common covering.

# ■ GLOSSARY OF TERMS: CABLES AND WIRES

## U

**UL** - Abbreviation for Underwriter's Laboratories, Inc.

**Ultraviolet** - Optical radiation for which the wavelengths are shorter than those for visible radiation, that is approximately between 1 nm and 400 nm.

**Unilay Stranding** - A conductor constructed in bunch form having more than one layer in a concentric stranding with a common length and direction of lay and contains 19, 27, 37 and any number of strands.

## V

**VDE** - West Germany approval agency.

**Velocity of light** - The velocity of light is 300.000 km/s in vacuum. In a medium it depends on the refractive index and the wavelength.

**Velocity of Propagation** - Ratio of speed of flow of electric current in an insulated cable to the speed of light. Usually expressed in percentage.

**Volt** - A unit of electromotive force.

**Voltage** - The term most often used in place of electromotive force, potential difference, or voltage drop to designate the electric pressure that exists between two points and is capable of producing a current when a closed circuit is connected between two points.

**Voltage Drop** - The amount of voltage loss from original input to point of electrical device.

**Voltage Rating** - The highest voltage that may be continuously applied to a wire in conformance with standards.

**VW-1** - A flammability rating established by Underwriters Laboratories for wires and cables that pass a specially designed vertical flame test, (formerly designated FR-1).

## W

**Wall Thickness** - The thickness of the applied insulation or jacket.

**WAN** - Wide Area Network. A network of connected computers that covers a great geographical area.

**Water Absorption** - A test to determine the water absorbed by a material after a given immersion period.

**Wire** - A conductor, either bare or insulated. A slender rod of metal usually referring to a single conductor, such as size 9 AWG and smaller.

**Wire Gauge** - A system of numerical designation of wire sizes.

## X

**XLPE** - Cross-linked polyethylene.






















## Y

**Yield Strength** - The minimum stress at which a material will start to physically deform without further increase in load.

## Z

**Zytel** - Du Pont's trade name for nylon resins.

# INTERNATIONAL CERTIFICATION MARKS AND TESTING INSTITUTE

Country	Certification marks	Testing Institutes/ Registration Agency
Belgien		Comité Electrotechnique Belge Belgisch Elektrotechnisch Comité (CEBEC)
China		Chinesische Zwangsläufige Zertifikation (China Compulsory Certification)
Denmark		Danmarks Elektriske Materielkontrol (DEMKO)
Germany		VDE-Prüfstelle (Verband Deutscher Elektrotechniker e. V.)
Germany		VDE-Prüfstelle (Verband Deutscher Elektrotechniker e. V.)
Germany		Fraunhofer Institut Produktionstechnik und Automatisierung
Europe		Communauté Européenne
Finland		FIMKO LTD
France		Union Technique de l'Electricité (UTE)
Great Britain		BSI British Standards Institution (Zeichenvergabestelle)
Italy		IMQ Istituto Italiano de Marchio Qualità
Canada		Canadian Standards Association (CSA)
Netherlands		Naamloze Vennootschap tot Keuring van Electrotechnische Materialen (KEMA)
Norway		Norges Elektriske Materielkontroll (NEMKO)
Austria		Österreichischer Verband für Elektrotechnik (Registration Agency)
Russia	 	EAC Certification (Eurasian Conformity) (GOST-R is replaced by EAC)
Sweden		Svenska Elektriska Materielkontrollanstalten (SEMKO)
Switzerland		Schweizerischer Elektrotechnischer Verein (SEV)
USA	 	Underwriters Laboratories (UL)

# FORMULAS OF ELECTROTECHNIC AND ELECTRONIC

Cross-section for **single wire round**

$$q = \frac{D^2 \cdot \pi}{4} \text{ or } D^2 \cdot 0,7854$$

Cross-section for **bunched wire**

$$q = \frac{d^2 \cdot \pi}{4} \cdot n \text{ or } d^2 \cdot 0,7854 \cdot n$$

Diameter for

**single wires cross-section**

$$D = \sqrt{\frac{q \cdot 4}{\pi}} \text{ or } \sqrt{q \cdot 1,2732}$$

Diameter for **bunched wires**

$$D = \sqrt{1,34 \cdot n \cdot d}$$

q = cross-section (mm<sup>2</sup>)

D = conductor diameter (mm)

d = single wire diameter (mm)

n = number of wires

Conductor Resistance

$$R = \frac{1}{\kappa \cdot q} \text{ oder } \frac{\rho \cdot l}{q}$$

$$R_{\text{Schleife}} = \frac{2 \cdot l}{\kappa \cdot q} \text{ oder } \frac{2 \cdot l \cdot \rho}{q}$$

R = Electrical direct-current resistant (Ohm)

R<sub>Schleife</sub> = Resistance of a complete circuit

q = cross-section (mm<sup>2</sup> or q mm)

κ (Kappa) = Conductivity

ρ (Rho) = Specific resistance ( $\rho = \frac{1}{\kappa}$ )

l = Conductor length (m)

Materials	Conductivity $\frac{m}{\Omega \cdot mm^2}$	Spec. resistance $\frac{\Omega \cdot mm^2}{m}$
Copper	58,00	0,01724
Aluminium	33,00	0,0303
Silver	62,00	0,0161
Iron	7,70	0,1299
Constantan	2,00	0,50

**Serial connection**

$$\text{Resistance: } R = R_1 + R_2 + R_3 + \dots + R_n$$

$$\text{Capacitance: } \frac{1}{C} = \frac{1}{C_1} + \frac{1}{C_2} + \frac{1}{C_3} + \dots + \frac{1}{C_n}$$

$$\text{Inductance: } L = L_1 + L_2 + L_3 + \dots + L_n$$

**Parallel connection**

$$\text{Resistance: } \frac{1}{R} = \frac{1}{R_1} + \frac{1}{R_2} + \frac{1}{R_3} + \dots + \frac{1}{R_n}$$

$$\text{Capacitance: } C = C_1 + C_2 + C_3 + \dots + C_n$$

$$\text{Inductance: } \frac{1}{L} = \frac{1}{L_1} + \frac{1}{L_2} + \frac{1}{L_3} + \dots + \frac{1}{L_n}$$

**Equivalent resistance** of 2 parallel connected resistance

$$R = \frac{R_1 \cdot R_2}{R_1 + R_2}$$

**Mutual capacity (C)**

$$\bullet \text{ coaxial cable } C = \frac{\xi r \cdot 10^3}{18 \cdot \ln \frac{D_a}{d}} \text{ (nF/km)}$$

$$\bullet \text{ parallel core } C = \frac{\xi r \cdot 10^3}{36 \cdot \ln \frac{D_a}{d}} \text{ (nF/km)}$$

• shielded twisted pair

$$C_B = \frac{\xi r \cdot 10^3}{36 \ln \frac{2a}{d} \cdot \frac{(D_a^2 - a^2)}{(D_a^2 - a^2)}} \text{ (nF/km)}$$

Da = Outer diameter over insulation

Ds = diameter over shield

d = diameter of conductor

a = distance - mid to mid of both

conductors

ξ = dielectric constant

**Ohm's Law**

The current intensity (I) is proportional to voltage (U) and inversely proportional to resistance (R)

$$I = \frac{U}{R} \quad R = \frac{U}{I} \quad U = I \cdot R$$

I = current intensity (Amps - A)

R = electrical resistance (Ω)

U = electrical voltage (V)

**Conductance**

$$G = \frac{1}{R} \quad 1S = \frac{1}{1 \Omega} \quad \text{or} \quad 1 \mu S = \frac{1}{1 M \Omega}$$

S (Siemens) = reciprocal value of a resistance

is used as **conductance**

1 Siemens = 1/Ohm

G = electrical conductance

**Capacitance**

• Single core against earth

$$C_B = \frac{\xi r \cdot 10^3}{18 \ln \frac{D_a}{d}} \text{ (nF/km or pF/m)}$$

• Unshielded symmetrical twisted pair

$$C_B = \frac{\xi r \cdot 10^3}{36 \ln \frac{2a}{d}} \text{ (nF/km or pF/m)}$$

• Coaxial pair

$$C_B = \frac{\xi r \cdot 10^3}{18 \ln \frac{D_a}{d}} \text{ (nF/km or pF/m)}$$

• Shielded symmetrical twisted pair

$$C_B = \frac{\xi r \cdot 10^3}{36 \ln \frac{2a}{d} \cdot \frac{(D_a^2 - a^2)}{(D_a^2 - a^2)}} \text{ (nF/km or pF/m)}$$

Di = outer diameter over single core (mm)

Da = outer diameter of multicores (mm)

d = conductor diameter (mm)

a = distance between two conductors mid to mid of both conductors

**Inductance of parallel cores**

at low frequencies

$$L = 0,4 \left( \ln \frac{D_a}{r} + 0,25 \right) \text{ mH/km}$$

at high frequencies

$$L = 0,4 \left( \ln \frac{D_a}{r} + 0 \right) \text{ mH/km}$$

**Inductance of coaxial cable**

at high frequencies

$$L = 0,2 \left( \ln \frac{D_a}{r} + 0 \right) \text{ mH/km}$$

Da = distance between two conductors mid to mid of both conductors

r = radius of a conductor

ξr = dielectric constant

**Impedance (Z)**

$$\text{for coaxial cable } Z = \frac{60}{\sqrt{\xi r}} \cdot \ln \frac{D_a}{d} \text{ (}\Omega\text{)}$$

D = diameter over insulation

d = conductor diameter

for communication cable

$$\text{at low frequencies } Z = \sqrt{\frac{R}{\omega C}} \text{ (}\Omega\text{)} \cdot \tan \varphi = 1, \quad \varphi = 45^\circ$$

$$\text{at high frequencies } Z = \sqrt{\frac{L}{C}} \text{ (}\Omega\text{)}$$

R = Resistance (Ω/km)

L = Inductance (mH/km)

C = Capacitance (nF/km)

ω = 2 π f

**Wave length**  $\lambda = \frac{v}{f}$

λ = wave length

v = propagation velocity

(velocity of light: 300 000 km/s)

f = frequency

units of attenuation - Neper (N), decibel (dB) and Bel (B)

1 Np = 8,686 dB

1 dB = 0,1151 Np =  $\frac{1}{10}$  Bel

1 Bel = 10 dB = 1,1513 Np

# FORMULAS OF POWER ENGINEERING

## Cross section

- for direct current and single **phase** alternative current one-phase current of known current for three-phase current
- for direct current and single **phase** alternative current of known power for three-phase current

$$q = \frac{2 \cdot I \cdot l}{\kappa \cdot U} \quad (\text{mm}^2)$$

$$q = \frac{1,732 \cdot I \cdot \cos \varphi \cdot l}{\kappa \cdot U} \quad (\text{mm}^2)$$

$$q = \frac{2 \cdot l \cdot P}{\kappa \cdot U \cdot U} \quad (\text{mm}^2)$$

$$q = \frac{l \cdot P}{\kappa \cdot U \cdot U} \quad (\text{mm}^2)$$

## Voltage drop

For low voltage cable network of normal operation, it is advisable of a voltage drop of 3-5%.

On exceptional case, higher values (up to 7%) can be permitted in case of network-extension or in short-circuit.

- for direct **current** of known current for single phase alternative current for three-phase current
- for direct **current** of known power for single phase alternative current for three-phase current

$$u = \frac{2 \cdot I \cdot l}{\kappa \cdot q} \quad (\text{V})$$

$$u = \frac{2 \cdot I \cdot \cos \varphi \cdot l}{\kappa \cdot q} \quad (\text{V})$$

$$u = \frac{1,732 \cdot I \cdot \cos \varphi \cdot l}{\kappa \cdot q} \quad (\text{V})$$

$$u = \frac{2 \cdot l \cdot P}{\kappa \cdot q \cdot U} \quad (\text{V})$$

$$u = \frac{2 \cdot l \cdot P}{\kappa \cdot q \cdot U} \quad (\text{V})$$

$$u = \frac{l \cdot P}{\kappa \cdot q \cdot U} \quad (\text{V})$$

u = voltage drop (V)  
 U = operating voltage (V)  
 P = power (W)  
 R<sub>w</sub> = effective resistance (Ω)/km  
 L = Inductance (mH/km)  
 ωL = induktiver Widerstand (Ω)/km (ω = 2 · π · f at 50 Hz = 314)

q = cross-section (mm<sup>2</sup>)  
 I = working current (A = Ampere)  
 l = length of the line in m  
 κ (Kappa) = electrical conductivity of conductors (m/Ω · mm<sup>2</sup>)  
 κ-copper : 58  
 κ-Alu : 33

## Nominal voltage

The nominal voltage is to be expressed with two values of alternative current U<sub>0</sub>/U in V (Volt).

