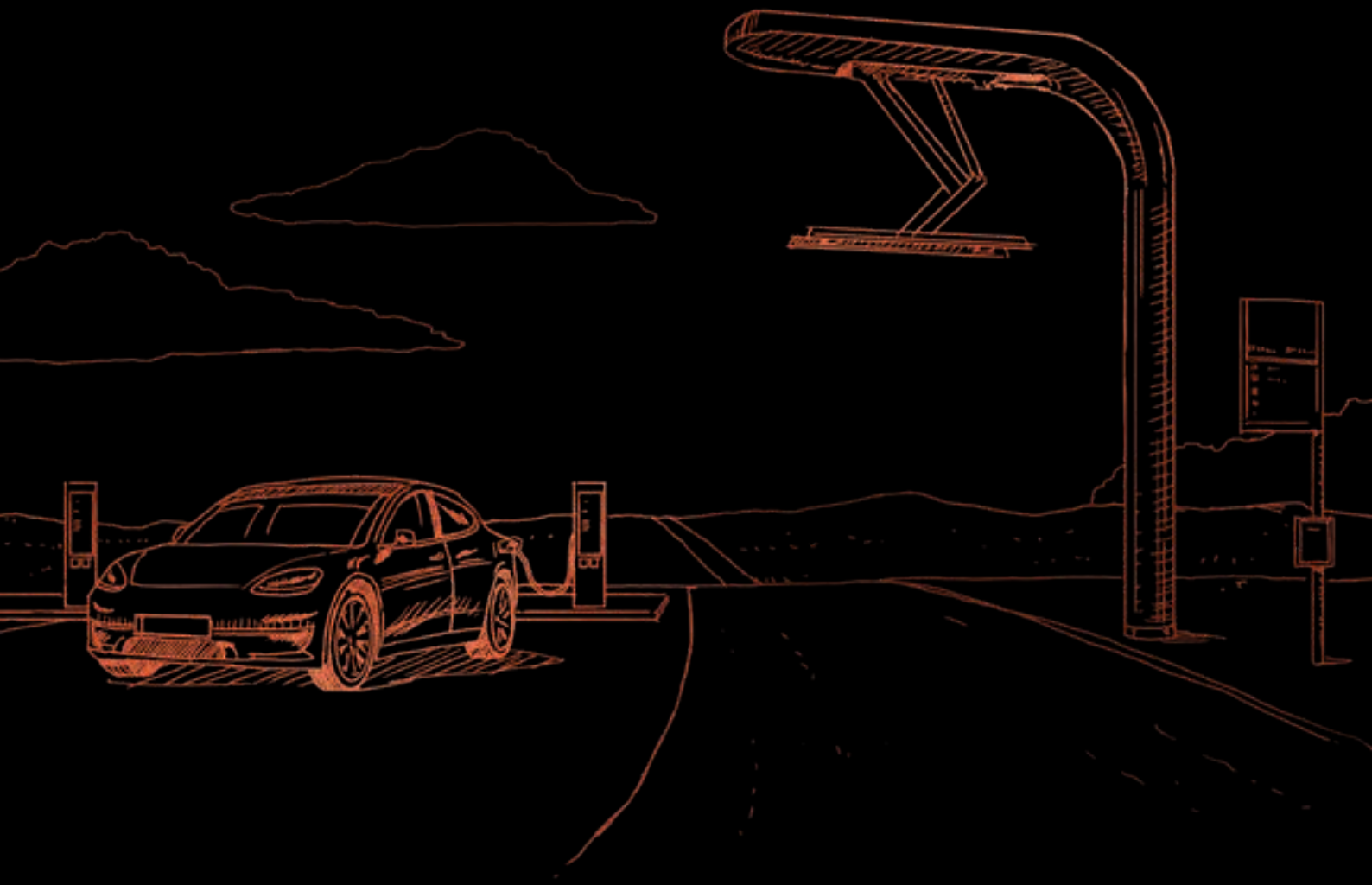
HELUKABEL®

Cables, Wires & Accessories

E-MOBILITY

Ed. 1.2 // GB



Channeling POWER

Icons

Approvals / Standards

UL

CSA

HAR

VDE REG Number

SPAIN

EAC

CCC

CE

DNV-GL

IPA

DESINA

Properties /Applications

Halogen-Free

UV Radiation

Robust

Drag Chain

Torsion

Wind-Offshore

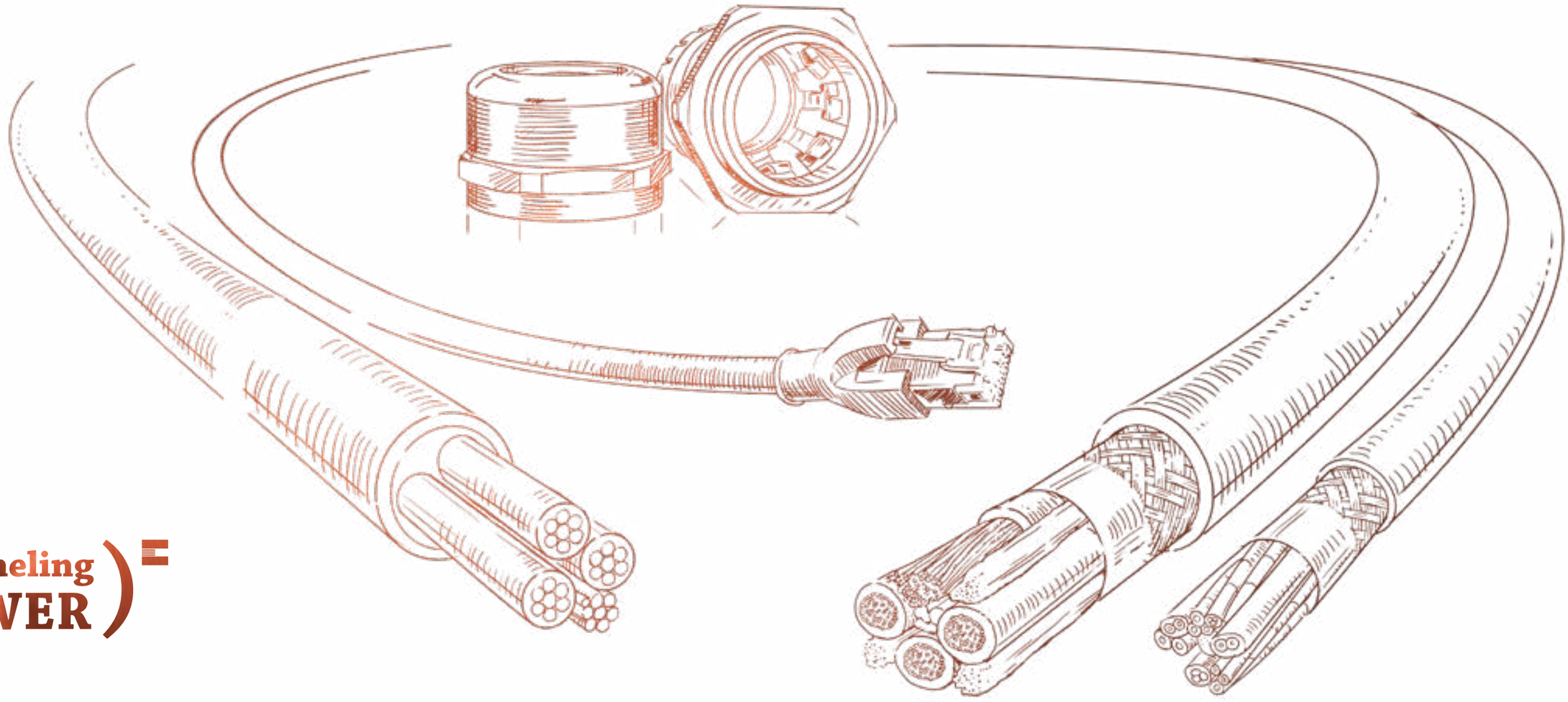
Meter Marking

In Feet

Explanation of the icons used in the brochure:

The icons are intended to provide a general overview of material properties and certifications.
For details, please refer to the information in the data sheets.

Contents



(Channeling POWER)

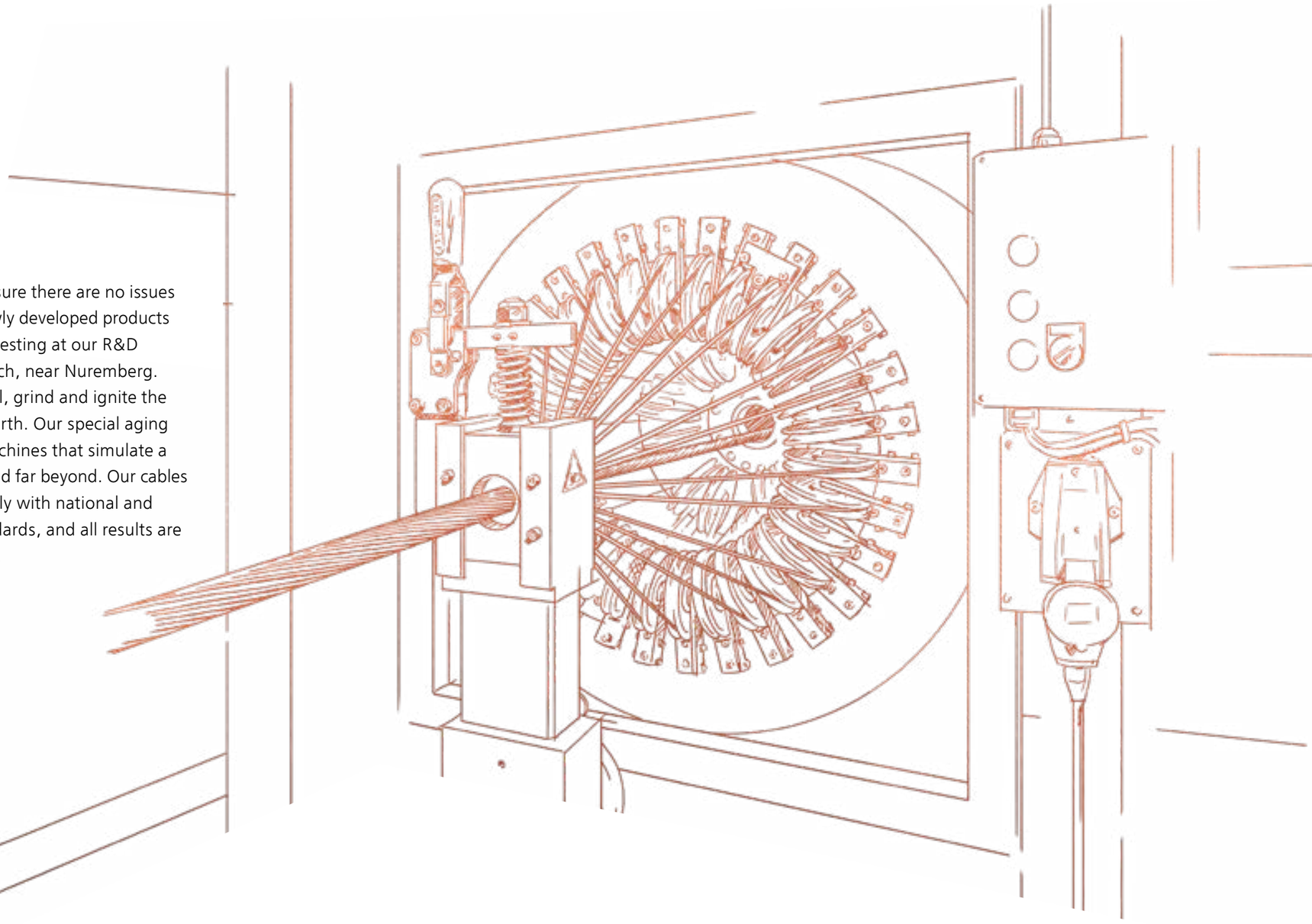
Cables are the vital supply lines of complex machines, plants, and systems. Whether operating under extreme mechanical stress, in the middle of the Arctic Ocean, in the scorching heat, or in the vastness of space – such conditions demonstrate what top-of-the-line cables can achieve.

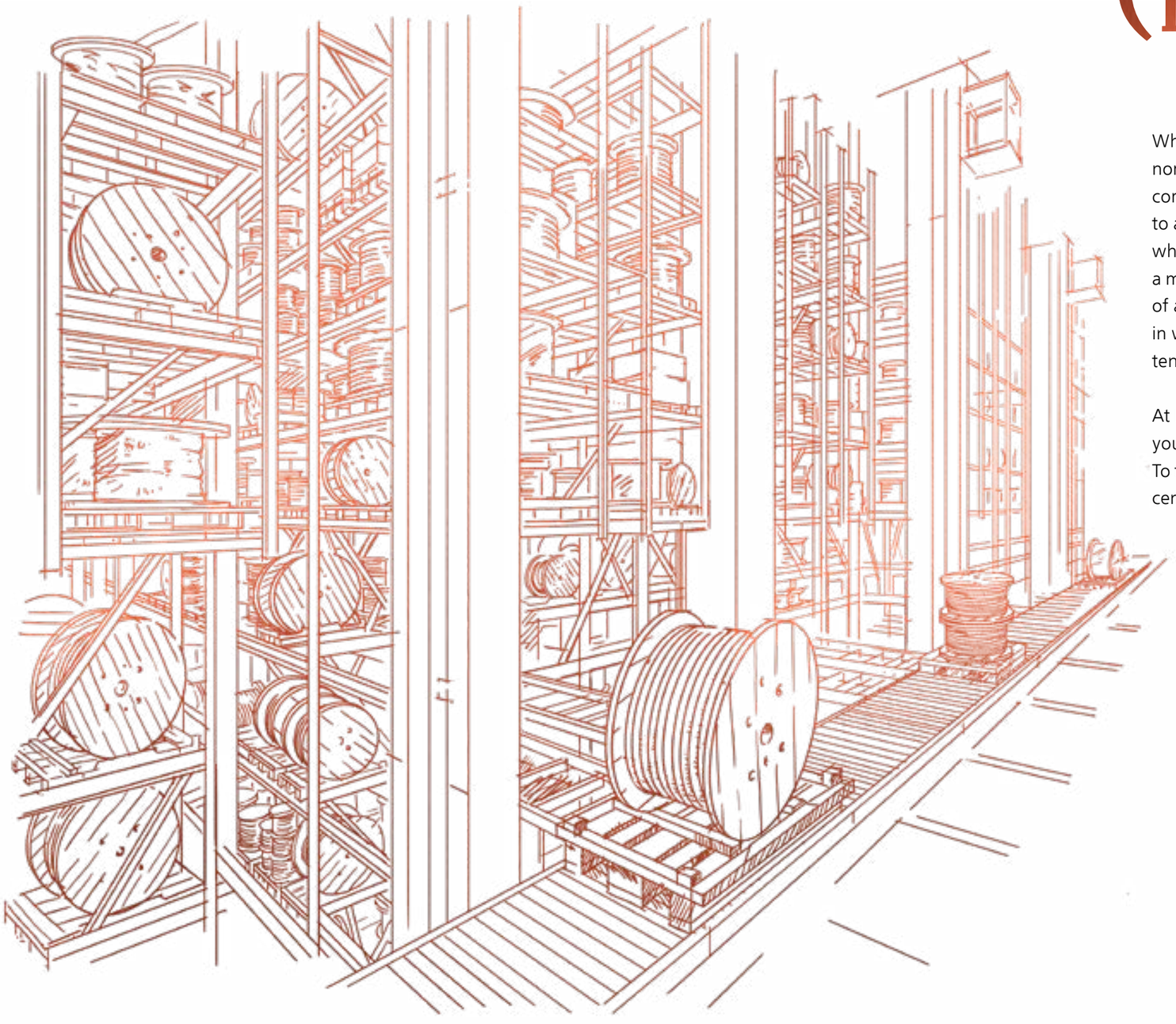
We at HELUKABEL have made it our mission to bring energy and communication to our customers' destinations reliably and consistently at all times, and to make the impossible, possible! "Channeling Power" succinctly summarizes this mission and is our commitment to customers.

Over 1,700 employees located at 57 sites across 36 countries work towards this common goal. We see it as our challenge to find the right cable solution for you every day, giving you the time to concentrate on more important things than cables and wires. This is where our products truly create value for you and your application.

Channeling INNOVATION

A cable is only as good as the minds that ask the right questions before it's made. We have a lot of bright minds at HELUKABEL who spend every day searching for intelligent answers. This is important because the challenges faced by modern cables and wires are multifaceted: for example, moving applications with more than ten million cycles, exposure to extreme mechanical and chemical loads, tricky bending radii and space-saving hybrid solutions. For each situation, HELUKABEL has answers to help you. To ensure there are no issues during use, all newly developed products undergo rigorous testing at our R&D centre in Windsbach, near Nuremberg. Here we bend, pull, grind and ignite the cable for all it's worth. Our special aging ovens are time machines that simulate a cable's life cycle and far beyond. Our cables are tested to comply with national and international standards, and all results are signed and sealed.





Channeling LOGISTICS

Where there's no cable there's no data nor electricity. When everything's going according to plan, cables are of little interest to anyone; but inevitability the day comes when a machine starts malfunctioning or a missing cable is holding up the completion of a project task. Whatever the situation in which problems occur, the time can be tense and critical for everyone involved.

At HELUKABEL, we try to remove the stress you're experiencing as quickly as possible. To this end, we built the biggest distribution centre for cable products in Europe.

With over 40,000 products stored in a fully automated, high-bay warehouse, we're ready to act upon your needs quickly and ship you the right cable at a moment's notice. Our "known shipper" status with the Federal Office of Civil Aviation means that your goods are checked in and pass security control directly at our warehouse, which speeds up the shipment process. On top of this, we have 32 additional warehouses on 5 continents so you can order your cables in Spanish, Russian, Chinese or in 23 other languages.

Biogas plant

Wind power plant

Hydroelectric power plant

Photovoltaic

Transformer station

Switchgear station with ESS

Charging stations

Inverter

Inductive parking lot

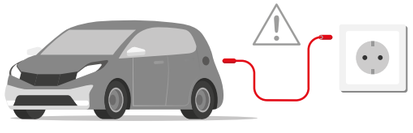
Low voltage direct burial:
NAYY / NA2XY / NAYCY / NAYCWY

Medium voltage direct burial:
NA2XSY / NA2XS2Y / NA2XS(F)2Y

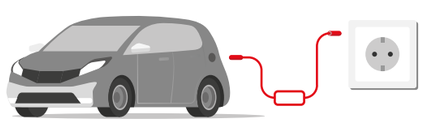
AC/DC charging cable:
HELUPOWER® CHARGE 750 AC
HELUPOWER® CHARGE 1200 DC
Optional: liquid-cooled DC cables

Charging Modes

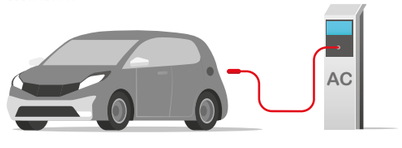
Mode 1



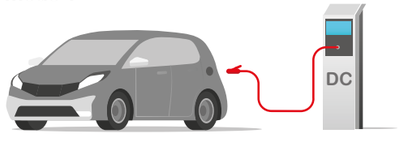
Mode 2



Mode 3

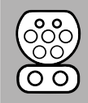
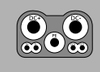


Mode 4



Charging mode	Communication	Plugs	Capacity	Current type	HELUKABEL
Mode 1	None	No longer in use	Single-phase: max. 16 A, 3,7 kW Three-phase: max. 16 A, 11 kW	AC	No longer in use
Mode 2	Between communi-cation module and vehicle	Type 2 -Schuko	Single-phase: max. 16 A, 3,7 kW Three-phase: max. 32 A, 22 kW	AC	HELUPOWER® Charge 750 AC
Mode 3	Between vehicle and charging station	Type 2	Single-phase: max. 16 A, 3,7 kW Three-phase: max. 63 A, 43.6 kW	AC	HELUPOWER® Charge 750 AC
Mode 4	Between vehicle and charging station	CCS or CHAdeMO	50 kW up to 350 kW, to 500A (200V - 900V)	DC	HELUPOWER® Charge 1200 DC

Charging Connections

	Schuko/US	CEE blue	CCE red	Type 1	Type 2	GB/T AC		Tesla	Tesla	CCS 2	CCS 1	GB/T DC	GB/T Chaoji	CHAdeMO
AC							**DC**							
Current type	1 Phase	1 Phase	3 Phase	1 Phase	3 Phase	3 Phase	**Current type**	DC	DC	DC		DC	DC	DC
Voltage level (V)	230	230	230 (400)	230	230 (400)	230 (400)	**Voltage level (V)**	410	410	1000		950	1500	1000
Amps (A) max.	10	16	16	32	63	63	**Amps (A) max.**	330	330	200-(500)		250	600	400
Max. power (kW)	2	3,7	11	7,4	44	44	**Max. power (kW)**	135	135	350		238	900	500
Charging cable	Mode 2	Mode 2	Mode 2	Mode 3	Mode 3	Mode 3	**Charging cable**	Mode 4	Mode 5	Mode 4		Mode 4	Mode 4	Mode 4
Region	EU, USA	EU	EU	USA, Japan	EU	China	**Region**	EU	USA, Japan	CCS2 EU	CCS1 USA	China	China	USA, Japan, EU

HELUPOWER® CHARGE-750-AC

flexible, flame retardant

TECHNICAL DATA

E-Mobility charging cable according to DIN VDE 0285-620 / DIN EN 50620 / GB/T 33594-2017

Temperature range	flexible -40°C bis +90°C fixed -40°C bis +90°C
Permissible operating temperature of the conductor	+90°C
Nominal voltage	U_0/U 450/750 V AC
Test voltage	signal cores: 2000 V DC power cores: 2500 V AC complete cable: 3500 V AC
Minimum bending radius	flexible 7,5 x Kabel-Ø fixed 4 x Kabel-Ø

CABLE STRUCTURE

- power and signal cores: bare copper conductor acc. to DIN VDE 0295 cl. 5, fine wire, IEC 60228 Kl. 5
- core insulation: halogen-free polymer type EVI-2 acc. to DIN EN 50620
- core identification: DIN VDE 0293-308 with signal cores RD, WH, OG, VT
- outer sheath: halogen-free polymer type EVM-1 acc. to DIN EN 50620
- outer sheath colour: black or red (RAL 3020)
- with meter marking

PROPERTIES

- resistant to: oil, UV radiation
- halogen-free
- flame retardant

TESTS

- oil resistant acc. to DIN VDE 0207-363-10-2 / DIN EN 50363-10-2
- flame retardant acc. to DIN VDE 0482-332-1 / DIN EN 60332-1 / IEC 60332-1
- halogen-free acc. to DIN VDE 0285-620 / DIN EN 50620
- UV-resistant acc. to DIN VDE 0285-620 / DIN EN 50620

APPLICATION

E-Mobility charging cable for multiple use scenarios. It can be used for charging electronic vehicles at public charge stations like parking areas, near highways or in garages as well as at domestic sockets. The UV and oil resistance ensure a reliable charging process indoors and outdoors. Due to its TPE-U outer sheath it even withstands harsh handling on concrete.

NOTES

- other constructions or outer sheath colours available on request
- UL 62 charging cable available on request
- can also be delivered for alternating current as HELUPOWER® CHARGE 1200 DC

outer sheath: black

Part no.	No. cores x cross-sec. mm²	Outer Ø app. mm	Copper weight kg/km	Weight app. kg / km
17001062	3 G 1.5 + 1 x 0.5	9.5	48.0	115
17001063	3 G 1.5 + 2 x 0.5	9.5	53.0	125
17001064	3 G 2.5 + 1 x 0.5	10.0	77.0	153
17001065	3 G 2.5 + 2 x 0.5	10.0	82.0	161
17001066	5 G 2.5 + 1 x 0.5	12.8	125.0	238
17001067	5 G 2.5 + 2 x 0.5	12.8	130.0	245
17001068	5 G 2.5 + 4 x 0.5	13.4	140.0	263
17001069	3 G 6 + 1 x 0.5	12.8	178.0	293
17001070	3 G 6 + 2 x 0.5	12.8	183.0	300
17001071	5 G 6 + 1 x 0.5	16.0	293.0	455
17001072	5 G 6 + 2 x 0.5	16.0	298.0	461
17001073	5 G 16 + 1 x 1	22.7	778.0	1100

outer sheath: red

Part no.	No. cores x cross-sec. mm²	Outer Ø app. mm	Copper weight kg/km	Weight app. kg / km
17001074	3 G 1.5 + 1 x 0.5	9.5	48.0	115
17001075	3 G 1.5 + 2 x 0.5	9.5	53.0	125
17001076	3 G 2.5 + 1 x 0.5	10.0	77.0	153
17001077	3 G 2.5 + 2 x 0.5	10.0	82.0	161
17001078	5 G 2.5 + 1 x 0.5	12.8	125.0	238
17001079	5 G 2.5 + 2 x 0.5	12.8	130.0	245
17001080	5 G 2.5 + 4 x 0.5	13.4	140.0	263
17001081	3 G 6 + 1 x 0.5	12.8	178.0	293
17001082	3 G 6 + 2 x 0.5	12.8	183.0	300
17001083	5 G 6 + 1 x 0.5	16.0	293.0	455
17001084	5 G 6 + 2 x 0.5	16.0	298.0	461
17001085	5 G 16 + 1 x 1	22.7	778.0	1100

HELUPOWER® CHARGE-1200-DC

flexible, flame retardant

TECHNICAL DATA

E-Mobility charging cable with VDE-REG No.

Temperature range	flexible -40°C bis +90°C fixed -40°C bis +90°C
Permissible operating temperature of the conductor	+90°C
Nominal voltage	U_0/U 600/1200 V DC
Test voltage	signal cores: 2000 V DC power cores: 2500 V AC complete cable: 3500 V AC
Minimum bending radius	flexible 10 x Kabel-Ø fixed 4 x Kabel-Ø

CABLE STRUCTURE

- bare copper-coductor acc. to DIN VDE 0295 cl. 6, finest wire, BS 6360 cl. 6, IEC 60228 cl. 6
- core insulation: halogen-free polymer type EVI-2 acc. to DIN 50620
- core identification: RD-BK-GNYE with signal cores WH, VT, BU, OG, BN, GY
- outer sheath: halogen-free polymer type EVM-1 acc. to DIN EN 50620
- outer sheath colour: black or red (RAL 3020)
- with meter marking

PROPERTIES

- resistant to: oil, UV radiation
- halogen-free
- flame retardant

TESTS

- oil resistant acc. to DIN VDE 0207-363-10-2 / DIN EN 50363-10-2
- flame retardant acc. to DIN VDE 0482-332-1 / DIN EN 60332-1 / IEC 60332-1
- halogen-free acc. to DIN VDE 0285-620 / DIN EN 50620
- UV-resistant acc. to DIN VDE 0285-620 / DIN EN 50620

APPLICATION

E-Mobility charging cable for multiple use scenarios. It can be used for charging electronic vehicles at public charge stations like parking areas, near highways or in garages as well as at domestic sockets. The UV and oil resistance ensure a reliable charging process indoors and outdoors. Due to its TPE-U outer sheath, it even withstands harsh handling on concrete. The high voltage with 1200 V direct current (DC) enables quick charging and therefore reduces the charging time significantly.

