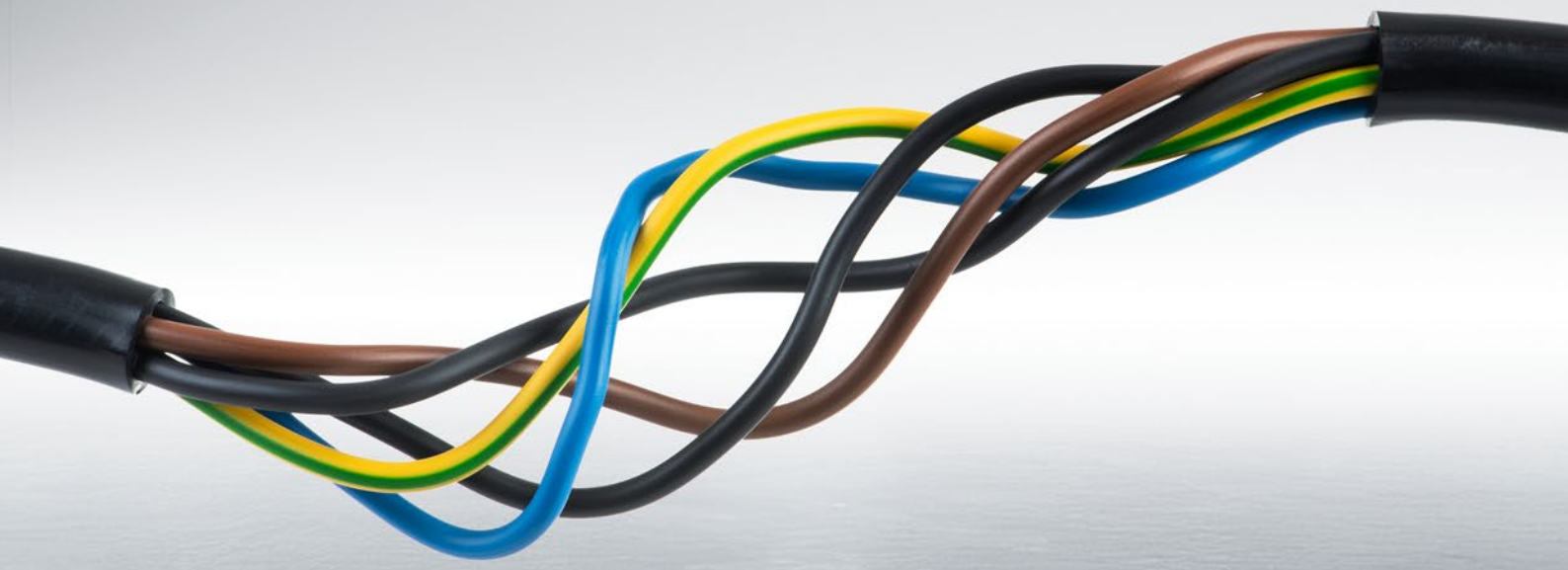
VAHLE

CABLES

FOR CABLE CARRIERS AND REELS



8E | EN 2016

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Applications
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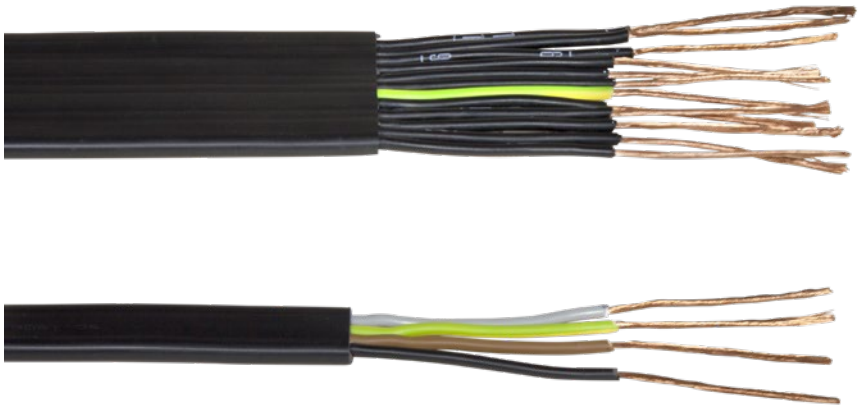
- Main feeds for indoor cranes
- Process cranes
- Trailing cable installation

Examples of applications
- Cement factory
- Chemical plants
- Foundries/steel mills
- Warehouses and refuse bunkers
- Landfills
- Paper mills
- Galvanising plants
- Electroplating shops

Abbreviation							Meaning
H	07	V	V	H6	-F	-J	
H							**Identification of designation:** Harmonised
	07						**Nominal voltage U_0/U** 450/750V
		V					**Insulation material** PVC (Polyvinyl chloride)
			V				**Sheath material** PVC (Polyvinyl chloride)
				H6			**Design features** Flatform cable, non-separable
					-F		**Conductor type** Finely stranded, for flexible cables
						-O	Without PE conductor
						-J	With PE conductor

(H)07VVH6-F | H07VVH6-F

As energy transmission and control lines for cable carriers, conveyor equipment, and machine tools, particularly in lifting devices, lifts, crane bridges and container cranes, and in all cases where the cable is constantly subject to strong bending stress and continuous sequences of motion in only one plane during operation. Suitable for use in dry, moist, and wet areas.



Special features
- Much smaller bending radius compared to round cables
- Free from lacquer-damaging substances/silicone-free (at production)

Notes
- RoHS compliant
- Complies with 2006/95/EC directive (Low Voltage Directive) CE
- Custom versions, other dimensions, cross-sections, conductor wire and sheath colours upon request
- Available accessories see page 34 onwards.

Technical data

Conductor material	Stranded copper wire, bare
Conductor category	Acc. to DIN VDE 0295 Class 5 / IEC 60228 Class 5
Conductor wire insulation	Polyvinyl chloride (PVC)
Cond. wire labelling	Acc. to VDE 0293-308 with colours for up to 5 wires, from 6 wires onwards black with white digits with or without GNYE
Stranding	Conductor wires parallel to each other
Exterior material	Polyvinyl chloride (PVC)
Sheath colour	Black, RAL 9005
Printed	Yes
Nominal voltage (U_0/U)	450 V / 750 V
Test voltage	2.5 kV
Operating temp., fixed	-40 °C – +60 °C
Operating temp, mob.	-25 °C – +60 °C
Max. temperature at conductor	+70 °C
Fire behaviour	Self-extinguishing and flame retardant acc. to IEC 60332-1
Standard	Acc. to DIN EN 50214
Speed	180 m/min

Minimum bending radii for flexible cables acc. to VDE 0298 Part 3, Table 2

≤ 8 mm	8 - 12 mm	12 - 20 mm	› 20 mm
3d	4d	5d	5d

	Type	No. of wires and nominal cross-section mm²	Dimensions (height x width) max. mm	Metric flatform cable glands		Ampacity A (1)	Weight kg/m	Cu content kg/m	Order no.
				Plastic	Brass				
•	LT-LTW-PVC-F-4X1.5-O-K	4 x 1.5	5.6 x 15.1	M25x1.5-1	M25x1.5	18	0.150	0.058	330 230
•	LT-LTW-PVC-F-8X1.5-O-K	8 x 1.5	5.6 x 29.0	M50x1.5-1	M40x1.5-2	18	0.300	0.115	331 724
•	LT-LTW-PVC-F-12X1.5-O-K	12 x 1.5	5.6 x 41.4	M63x1.5-1	M63x1.5-2	18	0.420	0.173	331 707
•	LT-LTW-PVC-F-4X1.5-J-K	4 G 1.5	5.6 x 15.1	M25x1.5-1	M25x1.5	18	0.150	0.058	331 353
•	LT-LTW-PVC-F-5x1.5-J-K	5 G 1.5	5.6 x 19.0	M32x1.5-1	M32x1.5-2	18	0.180	0.072	332 080
•	LT-LTW-PVC-F-7x1.5-J-K	7 G 1.5	5.6 x 26.0	M40x15-1	M40x1.5-2	18	0.260	0.101	331 481
•	LT-LTW-PVC-F-8x1.5-J-K	8 G 1.5	5.6 x 29.0	M50x1.5-1	M40x1.5-2	18	0.300	0.115	331 354
•	LT-LTW-PVC-F-10x1.5-J-K	10 G 1.5	5.6 x 35.0	M50x1.5-2	M50x1.5-2	18	0.360	0.144	335 060
•	LT-LTW-PVC-F-12x1.5-J-K	12 G 1.5	5.6 x 41.4	M63x1.5-1	M63x1.5-2	18	0.420	0.173	331 355
•	LT-LTW-PVC-F-14x1.5-J-K	14 G 1.5	5.6 x 49.5	–	–	18	0.490	0.202	332 514
•	LT-LTW-PVC-F-16x1.5-J-K	16 G 1.5	5.6 x 54.0	–	–	18	0.560	0.230	333 146
•	LT-LTW-PVC-F-18x1.5-J-K	18 G 1.5	5.6 x 60.2	–	–	18	0.620	0.259	331 900
	LT-LTW-PVC-F-24x1.5-J-K	24 G 1.5	5.6 x 83.0	–	–	18	0.790	0.346	332 625
•	LT-LTW-PVC-F-4x2.5-J-K	4 G 2.5	6.0 x 18.5	M32x1.5-1	M32x1.5-2	26	0.210	0.096	331 356
•	LT-LTW-PVC-F-5x2.5-J-K	5 G 2.5	6.0 x 23.2	M40x1.5-1	M40x1.5-2	26	0.260	0.120	332 100
•	LT-LTW-PVC-F-7x2.5-J-K	7 G 2.5	6.0 x 32.4	M50x1.5-1	M50x1.5-2	26	0.380	0.168	332 110
•	LT-LTW-PVC-F-8x2.5-J-K	8 G 2.5	6.0 x 35.0	M50x1.5-2	M50x1.5-2	26	0.405	0.192	331 357
•	LT-LTW-PVC-F-12x2.5-J-K	12 G 2.5	6.0 x 50.5	M63x1.5-1	M63x1.5-1	26	0.620	0.288	331 358
	LT-LTW-PVC-F-24x2.5-J-K	24 G 2.5	6.0 x 94.0	–	–	26	1.160	0.576	331 641
•	LT-LTW-PVC-F-4x4-J-K	4 G 4.0	7.0 x 21.3	M40x1.5-1	M32x1.5-2	34	0.300	0.154	331 359
•	LT-LTW-PVC-F-5x4-J-K	5 G 4.0	7.0 x 26.0	M40x1.5-1	M40x1.5-2	34	0.380	0.192	331 364
•	LT-LTW-PVC-F-7x4-J-K	7 G 4.0	7.0 x 38.0	M50x1.5-2	M50x1.5-2	34	0.550	0.269	331 365
•	LT-LTW-PVC-F-4x6-J-K	4 G 6.0	8.0 x 23.0	M40x1.5-1	M40x1.5-2	44	0.390	0.230	331 360
•	LT-LTW-PVC-F-5x6-J-K	5 G 6.0	8.0 x 31.5	M50x1.5-1	M50x1.5-2	44	0.480	0.290	331 366
•	LT-LTW-PVC-F-7x6-J-K	7 G 6.0	8.0 x 42.5	M63x1.5-1	M63x1.5-1	44	0.700	0.403	331 367
•	LT-LTW-PVC-F-4x10-J-K	4 G 10.0	10.5 x 29.0	M50x1.5-1	M50x1.5-2	61	0.620	0.384	331 361
•	LT-LTW-PVC-F-5x10-J-K	5 G 10.0	10.5 x 38.3	M50x1.5-2	M50x1.5-2	61	0.780	0.480	332 085
•	LT-LTW-PVC-F-4x16-J-K	4 G 16.0	11.0 x 37.0	M50x1.5-1	M50x1.5-2	82	0.990	0.614	331 362
•	LT-LTW-PVC-F-5x16-J-K	5 G 16.0	11.0 x 43.0	M63x1.5-1	M63x1.5-2	82	1.200	0.770	331 487
•	LT-LTW-PVC-F-4x25-J-K	4 G 25.0	13.5 x 46.0	M63x1.5-1	M63x1.5-2	108	1.550	0.960	331 363
•	LT-LTW-PVC-F-4x35-J-K	4 G 35.0	14.8 x 51.0	–	–	135	2.030	1.344	331 773
•	LT-LTW-PVC-F-4x50-J-K	4 G 50.0	17.0 x 57.0	–	–	168	2.650	1.920	331 853
•	LT-LTW-PVC-F-4x70-J-K	4 G 70.0	18.5 x 64.0	–	–	207	3.650	2.700	331 785
	LT-LTW-PVC-F-4x95-J-K	4 G 95.0	21.0 x 74.0	–	–	250	4.550	3.650	331 904

• Available at short notice

(1) The value serves as a reference, for a nominal voltage of up to 1000 V with an ambient temperature of 30 °C based on VDE recommendations; see Page 51

PVC flatform cables, shielded

Operating conditions
- Indoor installations

Toughness
- Low to medium mechanical strain

Suitability
- Standard applications
- Low to medium dynamic stresses
- Cost-effective system
- Small system/small train station

Applications
- Travelling trolley for indoor cranes
- Main feeds for indoor cranes
- Process cranes
- Trailing cable installation

Examples of applications
- Cement factory
- Chemical plants
- Foundries/steel mills
- Warehouses and refuse bunkers
- Landfills
- Paper mills
- Galvanising plants

Abbreviation						Meaning
(H)	Y	C	FL	Y	-O	
H						**Identification of designation:** Harmonised designation
	Y					**Insulation** PVC material (Polyvinyl chloride)
		C				**Shielding** Shielding of Cu braid or spun-wrapped
			FL			Flatform cable
				Y		**Protective covering (outer sheath)** PVC sheath (Polyvinyl chloride)
					-O	Without PE conductor
					-J	With PE conductor

YCFLY

As shielded energy transmission, control, and signal lines for crane installations, for providing power to high-bay storage and retrieval units, in industrial television sets for mobile cameras, and in machine tools. Suitable for all control, measurement, and communications purposes. Suitable for use in dry and moist areas.

Special features
- Much smaller bending radius compared to round cables
- Free from lacquer-damaging substances/silicone-free (at production)

Notes
- RoHS compliant
- Complies with 2006/95/EC directive (Low Voltage Directive) CE
- Custom versions, other dimensions, cross-sections, conductor wire and sheath colours upon request
- Available accessories see page 34 onwards.