U<sub>0</sub>/U = phase-to-earth voltage  
 U<sub>0</sub> : Voltage between conductor and earth or metallic covering (shields, armouring, concentric conductor)  
 U : Voltage between two outer conductors  
 U<sub>0</sub> : U/√3 for three-phase current systems  
 U<sub>0</sub> : U/2 for single-phase and direct current systems  
 U<sub>0</sub>/U<sub>0</sub> : an outer conductor is earth-connected for A. C. - and Nominal current

## Active current

I in (A)

## Reactive current

I<sub>w</sub> = I · cos φ

## Blindstrom

I<sub>0</sub> = I · sin φ

## Apparent power (VA)

S = U · I for single phase current (A. C.)  
 S = 1,732 · U · I for three-phase current

## Active power (W)

P = U · I · cos φ for single phase current (A. C.)  
 P = 1,732 · U · I · cos φ for three-phase current  
 P = U · I for direct current

## Reactive power (var)

Q = U · I · sin φ for single phase current (A. C.)  
 Q = 1,732 · U · I · sin φ for three-phase current  
 Q = P · tan φ

## Phase angle

φ is a phase angle between voltage and current

$$\cos \varphi = 1,0 \quad 0,9 \quad 0,8 \quad 0,7 \quad 0,6 \quad 0,5$$

$$\sin \varphi = 0 \quad 0,44 \quad 0,6 \quad 0,71 \quad 0,8 \quad 0,87$$

## Insulation resistance

$$R_{iso} = \frac{S_{iso}}{l} \cdot \ln \frac{D_a}{d} \cdot 10^{-8} \quad (\text{M}\Omega \cdot \text{km})$$

## Specific Insulation resistance

$$R_s = \frac{R \cdot 2\pi \cdot l \cdot 10^8}{\ln \frac{D_a}{d_i}}$$

D<sub>a</sub> = outer diameter over insulation (mm)  
 d = conductor diameter (mm)  
 d<sub>i</sub> = inner diameter of insulation (mm)  
 l = length of the line (m)  
 S<sub>iso</sub> = Spec. resistance of insulation materials (Ω · cm)

**Mutual capacity (C<sub>B</sub>)** for single-core, three-core and H-cable

$$C_B = \frac{\epsilon_r \cdot 10^3}{18 \ln \frac{D_a}{d}} \quad (\text{nF/km})$$

## Inductance

Single-phase 0,4 · (ln  $\frac{D_a}{r}$  + 0,25) mH/km

three-phase 0,2 · (ln  $\frac{D_a}{r}$  + 0,25) mH/km

D<sub>a</sub> = distance - mid to mid of both conductors  
 r = radius of conductor (mm)  
 ε<sub>r</sub> = dielectric constant  
 0,25 = factor for low frequency

## Earth capacitance

E<sub>C</sub> = 0,6 · C<sub>B</sub>

## Charging current (only for three-phase current)

I<sub>Lad</sub> = U · 2 π f · C<sub>B</sub> · 10<sup>-6</sup> A/km je Ader bei 50 Hz

## Charging power

P<sub>Lad</sub> = I<sub>Lad</sub> · U

## Leakage and loss factor

G = tan δ · ω C (S)      ω = 2 π f  
 C = Capacity  
 tan δ = loss factor  
 S = Siemens =  $\frac{1}{\Omega}$

## Dielectric loss

D<sub>v</sub> = U<sup>2</sup> · 2 π f · C<sub>B</sub> · tan δ · 10<sup>-6</sup> (W/km)  
 f on 50 Hz  
 tan δ PE/VPE cables ~0,0005  
 EPR ~0,005  
 Paper-single core, three-core, H-cable ~0,003  
 Oil-filled and pressure cable ~0,003  
 PVC-cable ~0,05

It should be noted that for the current load of the insulated cables and wires of selected cross-section, the power ratings table is also be considered.

To estimate the voltage drop of insulated wires and cables for heavy (big) cross-sections of single- and three-phase-overhead line, the active resistance as well as the inductive resistance must be considered.

The formula for single-phase (A. C.):

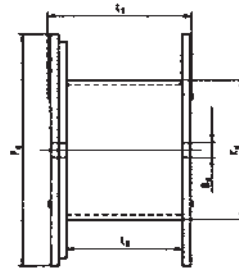
$$U = 2 \cdot l \cdot I \cdot (R_w \cdot \cos \varphi + \omega L \cdot \sin \varphi) \cdot 10^{-3} \quad (\text{V})$$

Three-phase:

$$U = 1,732 \cdot l \cdot I \cdot (R_w \cdot \cos \varphi + \omega L \cdot \sin \varphi) \cdot 10^{-3} \quad (\text{V})$$



# CAPACITY OF KTG-POOL DRUMS



$F_d$  = Flange- $\emptyset$   
 $K_d$  = Drum Barrel- $\emptyset$   
 $B_d$  = Bore- $\emptyset$   
 $l_1$  = Width over all  
 $l_2$  = Width for windings

## Wooden drums (standard)

Drum-code numbers	Drum-size	Flange $\emptyset$ $F_d$	Drum-Barrel $\emptyset$ $K_d$	Bore $\emptyset$ $B_d$	Width over all $l_1$	Width for windings $l_2$	Load bearing capacity max. kg	Drum weight kg
		mm	mm	mm	mm	mm		
051	05	500	150	56	470	410	100	8
061	06	630	315	56	415	315	250	17
071	07	710	355	80	520	400	250	25
081	08	800	400	80	520	400	400	31
091	09	900	450	80	690	560	750	47
101	10	1000	500	80	710	560	900	71
121	12	1250	630	80	890	670	1700	144
141	14	1400	710	80	890	670	2000	175
161	16/8	1600	800	80	1100	850	3000	280
181	18/10	1800	1000	100	1100	840	4000	380
201	20/12	2000	1250	100	1350	1045	5000	550
221	22/12	2240	1400	125	1450	1140	6000	710
250	25/14	2500	1400	125	1450	1140	7500	875
251	25/16	2500	1600	125	1450	1130	7500	900
281	28/18	2800	1800	140	1635	1280	10000	1175

## Plastic drums

Drum-code numbers	Flange $\emptyset$ $F_d$	Drum-Barrel $\emptyset$ $K_d$	Width over all $l_1$	Width-for windings $l_2$	Load bearing capacity max. kg	Drum weight kg
	mm	mm	mm	mm	kg	kg
050	500	150	456	404	100	4
070	710	355	510	400	250	15
080	800	400	510	400	350	16
090	900	450	680	560	400	23
100	1000	500	704	560	500	32

## One-way wooden drums

Drum-code numbers	Flange $\emptyset$ $F_d$	Drum-Barrel $\emptyset$ $K_d$	Width over all $l_1$	Width-for windings $l_2$	Bore $\emptyset$ max. $B_d$	Drum weight kg
	mm	mm	mm	mm	mm	kg
HE 350	350	150	320	300	56	1,8
HE 400	400	150	320	300	56	2,1
HE 401	400	150	425	405	56	2,3
HE 501	500	150	320	300	56	3,0
HE 500	500	150	425	405	56	3,3
HE 600	600	150	425	405	56	4,5
HE 760	760	300	425	400	80	8,0

# ■ CABLE LENGTHS (M) TO KTG-DRUMS CAPACITY OF POOL DRUMS

Drum sizes and code numbers																	
Cable Ø D mm	051 05	061 06	071 07	081 08	091 09	101 10	121 12	141 14	161 16/8	181 18/10	201 20/12	221 22/14	250 25/14	251 25/16	281 28/18	Cable Ø D mm	
6	1130	1110	2024	2755												6	
7	815	840	1480	2340												7	
8	630	640	1064	1463	2730											8	
9	460	470	890	1152	2202	2866										9	
10	390	388	680	980	1768	2349										10	
11	320	315	564	760	1404	1910										11	
12	260	254	470	643	1206	1540										12	
13	220	238	385	542	1032	1339	2727									13	
14	190	190	360	454	880	1159	2265	2967								14	
15	170	180	300	430	749	1000	1990	2480								15	
16	150	140	239	358	632	860	1756	2205								16	
17	130	134	228	294	603	736	1545	1960								17	
18	110	102	218	280	505	705	1355	1737								18	
19	105	96	172	228	485	599	1184	1535	2722							19	
20	100	92	165	220	402	576	1139	1352	2435	2830						20	
21	80	90	159	210	387	485	990	1304	2172	2527						21	
22		65	122	167	315	468	856	1145	1930	2248						22	
23		62	117	160	304	389	827	999	1870	2172	2954					23	
24		60	113	156	294	377	709	967	1657	1927	2608					24	
25		58	110	150	285	365	688	839	1608	1867	2522					25	
26		56	80	116	226	299	668	814	1420	1650	2218					26	
27			78	113	220	290	567	700	1244	1450	2150	2860				27	
28			76	109	215	282	550	680	1210	1410	1880	2777				28	
29			73	106	209	226	462	663	1180	1370	1826	2450			2976	29	
30			70	103	162	220	450	564	1028	1200	1583	2383			2893	30	
31				76	157	214	438	550	1003	1166	1540	2089			2558	31	
32				74	153	209	428	537	866	1009	1500	2035	2978		2490	32	
33				72	150	204	352	450	846	985	1289	1984	2908		2428	33	
34					146	158	344	440	828	962	1257	1726	2605		2134	34	
35					108	154	336	430	710	824	1227	1685	2547		2083	2890	35
36					105	150	329	422	692	806	1040	1646	2270		2035	2820	36
37					103	148	265	348	678	788	1017	1418	2223		1774	2760	37
38						144	259	340	664	772	994	1386	1969		1735	2432	38
39						110	254	334	560	653	972	1356	1930		1697	2380	39
40						105	249	327	549	640	812	1328	1892		1486	2330	40
41						102	244	264	539	627	795	1130	1664		1435	2036	41
42						100	190	259	529	615	779	1107	1633		1406	1995	42
43							187	254	437	510	763	1085	1603		1199	1956	43
44							183	249	430	502	750	1065	1574		1175	1692	44
45							180	245	422	492	610	890	1373		1153	1660	45
46							177	240	415	484	600	874	1349		1130	1630	46
47							174	187	408	475	589	858	1326		1110	1600	47
48							130	184	330	386	578	842	1144		930	1366	48
49							127	180	325	380	568	828	1125		914	1342	49
50							125	178	319	373	558	878	1107		898	1320	50
51							123	175	314	367	542	866	1089		883	1298	51
52							120	172	310	360	535	855	1072		869	1276	52
53								170	305	356	428	644	912		715	1072	53
54								126	230	280	420	634	898		700	1056	54
55								124	235	276	414	624	885		690	1040	55
56								122	232	270	408	614	872		680	1022	56
57								121	228	267	400	608	860		668	1006	57
58								119	225	263	304	480	720		658	990	58
59								117	222	260	300	473	710		649	815	59
60									220	256	295	466	700		640	803	60
61									216	252	290	460	690		610	790	61
62									160	190	287	453	680		500	780	62
63									158	187	282	448	670		494	770	63
64									156	184	280	440	662		487	760	64
65									154	182	275	435	640		480	748	65
66									152	180	270	430	634		474	738	66
67									150	178	266	426	628		468	728	67
68										174	264	320	520		462	580	68
69										172	262	318	518		456	574	69
70										170	260	316	516		450	566	70
71										168	258	314	514		444	558	71
72										166	256	312	512		438	552	72
73										164	254	310	510		434	545	73
74										162	252	308	508		430	540	74
75										160	250	306	506		426	532	75
76										112	170	291	380		322	526	76
77										110	168	287	375		318	520	77
78										109	166	284	370		314	514	78
79										108	164	281	367		310	508	79
80										107	163	278	363		306	502	80
81										106	161	276	360		304	498	81
82										105	158	273	356		300	492	82
83										103	156	270	352		297	486	83
84											155	190	349		294	480	84
85											154	188	345		290	474	85
86											152	186	342		288	468	86
87											150	184	338		285	462	87
88											149	182	335		282	456	88
89											147	180	332		280	450	89
90											146	178	329		278	444	90
91											144	176	326		276	438	91
92											90	175	325		275	430	92

- min. Drum-Barrel-Ø ≤ 40 · D
  - min. Drum-Barrel-Ø ≤ 30 · D
  - min. Drum-Barrel-Ø ≤ 25 · D
  - min. Drum-Barrel-Ø ≤ 20 · D
  - min. Drum-Barrel-Ø ≤ 15 · D
- Kd = Drum-Barrel-Ø  
D = Cable-Ø



# ■ EXPLANATORY NOTES ON CE MARKING

## Low Voltage Directive (NSR), EMC Legislation

The Manufacturers must have to identify those products by the CE marking which fall within the applicability of certain EC (European Community) directives.