NOTES

- other constructions or outer sheath colours available on request
- UL 62 charging cable available on request
- can also be delivered for alternating current as HELUPOWER® CHARGE 750 AC
- according to DIN VDE 0285-620 / DIN EN 50620 /GB/T 33594-2017

outer sheath: black

Part no.	No. cores x cross-sec. mm²	Outer Ø app. mm	Copper weight kg/km	Weight app. kg / km
17001086	3 G 16 + 3 x 2 x 0.75	19.2	525.0	780
17001087	2 x 35 +1 G 25 + 3 x 2 x 0.75	26.0	995.0	1300
17001088	2 x 50 +1 G 25 + 6 x 0.75	28.6	1295.0	1650
17001089	2 x 70 +1 G 35 + 6 x 0.75	32.5	1795.0	2300

outer sheath: red

Part no.	No. cores x cross-sec. mm²	Outer Ø app. mm	Copper weight kg/km	Weight app. kg / km
17001090	3 G 16 + 3 x 2 x 0.75	19.2	525.0	780
17001091	2 x 35 + 1 G 25 + 3 x 2 x 0.75	26.0	995.0	1300
17001092	2 x 50 + 1 G 25 + 6 x 0.75	28.6	1295.0	1650
17001093	2 x 70 + 1 G 35 + 6 x 0.75	32.5	1795.0	2300

HELUPOWER® CHARGE-1000-AC-UL

flexible, flame retardant

TECHNICAL DATA

E-Mobility charging cable according to UL 62

Temperature range	flexible -40°C bis +90°C fixed -40°C bis +90°C
Permissible operating temperature of the conductor	+90°C
Nominal voltage	EVJE U 300 V AC EVE U 1000 V AC
Test voltage	2000 V AC
Minimum bending radius	flexible 7,5 x Kabel-Ø fixed 4 x Kabel-Ø

CABLE STRUCTURE

- power and signal cores: bare copper conductor, fine wire acc. to UL 62
- core insulation: TPE-O
- core identification: coloured cores acc. to UL 62
- cores stranded in layers with optimal lay-length
- outer sheath: TPU
- outer sheath colour: black or red (RAL 3020)

PROPERTIES

- resistant to: oil, UV radiation
- flame retardant

TESTS

- flame retardant: vertical flame test FT1 acc. to UL 1581
- oil resistant acc. to UL 62
- weather resistant acc. toUL 62

APPLICATION

E-Mobility charging cable for multiple use scenarios. It can be used for charging electronic vehicles at public charge stations like parking areas, near highways or in garages as well as at domestic sockets. The UV and oil resistance ensure a reliable charging process indoors and outdoors. Due to its TPU outer sheath it even withstands harsh handling on concrete.

NOTES

- other constructions or outer sheath colours available on request
- can also be delivered for direct current as HELUPOWER® CHARGE-1000-DC-UL

outer sheath: black

Part no.	No. cores x cross-sec. mm²	Outer Ø app. mm	Copper weight kg/km	Weight app. kg / km
17001265	3 x AWG 14 (2.08 mm²) + 1 x AWG 20 (0.52 mm²)	10.5	72.0	130
17001266	3 x AWG 14 (2.08 mm²) + 1 x AWG 18 (0.82 mm²)	10.7	75.0	140
17001267	3 x AWG 14 (2.08 mm²) + 2 x AWG 18 (0.82 mm²)	11.8	84.0	175
17001268	3 x AWG 12 (3.31 mm²) + 1 x AWG 18 (0.82 mm²)	15.2	111.0	310
17001269	3 x AWG 10 (5.26 mm²) + 1 x AWG 20 (0.52 mm²)	15.7	171.0	375
17001270	3 x AWG 10 (5.26 mm²) + 1 x AWG 18 (0.82 mm²)	16.0	174.0	380
17001271	3 x AWG 10 (5.26 mm²) + 2 x AWG 20 (0.52 mm²)	16.0	177.0	385
17001272	5 x AWG 10 (5.26 mm²) + 1 x AWG 20 (0.52 mm²)	19.8	281.0	590

outer sheath: red

Part no.	No. cores x cross-sec. mm²	Outer Ø app. mm	Copper weight kg/km	Weight app. kg / km
17001273	3 x AWG 14 (2.08 mm²) + 1 x AWG 20 (0.52 mm²)	10.5	72.0	130
17001274	3 x AWG 14 (2.08 mm²) + 1 x AWG 18 (0.82 mm²)	10.7	75.0	140
17001275	3 x AWG 14 (2.08 mm²) + 2 x AWG 18 (0.82 mm²)	11.8	84.0	175
17001276	3 x AWG 12 (3.31 mm²) + 1 x AWG 18 (0.82 mm²)	15.2	111.0	310
17001277	3 x AWG 10 (5.26 mm²) + 1 x AWG 20 (0.52 mm²)	15.7	171.0	375
17001278	3 x AWG 10 (5.26 mm²) + 1 x AWG 18 (0.82 mm²)	16.0	174.0	380
17001279	3 x AWG 10 (5.26 mm²) + 2 x AWG 20 (0.52 mm²)	16.0	177.0	385
17001280	5 x AWG 10 (5.26 mm²) + 1 x AWG 20 (0.52 mm²)	19.8	281.0	590

HELUPOWER® CHARGE-1000-DC-UL

flexible, flame retardant

TECHNICAL DATA

E-Mobility charging cable according to UL 62

Temperature range	flexible -40°C bis +90°C fixed -40°C bis +90°C
Permissible operating temperature of the conductor	+90°C
Nominal voltage	U 1000 V DC
Test voltage	2000 V DC
Minimum bending radius	flexible 7,5 x Kabel-Ø fixed 4 x Kabel-Ø

CABLE STRUCTURE

- power and signal cores: bare copper conductor, fine wire acc. to UL 62
- core insulation: TPE-O
- core identification: coloured cores acc. to UL 62
- cores stranded in layers with optimal lay-length
- outer sheath: TPU
- outer sheath colour: black or red (RAL 3020)

PROPERTIES

- resistant to: oil, UV radiation
- flame retardant

TESTS

- flame retardant: vertical flame test FT1 acc. to UL 1581
- oil resistant acc. to UL 62
- weather resistant acc. toUL 62

APPLICATION

E-Mobility charging cable for multiple use scenarios. It can be used for charging electronic vehicles at public charge stations like parking areas, near highways or in garages as well as at domestic sockets. The UV and oil resistance ensure a reliable charging process indoors and outdoors. Due to its TPU outer sheath it even withstands harsh handling on concrete.

NOTES

- other constructions or outer sheath colours available on request
- can also be delivered for alternating current as HELUPOWER® CHARGE-1000-AC-UL

outer sheath: black

Part no.	No. cores x cross-sec. mm²	Outer Ø app. mm	Copper weight kg/km	Weight app. kg / km
17001533	3 x AWG 6 (13.3 mm²) + 3 x 2 x AWG 18 (0.82 mm²)	18.6	479.0	990
17001534	2 x AWG 2 (33.6 mm²) + 1 x AWG 4 (21.2 mm²) + 3 x 2 x AWG 18 (0.82 mm²)	25.1	950.0	1570
17001535	2 x AWG 1 (42.4 mm²) + 1 x AWG 3 (26.7 mm²) + 1 x 6 x AWG 18 (0.82 mm²)	28.2	1234.0	2040
17001536	2 x AWG 2/0 (67.4 mm²) + 1 x AWG 3 (26.7 mm²) + 1 x 6 x AWG 18 (0.82 mm²)	39.2	1674.0	2700

outer sheath: red

Part no.	No. cores x cross-sec. mm²	Outer Ø app. mm	Copper weight kg/km	Weight app. kg / km
17001537	3 x AWG 6 (13.3 mm²) + 3 x 2 x AWG 18 (0.82 mm²)	18.6	479.0	990
17001538	2 x AWG 2 (33.6 mm²) + 1 x AWG 4 (21.2 mm²) + 3 x 2 x AWG 18 (0.82 mm²)	25.1	950.0	1570
17001539	2 x AWG 1 (42.4 mm²) + 1 x AWG 3 (26.7 mm²) + 1 x 6 x AWG 18 (0.82 mm²)	28.2	1234.0	2040
17001540	2 x AWG 2/0 (67.4 mm²) + 1 x AWG 3 (26.7 mm²) + 1 x 6 x AWG 18 (0.82 mm²)	39.2	1674.0	2700

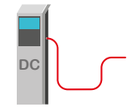
Charging Cable Configurator
HELUPOWER® CHARGE AC / DC

Guide to identifying desired combination options
AC (Mode 2/3)

AC (Mode 2/3)

	Type Charging cable assemblies	Charging cable / mm²	Current carrying capacity/A	Number of phases	Side B Infrastructure (plug) Number pieces	Sheath colour (red/black = standard)	Length/ m	GB/T	Typ2	Spiral (yes = X)	Open end
Side A Vehicle (socket)	Type1 USA	3G2,5+1x0,5 (metrisch)	16	1							
		3x14AWG+1x20AWG	16	1							
		3G6+1x0,5 (metrisch)	32	1							
		3x10AWG+1x18AWG	32	1							
	Type 2 EU	3G2,5+1x0,5	16	1							
		3G6+1x0,5	32	1							
		5G2,5+1x0,5	16	3							
		5G6+1x0,5	32	3							
		5G16+1x0.5	63	3							
	GB/T China	3G2,5+1x0,5	16	1							
		3G6+1x0,5	32	1							
		5G2,5+1x0,5	16	3							
		5G6+1x0,5	32	3							

Guide to identifying desired combination options
DC (Mode 4)



DC (Mode 4)

	Type Charging cable assemblies	Charging cable / mm²	Current carrying capacity/A	Number of phases	Side B Infrastructure (open end) Number pieces	Sheath colour (red/black = standard)	Lengt-h/m
Side A Vehicle (socket)	CCS1 USA	3xAWG 6+3x2xAWG 18	60	DC			
		2xAWG 2+1xAWG 4+3x2xAWG 18	100				
		2xAWG 1+1xAWG 3+1x6 AWG 18	125				
		2xAWG 2/0+1xAWG 3+1x6xAWG 8	200				
	CCS2 EU	2x16+1G16+3x2x0.75	60				
		2x35+1G25+3x2x0.75	100				
		2x50+1G25+3x2x0.75	125				
		2x70+1G35+6x0.75	200				
	GB/T China	3x16+2x4+(2×0,75)+10x0,75	80				
		2x35+1x25+2×4+(2×0,75)+10x0,75	125				
		2×50+1×25+2×4+(2×0,75)+10x0,75	180				
		2x70+1x25+2×4+(2×0,75)+10x0,75	250				

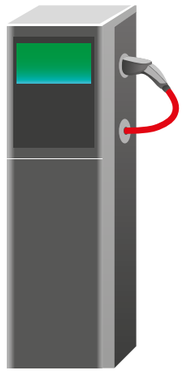
Enquiry form spiral cable
Charging cables HELUPOWER® Charge 750 AC
Find on page 84

Reeling Cables

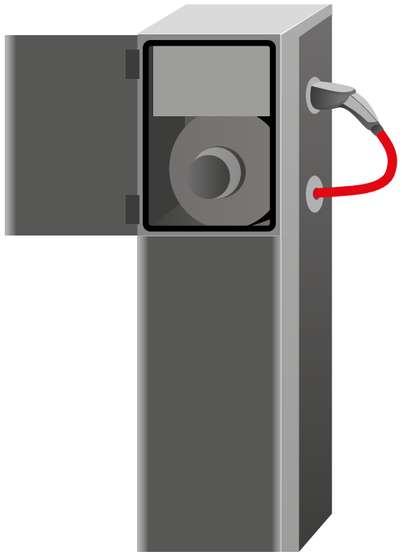
CHARGING STATIONS FOR ELECTRIC CARS

Robust, flexible and abrasion resistant: Reeling cables must function reliably, even when exposed to extreme mechanical stresses. This is precisely why we test our cables beyond their limits under real conditions. With this, we can be sure that our reeling cables, designed to sustain a very high number of cycles, keep their promise.

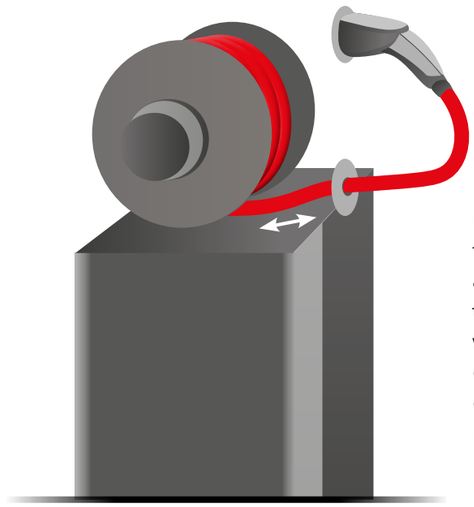
Charging station



Charging station, open



Drum with cable in the charging station

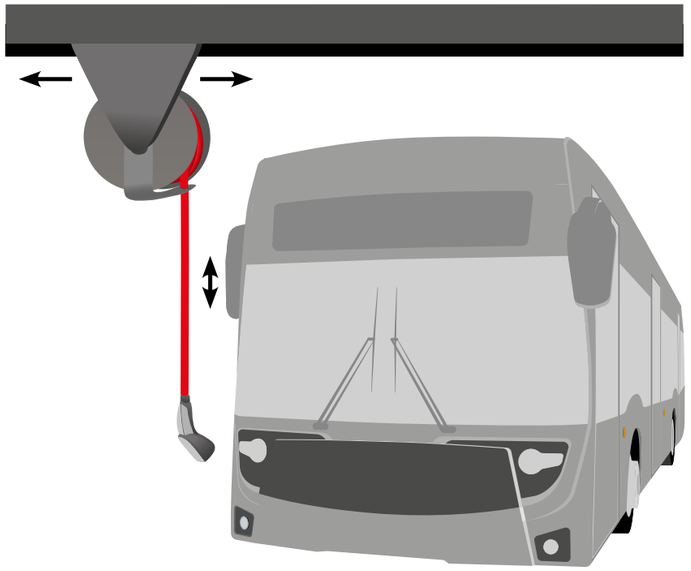


Reeling cables are mainly used in charging stations for electric vehicles. They are designed to be unwound and rewound by means of a spring cable reel. And this is how it works: Users pull the cable up to their vehicle, plug it in and pull it out again when the desired charge level is reached. The spring drum guides the cable and winds it neatly on and off the reel again so that the current can easily flow into the next e-vehicle.

DEPOT CHARGING SYSTEM

While charging electric cars involves comparatively low charging power, depot charging systems such as bus charging stations require much more energy. The high-power load as well as the continuous operation of charging systems throughout the day and night place extreme demands on cables. High quality reeling cables are therefore indispensable.

Reeling cables must be extremely resistant: High current loads and a continuous day and night operation place extreme demands on the cables.



ALWAYS VISIBLE

HELUPOWER® REFLECT & HELUPOWER® GLOW are perfect companions when it comes to charging in the dark. Because of their glow, the charging cables are more visible, less likely to be damaged and eliminate „tripping hazards".

How do we make our cables shine?

- By using a yellow signal colour for the cable sheath
- With the aid of a reflective foil under a transparent outer sheath
- With fluorescent elements in the outer sheath (by radiation with UV light, the cable glows in the dark)

Enquiry form for reeling cables
Find on page 85

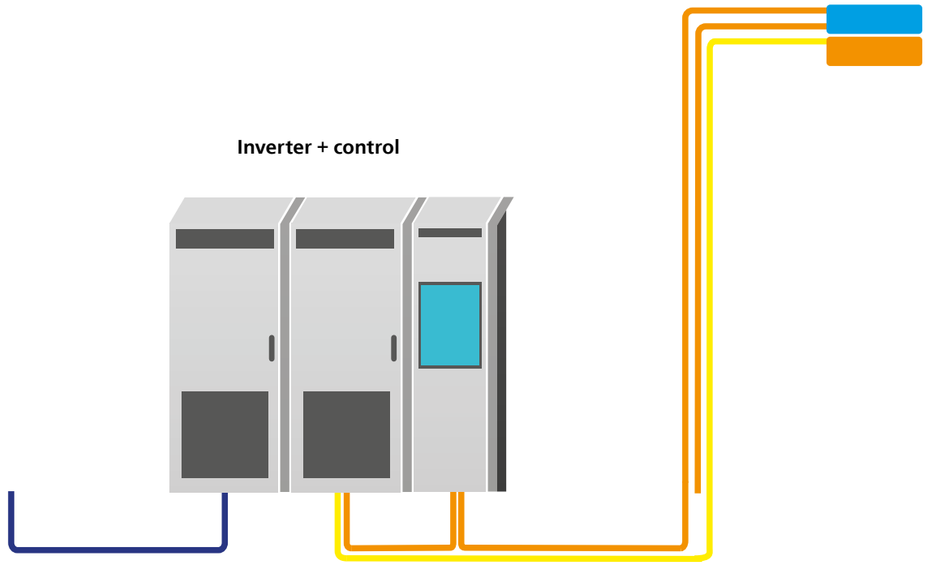
Charging Technology for Buses & Trucks

SUSTAINABLE LOCAL PUBLIC TRANSPORT

Fewer emissions, greater driving comfort and lower operation and maintenance costs in the long term—these are the reasons why electromobility is popular in the design of public transport. More and more major European cities are turning to fully electric vehicles. Battery powered buses can be charged in various ways: overnight in depots with a plug system, with top-down pantographs, with overhead wires or by induction at individual stops. All these charging methods require reliable and robust cables, which we offer in a wide variety of designs as part of our product portfolio.

POWER ELECTRONICS: THE HEART OF DC CHARGING TECHNOLOGY

High energy capacities pose great challenges to the supply network for charging systems. As can be seen in the diagram to the right, it is even more important that the power electronics, the heart of the DC charging station, function efficiently and reliably. Depending on the power class, a charging station must currently provide up to 600 amps to a power consumer (we use a bus as the energy consumer in this example). The larger the fleet of electric vehicles, the higher the demand for power and the greater the need for operators to adapt cable dimensions accordingly. There is a prerequisite for functioning power electronics: the direct current generated must be available at all times at each charging device and at the corresponding contact system (with and without plug). Our high performance, resilient and highly flexible cables and wires are particularly in demand for these applications. They must function perfectly in a confined space with a maximum current carrying capacity under mechanical stress. For charging devices in public places, such as airports or parking garages, we offer halogen-free cables and conductors (with corresponding global approvals if required). For a secure communication of the charging systems, we have various Bus and Ethernet cables available, both in copper and with fibre optic technology (also for direct installation in the ground).



Highly flexible power cables

Single 600 / Single 600-CY
Single 602 RC / 602-RC-CY UL/CSA
HELUPOWER® 1000 RV-K
HELUPOWER® H07RN-F LS0H
NSGAFÖU / NSGAFÖU orange
JZ-600 / JZ-600-Y-CY
HELUTHERM® 145 / THERMFLEX® 145
HELUWIND® WK POWERLINE ALU

BUS cables

CAN-Bus / Profibus L2 (direct burial optional)
Fiber optic raw cable and assemblies
Hybrid cable

Accessories

Protection tubes, cable glands, cable lugs, crimping tools,
Corrugated tube in orange for cable protection

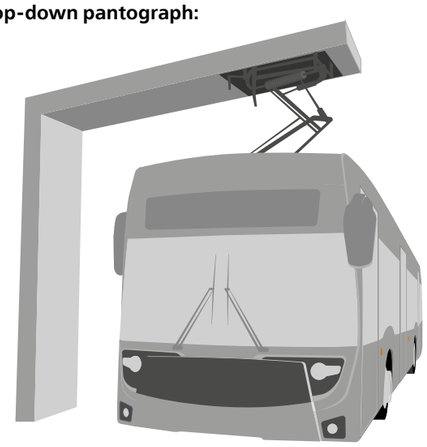
Ground cable

Medium-voltage
Low-voltage

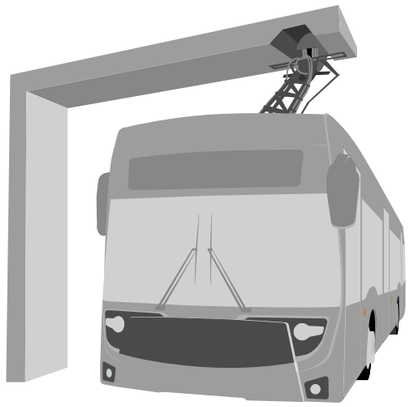
TOP-DOWN AND UP-DOWN PANTOGRAPH

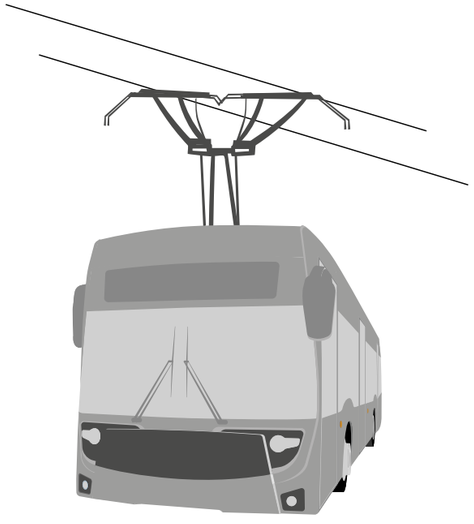
Within the route network, the buses are charged at regular intervals via a pantograph. The charging time depends on battery size, bus size, route length, traffic, and climatic conditions. Since pantographs are very compact, the available space should be used optimally. For this complex field of application, we offer special, highly flexible cables made of copper and aluminium. Due to the use of high-quality insulation materials, they have a high current-carrying capacity and a small outer diameter. In this brochure you will find the right cables for your needs (also in a shielded version for increasing EMC requirements).

Top-down pantograph:



Up-down pantograph:



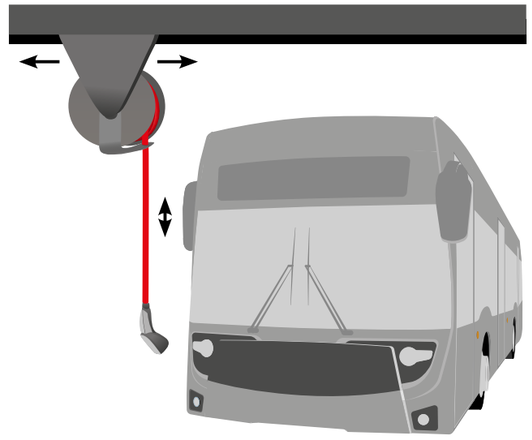


OVERHEAD LINE

When the battery charge level reaches the red zone, the electric bus drives to the next designated charging station and parks under an overhead line. Then the charging process begins. Current collectors mounted on the roof of the bus pick up the direct current via the overhead line.

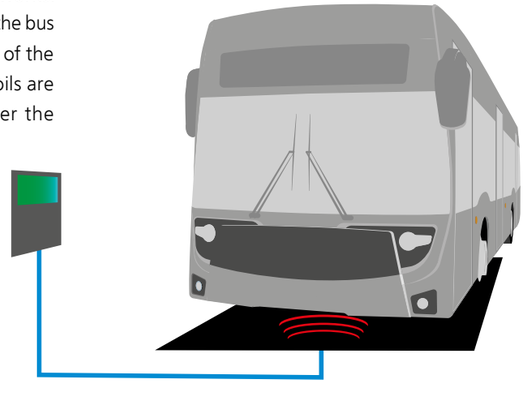
WIRED PLUG-IN CHARGING SYSTEMS:

Wired plug-in charging systems are used in service yards and bus depots. With high charging rates, even larger bus fleets can conveniently charge their batteries here overnight. CCS-2 connectors (Combined Charging System; supports AC, DC and fast charging) allow vehicles to be plugged in easily and quickly. As soon as the batteries are green again, the bus can continue its fixed route.



INDUCTIVE CHARGING

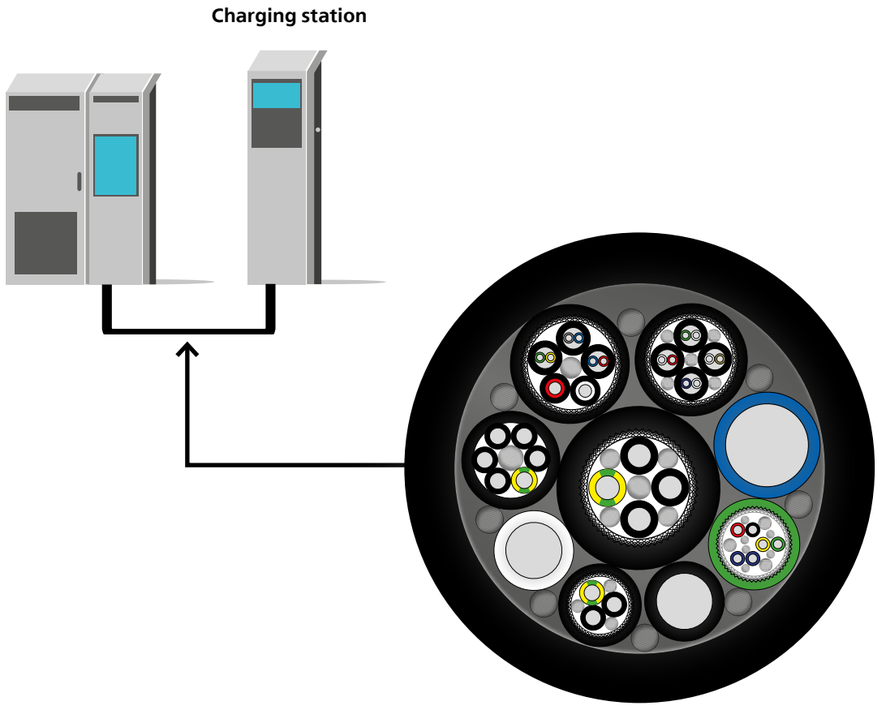
With inductive, contactless charging, the energy is transferred via a magnetic field. This is how it works: One coil is permanently installed in the floor of the bus stop, while the other coil is placed in the floor of the vehicle. The closer and more accurately the coils are positioned on top of each other, the greater the efficiency of the charging process.



Hybrid Cables

MULTIPLE FUNCTIONS IN JUST ONE CABLE: THE HYBRID CABLE TECHNIQUE SIMPLIFIES HANDLING

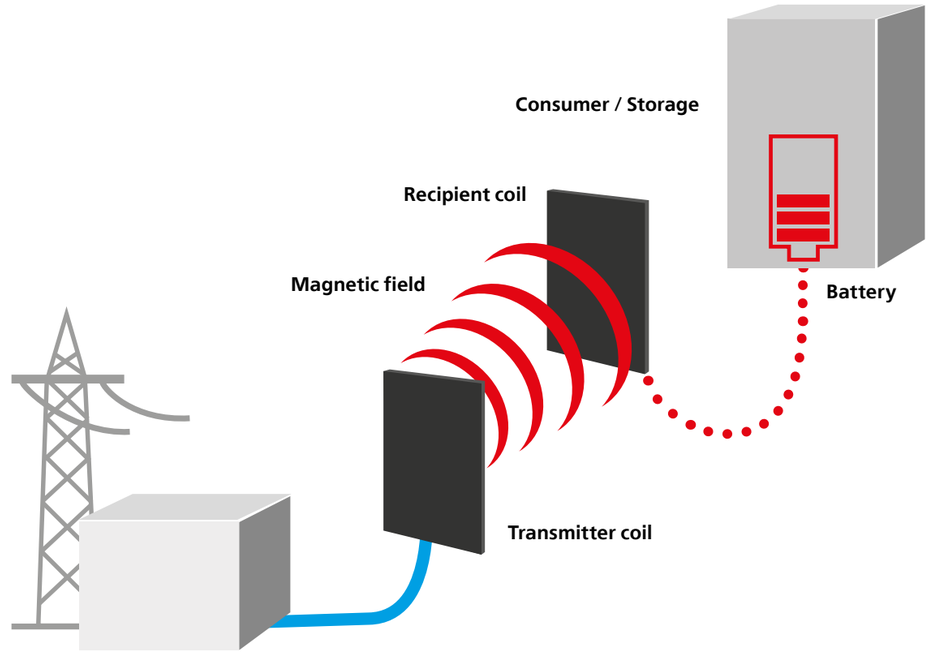
Space-saving, efficient and perfectly adapted to every application: Hybrid cables are particularly useful when several functions are to be combined in a single cable. Since users only have to connect one cable instead of several, this solution also simplifies handling and wiring. This is why single-cable technology is becoming increasingly popular in many industries. Hybrid cables are also increasingly being used in modern charging technology: They are used, for example, at charging stations for electric vehicles to connect the inverter/control panel and DC charging station. The crucial factors here are reliable and interference-free data transmission and an optimal energy supply. Extensive testing as well as the use of perfectly matched materials are further advancing hybrid cable technology. The current state of technology already allows for the combination of copper, aluminium and optical fibres in hybrid cables.