Technical data

Conductor material	Stranded copper wire, bare
Conductor category	Acc. to DIN VDE 0295 Class 5/6 / IEC 60228 Class 5/6
Conductor wire insulation	Polyvinyl chloride (PVC)
Cond. wire labelling	Acc. to VDE 0293-308 with colours for up to 5 wires, from 6 wires onwards black with white digits with or without GNYE and/or special colours
Stranding	Conductor wires/bundles parallel to each other
Shielding	Individual wires or bundles with Cu braid or wrapped cable, bare or tinned; coverage approx. 70 % - 80 %
Exterior material	Polyvinyl chloride (PVC)
Sheath colour	Black, RAL 9005
Printed	Yes
Nominal voltage (U_0/U)	0.5 mm² = 300 V; › 1.0 mm² = 300/500 V; › 1.5 mm² = 450/750 V
Test voltage	1,2 kV / 2 kV
Operating temp., fixed	-25 °C – +70 °C
Operating temp, mob.	-25 °C – +70 °C
Max. temperature at conductor	+70 °C
Fire behaviour	Self-extinguishing and flame retardant acc. to IEC 60332-1
Standard	Follows recommendations of DIN VDE 0250
Speed	180 m/min
Minimum bending radius	10 x d

	Type	No. of wires and nominal cross-section mm²	Dimensions (height x width) max. mm	Metric flatform cable glands		Ampacity A (1)	Weight kg/m	Cu content kg/m	Order no.
				Plastic	Brass				
•	LT-LTW-PVC-F-5x0.5-O-C-K	5 x 0.5	5.0 x 22.0	M32x1.5-1	M32x1.5-2	9	0.140	0.060	331 655
•	LT-LTW-PVC-F-7x4x0.5-O-C-K	7 x 4 x 0.5	10.3 x 50.0	M63x1.5-1	M63x1.5-1	9	0.745	0.222	331 923
•	LT-LTW-PVC-F-4x1.5-O-C-K	4 x 1.5	6.5 x 19.6	M32x1.5-1	M32x1.5-2	18	0.210	0.114	331 976
•	LT-LTW-PVC-F-8x1.5-J-C-K	8 G 1.5	6.3 x 37.1	M50x1.5-1	M50x1.5-2	18	0,400	0,220	331 918
•	LT-LTW-PVC-F-8x1.5-O-C-K	8 x 1.5	6.5 x 37.1	M50x1.5-1	M50x1.5-2	18	0.400	0.220	332 055
•	LT-LTW-PVC-F-12x1.5-O-C-K	12 x 1.5	6.5 x 52.7	M63x1.5-1	M63x1.5-1	18	0.610	0.335	331 829
•	LT-LTW-PVC-F-4x2.5-J-C-K	4 G 2.5	7.4 x 22.0	M32x1.5-1	M32x1.5-2	26	0.270	0.168	332 103
•	LT-LTW-PVC-F-4x4-J-C-K	4 G 4.0	9.4 x 28.1	M40x1.5-1	M40x1.5-2	34	0.400	0.220	332 105
•	LT-LTW-PVC-F-4x6-J-C-K	4 G 6.0	9.8 x 31.2	M50x1.5-1	M50x1.5-2	44	0.520	0.325	332 106
•	LT-LTW-PVC-F-4x10-J-C-K	4 G 10.0	11.8 x 37.5	M50x1.5-2	M50x1.5-2	61	0.840	0.522	332 107
•	LT-LTW-PVC-F-4x16-J-C-K	4 G 16.0	14.0 x 46.0	M63x1.5-1	M63x1.5-1	82	1.280	0.784	332 099
•	LT-LTW-PVC-F-4x25-J-C-K	4 G 25.0	15.0 x 51.0	–	–	108	1.800	1.163	332 521
•	LT-LTW-PVC-F-4x35-J-C-S(*)	4 G 35.0	16.8 x 59.0	–	–	135	2.300	1.430	333 619
•	LT-LTW-PVC-F-4X4X1-J-C-K	4 x 4 G1	11.5 x 35.5	M50x1.5-2	M50x1.5-2	15	0.625	0.315	331 371
	LT-LTW-PVC-F-5x4x0.5-O-C-K	5 x 4 x 0.5	8.0 x 40	M63x1.5-2	M63x1.5-2	9	0.450	0.175	332 074

• Available at short notice
(1) The value serves as a reference, for a nominal voltage of up to 1000 V with an ambient temperature of 30 °C based on VDE recommendations; see Page 51
(*) PE unshielded

Neoprene flatform cables

Operating conditions
- Indoor and outdoor installations

Toughness
- Low to medium mechanical strain

Suitability
- Installations with required explosion protection
- Where UL certification is required
- Where reliable outdoor solution is required due to UV, weather, and ozone resistance
- Small system/small train station

Applications
- Container cranes
- Car washes
- Travelling trolley for indoor cranes
- Process cranes
- Steel mills
- Trailing cable installation

Examples of applications
- Near the ocean
- Galvanising plants
- Cement factory
- Chemical plants
- Foundries/steel mills
- Warehouses and refuse bunkers
- Landfills

Abbreviation							Meaning
N	G	FL	G	Ö	U	-J	
N							Corresponds to a VDE standard (N)
	G						Sheath material of rubber
		FL					Flatform cable
			G				Insulation of rubber
				Ö			Oil-resistant cable
					U		Flame resistant outer sheath
						-O	Without PE conductor
						-J	With PE conductor

NGFLGÖU UL

As energy transmission and control lines for cable carriers, conveyor equipment, and machine tools, in lifting devices, lifts, crane bridges and container cranes, and in all cases where the cable is constantly subject to strong bending stress and continuous sequences of motion in only one plane during operation with medium mechanical strain. Suitable for use in dry, moist, and wet areas as well as outdoors.

Special features
- Much smaller bending radius compared to round cables
- Free from lacquer-damaging substances/silicone-free (at production)

Notes
- RoHS compliant
- Complies with 2006/95/EC directive (Low Voltage Directive) CE
- Custom versions, other dimensions, cross-sections, conductor wire and sheath colours upon request
- Available accessories see page 34 onwards.

Technical data

Conductor material	Stranded copper wire, bare
Conductor category	Acc. to DIN VDE 0295 Class 5/6 / IEC 60228 Class 5/6
Conductor wire insulation	Rubber compound
Cond. wire labelling	Acc. to VDE 0293-308 with colours for up to 5 wires, from 6 wires onwards black with white digits with or without GNYE
Stranding	Conductor wires/bundles parallel to each other
Exterior material	Special rubber compound
Sheath colour	Black
Nominal voltage	600 V
Test voltage	2 kV
Ampacity:	Acc. to DIN VDE, see technical appendix on page 50
Operating temp., fixed	-40 °C – +85 °C
Operating temp, mob.	-35 °C – +85 °C
Max. temperature at conductor	+90 °C
Fire behaviour	Self-extinguishing and flame retardant acc. to IEC 60332-1
Standard	UL-Style 4540 and acc. to DIN VDE 0250 Teil 809
Speed	180 m/min

Minimum bending radii for flexible cables acc. to VDE 0298 Part 3, Table 2

≤ 8 mm	8 - 12 mm	12 - 20 mm	› 20 mm
3d	4d	5d	5d

	Type	No. of wires and nominal cross-section mm²	Dimensions (height x width) max. mm	Metric flatform cable glands		Ampacity A (1)	Weight kg/m	Cu content kg/m	Order no.
				Plastic	Brass				
•	LT-LTW-NEO-F-NG-4x1.5-J-UL-K	4 x 1.5 (AWG16)	6.4 x 17.0	M32x1.5-1	M32x1.5-2	18	0.190	0.058	331 373
•	LT-LTW-NEO-F-NG-5x1.5-J-UL-K	5 x 1.5 (AWG16)	6.4 x 21.5	M40x1.5-1	M32x1.5-2	18	0.240	0.072	330 660
•	LT-LTW-NEO-F-NG-7x1.5-J-UL-K	7 x1.5 (AWG16)	6.4 x 29.1	M50x1.5-1	M40x1.5-2	18	0.300	0.101	330 670
•	LT-LTW-NEO-F-NG-8x1.5-J-UL-K	8 x1.5 (AWG16)	6.4 x 32.0	M50x1.5-1	M50x1.5-2	18	0.340	0.115	331 374
•	LT-LTW-NEO-F-NG-10x1.5-J-UL-K	10 x1.5 (AWG16)	7.0 x 40.7	M63x1.5-2	M63x1.5-2	18	0.465	0.144	331 375
•	LT-LTW-NEO-F-NG-12x1.5-J-UL-K	12 x1.5 (AWG16)	7.0 x 47.5	M63x1.5-1	M63x1.5-1	18	0.550	0.173	331 376
•	LT-LTW-NEO-F-NG-4x2.5-J-UL-K	4 x2.5 (AWG14)	7.8 x 20.7	M32x1.5-1	M32x1.5-2	26	0.960	0.280	330 680
•	LT-LTW-NEO-F-NG-5x2.5-J-UL-K	5 x2.5 (AWG14)	7.8 x 26.0	M40x1.5-1	M40x1.5-2	26	0.355	0.120	330 690
•	LT-LTW-NEO-F-NG-7x2.5-J-UL-K	7 x2.5 (AWG14)	7.8 x 33.0	M50x1.5-1	M50x1.5-2	26	0.485	0.168	330 700
•	LT-LTW-NEO-F-NG-8x2.5-J-UL-K	8 x2.5 (AWG14)	7.8 x 38.0	M50x1.5-2	M50x1.5-2	26	0.510	0.192	330 710
•	LT-LTW-NEO-F-NG-12x2.5-J-UL-K	12 x2.5 (AWG14)	8.2 x 54.8	M63x1.5-2	M63x1.5-2	26	0.795	0.288	330 720
•	LT-LTW-NEO-F-NG-4x4-J-UL-K	4 x4.0 (AWG12)	9.1 x 24.8	M40x1.5-1	M40x1.5-2	34	0.395	0.154	331 380
•	LT-LTW-NEO-F-NG-5x4-J-UL-K	5 x4.0 (AWG12)	9.1 x 32.0	M50x1.5-1	M50x1.5-2	34	0.520	0.192	331 381
•	LT-LTW-NEO-F-NG-7x4-J-UL-K	7 x4.0 (AWG12)	9.1 x 39.8	M63x1.5-1	M63x1.5-2	34	0.675	0.269	331 401
•	LT-LTW-NEO-F-NG-4x6-J-UL-K	4 x6.0 (AWG10)	9.9 x 27.9	M40x1.5-1	M40x1.5-2	44	0.466	0.230	330 730
•	LT-LTW-NEO-F-NG-5x6-J-UL-K	5 x6.0 (AWG10)	9.9 x 34.7	M50x1.5-1	M50x1.5-2	44	0.605	0.288	331 382
•	LT-LTW-NEO-F-NG-7x6-J-UL-K	7 x6.0 (AWG10)	9.9 x 45.9	M63x1.5-1	M63x1.5-1	44	0.910	0.403	331 402
•	LT-LTW-NEO-F-NG-4x10-J-UL-K	4 x10.0 (AWG8)	11.2 x 33.3	M50x1.5-1	M50x1.5-2	61	0.775	0.384	330 740
•	LT-LTW-NEO-F-NG-5x10-J-UL-K	5 x10.0 (AWG8)	11.2 x 41.5	M63x1.5-1	M63x1.5-2	61	0.985	0.480	331 383
•	LT-LTW-NEO-F-NG-4x16-J-UL-K	4 x16.0 (AWG6)	13.0 x 38.7	M63x1.5-1	M63x1.5-1	82	1.110	0.614	330 750
•	LT-LTW-NEO-F-NG-5x16-J-UL-K	5 x16.0 (AWG6)	13.0 x 50.0	M63x1.5-1	M63x1.5-1	82	1.410	0.768	331 384
•	LT-LTW-NEO-F-NG-7x16-J-UL-K	7 x16.0 (AWG6)	14.0 x 66.0	–	–	82	2.345	1.075	331 678
•	LT-LTW-NEO-F-NG-4x25-J-UL-K	4 x25.0 (AWG4)	14.7 x 46.0	M63x1.5-1	M63x1.5-1	108	1.465	0.960	330 760
•	LT-LTW-NEO-F-NG-7x25-J-UL-K	7 x25.0 (AWG4)	16.5 x 79.0	–	–	108	3.240	1.680	331 386
•	LT-LTW-NEO-F-NG-4x35-J-UL-K	4 x35.0 (AWG2)	17.6 x 53.2	–	–	135	2.175	1.344	330 770
•	LT-LTW-NEO-F-NG-7x35-J-UL-K	7 x35.0 (AWG2)	18.2 x 91.0	–	–	135	4.140	2.352	331 388
•	LT-LTW-NEO-F-NG-4x50-J-UL-K	4 x50.0 (AWG1)	20.1 x 62.0	–	–	168	3.020	1.920	331 389
•	LT-LTW-NEO-F-NG-4x70-J-UL-K	4 x70.0 (AWG00)	23.0 x 71.0	–	–	207	4.325	2.688	331 390
•	LT-LTW-NEO-F-NG-4x95-J-UL-K	4 x95.0 (AWG000)	25.5 x 81.0	–	–	250	5.110	3.648	331 391
•	LT-LTW-NEO-F-NG-4x120-J-UL-K	4 x120.0 (AWG000)	28.0 x 91.0	–	–	292	6.340	4.608	331 392
	LT-LTW-NEO-F-NG-6x4x1.5-J-UL-K	6 x 4 x 1.5 (AWG16)	12.4 x 55.3	–	–	18	1.069	0.351	332 088
	LT-LTW-NEO-F-NG-6x4x2.5-J-UL-K	6 x 4 x 2.5 (AWG14)	17.0 x 71.0	–	–	26	1.827	0.585	332 089

• Available at short notice

(1) The value serves as a reference, for a nominal voltage of up to 1000 V with an ambient temperature of 30 °C based on VDE recommendations; see Page 51

Neoprene flatform cables, shielded

Operating conditions
- Indoor and outdoor installations

Toughness
- Low to medium mechanical strain

Suitability
- Installations with required explosion protection
- Where reliable outdoor solution is required due to UV, weather, and ozone resistance
- Small system/small train station

Applications
- Container cranes
- Car washes
- Travelling trolley for indoor cranes
- Process cranes
- Steel mills
- Trailing cable installation

Examples of applications
- Near the ocean
- Galvanising plants
- Cement factory
- Chemical plants
- Foundries/steel mills
- Warehouses and refuse bunkers
- Landfills

Abbreviation							Meaning
G	C	FL	G	Ö	U	-J	
G							Sheath material of rubber
	C						Overall shielding/ cond. wire shielding/ cond. wire pair shielding
		FL					Flatform cable
			G				Insulation of rubber
				Ö			Oil-resistant cable
					U		Flame resistant outer sheath
						-O	Without PE conductor
						-J	With PE conductor

GCFLGÖU

As shielded energy transmission and control lines for the interference-free transfer of data and signals in cable carriers, conveyor equipment, and machine tools, particularly in lifting devices, lifts, crane bridges and container cranes, and in all cases where the cable is constantly subject to strong bending stress and continuous sequences of motion in only one plane during operation. Suitable for use in dry, moist, and wet areas as well as outdoors.

UL approval on request

Special features
- Much smaller bending radius compared to round cables
- Free from lacquer-damaging substances/silicone-free (at production)

Notes
- RoHS compliant
- Complies with 2006/95/EC directive (Low Voltage Directive) CE
- Custom versions, other dimensions, cross-sections, conductor wire and sheath colours upon request
- Available accessories see page 34 onwards.

Technical data

Conductor material	Stranded copper wire, bare
Conductor category	Acc. to DIN VDE 0295 Class 5/6 / IEC 60228 Class 5/6
Conductor wire insulation	Rubber compound
Cond. wire labelling	Acc. to VDE 0293-308 with colours for up to 5 wires, from 6 wires onwards black with white digits with GNYE
Stranding	Conductor wires parallel to each other
Shielding	Coated foil + wrapped tinned wire
Exterior material	Special rubber compound
Sheath colour	Black
Nominal voltage	600 V
Test voltage	2 kV
Ampacity:	Acc. to DIN VDE, see technical appendix on page 50
Operating temp., fixed	-40 °C – +80°C
Operating temp, mob.	-30 °C – +80 °C
Max. temperature at conductor	+90 °C
Fire behaviour	Self-extinguishing and flame retardant acc. to IEC 60332-1
Speed	180 m/min

Minimum bending radii for flexible cables acc. to VDE 0298 Part 3, Table 2

≤ 8 mm	8 - 12 mm	12 - 20 mm	› 20 mm
3d	4d	5d	5d

	Type	No. of wires and nominal cross-section mm²	Dimensions (height x width) max. mm	Metric flatform cable glands		Ampacity A (1)	Weight kg/m	Cu content kg/m	Order no.
				Plastic	Brass				
•	LT-LTW-NEO-F-NG-4X(2X1)-O-C-K	4x(2x1) (AWG18)	11.8x33.5	M50x1.5-1	M50x1.5-2	15	0.590	0.273	332 153/01
•	LT-LTW-NEO-F-NG-4x1.5-J-C-K	4x1.5 (AWG16)	8.0x21.5	M40x1.5-1	M40x1.5-2	18	0.290	0.099	332 138/01
•	LT-LTW-NEO-F-NG-8x1.5-J-C-K	8x1.5 (AWG16)	8.0x38.6	M63x1.5-1	M63x1.5-1	18	0.550	0.228	332 139/01
•	LT-LTW-NEO-F-NG-12x1.5-J-C-K	12x1.5 (AWG16)	8.0x57.1	–	–	18	0.800	0.342	332 141/01
•	LT-LTW-NEO-F-NG-4x2.5-J-C-K	4x2.5 (AWG14)	8.7x24.1	M40x1.5-1	M40x1.5-2	26	0.370	0.163	332 142/01
•	LT-LTW-NEO-F-NG-12x2.5-J-C-K	12x2.5 (AWG14)	8.7x64.0	–	–	26	1.050	0.493	332 144/01
•	LT-LTW-NEO-F-NG-4x4-J-C-K	4x4 (AWG12)	9.5x27.6	M40x1.5-1	M40x1.5-2	34	0.500	0.241	332 145/01
•	LT-LTW-NEO-F-NG-4x6-J-C-K	4x6 (AWG10)	10.5x31.1	M50x1.5-1	M50x1.5-2	44	0.610	0.353	332 146/01
•	LT-LTW-NEO-F-NG-4x10-J-C-K	4x10 (AWG8)	12.1x36.7	M50x1.5-2	M50x1.5-2	61	0.920	0.497	332 147/01
•	LT-LTW-NEO-F-NG-4x16-J-C-K	4x16 (AWG6)	13.7x41.5	M63x1.5-1	M63x1.5-1	82	1.320	0.805	332 148/01
•	LT-LTW-NEO-F-NG-4x25-J-C-K	4x25 (AWG4)	15.5x47.0	–	–	108	1.720	1.200	332 526/01
•	LT-LTW-NEO-F-NG-4x35-J-C-K	4x35 (AWG2)	17.1x53.2	–	–	135	2.330	1.657	333 028/01
•	LT-LTW-NEO-F-NG-4x50-J-C-K	4x50 (AWG1)	19.7x61.6	–	–	168	3.120	2.261	333 038/01
•	LT-LTW-NEO-F-NG-4x95-J-C-K	4x95 (AWG000)	25.3x81.9	–	–	250	5.540	4.311	332 645/01

• Available at short notice

(1) The value serves as a reference, for a nominal voltage of up to 1000 V with an ambient temperature of 30 °C based on VDE recommendations; see Page 51

Rubber round cable, indoor and outdoor use

Operating conditions
- Indoor/outdoor installations

Toughness
- Low to medium mechanical strain

Suitability
- Installations with required explosion protection
- Standard applications (cable carriers)
- Low to medium dynamic stresses
- As energy transmission and control lines
- Cost-effective system with low-cost cables
- Low to medium dynamic stresses
- Provides requisite high weather resistance
- Where reliable outdoor solution is required due to UV, weather, and ozone resistance

Applications
- Process cranes; power supply for crane and travelling trolley
- Dock cranes
- Car washes
- Trailing cable installation

Examples of applications
- Cement factory
- Chemical plants
- Foundries/steel mills
- Warehouses and refuse bunkers
- Landfills
- Paper mills

Abbreviation						Meaning
H	07	R	N	-F	-O	
H						**Identification of designation:** Harmonised
	07					**Nominal voltage U_0/U** 450/750V
		R				**Insulation material** Natural or synthetic rubber
			N			**Sheath material** (CR) Chloroprene rubber
				-F		**Conductor type** Finely stranded, for flexible cables
					-O	Without PE conductor
					-J	With PE conductor

H07RN-F

For connecting tools, mobile devices and machines, for medium mechanical strain in dry and moist areas, outdoors, and in explosion hazard areas, in commercial and agricultural operations and at construction sites.