This applies to products which are covered by these directives in accordance with the new concept to include particular requirements on the technical characteristics of products.

The realization of these requirements is the condition for marketing the products in Europe. Then these CE directives constitute binding legislation for the European Union.

The inclusion of the CE marking confirms the compliance by the products with the basic requirements of all specifications applicable to that product. This means that CE marking is thus the compelling requirement in order of placing the products on the market within the EU. This also applies in the country of manufacture.

These directives are only then binding when these have been implemented in the national legislation of individual EU member states. An implementation in the national legislation of individual members states does not always occur at the same time and is not always accomplished within the foreseen period.

Furthermore, certain transition rules may apply. If the obligation for implementation of these directives is not met, then these directives can still be directly applicable in certain circumstances.

The validity for these directives are not always clearly formulated and are sometimes abstract and not differentiated such that it cannot always be unambiguously established whether a product is covered by one or more directives and thus requires the CE marking.

The CE marking serves as evidence to the supervisory authorities of compliance with these directives. It is however often misinterpreted as being a "symbol for safety or quality" which is why it is often requested from customers without any legal justification.

### **EC Low Voltage Directive (NSR)**

The EC Low Voltage Directive (NSR) is one of these CE Designation Directives (Article 13 of the CE Marking Directive). This means that electrical equipment used in low voltage range applications must also be identified by the CE marking. The CE marking is affixed on these products since 01.01.1997.

The CE Marking Directive will apply to a large number of electrical products, alone on account of the extensive range of applicability of the Low Voltage (NSR) and Electromagnetic Compatibility (EMC) Directives.

**The following directives are of particular significance for the electrical industry:**

**2006/95/EC**

**Electrical equipment for use within specified voltage limits (Low Voltage Directive)**

**EU No. 305/2011**

**Construction products regulation**

**2004/108/EC**

**Electromagnetic compatibility (EMC Directive)**

**2006/42/EC**

**Machinery directive**

For HELUKABEL as manufacturer and supplier of cables and wires, only the Low Voltage Directive is of significance. The EMC directive is of indirect applicability – for customer enquiries – in that queries could arise regarding the immunity of cables to interference, capacitance unbalance values and similar characteristics.

### **The EMC Directive**

The EMC Directive, which applies for the electromagnetic compatibility of electrical and electronic equipment in their environments, can only be applied in complete systems.

For example, systems which are made up of several units, whereby each individual unit alone meet EMC requirements, are tested as a system for EMC together with the interconnecting cables.

EMC testing of a single cable or a single wire cannot be specified.

Continuation ►

# EXPLANATORY NOTES ON CE MARKING

Low Voltage Directive (NSR), EMC Legislation

## Important information regarding the Low Voltage Directive (NSR):

### 1. General Conditions:

- a) The major characteristics required for knowledge and observance, for use in accordance with the intended application, are given on the electrical equipment, or, if this is not possible, in the accompanying instructions.
- b) The manufacturer's symbol or trade mark shall be clearly visible on the electrical equipment, or, where this is not possible, shall be affixed on the packaging.
- c) The electrical devices as well as the components for these, shall be procured such that these can be connected safely and properly.
- d) The electrical equipment shall be designed and constructed such that protection from the hazards listed in item 2 and 3, is assured during use and proper maintenance in accordance with the intended application.

### 2. Protection against hazards which may arise from electrical equipment – technical measures shall be foreseen in accordance with item 1, such that:

- a) Humans and working animals are protected from injury or other harm which can be caused by either direct or indirect contact.
- b) No high temperatures, arcs or radiation are generated from which hazards could arise.
- c) Humans, working animals and property are adequately protected against non-electrical hazards which, from experience, can arise from electrical equipment.
- d) The insulation complies to the property requirements.

### 3. Protection against hazards which can arise from external influences on electrical equipment – technical measures are foreseen in accordance with item 1, such that the electrical equipment:

- a) can withstand the mechanical loads such that humans, working animals or property are not endangered.
- b) can withstand the non-mechanical effects under foreseen environmental conditions such that humans, working animals or property are not endangered.
- c) cannot endanger humans, working animals or property in any way by the foreseen overloads.

Equipment and areas which do **not** fall within the Directive.

- Electrical equipment for use in explosive atmospheres
- Electrical-radiological and electrical medical equipment
- Electrical components of passenger and goods lifts
- Electricity meters, household plug-in fixtures, radio interference suppression devices
- Installation for supplying power to electrified pasture fencing
- Specified electrical equipment intended for use on ships, in aircraft or railways and which comply with the safety regulations of member states for international installations.

Electrical equipment within the context of the Low Voltage Directive is electrical equipment for applications with a rated voltage between 50 and 1000 V alternating current and between 75 and 1500 V direct current.

For a more **exact** interpretation of the Directive, cables and wires are covered by the regulation, **not** however cables with a rated voltage exceeding 1000 V alternating current or 1500 V direct current.

HELUKABEL® as manufacturer and supplier must act in accordance with the Low Voltage Directive, that is to say:

Cables and wires up to 1000 V nominal voltage **must** be identified by the CE marking.

The identification can be attached either to the product or on the label.

# ■ EUROPEAN DIRECTIVES WEEE, ROHS AND ElektroG

The European Union has approved directives with a view to protecting man and environment. The member states have made these directives into national law.

## Directives and Laws

### WEEE

**Waste Electrical and Electronic Equipment** Directive 2012/19/EC of the European Parliament and the Council on used electrical and electronic devices dated July 4, 2012.

#### Aim:

- To attain a consistent level of health and environmental protection throughout the member states.
- To harmonise the responsibility held by the manufacturers.
- To attain equivalent participation by the traders.

The member states are to employ suitable measures for ensuring that used electrical and electronic devices are treated in such a way as to prevent their entry into the waste stream. They are to set out regulations for the dismantling, reuse and recycling of these devices.

### RoHS

**Restriction of Hazardous Substances** in electric and electronic equipment

Directive 2011/65/EC of the European Parliament and the Council on restriction of use of certain hazardous substances in electrical and electronic equipment dated June 8, 2011.

#### Aim:

- To reconcile the legal regulations of the member states on restriction of use of hazardous substances and electrical and electronic equipment.
- Substance bans and restrictions.

The member states guarantee that from July 1, 2006, use of the following substances in electrical and electronic equipment will be restricted:

Lead, Mercury, Cadmium, Chromium VI, Deca-BDE, Polybrominated biphenyl (PBB), Polybrominated diphenylether (PBDE)

### Law on the use, return and environmentally-compatible disposal of electrical and electronic equipment.

ElektroG (Electrical and Electronic Equipment Act) of March 16, 2005.

This Act enforces the EU Directives 2012/19/EC and 2011/65/EC.

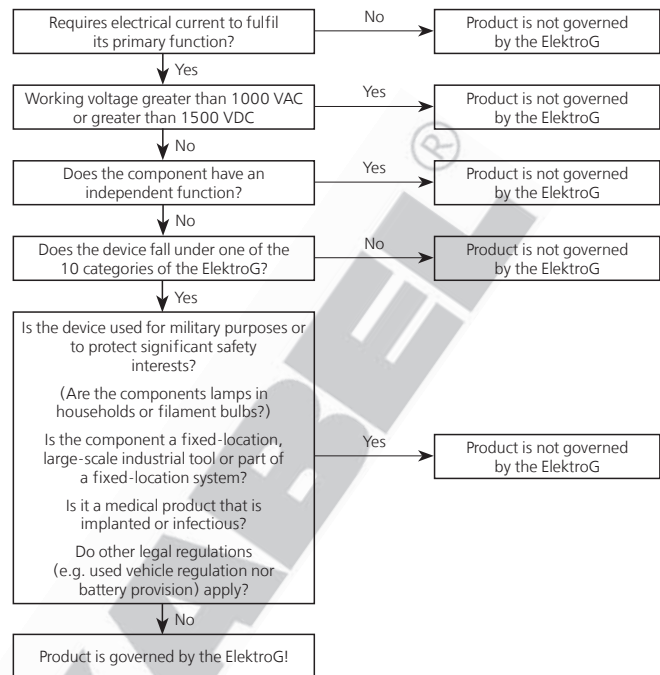
#### Aims:

- To avoid electrical and electronic equipment waste.
- To reuse and/or recycle the materials from this waste.

#### Scope:

This Act applies for all electrical and electronic devices that fall under certain categories, insofar as they are not part of another device not covered by the scope of this Act.

## Orientation aid



## Substance bans

### § 5 from ElektroG (RoHS)

It is forbidden to bring into circulation new electrical and electronic devices containing more than 0.1 percent by weight of lead, mercury, hexavalent chromium, Deca-BDE, polybrominated biphenyl (PBB) or polybrominated diphenylether (PBDE) for each homogenous material or more than 0.01 percentage by weight of cadmium per homogenous material. Clause 1 does not apply for category 8 and 9 electrical and electronic devices nor for electrical and electronic devices brought into a member state of the European Union for the first time before July 1, 2006. Nor does it apply for spare parts for the repair or reuse of electrical and electronic devices brought into circulation for the first time before July 1, 2006.

## Definition

The majority of our products are not governed by the ElektroG (WEEE/RoHS), as they do not have an independent function. As the possibility of our customers using our products in devices that are governed by the ElektroG, and as such are declarable, cannot be ruled out, we have decided to mark in this catalogue the products that either comply with the limit values indicated in accordance with ElektroG (WEEE/RoHS) § 5 and/or do not infringe provisions of the ElektroG (WEEE/RoHS).