Wireless Charging: The Inductive Charging Method

„WIRELESS" CHARGING – A TECHNOLOGY TREND

Smartphones laid the foundations for contactless, wireless battery charging. It was only logical that maritime, industrial and urban solutions would follow this technology trend. The new inductive charging process makes contactless, highly efficient charging possible: for example, for passenger ferries with a fixed route, electric cars, industrial trucks and for bicycles and this with charging power from 3.7 to 22 kW. However, all these applications still need cables. For their infrastructure in particular, inductive charging systems require extremely heavy-duty, reliable cables and conductors, which we can manufacture to customer specifications.



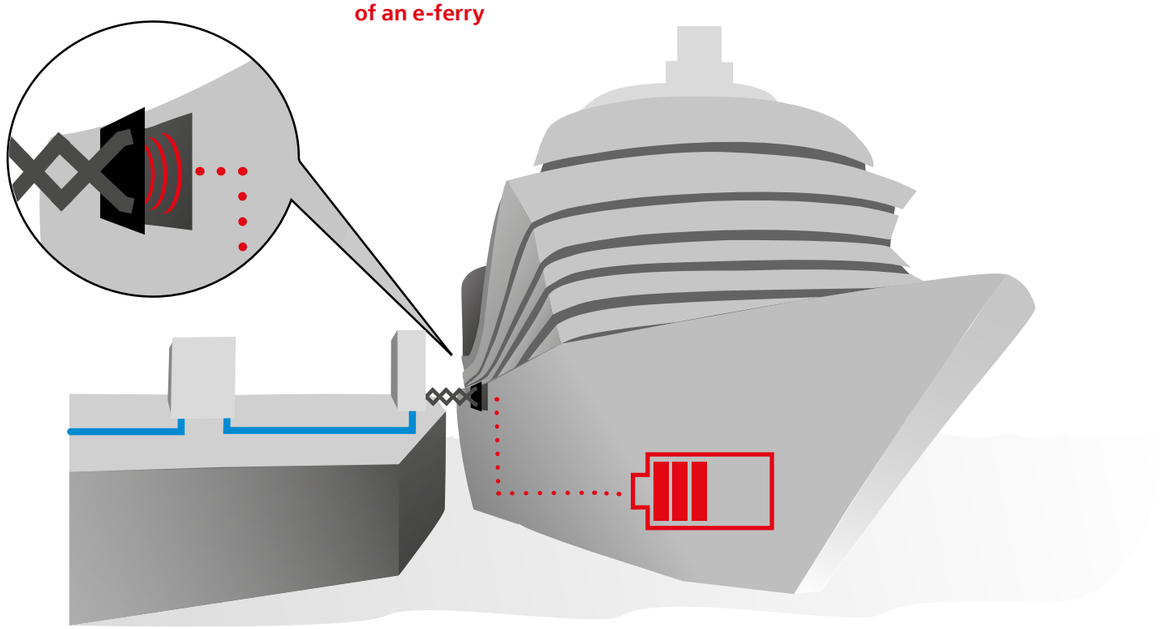
Special cables:
Cores: high-frequency lacquer strand
Sheath: PVC / PUR / optional PE for direct burial
Flat and round cable versions possible

Wireless Charging Application

FERRIES

Inductive charging in maritime applications: The first pilot projects are leading the way as good examples and expose the limits of the combustion engine. With the new technology, ferries charge their batteries within a very short time while keeping to their time-table. On scheduled routes, the battery is charged whenever passengers board and disembark. The battery size and the charging time depend on the planned route; once the route is clearly defined, the concept of inductive charging is precisely adapted to the needs of the particular ferry.

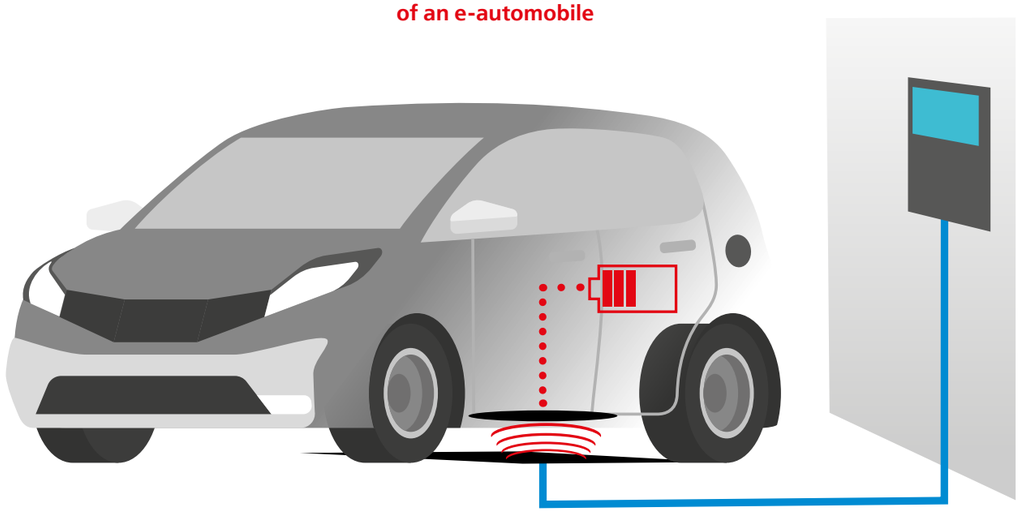
Wireless charging of an e-ferry



AUTOMOBILES

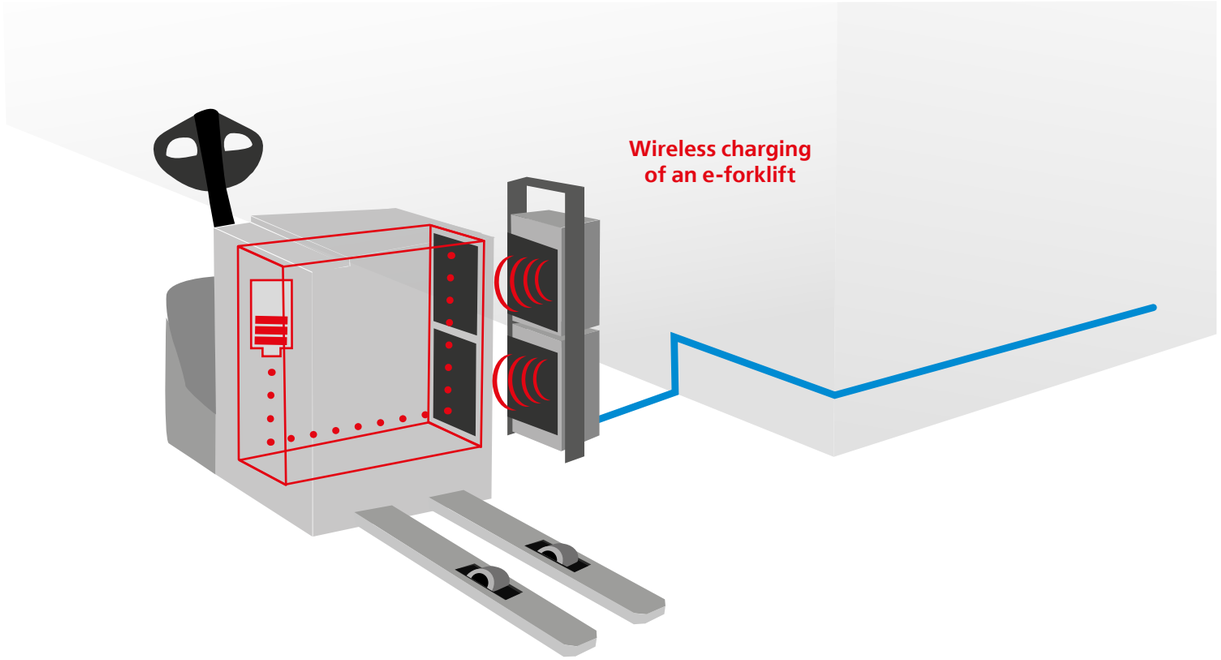
Electric vehicle registrations continue to rise worldwide. More and more parking spaces with charging points are being built in front of supermarkets or in popular shopping areas and streets. A new approach to charging electric cars involves inductive charging stations that are installed in the ground. The vehicles simply park in the charging zone and are easily charged without contact. Taxi stands are a good example of this: A taxi driver covers a certain distance with passengers and then stops at a defined charging zone. Once the charge level is back in the green zone, it heads to its next destination.

Wireless charging of an e-automobile



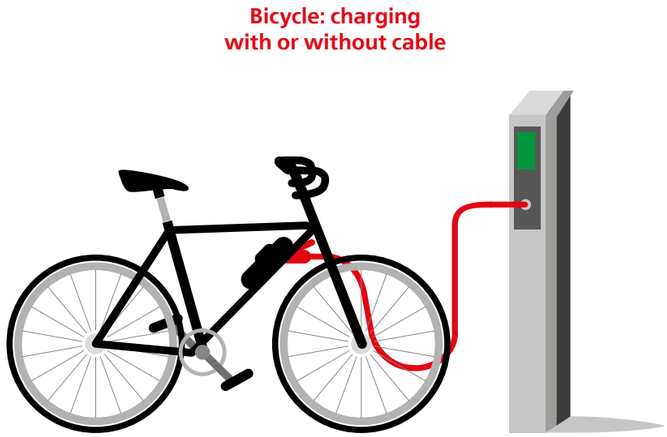
LOGISTICS

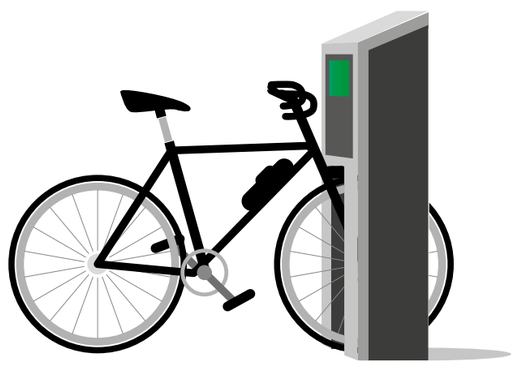
Another example of resource-friendly electrification is inductive charging for industrial trucks in logistics. Whether pallet trucks, forklifts or driverless transport systems – they can all be charged inductively in the future. The idea – In regular, scheduled cycles, they stop to rest at the designated charging stations. The goal – to optimise the utilisation and efficiency of the fleet. Sustainable solutions at airports, logistics centres and container ports will be the trend of the future.



BIKE-CHARGING

More and more people riding e-bikes. The boom has probably not yet reached its peak. This trend is not only creating a new dynamic among cyclists themselves, but also among cities, municipalities and manufacturers in the industry, who are now offering new charging methods for electric two-wheelers. „Charging boxes" allow the e-bike to be charged conventionally by plug and cable, or by induction. The front wheel latches into the charging station and is locked. Depending on the manufacturer, an app can be used to start and end the charging process very easily.





Single 600-J / Single 600-O

600 V

TECHNICAL DATA

PVC sheathed single core cable acc. to UL-Std. 758 (AWM) Style 10107, CSA-Std. C22.2 No. 210 - AWM I/II A/B, in alignment with DIN VDE 0285-525-2-31 / DIN EN 50525-2-31

Temperature range	flexible -5°C to +90°C fixed -40°C to +90°C
Permissible operating temperature of the conductor	+90°C
Nominal voltage	VDE AC U_o/U 600/1000 V UL (AWM) AC 600 V
Test voltage	4000 V
Breakdown voltage	8000 V
Minimum bending radius	flexible 7.5x Outer-Ø fixed 4x Outer-Ø

CABLE STRUCTURE

- Copper wire bare, finely stranded acc. to DIN VDE 0295 Class 5 / IEC 60228 Class 5
- Core insulation: Special-PVC acc. to UL-Std. 1581
- Core identification: see table
- G = with protective conductor GN-YE, x = without protective conductor
- Outer sheath: PVC acc. to DIN VDE 0207-5 (compound type YM5), UL-Std. 1581
- Sheath colour: black (RAL 9005)
- Length marking: in metres

PROPERTIES

- resistant to: UV radiation
- largely resistant to: oil, for details, see "Technical Information"
- for outdoor use
- the materials used during manufacturing are cadmium-free, contain no silicone and are free from substances harmful to the wetting properties of lacquers

TESTS

- flame-retardant acc. to DIN VDE 0482-332-1-2 / DIN EN 60332-1-2 / IEC 60332-1-2, UL VW-1, CSA FT1

APPLICATION

PVC sheathed single core cable suitable for medium mechanical stress with free movement, without tensile stress and without forced motion control in dry, damp and wet rooms, as well as outdoors (fixed installation). May not be laid directly in soil or water. This two-standard sheathed single core cables are preferably used in export-oriented mechanical engineering on machine tools, production lines and in plant construction.

NOTES

- the conductor is metrically (mm²) constructed, AWG numbers are approximated, and are for reference only

Single 600-J, Core identification: green-yellow

Part no.	No. cores x cross-sec. mm²	AWG, approx.	Outer Ø mm, approx.	Cu-weight kg/km	Weight kg/km, approx.
10881	1 G 6	10	7.8	58.0	118.0
10883	1 G 10	8	9.0	96.0	180.0
10885	1 G 16	6	10.0	154.0	250.0
10887	1 G 25	4	11.4	240.0	370.0
10889	1 G 35	2	13.0	336.0	490.0
10891	1 G 50	1	15.6	480.0	665.0
10893	1 G 70	2/0	17.9	672.0	910.0
10895	1 G 95	3/0	19.5	912.0	1195.0
10897	1 G 120	4/0	22.3	1152.0	1545.0
10899	1 G 150	250 kcmil	25.0	1440.0	1750.0
10901	1 G 185	350 kcmil	28.6	1776.0	2320.0
10903	1 G 240	450 kcmil	31.7	2304.0	2960.0

Single 600-O, Core identification: black

Part no.	No. cores x cross-sec. mm²	AWG, approx.	Outer Ø mm, approx.	Cu-weight kg/km	Weight kg/km, approx.
10882	1 x 6	10	7.8	58.0	118.0
10884	1 x 10	8	9.0	96.0	180.0
10886	1 x 16	6	10.0	154.0	250.0
10888	1 x 25	4	11.4	240.0	370.0
10890	1 x 35	2	13.0	336.0	490.0
10892	1 x 50	1	15.6	480.0	665.0
10894	1 x 70	2/0	17.9	672.0	910.0
10896	1 x 95	3/0	19.5	912.0	1195.0
10898	1 x 120	4/0	22.3	1152.0	1545.0
10900	1 x 150	250 kcmil	25.0	1440.0	1750.0
10902	1 x 185	350 kcmil	28.6	1776.0	2320.0
10904	1 x 240	450 kcmil	31.7	2304.0	2960.0

Single 600-CY-J / Single 600-CY-O

600 V, EMC-preferred type

TECHNICAL DATA

PVC sheathed single core cable acc. to UL-Std. 758 (AWM) Style 10107, CSA-Std. C22.2 No. 210 - AWM I/II A/B, in alignment with DIN VDE 0285-525-2-31 / DIN EN 50525-2-31

Temperature range	flexible -5°C to +90°C fixed -40°C to +90°C
Permissible operating temperature of the conductor	+90°C
Nominal voltage	VDE AC U_o/U 600/1000 V UL (AWM) AC 600 V
Test voltage	4000 V
Breakdown voltage	8000 V
Coupling resistance	at 30 MHz, approx. 250 Ohm/km
Minimum bending radius	flexible 7.5x Outer-Ø fixed 4x Outer-Ø

CABLE STRUCTURE

- Copper wire bare, finely stranded acc. to DIN VDE 0295 Class 5 / IEC 60228 Class 5
- Core insulation: Special-PVC acc. to UL-Std. 1581
- Core identification: see table
- G = with protective conductor GN-YE, x = without protective conductor
- Screen: braided screen of tinned copper wires, approx. coverage 85%
- Outer sheath: PVC acc. to DIN VDE 0207-5 (compound type YM5), UL-Std. 1581
- Sheath colour: black (RAL 9005)
- Length marking: in metres

PROPERTIES

- resistant to: UV radiation
- largely resistant to: oil, for details, see "Technical Information"
- for outdoor use
- the materials used during manufacturing are cadmium-free, contain no silicone and are free from substances harmful to the wetting properties of lacquers

TESTS

- flame-retardant acc. to DIN VDE 0482-332-1-2 / DIN EN 60332-1-2 / IEC 60332-1-2, UL VW-1, CSA FT1

APPLICATION

PVC sheathed single core cable suitable for medium mechanical stress with free movement, without tensile stress and without forced motion control in dry, damp and wet rooms, as well as outdoors (fixed installation). May not be laid directly in soil or water. This two-standard sheathed single core cables are preferably used in export-oriented mechanical engineering on machine tools, production lines and in plant construction. These copper screened cables are ideally suited for interference-free data signal transmission in measurement and control technology. EMC = Electromagnetic Compatibility; in order to optimise EMC properties, we recommend a double-sided and all-round large contact area of the copper braiding.

NOTES

- the conductor is metrically (mm²) constructed, AWG numbers are approximated, and are for reference only

Single 600-CY-J, Core identification: green-yellow

Part no.	No. cores x cross-sec. mm²	AWG, approx.	Outer Ø mm, approx.	Cu-weight kg/km	Weight kg/km, approx.
10910	1 G 6	10	7.8	72.0	140.0
10912	1 G 10	8	9.4	130.0	230.0
10914	1 G 16	6	10.4	190.0	300.0
10916	1 G 25	4	12.0	288.0	420.0
10918	1 G 35	2	14.4	405.0	615.0
10920	1 G 50	1	16.4	560.0	825.0
10922	1 G 70	2/0	18.5	780.0	1090.0
10924	1 G 95	3/0	20.1	1030.0	1395.0
10926	1 G 120	4/0	23.0	1285.0	1770.0
10928	1 G 150	250 kcmil	26.1	1570.0	1930.0
10930	1 G 185	350 kcmil	29.3	1940.0	2635.0
10932	1 G 240	450 kcmil	32.2	2530.0	3380.0

Single 600-CY-O, Core identification: black

Part no.	No. cores x cross-sec. mm²	AWG, approx.	Outer Ø mm, approx.	Cu-weight kg/km	Weight kg/km, approx.
10911	1 x 6	10	7.8	72.0	140.0
10913	1 x 10	8	9.4	130.0	230.0
10915	1 x 16	6	10.4	190.0	300.0
10917	1 x 25	4	12.0	288.0	420.0
10919	1 x 35	2	14.4	405.0	615.0
10921	1 x 50	1	16.4	560.0	825.0
10923	1 x 70	2/0	18.5	780.0	1090.0
10925	1 x 95	3/0	20.1	1030.0	1395.0
10927	1 x 120	4/0	23.0	1285.0	1770.0
10929	1 x 150	250 kcmil	26.1	1570.0	1930.0
10931	1 x 185	350 kcmil	29.3	1940.0	2635.0
10933	1 x 240	450 kcmil	32.2	2530.0	3380.0

Single 602-RC-J / Single 602-RC-O

90°C at conductor / enhanced current carrying capacity, 600 V

TECHNICAL DATA

PVC sheathed single core cable acc. to UL-Std. 758 (AWM) Style 10107, CSA-Std. C22.2 No. 210 - AWM I/II A/B, in alignment with DIN VDE 0285-525-2-31 / DIN EN 50525-2-31

Temperature range	flexible -5°C to +90°C fixed -40°C to +90°C
Permissible operating temperature of the conductor	+90°C
Nominal voltage	VDE AC U_o/U 600/1000 V UL (AWM) AC 600 V
Test voltage	4000 V
Breakdown voltage	8000 V
Minimum bending radius	flexible 7.5x Outer-Ø fixed 3x Outer-Ø

CABLE STRUCTURE

- Copper wire bare, extra finely stranded acc. to DIN VDE 0295 Class 6 / IEC 60228 Class 6
- Core insulation: Special-PVC acc. to UL-Std. 1581
- Core identification: see table
- G = with protective conductor GN-YE, x = without protective conductor
- Outer sheath: PVC acc. to DIN VDE 0207-5 (compound type YM5), UL-Std. 1581
- Sheath colour: black (RAL 9005)
- Length marking: in metres

PROPERTIES

- resistant to: UV radiation
- largely resistant to: oil
- for outdoor use
- suitable for use in drag chains
- the materials used during manufacturing are cadmium-free, contain no silicone and are free from substances harmful to the wetting properties of lacquers

TESTS

- flame-retardant acc. to DIN VDE 0482-332-1-2 / DIN EN 60332-1-2 / IEC 60332-1-2, UL VW-1, CSA FT1

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 and moist locations as well as for outdoor use (fixed installation). These two-norm cables primarily designed for exportorientated machinery manufacturer for flexible applications in machineries, machine tools, robot technics, for movable automated machinery parts. RC= Robotics Cable

NOTES

- the conductor is metrically (mm²) constructed, AWG numbers are approximated, and are for reference only
- for use in energy supply systems:
  1) the assembly instructions must be observed
  2) for further application parameters, please refer to the selection tables
  3) for special applications, we recommend contacting us and using our data entry form for energy supply systems

Single 602-RC-J, Core identification: green-yellow

Part no.	No. cores x cross-sec. mm²	AWG, approx.	Outer Ø mm, approx.	Cu-weight kg/km	Weight kg/km, approx.
69601	1 G 10	8	9.4	96.0	180.0
69603	1 G 16	6	10.5	154.0	250.0
69605	1 G 25	4	11.6	240.0	370.0
69607	1 G 35	2	14.0	336.0	490.0
69609	1 G 50	1	16.6	480.0	665.0
69611	1 G 70	2/0	18.4	672.0	910.0
69613	1 G 95	3/0	19.6	912.0	1195.0
69615	1 G 120	4/0	23.0	1152.0	1545.0
69617	1 G 150	250 kcmil	25.2	1440.0	1750.0
69619	1 G 185	350 kcmil	29.0	1776.0	2320.0
69621	1 G 240	450 kcmil	32.5	2304.0	2960.0
69623	1 G 300	550 kcmil	36.4	2880.0	3550.0

Single 602-RC-O, Core identification: black

Part no.	No. cores x cross-sec. mm²	AWG, approx.	Outer Ø mm, approx.	Cu-weight kg/km	Weight kg/km, approx.
69602	1 x 10	8	9.4	96.0	180.0
69604	1 x 16	6	10.5	154.0	250.0
69606	1 x 25	4	11.6	240.0	370.0
69608	1 x 35	2	14.0	336.0	490.0
69610	1 x 50	1	16.6	480.0	665.0
69612	1 x 70	2/0	18.4	672.0	910.0
69614	1 x 95	3/0	19.6	912.0	1195.0
69616	1 x 120	4/0	23.0	1152.0	1545.0
69618	1 x 150	250 kcmil	25.2	1440.0	1750.0
69620	1 x 185	350 kcmil	29.0	1776.0	2320.0
69622	1 x 240	450 kcmil	32.5	2304.0	2960.0
69624	1 x 300	550 kcmil	36.4	2880.0	3550.0

Single 602-RC-CY-J / Single 602-RC-CY-O

90°C at conductor / enhanced current carrying capacity, 600 V,

EMC-preferred type

TECHNICAL DATA

PVC sheathed single core cable acc. to UL-Std. 758 (AWM) Style 10107, CSA-Std. C22.2 No. 210 - AWM I/II A/B, in alignment with DIN VDE 0285-525-2-31 / DIN EN 50525-2-31

Temperature range	flexible -5°C to +90°C fixed -40°C to +90°C
Permissible operating temperature of the conductor	+90°C
Nominal voltage	VDE AC U_o/U 600/1000 V UL (AWM) AC 600 V
Test voltage	4000 V
Breakdown voltage	8000 V
Coupling resistance	at 30 MHz, approx. 250 Ohm/km
Minimum bending radius	flexible 7.5x Outer-Ø fixed 3x Outer-Ø

CABLE STRUCTURE

- Copper wire bare, extra finely stranded acc. to DIN VDE 0295 Class 6 / IEC 60228 Class 6
- Core insulation: Special-PVC acc. to UL-Std. 1581
- Core identification: see table
- G = with protective conductor GN-YE, x = without protective conductor
- Screen: braided screen of tinned copper wires, approx. coverage 85%
- Outer sheath: PVC acc. to DIN VDE 0207-5 (compound type YM5), UL-Std. 1581
- Sheath colour: orange (RAL 2003) / acc. to. DESINA
- Length marking: in metres

PROPERTIES

- largely resistant to: oil
- suitable for use in drag chains
- the materials used during manufacturing are cadmium-free, contain no silicone and are free from substances harmful to the wetting properties of lacquers

TESTS

- flame-retardant acc. to DIN VDE 0482-332-1-2 / DIN EN 60332-1-2 / IEC 60332-1-2, UL VW-1, CSA FT1

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 particulary suitable for the interference-free transmission in instrumentation and control engineering applications (electromagnetic compatibillity). EMC= Electromagnetic compatibillity; to optimize the EMC features we recommend a large round contact of the copper braiding on both ends. RC= Robotics Cable

NOTES

- the conductor is metrically (mm²) constructed, AWG numbers are approximated, and are for reference only
- for use in energy supply systems:
  1) the assembly instructions must be observed
  2) for further application parameters, please refer to the selection tables
  3) for special applications, we recommend contacting us and using our data entry form for energy supply systems

Single 602-RC-CY-J, Core identification: green-yellow

Part no.	No. cores x cross-sec. mm²	AWG, approx.	Outer Ø mm, approx.	Cu-weight kg/km	Weight kg/km, approx.
69631	1 G 10	8	10.0	130.0	230.0
69633	1 G 16	6	11.1	190.0	300.0
69635	1 G 25	4	12.3	288.0	420.0
69637	1 G 35	2	14.7	405.0	615.0
69639	1 G 50	1	17.2	560.0	825.0
69641	1 G 70	2/0	19.0	780.0	1090.0
69643	1 G 95	3/0	21.2	1030.0	1395.0
69645	1 G 120	4/0	23.6	1285.0	1770.0
69647	1 G 150	250 kcmil	25.8	1570.0	1930.0
69649	1 G 185	350 kcmil	29.8	1940.0	2635.0
69651	1 G 240	450 kcmil	33.5	2530.0	3380.0
69653	1 G 300	550 kcmil	38.0	3140.0	4120.0

Single 602-RC-CY-O, Core identification: black

Part no.	No. cores x cross-sec. mm²	AWG, approx.	Outer Ø mm, approx.	Cu-weight kg/km	Weight kg/km, approx.
69632	1 x 10	8	10.0	130.0	230.0
69634	1 x 16	6	11.1	190.0	300.0
69636	1 x 25	4	12.3	288.0	420.0
69638	1 x 35	2	14.7	405.0	615.0
69640	1 x 50	1	17.2	560.0	825.0
69642	1 x 70	2/0	19.0	780.0	1090.0
69644	1 x 95	3/0	21.2	1030.0	1395.0
69646	1 x 120	4/0	23.6	1285.0	1770.0
69648	1 x 150	250 kcmil	25.8	1570.0	1930.0
69650	1 x 185	350 kcmil	29.8	1940.0	2635.0
69652	1 x 240	450 kcmil	33.5	2530.0	3380.0
69654	1 x 300	550 kcmil	38.0	3140.0	4120.0

HELUPOWER® H07RN-F LS0H

oil-resistant, implementable up to a water depth of 100 m

TECHNICAL DATA

Rubber connection cable acc. to DIN VDE 0285-525-2-21 / DIN EN 50525-2-21

Temperature range	flexible -40°C to +90°C fixed -50°C to +90°C
Permissible operating temperature of the conductor	+90°C
Short-circuit temperature at conductor	+250°C
Nominal voltage	AC U_0/U 450/750 V
Max. permissible operating voltage	alternating current (AC) conductor/earth 476 V three-phase alternating current (AC) conductor/conductor 825 V direct current (DC) conductor/earth 619 V direct current (DC) conductor/conductor 1238 V
Test voltage core/core	2500 V
Minimum bending radius	flexible 6x Outer-Ø fixed 4x Outer-Ø

CABLE STRUCTURE

- Copper wire bare, finely stranded acc. to DIN VDE 0295 Class 5 / IEC 60228 Class 5
- Core insulation: Special rubber
- Core identification acc. to DIN VDE 0293-308,
  1 core(s): black
  2 - 5 core(s): colour coded
  7 - 12 core(s): black cores with consecutive labeling in white digits
- Protective conductor: starting with 3 cores,
  G = with protective conductor GN-YE, in the outer layer,
  x = without protective conductor
- Cores stranded in layers with optimal lay lengths
- Outer sheath: Special rubber
- Sheath colour: black

PROPERTIES

- resistant to: oil, UV radiation, ozone, weathering effects, lubricating oils, greases
- for outdoor use
- halogen-free

TESTS

- halogen-free acc. to DIN VDE 0482-754-1 / DIN EN 60754-1 / IEC 60754-1
- corrosiveness of combustion gases acc. to DIN VDE 0482-754-2 / DIN EN 60754-2 / IEC 60754-2
- flame-retardant acc. to DIN VDE 0482-332-1-2 / DIN EN 60332-1-2 / IEC 60332-1-2
- smoke density acc. to DIN VDE 0482-1034-1+2 / DIN EN 61034-1+2 / IEC 61034-1+2
- oil-resistant acc. to DIN VDE 0473-811-404 / DIN EN 60811-404 / IEC 60811-404
- ozone-resistant acc. to DIN VDE 0473-811-403 / DIN EN 60811-403

APPLICATION

Halogen-free rubber sheathed cables for use with medium mechanical stress in dry, damp, wet rooms and outdoors. Can only be used in stagnant waters (also in salt water) up to a water depth of 100 m (AD8) and a water temperature of min. +5°C. When installed in pipes or similar closed systems, the use of the cable is permitted up to and including 1000 V AC voltage or up to 750 V DC voltage against earth.