Special features
- **Free from lacquer-damaging substances/silicone-free (at production)**

Notes
- RoHS compliant
- Complies with 2006/95/EC directive (Low Voltage Directive) CE
- Available accessories see page 36 onwards.

Technical data

Conductor material	Stranded copper wire, bare or tinned
Conductor category	Acc. to DIN VDE 0295 Class 5 / IEC 60228 Class 5
Conductor wire insulation	Rubber compound
Cond. wire labelling	Acc. to VDE 0293-308 with colours for up to 5 wires, from 6 wires onwards black with white digits with or without GNYE
Stranding	Wires stranded in layers
Exterior material	Special rubber compound
Sheath colour	Black
Nominal voltage (U_0/U)	450/750 V
Test voltage	2.5 kV
Ampacity:	Acc. to DIN VDE, see technical appendix on page 50
Operating temp., fixed	-40 °C – +60 °C
Operating temp, mob.	-30 °C – +60 °C
Max. temperature at conductor	+60 °C
Standard	DIN VDE 0282 Part 4
Speed	120 m/min

Minimum bending radii for flexible cables acc. to VDE 0298 Part 3, Table 2

≤ 8 mm	8 - 12 mm	12 - 20 mm	› 20 mm
3d	4d	5d	5d

	Type	No. of wires and nominal cross-section mm²	Dimensions max. diameter mm	Ampacity A(1)	Weight kg/m	Cu content kg/m	Order no.
•	LT-LTW-GUM-R-H7-1x16-O-K	1x16	13.4	82	0.279	0.154	333 370
•	LT-LTW-GUM-R-H7-1x25-O-K	1x25	15.8	108	0.396	0.240	333 371
•	LT-LTW-GUM-R-H7-1x35-O-K	1x35	17.9	135	0.540	0.336	333 372
•	LT-LTW-GUM-R-H7-1x50-O-K	1x50	20.6	168	0.719	0.480	333 373
•	LT-LTW-GUM-R-H7-1x70-O-K	1x70	23.3	207	0.947	0.672	333 374
•	LT-LTW-GUM-R-H7-1x95-O-K	1x95	26.0	250	1.230	0.912	333 375
•	LT-LTW-GUM-R-H7-1x120-O-K	1x120	28.6	292	1.520	1.152	333 376
•	LT-LTW-GUM-R-H7-1x150-O-K	1x150	31.4	335	1.887	1.440	333 377
•	LT-LTW-GUM-R-H7-1x185-O-K	1x185	34.4	382	2.300	1.776	333 378
•	LT-LTW-GUM-R-H7-3x1.5-J-K	3G1.5	11.9	18	0.157	0.043	333 379
•	LT-LTW-GUM-R-H7-4x1.5-J-K	4G1.5	13.1	18	0.192	0.058	333 385
•	LT-LTW-GUM-R-H7-5x1.5-J-K	5G1.5	14.4	18	0.238	0.072	333 395
•	LT-LTW-GUM-R-H7-7x1.5-J-K	7G1.5	17.5	18	0.371	0.101	333 403
•	LT-LTW-GUM-R-H7-12x1.5-J	12G1.5	22.4	18	0.516	0.173	333 405
•	LT-LTW-GUM-R-H7-24x1.5-J-K	24G1.5	30.7	18	0.968	0.346	333 408
•	LT-LTW-GUM-R-H7-3x2.5-J-K	3G2.5	14.0	26	0.217	0.072	333 380
•	LT-LTW-GUM-R-H7-4x2.5-J-K	4G2.5	15.5	26	0.269	0.096	333 386
•	LT-LTW-GUM-R-H7-5x2.5-J-K	5G2.5	17.0	26	0.329	0.120	333 396
•	LT-LTW-GUM-R-H7-7x2.5-J-K	7G2.5	20.0	26	0.499	0.168	333 404
•	LT-LTW-GUM-R-H7-12x2.5-J-K	12G2.5	26.2	26	0.719	0.288	333 406
•	LT-LTW-GUM-R-H7-19x2.5-J-K	19G2.5	31.0	26	1.068	0.456	333 407
•	LT-LTW-GUM-R-H7-24x2.5-J-K	24G2.5	36.4	26	1.400	0.576	333 409
•	LT-LTW-GUM-R-H7-3x4-J-K	3G4	16.2	34	0.298	0.115	333 381
•	LT-LTW-GUM-R-H7-4x4-J-K	4G4	17.9	34	0.373	0.154	333 387
•	LT-LTW-GUM-R-H7-5x4-J-K	5G4	19.9	34	0.466	0.192	333 397
•	LT-LTW-GUM-R-H7-3x6-J-K	3G6	18.0	44	0.407	0.173	333 382
•	LT-LTW-GUM-R-H7-4x6-J-K	4G6	20.0	44	0.514	0.230	333 388
•	LT-LTW-GUM-R-H7-5x6-J-K	5G6	22.2	44	0.640	0.288	333 398
•	LT-LTW-GUM-R-H7-3x10-J-K	3G10	24.2	61	0.716	0.288	333 383
•	LT-LTW-GUM-R-H7-4x10-J-K	4G10	26.5	61	0.898	0.384	333 389
•	LT-LTW-GUM-R-H7-5x10-J-K	5G10	29.1	61	1.107	0.480	333 399
•	LT-LTW-GUM-R-H7-3x16-J-K	3G16	27.6	82	1.008	0.461	333 384
•	LT-LTW-GUM-R-H7-4x16-J-K	4G16	30.1	82	1.253	0.614	333 390
•	LT-LTW-GUM-R-H7-5x16-J-K	5G16	33.3	82	1.564	0.768	333 400
•	LT-LTW-GUM-R-H7-4x25-J-K	4G25	36.6	108	1.846	0.960	333 391
•	LT-LTW-GUM-R-H7-5x25-J-K	5G25	40.4	108	2.291	1.200	333 401
•	LT-LTW-GUM-R-H7-4x35-J-K	4G35	41.1	135	2.393	1.344	333 392
•	LT-LTW-GUM-R-H7-5x35-J-K	5G35	45.8	135	2.684	1.680	333 402
•	LT-LTW-GUM-R-H7-4x50-J-K	4G50	47.5	168	3.284	1.920	333 393
•	LT-LTW-GUM-R-H7-4x70-J-K	4G70	54.0	207	4.331	2.688	333 394

• Available at short notice

(1) The value serves as a reference, for a nominal voltage of up to 1000 V with an ambient temperature of 30 °C based on VDE recommendations; see Page 51

Round cable, outdoor use, shielded

Operating conditions
- Outdoor/indoor installations

Toughness
- Medium to high mechanical strain

Suitability
- Where reliable outdoor solution is required due to UV, weather, and ozone resistance
- Where a robust, durable cable is required
- Where cables need to be halogen-free

Applications
- Container cranes
- Travelling trolley for indoor cranes
- Process cranes
- Steel mills
- Trailing cable installation

Examples of applications
- Near the ocean
- Galvanising plants
- Cement factory
- Chemical plants
- Foundries/steel mills
- Nuclear power plants
- Warehouses and refuse bunkers
- Landfills

Abbreviation				Meaning
12YH	RD	C	11YH	
12YH				Cond. wire insulation polyester-based (PE), halogen-free
	RD			Round cable
		C		Shielded
			11YH	Outer sheath polyurethane-based (PUR), halogen-free

Not a standard cable, code conversion only for better comprehensibility

PUR round cable, shielded

As energy transmission and control lines for extremely high mechanical stresses, high bending frequencies during operation, particularly for use in cable carriers, in the moving parts of machine tools, conveyor systems etc. in dry, moist, and wet areas, as well as outdoors.

Special features
- **Free from lacquer-damaging substances/silicone-free (at production)**
- Halogen-free
- Limited suitability for constant use in water (no drinking water)
- More information upon request

Notes
- RoHS compliant
- Complies with 2006/95/EC directive (Low Voltage Directive) CE
- Permanent tensile loading without supporting element max. 25 N/mm² (dynamic)
- Custom versions, other dimensions, cross-sections, conductor wire and sheath colours available upon request

Technical data

Conductor material	Stranded copper wire, bare
Conductor category	Acc. to DIN VDE 0295 Class 5 / IEC 60228 Class 5
Conductor wire insulation	Polyester-based
Cond. wire labelling	Acc. to VDE 0293-308 with colours for up to 5 wires, from 6 wires onwards black with white digits with or without GNYE
Stranding	Wires stranded in layers
Supporting element	Multicore cables with central textile element
Exterior material	PUR, only cables with 2, 3, 4, and 5 wires and cables with twisted pairs
Protection against contact	PETP foil, overlapped
Overall shielding	Cu braid, tinned, coverage approx. 85 %
Protection against contact	Non-woven polyester, overlapped
Sheath colour	Black
Nominal voltage (U_0/U)	0.6/1 kV
Test voltage	2.5 kV
Ampacity:	Acc. to DIN VDE, see technical appendix on page 50
Operating temp., fixed	-50 °C – +90 °C
Operating temp, mob.	-40 °C – +90 °C
Max. temperature at conductor	+90 °C
Fire behaviour	Follows IEC 60332-2-1
Standard	Follows recommendations of DIN VDE 0250
Speed	240 m/min
Minimum bending radius	6xd (diameter)

	Type	No. of wires and nominal cross-section mm²	Dimensions max. diameter mm	Ampacity A(1)	Weight kg/m	Cu content kg/m	Order no.
•	LT-LTW-PUR-R-FF-1x25-O-C-K	1x25	12.5	176	0.325	0.310	333 258
•	LT-LTW-PUR-R-FF-1x35-O-C-K	1x35	14.1	218	0.435	0.406	333 429
•	LT-LTW-PUR-R-FF-1x50-O-C-K	1x50	16.5	276	0.620	0.550	333 272
•	LT-LTW-PUR-R-FF-1x70-O-C-K	1x70	19.0	347	0.824	0.747	333 430
•	LT-LTW-PUR-R-FF-1x95-O-C-K	1x95	20.5	416	1.060	0.998	333 266
•	LT-LTW-PUR-R-FF-1x120-O-C-K	1x120	23.0	488	1.331	1.306	333 431
•	LT-LTW-PUR-R-FF-1x150-O-C-K	1x150	24.5	566	1.860	1.613	333 432
•	LT-LTW-PUR-R-FF-1x185-O-C-K	1x185	28.0	644	2.026	1.903	333 433
•	LT-LTW-PUR-R-FF-1x240-O-C-K	1x240	31.5	775	2.620	2.474	333 434
•	LT-LTW-PUR-R-FF-7x1.5-J-C-K	7x1.5	12.4	23	0.240	0.192	333 135
•	LT-LTW-PUR-R-FF-12x1.5-J-C-K	12x1.5	16.5	23	0.374	0.250	333 134
•	LT-LTW-PUR-R-FF-18x1.5-J-C-K	18x1.5	18.0	23	0.419	0.341	333 136
•	LT-LTW-PUR-R-FF-4x2.5-J-C-K	4x2.5	13.6	30	0.257	0.157	333 182
•	LT-LTW-PUR-R-FF-5x2.5-J-C-K	5x2.5	14.3	30	0.292	0.190	333 435
•	LT-LTW-PUR-R-FF-12x2.5-J-C-K	12x2.5	19.0	30	0.540	0.370	333 270
•	LT-LTW-PUR-R-FF-18x2.5-J-C-K	18x2.5	19.2	30	0.690	0.621	333 316
•	LT-LTW-PUR-R-FF-4x4-J-C-K	4x4	15.0	41	0.340	0.221	333 138
•	LT-LTW-PUR-R-FF-4x6-J-C-K	4x6	16.2	53	0.430	0.300	333 137
•	LT-LTW-PUR-R-FF-4x10-J-C-K	4x10	19.5	74	0.640	0.454	333 317
•	LT-LTW-PUR-R-FF-4x16-J-C-K	4x16	23.0	99	1.070	0.694	333 436
•	LT-LTW-PUR-R-FF-4x25-J-C-K	4x25	27.0	131	1.520	1.050	333 157
•	LT-LTW-PUR-R-FF-4x35-J-C-K	4x35	31.5	162	2.037	1.444	333 311
•	LT-LTW-PUR-R-FF-4x50-J-C-K	4x50	37.0	202	2.780	2.124	333 369

• Available at short notice

(1) The value serves as a reference, for a nominal voltage of up to 1000 V with an ambient temperature of 30 °C based on VDE recommendations; see Page 51

Rubber round cable, outdoor use

Operating conditions
- Outdoor/indoor installations

Toughness
- Medium to high mechanical strain

Suitability
- Where reliable outdoor solution is required due to UV, weather, and ozone resistance
- Where a robust, durable cable is required

Applications
- Container cranes
- Travelling trolley for indoor cranes
- Process cranes
- Steel mills
- Trailing cable installation

Examples of applications
- Near the ocean
- Galvanising plants
- Cement factory
- Chemical plants
- Foundries/steel mills
- Nuclear power plants
- Warehouses and refuse bunkers
- Landfills

Abbreviation								Meaning
N	G	RD	G	C	Ö	U	-J	
N								VDE standard, standard cable (N) acc. to. recomm.
	G							Rubber material
		RD						Round cable
			G					Inner sheath of rubber
				C				Shielded
					Ö			Oil-resistant sheath material
						U		Flame resistant outer sheath
							-O	Without PE conductor
							-J	With PE conductor

Rondoflex©

As energy transmission and control lines for high mechanical stresses, high bending frequencies during operation, for use on cable carriers and for connecting moving parts on machine tools, conveyor systems etc. Brand name: Prysmian©

Special features
- Maximum stability from bundled strands
- Also suitable for reeling operations with low requirements
- Also available in a shielded variant or with twisted PE conductor

Notes
- Free from lacquer-damaging substances/silicone-free (at production)
- Custom versions, other dimensions, cross-sections, conductor wire and sheath colours upon request

Technical data

Conductor	Fine electrolytic copper
Conductor category	Acc. to DIN VDE 0295 bare, soft Class 5
Conductor wire insulation	Ethylene-propylene rubber-based (EPR)
Cond. wire labelling	Acc. to VDE 0293, optimal recognisability through light-coloured insulation with black printed characters for power transmission and control cables, PE green-yellow
Stranding	Stranded in max. 3 layers
Exterior material	CM-based (5GM3 rubber compound) of high quality, improved mechanical and electrical properties
Sheath colour	Black
Nominal voltage (U_0/U)	0.6/1 kV
Test voltage	3.5 kV
Ampacity:	Acc. to DIN VDE 0298 Part 4, see technical appendix on page 55
Operating temp., fixed	-50 °C – +80 °C
Operating temp, mob.	-35 °C – +80 °C
Max. temperature at conductor	+90 °C
Fire behaviour	Flame-retardant and self-extinguishing acc. to DIN VDE 0482 Part 265-2-1, IEC 60332-1
Standard	VDE certificate with VDE Reg. No. 7841; GOST-R
Speed	240 m/min