# Glossary of Cables and Wires

Type	Page	Type	Page
(H)03Z1Z1-F	94	Command Cable UL (LiYCY-TP)	418 – 419
(H)05VV5-F ((N)YSLYÖ-JZ)	37	Command Cable UL (LiYY)	403 – 404
(H)05VVC4V5-K ((N)YSLYCYÖ-JZ)	59	Command Cable UL (LiYY-TP)	407 – 408
(H)05Z1Z1-F	95	DATAFLAMM®	130
(N)A2XH	561 – 562	DATAFLAMM®-C	145
(N)HXCH-FE 180/E 30	569 – 570	DATAFLAMM®-C-PAAR	146
(N)HXCH-FE 180/E 90	577 – 578	DATAPUR-C®	144
(N)HXH-FE 180/E 30	567 – 568	DUO Stripper 200	1005
(N)HXH-FE 180/E 90	575 – 576	Earth Conductors ESUY and ESY	316
(N)SHTÖU-V	257	EDV-PiMF-CY	147
(N)TSCGEWÖU	258	Extensions / Supply cables	904
(N)YM(St)-J PVC-sheathed cable	518	F-C-PURö-JZ	78 – 79
A07RN-F	244	F-CY-JZ	50 – 51
A-2Y(L)2Y	524	F-CY-OZ (LiY-CY)	48 – 49
A-2YF(L)2Y	525	Feedback cables PUR	203
ADI	996 – 997	Feedback cables PVC	202
ADU	998	Fibre Optic Breakout Cable	640
Aerial Fibre Optic Cable	635	Fibre Optic Breakout Cable flexible	643
AIRPORT 400 Hz	824 – 825	Fibre Optic Breakout Cable robust	646
A-LiY(StE)YÖ	552	Fibre Optic Breakout Cable robust, flexible	644 – 645
Anaconda Sealtite® EF	973	Fibre Optic Breakout-Cable	609
Anaconda Sealtite® HTDL	974	Fibre Optic Cable flexible	636 – 639, 642
Audio	766 – 774, 781 – 784, 789	Fibre Optic Cable robust	641
Audio & Light	775 – 778	Fibre Optic Cable with Functionality	617 – 618
AV	999	Fibre Optic Indoor Cable	608, 611
Bauliftkabel B101 / B102 / B103	249	Fibre Optic Indoor/Outdoor Cable	613 – 616
BIOFLEX-500®-JZ	109	Fibre Optic Indoor/Outdoor Minibreakout Cable	612
BIOFLEX-500®-JZ-C	110 – 111	Fibre Optic Minibreakout Cable	610
BIOFLEX-500®-JZ-HF	181	Fibre Optic Outdoor Cable	619 – 632
BIOFLEX-500®-JZ-HF-C	182 – 183	Fibre Optic Outdoor Cable Hybrid	633 – 634
BUS Cables	705 – 763	Fibre Optic Universal Cable	647
C.N.O.M.O	372	FIVENORM	490 – 492
Cable stripper for vulcanized semi conductive layer HFBS	1010	Flugzeugheber-T	255
Cable stripping knife HKM1	1013	Front connecting cables for Simatic® S7	905
CATV-Cables	342	FROR CEI 20-22 II	371
Chamfer cutter HUF5	1012	FZ-LSi / FZ-LS / Neon Light Cables	309
Command Cable UL (LiYCY)	413 – 415	GALVANICABLE®	317

# Glossary of Cables and Wires

Type	Page	Type	Page
H01N2-D / H01N2-E	318	HELU-S-RK-CU	988
H03VV-F	45	HELU-S-RK-CU-UL	989 – 990
H05BQ-F / H07BQ-F (NGMH11YÖ)	72	HELU-S-RK-F-CU	991 – 992
H05G-U / -K / H07G-U / -R / -K	302	HELUTHERM® 120	220
H05RR-F / H05RN-F	241	HELUTHERM® 1200 / 1200-ES	315
H05SS-F / H05SST-F	226	HELUTHERM® 145	305 – 306, 495 – 496
H05V-K	289 – 290	HELUTHERM® 145 MULTI	221 – 222
H05V-K / (H)07V-K	293	HELUTHERM® 145 MULTI-C	230 – 231
H05V-U / H07V-U	294	HELUTHERM® 400	312
H05VV5-F (NYSLYÖ-JZ)	35 – 36	HELUTHERM® 600 / 600-ES	313
H05VVC4V5-K (NYSLYCYÖ-JZ)	57 – 58	HELUTHERM® 800 / 800-ES	314
H05VV-F	46 – 47	HELUTOOL 250 pocket, 190	1007
H05VV-F/SJT	368 – 369	HELUTOOL MZ	1008
H05VV-F/UL	370	HELUTOP® HT	944 – 945
H05Z-K / H07Z-K	300 – 301	HELUTOP® HT-Clean	951
H07RN8-F	272	HELUTOP® HT-Clean-EMV (EMC)	952
H07RN-F	242 – 243	HELUTOP® HT-MS	946 – 947
H07RN-F/SOOW	481	HELUTOP® HT-MS Plus	955
H07V2-K	304	HELUTOP® HT-MS-EX-d	954
H07V-K / (H)07V-K	291 – 292	HELUTOP® HT-PA-EX	953
H07V-R	295	HELUTOP® MS-EP	949
H07ZZ-F	90	HELUTOP® MS-EP4	950
Halogen-Free RG-Coaxial Cables	341	HELUTRAIN® 3GKW	834
HELUcond PA6-L	970	HELUTRAIN® 4GKW-AXplus	835
HELUcond PA6-UL	971	HELUTRUCK® 270 (FLRY Y)	828
HELUFロン®-FEP-6Y	227 – 228, 310	HELUTRUCK® 271 (FLRY Y11Y)	829
HELUFロン®-PTFE-5Y	311	HELUTRUCK® 272 (FLRY YF)	830
HELUKABEL® BS 5308 Part 1	508	HELUTRUCK® 273	831
HELUKABEL® BS 5308 Part 2	509	HELUWIND® WK (N)A2XH	820
HELUKABEL® BS 5467	510	HELUWIND® WK 101 H	815
HELUKABEL® BS 6724	511	HELUWIND® WK 103k-T, WK 103k EMV D-T	809
HELUSOUND® 400 PVC	786	HELUWIND® WK 103w-T, WK 103w EMV D-T	808
HELUSOUND® 500 PUR	787	HELUWIND® WK 135-T, WK 135 D-EMV T	810
HELUSOUND® 600 FRNC, halogen-free	788	HELUWIND® WK 137-T / WK 137 EMV D-TFT 4	811
HELUSOUND® DMX+POWER	780	HELUWIND® WK 300w-Torsion 1,8/3kV	812
HELU-S-PK-AL-DIN	995	HELUWIND® WK 305-Torsion 1,8/3kV	813
HELU-S-PK-CU-DIN	993 – 994		
HELUSPREADER YSLTÖ-J	250		

# Glossary of Cables and Wires

Type	Page	Type	Page
HELUWIND® WK DLO 2kV	817	JZ-600 UL/CSA	362 – 363
HELUWIND® WK Fire Alarm Cable-Torsion	816	JZ-600-YC-PUR	390 – 391
HELUWIND® WK H07BN4-F WIND-Torsion	814	JZ-600-Y-CY	60 – 61
HELUWIND® WK Powerline ALU 105°C	818	JZ-600-Y-CY UL/CSA	378 – 379
HELUWIND® WK THERMFLEX® 145	819	JZ-602	356 – 357
HSK-PVDF	956 – 957	JZ-602 RC	423
HT-E	948	JZ-602 RC-C-PUR	436
HTP	975	JZ-602 RC-CY	427
Industrial Ethernet	687 – 704	JZ-602 RC-PUR	430
Inside cleading cutter (universal) HIMS II	1011	JZ-602-C-PUR	389
J-2Y(St)H	533	JZ-602-CY	373 – 374
J-2Y(St)Y	529	JZ-602-PUR	384 – 385
JB-500	42	JZ-602-PUR DC/AC	386
JB-750	43	JZ-603	358
JB-750 HMH	93	JZ-603-CY	375
JB-750 HMH-C	102 – 103	JZ-604 TC TRAY CABLE	364 – 365
JB-750 yellow	44	JZ-604-FCY TC TRAY CABLE	380
JE-H(St)H	579 – 580	JZ-604-YCY TC TRAY CABLE	381
JE-H(St)HRH	581	JZ-750	38 – 39
JE-LiHCH	154	JZ-HF	160 – 161
JE-LiYCY	153	JZ-HF-CY	163 – 164
JE-Y(St)Y	152	JZ-HF-FCY	426
J-H(St)H	531 – 532	KM	963 – 964
J-Y(St)Y Lg	527 – 528	KM-EMV	966
J-YY Bd	526	KM-INOX	965
JZ-500	30 – 31	KMK-PA-MB	962
JZ-500 black	32	KOMPOFLEX® JZ-500	112
JZ-500 COLD	34	KOMPOFLEX® JZ-500-C	113 – 114
JZ-500 HMH	86 – 87	KOMPOSPEED® 600 / 600-C	322
JZ-500 HMH-C	96 – 97	KOMPOSPEED® JZ-HF-500	184
JZ-500 orange	33	KOMPOSPEED® JZ-HF-500-C	185
JZ-500 PUR	67	KVA-XXL-MS	958
JZ-500-C black	52	KVA-XXL-MS-E	959
JZ-500-FC-PUR	76 – 77	LAN Cable	654 – 656, 658 – 673, 677 – 680, 683
JZ-600	40 – 41	LAN Cable direct Burial	675
JZ-600 HMH	91 – 92	LAN Cable direct Burial / armoured	676
JZ-600 HMH-C	100 – 101	LAN Cable Outdoor	674
JZ-600 PUR	387 – 388		

# Glossary of Cables and Wires

Type	Page	Type	Page
LAN-Cable	657	MULTISPEED® 500-PUR UL/CSA	433 – 434
LIFT-TRAGO® -30 / -60	247	MULTISPEED® 500-PVC	162
LifY Single Core	298	MULTISPEED® 500-PVC UL/CSA	425
LifYCY	140	MULTISPEED® 500-TPE	177 – 178
Light Marine Power Cables XLFMCK	922	MULTISPEED® 500-TPE UL/CSA	441 – 442
Light Marine Telecommunication cables LFMGSSGO	927	MULTISPEED® 600-C-PUR -J/-O	505
Light Marine Telecommunication Cables LFMGSSGO	928	MULTISPEED® 600-PUR -J/-O	504
Light+Power	779	MULTISPEED®-TRONIC-C-PUR	450
LiY-TPC-Y	143	MULTISPEED®-TRONIC-PUR	448
LiYv	287 – 288	Multistrip 10	1004
LiYW / H05V2-K	303	MULTITHERM 400	229
Loadcable 300/500 V + 600/1000 V	790	MULTITHERM 400-ES	236
Loudspeaker Cables	785	N2XCH	559 – 560
Marine Power Cables LMGSGO	923	N2XCH-FE 180/E 30	565 – 566
Marine Telecommunication Cables FMGSGO	925	N2XCH-FE 180/E 90	573 – 574
Marine Telecommunication Cables FMGSGO250 V	926	N2XCY	549 – 550
MEGAFLEX® 500	88 – 89, 394 – 395	N2XH	557 – 558
MEGAFLEX® 500-C	98 – 99, 398 – 399	N2XH-FE 180/E 30	563 – 564
MEGAFLEX® 600	396 – 397	N2XH-FE 180/E 90	571 – 572
MEGAFLEX® 600-C	400 – 401	N2XS(F)2Y 6/10kV, 12/20kV, 18/30kV	589 – 590
MS-Skinning-Complete-Set	1014	N2XS(FL)2Y 6/10kV, 12/20kV, 18/30kV	591 – 592
MULTIFLEX 512®-C-PUR	174 – 175	N2XS2Y 6/10kV, 12/20kV, 18/30kV	587 – 588
MULTIFLEX 512®-C-PUR UL/CSA	437 – 438	N2XSEH 3 x ... 6/10kV	603
MULTIFLEX 512®-PUR	169 – 170	N2XSEY 3 x ... 6/10kV	602
MULTIFLEX 512®-PUR UL/CSA	431 – 432	N2XS2Y 6/10kV, 12/20kV, 18/30kV	585 – 586
MULTIFLEX 600	424	N2XY	548
MULTIFLEX 600-C	428	NA2XS(F)2Y 6/10kV, 12/20kV, 18/30kV	597 – 598
Multimedia Cable	681 – 682	NA2XS(FL)2Y 6/10kV, 12/20kV, 18/30kV	599 – 600
Multimedia-Coaxial Cables	344	NA2XS2Y 6/10kV, 12/20kV, 18/30kV	595 – 596
MULTISPEED® 500-C-PUR	176	NA2XS2Y 6/10kV, 12/20kV, 18/30kV	593 – 594
MULTISPEED® 500-C-PUR UL/CSA	439 – 440	NA2XY	551
MULTISPEED® 500-C-PVC	165	NANOFLEX® HC*500	116
MULTISPEED® 500-C-PVC UL/CSA	429	NANOFLEX® HC*500-C	117
MULTISPEED® 500-C-TPE	179	NANOFLEX® HC*TRONIC	118 – 119
MULTISPEED® 500-C-TPE UL/CSA	443 – 444	NANOFLEX® HC*TRONIC-C	120 – 121
MULTISPEED® 500-PUR	171	NAY2Y	546
		NAYCWY	547
		NAYY	544 – 545