NOTES

- the conductor is metrically (mm²) constructed, AWG numbers are approximated, and are for reference only

Part no.	No. cores x cross-sec. mm²	AWG, approx.	Outer-Ø min. - max. mm	Cu-weight kg/km	Weight kg/km, approx.
30737	1 x 1.5	16	5.7 - 6.5	14.4	51.0
30738	1 x 2.5	14	6.3 - 7.2	24.0	67.0
30739	1 x 4	12	7.2 - 8.1	38.0	92.0
30740	1 x 6	10	7.9 - 8.8	58.0	121.0
30741	1 x 10	8	9.5 - 11.5	96.0	186.0
30742	1 x 16	6	10.8 - 13.0	154.0	256.0
30743	1 x 25	4	12.7 - 15.0	240.0	368.0
30744	1 x 35	2	14.3 - 16.5	336.0	485.0
30745	1 x 50	1	16.5 - 19.5	480.0	668.0
30746	1 x 70	2/0	18.6 - 22.5	672.0	905.0
30747	1 x 95	3/0	20.8 - 25.4	912.0	1180.0
30748	1 x 120	4/0	22.8 - 27.6	1152.0	1460.0
30749	1 x 150	300 kcmil	25.2 - 30.3	1440.0	1810.0
30750	1 x 185	350 kcmil	27.6 - 33.0	1776.0	2165.0
30751	1 x 240	500 kcmil	30.6 - 36.3	2304.0	2750.0
30752	1 x 300	600 kcmil	33.5 - 39.0	2880.0	3271.0
30753	1 x 400	750 kcmil	37.4 - 41.5	3840.0	4286.0
30754	1 x 500	1000 kcmil	41.3 - 46.0	4800.0	5301.0
30755	1 x 630	1250 kcmil	45.5 - 50.0	6048.0	6959.0
30756	2 x 1	18	7.7 - 9.0	19.0	93.0
30757	2 x 1.5	16	8.5 - 9.9	29.0	115.0
30758	2 x 2.5	14	10.2 - 11.7	48.0	165.0
30759	2 x 4	12	11.8 - 13.4	77.0	225.0
30760	2 x 6	10	13.1 - 14.9	115.0	300.0
30761	2 x 10	8	17.7 - 20.0	192.0	550.0
30762	2 x 16	6	20.2 - 22.6	307.0	745.0
30763	2 x 25	4	24.3 - 27.0	480.0	1060.0
30764	3 G 1	18	8.3 - 9.7	29.0	120.0
30765	3 G 1.5	16	9.2 - 10.7	43.0	150.0
30766	3 G 2.5	14	10.9 - 12.5	72.0	200.0

HELUPOWER® H07RN-F LS0H

oil-resistant, implementable up to a water depth of 100 m

Part no.	No. cores x cross-sec. mm²	AWG, approx.	Outer-Ø min. - max. mm	Cu-weight kg/km	Weight kg/km, approx.
30767	3 G 4	12	12.7 - 14.4	115.0	295.0
30768	3 G 6	10	14.1 - 16.0	173.0	380.0
30769	3 G 10	8	19.1 - 21.5	288.0	675.0
30770	3 G 16	6	21.8 - 24.3	461.0	950.0
30771	3 G 25	4	26.1 - 28.8	720.0	1355.0
30772	3 G 35	2	29.3 - 32.5	1008.0	1765.0
30773	3 G 50	1	34.1 - 37.0	1440.0	2415.0
30774	3 G 70	2/0	38.4 - 40.9	2016.0	3230.0
30775	3 G 95	3/0	43.3 - 47.4	2736.0	4225.0
30776	3 G 120	4/0	47.4 - 53.2	3456.0	5190.0
30777	3 G 150	300 kcmil	52.0 - 57.5	4320.0	6415.0
30778	3 G 185	350 kcmil	57.0 - 62.7	5328.0	7700.0
30779	3 G 240	500 kcmil	65.0 - 71.4	6912.0	9458.0
30780	3 G 300	600 kcmil	72.0 - 78.3	8640.0	11635.0
30781	4 G 1	18	9.2 - 10.7	38.0	145.0
30782	4 G 1.5	16	10.2 - 11.7	58.0	175.0
30783	4 G 2.5	14	12.1 - 13.8	96.0	255.0
30784	4 G 4	12	14.0 - 15.9	154.0	355.0
30785	4 G 6	10	15.7 - 17.7	230.0	485.0
30786	4 G 10	8	20.9 - 23.6	384.0	845.0
30787	4 G 16	6	23.8 - 26.4	614.0	1185.0
30788	4 G 25	4	28.9 - 32.1	960.0	1730.0
30789	4 G 35	2	32.5 - 36.0	1344.0	2250.0
30790	4 G 50	1	37.7 - 41.5	1920.0	3085.0
30791	4 G 70	2/0	42.7 - 47.1	2688.0	4145.0
30792	4 G 95	3/0	48.4 - 54.9	3648.0	5465.0
30793	4 G 120	4/0	53.0 - 57.5	4608.0	6670.0
30794	4 G 150	300 kcmil	58.0 - 63.6	5760.0	8290.0
30795	4 G 185	350 kcmil	64.0 - 69.7	7104.0	9385.0
30796	5 G 1	18	10.2 - 11.7	48.0	180.0
30797	5 G 1.5	16	11.2 - 12.8	72.0	220.0
30798	5 G 2.5	14	13.3 - 15.1	120.0	310.0
30799	5 G 4	12	15.6 - 17.9	192.0	445.0
30800	5 G 6	10	17.5 - 20.0	288.0	605.0
30801	5 G 10	8	22.9 - 25.7	480.0	1035.0
30802	5 G 16	6	26.4 - 30.0	768.0	1465.0
30803	5 G 25	4	32.0 - 35.4	1200.0	2145.0
30804	5 G 35	2	35.7 - 39.5	1680.0	2579.0
30805	5 G 50	1	41.8 - 47.0	2400.0	3594.0
30806	5 G 70	2/0	47.5 - 52.5	3360.0	4837.0
30807	5 G 95	3/0	54.0 - 58.0	4560.0	6269.0
30808	7 G 1.5	16	14.7 - 17.5	101.0	355.0
30809	7 G 2.5	14	17.1 - 20.0	168.0	498.0
30810	12 G 1.5	16	17.6 - 21.0	173.0	505.0
30811	12 G 2.5	14	20.6 - 24.5	288.0	710.0

HELUWIND® WK DLO, WK DLO-Torsion

2 kV, FT4, VW-1, RHH/RHW-2, UL44

TECHNICAL DATA

Cable for torsion applications in wind turbines

Temperature range	flexible -25°C to +80°C fixed -40°C to +80°C
Nominal voltage	2000 V
Torsion application	only for WK DLO-Torsion +/- 150° per 1m

CABLE STRUCTURE

- Special stranded bare copper wire, fine stranded acc. to ASTM-B3
- Insulation: EP
- Seperarting foil wrap
- Sheath: TPE/CPE
- Sheath colour: black

TESTS

- Torsion tested in accordance with HELUKABEL test requirements
- RHH/RHW-2, PRI PRII, CSA RW90,CSA 22.2 No. 38, VW-1, cold impact test, cold bend test, wet or dry per UL44, for CT use
- Flame test CSA FT1, FT4, IEEE 1202

APPLICATION

The cable HELUWIND® WK DLO was specifically designed for use in wind turbines up to a nominal voltage of 2 kV.
It has been specially developed for torsion applications in wind turbines. We supply the leading wind turbine manufacturers.

NOTE

For more information, especially on custom cables, please contact us:
wind@helukabel.de

WK DLO 2 kV

Part no.	Cross-section AWG / kcmil	Outer Ø app. mm	Cop. weight kg/km	Weight app. kg / km
703156	14	5.9	22.0	37.0
703157	12	6.3	33.0	69.0
703158	10	7.2	61.0	100.0
702513	8	8.2	82.8	142.0
703159	6	10.1	140.0	200.0
703160	4	11.5	237.0	286.0
703161	2	12.6	339.0	370.0
703162	1	16.1	510.0	637.0
703163	1/0	17.5	465.0	715.0
703862	2/0	18.5	656.0	830.0
703164	3/0	20.2	930.0	1104.0
702863	4/0	21.7	1103.0	1298.0
702514	262 kcmil	24.8	1280.0	1590.0
703165	313 kcmil	26.4	1590.0	1872.0
703166	373 kcmil	28.2	1900.0	2176.0
703167	444 kcmil	30.0	930.0	1104.0
702515	535 kcmil	32.2	2608.0	3046.0
703168	646 kcmil	34.8	3300.0	3600.0
703169	777 kcmil	37.0	3970.0	4290.0
703170	929 kcmil	39.5	4780.0	5144.0
703171	1111 kcmil	44.4	5690.0	6070.0

WK DLO-Torsion 2 kV

Part no.	Cross-section AWG / kcmil	Outer Ø app. mm	Cop. weight kg/km	Weight app. kg / km
709729	8	8.2	82.8	142.0
709730	6	10.1	140.0	200.0
709731	4	11.5	237.0	286.0
709732	2	12.6	339.0	370.0
709733	1	16.1	510.0	637.0
709734	1/0	17.5	465.0	715.0
709735	2/0	18.5	656.0	830.0
709288	3/0	20.2	930.0	1104.0
709289	4/0	21.7	1103.0	1298.0
709290	262 kcmil	24.8	1280.0	1590.0
709291	313 kcmil	26.4	1590.0	1872.0
709292	373 kcmil	28.2	1900.0	2176.0
709293	444 kcmil	30.0	930.0	1104.0
709294	535 kcmil	32.2	2608.0	3046.0
709295	646 kcmil	34.8	3300.0	3600.0
709296	777 kcmil	37.0	3970.0	4290.0
709297	929 kcmil	39.5	4780.0	5144.0
709298	1111 kcmil	44.4	5690.0	6070.0

more information on page 82

NFPA 70 and 79

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 covers fires triggered by electricity and is updated every three years. In article 670 „Industrial Machinery", the NEC refers to NFPA 79 (Electrical Standard for Industrial Machinery). This standard cites basic requirements for electrical equipment found in machines and devices. Manufacturers and owners of machines and equipment must comply with this standard in order to meet product liability and insurance requirements, for example. NFPA 79 is also updated every three years.

Machines placed in service in the USA are always subject to an approval process. A piece of equipment can be pre-approved through a test institute recognized in the USA (e.g. Underwriter's Laboratory – UL) or upon inspection by a local authority having jurisdiction (AHJ). However, the final decision concerning a machine's commissioning is made on site by the 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 any concerns about its compliance with US standards.

Appliance Wire Material (AWM) cables were first approved for use under NFPA 79 Edition 2007 in chapter 12.2.7.3 „When part of a listed assembly suitable for the intended application, type AWM shall be permissible." This means that if AWM cables, which are UL Recognized, are part of a listed system and are suitable for the intended application, they can be used.

Prior to 2012 there had been no NFPA 79 approval for cables used in applications such as drag chains, i.e. continuous-flex cables. There were objections from the industry regarding this gap in the approved standard. The NFPA reacted accordingly and as a result the use of AWM cables under certain conditions was again approved in NFPA 79 Edition 2012. As before, unrestricted use was not permitted. The responsibility for standard compliance was placed on the manufacturer or builder of the equipment. As such, article 12.2.7 of edition 2007 was completely eliminated. All recommendations have been summarized in article 12.9 "Special Cables and Conductors".

Summary

- Machines and equipment that are already certified (e.g. through UL) may continue to be repaired, modified, or extended in accordance with the previous rules.
- New machines and equipment certified in accordance with the previous rules may continue to be built with the previous certification still being recognized.
- For new machines and equipment without certification, stricter requirements may be placed on certain cables (e.g. UL listing). In this case, the important thing is to consult with the respective certification authority.

In many cases, HELUKABEL recommends the use of UL-listed cables. For additional information, please contact our technical department at +49 7150 92 09-0.

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 intended use
12.9.2 Appliance Wiring Material (AWM) shall be permitted as follows
12.9.2.1 Where part of an assembly that has been identified for the intended use
12.9.2.2 Where the AWM has been identified for use with approved equipment and is used in accordance with the equipment manufacturer's instructions.
12.9.2.3 Where its construction meets all applicable requirements of Section 12.2 through Section 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 seven strands.
(2) Conductor insulation and cable jacket materials not specified in 12.3.1 shall 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 accordance with ANSI/UL 1581.
(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 machine technical documentation.

HELUPOWER® 1000 RV-K

direct burial, XLPE core insulation / 90°C

TECHNICAL DATA

PVC connection cable, acc. to UNE 21123-2; articles with 3+1/2 conductors: in alignment with UNE 21123-2

Temperature range	fixed -15°C to +90°C
Permissible operating temperature of the conductor	+90°C
Short circuit temperature at the conductor	+250°C (Short circuit temperature max. 5 s)
Nominal voltage	AC U_0/U 600/1000 V
Max. permissible operating voltage	alternating current (AC) conductor/earth 700 V three-phase alternating current (AC) conductor/conductor 1200 V direct current (DC) conductor/earth 900 V
Test voltage core/core	3500 V
Minimum bending radius	<25 mm: 4x Outer-ø 25-50 mm: 5x Outer-ø >50 mm: 6x Outer-ø

CABLE STRUCTURE

- Copper wire bare, finely stranded acc. to DIN VDE 0295 Class 5 / IEC 60228 Class 5
- Core insulation: XLPE acc. to UNE-HD 603-1 (compound type DIX 3)
- Core identification: see table
- G = with protective conductor GN-YE, in the outer layer, x = without protective conductor
- Cores stranded in layers with optimal lay lengths
- Outer sheath: PVC acc. to UNE HD 603-1 (compound type DMV 18)
- Sheath colour: black
- Length marking: in metres

PROPERTIES

- resistant to: UV radiation
- for outdoor use
- direct burial
- the materials used during manufacturing are cadmium-free, contain no silicone and are free from substances harmful to the wetting properties of lacquers

TESTS

- flame-retardant acc. to DIN VDE 0482-332-1-2 / DIN EN 60332-1-2 / IEC 60332-1-2
- UV-resistant acc. to DIN VDE 0276-605 / HD 605 S2

APPLICATION

Suitable for use in dry, moist and wet rooms as well as outdoors. Also suitable for direct burial, laying in tubes and underground installation areas. Typical application areas range from general production machinery, to machine tool applications, conveyor belt systems, air-conditioning units, steel plants installations and factory automation. Ideal as power or control cable especially if increased temperature and/or voltage is required. UV resistant due to it's special PVC outer sheath compound and therefore also ideal as power connection cable for outdoor devices and machinery. Alternatively also for use as power connection cable in the stage and lighting industry or renewable energy sector.

NOTES

- the conductor is metrically (mm²) constructed, AWG numbers are approximated, and are for reference only

Core identification acc. to DIN VDE 0293-308, black

Part no.	No. cores x cross-sec. mm²	AWG, approx.	Outer-ø min - max mm	Cu-weight kg/km	Weight kg/km, approx.
11003798	1 x 1.5	16	4.6 - 5.5	14.4	50.0
11003822	1 x 2.5	14	5.1 - 6.0	24.0	65.0
11003846	1 x 4	12	5.7 - 6.5	38.4	80.0
11003854	1 x 6	10	6.2 - 7.1	57.6	105.0
11003862	1 x 10	8	7.2 - 8.0	96.0	155.0
11003870	1 x 16	6	8.1 - 8.9	153.6	220.0
11003878	1 x 25	4	10.0 - 10.6	240.0	320.0
11003886	1 x 35	2	11.1 - 11.8	336.0	420.0
11003894	1 x 50	1	12.9 - 13.7	480.0	560.0
11003902	1 x 70	2/0	14.3 - 15.7	672.0	785.0
11003910	1 x 95	3/0	16.2 - 17.3	912.0	1050.0
11003918	1 x 120	4/0	18.1 - 19.2	1152.0	1305.0
11003924	1 x 150	300 kcmil	19.9 - 21.4	1440.0	1610.0
11003930	1 x 185	350 kcmil	22.3 - 23.4	1776.0	1985.0
11003936	1 x 240	500 kcmil	25.2 - 26.8	2304.0	2610.0
11003942	1 x 300	600 kcmil	27.6 - 30.4	2880.0	3225.0
11003948	1 x 400	750 kcmil	32.0 - 34.0	3840.0	3500.0
11003949	1 x 500	1000 kcmil	38.4 - 40.0	4800.0	5060.0
11003950	1 x 630	1250 kcmil	43.6 - 45.2	6048.0	6760.0

HELUPOWER® 1000 RV-K

direct burial, XLPE core insulation / 90°C

Core identification acc. to DIN VDE 0293-308, colour coded

Part no.	No. cores x cross-sec. mm²	AWG, approx.	Outer-ø min - max mm	Cu-weight kg/km	Weight kg/km, approx.
11003799	2 x 1.5	16	8.3 - 8.9	28.8	145.0
11003823	2 x 2.5	14	9.3 - 9.9	48.0	195.0
11003847	2 x 4	12	10.4 - 11.0	76.8	235.0
11003855	2 x 6	10	11.4 - 12.2	115.2	300.0
11003863	2 x 10	8	13.7 - 14.8	192.0	460.0
11003871	2 x 16	6	15.9 - 17.1	307.2	635.0
11003879	2 x 25	4	19.1 - 20.9	480.0	930.0
11003887	2 x 35	2	21.4 - 23.1	672.0	1220.0
11003895	2 x 50	1	25.2 - 27.4	960.0	1665.0
11003903	2 x 70	2/0	29.0 - 30.4	1344.0	2320.0
11003911	2 x 95	3/0	32.0 - 34.3	1824.0	3025.0
11003919	2 x 120	4/0	36.5 - 38.6	2304.0	3845.0
11003925	2 x 150	300 kcmil	40.5 - 42.5	2880.0	4720.0
11003931	2 x 185	350 kcmil	45.2 - 47.8	3552.0	5910.0
11003937	2 x 240	500 kcmil	49.9 - 55.4	4608.0	7665.0
11003800	3 G 1.5	16	8.8 - 9.3	43.2	165.0
11003824	3 G 2.5	14	9.8 - 10.5	72.0	210.0
11003848	3 G 4	12	11.0 - 11.6	115.2	275.0
11003856	3 G 6	10	12.1 - 12.9	172.8	355.0
11003864	3 G 10	8	14.5 - 15.7	288.0	560.0
11003872	3 G 16	6	16.8 - 18.1	460.8	780.0
11003880	3 G 25	4	20.2 - 22.2	720.0	1160.0
11003888	3 G 35	2	22.8 - 24.8	1008.0	1535.0
11003896	3 G 50	1	26.8 - 29.2	1440.0	2090.0
11003904	3 G 70	2/0	31.0 - 33.0	2016.0	2945.0
11003912	3 G 95	3/0	34.6 - 36.8	2736.0	3925.0
11003920	3 G 120	4/0	39.0 - 41.3	3456.0	4905.0
11003926	3 G 150	300 kcmil	43.3 - 45.8	4320.0	6055.0
11003932	3 G 185	350 kcmil	47.3 - 51.4	5328.0	7570.0
11003938	3 G 240	500 kcmil	53.5 - 59.3	6912.0	9865.0
11003944	3 G 300	600 kcmil	58.5 - 67.5	8640.0	12120.0
11003801	3 x 1.5	16	8.8 - 9.3	43.2	165.0
11003825	3 x 2.5	14	9.8 - 10.5	72.0	210.0
11003849	3 x 4	12	11.0 - 11.6	115.2	275.0
11003857	3 x 6	10	12.1 - 12.9	172.8	355.0
11003865	3 x 10	8	14.5 - 15.7	288.0	560.0
11003873	3 x 16	6	16.8 - 18.1	460.8	780.0
11003881	3 x 25	4	20.2 - 22.2	720.0	1160.0
11003889	3 x 35	2	22.8 - 24.8	1008.0	1535.0
11003897	3 x 50	1	26.8 - 29.2	1440.0	2090.0
11003905	3 x 70	2/0	31.0 - 33.0	2016.0	2945.0
11003913	3 x 95	3/0	34.6 - 36.8	2736.0	3925.0
11003921	3 x 120	4/0	39.0 - 41.3	3456.0	4905.0
11003927	3 x 150	300 kcmil	43.3 - 45.8	4320.0	6055.0
11003933	3 x 185	350 kcmil	47.3 - 51.4	5328.0	7570.0
11003939	3 x 240	500 kcmil	53.5 - 59.3	6912.0	9865.0
11003945	3 x 300	600 kcmil	58.5 - 67.5	8640.0	12120.0
11003802	4 G 1.5	16	9.5 - 10.2	57.6	190.0
11003826	4 G 2.5	14	10.7 - 11.3	96.0	250.0
11003850	4 G 4	12	12.0 - 12.7	153.6	325.0
11003858	4 G 6	10	13.2 - 14.0	230.4	445.0
11003866	4 G 10	8	15.9 - 17.1	384.0	685.0
11003874	4 G 16	6	18.5 - 20.0	614.4	970.0
11003882	4 G 25	4	22.2 - 24.3	960.0	1450.0
11003890	4 G 35	2	25.5 - 27.2	1344.0	1960.0
11003898	4 G 50	1	29.3 - 32.7	1920.0	2640.0
11003906	4 G 70	2/0	34.5 - 36.5	2688.0	3790.0
11003914	4 G 95	3/0	38.6 - 40.7	3648.0	4985.0
11003922	4 G 120	4/0	43.4 - 46.3	4608.0	6255.0
11003928	4 G 150	300 kcmil	48.1 - 51.0	5760.0	7775.0
11003934	4 G 185	350 kcmil	53.0 - 57.8	7104.0	9640.0
11003940	4 G 240	500 kcmil	59.7 - 66.3	9216.0	12585.0
11003946	4 G 300	600 kcmil	65.4 - 69.4	11520.0	15475.0
11003803	4 x 1.5	16	9.5 - 10.2	57.6	190.0
11003827	4 x 2.5	14	10.7 - 11.3	96.0	250.0
11003851	4 x 4	12	12.0 - 12.7	153.6	325.0
11003859	4 x 6	10	13.2 - 14.0	230.4	445.0
11003867	4 x 10	8	15.9 - 17.1	384.0	685.0
11003875	4 x 16	6	18.5 - 20.0	614.4	970.0
11003883	4 x 25	4	22.2 - 24.3	960.0	1450.0
11003891	4 x 35	2	25.5 - 27.2	1344.0	1960.0
11003899	4 x 50	1	29.3 - 32.7	1920.0	2640.0
11003907	4 x 70	2/0	34.5 - 36.5	2688.0	3790.0
11003915	4 x 95	3/0	38.6 - 40.7	3648.0	4985.0
11003923	4 x 120	4/0	43.4 - 46.3	4608.0	6255.0
11003929	4 x 150	300 kcmil	48.1 - 51.0	5760.0	7775.0
11003935	4 x 185	350 kcmil	53.0 - 57.8	7104.0	9640.0
11003941	4 x 240	500 kcmil	59.7 - 66.3	9216.0	12585.0
11003947	4 x 300	600 kcmil	65.4 - 69.4	11520.0	15475.0
11003804	5 G 1.5	16	10.3 - 11.0	72.0	215.0
11003828	5 G 2.5	14	11.6 - 12.3	120.0	285.0
11003852	5 G 4	12	13.1 - 13.8	192.0	390.0
11003860	5 G 6	10	14.6 - 15.4	288.0	515.0
11003868	5 G 10	8	17.4 - 18.7	480.0	810.0
11003876	5 G 16	6	20.2 - 22.0	768.0	1150.0
11003884	5 G 25	4	19.9 - 26.9	1200.0	1760.0
11003892	5 G 35	2	28.2 - 30.1	1680.0	2345.0
11003900	5 G 50	1	32.6 - 36.2	2400.0	3175.0
11003908	5 G 70	2/0	39.0 - 41.0	3360.0	4560.0
11003916	5 G 95	3/0	43.1 - 45.1	4560.0	6035.0
11003805	5 x 1.5	16	10.3 - 11.0	72.0	215.0
11003829	5 x 2.5	14	11.6 - 12.3	120.0	285.0
11003853	5 x 4	12	13.1 - 13.8	192.0	390.0
11003861	5 x 6	10	14.6 - 15.4	288.0	515.0
11003869	5 x 10	8	17.4 - 18.7	480.0	810.0
11003877	5 x 16	6	20.2 - 22.0	768.0	1150.0
11003885	5 x 25	4	19.9 - 26.9	1200.0	1760.0
11003893	5 x 35	2	28.2 - 30.1	1680.0	2345.0
11003901	5 x 50	1	32.6 - 36.2	2400.0	3175.0
11003909	5 x 70	2/0	39.0 - 41.0	3360.0	4560.0
11003917	5 x 95	3/0	43.1 - 45.1	4560.0	6035.0

Core identification acc. to DIN VDE 0293-334, black cores with consecutive labeling in white digits