Minimum bending radii for flexible cables acc. to VDE 0298 Part 3, Table 2

≤ 8 mm	8 - 12 mm	12 - 20 mm	› 20 mm
3d	4d	5d	5d

	Type	No. of wires and nominal cross-section mm²	Dimensions max. diameter mm	Ampacity A(1)	Weight kg/m	Cu content kg/m	Order no.
Rondoflex©, unshielded							
	LT-LTW-GUM-R-RO-1x25-O-K	1x25	12.6	138	0.330	0.240	332 131
	LT-LTW-GUM-R-RO-1x35-O-K	1x35	13.9	170	0.430	0.336	331 914
	LT-LTW-GUM-R-RO-1x50-O-K	1x50	16.6	212	0.625	0.480	331 775
	LT-LTW-GUM-R-RO-1x70-O-K	1x70	18.5	263	0.835	0.672	331 869
	LT-LTW-GUM-R-RO-1x95-O-K	1x95	20.9	316	1.070	0.912	331 764
	LT-LTW-GUM-R-RO-1x120-O-K	1x120	22.8	370	1.340	1.152	331 836
	LT-LTW-GUM-R-RO-1x150-O-K	1x150	24.9	424	1.650	1.440	331 870
	LT-LTW-GUM-R-RO-1x185-O-K	1x185	27.8	484	2.010	1.776	331 847
	LT-LTW-GUM-R-RO-1x240-O-K	1x240	32.9	567	2.830	2.304	332 662
	LT-LTW-GUM-R-RO-12x1.5-J-K	12x1.5	18.2	24	0.440	0.173	331 857
	LT-LTW-GUM-R-RO-18x1.5-J-K	18x1.5	20.7	24	0.615	0.259	331 856
	LT-LTW-GUM-R-RO-24x1.5-J-K	24x1.5	24.1	24	0.805	0.346	331 861
	LT-LTW-GUM-R-RO-30x1.5-J-K	30x1.5	25.3	24	0.930	0.432	332 122
	LT-LTW-GUM-R-RO-36x1.5-J-K	36x1.5	27.6	24	1.090	0.518	332 123
	LT-LTW-GUM-R-RO-12x2.5-J-K	12x2.5	19.9	32	0.580	0.288	331 860
	LT-LTW-GUM-R-RO-18x2.5-J-K	18x2.5	23.5	32	0.865	0.432	331 871
	LT-LTW-GUM-R-RO-24x2.5-J-K	24x2.5	27.0	32	1.110	0.576	331 778
	LT-LTW-GUM-R-RO-30x2.5-J-K	30x2.5	29.4	32	1.330	0.720	338 008
	LT-LTW-GUM-R-RO-36x2.5-J-K	36x2.5	31.1	32	1.550	0.864	332 124
	LT-LTW-GUM-R-RO-4x4-J-K	4x4	15.5	43	0.350	0.154	331 903
	LT-LTW-GUM-R-RO-5x4-J-K	5x4	17.7	43	0.450	0.192	331 902
	LT-LTW-GUM-R-RO-4x6-J-K	4x6	17.9	56	0.475	0.230	331 858
	LT-LTW-GUM-R-RO-5x6-J-K	5x6	19.5	56	0.575	0.288	331 777
	LT-LTW-GUM-R-RO-4x10-J-K	4x10	20.2	78	0.680	0.384	331 776
	LT-LTW-GUM-R-RO-5x10-J-K	5x10	22.8	78	0.865	0.480	331 765
	LT-LTW-GUM-R-RO-4x16-J-K	4x16	24.9	104	1.070	0.614	331 859
	LT-LTW-GUM-R-RO-4x25-J-K	4x25	29.9	138	1.600	0.960	331 863
	LT-LTW-GUM-R-RO-4x35-J-K	4x35	33.1	170	2.090	1.344	331 873
Rondoflex©, shielded							
	LT-LTW-GUM-R-RO-3x(2x1)-O-C-K	3x(2x1)	22.8	19	0.685	0.214	333 236
	LT-LTW-GUM-R-RO-6x(2x1)-O-C-K	6x(2x1)	31.3	19	1.250	0.427	331 767
	LT-LTW-GUM-R-RO-12x1.5-J-C-K	12x1.5	16.7	24	0.480	0.309	333 290
	LT-LTW-GUM-R-RO-4x4-J-C-K	4x4	17.8	43	0.485	0.221	332 855
	LT-LTW-GUM-R-RO-4x6-J-C-K	4x6	20.2	56	0.700	0.300	332 856
	LT-LTW-GUM-R-RO-4x10-J-C-K	4x10	22.7	78	0.925	0.454	332 857
Rondoflex© with twisted PE conductors							
	LT-LTW-GUM-R-RO-3x35+3x16/3-J-K	3x35+3x16/3	30.7	170	1.800	1.162	332 363
	LT-LTW-GUM-R-RO-3x50+3x25/3-J-K	3x50+3x25/3	35.5	212	2.540	1.680	332 364
	LT-LTW-GUM-R-RO-3x70+3x35/3-J-K	3x70+3x35/3	42.1	263	3.570	2.352	332 365

Min. purchase qty. 500 metres

(1) The value serves as a reference, for a nominal voltage of up to 1000 V with an ambient temperature of 30 °C based on VDE recommendations; see Page 51

Fibre optic cable

Operating conditions
- Indoor/outdoor installations

Toughness
- Medium mechanical strain

Suitability
- Where UL certification is required
- Where reliable outdoor solution is required due to UV, weather, and ozone resistance
- Where a robust, durable cable is required

Applications
- Container cranes
- Travelling trolley for indoor cranes
- Process cranes
- Steel mills
- Trailing cable installation

Examples of applications
- Near the ocean
- Cement factory
- Chemical plants
- Foundries/steel mills
- Warehouses and refuse bunkers
- Landfills

Abbreviation			Meaning
11	G50	/125µm	
11			No. of optical fibres
	G50		Fibre type/Ø core diameter
		125µm	Cladding diameter

Festoontec FIBER

For optical signal and data transmission on lifting devices and conveyor equipment. Particularly suited for forced guidance, e.g. cable carriers.
Fibre optic cables in which multiple beans are transmitted are called multimode fibres (see illustration). Multimode fibres with graded-index fibres for crane applications have a small core, usually 50 µm and 62.5 µm. In rare cases, a single mode transmission is used. If you require these types, please inform us in your enquiry.
There are various fitting terminations used in the field of fibre optic cables, but ST and SC connectors are the most popular.
We would be happy to provide you with cables that meet your specific fitting termination requirements. Please do not hesitate to contact us.

Special features
- Special rubber design which is particularly suited to cable carrier applications
- Fibres are enclosed in gel-filled hollow cores
- Strain relief element: high-quality synthetic fibres

Technical data

Abrasion resistance	High		
Tensile load	Max. 2000 N		
Sheath colour	Orange		
Operating temp., fixed	-40 °C – +80 °C		
Operating temp, mob.	-30 °C – +60 °C		
Fire behaviour	IEC 60332-1-2		
Standard	International EN 188000, national DIN VDE 0888		
Speed	240 m/min		
Minimum bending radius	›125 mm		
Core diameter	G50/125: 50 ± 3 µm; G62.5/125: 62.5 ± 3 µm		
Tolerance	≤ 5.0 %		
Fibre diameter	125 ± 2 µm;		
Tolerance	≤ 2.0 %		
Cladding diameter	For a wavelength of 850 nm:	G50/125	≤ 3.0 dB/km;
		G62.5/125	≤ 3.5 dB/km
	For a wavelength of 1310 nm:	G50/125	≤ 1.0 dB/km;
		G62.5/125	≤ 1.5 dB/km
Bandwidth	At 850 nm:	G50/125	≤ 600 dB/km;
		G62.5/125	≤ 200 dB/km
Bandwidth	At 1300 nm:	G50/125	≤ 1200 dB/km;
		G62.5/125	≤ 500 dB/km

Further details available upon request

	Type	Dimensions max. diameter mm	Weight kg/m	Order no.
	LT-LTW-GUM-R-LWL-12G62.5/125-UL-V	11	0.110	100 24700
	LT-LTW-GUM-R-LWL-12G50/125-UL-V	11	0.110	100 23216

• Available at short notice

Control and signal lines

VAHLE PUR Festoon 6x(2x1)C

As a control and signal line for high mechanical stresses, high bending frequencies during operation, use on cable carriers.

Technical data

Conductor material	Cu, bare, finely stranded
Conductor wire insulation	SABIX
Labelling	Black with numbers 1 – 12
Stranding	Pairs 1/2, 3/4, 5/6, 7/8, 9/10, 11/12
Wrapping for each pair	Non-woven material
Shielding for each pair	Braid of tinned copper wires
Inner sheath for each pair	TPE, black, similar to RAL 9005
Stranding:	Pairs optimally stranded together, filler in the reinforcing layers and insulated supporting element in the core
Wrapping	Non-woven material
Outer sheath	PUR, deep black, similar to RAL 9005
Nominal voltage	0.6/1kV
Test voltage	Wire/wire 4kV, wire/shielding: 4kV
Characteristic impedance 1-20MHz	70 Ω ±20%
Operating temperature, fixed	–50° C tp +90° C; UL up to +80°C
Operating temperature, mobile	–40° C bis +90° C; UL up to +80°C
Speed	Up to 240m/min
Minimum bending radius	5xd (diameter)

Further details available upon request

Operating conditions
- Indoor/outdoor installations

Toughness
- Medium to high mechanical strain

Suitability
- Where UL certification is required
- Where reliable outdoor solution is required due to UV, weather, and ozone resistance
- Where a robust, durable cable is required
- Where cables need to be halogen-free

Applications
- Container cranes
- Travelling trolley for indoor cranes
- Process cranes
- Steel mills
- Trailing cable installation

Examples of applications
- Near the ocean
- Cement factory
- Chemical plants
- Foundries/steel mills
- Warehouses and refuse bunkers
- Landfills

	Type	No. of wires and nominal cross-section mm²	Dimensions max. diameter mm	Weight kg/m	Cu content kg/m	Order no.
•	LT-LTW-PUR-R-VS-6X(2X1)-O-C-UL-V	6x(2x1)C	21.1	0.438	0.232	333 495

• Available at short notice

Operating conditions
- Indoor/outdoor installations

Toughness
- Medium mechanical strain

Suitability
- Where UL certification is required
- Where reliable outdoor solution is required due to UV, weather, and ozone resistance
- Where a robust, durable cable is required
- Where cables need to be halogen-free

Applications
- Container cranes
- Travelling trolley for indoor cranes
- Process cranes
- Steel mills
- Trailing cable installation

Examples of applications
- Near the ocean
- Cement factory
- Chemical plants
- Foundries/steel mills
- Warehouses and refuse bunkers
- Landfills

VAHLE Profibus Festoon 1x(2x0.25)mm²

This copper data cable designed for mobile industrial use is perfect for profibus applications. It guarantees first-class transmission properties and can be used even under the most difficult conditions.

Technical data

Conductor material	Cu, bare, finely stranded
Conductor wire insulation	Foamskin PE in red and green
Stranding	Wires stranded in pairs, filler in the reinforcing layers
Wrapping	PTFE foil + ALU foil, wrapped, overlapping
Shielding	Braid of tinned round copper wires
Wrapping	PTFE foil, wrapped, overlapping
Exterior material	Thermoplastic material, fulfils UL-AWM Style 20233
Sheath colour	Red-purple, similar to 4001
Test voltage	Wire/wire 2 kV; wire/shielding 2 kV
Operating temperature, fixed	-40 °C – +60 °C; UL +80 °C
Operating temp, mob.	-30 °C – +60 °C; UL +80 °C
Fire behaviour	flame retardant and self-extinguishing acc. to IEC 60332-1-2
Characteristic impedance	Acc. to VDE 0472 Part 516 In frequency range of 3-20 MHz: 150Ω ±15Ω
Speed	180 m/min, higher speeds upon request
Minimum bending radius	› 70 mm
Tensile force	29 N when laying, 8.7 N in operation

Further details available upon request

	Type	No. of wires and nominal cross-section mm²	Dimensions max. diameter mm	Weight kg/m	Cu content kg/m	Order no.
•	LT-LTW-PUR-R-PB-1X(2X0.25)-O-C-UL-V	1x(2x0.25)	8.3	0.068	0.023	333 448

• Available at short notice

Profinet Cat 5 cable

VAHLE Profinet Cat 5 Festoon 2x(2x0.34)mm²

This copper data cable designed for industrial use is perfect for Ethernet applications. It guarantees first-class transmission properties and can be used even under the most difficult conditions.
We would be happy to provide you with cables that meet your specific fitting termination requirements. Please do not hesitate to contact us.

Operating conditions
- Indoor/outdoor installations

Toughness
- Medium mechanical strain

Suitability
- Where UL certification is required
- Where reliable outdoor solution is required due to UV, weather, and ozone resistance
- Where a robust, durable cable is required
- Where cables need to be halogen-free

Applications
- Container cranes
- Travelling trolley for indoor cranes
- Process cranes
- Steel mills
- Trailing cable installation

Examples of applications
- Near the ocean
- Cement factory
- Chemical plants
- Foundries/steel mills
- Warehouses and refuse bunkers
- Landfills

Technical data

Conductor material	Cu, tinned, extremely finely stranded
Conductor wire insulation	PE
Cond. wire labelling	White, blue, yellow, orange
Stranding	Star quad stranding, filler in core
Wrapping	PETP foil
Inner sheath	SABIX
Wrapping	Alu foil
Shielding	Braid of tinned copper wires
Wrapping	Non-woven material
Exterior material	PUR
Sheath colour	Green, similar to RAL 6018
Test voltage	Wire/wire 2 kV; wire/shielding 2 kV
Operating temperature, fixed	-30 °C – +70 °C; UL +80 °C
Operating temp, mob.	-20 °C – +70 °C; UL +80 °C
Ohmic resistance (20 °C)	Max. 52.2 Ω/km
Speed	180 m/min, higher speeds upon request
Minimum bending radius	› 70 mm

Further details available upon request

	Type	No. of wires and nominal cross-section mm²	Dimensions max. diameter mm	Weight kg/m	Cu content kg/m	Order no.
•	LT-LTW-PUR-R-C5-2X2X0.34-O-C-UL-V	2x(2x0.34)	6.9	0.069	0.037	333 438
•	LT-LTW-PUR-R-C6a-4X2X0.25-O-C-UL-V	4x(2x0.25)	8.4	0.074	0.041	333 620

• Available at short notice

Round cable with tension relief

Operating conditions
- Indoor/outdoor installations

Toughness
- Low to medium mechanical strain

Suitability
- Standard applications
- Low to medium dynamic stresses
- As energy transmission and control lines

Applications
- Control or energy transmission line
- Freely hanging teach pad/ freely hanging switch controls

Examples of applications
- High-bay warehouse
- Port facilities

Abbreviation			Meaning
2	T	Y	
2			No. of supporting elements
	T		Cable with supporting element
		Y	Polyvinyl chloride PVC exterior material

Not a standard cable, code conversion only for better comprehensibility

Lifting cable 2TY

This cable is particularly suited as a feed to a teach pad in crane construction. In addition, it can also be used as an energy transmission and control line in lift, crane, and conveyor systems. Due to the high quality of the materials used, this cable remains highly flexible even at low temperatures.