# Glossary of Cables and Wires

Type	Page	Type	Page
NEO-Flat	277	PUR electronic spiral cables unscreened	913 – 914
NEO-Flat-C	279	PUR Single Core	299
NEOPREN Command Cable	245	PUR spiral cables black	909 – 910
NHMH-J	520	PUR spiral cables orange	911 – 912
NHMH-O	519	PUR-750	75
NHXMH-O/-J	521	PUR-C-PUR	84
NSGAFÖU 3kV	319	PURö-JZ	68 – 69
NSHTÖU	256	PURö-JZ-HF	167 – 168
NSHXAFö 3kV	320	PURö-JZ-HF-FCP	435
NSSHÖU	246	PURö-JZ-HF-YCP	172 – 173
NYCWY	542 – 543	PUR-ORANGE	70
NYCY	540 – 541	PUR-YELLOW	71
NYFGY 3 x ... 3,6/6kV	601	PVC connecting cables	900
NYKY-J 0,6/1kV	554 – 555	PVC single cores	494
NYM-J/-O PVC-Sheathed Cable	517	PVC spiral cables	908
NY Y	538 – 539	PVC-flat	276
OB-BL-PAAR-CY	107	PVC-flat-CY	278
Outside cleading cutter HAMX	1009	PV-male and female cable coupler MC4	1001
OZ-BL	105	RD-H(St)H	155
OZ-BL-CY	106	RD-Y(St)Y	148
PAAR-CY-OZ	135	RD-Y(St)Yv / RD-Y(St)YY	149
PAAR-TRONIC	126 – 127	RE-2Y(St)Yv	150
PAAR-TRONIC-CY	133 – 134	RE-2Y(St)Yv PiMF	151
PAAR-TRONIC-CY-CY (LiYCY-CY)	136 – 137	RGB-COAX-CY / RGB-COAX-(St)Y	346
PAAR-TRONIC-Li-2YCY	139	RG-Coaxial Cables	338 – 340
PAAR-TRONIC-Li-2YCYv	138	Ribbon Cables	280
Petrol Station Cables	553	ROBOFLEX® 150,...151,...152,...153	266
Plastic Fibre cable industry	648	ROBOFLEX® 2001 / 2001-C	264
Plastic Fibre Cable Industry	649	ROBOFLEX® recycle	262 – 263
Pre-assembled adapter cables	876	ROBOFLEX® sewer robot	267
Pre-assembled fan cables	861 – 862, 867 – 868	ROBOFLEX®-recycle	880 – 896
Pre-assembled feedback cables	846 – 847, 850 – 851, 855 – 856, 859 – 860, 865 – 866, 871 – 872, 875	Rubber / Neoprene Control Cable	480
Pre-assembled servo motor cables	844 – 845, 848 – 849, 852 – 854, 857 – 858, 863 – 864, 869 – 870, 873 – 874	Rubber connecting cables	901
PUR connecting cables, orange	903	SAT-Coaxial Cables	343, 345
PUR electronic spiral cables screened	915 – 916	SENSORFLEX®	128
		SENSORFLEX® / VERTEILERFLEX two-approvals	411 – 412
		SENSORFLEX®-H	192 – 193



# Glossary of Cables and Wires

Type	Page	Type	Page
SHIPFLEX® 109	936 – 937	SUPERTRONIC®-PVC	187
SHIPFLEX® 113	938	SUPERTRONIC®-310-C-PVC	446
SHIPFLEX® 121	939	SY-JB	64 – 65
SHIPFLEX® 330	934	SY-JZ	55 – 56
SHIPFLEX® 340	935	S-YY Lg	530
SHIPFLEX® 512	933	T	982
Ships Power Cables MGSGO	921	Tauchflex-FL	271
Ships Telephone Cables FMGCH 250 V	924	Tauchflex-R	270
Ships Wiring Cables-SY single cores	929	THERMFLEX® 180 EWKF	225
Ships Wiring Cables-SY stranded type	930	THERMFLEX® 180 EWKF-C	234
SiF / SiFF	307	THHN/THWN	493
SiF/GL, SiD, SiD/GL	308	THREENORM	488 – 489
SiHF	223 – 224	TOPFLEX® 1000 VFD	460
SiHF UL/CSA	476 – 477	TOPFLEX® 300	321
SiHF/GL-P	235	TOPFLEX® 301 / 301-C	506
SiHF-C-Si	232 – 233	TOPFLEX® 302 / 302-UL	500
SiHF-C-Si UL/CSA	478	TOPFLEX® 303 X07V-K-YÖ	297
Single 600-CY -J/-O	499	TOPFLEX® 304 / 304-C	503
Single 600-J/-O	498	TOPFLEX® 600 VFD	458
Single 602-RC -CY -J/O	502	TOPFLEX® 600-C-PVC	198
Single 602-RC -J/O	501	TOPFLEX® 600-PVC	197
Skinning tool HAM1	1006	TOPFLEX® 611-C-PUR	200
SOLARFLEX®-X PV1-F	798	TOPFLEX® 611-PUR	199
SOLARFLEX®-X PV1-F NTS	799	TOPFLEX® 650 VFD	459
SOLARFLEX®-X PV1-F TWIN	800	TOPFLEX® -EMV-2YSLCY-J	204
SPSP - spools	978 – 979	TOPFLEX® -EMV-UV-2YSLCYK-J	206
STK-F	960	TOPFLEX® Motor 109	217
STS-F	961	TOPFLEX® MOTOR EMV 1/1	462
SUPER-PAAR-TRONIC 340-C-PUR	451	TOPFLEX®-EMV-3 PLUS 2YSLCY-J	205
SUPER-PAAR-TRONIC-C-PUR®	191	TOPFLEX®-EMV-UV 2YSLC11Y-J UL/CSA	461
SUPERTRONIC®-310-PVC	445	TOPFLEX®-EMV-UV-2XSLCH-J	214
SUPERTRONIC®-330 C-PURö	449	TOPFLEX®-EMV-UV-2XSLCYK-J	209 – 210
SUPERTRONIC®-330 PURö	447	TOPFLEX®-EMV-UV-2YSLCYK-J UL/CSA	453 – 454
SUPERTRONIC®-C-PURö	190	TOPFLEX®-EMV-UV-3 PLUS 2XSLCH-J	216
SUPERTRONIC®-C-PVC	188	TOPFLEX®-EMV-UV-3 PLUS 2XSLCYK-J	212
SUPERTRONIC®-PURö	189	TOPFLEX®-EMV-UV-3 PLUS 2YSLCYK-J	208
		TOPFLEX®-EMV-UV-3 PLUS 2YSLCYK-J UL/CSA	455 – 456
		TOPFLEX®-MOTOR-EMV 103	457

# Glossary of Cables and Wires

Type	Page	Type	Page
TOPFLEX®-MOTOR-EMV 3/3	464	Vehicle Cable FLY	836 – 838
TOPGEBER 511 PVC	467	VERTEILERFLEX	129
TOPGEBER 512 PUR	471	Video	792 – 793
TOPSERV® 110 / 120	201	Video Cables	791
TOPSERV® 600 VFD	472	Y-CY-JB	62 – 63
TOPSERV® 650 VFD	473	Y-CY-JZ	53 – 54
TOPSERV® Hybrid	474	YELLOWFLEX	240
TOPSERV® PUR	469	YELLOWFLEX - connecting cable	902
TOPSERV® PVC	466	Yö-C-PURö-JZ	80 – 81
TRAGO / Lift-2S	248	YV-Equipment Wires / YR-Bell Sheathed Cables	516
TRAYCONTROL® 300	405 – 406		
TRAYCONTROL® 300 TP	409 – 410		
TRAYCONTROL® 300-C	416 – 417		
TRAYCONTROL® 300-C TP	420 – 421		
TRAYCONTROL® 500	359 – 360		
TRAYCONTROL® 500-C	376 – 377		
TRAYCONTROL® 530	361		
TRAYCONTROL® 600	366 – 367		
TRAYCONTROL® 600-C	382		
TRAYCONTROL® 670 HDP / 670-C HDP	392		
TROMMPUR®	254		
TROMMPUR®-H	483		
TRONIC (LiYY)	124 – 125		
TRONIC 1-CY	141		
TRONIC 2-CY	142		
TRONIC-CY (LiY-CY)	131 – 132		
T-SK/SKU	983		
TUBEFLEX-(St)-CY	282		
TUBEFLEX-Y	281		
T-WS	984		
Type S	972		
UL-Style 1007, CSA TR 64	485		
UL-Style 1015	487		
UL-Style 1569, CSA TR 64	486		
UL-Style 3135	497		
UNIPUR®	73 – 74		
UNIPUR®-CP	82 – 83		
Vehicle Cable FLRY	839		

# Part No. Index

Part no.	Page	Part no.	Page	Part no.	Page
10001 – 10047	30	11494	60	12328	65
10048 – 10168	31	11495 – 11497	52	12345 – 12371	378
10169	30	11498	60	12372 – 12405	379
10170	31	11499 – 11500	52	12410 – 12436	378
10172 – 10173	30	11501	60	12437 – 12470	379
10174 – 10176	31	11502 – 11503	52	12471 – 12517	384
10177	30	11504 – 11519	60	12518 – 12543	385
10178 – 10182	31	11520	52	12550 – 12620	389
10183	30	11521	60	12630 – 12671	430
10184 – 10333	31	11522 – 11524	52	12680 – 12722	436
10334 – 10339	44	11525	60	12723 – 12746	91
10340 – 10388	32	11526 – 11527	52	12747 – 12804	92
10533 – 10536	31	11528 – 11549	60	12805 – 12846	386
10537 – 10542	33	11550	52	12850 – 12877	100
10543	32	11551 – 11563	60	12878 – 12907	101
10544 – 10547	33	11574 – 11629	61	12908 – 12943	426
10548 – 10549	31	11630 – 11654	32	12944 – 12979	435
10550 – 10615	40	11656 – 11685	96	13001 – 13024	35
10616 – 10746	41	11687 – 11813	97	13025 – 13059	36
10747 – 10749	33	11815 – 11846	362	13060 – 13083	57
10750 – 10797	34	11847 – 11876	363	13084 – 13118	58
10800 – 10867	38	11880 – 11911	362	13119 – 13121	36
10868 – 10880	39	11912 – 11941	363	13122 – 13123	35
10881 – 10904	498	11942 – 11952	102	13124	36
10910 – 10933	499	11953 – 11964	103	13125 – 13126	35
10934 – 10980	52	11965 – 11987	93	13127 – 13128	36
11001 – 11112	42	12001 – 12056	55	13129 – 13130	57
11121 – 11169	43	12057 – 12111	56	13131 – 13132	58
11201 – 11220	86	12112 – 12114	55	13133 – 13136	37
11221 – 11331	87	12115 – 12119	56	13137	61
11332 – 11334	86	12188	55	13138	37
11335 – 11341	87	12200 – 12310	64	13139 – 13140	31
11342 – 11347	96	12311	65	13141 – 13146	37
11348 – 11350	97	12312 – 12315	64	13147	61
11464 – 11478	60	12316 – 12317	65	13148 – 13166	37
11479 – 11488	52	12318 – 12324	64	13170 – 13199	59
11489 – 11492	60	12325 – 12326	65	13200 – 13215	396
11493	52	12327	56	13216 – 13343	397