Part no.	No. cores x cross-sec. mm²	AWG, approx.	Outer-ø min - max mm	Cu-weight kg/km	Weight kg/km, approx.
11003806	7 G 1.5	16	11.9 - 12.5	100.8	300.0
11003830	7 G 2.5	14	13.2 - 13.8	168.0	390.0
11003807	7 x 1.5	16	11.9 - 12.5	100.8	300.0
11003831	7 x 2.5	14	13.2 - 13.8	168.0	390.0
11003808	10 G 1.5	16	13.7 - 14.3	144.0	390.0
11003832	10 G 2.5	14	15.2 - 16.0	240.0	520.0
11003809	10 x 1.5	16	13.7 - 14.3	144.0	390.0
11003833	10 x 2.5	14	15.2 - 16.0	240.0	520.0
11003810	12 G 1.5	16	14.6 - 15.4	172.8	440.0
11003834	12 G 2.5	14	16.3 - 17.1	288.0	290.0
11003811	12 x 1.5	16	14.6 - 15.4	172.8	440.0
11003835	12 x 2.5	14	16.3 - 17.1	288.0	290.0
11003812	16 G 1.5	16	16.4 - 17.2	230.4	550.0
11003836	16 G 2.5	14	18.4 - 19.2	384.0	750.0

HELUPOWER® 1000 RV-K

direct burial, XLPE core insulation / 90°C

Core identification acc. to DIN VDE 0293-334, black cores with consecutive labeling in white digits

Part no.	No. cores x cross-sec. mm²	AWG, approx.	Outer-ø min - max mm	Cu-weight kg/km	Weight kg/km, approx.
11003813	16 x 1.5	16	16.4 - 17.2	230.4	550.0
11003837	16 x 2.5	14	18.4 - 19.2	384.0	750.0
11003816	19 G 1.5	16	17.3 - 18.1	273.6	620.0
11003840	19 G 2.5	14	19.5 - 20.3	456.0	850.0
11003817	19 x 1.5	16	17.3 - 18.1	273.6	620.0
11003841	19 x 2.5	14	19.5 - 20.3	456.0	850.0
11003818	24 G 1.5	16	19.2 - 20.0	345.6	760.0
11003842	24 G 2.5	14	21.5 - 22.5	576.0	1040.0
11003819	24 x 1.5	16	19.2 - 20.0	345.6	760.0
11003843	24 x 2.5	14	21.5 - 22.5	576.0	1040.0

Core identification: green-yellow (1/2), brown, black, grey

Part no.	No. cores x cross-sec. mm²	AWG, approx.	Outer-ø min - max mm	Cu-weight kg/km	Weight kg/km, approx.
11007951	3 x 35 + 1 G 16	2	24.0 - 25.0	1162.0	1425.0
11007952	3 x 50 + 1 G 25	1	28.0 - 29.0	1680.0	2045.0
11007953	3 x 70 + 1 G 35	2/0	32.3 - 34.3	2352.0	2832.0
11007954	3 x 95 + 1 G 50	3/0	36.6 - 38.6	3216.0	3628.0
11007955	3 x 120 + 1 G 70	4/0	41.6 - 43.6	4128.0	4706.0
11007956	3 x 150 + 1 G 70	300 kcmil	45.8 - 47.8	4992.0	5747.0
11007957	3 x 185 + 1 G 95	350 kcmil	49.5 - 53.5	6240.0	7174.0
11007958	3 x 240 + 1 G 120	500 kcmil	55.8 - 59.8	8064.0	9300.0
11007959	3 x 300 + 1 G 150	600 kcmil	61.4 - 65.4	10080.0	11945.0

HELUPOWER® 1100-RZ1-K LS0H GREEN

flexible, direct burial, low smoke development, flame-retardant

TECHNICAL DATA

Connection cable acc. to UNE 21123-4

Temperature range	flexible 0°C to +90°C fixed -15°C to +90°C
Permissible operating temperature of the conductor	+90°C
Short circuit temperature at the conductor	+250°C (Short circuit temperature max. 5 s)
Nominal voltage	AC U_0/U 600/1000 V
Max. permissible operating voltage	alternating current (AC) conductor/earth 700 V three-phase alternating current (AC) conductor/conductor 1200 V direct current (DC) conductor/earth 900 V direct current (DC) conductor/conductor 1800 V
Test voltage core/core	3500 V
Minimum bending radius	<25 mm: 4x Outer-ø 25-50 mm: 5x Outer-ø >50 mm: 6x Outer-ø

CABLE STRUCTURE

- Copper wire bare, finely stranded acc. to DIN VDE 0295 Class 5 / IEC 60228 Class 5
- Core insulation: XLPE acc. to UNE-HD 603-1 (compound type DIX 3)
- Core identification acc. to DIN VDE 0293-308,
  1 core(s): black
  2 - 5 core(s): colour coded
- Protective conductor: starting with 3 cores,
  G = with protective conductor GN-YE,
  x = without protective conductor
- Cores stranded with optimal lay lengths
- Outer sheath: Polyolefin acc. to UNE 21123-4 (compound type DMZ-E)
- Sheath colour: green
- Length marking: in metres

PROPERTIES

- resistant to: oil, UV radiation
- for outdoor use
- direct burial
- halogen-free
- the materials used during manufacturing are cadmium-free, contain no silicone and are free from substances harmful to the wetting properties of lacquers
- reduced fire propagation, reduced release of corrosive and toxic gases

TESTS

- halogen-free acc. to DIN VDE 0482-754-1 / DIN EN 60754-1 / IEC 60754-1
- corrosiveness of combustion gases acc. to DIN VDE 0482-754-2 / DIN EN 60754-2 / IEC 60754-2
- flame-retardant acc. to DIN VDE 0482-332-1-2 / DIN EN 60332-1-2 / IEC 60332-1-2
- bundle fire test acc. to DIN VDE 0482-332-3-24 / DIN EN 60332-3-24 / IEC 60332-3-24 (Cat. C)
- smoke density acc. to DIN VDE 0482-1034-1+2 / DIN EN 61034-1+2 / IEC 61034-1+2
- oil-resistant acc. to DIN VDE 0473-811-404 / DIN EN 60811-404 / IEC 60811-404
- UV-resistant acc. to UNE 211605
- CPR-class: C_{ca} s1b d1 a1

APPLICATION

Suitable for fixed power supply installations in public and commercial buildings or in power distribution networks where a high degree of safety is required. Suitable for indoor and outdoor use, for laying in tubes and pipes and suitable for direct burial.

NOTES

- the conductor is metrically (mm²) constructed, AWG numbers are approximated, and are for reference only

Part no.	No. cores x cross-sec. mm²	AWG, approx.	Outer-ø min - max mm	Cu-weight kg/km	Weight kg/km, approx.
11008092	2 x 1.5	16	9.0 - 10.4	28.8	105.0
11008093	3 G 1.5	16	9.5 - 10.8	43.2	120.0
11008094	3 x 1.5	16	9.5 - 10.8	43.2	120.0
11008095	4 G 1.5	16	10.2 - 11.6	57.6	142.0
11008096	4 x 1.5	16	10.2 - 11.6	57.6	142.0
11008097	5 G 1.5	16	11.0 - 12.4	72.0	165.0
11008098	5 x 1.5	16	11.0 - 12.4	72.0	165.0
11008118	2 x 2.5	14	9.8 - 11.3	48.0	137.0
11008119	3 G 2.5	14	10.3 - 11.8	72.0	161.0
11008120	3 x 2.5	14	10.3 - 11.8	72.0	161.0
11008121	4 G 2.5	14	11.1 - 12.7	96.0	195.0
11008122	4 x 2.5	14	11.1 - 12.7	96.0	195.0
11008123	5 G 2.5	14	12.1 - 13.6	120.0	225.0
11008124	5 x 2.5	14	12.1 - 13.6	120.0	225.0
11008144	2 x 4	12	11.0 - 12.4	76.8	180.0
11008145	3 G 4	12	11.6 - 13.0	115.2	215.0
11008146	3 x 4	12	11.6 - 13.0	115.2	215.0
11008147	4 G 4	12	12.6 - 14.0	153.6	260.0
11008148	4 x 4	12	12.6 - 14.0	153.6	260.0
11008149	5 G 4	12	13.7 - 15.1	192.0	315.0
11008150	5 x 4	12	13.7 - 15.1	192.0	315.0
11008152	2 x 6	10	12.0 - 13.6	115.2	230.0

HELUPOWER® 1100-RZ1-K LS0H GREEN

flexible, direct burial, low smoke development, flame-retardant

Part no.	No. cores x cross-sec. mm²	AWG, approx.	Outer-ø min - max mm	Cu-weight kg/km	Weight kg/km, approx.
11008153	3 G 6	10	12.6 - 14.3	172.8	280.0
11008154	3 x 6	10	12.6 - 14.3	172.8	280.0
11008155	4 G 6	10	13.8 - 15.5	230.4	350.0
11008156	4 x 6	10	13.8 - 15.5	230.4	350.0
11008157	5 G 6	10	15.1 - 16.8	288.0	420.0
11008158	5 x 6	10	15.1 - 16.8	288.0	420.0
11008159	1 x 10	8	8.1 - 9.4	96.0	140.0
11008160	2 x 10	8	14.2 - 15.7	192.0	350.0
11008161	3 G 10	8	14.9 - 16.5	288.0	435.0
11008162	3 x 10	8	14.9 - 16.5	288.0	435.0
11008163	4 G 10	8	16.3 - 17.9	384.0	615.0
11008164	4 x 10	8	16.3 - 17.9	384.0	615.0
11008165	5 G 10	8	17.8 - 19.5	480.0	725.0
11008166	5 x 10	8	17.8 - 19.5	480.0	725.0
11008167	1 x 16	6	9.1 - 10.4	153.6	195.0
11008168	2 x 16	6	16.2 - 17.5	307.2	575.0
11008169	3 G 16	6	17.2 - 18.4	460.8	700.0
11008170	3 x 16	6	17.2 - 18.4	460.8	700.0
11008171	4 G 16	6	19.0 - 20.1	614.4	880.0
11008172	4 x 16	6	19.0 - 20.1	614.4	880.0
11008173	5 G 16	6	20.8 - 22.0	768.0	1060.0
11008174	5 x 16	6	20.8 - 22.0	768.0	1060.0
11008175	1 x 25	4	10.9 - 12.0	240.0	285.0
11008176	2 x 25	4	19.7 - 20.8	480.0	880.0
11008177	3 G 25	4	20.9 - 22.0	720.0	1075.0
11008178	3 x 25	4	20.9 - 22.0	720.0	1075.0
11008179	4 G 25	4	23.0 - 24.0	960.0	1315.0
11008180	4 x 25	4	23.0 - 24.0	960.0	1315.0
11008181	5 G 25	4	25.3 - 26.6	1200.0	1590.0
11008182	5 x 25	4	25.3 - 26.6	1200.0	1590.0
11008183	1 x 35	2	12.3 - 13.2	336.0	380.0
11008184	2 x 35	2	22.2 - 23.5	672.0	1130.0
11008185	3 G 35	2	23.6 - 25.2	1008.0	1405.0
11008186	3 x 35	2	23.6 - 25.2	1008.0	1405.0
11008187	4 G 35	2	25.9 - 27.7	1344.0	1745.0
11008188	4 x 35	2	25.9 - 27.7	1344.0	1745.0
11008189	5 G 35	2	28.6 - 30.6	1680.0	2100.0
11008190	5 x 35	2	28.6 - 30.6	1680.0	2100.0
11008191	1 x 50	1	13.8 - 14.9	480.0	520.0
11008192	2 x 50	1	25.6 - 26.8	960.0	1565.0
11008193	3 G 50	1	27.2 - 28.5	1440.0	1950.0
11008194	3 x 50	1	27.2 - 28.5	1440.0	1950.0
11008195	4 G 50	1	29.7 - 31.9	1920.0	2455.0
11008196	4 x 50	1	29.7 - 31.9	1920.0	2455.0
11008197	5 G 50	1	33.0 - 35.4	2400.0	2970.0
11008198	5 x 50	1	33.0 - 35.4	2400.0	2970.0
11008199	1 x 70	2/0	15.5 - 17.1	672.0	715.0
11008201	3 G 70	2/0	31.4 - 33.4	2016.0	2675.0
11008202	3 x 70	2/0	31.4 - 33.4	2016.0	2675.0
11008203	4 G 70	2/0	35.2 - 37.5	2688.0	3340.0
11008204	4 x 70	2/0	35.2 - 37.5	2688.0	3340.0
11008207	1 x 95	3/0	17.1 - 18.7	912.0	925.0
11008209	3 G 95	3/0	35.0 - 37.1	2736.0	3390.0
11008210	3 x 95	3/0	35.0 - 37.1	2736.0	3390.0
11008211	4 G 95	3/0	38.8 - 41.1	3648.0	4315.0
11008212	4 x 95	3/0	38.8 - 41.1	3648.0	4315.0
11008215	1 x 120	4/0	19.3 - 20.7	1152.0	1160.0
11008219	4 G 120	4/0	43.6 - 46.5	4608.0	5465.0
11008220	4 x 120	4/0	43.6 - 46.5	4608.0	5465.0
11008221	1 x 150	300 kcmil	21.1 - 22.8	1440.0	1460.0
11008225	4 G 150	300 kcmil	48.1 - 51.0	5760.0	6830.0
11008226	4 x 150	300 kcmil	48.1 - 51.0	5760.0	6830.0
11008227	1 x 185	350 kcmil	23.0 - 24.8	1776.0	1780.0
11008231	4 G 185	350 kcmil	53.0 - 57.0	7104.0	8575.0
11008232	4 x 185	350 kcmil	53.0 - 57.0	7104.0	8575.0
11008233	1 x 240	500 kcmil	26.3 - 27.6	2304.0	2300.0
11008237	4 G 240	500 kcmil	59.7 - 65.1	9216.0	11085.0
11008238	4 x 240	500 kcmil	59.7 - 65.1	9216.0	11085.0
11008239	1 x 300	600 kcmil	29.0 - 31.0	2880.0	2910.0

NSGAFÖU 1,8/3 kV

short-circuit and earth-fault proof up to 1000 V, oil-resistant, for increased mechanical stress

TECHNICAL DATA

Rubber sheathed single core cable acc. to DIN VDE 0250-602

Temperature range	flexible -25°C to +80°C fixed -40°C to +80°C
Permissible operating temperature of the conductor	+90°C
Nominal voltage	AC U_0/U 1800/3000 V
Max. permissible operating voltage	alternating current (AC) conductor/earth 2100 V three-phase alternating current (AC) conductor/conductor 3600 V direct current (DC) conductor/earth 2700 V direct current (DC) conductor/conductor 5400 V
Test voltage	6000 V
Minimum bending radius	flexible 10x Outer-Ø fixed 6x Outer-Ø

CABLE STRUCTURE

- Copper wire tinned, finely stranded acc. to DIN VDE 0295 Class 5 / IEC 60228 Class 5
- Core insulation: rubber (EPR) acc. to DIN VDE 0207-20 (compound type 3GI3)
- x = without protective conductor
- Outer cladding: rubber (polychloropren) acc. to DIN VDE 0207-21 (compound type 5GM3)
- Colour: see table

PROPERTIES

- resistant to: oil

TESTS

- flame-retardant acc. to DIN VDE 0482-332-1-2 / DIN EN 60332-1-2 / IEC 60332-1-2
- oil-resistant acc. to DIN VDE 0473-811-404 / DIN EN 60811-404 / IEC 60811-404

APPLICATION

For use in rail vehicles and buses, as well as in dry rooms. The cable is short-circuit and earth-fault proof in switchgear and distribution boards up to 1000 V. Normative permissible laying types are: in pipes, closed installation ducts, for connecting moving parts, device wiring and bundled. Not for use on cable ladders and cable trays.

NOTES

- the conductor is metrically (mm²) constructed, AWG numbers are approximated, and are for reference only

Colour: black

Part no.	No. cores x cross-sec. mm²	AWG, approx.	Outer-Ø max. mm	Cu-weight kg/km	Weight kg/km, approx.
38501	1 x 1.5	16	7.0	14.4	62.0
38502	1 x 2.5	14	7.5	24.0	76.0
38503	1 x 4	12	9.0	38.0	95.0
38504	1 x 6	10	9.5	58.0	140.0
38505	1 x 10	8	11.0	96.0	190.0
38506	1 x 16	6	13.0	154.0	270.0
38507	1 x 25	4	15.0	240.0	410.0
38508	1 x 35	2	16.5	336.0	490.0
38509	1 x 50	1	18.0	480.0	650.0
38510	1 x 70	2/0	20.5	672.0	900.0
38511	1 x 95	3/0	24.0	912.0	1200.0
38513	1 x 120	4/0	26.0	1152.0	1450.0
38514	1 x 150	300 kcmil	28.0	1440.0	1800.0
38512	1 x 185	350 kcmil	31.0	1776.0	2200.0
38515	1 x 240	500 kcmil	34.5	2304.0	2650.0
38516	1 x 300	600 kcmil	38.0	2880.0	3250.0

Colour: orange

Part no.	No. cores x cross-sec. mm²	AWG, approx.	Outer-Ø max. mm	Cu-weight kg/km	Weight kg/km, approx.
17001252	1 x 1.5	16	7.0	14.4	62.0
710665	1 x 2.5	14	7.5	24.0	76.0
710666	1 x 4	12	9.0	38.0	95.0
710223	1 x 6	10	9.5	58.0	140.0
17000914	1 x 10	8	11.0	96.0	190.0
17000915	1 x 16	6	13.0	154.0	270.0
17000916	1 x 25	4	15.0	240.0	410.0
17000917	1 x 35	2	16.5	336.0	490.0
17000918	1 x 50	1	18.0	480.0	650.0
17000919	1 x 70	2/0	20.5	672.0	900.0
17000920	1 x 95	3/0	24.0	912.0	1200.0
17000921	1 x 120	4/0	26.0	1152.0	1450.0
17000922	1 x 150	300 kcmil	28.0	1440.0	1800.0
17000923	1 x 185	350 kcmil	31.0	1776.0	2200.0
17000924	1 x 240	500 kcmil	34.5	2304.0	2650.0
17001253	1 x 300	600 kcmil	38.0	2880.0	3250.0

JZ-600 / OZ-600

TECHNICAL DATA

PVC control and connection cable in alignment with DIN VDE 0262, DIN VDE 0285-525-2-51 / DIN EN 50525-2-51

Temperature range	flexible -15°C to +80°C fixed -40°C to +80°C
Nominal voltage	AC U_0/U 600/1000 V
Test voltage core/core	4000 V
Breakdown voltage	8000 V
Minimum bending radius	flexible 7,5x Outer-Ø fixed 4x Outer-Ø

CABLE STRUCTURE

- Copper wire bare, finely stranded acc. to DIN VDE 0295 class 5 / IEC 60228 class 5
- Core insulation: PVC acc. to DIN VDE 0207-363-3 / DIN EN 50363-3 (compound type TI2)
- Core identification acc. to DIN VDE 0293-334, black cores with consecutive labeling in white digits
- Protective conductor: starting with 3 cores, G = with protective conductor GN-YE, in the outer layer, x = without protective conductor (OZ)
- Cores stranded in layers with optimal lay lengths
- Outer sheath: PVC acc. to DIN VDE 0207-363-4-1 / DIN EN 50363-4-1 (compound type TM2)
- Sheath colour: black (RAL 9005)
- Length marking: in metres

PROPERTIES

- resistant to: UV radiation, weathering effects
- largely resistant to: oil, for details, see "Technical Information"
- for outdoor use
- the materials used during manufacturing are cadmium-free, contain no silicone and are free from substances harmful to the wetting properties of lacquers

TESTS

- flame-retardant acc. to DIN VDE 0482-332-1-2 / DIN EN 60332-1-2 / IEC 60332-1-2
- UV-resistant acc. to DIN EN ISO 4892-2
- weather-resistant acc. to DIN EN ISO 4892-2

APPLICATION

Used as a connection and control cable in machine tools, assembly lines and conveyor belts, production lines, in plant construction, heating and air-conditioning technology, in smelters and steel mills. Suitable for flexible applications involving medium mechanical stress with free movement, without tensile stress and without forced motion control in dry, damp and wet rooms, as well as outdoors (fixed installation). May not be laid directly in soil (suitable for direct burial starting with an outer diameter of 18.0 mm) or water. Primarily used in southern European and Arabic countries, as well as in eastern states.

NOTES

- the conductor is metrically (mm²) constructed, AWG numbers are approximated, and are for reference only

Part no.	No. cores x cross-sec. mm²	AWG, approx.	Outer Ø mm, approx.	Cu-weight kg/km	Weight kg/km, approx.
10550	2 x 0.5	20	6.2	9.6	56.0
10551	3 G 0.5	20	6.5	14.0	68.0
10552	3 x 0.5	20	6.5	14.0	68.0
10553	4 G 0.5	20	7.0	19.0	100.0
10554	4 x 0.5	20	7.0	19.0	100.0
10555	5 G 0.5	20	7.9	24.0	117.0
10556	5 x 0.5	20	7.9	24.0	117.0
10557	6 G 0.5	20	8.5	29.0	126.0
10558	7 G 0.5	20	8.5	34.0	138.0
10559	7 x 0.5	20	8.5	34.0	138.0
10560	8 G 0.5	20	9.4	38.0	150.0
10561	8 x 0.5	20	9.4	38.0	150.0
10562	10 G 0.5	20	11.0	48.0	176.0
10563	12 G 0.5	20	11.3	58.0	200.0
10564	12 x 0.5	20	11.3	58.0	200.0
10565	14 G 0.5	20	11.9	67.0	230.0
10566	16 G 0.5	20	12.7	76.0	250.0
10567	18 G 0.5	20	13.3	86.0	276.0
10568	20 G 0.5	20	14.2	96.0	293.0
10569	21 G 0.5	20	14.2	96.0	305.0
10570	25 G 0.5	20	15.8	120.0	335.0
10571	30 G 0.5	20	16.9	144.0	348.0
10572	32 G 0.5	20	18.7	154.0	355.0
10573	34 G 0.5	20	19.3	163.0	520.0
10574	40 G 0.5	20	20.0	192.0	590.0
10575	42 G 0.5	20	20.6	202.0	595.0
10576	50 G 0.5	20	22.3	240.0	715.0
10577	52 G 0.5	20	22.3	252.0	740.0
10578	61 G 0.5	20	23.5	293.0	840.0
10579	65 G 0.5	20	24.2	312.0	880.0
10580	80 G 0.5	20	26.7	384.0	960.0
10581	100 G 0.5	20	29.7	480.0	1050.0
10582	2 x 0.75	19	6.7	14.0	66.0
10583	3 G 0.75	19	7.1	22.0	74.0
10584	3 x 0.75	19	7.1	22.0	74.0
10585	4 G 0.75	19	7.7	29.0	126.0
10586	4 x 0.75	19	7.7	29.0	126.0
10587	5 G 0.75	19	8.5	36.0	140.0
10588	5 x 0.75	19	8.5	36.0	140.0
10589	6 G 0.75	19	9.5	43.0	170.0
10590	6 x 0.75	19	9.5	43.0	170.0
10591	7 G 0.75	19	9.5	50.0	190.0
10592	7 x 0.75	19	9.5	50.0	190.0
10593	8 G 0.75	19	10.2	58.0	212.0
10594	8 x 0.75	19	10.2	58.0	212.0
10595	9 G 0.75	19	11.1	65.0	227.0

JZ-600 / OZ-600

Part no.	No. cores x cross-sec. mm²	AWG, approx.	Outer Ø mm, approx.	Cu-weight kg/km	Weight kg/km, approx.
10596	10 G 0.75	19	12.2	72.0	238.0
10597	12 G 0.75	19	12.6	86.0	257.0
10598	12 x 0.75	19	12.6	86.0	257.0
10599	14 G 0.75	19	13.2	101.0	286.0
10600	15 G 0.75	19	14.0	108.0	319.0
10601	18 G 0.75	19	14.8	130.0	362.0
10602	20 G 0.75	19	15.7	144.0	394.0
10603	21 G 0.75	19	15.7	151.0	422.0
10604	25 G 0.75	19	17.5	180.0	486.0
10605	32 G 0.75	19	20.3	230.0	595.0
10606	34 G 0.75	19	21.1	245.0	638.0
10607	37 G 0.75	19	21.1	260.0	696.0
10608	40 G 0.75	19	21.8	288.0	726.0
10609	41 G 0.75	19	22.5	296.0	750.0
10610	42 G 0.75	19	22.5	302.0	770.0
10611	50 G 0.75	19	24.4	360.0	895.0
10612	61 G 0.75	19	25.8	439.0	1070.0
10613	65 G 0.75	19	26.7	468.0	1110.0
10614	80 G 0.75	19	29.7	576.0	1500.0
10615	100 G 0.75	19	33.0	720.0	1889.0
10616	2 x 1	18	7.0	19.2	80.0
10617	3 G 1	18	7.4	29.0	96.0
10618	3 x 1	18	7.4	29.0	96.0
10619	4 G 1	18	8.2	38.0	100.0
10620	4 x 1	18	8.2	38.0	100.0
10621	5 G 1	18	9.0	48.0	130.0
10622	5 x 1	18	9.0	48.0	130.0
10623	6 G 1	18	9.9	58.0	150.0
10624	7 G 1	18	9.9	67.0	170.0
10625	7 x 1	18	9.9	67.0	170.0
10626	8 G 1	18	10.9	77.0	230.0
10627	9 G 1	18	11.7	86.0	250.0
10628	10 G 1	18	12.8	96.0	270.0
10629	10 x 1	18	12.8	96.0	270.0
10630	12 G 1	18	13.2	115.0	290.0
10631	12 x 1	18	13.2	115.0	290.0
10632	14 G 1	18	14.0	134.0	320.0
10633	16 G 1	18	14.8	154.0	360.0
10634	18 G 1	18	15.7	173.0	405.0
10635	18 x 1	18	15.7	173.0	405.0
10636	20 G 1	18	16.7	192.0	450.0
10637	20 x 1	18	16.7	192.0	480.0
10638	21 G 1	18	16.7	205.0	510.0
10639	24 G 1	18	19.6	236.0	550.0
10640	25 G 1	18	19.6	240.0	570.0
10641	25 x 1	18	19.6	240.0	570.0
10642	26 G 1	18	19.6	252.0	590.0
10643	30 x 1	18	20.6	308.0	650.0
10644	34 G 1	18	22.1	326.0	750.0
10645	36 G 1	18	22.1	346.0	790.0
10646	40 G 1	18	22.9	384.0	850.0
10647	40 x 1	18	22.9	384.0	850.0
10648	41 G 1	18	23.7	394.0	890.0
10649	42 G 1	18	23.7	403.0	900.0
10650	50 G 1	18	25.6	480.0	1100.0
10651	56 G 1	18	26.4	538.0	1190.0
10652	61 G 1	18	27.3	586.0	1266.0
10653	65 G 1	18	28.3	628.0	1560.0
10654	80 G 1	18	31.5	786.0	1810.0
10655	100 G 1	18	35.0	960.0	1950.0
10656	2 x 1.5	16	8.2	29.0	95.0
10657	3 G 1.5	16	8.7	43.0	112.0
10658	3 x 1.5	16	8.7	43.0	112.0
10659	4 G 1.5	16	9.7	58.0	139.0
10660	4 x 1.5	16	9.7	58.0	139.0
10661	5 G 1.5	16	10.5	72.0	170.0
10662	5 x 1.5	16	10.5	72.0	170.0
10663	6 G 1.5	16	11.6	86.0	190.0
10664	7 G 1.5	16	11.6	101.0	225.0
10665	7 x 1.5	16	11.6	101.0	225.0
10666	8 G 1.5	16	12.7	115.0	250.0
10667	9 G 1.5	16	13.9	130.0	280.0
10668	10 G 1.5	16	15.2	144.0	300.0
10669	11 G 1.5	16	15.2	158.0	330.0
10670	12 G 1.5	16	15.7	173.0	370.0
10671	12 x 1.5	16	15.7	173.0	370.0
10672	14 G 1.5	16	16.6	202.0	400.0
10673	16 G 1.5	16	17.5	230.0	450.0
10674	18 G 1.5	16	19.6	259.0	520.0
10675	19 G 1.5	16	19.6	279.0	550.0
10676	20 G 1.5	16	20.6	288.0	600.0
10677	21 G 1.5	16	20.6	302.0	600.0
10678	25 G 1.5	16	22.6	360.0	730.0
10679	32 G 1.5	16	24.7	461.0	880.0
10680	34 G 1.5	16	25.6	490.0	950.0
10681	40 G 1.5	16	26.8	576.0	990.0
10682	42 G 1.5	16	27.7	605.0	1120.0
10683	50 G 1.5	16	30.4	720.0	1400.0
10684	56 G 1.5	16	31.5	806.0	1530.0
10685	61 G 1.5	16	32.6	878.0	1700.0
10686	65 G 1.5	16	33.5	936.0	1900.0
10687	80 G 1.5	16	37.5	1152.0	2300.0
10688	100 G 1.5	16	41.8	1440.0	2700.0
10689	2 x 2.5	14	9.6	48.0	160.0
10690	3 G 2.5	14	10.1	72.0	175.0
10691	3 x 2.5	14	10.1	72.0	175.0
10692	4 G 2.5	14	11.2	96.0	203.0
10693	4 x 2.5	14	11.2	96.0	203.0
10694	5 G 2.5	14	12.5	120.0	251.0
10695	5 x 2.5	14	12.5	120.0	251.0
10696	7 G 2.5	14	13.8	168.0	330.0
10697	7 x 2.5	14	13.8	168.0	330.0
10698	8 G 2.5	14	15.1	192.0	400.0
10699	12 G 2.5	14	19.6	288.0	553.0
10700	14 G 2.5	14	20.5	336.0	630.0
10701	18 G 2.5	14	22.6	432.0	795.0
10702	21 G 2.5	14	23.8	504.0	930.0
10703	25 G 2.5	14	26.2	600.0	1110.0
10704	34 G 2.5	14	30.4	816.0	1450.0
10705	42 G 2.5	14	33.0	1008.0	1750.0
10706	50 G 2.5	14	36.3	1200.0	2100.0
10707	61 G 2.5	14	38.8	1464.0	2540.0
10708	100 G 2.5	14	50.0	2400.0	3850.0
10709	2 x 4	12	11.0	77.0	180.0
10710	3 G 4	12	11.6	115.0	230.0
10711	4 G 4	12	12.9	154.0	310.0
10712	5 G 4	12	14.3	192.0	410.0
10713	7 G 4	12	15.8	269.0	540.0
10714	8 G 4	12	17.3	307.0	710.0
10715	12 G 4	12	22.1	461.0	860.0
10716	3 G 6	10	13.1	173.0	370.0
10717	4 G 6	10	14.5	230.0	430.0
10718	5 G 6	10	16.2	288.0	650.0
10719	7 G 6	10	19.0	403.0	860.0
10720	3 G 10	8	16.7	288.0	660.0
10721	4 G 10	8	19.5	384.0	790.0
10722	5 G 10	8	21.3	480.0	960.0
10723	7 G 10	8	23.2	672.0	1300.0
10724	3 G 16	6	21.1	461.0	700.0
10725	4 G 16	6	22.9	614.0	1100.0
10726	5 G 16	6	25.2	768.0	1600.0
10727	7 G 16	6	27.6	1075.0	1890.0