Special features
- With steel supporting element
- Free from lacquer-damaging substances/silicone-free (at production)

Notes
- RoHS compliant
- Free from axial torsion
- Complies with 2006/95/EC directive (Low Voltage Directive) CE
- The breaking load of the supporting element is 1400 newtons

Technical data

Conductor material	Stranded copper wire, bare
Conductor category	Acc. to DIN VDE 0295 Classe 5 bzw. IEC 60228 Cl. 5
Conductor wire insulation	Thermoplastic
Cond. wire labelling	Black or white with printed numbers with or without GNYE
Stranding	Wires stranded in layers
Exterior material	Polyvinyl chloride (PVC)
Sheath colour	Black, RAL 9005
Nominal voltage (U_0/U)	300/500 V
Test voltage	2 kV
Ampacity:	Acc. to DIN VDE, see technical appendix on page 50
Operating temp., fixed	-25 °C – +60 °C
Operating temp, mob.	-25 °C – +60 °C
Max. temperature at conductor	+70 °C
Fire behaviour	Self-extinguishing and flame retardant acc. to IEC 60332-1
Standard	Follows recommendations of DIN VDE 0250
Bending radius	12xd (diameter)

	Type	No. of wires and nominal cross-section mm²	Dimensions max. diameter mm	Ampacity A(1)	Weight kg/m	Cu content kg/m	Order no.
•	LT-KS-PVC-R-TY-18x1-J-K	18x1	33.4	15	0.590	0.173	332 602
•	LT-KS-PVC-R-TY-25x1-J	25x1	37.5	15	0.751	0.240	331 924
•	LT-KS-PVC-R-TY-8x1.5-J-K	8x1.5	28.5	18	0.491	0.115	332 134
•	LT-KS-PVC-R-TY-12x1.5-J	12x1.5	31.5	18	0.515	0.173	333 198
•	LT-KS-PVC-R-TY-16x1.5-O-K	16x1.5	32.0	18	0.594	0.230	333 241
•	LT-KS-PVC-R-TY-20x1.5-J	20x1.5	37.5	18	0.798	0.288	332 135

• Available at short notice
(1) The value serves as a reference, for a nominal voltage of up to 1000 V with an ambient temperature of 30 °C based on VDE recommendations; see Page 51

Round cable, outdoor use

Operating conditions
- Indoor/outdoor installations

Toughness
- Low to high mechanical strain

Suitability
- Standard applications
- Spring- and motor-powered cable reels
- As energy transmission and control lines
- As defined by technical data

Applications
- Main feeds for indoor cranes
- Process cranes
- Outdoor cranes/gantry cranes
- Transfer trolleys
- Hoists
- Truck-mounted cranes

Examples of applications
- Cement factory
- Chemical plants
- Foundries/steel mills
- Nuclear power plants
- Warehouses and refuse bunkers
- Landfills
- Paper mills
- Galvanising plants

Reeling cable (PUR)

As a halogen-free reeling cable for heavy devices such as cable drums (including vertical reeling operations) lifting equipment, conveyor equipment, mobile motors, traction motors and agricultural equipment with exceptional mechanical stress requirements in dry, moist, and wet areas, as well as outdoors.

Special features
- Special protection for persons and material assets
- Free from lacquer-damaging substances/silicone-free (at production)
- Halogen-free
- Small outer diameter and weight
- For travel speeds of up to 180 m/min
- Textile braid embedded between inner and outer sheath
- Permanent tensile loading without supporting element max. 25 N/mm² copper
- Limited suitability for constant use in water (no drinking water)

Notes
- RoHS compliant
- Complies with 2006/95/EC directive (Low Voltage Directive) CE
- Custom versions, other dimensions, cross-sections, conductor wire and sheath colours upon request
- Available accessories see page 36 onwards.

Technical data

Conductor material	Stranded copper wire, bare
Conductor category	Acc. to DIN VDE 0295 Class 5 / IEC 60228 Class 5
Conductor wire insulation	Polyester-based
Cond. wire labelling	Acc. to VDE 0293-308 with colours for up to 5 wires, from 6 wires onwards white with black digits with GNYE or DIN
Stranding	Wires stranded in layers
Supporting element	Central textile element (values upon request)
Exterior material	Polyurethane
Sheath colour	Black
Nominal voltage (U_0/U)	0.6/1 kV
Test voltage	2.5 kV
Ampacity:	Acc. to DIN VDE, see technical appendix on page 50
Operating temp., fixed	-50 °C – +90 °C
Operating temp, mob.	-40 °C – +90 °C
Max. temperature at conductor	+90 °C
Fire behaviour	Follows IEC 60332-1
Standard	Follows recommendations of DIN VDE 0250
Speed	180 m/min
Minimum bending radius	6xd (diameter)

	Type	No. of wires and nominal cross-section mm²	Dimensions max. diameter mm	Weight kg/m	Cu con-tent kg/m	Order no.
PUR, unshielded						
•	LT-TR-PUR-R-TF-4x1.5-J-K	4x1.5	11.2	0.155	0.061	332 404
•	LT-TR-PUR-R-TF-5x1.5-J-K	5x1.5	11.8	0.178	0.081	332 405
•	LT-TR-PUR-R-TF-7x1.5-J-K	7x1.5	13.5	0.218	0.115	332 406
•	LT-TR-PUR-R-TF-12x1.5-J-K	12x1.5	17.0	0.363	0.196	332 353
•	LT-TR-PUR-R-TF-18x1.5-J-K	18x1.5	18.1	0.459	0.271	332 407
•	LT-TR-PUR-R-TF-24x1.5-J-K	24x1.5	20.9	0.590	0.392	332 408
•	LT-TR-PUR-R-TF-30x1.5-J-K	30x1.5	24.0	0.720	0.450	332 402
•	LT-TR-PUR-R-TF-42x1.5-J	42x1.5	28.0	0.920	0.633	332 411
•	LT-TR-PUR-R-TF-4x2.5-J-K	4x2.5	12.3	0.208	0.099	332 412
•	LT-TR-PUR-R-TF-5x2.5-J-K	5x2.5	13.0	0.230	0.125	332 413
•	LT-TR-PUR-R-TF-7x2.5-J-K	7x2.5	14.7	0.315	0.180	332 414
•	LT-TR-PUR-R-TF-12x2.5-J-K	12x2.5	20.5	0.485	0.308	332 415
•	LT-TR-PUR-R-TF-18x2.5-J-K	18x2.5	20.5	0.679	0.451	332 416
•	LT-TR-PUR-R-TF-24x2.5-J-K	24x2.5	23.6	0.860	0.616	332 417
•	LT-TR-PUR-R-TF-30x2.5-J-K	30x2.5	28.2	1.080	0.771	332 409
•	LT-TR-PUR-R-TF-4x4-J-K	4x4	13.6	0.281	0.160	332 418
•	LT-TR-PUR-R-TF-4x6-J-K	4x6	14.9	0.372	0.241	332 419
•	LT-TR-PUR-R-TF-4x10-J-K	4x10	18.9	0.615	0.404	332 421
•	LT-TR-PUR-R-TF-4x16-J-K	4x16	22.1	0.924	0.645	332 422
•	LT-TR-PUR-R-TF-4x25-J-K	4x25	25.5	1.222	1.005	332 185
•	LT-TR-PUR-R-TF-4x35-J-K	4x35	30.0	1.778	1.417	332 423
•	LT-TR-PUR-R-TF-5x4-J-K	5x4	14.5	0.318	0.200	332 427
•	LT-TR-PUR-R-TF-5x6-J-K	5x6	16.1	0.435	0.317	332 428
•	LT-TR-PUR-R-TF-5x10-J-K	5x10	20.5	0.704	0.528	332 770
•	LT-TR-PUR-R-TF-5x16-J-K	5x16	24.2	1.067	0.816	332 501
PUR, shielded						
•	LT-TR-PUR-R-TF-19x2.5+5x1.5-J-C-K	19x2.5 + 5x1.5C	23.8	0.850	0.563	332 429
•	LT-TR-PUR-R-TF-4x16+2x(4x1.5)-J-C-K	4x16 +2x(4x1.5)C	25.6	1.184	0.840	332 510
•	LT-TR-PUR-TF-6X(2X1)-O-C-K	6x(2x1)C	23.0	0.597	0.265	333 250

• Available at short notice

For ampacities see table on page 55

Round cable, outdoor use

Operating conditions
- Indoor/outdoor installations

Toughness
- Low to high mechanical strain

Suitability
- Standard applications
- Spring- and motor-powered cable reels
- As energy transmission and control lines
- As defined by technical data

Applications
- Main feeds for indoor cranes
- Process cranes
- Outdoor cranes/gantry cranes
- Transfer trolleys
- Hoists
- Truck-mounted cranes

Examples of applications
- Cement factory
- Chemical plants
- Foundries/steel mills
- Nuclear power plants
- Warehouses and refuse bunkers
- Landfills
- Paper mills
- Galvanising plants

Round reeling cable KSM-S (N)SHTÖU-J/O

As a reeling cable for applications in which frequent reeling in and out is required during operation, particularly with simultaneous tension stress and/or torsional stress and/or forced guidance of the cable; in dry, moist, and wet areas, as well as outdoors; also on construction sites, in commercial and agricultural operations.

Special features
- **Free from lacquer-damaging substances/silicone-free (at production)**
- For travel speeds of up to 180 m/min
- Textile braid embedded between inner and outer sheath
- Permanent tensile loading max. 20 N/mm²
- For high mechanical stresses, particularly for high dynamic tensile forces, e.g. due to high acceleration, the permissible stress limits will need to be determined individually.

Notes
- RoHS compliant
- Complies with 2006/95/EC directive (Low Voltage Directive) CE
- Custom versions, other dimensions, cross-sections, conductor wire and sheath colours upon request
- We are pleased to offer you the cables assembled with fitting terminations

Technical data

Conductor material	Stranded copper wire, bare
Conductor category	Acc. to DIN VDE 0295 Class 5 / IEC 60228 Class 5
Conductor wire insulation	Rubber compound
Cond. wire labelling	Acc. to VDE 0293-308 with colours for up to 5 wires, from 6 wires onwards black with white digits with GNYE
Stranding	Wires stranded in layers
Inner material	Special rubber compound
Exterior material	Special rubber compound
Sheath colour	Black
Nominal voltage (U_0/U)	0.6/1 kV
Test voltage	2.5 kV
Ampacity:	Acc. to DIN VDE, see technical appendix on page 55
Operating temp., fixed	-40 °C – +80 °C
Operating temp, mob.	-40 °C – +80 °C
Max. temperature at conductor	+90 °C
Fire behaviour	Self-extinguishing and flame retardant acc. to IEC 60332-1
Standard	Follows recommendations of DIN VDE 0250
Speed	180 m/min, higher speeds upon request
Minimum bending radius	6xd (diameter) for reels 7.5xd (diameter) for guide roller

	Type	No. of wires and nominal cross-section mm²	Dimensions max. diameter mm	Weight kg/m	Cu con-tent kg/m	Order no.
•	LT-TR-GUM-R-KS-3x50+3x25/3-J-K	3x50+3x25/3	36.0	2.516	1.680	333 074
•	LT-TR-GUM-R-KS-3x70+3x35/3-J-K	3x70+3x35/3	42.0	3.494	2.352	333 075
•	LT-TR-GUM-R-KS-3x95+3x50/3-J-K	3x95+3x50/3	46.0	4.466	3.216	333 076
•	LT-TR-GUM-R-KS-3x120+3x70/3-J-K	3x120+3x70/3	52.0	5.640	4.128	333 077
•	LT-TR-GUM-R-KS-3x150+3x70/3-J-K	3x150+3x70/3	56.0	6.713	4.992	333 078
•	LT-TR-GUM-R-KS-3x185+3x95/3-J-K	3x185+3x95/3	61.0	7.865	6.240	333 079
•	LT-TR-GUM-R-KS-3x240+3x120/3-J-K	3x240+3x120/3	70.0	10.800	8.064	333 080

• Available at short notice
For ampacities see table Page 51

Operating conditions
- Indoor/outdoor installations

Toughness
- Low to high mechanical strain

Suitability
- Standard applications
- Motor-powered cable reels
- As a power transmission line and combined power and control line
- As defined by technical data

Applications
- Gantry cranes
- Container cranes

Examples of applications
- Container terminals
- Container ports

Protolon (SMK) and Protolon (SMK)+LWL

As a reeling cable for high to extreme mechanical stresses (e.g. dynamic tensile loads, multiple deflections in other planes, flexing work when running over rollers, torsional stresses etc.). Use on mobile devices such as high-speed container cranes, crane installations, large mobile equipment and excavators. Can also be used in areas defined by DIN VDE 0168 and 0118: Surface and underground mining. We would be happy to provide you with other trailing cables as well. Please do not hesitate to contact us.
Protolon SMK – Brand name Prysmian©

Mechanical parameters

Dynamic tensile loads during acceleration processes:	up to 30 N/mm²
Max. permanent tensile loading max.	Up to 20 N/mm²
Torsional stress	± 25 °/m
Minimum bending radii	Acc. to DIN VDE 0298 Part 3
Minimum clearances for S-shaped deflection	20xd (diameter)
Travel speed	Crane carriage (reeling): no limits, above 240 m/min. upon request
Additional testing	Alternating bending test, torsion test

Chemical parameters

Oil resistance	Given by DIN VDE 0473, Part 811-2-1 Para 10
Weather resistance	No limits on use outdoors and in indoor areas, resistant to ozone, UV, and moisture
Water compatibility	Acc. to HD 2216

Electrical and thermal parameters

Nominal voltage	Uo/U 6/10 kV
Highest permissible operating voltage	In AC grids Uo/U 6.9/12 kV in DC grids Uo/U 9,0/18 kV
Test alternating voltage	17 kV
Ampacity	Acc. to DIN VDE 0298 Part 4, higher values permissible in exceptions. Please contact the manufacturer.
Bus compatibility	Interference-free data transfer with the use of fibre optic cables (LWL). Also see Protolon (SMK) LWL
EMC	Due to the symmetrical three-wire design with extremely low manufacturing tolerances, this design has a very low interference/noise level.
Operating temp., fixed	-35 °C – +80 °C
Operating temp, mob.	-50 °C – +80 °C
Max. temperature at conductor	+90 °C
Short-circuit temperature. at conductor	+250 °C
Conductor and PE	Electrolytic copper, tinned, especially finely stranded Class FS; also see DIN VDE 0295
Insulation	Acc. to DIN VDE 0207 Part 20; Protolon HS
Cond. wire labelling marker layer	From 3.6/6 kV natural-coloured insulation with black
Wire configuration	Stranded, three-wire configuration, PE twisted in the reinforcing layers
Designation	Protolon (SMK) (N)TSCGEWÖU (No. of cond. wires)x(cross-section)(nominal voltage)(year of manufacture)(running no.)

LWL – Optical parameters, multi-mode

Transfer rate of optical fibres	62,5/125 graded-index fibres
Max. cable attenuation	For a wavelength of 850 nm: 3.3 dB/km For a wavelength of 1300 nm: 0.9 dB/km
Bandwidth	at 850 nm › 400 MHz at 1300 nm › 600 MHz
Numerical aperture	0.275 ± 0,02
Core	Generally for all optical fibre trailing cables: conducting NBR profile core for additional stabilisation
Optical fibres	Core diameter of fibres 62.5; 50 or 9 µm Diameter above the coating 250 µm Versions with 6, 12 or 18 fibres
Labelling of fibres	Specially developed colour code to differentiate the individual fibres
Fibre cladding	Hollow cores with filler mass, maerial ETFE-based
Fibre configuration	Six strands, single-layer stranding, with one or three fibres each. Special stranding around a supporting element
Fibre configuration	Three-strand configuration with special supporting element in core, PE halved in two outer reinforcing layers
Sheath system	• Protofirm Sandwich: 2-layer inner sheath Advanced special compound with EPR-based material, minimum quality 5GM3, simultaneously serves as waterproofing, colour red • Torsion protection braiding: reinforced braiding of polyester fibres permanently vulcanised between the sheaths. This results in the high strength of the sheath system. • Protofirm Sandwich: 2-layer outer sheath The innovative sandwich design offers a sheath system with a unique combination of flexibility and resilience. Abrasion-resistant and tear-proof special rubber compound, PCP-based. min. quality 5GM5, colour bright red / red

	Type	No. of wires and nominal cross-section mm²	Dimensions max. diameter mm	Weight kg/m	Cu content kg/m	Order no.
Protolon (SMK)						
	LT-TR-EPR-R-PR-3x25+3x25/3-J-K	3x25+3x25/3	40.8	2.410	1.008	332 357
	LT-TR-EPR-R-PR-3x35+3x35/3-J-K	3x35+3x35/3	43.9	2.880	1.411	332 376
	LT-TR-EPR-R-PR-3x50+3x25/3-J-K	3x50+3x25/3	46.7	3.480	1.765	332 631
Protolon (SMK) +LWL (6G62.5/125 | alternatives upon request)						
	LT-TR-EPR-R-PR-LWL-3x25+2x25/2-J-K	3x25+2x25/2	43.7	2.610	1.008	332 486
	LT-TR-EPR-R-PR-LWL-3x35+2x25/2-J-K	3x35+2x25/2	45.7	3.010	1.411	332 675

Cable glands, accessories

PVC-cable glands for flatform cables

Operating conditions
- Indoor use

Use
- When inserting flatform cables, the sealing lips automatically adjust for large clearances. This allows for up to two flat-form cables to be clamped. Smaller cable dimensions can be used. This reduces the protection class.