# Part No. Index

Part no.	Page	Part no.	Page	Part no.	Page
13344 – 13360	88, 394	15987 – 15999	140	17172	53
13361 – 13362	88, 395	159xx	298	18001 – 18054	124
13363 – 13489	89, 395	16000	140	18055 – 18113	125
13500 – 13515	98, 398	16001 – 16049	132	18114 – 18115	124
13516 – 13597	99, 399	16050 – 16118	49	18116	125
13920 – 13930	35	16119	63	18117 – 18118	124
13931 – 13949	36	16120	132	1812x – 1832x	73
13951 – 13962	57	16121 – 16152	62	1833x – 1876x	74
13963 – 13985	58	16153 – 16156	63	19001 – 19033	126
14001 – 14027	105	16157 – 16160	54	19034 – 19078	127
14028 – 14059	106	16161	167	19101 – 19141	191
14075 – 14076	105	16163 – 16164	132	1915x – 1935x	82
14077 – 14087	107	16165	50	1936x – 1978x	83
14088	106	16166	51	19798 – 19799	936
14089 – 14099	107	16167 – 16168	54	1979x	83
14100 – 14102	105	16169 – 16175	53	19800 – 19809	936
15001 – 15036	160	16176 – 16183	54	19810 – 19821	937
15037 – 15089	161	16196 – 16239	53	19822 – 19835	938
15090 – 15091	160	16240 – 16246	54	19836 – 19845	939
15092	161	16247	63	19846 – 19863	934
15093 – 15141	298	16248 – 16314	54	19864 – 19926	933
15142 – 15150	161	16315 – 16316	53	19927 – 19968	935
15152 – 15163	164	16317 – 16318	54	19969	937
151xx	298	16319	63	19970 – 19995	134
15214 – 15216	161	16320 – 16343	50	20001 – 20028	131
15217 – 15232	400	16344 – 16452	51	20029 – 20090	132
15233 – 15283	401	16453	53	20091	131
152xx – 154xx	298	16454 – 16468	54	20092 – 20093	132
15520 – 15589	167	16469 – 16474	63	20099 – 20109	150
15590 – 15592	168	16475 – 16489	132	20115 – 20124	151
155xx	298	16490	50	20125 – 20132	150
15620 – 15656	168	16491 – 16493	51	20133 – 20138	151
156xx – 157xx	298	16500 – 16530	132	20139	131
15876 – 15894	163	16531 – 16556	48	20140 – 20148	148
158xx	298	16557 – 16585	49	20149 – 20159	150
15925 – 15929	164	17001 – 17022	134	20160 – 20168	149
15930 – 15952	163	17023 – 17044	135	20169 – 20179	150
15961 – 15983	164	17047 – 17056	134	20180 – 20188	149

# Part No. Index

Part no.	Page	Part no.	Page	Part no.	Page
20189 – 20197	148	22223 – 22230	456	22944 – 22949	224
20200 – 20232	155	22233	71	22960 – 22967	198
20233 – 20255	150	22234 – 22247	206	22970 – 22977	200
2026x – 2037x	310	22250 – 22273	70	22978 – 22981	199
21001 – 21010	133	22290 – 22309	226	22982 – 22985	200
21011 – 21064	134	22315 – 22319	84	22989 – 23008	223
21065 – 21076	136	22320 – 22327	453	23009 – 23059	224
21077 – 21110	137	22328 – 22333	454	23062 – 23103	235
21111 – 21127	139	22339 – 22342	84	23104 – 23105	223
21129 – 21150	138	22343 – 22362	226	23106 – 23110	309
21200 – 21251	78	22364 – 22367	84	23127 – 23132	223
21253 – 21322	79	22368 – 22382	205	23133 – 23146	224
21323 – 21329	143	22385 – 22388	84	23147 – 23149	309
21330 – 21339	936	22389 – 22399	461	23150	233
21340 – 21373	143	22400 – 22433	172	23151 – 23168	232
21374 – 21384	936	22434 – 22494	173	23169 – 23198	233
21385 – 21387	143	22501 – 22522	169	23214 – 23237	476
21388 – 21399	936	22523 – 22565	170	23238 – 23290	477
21400 – 21403	80	22566 – 22568	461	23291 – 23292	232
21404	936	22571 – 22581	174	23293 – 23294	233
21405	80	22582 – 22634	175	232xx	307
21406	936	22637 – 22667	478	23314 – 23388	67
21407 – 21409	80	22673 – 22687	208	233xx	307
21410	936	22689 – 22706	457	23414 – 23443	76
21411 – 21447	80	22707 – 22724	217	23444 – 23488	77
21451 – 21534	81	22800 – 22806	202	234xx – 238xx	307
21535 – 21554	151	22818 – 22823	203	23914 – 23930	443
21559 – 21580	431	22825	202	23931 – 23949	444
21581 – 21629	432	22828 – 22843	72	23953 – 239xx	307
21630 – 21640	437	22845 – 22846	202	24000	224
21641 – 21699	438	22847 – 22852	203	24002 – 24009	220
22001 – 22046	70	22854 – 22855	197	24010	476
22050 – 22083	72	22856 – 22859	198	24011 – 24042	220
22084 – 22097	204	22860 – 22869	197	24043	178
22100 – 22163	68	22870 – 22877	199	24044 – 24046	220
22164 – 22192	69	22878 – 22883	170	24050 – 24085	162
22193 – 22199	456	22884 – 22889	175	24086 – 24118	165
22200 – 22222	71	22940 – 22943	223	24119 – 24155	171



# Part No. Index

Part no.	Page	Part no.	Page	Part no.	Page
24156 – 24190	176	2531x – 2542x	311	26590 – 26637	289
24191 – 24208	177	25439	264	26640 – 26687	290
24209 – 24235	178	2543x	311	26690 – 26753	291
24236 – 24272	179	25440 – 25449	264	26754	278
24273 – 24285	227	2544x	311	26755 – 26936	292
24291 – 24292	220	25450 – 25459	264	26937 – 26960	294
24295 – 24330	425	2545x	311	26980 – 27030	276
24331 – 24332	434	25460 – 25519	264	27031 – 27089	116
24333 – 24334	440	2551x	310	27090 – 27104	278
24335 – 24367	429	25520 – 25529	264	27105 – 27163	117
24370 – 24386	433	2552x	310	27164 – 27196	118
24387 – 24406	434	25530 – 25539	264	27197 – 27234	119
24410 – 24426	439	2553x – 2554x	310	27235 – 27268	120
24427 – 24444	440	25559	264	27269 – 27321	121
24450 – 24467	441	2555x – 2561x	310	28001 – 28033	277
24468 – 24488	442	25620 – 25690	109	28034 – 28081	368
24489 – 24494	209	25691 – 25734	110	28100 – 28104	279
24495 – 24500	210	25735 – 25760	111	28145 – 28184	294
24501 – 24505	227	25761 – 25825	181	28185 – 28237	295
24506 – 24507	210	25826 – 25871	182	28240 – 28271	387
24508 – 24521	212	25872 – 25887	183	28272 – 28301	388
24522 – 24535	214	25888 – 25900	504	28302	279
24536 – 24546	216	25901 – 25913	505	28305 – 28336	387
24547 – 24566	227	25914 – 25990	228	28337 – 28366	388
24567 – 24582	448	26001 – 26032	256	28370 – 28393	390
24583 – 24586	216	26035 – 26059	254	28394 – 28423	391
24587	212	26060 – 26119	292	28430 – 28453	390
24614 – 24629	450	26125 – 26216	112	28454 – 28483	391
246xx – 248xx	307	26217 – 26272	113	28484 – 28571	839
2490x – 2499x	310	26273 – 26306	114	28761 – 28824	294
25001 – 25075	245	26307 – 26346	184	28825 – 28877	295
25080 – 25100	248	26347 – 26385	185	28900 – 28928	516
2511x – 2524x	311	26386 – 26391	289	28930 – 28947	316
25259	247	26392 – 26394	290	28948 – 28979	293
2525x	311	26395 – 26402	291	29081 – 29128	289
25260 – 25268	247	26403 – 26404	292	29129 – 29192	291
25269 – 25281	504	26405 – 26500	287	29193 – 29368	292
25282 – 25294	505	26505 – 26584	288	29370 – 29399	293

# Part No. Index

Part no.	Page	Part no.	Page	Part no.	Page
29400 – 29417	45	3120x	369	32687 – 32689	555
29418 – 29449	292	31219	598	3269x – 3283x	370
29450 – 29493	46	3121x – 3125x	369	32840 – 32849	547
29494 – 29499	292	32001 – 32015	538	32850 – 32893	548
29500 – 29526	303	32016 – 32088	539	32999	596
29527 – 29528	293	32089 – 32103	538	33001 – 33034	527
29590 – 29599	292	32104 – 32176	539	33035 – 33053	528
29600 – 29735	494	32177 – 32199	544	33054 – 33075	591
29736 – 29744	45	32200 – 32223	540	33078	595
29745 – 29776	293	32224 – 32255	541	33083	591
29800 – 29812	836	32256 – 32257	539	33084 – 33085	600
29813 – 29819	292	32258	544	33089	599
29825 – 29826	46	32260 – 32283	542	33090 – 33091	597
29840 – 29933	292	32284 – 32292	543	33092	589
29942 – 29968	303	32293 – 32300	539	33096	585
29970 – 30041	304	32301 – 32310	544	33097	597
3011x – 3026x	47	32311 – 32329	545	33098	586
3027x – 3047x	95	3233x – 3238x	94	33099	585
31001 – 31039	318	32390 – 32399	545	33100 – 33112	526
31040 – 31096	257	32400 – 32427	585	33113 – 33156	551
3110x – 3111x	369	32428 – 32437	586	33200 – 33211	529
31129	546	32440 – 32467	593	33212 – 33239	549
3112x	369	32468 – 32478	594	33240 – 33274	550
31139	546	32480 – 32509	587	33275 – 33290	545
3113x	369	32510 – 32517	588	34007 – 34040	525
31149	546	32520 – 32546	595	34041 – 34046	545
3114x	369	32547 – 32555	596	34050 – 34071	531
31159	546	32556 – 32559	538	34072 – 34080	581
3115x	369	32560 – 32581	589	34081 – 34089	579
31169	546	32582 – 32591	590	34090	243
3116x	369	32592 – 32596	553	34091 – 34099	580
31179	546	32597 – 32599	552	34100 – 34115	524
3117x	369	32600 – 32620	597	34116 – 34126	532
31189	546	32621 – 32630	598	34127	243
3118x	369	32633	552	34130 – 34147	524
31199	546	32640 – 32652	554	34148 – 34156	579
3119x	369	32653 – 32685	555	34157 – 34165	580
31209	546	32686	554	34166 – 34177	533

# Part No. Index

Part no.	Page	Part no.	Page	Part no.	Page
34187 – 34195	601	40023 – 40027	785	49764 – 49796	447
34300 – 34311	530	40028 – 40073	791	49797 – 49829	449
34312 – 34315	592	40085	345	49830 – 49870	451
34339 – 34348	602	40135 – 40144	342	49885 – 49917	445
34349	243	40145 – 40149	346	49918	75
34350 – 34356	154	40150 – 40159	343	49920 – 49952	446
35001 – 36008	241	40160 – 40167	250	50060 – 50072	229
36009 – 36030	547	40168 – 40169	343	50073 – 50094	561
37001 – 37028	242	40170 – 40175	791	50095 – 50127	562
37029 – 37068	243	40176 – 40178	344	50128 – 50148	561
37069 – 37078	244	40179	342	50149 – 50189	562
37079	243	40180 – 40189	785	50209	312
37080 – 37090	244	40190 – 40196	341	50475 – 50486	313
37091 – 37099	243	40197	339	50488 – 50499	314
37100 – 37153	270	40200 – 40203	340	50635 – 50646	315
37154	243	40204 – 40333	836	50650 – 50889	299
37155 – 37175	271	40334 – 40567	837	50890 – 50898	312
37176 – 37258	90	40568 – 40801	838	50899	301
37259 – 37286	240	40802 – 40814	837	50900 – 50997	312
37287 – 37358	272	43050 – 43065	518	50998 – 50999	305
38001 – 38040	246	43524 – 43564	147	51000	231
38041 – 38047	603	44001 – 44058	280	51070 – 51391	305
38049 – 38054	591	45130 – 45145	281	51392 – 51418	301
38055 – 38061	592	45150 – 45165	282	51419 – 51558	306
38062 – 38082	599	451xx – 459xx	307	51559 – 51702	312
38083 – 38091	600	461xx – 47020	308	51703 – 51715	313
38501 – 38516	319	47021 – 47076	497	51716 – 51728	314
38517 – 38532	320	48500 – 48509	152	51729 – 51740	315
38533 – 38547	258	48510 – 48518	153	51741 – 51767	229
39001 – 39024	517	48519 – 48528	152	51768 – 51848	300
39025 – 39039	481	48529 – 48537	153	51849 – 51902	301
39040 – 39048	258	49501 – 49520	141	51970 – 51991	519
39050 – 39079	517	49521 – 49535	142	51992 – 52017	520
40001 – 40006	338	49550 – 49582	187	52018 – 52057	236
40007 – 40010	339	49583 – 49615	189	52058 – 52067	563
40011 – 40012	340	49620 – 49652	188	52068 – 52097	564
40015 – 40021	345	49653 – 49685	190	52098 – 52103	565
40022	791	49700 – 49763	75	52104 – 52134	566