JZ-600 / OZ-600

Part no.	No. cores x cross-sec. mm²	AWG, approx.	Outer Ø mm, approx.	Cu-weight kg/km	Weight kg/km, approx.
10728	3 G 25	4	25.0	720.0	1450.0
10729	4 G 25	4	27.4	960.0	1600.0
10730	5 G 25	4	30.7	1200.0	2050.0
10731	7 G 25	4	34.0	1680.0	2900.0
10732	3 G 35	2	27.5	1008.0	1900.0
10733	4 G 35	2	30.4	1344.0	2400.0
10734	5 G 35	2	34.0	1680.0	2900.0
10735	3 G 50	1	32.2	1440.0	2700.0
10736	4 G 50	1	35.8	1920.0	3400.0
10742	5 G 50	1	39.9	2400.0	4361.0
10737	3 G 70	2/0	36.4	2016.0	3300.0
10738	4 G 70	2/0	40.4	2688.0	4400.0
10743	5 G 70	2/0	45.1	3360.0	5807.0
10739	3 G 95	3/0	41.9	2736.0	5050.0
10740	4 G 95	3/0	46.4	3648.0	6010.0
10744	5 G 95	3/0	51.7	4560.0	7752.0
10741	4 G 120	4/0	51.3	4608.0	7500.0
11007924	5 G 120	4/0	56.4	5760.0	7659.0
10745	4 G 150	300 kcmil	57.0	5760.0	8640.0
11007925	5 G 150	300 kcmil	62.9	7200.0	9562.0
10746	4 G 185	350 kcmil	62.8	7104.0	10380.0

JZ-600-Y-CY / OZ-600-Y-CY

EMC-preferred type, with inner sheath

TECHNICAL DATA

PVC control and connection cable in alignment with DIN VDE 0262, DIN VDE 0285-525-2-51 / DIN EN 50525-2-51

Temperature range	flexible -15°C to +80°C fixed -40°C to +80°C
Nominal voltage	AC U_o/U 600/1000 V
Test voltage core/core	4000 V
Breakdown voltage	8000 V
Coupling resistance	at 30 MHz, approx. 250 Ohm/km
Minimum bending radius	flexible 10x Outer-Ø fixed 5x Outer-Ø

CABLE STRUCTURE

- Copper wire bare, finely stranded acc. to DIN VDE 0295 class 5 / IEC 60228 class 5
- Core insulation: PVC acc. to DIN VDE 0207-363-3 / DIN EN 50363-3 (compound type TI2)
- Core identification acc. to DIN VDE 0293-334, black cores with consecutive labeling in white digits
- Protective conductor: starting with 3 cores, G = with protective conductor GN-YE, in the outer layer, x = without protective conductor (OZ)
- Cores stranded in layers with optimal lay lengths
- Inner sheath: PVC
- Screen: braided screen of tinned copper, approx. coverage 85%
- Outer sheath: PVC acc. to DIN VDE 0207-363-4-1 / DIN EN 50363-4-1 (compound type TM2)
- Sheath colour: black (RAL 9005)
- Length marking: in metres

PROPERTIES

- resistant to: UV radiation, weathering effects
- largely resistant to: oil, for details, see "Technical Information"
- for outdoor use
- the materials used during manufacturing are cadmium-free, contain no silicone and are free from substances harmful to the wetting properties of lacquers

TESTS

- flame-retardant acc. to DIN VDE 0482-332-1-2 / DIN EN 60332-1-2 / IEC 60332-1-2
- UV-resistant acc. to DIN EN ISO 4892-2
- weather-resistant acc. to DIN EN ISO 4892-2

APPLICATION

Used as a connection and control cable in machine tools, assembly lines and conveyor belts, production lines, plant construction, heating and air-conditioning technology and in smelters and steel mills. Suitable for flexible applications involving medium mechanical stress with free movement, without tensile stress and without forced motion control in dry, damp and wet rooms, as well as outdoors (fixed installation). May not be laid directly in soil (suitable for direct burial starting with an outer diameter of 20 mm) or water. Due to its extended nominal voltage range and good UV resistance, this cable is primarily used in Southern Europe, Arabic, Asian and Eastern countries. Due to the high screening density, interference-free transmission of signals or pulses is ensured. EMC= Electromagnetic Compatibility; in order to optimise EMC properties, we recommend a double-sided and all-round large contact area of the copper braiding.

NOTES

- the conductor is metrically (mm²) constructed, AWG numbers are approximated, and are for reference only

Part no.	No. cores x cross-sec. mm²	AWG, approx.	Outer Ø mm, approx.	Cu-weight kg/km	Weight kg/km, approx.
11464	2 x 0.5	20	8.4	41.0	115.0
11465	3 G 0.5	20	8.8	45.0	127.0
11466	4 G 0.5	20	9.3	54.0	149.0
11467	5 G 0.5	20	10.1	66.0	169.0
11469	7 G 0.5	20	10.9	79.0	230.0
11472	12 G 0.5	20	14.0	137.0	386.0
11475	18 G 0.5	20	16.3	156.0	428.0
11478	25 G 0.5	20	19.0	250.0	693.0
11489	2 x 0.75	19	8.9	46.0	128.0
11490	3 G 0.75	19	9.3	57.0	143.0
11491	4 G 0.75	19	10.1	63.0	164.0
11492	5 G 0.75	19	11.0	76.0	198.0
11494	7 G 0.75	19	11.9	100.0	232.0
11498	12 G 0.75	19	15.4	175.0	360.0
11501	18 G 0.75	19	18.0	240.0	562.0
11504	25 G 0.75	19	21.9	306.0	729.0
11516	2 x 1	18	9.2	54.0	146.0
11517	3 G 1	18	9.8	64.0	165.0
11518	4 G 1	18	10.4	76.0	204.0
11519	5 G 1	18	11.6	89.0	224.0
11521	7 G 1	18	12.3	114.0	379.0
11525	12 G 1	18	16.2	186.0	430.0
11528	18 G 1	18	18.9	284.0	636.0
11532	25 G 1	18	22.8	387.0	837.0
11546	2 x 1.5	16	10.4	64.0	175.0
11547	3 G 1.5	16	11.3	82.0	213.0
11548	4 G 1.5	16	12.0	99.0	247.0
11549	5 G 1.5	16	13.1	123.0	300.0
11551	7 G 1.5	16	14.6	148.0	364.0
11556	12 G 1.5	16	18.7	274.0	668.0
11559	18 G 1.5	16	22.8	386.0	844.0
11563	25 G 1.5	16	26.2	531.0	1356.0
11574	2 x 2.5	14	12.0	110.0	241.0
11575	3 G 2.5	14	12.6	148.0	266.0
11576	4 G 2.5	14	13.9	169.0	351.0
11577	5 G 2.5	14	15.4	220.0	434.0

JZ-600-Y-CY / OZ-600-Y-CY

EMC-preferred type, with inner sheath

Part no.	No. cores x cross-sec. mm²	AWG, approx.	Outer Ø mm, approx.	Cu-weight kg/km	Weight kg/km, approx.
11578	7 G 2.5	14	16.6	284.0	517.0
11580	12 G 2.5	14	22.8	470.0	862.0
11582	18 G 2.5	14	26.2	572.0	1236.0
11584	25 G 2.5	14	30.6	740.0	1659.0
11590	2 x 4	12	13.4	124.0	306.0
11591	3 G 4	12	14.7	178.0	444.0
11592	4 G 4	12	15.9	234.0	489.0
11593	5 G 4	12	17.6	284.0	623.0
11594	7 G 4	12	19.0	385.0	775.0
11596	12 G 4	12	25.5	581.0	1244.0
11597	2 x 6	10	15.2	176.0	433.0
11598	3 G 6	10	16.2	245.0	572.0
11599	4 G 6	10	17.8	316.0	673.0
11600	5 G 6	10	19.4	442.0	841.0
11601	7 G 6	10	22.2	530.0	1078.0
11602	2 x 10	8	18.6	260.0	640.0
11603	3 G 10	8	20.0	367.0	820.0
11604	4 G 10	8	22.7	549.0	979.0
11605	5 G 10	8	24.8	604.0	1207.0
11606	7 G 10	8	26.8	820.0	2210.0
11607	2 x 16	6	23.2	491.0	1150.0
11608	3 G 16	6	24.5	653.0	1395.0
11609	4 G 16	6	26.5	807.0	1426.0
11610	5 G 16	6	29.3	940.0	2720.0
11611	7 G 16	6	32.0	1345.0	3213.0
11612	3 G 25	4	29.0	920.0	1810.0
11613	4 G 25	4	32.0	1169.0	2261.0
11614	5 G 25	4	35.3	1420.0	2773.0
11615	7 G 25	4	38.6	1921.0	4980.0
11616	3 G 35	2	31.9	1250.0	2400.0
11617	4 G 35	2	35.0	1680.0	2973.0
11618	5 G 35	2	38.6	2020.0	3548.0
11619	3 G 50	1	37.0	1887.0	3120.0
11620	4 G 50	1	40.8	2370.0	3873.0
11621	5 G 50	1	45.2	2880.0	4634.0
11622	3 G 70	2/0	41.5	2516.0	4220.0
11623	4 G 70	2/0	45.9	3257.0	5546.0
11624	5 G 70	2/0	50.8	4032.0	6410.0
11625	3 G 95	3/0	47.4	3086.0	5240.0
11626	4 G 95	3/0	52.3	4060.0	6538.0
11627	5 G 95	3/0	57.4	5244.0	7812.0
11628	3 G 120	4/0	52.2	4176.0	7210.0
11629	4 G 120	4/0	56.9	5231.0	7994.0
13137	4 G 150	300 kcmil	63.3	7760.0	10305.0
13147	4 G 185	350 kcmil	69.4	8104.0	12154.0

HELUTHERM® 145

temperature-resistant, cross-linked, improved behaviour in case of fire

TECHNICAL DATA

Single core

Temperature range	flexible -35°C to +120°C fixed -55°C to +145°C
Nominal voltage	0.25 - 1 mm²: AC U_o/U 300/500 V 1.5 - 240 mm²: AC U_o/U 450/750 V 1.5 - 240 mm²: fixed and protected installation AC U_o/U 600/1000 V
Test voltage	3500 V
Minimum bending radius	flexible 8x Outer-Ø fixed 4x Outer-Ø

CABLE STRUCTURE

- Copper wire tinned, finely stranded acc. to DIN VDE 0295 Class 5 / IEC 60228 Class 5
- Core insulation: cross-linked polyolefin
- Core identification: see table

PROPERTIES

- resistant to: oil, UV radiation, ozone, weathering effects
- abrasion-resistant, notch-resistant
- for outdoor use
- halogen-free
- the materials used during manufacturing are cadmium-free, contain no silicone and are free from substances harmful to the wetting properties of lacquers
- no fire propagation

TESTS

- halogen-free acc. to DIN VDE 0482-754-1 / DIN EN 60754-1 / IEC 60754-1
- corrosiveness of combustion gases acc. to DIN VDE 0482-754-2 / DIN EN 60754-2 / IEC 60754-2
- flame-retardant acc. to DIN VDE 0482-332-1-2 / DIN EN 60332-1-2 / IEC 60332-1-2
- bundle fire test acc. to DIN VDE 0482-332-3-22 / DIN EN 60332-3-22 / IEC 60332-3-22
- smoke density acc. to DIN VDE 0482-1034-1+2 / DIN EN 61034-1+2 / IEC 61034-1+2
- protection against fire acc. to DIN EN 45545-2
- oil-resistant acc. to DIN VDE 0473-811-404 / DIN EN 60811-404 / IEC 60811-404, IRM 902 4h at +70°C
- Certifications:
  0.5 - 240 mm²: DNV GL

APPLICATION

Temperature resistant single core for the internal wiring of lighting fixtures, heaters, electrical machinery, switching systems and distributors in industrial equipment as well as plant and machinery construction; suitable for laying in tubes on and under plaster, in closed installation ducts, as well as for traffic systems and outdoor applications. Not suitable for direct laying in cable ladders and cable trays, except as a potential equalization cable.

NOTES

- the conductor is metrically (mm²) constructed, AWG numbers are approximated, and are for reference only

Cross-sec. mm²	AWG, approx.	Outer Ø mm, approx.	Cu-weight kg/km	Weight kg/km, approx.	black (RAL 9005) Part no.	green-yellow Part no.	blue (RAL 5015) Part no.	brown (RAL 8003) Part no.	red (RAL 3000) Part no.	white (RAL 9010) Part no.	grey (RAL 7001) Part no.	purple (RAL 4005) Part no.
0.25	24	1.6	2.4	4.0	**50999**	**50998**	**51070**	**51071**	**51072**	**51073**	**51074**	**51075**
0.34	22	1.7	3.2	5.0	**51167**	**51166**	**51168**	**51169**	**51170**	**51171**	**51172**	**51173**
0.5	20	1.9	4.8	7.0	**51281**	**51280**	**51282**	**51283**	**51284**	**51285**	**51286**	**51287**
0.75	19	2.2	7.2	11.0	**51295**	**51294**	**51296**	**51297**	**51298**	**51299**	**51300**	**51301**
1	18	2.5	9.6	14.0	**51309**	**51308**	**51310**	**51311**	**51312**	**51313**	**51314**	**51315**
1.5	16	2.9	14.4	20.0	**51323**	**51322**	**51324**	**51325**	**51326**	**51327**	**51328**	**51329**
2.5	14	3.5	24.0	30.0	**51337**	**51336**	**51338**	**51339**	**51340**	**51341**	**51342**	**51343**
4	12	4.3	38.0	47.0	**51351**	**51350**	**51352**	**51353**	**51354**	**51355**	**51356**	**51357**
6	10	5.0	58.0	72.0	**51365**	**51364**	**51366**	**51367**	**51368**	**51369**	**51370**	**51371**
10	8	6.3	96.0	120.0	**51379**	**51378**	**51380**	**51381**	**51382**	**51383**	**51384**	**51385**
16	6	7.3	154.0	182.0	**51420**	**51419**	**51421**	**51422**	**51423**	**51424**	**51425**	**51426**
25	4	9.6	240.0	272.0	**51434**	**51433**	**51435**	**51436**	**51437**	**51438**	**51439**	**51440**
35	2	10.8	336.0	371.0	**51448**	**51447**	**51449**	**51450**	**51451**	**51452**	**51453**	**51454**
50	1	12.6	480.0	530.0	**51462**	**51461**	**51463**	**51464**	**51465**	**51466**	**51467**	**51468**
70	2/0	14.6	672.0	730.0	**51476**	**51475**	**51477**	**51478**	**51479**	**51480**	**51481**	**51482**
95	3/0	16.5	912.0	964.0	**51490**	**51489**	**51491**	**51492**	**51493**	**51494**	**51495**	**51496**
120	4/0	18.0	1152.0	1235.0	**51504**	**51503**	**51505**	**51506**	**51507**	**51508**	**51509**	**51510**

HELUTHERM® 145

temperature-resistant, cross-linked, improved behaviour in case of fire

Cross-sec. mm²	AWG, approx.	Outer Ø mm, approx.	Cu-weight kg/km	Weight kg/km, approx.	black (RAL 9005) Part no.	green-yellow Part no.	blue (RAL 5015) Part no.	brown (RAL 8003) Part no.	red (RAL 3000) Part no.	white (RAL 9010) Part no.	grey (RAL 7001) Part no.	purple (RAL 4005) Part no.
150	300 kcmil	20.0	1440.0	1523.0	**51518**	**51517**	**51519**	**51520**	**51521**	**51522**	**51523**	**51524**
185	350 kcmil	22.2	1776.0	1850.0	**51532**	**51531**	**51533**	**51534**	**51535**	**51536**	**51537**	**51538**
240	500 kcmil	24.5	2304.0	2432.0	**51546**	**51545**	**51547**	**51548**	**51549**	**51550**	**51551**	**51552**

Cross-sec. mm²	AWG, approx.	Outer Ø mm, approx.	Cu-weight kg/km	Weight kg/km, approx.	yellow (RAL 1021) Part no.	orange (RAL 2003) Part no.	green (RAL 6018) Part no.	dark blue (RAL 5010) Part no.	beige (RAL 1001) Part no.
0.25	24	1.6	2.4	4.0	**51076**	**51077**	**51078**	**51079**	**51164**
0.34	22	1.7	3.2	5.0	**51174**	**51175**	**51176**	**51177**	**51178**
0.5	20	1.9	4.8	7.0	**51288**	**51289**	**51290**	**51291**	**51292**
0.75	19	2.2	7.2	11.0	**51302**	**51303**	**51304**	**51305**	**51306**
1	18	2.5	9.6	14.0	**51316**	**51317**	**51318**	**51319**	**51320**
1.5	16	2.9	14.4	20.0	**51330**	**51331**	**51332**	**51333**	**51334**
2.5	14	3.5	24.0	30.0	**51344**	**51345**	**51346**	**51347**	**51348**
4	12	4.3	38.0	47.0	**51358**	**51359**	**51360**	**51361**	**51362**
6	10	5.0	58.0	72.0	**51372**	**51373**	**51374**	**51375**	**51376**
10	8	6.3	96.0	120.0	**51386**	**51387**	**51388**	**51389**	**51390**
16	6	7.3	154.0	182.0	**51427**	**51428**	**51429**	**51430**	**51431**
25	4	9.6	240.0	272.0	**51441**	**51442**	**51443**	**51444**	**51445**
35	2	10.8	336.0	371.0	**51455**	**51456**	**51457**	**51458**	**51459**
50	1	12.6	480.0	530.0	**51469**	**51470**	**51471**	**51472**	**51473**
70	2/0	14.6	672.0	730.0	**51483**	**51484**	**51485**	**51486**	**51487**
95	3/0	16.5	912.0	964.0	**51497**	**51498**	**51499**	**51500**	**51501**
120	4/0	18.0	1152.0	1235.0	**51511**	**51512**	**51513**	**51514**	**51515**
150	300 kcmil	20.0	1440.0	1523.0	**51525**	**51526**	**51527**	**51528**	**51529**
185	350 kcmil	22.2	1776.0	1850.0	**51539**	**51540**	**51541**	**51542**	**51543**
240	500 kcmil	24.5	2304.0	2432.0	**51553**	**51554**	**51555**	**51556**	**51557**

HELUTHERM® 145 UL/CSA 600V

temperature-resistant, cross-linked

TECHNICAL DATA

Single core acc. to UL-Std. 758 (AWM) Style 3578, CSA-Std. C22.2 No. 210 - AWM I/II A/B

Temperature range	flexible -35°C to +120°C fixed -55°C to +145°C UL (AWM) flexible -35°C to +105°C UL (AWM) fixed -55°C to +105°C
Nominal voltage	UL (AWM) AC 600 V
Test voltage	3000 V
Minimum bending radius	flexible 12.5x Outer-Ø fixed 4x Outer-Ø

CABLE STRUCTURE

- Copper wire tinned, finely stranded acc. to DIN VDE 0295 Class 5 / IEC 60228 Class 5
- Core insulation: cross-linked polyolefin
- Core identification: see table

PROPERTIES

- resistant to: UV radiation, ozone, weathering effects
- abrasion-resistant, notch-resistant
- halogen-free
- the materials used during manufacturing are cadmium-free, contain no silicone and are free from substances harmful to the wetting properties of lacquers
- no fire propagation

TESTS

- halogen-free acc. to DIN VDE 0482-754-1 / DIN EN 60754-1 / IEC 60754-1
- corrosiveness of combustion gases acc. to DIN VDE 0482-754-2 / DIN EN 60754-2 / IEC 60754-2
- flame-retardant acc. to CSA FT1
- bundle fire test acc. to DIN VDE 0482-332-3-24 / DIN EN 60332-3-24 / IEC 60332-3-24
- smoke density acc. to DIN VDE 0482-1034-1+2 / DIN EN 61034-1+2 / IEC 61034-1+2
- Certifications:
  0.5 - 50 mm²: DNV GL

APPLICATION

Temperature resistant single core for the internal wiring of lighting fixtures, heaters, electrical machinery, switching systems and distributors in industrial equipment as well as plant and machinery construction; suitable for laying in tubes, on and under plaster as well as closed installation ducts. Not suitable for direct laying in cable ladders and cable trays.

NOTES

- the conductor is metrically (mm²) constructed, AWG numbers are approximated, and are for reference only

Cross-sec. mm²	AWG, approx.	Outer Ø mm, approx.	Cu-weight kg/km	Weight kg/km, approx.	black (RAL 9005) Part no.	green-yellow Part no.	blue (RAL 5015) Part no.	brown (RAL 8003) Part no.	red (RAL 3000) Part no.	white (RAL 9010) Part no.	grey (RAL 7001) Part no.	purple (RAL 4005) Part no.
0.25	24	2.3	2.4	7.0	**59473**	**59472**	**59474**	**59475**	**59476**	**59477**	**59478**	**59479**
0.5	20	2.6	4.8	11.0	**59487**	**59486**	**59488**	**59489**	**59490**	**59491**	**59492**	**59493**
0.75	19	2.8	7.2	14.0	**59501**	**59500**	**59502**	**59503**	**59504**	**59505**	**59506**	**59507**
1	18	2.9	9.6	17.0	**59515**	**59514**	**59516**	**59517**	**59518**	**59519**	**59520**	**59521**
1.5	16	3.1	14.4	22.0	**59529**	**59528**	**59530**	**59531**	**59532**	**59533**	**59534**	**59535**
2.5	14	3.6	24.0	33.0	**59543**	**59542**	**59544**	**59545**	**59546**	**59547**	**59548**	**59549**
4	12	4.3	38.4	53.0	**59557**	**59556**	**59558**	**59559**	**59560**	**59561**	**59562**	**59563**
6	10	5.0	57.6	78.0	**59571**	**59570**	**59572**	**59573**	**59574**	**59575**	**59576**	**59577**
10	8	6.4	96.0	136.0	**59585**	**59584**	**59586**	**59587**	**59588**	**59589**	**59590**	**59591**
16	6	7.5	154.0	203.0	**59599**	**59598**	**59600**	**59601**	**59602**	**59603**	**59604**	**59605**
25	4	9.6	240.0	300.0	**59613**	**59612**	**59614**	**59615**	**59616**	**59617**	**59618**	**59619**
35	2	10.8	336.0	405.0	**59627**	**59626**	**59628**	**59629**	**59630**	**59631**	**59632**	**59633**
50	1	12.6	480.0	580.0	**59641**	**59640**	**59642**	**59643**	**59644**	**59645**	**59646**	**59647**

HELUTHERM® 145 UL/CSA 600V

temperature-resistant, cross-linked

Cross-sec. mm²	AWG, approx.	Outer Ø mm, approx.	Cu-weight kg/km	Weight kg/km, approx.	yellow (RAL 1021) Part no.	orange (RAL 2003) Part no.	green (RAL 6018) Part no.	pink (RAL 3015) Part no.	beige (RAL 1001) Part no.
0.25	24	2.3	2.4	7.0	**59480**	**59481**	**59482**	**59483**	**59484**
0.5	20	2.6	4.8	11.0	**59494**	**59495**	**59496**	**59497**	**59498**
0.75	19	2.8	7.2	14.0	**59508**	**59509**	**59510**	**59511**	**59512**
1	18	2.9	9.6	17.0	**59522**	**59523**	**59524**	**59525**	**59526**
1.5	16	3.1	14.4	22.0	**59536**	**59537**	**59538**	**59539**	**59540**
2.5	14	3.6	24.0	33.0	**59550**	**59551**	**59552**	**59553**	**59554**
4	12	4.3	38.4	53.0	**59564**	**59565**	**59566**	**59567**	**59568**
6	10	5.0	57.6	78.0	**59578**	**59579**	**59580**	**59581**	**59582**
10	8	6.4	96.0	136.0	**59592**	**59593**	**59594**	**59595**	**59596**
16	6	7.5	154.0	203.0	**59606**	**59607**	**59608**	**59609**	**59610**
25	4	9.6	240.0	300.0	**59620**	**59621**	**59622**	**59623**	**59624**
35	2	10.8	336.0	405.0	**59634**	**59635**	**59636**	**59637**	**59638**
50	1	12.6	480.0	580.0	**59648**	**59649**	**59650**	**59651**	**59652**

HELUPOWER® THERMFLEX® 145-Single

Single core with reinforced insulation, temperature-resistant, improved behaviour in case of fire

TECHNICAL DATA

Single core

Temperature range	flexible -40°C to +120°C fixed -55°C to +145°C
Short circuit temperature at the conductor	+250°C
Nominal voltage	AC U_o/U 600/1000 V
Max. permissible operating voltage	alternating current (AC) conductor/earth 700 V three-phase alternating current (AC) conductor/conductor 1200 V direct current (DC) conductor/earth 1500 V direct current (DC) conductor/conductor 1800 V
Test voltage	4000 V
Minimum bending radius	flexible 12.5x Outer-Ø fixed 4x Outer-Ø

CABLE STRUCTURE

- Copper wire tinned, finely stranded acc. to DIN VDE 0295 Class 5 / IEC 60228 Class 5
- Core insulation: cross-linked polyolefin
- Core identification: black
- x = without protective conductor

PROPERTIES

- resistant to: oil, UV radiation, ozone, weathering effects
- abrasion-resistant, notch-resistant
- halogen-free
- the materials used during manufacturing are cadmium-free, contain no silicone and are free from substances harmful to the wetting properties of lacquers
- reduced fire propagation, no release of corrosive and toxic gases, low smoke development

TESTS

- halogen-free acc. to DIN VDE 0482-754-1 / DIN EN 60754-1 / IEC 60754-1
- corrosiveness of combustion gases acc. to DIN VDE 0482-754-2 / DIN EN 60754-2 / IEC 60754-2
- bundle fire test acc. to DIN VDE 0482-332-3-22 / DIN EN 60332-3-22 / IEC 60332-3-22
- smoke density acc. to DIN VDE 0482-1034-1+2 / DIN EN 61034-1+2 / IEC 61034-1+2
- oil-resistant acc. to DIN VDE 0473-811-404 / DIN EN 60811-404 / IEC 60811-404, IRM 902 4h at +70°C
- Certifications:
  6 - 240 mm²: DNV GL

APPLICATION

This cable is used as a generator connection cable in wind power plants and wherever a high current carrying capacity is required and a reduced outer diameter is beneficial due to limited installation space. Other areas of application: connection cable of thermal class B (130°C) for motors, transformers, relays, coils, magnets; power unit connections in the automotive industry; halogen-free wiring of switch and control cabinets; connecting cable for heating devices; supply cable for high-performance luminaires in industrial areas, sports facilities and traffic infrastructure; wiring of charging stations and pantographs within e-Mobility applications.