Technical data:
- Temperature range: -30 °C to + 80 °C
- Protection class IP 54 acc. to EN 60529
- Colour: grey
- Material: polyamide
- Connecting thread: M25 to M50 UL listed acc. to EN 60423

Required accessories:
- Lock nut; seals to be ordered separately (page 39)
- Compatible flatform cables starting from page 4
- Cable glands for explosion hazard areas are also available

Type	H (1) mm	B (2) mm	SW 1 mm	SW 2 mm	Order no.
LV-FL-M25X1.5-1-K	5	15	27	23	332 549
LV-FL-M32X1.5-1-K	8	22	42	40	332 550
LV-FL-M40X1.5-1-K	10.5	27	42	40	332 551
LV-FL-M50X1.5-1-K	11.5	39	60	55	332 552
LV-FL-M50X1.5-2-K	13.5	40	60	55	332 553

Brass cable glands for flatform cables

Operating conditions
- Indoor and outdoor use

Use
- When inserting flatform cables, the sealing lips automatically adjust for large clearances. This allows for up to two flat-form cables to be clamped. Smaller cable dimensions can be used. This reduces the protection class.

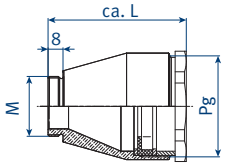
Technical data:
- Temperature range: -30 °C to + 80 °C
- Protection class IP 54 acc. to EN 60529
- Colour: silver
- Material: brass, nickel-plated
- Connecting thread: M25 to M50 acc. to EN 60423

Required accessories:
- Lock nut to be ordered separately (page 39)
- Compatible flatform cables starting from page 4
- **Cable glands for explosion hazard areas are also available**

Type	H(1) mm	B(2) mm	SW 1 mm	SW 2 mm	Order no.
LV-FL-M20X1.5-2-MS	5	15	22	20	332 543
LV-FL-M25X1.5-2-MS	8.5	20	30	28	332 544
LV-FL-M32X1.5-2-MS	8	22	40	37	332 545
LV-FL-M40X1.5-2-MS	10.5	30	43	37	332 546
LV-FL-M50X1.5/2-MS	12.5	37	55	47	332 624

1) H = height of cable feedthrough
2) B = width (breadth) of cable feedthrough

Aluminium metal and brass cable glands for flatform cables



Type	Screw thread D		H[1] mm	B[2] mm	L mm	SW1 m	Order no.
	M	Pg					
LV-FL-M32X1.5/42	M 32 x 1.5	42	12	44	74	54	332 665
LV-FL-M40X1.5/42	M 40 x 1.5	42	12	44	60	54	332 666
LV-FL-M40X1.5/48-1	M 40 x 1.5	48-1	13	50	75	60	332 667
LV-FL-M40X1.5/48-2	M 40 x 1.5	48-2	9	60	78	60	332 668

Operating conditions
- Indoor and outdoor use

Use
- When inserting flatform cables, the sealing lips automatically adjust for large clearances. This allows for up to two flatform cables to be clamped. Smaller cable dimensions can be used. This reduces the protection class.

Technical data:
- Temperature range: -30 °C to + 80 °C
- Protection class IP 54 acc. to EN 60529
- Colour: silver
- Material: Aluminium
- Connecting thread: M32 to M40

Required accessories:
- Lock nut; seals; to be ordered separately
- **Compatible flatform cables starting from page 4**
- Cable glands for explosion hazard areas are also available

1) H = height of cable feedthrough
2) B = width (breadth) of cable feedthrough

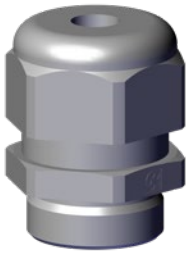
PVC cable glands for round cables

Operating conditions
- Depends on individual gland

Use
- For inserting round cables
- For use in installation scenarios without special requirements
- Version with large seal area

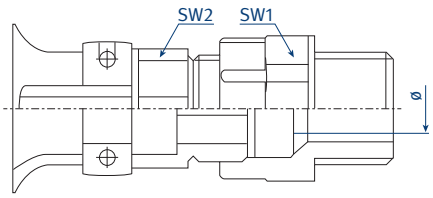
Technical data:
- Temperature range: -20 °C to + 65 °C
- Protection class IP 68 acc. to EN 50262
- Colour: grey
- Material: polyamide
- Connecting thread: M16 to M63 Acc. to EN 60423

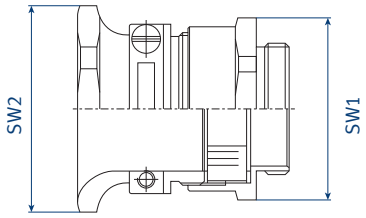
Required accessories:
- Lock nut to be ordered separately (page 39)
- Compatible round cables starting from page 12
- Cable glands for explosion hazard areas are also available



Type	Screw thread D	for cable ø mm from-to	SW1 mm	Order no.
Plastic				
LV-RL-M16X1.5-K-LD4.5/10-IP68	M 16 x 1.5	4.5 - 10	20	333 661
LV-RL-M20X1.5-1-K-LD6/13-IP68	M 20 x 1.5	6 - 13	24	333 662
LV-RL-M25X1.5-K-LD9/17-IP68	M 25 x 1.5	9 - 17	29	333 663
LV-RL-M32X1.5-K-LD15/21-IP68	M 32 x 1.5	15 - 21	36	333 664
LV-RL-M40X1.5-K-LD16/28-IP68	M 40 x 1.5	16 - 28	44	333 665
LV-RL-M50X1.5-K-LD23/35-IP68	M 50 x 1.5	23 - 35	54	333 666
LV-RL-M63X1.5-K-LD36/48-IP68	M 63 x 1.5	36 - 48	67	332 698

PVC and brass cable glands for round cables with strain relief and bend radius protection





Type	for cable ø mm from-to	SW1 mm	SW2 mm	Order no.
Plastic				
LV-RL-M16X1.5-K-LD5.5/7.5-ZB-IP55	5.5 - 7.5	19	17	332 586
LV-RL-M20X1.5-K-LD9/11-ZB-IP55	9 - 11	24	22	332 587
LV-RL-M20X1.5-K-LD10/13-ZB-IP55	10 - 13	27	24	332 588
LV-RL-M25X1.5-K-LD13/16.5-ZB-IP55	13 - 16.5	32	30	332 589
LV-RL-M32X1.5-K-LD18/25-ZB-IP55	18 - 25	42	40	332 590
LV-RL-M40X1.5-K-LD18/25-ZB-IP55	18 - 25	42	40	332 591
Brass				
LV-RL-M16X1.5-MS-LD6/11,5-ZB-IP55	6 - 11.5	20	24	332 580
LV-RL-M20X1.5-MS-LD8/11.5-ZB-IP55	8 - 11.5	22	27	332 581
LV-RL-M25X1.5-MS-LD8.5/15-ZB-IP55	8.5 - 15	27	30	332 582
LV-RL-M25X1.5-MS-LD12/19-ZB-IP55	12 - 19	30	34	332 583
LV-RL-M32X1.5-MS-LD17/27-ZB-IP55	17 - 27	40	46	332 584
LV-RL-M40X1.5-MS-LD17/27-ZB-IP55	17 - 27	43	46	332 585

Operating conditions
- Depends on individual gland

Use
- For inserting round cables
- For use in installation scenarios that require high tension resistance and bend radius protection

Technical data (plastic):
- Temperature range: -30 °C to + 80 °C
- Protection class IP 55 acc. to EN 60529
- Colour: grey
- Material: polyamide
- Screw/nut: stainless steel
- Connecting thread: M16 to M40 acc. to EN 60423

Technical data (brass):
- Temperature range: -30 °C to + 100 °C
- Protection class IP 55 acc. to EN 60529
- Colour: silver
- Material: brass, nickel-plated
- Screw/nut: stainless steel
- Connecting thread: M12 to M40 acc. to EN 60423

Required accessories:
- Lock nut to be ordered separately (page 39)
- Compatible round cables starting from page 12
- Cable glands for explosion hazard areas are also available

Cable glands, accessories

PVC and brass cable glands for round cables

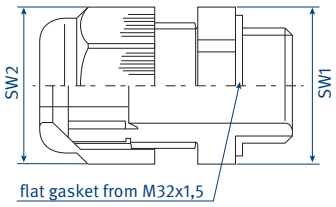
Operating conditions
- Depends on individual gland

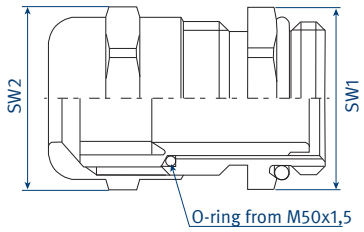
Use
- For inserting round cables
- For use in installation scenarios with high fire protection requirements.
- Integrated strain relief
- Large sealing area
- Installation-friendly

Technical data (plastic)
- Temperature range: -20 °C to +100 °C
- Protection class IP 68 acc. to EN 60529
- Colour: grey
- Material: polyamide
- Connecting thread: M16 to M63 Acc. to EN 60423
- UL/CSA listed

Technical data (plastic)
- Temperature range: -20 °C to + 100 °C
- Protection class IP 68 acc. to EN 60529
- Colour: silver
- Material: brass, nickel-plated
- Connecting thread: M12 to M63 acc. to EN 60423
- UL/CSA listed

Required accessories
- Lock nut to be ordered separately (page 39)
- Compatible round cables starting from page 12
- Cable glands for explosion hazard areas are also available





Type	for cable ø mm from-to	SW1 mm	SW 2 mm	Order no.
Plastic				
LV-RL-M12X1.5-K-LD3/6-IP68	3-6	15	15	332 679
LV-RL-M16X1.5-K-LD5/10-IP68	5-10	20	20	332 680
LV-RL-M20X1.5-K-LD8/13-IP68	8-13	24	24	332 681
LV-RL-M25X1.5-K-LD11/17-IP68	11-17	29	29	332 682
LV-RL-M32X1.5X-K-LD15/21-IP68	15-21	36	36	332 683
LV-RL-M40X1.5-K-LD19/28-IP68	19-28	46	46	332 684
LV-RL-M50X1.5-K-LD27/35-IP68	27-35	55	55	332 685
LV-RL-M63X1.5-K-LD32/42-IP68	32-42	68	68	332 686
Brass				
LV-RL-M12X1.5-MS-LD3/6-IP68	3-6	14	14	332 592
LV-RL-M16X1.5-MS-LD5/9-IP68	5-9	17	17	332 593
LV-RL-M20X1.5-MS-LD9/13-IP68	9-13	22	22	332 594
LV-RL-M25X1.5-MS-LD11/16-IP68	11-16	27	27	332 595
LV-RL-M32X1.5-MS-LD14/21-IP68	14-21	34	34	332 596
LV-RL-M40X1.5-MS-LD19/27-IP68	19-27	43	43	332 597
LV-RL-M50X1.5-MS-LD24/35-IP68	24-35	55	55	332 598
LV-RL-M63X1.5-MS-LD32/42-IP68	32-42	65	65	332 599
LV-RL-M63X1.5-MS-LD38/48-IP68	38-48	65	65	332 678

Conduit nuts GM

Type	Screw thread D	SW mm	Order no.
Plastic			
LV-GM-M12X1.5-K	M 12x1.5	17	332 763
LV-GM-M16X1.5-K	M 16x1.5	22	332 752
LV-GM-M20X1.5-K	M 20x1.5	27	332 541
LV-GM-M25X1.5-K	M 25x1.5	32	332 533
LV-GM-M32X1.5-K	M 32x1.5	41	332 534
LV-GM-M40X1.5-K	M 40x1.5	50	332 753
LV-GM-M50X1.5-K	M 50x1.5	60	332 535
LV-GM-M63X1.5-K	M 63x1.5	75	332 542
Brass			
LV-GM-M12X1.5-MS	M 12x1.5	15	332 762
LV-GM-M16X1.5-MS	M 16x1.5	19	332 745
LV-GM-M20X1.5-MS	M 20x1.5	24	332 746
LV-GM-M25X1.5-MS	M 25x1.5	30	332 747
LV-GM-M32X1.5-MS	M 32x1.5	36	332 748
LV-GM-M40X1.5-MS	M 40x1.5	46	332 749
LV-GM-M50X1.5-MS	M 50x1.5	60	322 750
LV-GM-M63X1.5-MS	M 63x1.5	70	332 751

Operating conditions
- Depends on individual gland

Use
- For securely fixing cable glands in place

Technical data (plastic)
- Temperature range: -20 °C to +100 °C
- Protection class IP 54 acc. to EN 60529
- Colour: grey
- Material: polyamide
- Connecting thread: M12 to M63 acc. to EN 60423

Technical data (plastic)
- Temperature range: -60 °C to +200 °C
- Protection class IP 54 acc. to EN 60529
- Colour: silver
- Material: brass, nickel-plated
- Connecting thread: M12 to M63 acc. to EN 60423

Sealing rings DM

Type	Screw thread D	Order no.
LV-D-M12X1.5-K	M 12x1.5	332 754
LV-D-M16X1.5-K	M 16x1.5	332 755
LV-D-M20X1.5-K	M 20x1.5	332 756
LV-D-M25X1.5-K	M 25x1.5	332 757
LV-D-M32X1.5-K	M 32x1.5	332 758
LV-D-M40X1.5-K	M 40x1.5	332 759
LV-D-M50X1.5-K	M 50x1.5	332 760
LV-D-M63X1.5-K	M 63x1.5	332 761

Operating conditions
- Indoor and outdoor use

Use
- For better seals at connecting threads
- Installed seal enables higher protection class

Technical data
- Temperature range: -30 °C to +90 °C
- Colour: grey
- Material: Polyethylene
- Connecting thread: M12 to M63 acc. to EN 50262

Extension fittings EM

Operating conditions
- Depends on individual gland

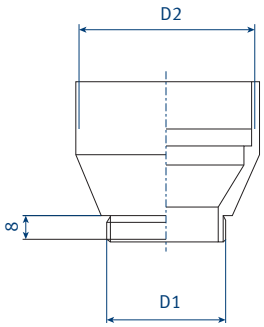
Use
- To enlarge a threaded hole or a through hole to a larger screw thread size.

Technical data (plastic)
- Temperature range: -30 °C to +100 °C
- Protection class: depends on the combination of components
- Colour: grey
- Material: polyamide
- Connecting thread: M12 to M32 acc. to EN 60423

Technical data (plastic)
- Temperature range: -60 °C to +200 °C
- Protection class: depends on the combination of components
- Colour: silver
- Material: brass, nickel-plated
- Connecting thread: M12 to M50 acc. to EN 60423

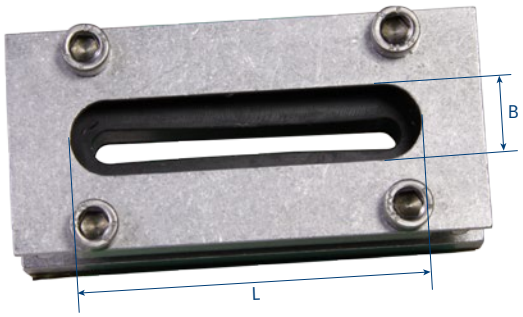
Technical data (aluminium)
- Colour: silver
- Material: Aluminium
- Connecting thread: M32 to M40

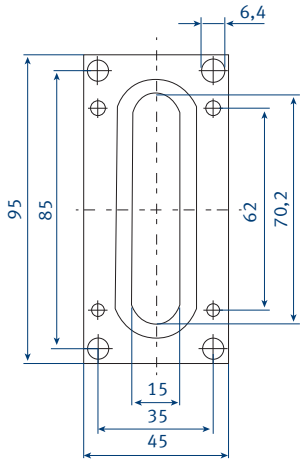
Type	Screw thread		Order no.
	D1	D2	
Plastic			
LV-E-M12X1.5-K-M16X1.5	M12x1.5	M 16x1.5	332 721
LV-E-M16X1.5-K-M20X1.5	M 16x1.5	M 20x1.5	332 722
LV-E-M20X1.5-K-M25X1.5	M 20x1.5	M 25x1.5	332 723
LV-E-M25X1.5-K-M32X1.5	M 25x1.5	M 32x1.5	332 724
LV-E-M32X1.5-K-M40X1.5	M 32x1.5	M 40x1.5	332 725
Brass			
LV-E-M12X1.5-MS-M16X1.5	M12x1.5	M 16x1.5	332 714
LV-E-M16X1.5-MS-M20X1.5	M 16x1.5	M 20x1.5	332 715
LV-E-M20X1.5-MS-M25X1.5	M 20x1.5	M 25x1.5	332 716
LV-E-M25X1.5-MS-M32X1.5	M 25x1.5	M 32x1.5	332 717
LV-E-M32X1.5-MS-M40X1.5	M 32x1.5	M 40x1.5	332 718
LV-E-M40X1.5-MS-M50X1.5	M 40x1.5	M 50x1.5	332 719
LV-E-M50X1.5-MS-M63X1.5	M 50x1.5	M 63x1.5	332 720