# Part No. Index

Part no.	Page	Part no.	Page	Part no.	Page
52135 – 52154	301	53180 – 53191	575	59396 – 59397	928
52194 – 52197	230	53192 – 53195	521	59398 – 59411	460
52198 – 52292	231	53200 – 53235	559	59450 – 59457	929
52300 – 52361	130	53236 – 53238	560	59460 – 59471	930
52365 – 52382	145	53239 – 53242	559	59472 – 59653	496
52383	564	53243 – 53245	560	59654 – 59706	931
52384 – 52429	145	53246 – 53247	559	59707 – 59759	932
52430 – 52431	130	53248 – 53268	557	59760 – 59810	420
52432 – 52434	564	53269 – 53299	558	59811 – 59836	421
52435 – 52484	146	53300 – 53308	521	59837 – 59854	473
52485 – 52486	557	53309 – 53336	558	60000 – 60051	372
52490 – 52533	144	53350 – 53375	521	601xx	487
52534 – 52541	571	53376 – 53386	221	60216 – 60226	322
52542 – 52612	572	53387 – 53389	222	60250 – 60287	371
52614 – 52629	564	53390	576	60288 – 60298	322
52630	221	53391 – 53549	222	602xx – 617xx	487
52631 – 52644	222	53550 – 53552	562	61816 – 61899	495
52700 – 52713	567	53553 – 53555	561	618xx	487
52714 – 52770	568	53556	562	61900 – 61927	495
52771 – 52780	573	53557	558	61928 – 61980	409
52781 – 52808	574	53558 – 53559	557	61981 – 61998	410
52809 – 52867	301	53560	562	61999	420
52872 – 52898	300	53561 – 53562	561	62020 – 62028	366
52899	572	53758 – 53761	559	620xx – 624xx	485
52900 – 52913	569	53762 – 53777	834	62500	322
52914 – 52944	570	541xx – 564xx	302	62501	487
52945 – 52968	300	59028	577	62502 – 62554	424
52969 – 52980	301	59114 – 59135	834	62556 – 62600	428
52990 – 52999	576	59138 – 59145	924	62601	487
53000 – 53003	575	59150 – 59156	926	62602 – 62605	428
53004 – 53031	576	59262 – 59269	835	62607 – 62624	472
53032 – 53046	577	59270 – 59311	921	62625 – 62684	405
53047 – 53069	578	59312 – 59318	835	62685 – 62700	406
53070	576	59336 – 59338	922	62701	487
53071 – 53082	300	59339	495	62702 – 62709	406
53083 – 53088	301	59360 – 59377	923	62710 – 62765	416
53100 – 53120	557	59380 – 59386	925	62766 – 62793	417
53121 – 53179	558	59390 – 59395	927	62794 – 62800	409

# Part No. Index

Part no.	Page	Part no.	Page	Part no.	Page
62801	487	63485 – 63497	492	70561	266
62802 – 62812	360	635xx – 637xx	485	70581	267
62813 – 62868	376	63815 – 63862	488	70736	255
62869 – 62875	377	63863 – 63899	489	70931	249
62876 – 62884	459	638xx	485	71254	129
62901	487	63900 – 64070	489	71369	249
62902 – 62952	366	64075 – 64122	490	71491 – 71493	201
62953 – 62996	367	64123 – 64330	491	71544	503
62997	382	65044 – 65087	414	71705 – 71711	201
63010 – 63048	480	65114 – 65133	415	71789 – 71820	266
63049 – 63078	382	65214 – 65242	407	71901	249
63079 – 63133	359	65243 – 65285	408	71990 – 71997	201
63136	424	65314 – 65349	418	72082	297
63137	458	65350 – 65385	419	72106	201
63138	459	65386 – 65388	491	72184 – 72185	297
63139 – 63155	458	65389 – 65401	492	72214	266
63156 – 63163	459	65402 – 65478	491	72872	321
63164	359	65479 – 65548	492	72944 – 72950	500
63165 – 63199	360	65549	491	72951 – 72961	129
6320x – 63331	493	660xx – 667xx	486	72973 – 73485	128
63332 – 63334	491	66820 – 66837	392	73519	249
63335 – 63340	492	66840 – 66883	361	73548	128
63341	493	668xx	486	73571	411
63342 – 63348	492	69601 – 69624	501	73574	129
63351	493	69625 – 69627	491	73579 – 73580	469
63352 – 63354	491	69628 – 69630	492	73587	412
63355 – 63360	492	69631 – 69654	502	73657	128
63361	493	69655 – 69660	492	73714	321
63362 – 63368	492	69661 – 69714	364	73726	249
63371	493	69715 – 69737	365	73728	128
63372 – 63374	491	69738 – 69741	492	73774	469
63375 – 63380	492	69750 – 69803	380	73859	297
63381	493	69804 – 69826	381	73870	128
63382 – 63388	492	69827 – 69853	491	73884 – 73885	321
63391 – 63401	493	69854 – 69907	492	73913	249
63402 – 63416	491	70116	266	73924	500
63417 – 63481	492	70377 – 70402	249	73993 – 74034	129
63482 – 63484	491	70518 – 70536	321	74094 – 74096	469



# Part No. Index

Part no.	Page	Part no.	Page	Part no.	Page
74221	297	76397	267	80000 – 80028	626
74293 – 74297	249	76639 – 76640	129	80031	627
74506 – 74514	469	76705	193	80032 – 80041	626
74540	267	76706	830	80043	658
74551	412	77144 – 77175	483	80045	611
74658	266	77261 – 77270	266	80046 – 80051	626
74670	249	77352	412	80053	654
74729	129	77376	469	80055	657
74749	317	77424	266	80068	683
74992 – 75019	225	77427 – 77468	193	80084 – 80116	627
75167 – 75253	266	77469	266	80118	628
75254 – 75319	828	77532 – 77538	249	80120 – 80130	627
75375 – 75410	506	77548	255	80131 – 80138	619
75415 – 75418	266	77642	129	80139 – 80146	620
75431 – 75445	321	77741 – 78081	471	80148 – 80155	619
75449	297	78106 – 78117	321	80156 – 80162	620
75450 – 75458	500	78122 – 78125	249	80164 – 80171	619
75460 – 75479	297	78240 – 78241	128	80172 – 80178	620
75486	819	78265 – 78268	192	80180 – 80187	622
75497 – 75499	317	78269 – 78275	193	80188 – 80195	623
75507 – 75514	831	78284 – 78288	411	80196 – 80204	622
75528 – 75541	829	78289 – 78291	412	80207 – 80211	623
75642	411	78372	471	80212 – 80218	622
75801	193	78377 – 78479	462	80219	623
75932	829	78614 – 78626	464	80220	622
75940	266	78828	471	80223 – 80227	623
75943 – 75980	469	78948 – 78958	469	80264 – 80265	615
76061 – 76099	128	78963	471	80267	709
76103	469	78983	830	80270 – 80281	615
76105 – 76123	129	79513	471	80294	673
76157 – 76175	266	79608	539	80316	608
76283 – 76294	192	79613	471	80363 – 80382	636
76295 – 76298	193	79623 – 79638	321	80384	705
76299 – 76310	192	79639 – 79685	503	80388	648
76311 – 76314	193	79804 – 79830	234	80418 – 80435	610
76345 – 76349	411	79850 – 79907	411	80436 – 80450	620
76350	412	79921	129	80473 – 80475	626
76351	411	79954	589	80495 – 80518	634

# Part No. Index

Part no.	Page	Part no.	Page	Part no.	Page
80532	648	81081	760	82032 – 82033	648
80534	636	81085	763	82190	632
80576 – 80627	628	81108 – 81121	623	82390 – 82407	635
80629 – 80630	648	81123	663	82408 – 82412	608
80631	611	81133 – 81136	623	82431	615
80672	628	81137 – 81149	627	82434	749
80681	615	81155	697	82488	374
80688	609	81186	706	82501	666
80691	628	81202	742	82502	667
80699	608	81203	744	82509	732
80725	615	81209	633	82561	633
80732 – 80735	628	81238	642	82648	623
80743 – 80754	609	81246	611	82696	744
80759	627	81254	664	82780 – 82783	374
80764	626	81255 – 81260	633	82786	633
80769	609	81278	659	82792 – 82803	613
80771	627	81286 – 81287	731	82804 – 82818	612
80774 – 80777	626	81382	623	82822	749
80778	742	81446	672	82824	707
80782 – 80791	608	81447	763	82835 – 82836	714
80792	706	81448	705	82838	694
80793	611	81478	625	82839	695
80795 – 80806	609	81495	616	82913	710
80809	628	81501	718	82914 – 82940	374
80810	671	81557	743	82941 – 82942	373
80813 – 80821	609	81609 – 81610	662	82943 – 82944	374
80824 – 80825	747	81611	648	82945 – 83000	373
80826	761	81663	760	83001 – 83024	357
80846	616	81699	679	83031 – 83044	356
80851	615	81713	712	83045 – 83050	403
80868 – 80894	611	81882	648	83051 – 83054	356
80895	628	81900	608	83055 – 83059	403
80896 – 80908	611	81903 – 81904	717	83060 – 83104	356
80912 – 80914	626	81905	718	83130 – 83227	403
80915 – 80959	628	81906	719	83233 – 83253	404
81003	709	81907 – 81908	755	83254 – 83280	413
81036 – 81038	636	81909 – 81910	756	83286 – 83344	414
81077	761	81911 – 81912	740	83350 – 83370	415

# Part No. Index

Part no.	Page	Part no.	Page	Part no.	Page
83371 – 83498	403	87127 – 87143	900	91229 – 91237	973
83565	356	87145	901	91270 – 91279	972
83624 – 83644	404	87164 – 87196	904	91350 – 91351	996
83650 – 83708	358	87277	900	91352 – 91359	997
83709 – 83773	375	87328	847	91368 – 91376	998
83774 – 83809	418	87406	901	91383 – 91384	996
83810 – 83845	419	87410	900	91385 – 91397	997
83904 – 83932	407	87416 – 87476	904	91600	959
83933 – 83975	408	87503	900	91675 – 91678	957
83976 – 83997	413	87548	903	91777 – 91786	978
84178	904	87549	904	91850 – 91870	996
84400 – 84476	900	87575	900	91871 – 91911	997
84481 – 84499	901	87604 – 87690	901	91924	1005
84500 – 84612	908	87725	900	9231x – 9232x	979
84653 – 84655	901	87738	901	92335	978
84656 – 84673	903	87748	900	9233x	979
84674 – 84691	904	87802	903	92345	978
84700 – 84812	908	87845 – 87919	904	9234x	979
84867 – 84875	905	89293	847	92355	978
84903 – 84915	909	89800 – 89802	845	9235x	979
84919 – 84979	910	89900 – 89941	423	92365	978
85221 – 85355	911	89950 – 89992	427	9236x	979
85357 – 85508	912	90067	963	92375	978
85550 – 85675	913	90068	959	9237x	979
85686 – 85795	914	90100 – 90105	961	92385	978
85900 – 86001	915	90140 – 90159	982	9238x	979
86004 – 86073	916	90165 – 90172	966	92395	978
86303 – 86411	909	90175 – 90178	951, 963	9239x	979
86415 – 86491	910	90179 – 90182	963	92405	978
86740 – 86741	901	90186 – 90189	952, 964	9240x	979
86762	904	90190 – 90199	964	92667 – 92669	944
86764 – 86765	900	90489 – 90619	963	92779	958
86774 – 86782	903	90710 – 90719	962	92780 – 92804	945
86867 – 86870	900	90750 – 90759	947	92970 – 92977	965
86960 – 86961	901	90760 – 90767	946	93030	996
86989	903	90870 – 90878	962	93031 – 93034	997
87074	900	91030 – 91031	998	93096 – 93099	998
87084	901	91219 – 91228	972	93105	958