NOTES

- the conductor is metrically (mm²) constructed, AWG numbers are approximated, and are for reference only

Part no.	No. cores x cross-sec. mm²	AWG, approx.	Outer Ø mm, approx.	Cu-weight kg/km	Weight kg/km, approx.
75486	1 x 6	10	5.4	58.0	79.0
75487	1 x 10	8	6.8	96.0	156.0
75488	1 x 16	6	8.5	154.0	218.0
75489	1 x 25	4	10.3	240.0	331.0
75490	1 x 35	2	11.8	336.0	448.0
75491	1 x 50	1	13.9	480.0	632.0
75492	1 x 70	2/0	16.0	672.0	820.0

Part no.	No. cores x cross-sec. mm²	AWG, approx.	Outer Ø mm, approx.	Cu-weight kg/km	Weight kg/km, approx.
75493	1 x 95	3/0	17.3	912.0	1076.0
75494	1 x 120	4/0	20.0	1152.0	1392.0
75495	1 x 150	250 kcmil	22.1	1440.0	1788.0
71437	1 x 185	350 kcmil	24.8	1776.0	2106.3
75496	1 x 240	400 kcmil	27.7	2304.0	2749.0
706557	1 x 300	500 kcmil	30.0	2880.0	3910.0
706558	1 x 400	750 kcmil	38.7	3840.0	4870.0

more information on page 82

HELUPOWER® THERMFLEX® 145

Sheathed single core cable, temperature-resistant, improved behaviour in case of fire

TECHNICAL DATA

Sheathed single core cable

Temperature range	flexible -40°C to +120°C fixed -55°C to +145°C
Short circuit temperature at the conductor	+250°C
Nominal voltage	AC U_0/U 600/1000 V
Max. permissible operating voltage	alternating current (AC) conductor/earth 700 V three-phase alternating current (AC) conductor/conductor 1200 V direct current (DC) conductor/earth 900 V direct current (DC) conductor/conductor 1800 V
Test voltage	4000 V
Minimum bending radius	flexible 12.5x Outer-Ø fixed 4x Outer-Ø

CABLE STRUCTURE

- Copper wire tinned, finely stranded acc. to DIN VDE 0295 Class 5 / IEC 60228 Class 5
- Core insulation: cross-linked polyolefin
- Core identification: black
- x = without protective conductor
- Outer sheath: cross-linked polyolefin
- Sheath colour: black

PROPERTIES

- resistant to: oil, UV radiation, ozone, weathering effects
- abrasion-resistant, notch-resistant
- for outdoor use
- halogen-free
- the materials used during manufacturing are cadmium-free, contain no silicone and are free from substances harmful to the wetting properties of lacquers
- reduced fire propagation, no release of corrosive and toxic gases, low smoke development

TESTS

- halogen-free acc. to DIN VDE 0482-754-1 / DIN EN 60754-1 / IEC 60754-1
- corrosiveness of combustion gases acc. to DIN VDE 0482-754-2 / DIN EN 60754-2 / IEC 60754-2
- bundle fire test acc. to DIN VDE 0482-332-3-22 / DIN EN 60332-3-22 / IEC 60332-3-22
- smoke density acc. to DIN VDE 0482-1034-1+2 / DIN EN 61034-1+2 / IEC 61034-1+2
- oil-resistant acc. to DIN VDE 0473-811-404 / DIN EN 60811-404 / IEC 60811-404, IRM 902 4h at +70°C
- Certifications:
  50 - 240 mm²: DNV GL

APPLICATION

This cable is used as a generator connection cable in wind power plants and wherever a high current carrying capacity is required and a reduced outer diameter is beneficial due to limited installation space. Other areas of application: connection cable of thermal class B (130°C) for motors, transformers, relays, coils, magnets; power unit connections in the automotive industry; halogen-free wiring of switch and control cabinets; connecting cable for heating devices; supply cable for high-performance luminaires in industrial areas, sports facilities and traffic infrastructure; wiring of charging stations and pantographs within e-Mobility applications.

NOTES

- the conductor is metrically (mm²) constructed, AWG numbers are approximated, and are for reference only

Part no.	No. cores x cross-sec. mm²	AWG, approx.	Outer Ø mm, approx.	Cu-weight kg/km	Weight kg/km, approx.
17001667	1 x 50	1	16.0	480.0	711.0
17001668	1 x 70	2/0	18.5	672.0	902.0
17001669	1 x 95	3/0	20.0	912.0	1028.0
17001670	1 x 120	4/0	21.0	1152.0	1515.0
17001671	1 x 150	250 kcmil	25.0	1440.0	1913.0
17001672	1 x 185	350 kcmil	28.5	1776.0	2243.0
17001673	1 x 240	400 kcmil	32.5	2304.0	2912.0
17001674	1 x 300	500 kcmil	35.0	2880.0	4089.0
17001675	1 x 400	750 kcmil	42.5	3840.0	5067.0

HELUPOWER® THERMFLEX® 145-C

Sheathed single core cable, temperature-resistant, improved behaviour in case of fire, EMC-preferred type

TECHNICAL DATA

Sheathed single core cable

Temperature range	flexible -40°C to +120°C fixed -55°C to +145°C
Short circuit temperature at the conductor	+250°C
Nominal voltage	AC U_0/U 600/1000 V
Max. permissible operating voltage	alternating current (AC) conductor/earth 700 V three-phase alternating current (AC) conductor/conductor 1200 V direct current (DC) conductor/earth 900 V direct current (DC) conductor/conductor 1800 V
Test voltage	4000 V
Minimum bending radius	flexible 12.5x Outer-Ø fixed 4x Outer-Ø

CABLE STRUCTURE

- Copper wire tinned, finely stranded acc. to DIN VDE 0295 Class 5 / IEC 60228 Class 5
- Core insulation: cross-linked polyolefin
- Core identification: black
- x = without protective conductor
- Screen: braided screen of tinned copper wires, approx. coverage 85%
- Outer sheath: cross-linked polyolefin
- Sheath colour: black

PROPERTIES

- resistant to: oil, UV radiation, ozone, weathering effects
- abrasion-resistant, notch-resistant
- for outdoor use
- halogen-free
- the materials used during manufacturing are cadmium-free, contain no silicone and are free from substances harmful to the wetting properties of lacquers
- reduced fire propagation, no release of corrosive and toxic gases, low smoke development

TESTS

- halogen-free acc. to DIN VDE 0482-754-1 / DIN EN 60754-1 / IEC 60754-1
- corrosiveness of combustion gases acc. to DIN VDE 0482-754-2 / DIN EN 60754-2 / IEC 60754-2
- bundle fire test acc. to DIN VDE 0482-332-3-22 / DIN EN 60332-3-22 / IEC 60332-3-22
- smoke density acc. to DIN VDE 0482-1034-1+2 / DIN EN 61034-1+2 / IEC 61034-1+2
- oil-resistant acc. to DIN VDE 0473-811-404 / DIN EN 60811-404 / IEC 60811-404, IRM 902 4h at +70°C

APPLICATION

This cable is used as a generator connection cable in wind power plants and wherever a high current carrying capacity is required and a reduced outer diameter is beneficial due to limited installation space. Other areas of application: connection cable of thermal class B (130°C) for motors, transformers, relays, coils, magnets; power unit connections in the automotive industry; halogen-free wiring of switch and control cabinets; connecting cable for heating devices; supply cable for high-performance luminaires in industrial areas, sports facilities and traffic infrastructure; wiring of charging stations and pantographs within e-Mobility applications. EMC= Electromagnetic compatibility; to optimize the EMC features we recommend a large round contact of the copper braiding on both ends.

NOTES

- the conductor is metrically (mm²) constructed, AWG numbers are approximated, and are for reference only

Part no.	No. cores x cross-sec. mm²	AWG, approx.	Outer Ø mm, approx.	Cu-weight kg/km	Weight kg/km, approx.
17001676	1 x 16	6	10.3	183.0	328.0
17001677	1 x 25	4	12.8	275.0	443.0
17001678	1 x 35	2	13.9	391.0	612.0
17001679	1 x 50	1	16.6	532.0	749.0
17001680	1 x 70	2/0	19.1	756.0	968.0
17001681	1 x 95	3/0	20.6	1030.0	1087.0
17001682	1 x 120	4/0	23.0	1289.0	1595.0
17001683	1 x 150	250 kcmil	25.6	1568.0	2033.0
17001684	1 x 185	350 kcmil	29.1	1941.0	2363.0
17001685	1 x 240	400 kcmil	33.1	2568.0	3099.0
17001686	1 x 300	500 kcmil	35.6	3147.0	4221.0

HELUWIND® WK POWERLINE ALU 0,6/1 kV

finely stranded Al wire, extremely flexible

TECHNICAL DATA

Sheathed single core cable in alignment with DIN VDE 0250-813

Temperature range	flexible -20°C to +90°C fixed -40°C to +90°C
Permissible operating temperature of the conductor	+90°C
Nominal voltage	AC U_0/U 600/1000 V
Test voltage core/core	4000 V
Minimum bending radius	flexible 10x Outer-Ø fixed 4x Outer-Ø

CABLE STRUCTURE

- Al wire, finely stranded
- Core insulation: Special-PVC
- Core identification: black
- x = without protective conductor
- Outer sheath: Special-PVC
- Sheath colour: black

PROPERTIES

- resistant to: oil, UV radiation
- excellent flexibility enables fast laying
- recyclable

TESTS

- flame-retardant acc. to DIN VDE 0482-332-1-2 / DIN EN 60332-1-2 / IEC 60332-1-2

APPLICATION

Extremely flexible aluminium cable for use in many areas of energy and plant engineering. The high flexibility and low dead weight can significantly reduce labour time required for installation in the field. The HELUWIND® WK POWERLINE ALU may only be handled using the certified HELUKABEL® C8 crimping method according to IEC 61238-1 Class A. The appropriate tools for this connection method are available for delivery (may also be rented).

NOTES

- the conductor is metrically (mm²) constructed, AWG numbers are approximated, and are for reference only
- Further details, as well as information regarding custom solutions and suitable connection technology, can be found at wind@heluka-bel.de

Part no.	No. cores x cross-sec. mm²	AWG, approx.	Outer Ø mm, approx.	Al-weight kg/km	Weight kg/km, approx.
707062	1 x 70	2/0	16.5	206.0	379.0
707063	1 x 95	3/0	17.9	280.0	480.0
707064	1 x 120	4/0	19.7	355.0	576.0
706408	1 x 150	250 kcmil	21.7	441.0	743.0

Part no.	No. cores x cross-sec. mm²	AWG, approx.	Outer Ø mm, approx.	Al-weight kg/km	Weight kg/km, approx.
706088	1 x 185	350 kcmil	24.3	544.0	950.0
706089	1 x 240	400 kcmil	28.1	706.0	1150.0
706084	1 x 300	500 kcmil	31.4	882.0	1400.0
706085	1 x 400	750 kcmil	35.0	1176.0	1692.0

Selection Table WK Powerline ALU

	Approval	FT1/ IEC 60332-1-2	Nominal voltage acc. to UL	Nominal voltage U_0/U	halogen-free	extensively oil-resistant	UV-resistant	Temp. fixed installation in °C	Temp. flexing in °C	Cu-screen
Power cable aluminium 0,6/1kV										
WK POWERLINE ALU1	CE	x		0,6/1kV		x	x	-40 to +90[3]	-20 to +90	
WK POWERLINE ALU robust[1]	CE	x		0,6/1kV		x	x	-40 to +90[3]	-20 to +90	
WK POWERLINE ALU torsion	CE	x	1000 V	0,6/1kV		x	x	-40 to +90[3]	-20 to +90	
Power cable aluminium 1,8/3kV										
WK POWERLINE ALU1		x		1,8/3kV		x	x	-40 to +90[3]	-20 to +90	
WK POWERLINE ALU robust[1]		x		1,8/3kV		x	x	-40 to +90[3]	-20 to +90	
WK POWERLINE ALU halogen-free[1]		x		1,8/3kV	x	x	x	-40 to +90[3]	-20 to +90	
Control cables										
WK POWERLINE ALU MULTI	CE	x		0,6/1kV		x	x	-40 to +90[3]	-20 to +90	
Single cores										
WK POWERLINE ALU SINGLE	CE	x		0,6/1kV		x	x	-40 to +90[3]	-20 to +90	

x[1] for multicore types
* in progress
** in reference to UL 1277
[1] If laid in the ground or foundation only in the protective pipe (watertight)
[3] max. 3.000 h

more information on page 82

Selection List Earth & Power Distribution Cables

Description	Properties	Approvals
NYY	Underground cable 0.6/1 kV, VDE approved	EAC VDE
NYCY	Underground cable 0.6/1 kV, with concentric conductor, VDE approved	EAC VDE
NYCWY	Underground cable 0.6/1 kV, with concentric conductor, VDE approved	EAC VDE
NAYY	Underground cable 0.6/1 kV, VDE approved	EAC VDE
NAY2Y	Underground cable 0.6/1kV, with PE outer sheath	VDE
NAYCWY	Underground cable 0.6/1 kV, with concentric conductor, VDE approved	EAC VDE
N2XY	Underground cable 0.6/1 kV, VDE approved, increased current load	VDE
N2XCY	Underground cable 0.6/1 kV, with concentric conductor, VDE approved, increased current load	VDE
NA2XY	Underground cable 0.6/1 kV, VDE approved, increased current load	VDE

more information on page 82

LAN Cable Outdoor

Category 7e

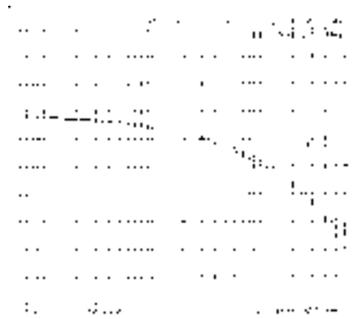
HELUKAT® 600A

S/FTP PVC/PVC

Cable structure

S/FTP 4x2xAWG 23/1 PVC/PVC

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
Separator:	-
Inner sheath material:	PVC
Screen over stranding element:	Al-Foil
Screen 1 over stranding:	Cu braid
Screen 2 over stranding:	-
Outer sheath material:	PVC
Outer diameter:	app. 11,6 mm
Outer sheath colour:	Black similar to RAL 9005



Electrical data

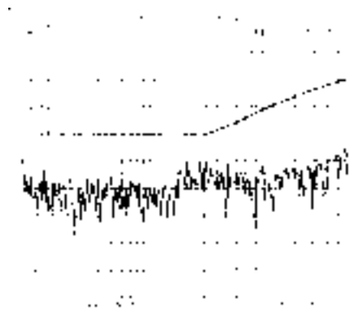
Characteristic impedance:	100 Ohm ± 15 Ohm at 1 to 100 MHz 100 Ohm ± 20 Ohm at 101 to 1000 MHz
Loop resistance:	160 Ohm/km max.
Mutual capacitance:	43 nF/km nom.
Rel. propagation velocity:	79 %

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. 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 60332-1-2

Application

HELUKAT® 600A 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)

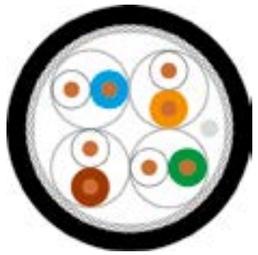
Dimensions and specifications may be changed without prior notice.

LAN Cable direct Burial

Category 7e

HELUKAT® 600E

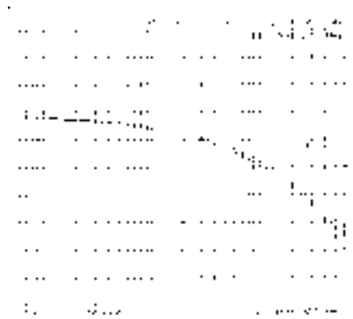
S/FTP PVC



Cable structure

S/FTP 4x2xAWG 23/1 direct burial

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
Separator:	-
Screen over stranding element:	Al-Foil
Screen 1 over stranding:	Cu braid
Screen 2 over stranding:	-
Outer sheath material:	PVC
Outer diameter:	app. 9,8 mm
Outer sheath colour:	Black



Electrical data

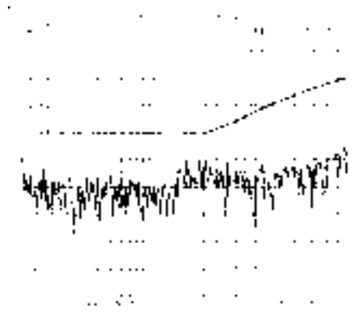
Characteristic impedance:	100 Ohm ± 15 Ohm at 1 to 100 MHz 100 Ohm ± 20 Ohm at 101 to 1000 MHz
Loop resistance:	150 Ohm/km max.
Mutual capacitance:	42 nF/km nom.
Rel. propagation velocity:	79 %

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. 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 60332-1-2, Smoke density acc. to IEC 61034

Application

HELUKAT® 600E 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® 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.

BUS Cables

Profibus L2 direct Burial without + with Armouring

HELUKABEL®

PE

Type Cable structure	Direct burial 1x2x0.64 mm	Direct burial 1x2x0.64 mm
Inner conductor diameter:	Copper, bare (AWG 22/1)	Copper, bare (AWG 22/1)
Core insulation:	Foam-skin-PE	Cell PE
Core colours:	rd, gn	rd, gn
Stranding element:	2 cores + 2 fillers stranded together	2 cores + 2 fillers stranded together
Separator:	Polyester foil over stranded bundle	-
Inner sheath material:	PVC	PVC
Shielding 1:	Al-Foil	Al-Foil
Total shielding:	Cu braid, tinned	Cu braid, tinned
Armouring:	-	Steel band
Outer sheath material:	PE	PE
Cable external diameter:	app. 10,0 mm ± 0,2 mm	app. 10,6 mm ± 0,5 mm
Outer sheath colour:	Black similar to RAL 9005	Black similar to RAL 9005
Electrical data		
Characteristic impedance:	150 Ohm ± 10 %	150 Ohm ± 10 %
Conductor resistance, max.:	55 Ohm/km	55 Ohm/km
Insulation resistance, min.:	1 GOhm x km	5 GOhm x km
Loop resistance:	110 Ohm/km max.	110 Ohm/km max.
Mutual capacitance:	30 nF/km nom.	30 nF/km nom.
Nominal voltage:	-	250 V
Test voltage:	1,5 kV	1,5 kV
Attenuation:	9,6 kHz < 2,5 dB/km	9,6 kHz < 2,5 dB/km
	38,4 kHz < 4,0 dB/km	38,4 kHz < 4,0 dB/km
	3 MHz < 22,0 dB/km	4 MHz < 22,0 dB/km
	20 MHz < 42,0 dB/km	16 MHz < 42,0 dB/km
Technical data		
Weight:	app. 92 kg/km	app. 132 kg/km
bending radius, repeated:	150 mm	165 mm
Operating temperature range min.:	-40°C	-40°C
Operating temperature range max.:	+80°C	+80°C
Caloric load, approx. value:	2,657 MJ/m	2,40 MJ/m
Copper weight:	24,00 kg/km	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 and 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

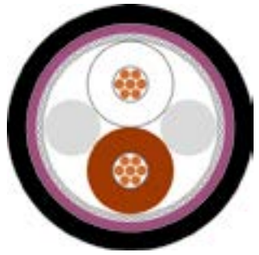
Dimensions and specifications may be changed without prior notice.

BUS Cables

CAN Bus direct Burial

HELUKABEL®

PE



Type Cable structure	Direct burial 1x2x0.50 mm² (stranded)	Direct burial 4x1x0.50 mm² (stranded)
Inner conductor diameter:	Copper, bare (AWG 20/7)	Copper, bare (AWG 20/7)
Core insulation:	Foam-skin-PE	Foam-skin-PE
Core colours:	wh/bn	wh, bn, gn, ye
Stranding element:	2 cores + 2 fillers stranded together	Star quad
Separator:	Polyester foil over stranded bundle	Polyester foil over stranded bundle
Inner sheath material:	PVC	PVC
Shielding 1:	-	-
Total shielding:	Cu braid, tinned	Cu braid, tinned
Armouring:	PET/PA tape	PET/PA tape
Outer sheath material:	PE	PE
Cable external diameter:	app. 9,2 mm ± 0,4 mm	app. 9,7 mm ± 0,4 mm
Outer sheath colour:	Black similar to RAL 9005	Black similar to RAL 9005
Electrical data		
Characteristic impedance:	120 Ohm ± 10 %	120 Ohm ± 10 %
Conductor resistance, max.:	37 Ohm/km	36,4 Ohm/km
Insulation resistance, min.:	1 GOhm x km	1 GOhm x km
Loop resistance:	74 Ohm/km max.	72,8 Ohm/km max.
Mutual capacitance:	40 nF/km nom.	44 nF/km nom.
Test voltage:	1,5 kV	1,5 kV
Technical data		
Weight:	app. 105 kg/km	app. 115 kg/km
bending radius, repeated:	150 mm	160 mm
Operating temperature range min.:	-40°C	-40°C
Operating temperature range max.:	+70°C	+70°C
Caloric load, approx. value:	2,05 MJ/m	2,18 MJ/m
Copper weight:	33,00 kg/km	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 meets the requirements of the CAN standard. For cable lengths up to 600m (observe CAN specifications).

Part no.		
	804268, CAN BUS	**804269,** CAN BUS

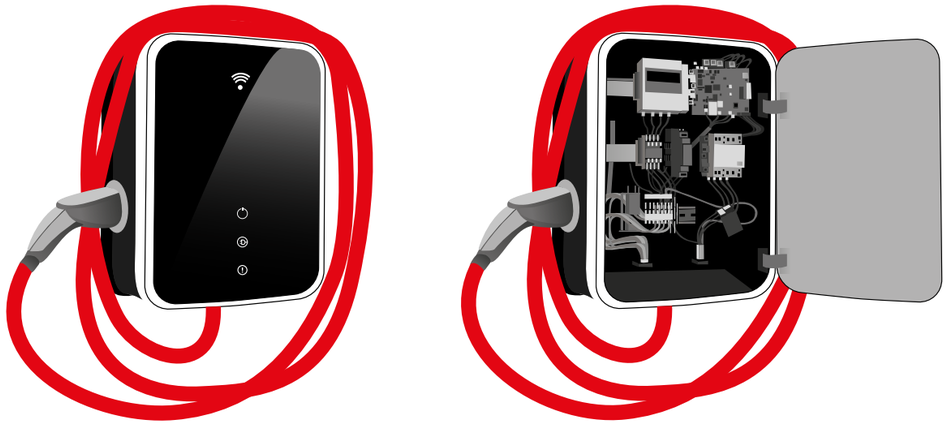
Dimensions and specifications may be changed without prior notice.

Wallbox:
Wall Charging Station for Electric Cars

AC CHARGING STATION WITH HIGH PERFORMANCE AND CONVENIENCE

Compact, efficient and quickly installed — the so-called wallbox, a wall charging station, offers a convenient way to charge electric cars. It can be installed in a few simple steps, whether on the wall of your own home or in single and multi-storey car parks. The AC charging station offers users the highest level of convenience as well as a reliable charging performance thanks to its fixed installation.

Wallbox



THESE DATA CABLES/PATCH CABLES HAVE AN INCREASED DIELECTRIC STRENGTH OF 4/6 KV:

Type	Cable	Plugs
Patch cable Industrial Ethernet	SF/UTP 4x2xAWG26/7	RJ45 plug TM21, double sided 180°
Patch cable Industrial Ethernet	SF/FTP 4x2xAWG26/7	RJ45 plug, double sided 180°
HELUKABEL® USB BUS S 2.0	1x2xAWG28 + 1x2xAWG20, shielded, PUR	USB Type A 30 µ, gold-plated, straight overmoulded USB Type B 30 µ, gold-plated, straight overmoulded

Patch Cables Industrial Ethernet

200IND PUR, RJ45 plug TM21 both sides 180°

SF/UTP, Category 5e

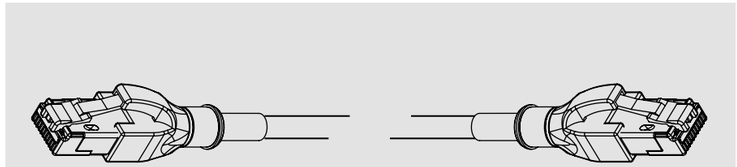


Fig. Similar

Type

Patch cable 200IND SF/UTP 4x2xAWG26/7 Cat 5e PUR grey RJ45 plug TM21 both sides 180°

Cable

Designation:	SF/UTP 4x2xAWG26/7
Category (Cable):	5e
Conductor:	bare stranded copper AWG 26/7
Sheath material:	PUR halogen free and flame retardent, nom. 5.8 mm Ø
Sheath colour:	grey similar RAL 7035
Bending radius:	min. 46 mm multiple / min. 29 mm once
Temp.-range:	-40°C to +80°C fixed installation /-30°C to +80°C flexing
Conductor resistance:	max. 130 Ohm/km
Insulation resistance:	5 GOhm x km
Cable weight:	approx. 44 kg/km

Plug

Category (Plug):	5e
Data rate:	up to 1 Gbit
Frequency range:	up to100 MHz
Connector both sides:	RJ45 8-pole Hirose TM21 Cat 6
Anti-kink sleeve:	mounted with locking lever protection (alternatively with overmolded connector possible)
Pin pos.:	1:1
Coding:	TIA/EIA 568B
Mating cycles:	max. 750

Flame proof

acc. to IEC 60332-1-2

Norms and standards

category 5e, silicone free, halogen free

Application

HELUKAT® 200IND patch cable for flexible use with robust PUR sheath.
The cable by meter art. 800068 is with UL approval AWM Style 21576 80°C 1000V.
In addition, the sheath is tested for 6 kV AC for 60 seconds (type test).