Type	Screw thread D1	Screw thread D2	Order no.
LV-E-M32X1.5-AL	M 32x1.5	Pg 42	332 669
LV-E-M40X1.5-AL	M 40x1.5	Pg 42	332 670
LV-E-M40X1.5-AL	M 40x1.5	Pg 48	332 671

Cable connectors for flatform cables





Type	Cable opening L x B mm	Order no.
LV-LS-FL-70-15-63x7-AL	70 x 15 + 63 x 7	333 461
LV-LS-FL-49x4.5-AL	49 x 4.5	333 462
LV-LS-FL-49x4.5+49x4.5-49x11.5-AL	49 x 4.5 + 49 x 11.5	333 463
LV-LS-FL-63x12-70.2-AL	63 x 12 (70.2)	333 464

Operating conditions
- Indoor and outdoor use

Use
- Cable flanges for universal use
- Primarily for large flatform cables

Technical data
- Temperature range: -20 °C to +100 °C
- Protection class: with proper installation IP 65
- Colour: silver
- Material: Aluminium
- Seal: NBR

Conduit covers VM

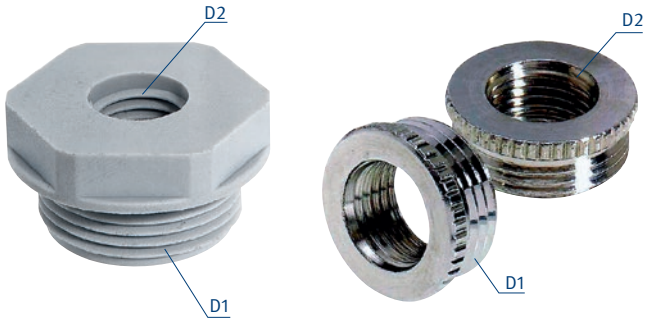
Use
- To securely seal an unused threaded or through hole

Technical data (plastic)
- Temperature range: -30 °C to +100 °C
- Protection class: IP 54 (higher protection class possible when installed with sealing ring)
- Colour: grey
- Material: polyamide
- Connecting thread: M12 to M63

Technical data (plastic)
- Temperature range: -60 °C to +200 °C
- Protection class: IP 54
- Colour: silver
- Material: brass, nickel-plated
- Connecting thread: M12 to M63

Type	Screw thread D	Order no.
Plastic		
LV-VM-M-12-X-1.5-K	M 12x1.5	332 743
LV-VM-M16X1.5-K	M 16x1.5	332 699
LV-VM-M20X1.5-K	M 20x1.5	332 700
LV-VM-M25X1.5-K	M 25x1.5	332 701
LV-VM-M32X1.5-K	M 32x1.5	332 702
LV-VM-M40X1.5-K	M 40x1.5	332 703
LV-VM-M50X1.5-K	M 50x1.5	332 704
LV-VM-M63X1.5-K	M 63x1.5	332 705
Brass		
LV-VM-M12X1.5-MS	M 12x1.5	332 742
LV-VM-M16X1.5-MS	M 16x1.5	332 706
LV-VM-M20X1.5-MS	M 20x1.5	332 707
LV-VM-M25X1.5-MS	M 25x1.5	332 708
LV-VM-M32X1.5-MS	M 32x1.5	332 709
LV-VM-M40X1.5-MS	M 40x1.5	332 710
LV-VM-M50X1.5-MS	M 50x1.5	332 711
LV-VM-M63X1.5-MS	M 63x1.5	332 712

Reductions RM



Type	Screw thread D1	Screw thread D2	Order no.
Plastic			
LV-R-M16X1.5-K-M12X1.5	M 16x1.5	M 12x1.5	332 735
LV-R-M20X1.5-K-M16X1.5	M 20x1.5	M 16x1.5	332 736
LV-R-M25X1.5-K-M20X1.5	M 25x1.5	M 20x1.5	332 737
LV-R-M32X1.5-K-M25X1.5	M 32x1.5	M 25x1.5	332 738
LV-R-M40X1.5-K-M32X1.5	M 40x1.5	M 32x1.5	332 739
LV-R-M50X1.5-K-M40X1.5	M 50x1.5	M 40x1.5	332 740
LV-R-M63X1.5-K-M50X1.5	M 63x1.5	M 50x1.5	332 741
Brass			
LV-R-M16X1.5-MS-M12X1.5	M 16x1.5	M 12x1.5	332 728
LV-R-M20X1.5-MS-M16X1.5	M 20x1.5	M 16x1.5	332 729
LV-R-M25X1.5-MS-M20X1.5	M 25x1.5	M 20x1.5	332 730
LV-R-M32X1.5-MS-M25X1.5	M 32x1.5	M 25x1.5	332 731
LV-R-M40X1.5-MS-M32X1.5	M 40x1.5	M 32x1.5	332 732
LV-R-M50X1.5-MS-M40X1.5	M 50x1.5	M 40x1.5	332 733
LV-R-M63X1.5-MS-M50X1.5	M 63x1.5	M 50x1.5	332 734

Use
- To reduce a threaded hole or a through hole to a smaller screw thread size.

Technical data (plastic)
- Temperature range: -30 °C to +100 °C
- Protection class: IP depends on the combination with other components
- Colour: grey
- Material: polyamide
- Connecting thread: M16 to M63

Technical data (plastic)
- Temperature range: -60 °C to +200 °C
- Protection class: IP depends on the combination with other components
- Colour: silver
- Material: brass, nickel-plated
- Connecting thread: M16 to M63

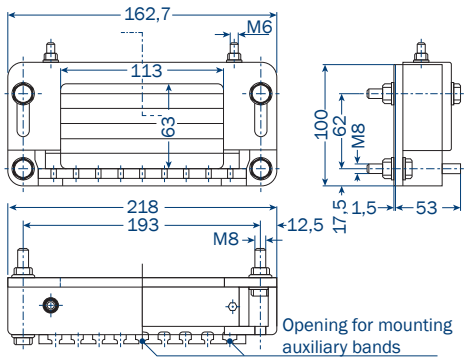
Combination flange

Operating conditions
- Indoor and outdoor use

Use
- Cable flanges for universal use
- Primarily for large flatform cables

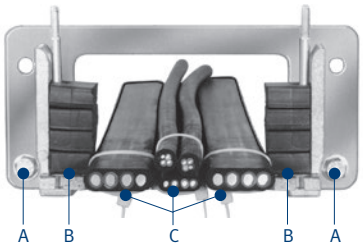
Technical data
- Temperature range: -30 °C to +55 °C
- Protection class: IP 54
- Colour: grey
- Material: Aluminium
- Seal: NBR
- Connecting thread: M12 to M63 acc. to EN 50262

Combination connector for flatform and round cables (protection class IP 54)

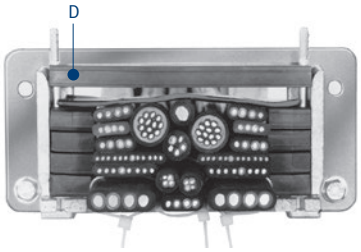


Type	Max. cable opening Height x width mm	Materials	Order no.
LV-KFL21-55x105-AL	55 x 105	Housing: light metal Sealing elements: Neoprene screws: galvanised	331 241
LV-KFL-DIMA			331 271

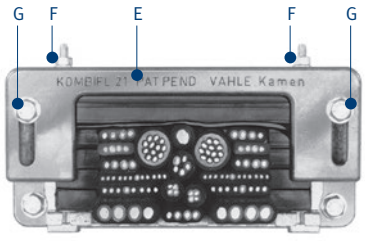
Installation instructions



1. Screw the combination flange to the junction box with the lower short fastening M8 screw (A).
2. Cut the lateral rubber elements (B) to the desired length depending on the planned cable group and insert them.
3. Insert the cables with sealant and fill out the empty spaces with sealant. In order to ensure that the cables remain in position during installation, they can be held in place using auxiliary bands (C).



4. Even out the surface of the cable group with sealant.
5. Insert the remaining uncut rubber elements (D).



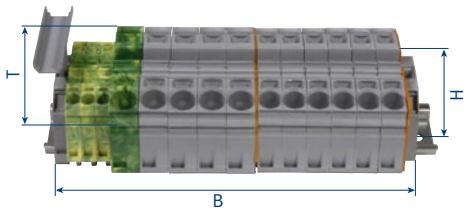
6. Loosely screw on the top part of the combination flange (E) with the M6 screws (F).
7. Insert the upper long M8 fastening screws (G) into the combination flange and screw on loosely.
8. Tighten M6 nuts (F).
9. Tighten M8 fastening screws (G).
10. The auxiliary bands (C) can now be removed.

Terminal clamps and accessories

Technical data

(Rated impulse-withstand voltage/contamination level: 8 kV/3)
2-cond. feed-circuit terminals

Other terminals available upon request



Type	Rated voltage	Rated current	Rated cross-section
Circuit_terminal2.5QMM-ZF	800 V	24 A	2.5 mm²
Circuit_terminal4QMM-ZF	800 V	32 A	4.0 mm²
Circuit_terminal6QMM-ZF	800 V	41 A	6.0 mm²
Circuit_terminal10QMM-ZF	800 V	57 A	10.0 mm²
Circuit_terminal16QMM-ZF	800 V	76 A	16.0 mm²
Circuit_terminal35QMM-ZF	1000 V	125 A	35.0 mm²
Circuit_terminal50QMM-ZF	1000 V	150 A	50.0 mm²
Circuit_terminal95QMM-ZF	1000 V	232 A	95.0 mm²

Operating conditions

- Circuit terminals
- Vibration-proof, maintenance-free

Use

- For universal use
- For installation in terminal and junction boxes

Technical data

- Total number of terminals 2
- Total number of potentials 1
- Colour: grey

- Rating data in. acc. with IEC/EN 60947-7-1
- Contamination level 3
- Rated voltage EN: 800/1000 V
- Rated impulse-withstand voltage: 8 kV
- Nominal current: according to cross-section A
- Connecting technology: CAGE CLAMP
- Connects single and fine wires depending on cross-section

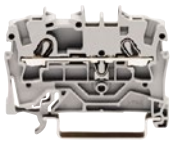
- Wiring type: front/side
- Design: horizontal design
- Labelling area: middle/side

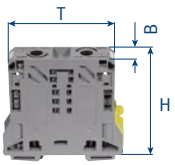
- Insulating material: PA 6.6 V0
- Installation type: DIN 35 mounting rail

- Terminals up to 16 mm² suitable for Ex e II applications
- Terminals ‹ 16 mm² for Ex applications upon request

Terminal clamps

2-cond. feed-circuit terminals





Type	Connection ø, fine wire, in mm²	T mm	H mm	B mm	Order no.
EZK-2.5DK-GR-21-ZF2002-WAG-35-5.2-24	0.5 - 2.5	48.5	32.9	5.2	333 500
EZK-4DK-GR-21-ZF2004-WAG-35-6.2-32	0.5 - 4	52.3	32.9	6.2	333 501
EZK-6DK-GR-21-ZF2006-WAG-35-7.5-41	0.5 - 6	57.5	32.9	7.5	333 502
EZK-10DK-GR-21-ZF2010-WAG-35-10-57	0.5 - 10	67.8	36.9	10	333 503
EZK-16DK-GR-21-ZF2016-WAG-35-12-76	0.5 - 16	69.8	36.9	12	333 504
EZK-35DK-GR-21-ZF285-WAG-35H-16-125	2.5 - 35	86	63	16	333 505
EZK-50DK-GR-21-ZF285-WAG-35H-20-150[1]	10 - 70	94	87	20	333 506
EZK-95DK-GR-21-ZF285-WAG-35H-25-232	25 - 95	107	101	25	333 507

[1] Terminal 50 mm² connects a finely stranded cable of up to 70 mm²

Terminal clamps and accessories

Operating conditions
- Circuit terminals
- Vibration-proof, maintenance-free

Use
- For universal use
- For installation in terminal and junction boxes

Technical data
- Total number of terminals 2
- Total number of potentials 1
- Colour: grey

- Rating data in. acc. with IEC/EN 60947-7-1
- Contamination level 3
- Rated voltage EN: 800/1000 V
- Rated impulse-withstand voltage: 8 kV
- Nominal current: according to cross-section A
- Connecting technology: CAGE CLAMP
- Connects single and fine wires depending on cross-section

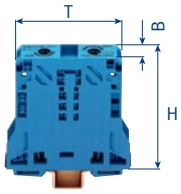
- Wiring type: front/side
- Design: horizontal design
- Labelling area: middle/side

- Insulating material: PA 6.6 V0
- Installation type: DIN 35 mounting rail

- Terminals up to 16 mm² suitable for Ex e II applications
- Terminals ‹ 16 mm² for Ex applications upon request

Circuit terminal

N-terminal

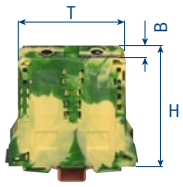


Type	Connection ø. fine wire, in mm²	T mm	H mm	B mm	Order no.
EZK-2.5DK-BL-21-ZF2002-WAG-35-5.2-24	0.5 - 2.5	48.5	32.9	5.2	333 508
EZK-4DK-BL-21-ZF2004-WAG-35X6.2-32	0.5 - 4	52.3	32.9	6.2	333 509
EZK-6DK-BL-21-ZF2006-WAG-35-7.5-41	0.5 - 6	57.5	32.9	7.5	333 510
EZK-10DK-BL-21-ZF2010-WAG-35-10-57	0.5 - 10	67.8	36.9	10	333 511
EZK-16DK-BL-21-ZF2016-WAG-35-12-76	0.5 - 16	69.8	36.9	12	333 512
EZK-35DK-BL-21-ZF285-WAG-35H-16-125	2.5 - 35	86	63	16	333 513
EZK-50DK-BL-21-ZF285-WAG-35H-20-150[1]	10 - 70	94	87	20	333 514
EZK-95DK-BL-21-ZF285-WAG-35H-25-232	25 - 95	107	101	25	333 515

Terminals clamps for ground

PE terminal

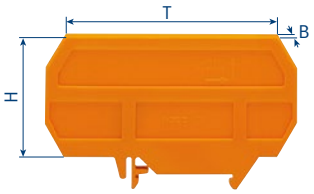
The ground clamp makes the connection to the mounting rail. The plastic housing of the terminal strip is coloured green-yellow.



Type	Connection ø. fine wire, in mm²	T mm	H mm	B mm	Order no.
EZK-2.5SL-GNGE-21-ZF2002-WAG-35-5.2-24	0.5 - 2.5	48.5	32.9	5.2	333 516
EZK-4SL-GNGE-21-ZF2004-WAG-35-6.2-32	0.5 - 4	52.3	32.9	6.2	333 517
EZK-6SL-GNGE-21-ZF2006-WAG-35-7.5-41	0.5 - 6	57.5	32.9	7.5	333 518
EZK-10SL-GNGE-21-ZF2010-WAG-35-10-57	0.5 - 10	67.8	36.9	10	333 519
EZK-16SL-GNGE-21-ZF2016-WAG-35-12-76	0.5 - 16	69.8	36.9	12	333 520
EZK-35SL-GNGE-21-ZF285-WAG-35H-16-125	2.5 - 35	86	63	16	333 521
EZK-50SL-GNGE-21-ZF285-WAG-35H-20-150[1]	10 - 70	94	87	20	333 522
EZK-95SL-GNGE-21-ZF285-WAG-35H-25-232	25 - 95	107	101	25	333 523

[1] Terminal 50 mm² connects a finely stranded cable of up to 70 mm²

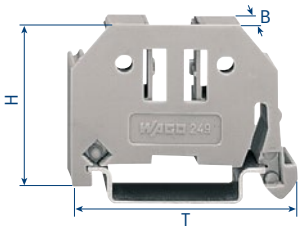
Cover and intermediate plates



Type	T mm	H mm	B mm	Order no.
EZK-AP-GR-2002-WAG-0.8	48.5	32.9	0.8	333 524
EZK-AP-GR-2004-WAG-1	52.5	32.9	1	333 525
EZK-AP-GR-2006-WAG-1	57.5	32.9	1	333 526
EZK-AP-GR-2010-WAG-1	65	36.5	1	333 527
EZK-AP-GR-2016-WAG-1	73	36.5	1	333 528
EZK-AP-OR-209-WAG-3	90	52	3	333 529

End clamp

for terminal strips



Type	T mm	H mm	B mm	Order no.
EZK-EK-GR-249-WAG-35-6	45	28.2	6	333 530
EZK-EK-GR-249-WAG-35-10	45	28.2	10	333 531