# Part No. Index

Part no.	Page	Part no.	Page	Part no.	Page
93147 – 93150	999	98163 – 98170	962	400081	779
93209	966	98257	959	400089 – 400094	786
93529	1007	98314	963	400109 – 400115	787
93569	958	98366	962	400116 – 400122	788
93630 – 93644	975	98698	966	400143 – 400150	790
93727	958	98725 – 98908	959	400151	780
93728	959	99300 – 99329	945	400158	773
93908 – 93944	944	99610 – 99628	970	400189	339
94000 – 94022	998	99630 – 99634	956	600154 – 600157	915
94023	996	99800 – 99803	948	650086 – 650092	905
94024	997	99875	966	650122	847
94188 – 94218	959	99950 – 99957	949	650200 – 650213	905
94250 – 94267	962	99960 – 99963	946	650950 – 650965	902
94484 – 94489	961	99965 – 99968	947	660014 – 660038	847
94624	946	99970 – 99987	948	660053 – 660089	845
94847	959	220958 – 228943	72	660090 – 660160	853
94915 – 94933	973	400000 – 400002	766	660207 – 660222	846
96176 – 96228	962	400003 – 400010	767	660224 – 660259	844
96248 – 96252	973	400011	768	660260 – 660314	856
96458 – 96464	962	400012 – 400020	769	660334	857
96491 – 96492	982	400021	771	660335	859
96560	959	400022 – 400024	772	660350	857
96718	973	400025 – 400029	773	660351	861
96748	957	400030	774	660445	860
96841	998	400031	775	660482	857
96939	973	400032 – 400033	776	660500	858
97066	959	400034	777	660510	864
97153	973	400035	778	660627	854
97166 – 97171	966	400036 – 400037	781	660628	856
97175	973	400038 – 400039	782	660630	865
97184 – 97192	957	400040	783	660648	858
97219 – 97223	982	400041	784	660666 – 660667	844
97243 – 97246	966	400042 – 400043	770	660668	845
97315 – 97317	962	400060	786	660669 – 660675	846
97527 – 97531	956	400061 – 400062	789	660676 – 660679	847
97785	964	400068 – 400072	792	660680 – 660688	852
97816 – 97823	962	400073 – 400078	793	660689 – 660730	854
98149 – 98155	974	400080	783	660731	857

# Part No. Index

Part no.	Page	Part no.	Page	Part no.	Page
660732 – 660737	854	670742 – 670749	880	700199	469
660738	857	670750 – 670753	883	700231 – 700235	500
660739 – 660751	854	670757 – 670769	884	700407	828
660752 – 660756	855	670771 – 670777	883	700437	469
660757 – 660761	856	670781 – 670793	884	700540 – 700560	471
660762 – 660764	857	670802 – 670817	883	700561 – 700565	469
660766 – 660771	858	670822 – 670825	888	700566 – 700572	825
660772 – 660773	859	670826 – 670833	889	700573 – 700574	824
660774	860	670834 – 670837	888	700575 – 700583	828
660776 – 660785	863	670838 – 670845	889	700585 – 700596	829
660786 – 660794	864	670849 – 670865	888	700653 – 700657	471
660795 – 660814	865	670866 – 670867	883	700766	267
660815 – 660821	866	671100	895	700768 – 700771	317
660822 – 660823	869	671120	896	700849	828
660824 – 660833	870	671332 – 671335	889	700897	469
660834 – 660837	871	671341	883	700905	511
660838 – 660841	872	671351 – 671356	888	700939	539
660842 – 660845	873	671426 – 671433	886	701044 – 701045	829
660846 – 660849	874	671434 – 671441	881	701219	234
660850	862	671473 – 671478	880	701351 – 701359	500
660851 – 660852	867	671483 – 671489	884	701889 – 701900	262
660853 – 660854	868	671493 – 671499	883	701901 – 701913	263
660855 – 660870	848	671533 – 671537	884	702050	471
660871 – 660886	849	671543 – 671557	880	702179	828
660887 – 660889	850	671759	893	702485	816
660890 – 660892	851	671833 – 671889	892	702656	509
660893	875	671893 – 671949	891	702801	824
660894	876	671953 – 672019	893	702803 – 702805	262
660897	869	672023 – 672039	894	702806 – 702808	263
670656 – 670659	887	672303 – 672339	885	703156	817
670660 – 670667	890	672343 – 672369	882	703402	814
670668 – 670675	887	672373 – 672379	885	703668	810
670676 – 670683	890	672393 – 672419	882	703834	510
670684 – 670696	887	672443 – 672449	885	703843 – 703902	263
670710 – 670717	886	700016 – 700032	828	703999	508
670718 – 670725	881	700035	830	704225 – 704234	798
670726 – 670733	886	700114	500	704809	808
670734 – 670741	881	700142	828	704940	809



# Part No. Index

Part no.	Page	Part no.	Page	Part no.	Page
705031	820	709556	829	801195	700
705135	829	709703 – 709938	474	801196	646
705167	828	710054 – 710055	466	801197	687
705221 – 705413	471	710081	474	801198	647
705461	467	770001 – 770005	825	801200 – 801202	649
705462	264	770009	824	801217 – 801221	617
705738 – 705739	798	800044	710	801352	640
705741	811	800067	698	801572 – 801573	734
705769	800	800068	692	801650	700
705775 – 705894	798	800088	696	801651	701
706003	469	800109	713	801652	745
706288 – 706289	798	800126	641	801659	719
706307 – 706309	799	800497	757	801727	636
706333	471	800571	736	801733	644
706432	812	800579	642	801846 – 801847	751
706452	813	800647	680	801982	733
706627	828	800648	708	802001 – 802004	647
706839 – 706840	798	800649	713	802131 – 802142	621
707062	818	800650	716	802143 – 802145	613
707077	467	800651 – 800652	758	802167	675
707221 – 707225	466	800653	699	802168	676
707228 – 707232	469	800654 – 800655	703	802169	681
707234 – 707236	800	800681 – 800682	754	802170	682
707250 – 707296	466	800683 – 800684	753	802171	655
707389 – 707398	467	800685	736	802172	656
707400 – 707410	471	800708 – 800710	632	802173	661
707417	467	800715	716	802174	665
707418	471	800753	634	802177	707
707522	815	800754 – 800762	621	802178 – 802179	711
707738 – 707740	471	800980	645	802180 – 802181	715
707746 – 707747	469	801147	674	802182	741
708090	829	801182	634	802183	752
708371 – 708373	464	801183	625	802184	689
708487	590	801190	617	802185	702
708543 – 708548	474	801191	721	802186	704
708609 – 708612	462	801192	722	802187 – 802188	759
708613	464	801193	723	802247 – 802249	614
709043	831	801194	699	802260	643

# Part No. Index

Part no.	Page	Part no.	Page	Part no.	Page
802261 – 802276	616	804115	746	906532 – 906538	994
802277 – 802278	614	804254 – 804256	608	906682 – 906686	984
802281	616	804268 – 804269	738	906689 – 906700	953
802293	693	804299	730	906914 – 906917	951
802339	741	804408 – 804409	748	906918 – 906920	952
802469	727	804410 – 804411	750	906921 – 906924	951, 952
802470	728	804700	638	906936 – 906940	953
802471	467, 724	804705 – 804706	614	906941 – 906982	954
802792	637	804767	471, 726	907016 – 907038	983
802800	762	805287	729	907275 – 907277	944
802917 – 802918	631	903532 – 903559	944	907303 – 907317	988
803037 – 803038	624	903560 – 903567	946	907318 – 907347	989
803295	702	903716	1007	907348 – 907407	990
803344	735	904731	1004	907409 – 907434	991
803346 – 803349	638	904892 – 904893	1008	907435 – 907461	992
803354	720	904924	975	907677 – 907726	993
803364	639	904963 – 904964	1001	907728 – 907749	994
803378	668	904996 – 905068	960	907865 – 907884	995
803379	669	905181 – 905189	950	920384 – 920403	971
803380	677	905206 – 905211	1001	920605 – 920612	965
803381	678	905248	950		
803382	688	905303 – 905498	959		
803383 – 803384	739	905525 – 905546	984		
803387	691	905720 – 905723	955		
803658 – 803661	630	905863 – 905864	1001		
803664	629	905870 – 905875	963		
803668	630	905957 – 905966	958		
803672	467, 725	906199	946		
803693	690	906233 – 906234	1006		
803722	737	906235 – 906236	1009		
803917 – 803920	618	906237 – 906238	1010		
803923 – 803924	624	906239	1010, 1011		
803925 – 803928	631	906240 – 906241	1011		
803929	629	906242 – 906243	1012		
803930 – 803932	630	906244	1014		
803934 – 803935	637	906245 – 906246	1013		
804043	670	906436 – 906477	995		
804045	660	906524 – 906531	993		











## NOTES

### Technical modifications

© HELUKABEL® GmbH Hemmingen

Specifications have been carefully checked and are believed to be correct; however, no responsibility is assumed for inaccuracies. Subject to technical modifications. Consequently all illustrations, numerical data, etc. are provided without guarantee. Color deviations between photos and delivered goods cannot be avoided. Reproduction or duplication of the text and illustrations, in whole or in part, remain reserved. The transfer of copyrights always requires the written consent of HELUKABEL® GmbH. Our General Terms of Delivery and Payment, which can be viewed at [www.helukabel-group.com](http://www.helukabel-group.com), apply.

### Length markings

The length marking, which cannot be calibrated, is an aid, e.g. for easy material allowance determination or for determination of the length remaining on the drum. Deviation of the line length shown by the marking is up to 1%. Incomplete length markings or length markings missing on sections, deviations of the cable length shown by the length marking do not substantiate any legal obligation whatsoever. Only use calibrated measurement devices to determine line length.

### Safety notice

The cables and wires described in the catalog are produced in accordance with national and international standards, as well as plant standards; application safety, as stipulated in the safety directives, standards, and statutory regulations, as amended, is provided. With the prerequisite of proper and professional installation and use, the possibility of product-specific dangers can be excluded. For each product this catalog describes general information for use. Independent of the above, the applicable DIN VDE specifications apply. However, installation and processing must only be executed by qualified electricians.

### VDE approval

„Extracts from DIN standards with VDE classification are reproduced for the registered limited press run via permit no. 392.013, issued by Deutsches Institut für Normung e.V. [German Institute for Standardization] and VDE Verband der Elektrotechnik Elektronik Informationstechnik e.V. [Institute of Electrical and Electronics Engineers]. Any further reproduction or printing of these materials is subject to a specific permit. The versions of the standards with the most recent issue data are binding for the application thereof. These versions can be obtained from VDE VERLAG GMBH, Bismarckstr. 33, 10625 Berlin, [www.vde-verlag.de](http://www.vde-verlag.de).“

**Our General Terms of Delivery and Payment, which can be viewed at [www.helukabel-group.com](http://www.helukabel-group.com), apply**





**HELUKABEL®**



**HELUKABEL® (UK) Ltd.**

Unit 6 Wrynose Road  
Old Hall Industrial Estate  
Bromborough, Wirral  
CH62 3QD Merseyside  
United Kingdom  
Phone +44 (0)151 345 0808  
Fax +44 (0)151 329 2808  
Email: [info@helukabel.co.uk](mailto:info@helukabel.co.uk)  
[www.helukabel.co.uk](http://www.helukabel.co.uk)