Preferred types

Length in meters	0.15	0.25	0.5	1.0	1.5	2.0	3.0	5.0	7.5	10.0	15.0

Dimensions and specifications may be changed without prior notice

Patch Cables Industrial Ethernet

EXTRAFLEX 10 Gbit, RJ45 plug both sides 180°

SF/FTP, Category 6_A

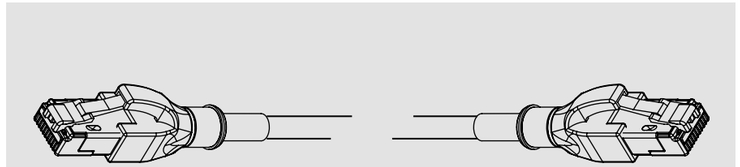


Fig. Similar

Type

Extraflex Patch Cable 10 Gbit, SF/FTP 4x2xAWG26/7 Cat 6_A TPE green, RJ45 plug both sides 180°

Cable

Designation:	SF/FTP 4x2xAWG26/7
Category (Cable):	7
Conductor:	bare stranded copper AWG 26/7
Sheath material:	TPE compound halogen free and flame retardent, nom. 6.5 mm Ø
Sheath colour:	green similar RAL 6018
Bending radius:	min. 5 x d (cable outerdiameter maximum)
Temp.-range:	-20°C to +75°C
Conductor resistance:	nom. 142 Ohm/km
Insulation resistance:	100 MOhm x km
Cable weight:	approx. 44 kg/km

Plug

Category (Plug):	6_A
Data rate:	up to 10 Gbit
Frequency range:	up to 500 MHz
Connector both sides:	RJ45 8-pole acc. to IEC 60603-7-51, contacts 50 µ gold plated, screened
Anti-kink sleeve:	overmolded with locking lever protection
Pin pos.:	1:1x
Coding:	TIA/EIA 568B
Mating cycles:	max. 750

Flame proof

acc. to IEC 60332-1-2

Halogen free

acc. to IEC 60754-2

Norms and standards

category 5e, Low smoke acc. to IEC 61034, silicone free

Application

Extraflex Patch cable for highly flexible application with TPE sheath. This series has been tested in swivel bending as well as roller bending and torsion tests and offers excellent properties compared to conventional patch cables with PVC or FRNC sheath.

Preferred types

Part.-No.	11007747	11007748	11007749	11007750	11007751	11007752	11007753	11007754	11007755	11007756	11007757
Length in meters	0.15	0.25	0.5	1.0	1.5	2.0	3.0	5.0	7.5	10.0	15.0

Dimensions and specifications may be changed without prior notice

HELUKABEL® USB BUS S 2.0

Plug type A + B

USB BUS S 2.0

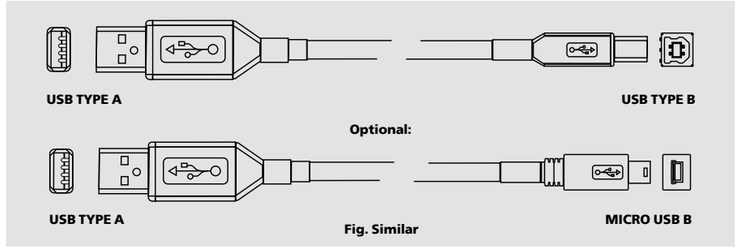


Fig. Similar

Type

USB BUS S 2.0: 1x2xAWG28 + 1x2xAWG20 PUR violet side 1 type A / side 2 type B, both straight overmolded

Cable

Designation:	1x2xAWG28 + 1x2xAWG20 screened PUR
USB (Cable):	2.0
Conductor:	tinned copper AWG 28/19 (data pair) tinned copper AWG 20/19 (power cores)
Screening:	plastic laminated aluminium foil + tinned copper braid
Sheath material:	PUR halogen free and flame retardent, nom. 5.0 mm Ø
Sheath colour:	violet
Bending radius:	min. 52mm in drag chain / 39mm multiple / min. 26mm once
Temp.-range:	-40°C to +80°C fixed installation / -30°C to +60°C flexing
Conductor resistance:	max. 230 ohm / km (AWG 28) / max. 36.7 ohm / km (AWG 20)
Insulation resistance:	1 GOhm x km
Cable weight:	approx. 45 kg/km

Plug

USB standard:	2.0
Connector side 1:	USB type A 30 µ gold plated straight overmolded
Connector side 2:	USB type B 30 µ gold plated straight overmolded
Mating cycles:	min. 10.000

Flame proof

acc. to IEC 60332-1-2 and UL 1581 §1060 – 1090 standard requirements

Oil-resistant

acc. to IEC 60811-2-1, ASTM oil 1

Norms and standards

silicone free, halogen free

Application

HELUKABEL® USB BUS S with PUR sheath is drag chain quality as harnessed product and on both sides gold plated USB connectors. The cable by meter art. 802469 is with UL approval AWM Style 20963 80°C 30V. **In addition, the sheath is tested for 4 kV AC for 60 seconds (type test).**

Preferred types

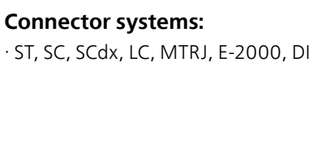
Length in meters	0.5	1.0	1.5	2.0	3.0	5.0

Dimensions and specifications may be changed without prior notice

more information
on page 82

Pre-Assembled Fibre Optic Cables

HELUCOM® pre-assembled fibre optic cables can be installed without special skills and without special tools. The cable is ready mounted and can be connected directly after insertion. The entire installation of complete fibre optic links is practically limited to the insertion. In the splitters, the fibres from the loose tube cable are routed without splicing in the individual simplex cables. The simplex cables are terminated with factory-assembled plugs. For insertion, the plugs, the simplex cables and the splitter are covered by a plug protector supplied with the unit. The insertion aid is connected to the pull rope. In this way, the cable can be pulled in like a conventional cable with the factory-prepared splitter. The advantages of a pre-assembled cable that has been finished in the factory are obvious. The fibre optic cables are cut to any desired length and the fibres are bonded in a clean and dust-free environment with connectors of various designs.


01


02

03

04

05

01 Delivery condition of the ready-assembled loose tube cable with splitting body and pull-in protection. Depending on the cable length, the delivery packaging is either in the form of a ring or on a disposable drum.

02 Detailed view of cable end with pull-in aid.

03 Detailed view of the robust, moulded splitting body. This is equipped with a compatible PG gland for installation in splice boxes from HELUKABEL®. In addition, the system can be reused for new installations.

04 Mini-conductor cable graded for easy insertion into prepared splice boxes. In addition, the mini-conductor cables are number-coded.

05 Fibre optic splice box as cable termination for multi-fibre fibre optic cables in 19" cabinets. The splice box shown here is particularly suitable as a connection unit for our pre-assembled fibre optic loose tube cables.

ATTRIBUTES:

Uses:
Outdoor and indoor cabling

Cable types:
· Zipcords with halogen-free outer sheath
· Breakout cable with halogen-free outer sheath
· Mini breakout cable with halogen-free outer sheath
· Fibre optic cable with central or stranded loose tubes
· Plastic Optical Fibre (POF) cable

Fiber types:
· E9/125 µm (G652.d, G657.A1 + A2)
· G50/125 µm (OM2, OM3, OM4)
· G62,5/125 µm (OM1)
· 200/230 µm
· 980/1000 µm

Additional fittings:
· Insertion aid / insertion tube / core coding

Connector systems:
· ST, SC, SCdx, LC, MTRJ, E-2000, DIN, FDDI, FC-PC and F-SMA

HELUTOP® HT

Cable gland

TECHNICAL DATA

Plastic cable gland acc. to EN62444 with vibration protection

Protection class:	IP 66 / IP 68 - 5 bar, 30 min / IP 69K acc. to DIN EN 60529	
Temperature range:	-20°C up to +100°C	
Dimensions:	G	Thread size
	GL	Thread length
	SW	Spanner size

MATERIAL

- Polyamide PA 6, V2 acc. to UL 94
- seal: Chloroprene-rubber (CR)
- phosphor-free
- silicone-free
- cadmium-free

PROPERTIES

- optimum strain relief through clamping lamella
- easy to assemble
- large clamping areas

APPLICATION

- plant and machine construction
- robot construction
- automation technology
- vehicle construction and shipbuilding
- rail technology
- installation technology
- control cabinet construction

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 Pcs.
93908	93923	93937	M 12 x 1.5	3.0 - 6.5	8.0	15	100
93909	93924	93938	M 16 x 1.5	4.0 - 8.0	8.0	19	50
907275	907276	907277	M 16 x 1.5	5.0 - 10.0	8.0	19	50
92667	92668	92669	M 16 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	M 25 x 1.5	11.0 - 17.0	8.0	29	50
93912	93927	93941	M 32 x 1.5	15.0 - 21.0	10.0	36	25
93913	93928	93942	M 40 x 1.5	19.0 - 28.0	10.0	40	20
93914	93929	93943	M 50 x 1.5	30.0 - 38.0	18.0	60	10
93915	93930	93944	M 63 x 1.5	34.0 - 44.0	18.0	65	10

Metric thread - mit Reduziereinsatz

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 Pcs.
903532	903542	903552	M 12 x 1.5	2.0 - 5.0	8.0	15	100
903533	903543	903553	M 16 x 1.5	2.0 - 6.0	8.0	19	50
903534	903544	903554	M 20 x 1.5	5.0 - 9.0	10.0	24	50
903535	903545	903555	M 25 x 1.5	9.0 - 13.0	8.0	29	50
903536	903546	903556	M 32 x 1.5	11.0 - 15.0	10.0	36	25
903537	903547	903557	M 40 x 1.5	16.0 - 23.0	10.0	46	20
903538	903548	903558	M 50 x 1.5	25.0 - 31.0	18.0	60	10
903539	903549	903559	M 63 x 1.5	29.0 - 35.0	18.0	65	10

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	VPE Pcs.
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 BSP	Cable Ø from / to mm	Thread length mm	Spanner size mm	VPE Pcs.
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

more information on page 82

HELUTOP® HT-MS

Cable gland

TECHNICAL DATA

Nickel-coated brass cable gland acc. to EN62444.

Protection class:	IP 66 / 68 - 5 bar, 30 min / IP 69K	
Temperature range:	-20°C up to +100°C	
Temperature range temporary:	-40°C up to +150°C	
Dimensions:	G	Thread size
	GL	Thread length
	SW	Spanner size

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

APPLICATION

- plant and machine construction
- robot construction
- automation technology
- vehicle construction and shipbuilding
- rail technology
- installation technology
- control cabinet construction

NOTE

- Brass surcharge will be charged for these items.
  Basis is 150 € / 100 kg. For more details please refer to the

metric thread

Part no.	Size Metr.	Cable Ø from / to mm	Thread length mm	Spanner size mm	Unit Pcs.
90760	M 12 x 1.5	3.0 - 6.5	6.0	14	50
99960	M 16 x 1.5	5.0 - 10.0	7.0	20	50
90762	M 20 x 1.5	6.0 - 12.0	8.0	22	50
99961	M 25 x 1.5	11.0 - 17.0	8.0	27	25
94624	M 32 x 1.5	15.0 - 21.0	9.0	34	20
99962	M 40 x 1.5	19.0 - 28.0	9.0	43	5
99963	M 50 x 1.5	27.0 - 38.0	10.0	58	5
90767	M 63 x 1.5	34.0 - 44.0	10.0	64/68	5
906199	M 63 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 Pcs.
903560	M 12 x 1.5	2.0 - 5.0	6.0	14	50
903561	M 16 x 1.5	2.0 - 6.0	7.0	17/18	50
903562	M 20 x 1.5	5.0 - 9.0	8.0	22	50
903563	M 25 x 1.5	7.0 - 12.0	8.0	24/27	25
903564	M 32 x 1.5	9.0 - 16.0	9.0	30/34	20
903565	M 40 x 1.5	12.0 - 20.0	9.0	40/43	5
903566	M 50 x 1.5	20.0 - 26.0	10.0	50/55	5
903567	M 63 x 1.5	29.0 - 35.0	14.0	64/68	5

HELUTOP® HT-MS

Cable gland

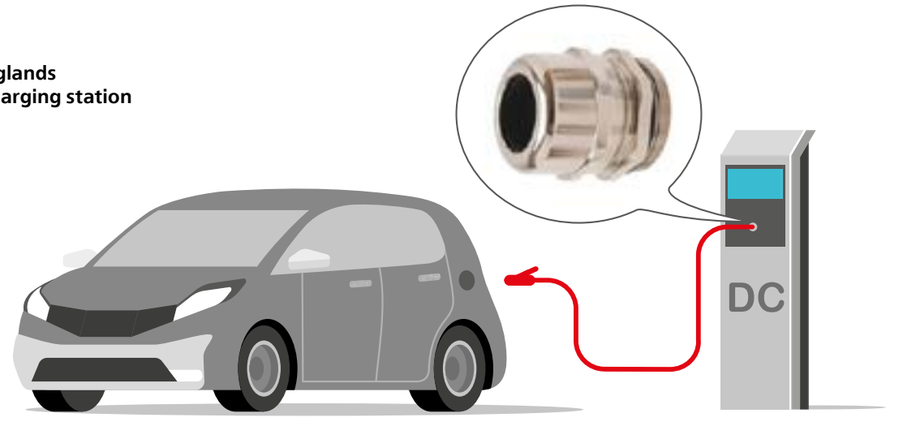
PG thread

Part no.	Size PG	Cable Ø from / to mm	Thread length mm	Spanner size mm	Unit Pcs.
90750	7	3.0 - 6.5	6.0	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	7.2	30	25
90756	29	18.0 - 25.0	8.0	40	20
90757	36	30.0 - 32.0	9.0	50	5
90758	42	30.0 - 38.0	12.0	58	5
90759	48	34.0 - 44.0	14.0	64	5

NPT thread

Part no.	Size BSP	Cable Ø from / to mm	Thread length mm	Spanner size mm	Unit Pcs.
99965	3/8"	4.0 - 8.0	11.5	17/19	50
99966	1/2"	6.0 - 12.0	13.0	22	50
99967	3/4"	13.0 - 18.0	13.0	30	25
99968	1"	18.0 - 25.0	13.0	40/43	10

EMC glands
for charging station



HELUTOP® MS-EP4

EMC cable gland

TECHNICAL DATA

EMC- cable gland acc. to EN 62444 with integrated contact system.

Protection class:	IP 68 - 5 bar, 30 min	
Temperature range:	-20°C to +100°C	
Contact system:	patented	
Dimensions:	G	Thread size
	GL	Thread length
	SW	Spanner size

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

APPLICATION

- plant and machine construction
- robot construction
- automation technology
- vehicle construction and shipbuilding
- rail technology
- installation technology
- control cabinet construction

NOTE

- Brass surcharge will be charged for these items. Basis is 150 € / 100 kg. For more details please refer to the general terms and conditions.

metric thread

Part no.	Size Metr.	Cable Ø from / to mm	Thread length mm	Spanner size mm	Unit pcs.
905181	M 12 x 1.5	3.0 - 6.5	6.0	14	50
905182	M 16 x 1.5	5.0 - 10.0	6.0	20	50
905183*	M 20 x 1.5	6.0 - 12.0	6.0	22	50
905184	M 20 x 1.5	7.5 - 14.0	8.0	24/26	50
905185	M 25 x 1.5	10.0 - 18.0	8.0	30	25
905186	M 32 x 1.5	16.0 - 25.0	9.0	40	10
905187	M 40 x 1.5	22.0 - 32.0	9.0	50	5
905188	M 50 x 1.5	30.0 - 38.0	9.0	58	5
905189	M 63 x 1.5	34.0 - 44.0	14.0	64/68	5
905248*	M 63 x 1.5	37.0 - 53.0	10.0	75	5

* no CSA at 905183 and 905248.

SD-XXL

Cable gland for particularly large cable diameters

TECHNICAL DATA

The finish, similar to that of an incision sealingring, guarantees very large clamping areas.

Protection class:	IP 68 - 5 bar, 30 min	
Temperature range:	-40°C to +100°C	
Dimensions:	G	Thread size
	GL	Thread length
	SW	Spanner size

MATERIAL

- brass, nickel plated
- seal: NBR
- o-ring: NBR

PROPERTIES

- large-area cable sealing
- easy to assemble
- large clamping range

APPLICATION

- plant and machine construction
- automation technology
- vehicle construction and shipbuilding
- installation technology

NOTE

- BSP variant: without O-ring on connection thread, sealing insert made of TPE. A brass surcharge is charged for these items. Basis is 150 € / 100 kg. For more details, please refer to the general terms and conditions.

metric thread

Part no.	Size Metr.	Cable Ø from / to mm	Thread length mm	Spanner size mm	Unit pcs.
905570	M 72 x 2.0	56.0 - 61.0	16.0	77	1
905506	M 75 x 1.5	56.0 - 61.0	16.0	77	1
905571	M 75 x 2.0	56.0 - 61.0	16.0	77	1
905573	M 80 x 2.0	50.0 - 56.0	18.0	90	1
905572	M 80 x 2.0	60.0 - 66.0	18.0	90	1
905575	M 85 x 2.0	63.0 - 70.0	22.0	96	1
905574	M 85 x 2.0	68.0 - 76.0	22.0	96	1
905576	M 90 x 2.0	68.0 - 76.0	22.0	98 / 96	1
905577	M 110 x 2.0	75.0 - 82.0	25.0	125 / 110	1
905578	M 120 x 2.0	88.0 - 95.0	25.0	120 / 116	1

BSP-thread

Part no.	Size BSP	Cable Ø from / to mm	Thread length mm	Spanner size mm	Unit pcs
90604	G 3"	58.0 - 65.0	18.0	100	1
90605	G 3"	63.0 - 70.0	18.0	100	1
90606	G 4"	68.0 - 75.0	22.0	125	1
90607	G 4"	73.0 - 80.0	22.0	125	1
90608	G 4"	78.0 - 85.0	22.0	125	1
90609	G 4"	83.0 - 90.0	22.0	125	1
93440	G 5"	91.0 - 97.0	22.0	150	1
93441	G 5"	97.0 - 104.0	22.0	150	1
93442	G 5"	102.0 - 109.0	22.0	150	1
93443	G 5"	109.0 - 116.0	22.0	150	1

HELUcond PP-MOD-FPPS-O

Orange corrugated tube for protection and marking of cables

TECHNICAL DATA

Orange corrugated tube for protection and marking of cables

Temperature range:	-40°C to +105°C
Temperature range temporary:	up to +150°C (500h) up to +165°C (100h)
Filling ratio:	max. 70%

MATERIAL

- PP MOD BS orange similar RAL 2003

PROPERTIES

- flammability acc. to UL94: V2
- low smoke gas development
- good mechanical properties
- self-extinguishing
- non flame propagating
- halogen free
- cadmium free
- resistant to: UV radiation
- resistant to the accelerated weathering test

APPLICATION

Suitable for applications where cables or wires need to be protected and specially or separately marked.

NOTE

- suitable hose glands and hose holders on request
- test at nominal size 17:
  Impact strength: 23°C: 6 Joule
  Impact strength: -25°C: 2 Joule
  Peak load value: 125 N
  Pull out strength: 23°C: 500 N

Part no.	Type	Nominal size mm	Size for fitting cable gland	Profil	Inner Ø mm	Outer Ø mm	Bending radius stat. R. mm	Bending radius dyn. R. mm	Unit m
11019845	FPPSF-07O2.50	7	10	F	6.6	10.0	15	40	50
11019846	FPPSF-10O2.50	10	12	F	9.8	12.8	20	45	50
11019847	FPPSF-12O2.50	12	16	F	12.3	15.7	25	65	50
11019848	FPPSF-17O2.50	17	20	F	16.6	21.1	30	70	50
11019849	FPPSF-23O2.50	23	25	F	23.1	28.4	35	90	50
11019850	FPPSF-29O2.50	29	32	F	28.9	34.5	45	110	50
11019851	FPPSF-36O2.25	36	40	F	36.5	42.4	60	170	25
11019852	FPPSF-48O2.25	48	50	F	47.5	54.4	70	185	25

HELUcond PP-MOD-2PPS-O

Orange dividable corrugated tube for protection and marking of cables

TECHNICAL DATA

Orange dividable corrugated tube for protection and marking of cables

Temperature range:	-40°C to +105°C
Filling ratio:	max. 70%

MATERIAL

- PP MOD BS orange similar RAL 2003

PROPERTIES

- flammability acc. to UL94: V2
- low smoke gas development
- good mechanical properties
- self-extinguishing
- non flame propagating
- halogen free
- cadmium free
- resistant to: UV radiation
- resistant to the accelerated weathering test

APPLICATION

Ideal solution for retrofit application of cable protection, also pre-assembled cable harnesses with already installed connectors. The double shell conduit properly overlaps and provides enhanced cable protection capabilities against external influences and impacts. This divisible conduit type made of high grade specially modified Polypropylene is suitable for applications in which cables or pipelines have to be marked separately.

NOTE

- suitable hose glands and hose holders on request
- test at nominal size 17:
  Peak load value: 320 N

Part no.	Type	Nominal size mm	Profile	Inner Ø mm	Outer Ø mm	Bending radius stat. R. mm	Unit m
11019853	2PPSM-07O2.50	07	M	6.3	10.0	20	50
11019854	2PPSM-10O2.50	10	M	8.4	13.4	25	50
11019855	2PPSM-11O2.50	11	M	11.0	16.1	30	50
11019856	2PPSM-14O2.50	14	M	12.5	18.5	35	50
11019857	2PPSM-16O2.50	16	M	16.0	21.5	40	50
11019858	2PPSM-20O2.50	20	M	19.2	25.3	45	50
11019859	2PPSM-23O2.50	23	M	23.4	30.8	50	50
11019860	2PPSM-29O2.25	29	M	27.3	35.5	90	25
11019861	2PPSM-37O2.25	37	M	31.0	41.4	110	25
11019862	2PPSM-45O2.25	45	M	42.7	54.0	130	25
11019863	2PPSM-70O2.10	70	M	67.5	79.8	190	10
11019864	2PPSM-100O2.10	100	M	87.5	102.5	210	10

Glossary

You can find further information in our Download Center:
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EDITION 2

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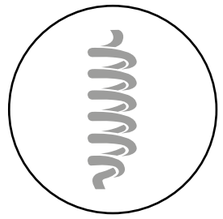
Request Spiral Cables

Charging cables HELUPOWER® Charge 750 AC



You can also download this form online at:
www.helukabel.com/request-spiral-cables

Tel: +49 (0)7150 9209-135 • Fax: +49 (0)7150 9209-5135
E-mail: joachim.koch@helukabel.de

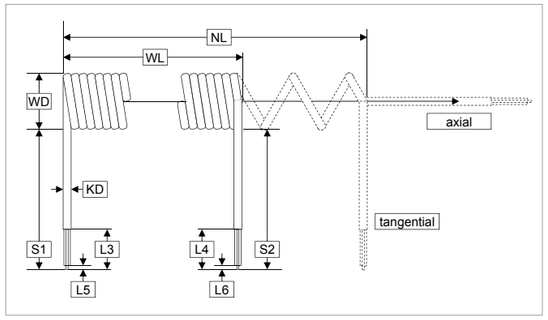
Customer: _____

Customer no.: _____

Date: _____

Demand (pcs.): _____

Annual demand (pcs.): _____



Number of cores x cross-section:

☐ 3G2.5+1x0.5mm² ☐ 5G2.5+1x0.5 mm² ☐ 3G6+1x0.5mm² ☐ 5G6+1x0.5mm²

☐ other dimensions

Sheath colour:

☐ black ☐ red ☐ other colours _____

Effective length (NL): spiral extended (spiral contracted WL *) _____

☐ 2m (500mm*) ☐ 3m (600mm*) ☐ 4m (700mm*) ☐ 5m (800mm*) ☐ 7m (1300mm*)

☐ desired length _____ m

Spiral outside diameter (WD) (50-100mm) _____ mm

End S1 ☐ axial ☐ tangential length _____ mm
End S2 ☐ axial ☐ tangential length _____ mm

Notes

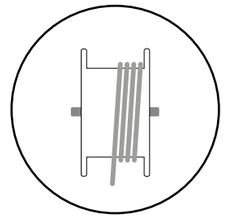
_____

_____

_____

HELUKABEL®

Request Reeling Cables



You can also download this form online at:
www.helukabel.com/request-reeling-cables

Company _____ Location _____

Surname, Name _____ Maschine Type _____

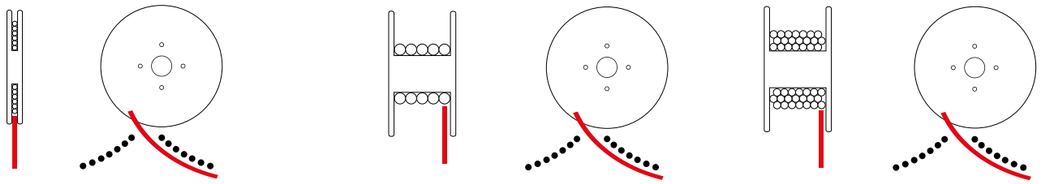
Street, Nr. _____ In Operation Since _____

Postal Code, City _____

Telephone / Fax _____

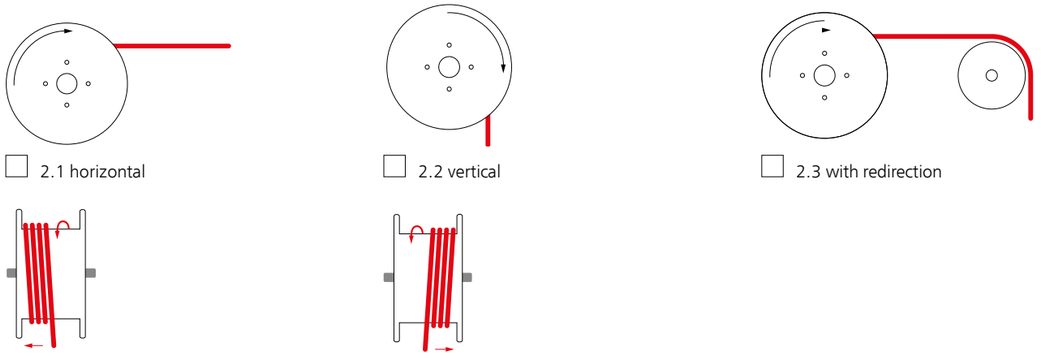
E-mail _____ Sender/Stamp _____

1. Reeling configuration



☐ 1.1 Monospiral ☐ 1.2 single layer (multispiral) ☐ 1.3 multi layer

2. Arrangement of the cable



☐ 2.1 horizontal ☐ 2.2 vertical ☐ 2.3 with redirection

☐ 2.4 Feed ☐ 2.5 Feed ☐ 2.6 Different feed
(please attach sketch or photo)

3. Roadway end wire fixation

☐ 3.1 Cable grip
☐ 3.2 Bracket
☐ 3.3 Other _____

4. Movement parameters

☐ 4.1 Movement distance (max.) _____
☐ 4.2 Travel speed (m/s) _____
☐ 4.3 Travel acceleration (m/s2) _____
☐ 4.4 Cycles/Time unit _____

NOTES

NOTES

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