Mounting rail

Length: 2 m
acc. to EN 60715

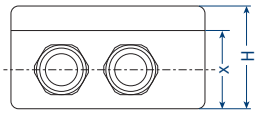
Type	Material	H mm	Order no.
EZK-TS-VZ-210-WAG-35H-G	Galvanised steel	15	333 532
EZK-TS-VZ-210-WAG-35-G	Galvanised steel	7.5	333 533
EZK-TS-VZ-210-WAG-35-U	Galvanised steel	7.5	333 534
EZK-TS-VZ-210-WAG-35H-U	Galvanised steel	15	333 535
EZK-TS-KU-210-WAG-35H-U	Copper	15	333 536

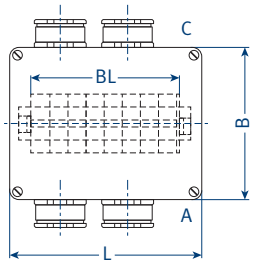
Terminal strips for explosion hazard areas are also available

Terminal boxes

Plastic terminal boxes

Cable glands and terminal strips to be ordered separately.
Material: Plastic
Metal parts: galvanised
Protection class: IP 54



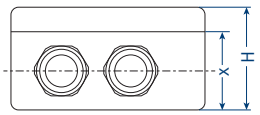


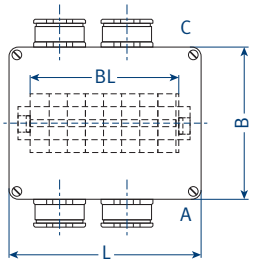
Type	Dimensions			Dimension X	Max. block length BL mm	Weight in kg	Order no.
	L mm	B mm	H mm				
AK0-K-TS35	115	115	70	60	60	approx. 0.280	333 540
AK1-K-TS35	190	150	100	75	130	approx. 0.500	333 541
AK2-K-TS35	280	200	140	120	220	approx. 1.300	333 542

Type	Cable glands											
	M 20x1.5		M 25x1.5		M 32x1.5		M 40x1.5		M 50x1.5		M 63x1.5	
	Max. qty		Max. qty		Max. qty		Max. qty		Max. qty		Max. qty	
	A	C	A	C	A	C	A	C	A	C	A	C
AK0-K-TS35	2	2	2	2	1	1	-	-	-	-	-	-
AK1-K-TS35	6	6	5	5	3	3	2	2	2	2	-	-
AK2-K-TS35	12	12	10	10	8	8	4	4	3	3	3	3

Steel terminal boxes

Cable glands and terminal strips to be ordered separately.
Material: Sheet steel
Metal parts: Timer unit DD paint RAL 7032, galvanised screws
Protection class: IP 54





Type	Dimensions			Dimension X	Max. block length BL mm	Weight in kg	Order no.
	L mm	B mm	H mm				
AK1-ST-TS35	200	150	120	90	160	approx. 2.100	333 543
AK2-ST-TS35	300	200	120	90	260	approx. 2.950	333 544
AK3-ST-TS35	400	200	120	90	360	approx. 3.720	333 545

Type	Cable glands											
	M 20x1.5		M 25x1.5		M 32x1.5		M 40x1.5		M 50x1.5		M 63x1.5	
	Max. qty		Max. qty		Max. qty		Max. qty		Max. qty		Max. qty	
	A	C	A	C	A	C	A	C	A	C	A	C
AK1-ST-TS35	10	10	10	10	5	5	3	3	2	2	2	2
AK2-ST-TS35	18	18	14	14	9	9	5	5	4	4	3	3
AK3-ST-TS35	22	22	20	20	10	10	7	7	5	5	4	4

A&C are possible design variants for cable glands
Terminal strips for explosion hazard areas are also available

Notes

Technical appendix

1. Determining amperage

a) Nominal and starting currents

Table 1

Nominal power	Three-phase motor, cage rotor (1500 RPM, 50 Hz)											DC motor			
	Efficiency	Power factors		Motor current								Efficiency	Motor current		
				230V		400V		500V		660V			110V	220V	440V
P	η	cos φN	cos φA	I_N	I_A	I_N	I_A	I_N	I_A	I_N	I_A	η	I_N	I_N	I_N
kW	%			A	A	A	A	A	A	A	A	%	A	A	A
0.75	74.5	0.78	0.76	3.2	14.4	1.8	8.1	1.5	6.8	1.1	5	75	9.2	4.6	2.3
1.1	75	0.81	0.76	4.3	19.8	2.5	11.5	2	9.2	1.5	6.9	75	13.5	6.8	3.3
1.5	77	0.82	0.76	5.8	27.3	3.3	15.5	2.6	12.2	2	9.4	77	17.2	8.7	4.4
2.2	80	0.82	0.73	8.2	39.4	4.7	22.6	3.7	17.8	2.9	14	78	27	13.3	6.7
3	80	0.79	0.73	11.1	54.4	6.4	31.4	5	24.5	3.5	17.2	80	34	17	8.5
4	82	0.84	0.73	14.6	73	8.4	42	6.4	32	4.9	24.5	80	45	22	11
5.5	83	0.85	0.65	19.6	100	11.3	57.6	8.6	43.9	6.7	34.2	84	61	30	15.5
7.5	85	0.86	0.65	25.8	134.2	14.8	77	11.5	59.8	9	46.8	85	82	41	21
11	87	0.86	0.60	36.9	195.6	21.2	112.4	17	90.1	13	68.9	86	120	60	30
15	87	0.86	0.60	50	270	29	156.6	22.5	121.5	17.5	94.5	87	160	81	41
18.5	88	0.86	0.60	61	335.5	35	192.5	27	148.5	21	115.5	88	195	97	49
22	89	0.87	0.60	71	398	41	230	32	179	25	140	89	232	116	58
30	90	0.87	0.60	96	547	55	314	43	245	33	188	89	315	155	78
37	90	0.87	0.60	119	690	68	394	54	313	42	244	89	384	190	96
45	91	0.88	0.60	141	832	81	478	64	378	49	289	90	462	230	116
55	91	0.88	0.60	172	–	99	594	78	468	60	360	91	–	282	140
75	91	0.88	0.60	235	–	135	826	106	647	82	500	92	–	280	190
90	92	0.88	0.60	279	–	160	992	127	787	98	608	93	–	–	225
110	92	0.88	0.60	341	–	196	–	154	970	118	743	93	–	–	277
132	92	0.88	0.60	409	–	235	–	182	–	140	896	93	–	–	330
160	93	0.88	0.60	491	–	282	–	220	–	170	–	93	–	–	–

The table indicates typical operating values that should only be used when no other manufacturer information is available.

Notes:

Nominal current: I_N
Starting current: I_A

Squirrel-cage motors:	X = 6
Slipring induction motors:	X = 2
Frequency-regulated drives:	X = 1.1(1)
DC	X = 2.5

$I_A = X \cdot IN$

The starting current or starting factors of the squirrel cage motors only apply if they are turned on when connected directly to the grid.
If the required motor power values are not in this table, please use the formula in section 1.

b) Determining the nominal current (I_N)
when only the power (P_N) of the drive to be supplied is indicated and is not given in the table above

For three-phase drives

$$I_N = \frac{P_N\,[kW] \cdot 1000}{\sqrt{3} \cdot U[V] \cdot \cos \varphi_N \cdot \eta}$$

For DC drives

$$I_N = \frac{P_N\,[kW] \cdot 1000}{U[V] \cdot \eta}$$

For AC drives

$$I_N = \frac{P_N\,[kW] \cdot 1000}{U[V] \cdot \cos \varphi_N \cdot \eta}$$

Roughly, the following applies:
$\cos \varphi_N$ = 0.85
η = 0.85 (efficiency)

2. Cable selection for intermittent periodic duty motor operation

a) Depending on the nominal current I_N, the appropriate cross-section is determined from the corresponding cable tables (pages 4 to 33).
b) Determining the correction factor f_1, for intermittent periodic duty:

Conductor cross-section [mm²]	Factors (f_1) for intermittent periodic duty for the following running times			
	60 %	40 %	25 %	15 %
1.5	1.00	1.00	1.00	1.00
2.5	1.00	1.00	1.04	1.07
4	1.00	1.03	1.05	1.19
6	1.00	1.04	1.013	1.27
10	1.03	1.09	1.21	1.44
16	1.07	1.16	1.34	1.62
25	1.10	1.23	1.46	1.79
35	1.13	1.28	1.53	1.90
50	1.16	1.34	1.62	2.03
70	1.18	1.38	1.69	2.13
95	1.20	1.42	1.74	2.21
120	1.21	1.44	1.78	2.26
150	1.22	1.46	1.81	2.30
185	1.23	1.48	1.82	2.32
240	1.23	1.49	1.85	2.36
300	1.23	1.50	1.87	2.39

(1) In frequency-regulated drives, the use of input chokes is assumed.

c) Determining the correction factor f_2 for deviating ambient temperatures according to DIN VDE 0298, Part 4:

Insulation material	Rubber	PVC	Special compound
Max. permissible operating temperature at conductor	60 °C	70 °C	90 °C
Ambient temperature °C	Correction factor f_2		
10	1.29	1.22	1.15
15	1.22	1.17	1.12
20	1.15	1.12	1.08
25	1.08	1.06	1.04
30	1.00	1.00	1.00
35	0.91	0.94	0.96
40	0.82	0.87	0.91
45	0.71	0.79	0.87
50	0.58	0.71	0.82
55	0.41	0.61	0.76
60	-	0.50	0.71
65	-	0.35	0.65
70	-	-	0.58
75	-	-	0.50
80	-	-	0.41
85	-	-	0.29
90	-	-	-

d) Determining the correction factor f_3 for cables with multiple wires in acc. with DIN VDE 0298, Part 4, up to 10 mm²:

No. of wires carrying current	5	7	10	14	19	24	40	61
Correction factor f_3	0.75	0.65	0.55	0.50	0.45	0.40	0.35	0.30

No. of current-carrying conductors ‹5: $f_3 = 1$

e) De-rating factors for the dependency of ampacity on the number of layers on reel in acc. with DIN VDE 0298 Part 4, for cable reel $f_4 = 1$

Number of full layers LZ on reel	1 (1)	2	3	4	5
Conversion factor f_3	0.80	0.61	0.49	0.42	0.38

(1) also applies for spiral winding

f) Permissible ampacity of cable when operating conditions are taken into account

$$I_{perm} = I_{max} \cdot f_1 \cdot f_2 \cdot f_3 \cdot f_4$$

Note: The type of laying was not taken into account (cable carrier ≈ 1, for cable reel see calculation method in catalogue 9b), I_{max} according to the tables on page 7.

g) Verifying the conductor cross-section selected in 2a:

$$I_N \leq I_{perm}$$

I_N = nominal current
I_{perm} = permissible ampacity of cable when operating conditions are taking into account.

h) If the aforementioned condition in 2g is not fulfilled, the steps 2a to 2f must be repeated with a different cross-section.

3. Voltage drop calculation for starting current

a) If no other specifications apply, an approximate value of 3 % of the nominal voltage can be assumed for the max. voltage drop. If this value is exceeded, the voltage drop can be reduced by increasing the cross-section. If the measures described above are insufficient, the voltage drop can be reduced by connecting current-conducting wires in parallel.

b) If the nominal current I_N was determined using the method in section 1a, please use the table value for the starting current I_A to verify the voltage drop.

c) Determining the max. starting current (I_A) of the installation if the nominal current was determined using the method in section 1b. For the starting current, use the x-th multiple of the nominal current depending on the motor type (see 1a); table 1.

$$I_A = I_N \cdot X$$

d) Voltage drop

For three-phase current

$$\Delta U = \sqrt{3} \cdot I \cdot I_A \cdot Z$$

For alternating current

$$\Delta U = 2 \cdot I \cdot I_A \cdot Z$$

For direct current

$$\Delta U = 2 \cdot I \cdot I_A \cdot R$$

Z = impedance [Ω/km]
R = resistance [Ω/km]
I = feed length [km]
I_A = starting current of installation in amperes

Table 7: Resistance per metre

Conductor cross-section [mm²]	Z for cage motor and slipring motor cos φ = 0.6, f = 50 Hz [Ω/km]	Z for frequency-regulated drives cos φ = 0.95, f = 50 Hz [Ω/km]	R for direct current [Ω/km]
1.5	8.7700	13.8000	14.4700
2.5	5.3100	8.3100	8.7100
4	3.3600	5.2100	5.4500
6	2.2500	3.4700	3.6200
10	1.3700	2.0800	2.1600
16	0.8880	1.3200	1.3600
25	0.5870	0.8470	0.8630
35	0.4430	0.6220	0.6270
50	0.3440	0.4660	0.4630
70	0.2580	0.3310	0.3210
95	0.2050	0.2460	0.2310
120	0.1740	0.2000	0.1830
150	0.1540	0.1680	0.1498
185	0.1360	0.1390	0.1180
240	0.1190	0.1120	0.0901
300	0.1080	0.0954	0.0718

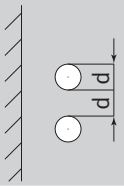
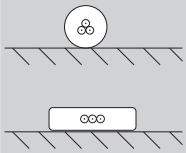
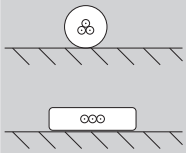
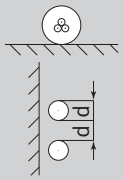
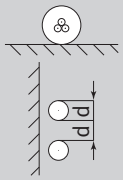
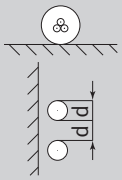
4. AWG/conversion of metric cross-sections

AWG	Cross-section mm²	Nominal cross-section, metric
25	0.163	0.25
24	0.205	
23	0.259	
22	0.325	0.5
21	0.412	
20	0.519	0.75
19	0.653	
18	0.823	1
17	1.04	
16	1.31	1.5
15	1.65	
14	2.08	2.5
13	2.62	
12	3.3	4
11	4.15	
10	5.26	6
9	6.63	
8	8.37	10
7	10.6	
6	13.3	16
5	16.8	
4	21.2	25
3	26.7	
2	33.6	35
1	42.4	50
0	53.4	50
2/0	67.5	70
3/0	85	95
4/0	107	120
250	127	
300	152	150
350	178	185
400	203	
500	254	240
600	304	300
750	380	400
1000 MCM(1)	507	500

(1) For larger cross-sections information in MCM (circular mils)

5. Ampacity table according to VDE 0298-4

Ampacity of cables with nominal voltage of up to 1000V at an ambient temperature of +30°C according to the VDE
The information here only serves as a guideline; the table deviates from standard specifications. If you have other values or ambient conditions, please provide us with this information when making your enquiry.

	A	B		C	D		E	F	G
	Single-wire cables · Rubber insulation · PVC insulation · TPE insulated heat-resistant	Cables with multiple wires for indoor and hand-held devices · Rubber insulation · PVC insulation · TPE insulated		Cables with multiple wires for outdoor and hand-held devices · Rubber insulation · PVC insulation · TPE insulated heat-resistant	Rubber cables with multiple wires Min. 0.6/1 kV Special rubber cables 0.6/1 kV or 1.8/3 kV		Rubber insulated cable	Protolon values for stretched-out laying	Rubber insulated cable
				e.g. NGFLGÖU, YCFLY, H07RNF, H07VVH6-F KSM-S, Lifting cable 2TY	e.g. Round cable PUR for cable carriers, Round reeling cable PUR		Rondoflex NGRDGÖU Factor 1.05 Festoon	Protolon stretched-out laying Factor 1 up to 10 kV	Rheyfestoon
Laying type:									
No. of wires carrying current	1	2	3	2 or 3	3	1	Single or multiple wires	Multiple wires	Single or multiple wires
Nominal cross-section in mm²									
0.5	12	3	3	9	-	-	-	-	-
1	19	10	10	15	-	-	19	18	-
1.5	24	16	16	18	23	30	24	23	-
2.5	32	25	20	26	30	41	32	30	30
4	42	32	25	34	41	55	43	41	41
6	54	40	-	44	53	70	56	53	53
10	73	63	-	61	74	98	78	74	74
16	98	-	-	82	99	132	104	99	99
25	129	-	-	108	131	176	138	131	131
35	158	-	-	135	162	218	170	162	162
50	198	-	-	168	202	276	212	202	202
70	245	-	-	207	250	347	263	250	250
95	292	-	-	250	301	416	316	301	301
120	344	-	-	292	-	488	370	352	352
150	391	-	-	335	-	566	424	404	404
185	448	-	-	382	-	644	484	461	461
240	528	-	-	453	-	775	567	540	553
300	608	-	-	523	-	898	651	620	641
400	726	-	-	-	-	-	-	-	-
500	830	-	-	-	-	-	-	-	-
Ampacity values from:	VDE 0298-4, 2003-08	DIN VDE 0298-4, 2003-08		DIN VDE 0298-4, 2003-08	DIN VDE 0298-4, 2003-08		"Source: Prysmian (manufacturer) Other values / correction factors upon request"		According to VDE 0298-4

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