MOTION-CONNECT connection systems
Overview

Power cables

Cable	For motor	MOTION-CONNECT 500	MOTION-CONNECT 800PLUS	Page
Dynamic requirements	SIMOTICS	Medium	High	
Environmental requirements		Medium	High	
UL/CSA		✔	✔	
Halogen-free		–	✔	
RoHS		✔	✔	
Power cables with SPEED-CONNECT connector				
	S-1FT7	✔	✔	**12/9, 12/10**
	S-1FK7	✔	✔	**12/11**
	M-1PH808 M-1PH810	✔	✔	**12/9**
Power cables with full-thread connector				
	S-1FT7	✔	✔	**12/12 ... 12/14**
	S-1FK7	✔	✔	**12/14**
	M-1PH808 M-1PH810 M-1PH813	✔	✔	**12/12, 12/14**
	L-1FN3	–	✔	**12/19**
	T-1FW6	–	✔	**12/21**
Extensions for power cables with SPEED-CONNECT or full-thread connector				
	S-1FT7	✔	✔	**12/15**
	S-1FK7	✔	✔	**12/15**
	M-1PH808 M-1PH810 M-1PH813	✔	✔	**12/15**
	L-1FN3	–	✔	**12/19**
	T-1FW6	–	✔	**12/21**
Power cables for motors with terminal box				
	M-1PH8	✔ from 35 mm^2	✔ up to 16 mm^2	**12/16, 12/17**
	T-1FW3	✔	✔ up to 16 mm^2	**12/20**

Hybrid cables for SINAMICS S120M distributed servo drive

Cable	For distributed servo drive	MOTION-CONNECT 800PLUS	Page
Dynamic requirements	SINAMICS S120M	High	
Environmental requirements		High	
UL/CSA		✔	
Halogen-free		✔	
RoHS		✔	
Hybrid cables			
	6FX8002-7HY	✔	**12/22**

✔ = Possible
– = Not possible

General information

Overview

MOTION-CONNECT cables are suitable for use with many different types of machine tools and production machinery.

The following variants of MOTION-CONNECT cable are available as fully-assembled power and signal cables or sold by the meter:

- **MOTION-CONNECT 500**
  - Cost-effective solution for predominantly fixed installation
  - Suitable for low mechanical loading
  - Tested for travel distances up to 5 m (16.4 ft)
- **MOTION-CONNECT 800PLUS**
  - Meets requirements for use in cable carriers
  - Suitable for high mechanical loading
  - Oil resistance
  - Tested for travel distances of up to 50 m (164 ft)

Benefits

Pre-assembled MOTION-CONNECT cables provide high quality and perfect, system-tested functionality.

SPEED-CONNECT

Fast, stable and reliable connections can be made with the new, pre-assembled cables with SPEED-CONNECT connectors. With a short rotation as far as the stop, the cap nut of the connector secures the connection.

The cables with SPEED-CONNECT connectors supplement the previous offering of MOTION-CONNECT cables with full-thread connectors.

Application

MOTION-CONNECT cables are intended for use in machines. They are not suitable for building technology applications or outdoor installation.

MOTION-CONNECT cables have been tested in a cable carrier with horizontal travel distance and have also been designed for this type of application. They are not self-supporting.

The pre-assembled cables can be ordered in length units of 10 cm (3.94 in) and can be extended, if necessary.

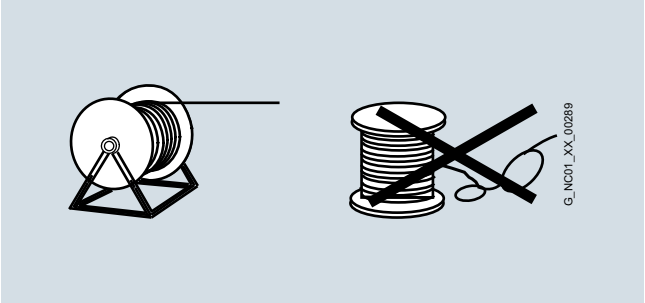
When cable lengths (basic cables and extensions) are determined for the systems and applications described in this catalog, the technically permissible maximum cable lengths (e.g., 25 m (82 ft)) specified in the catalog must be observed. Malfunctions can occur if longer cables are used.

Siemens assumes no liability for correct transmission of signals or power in this case.

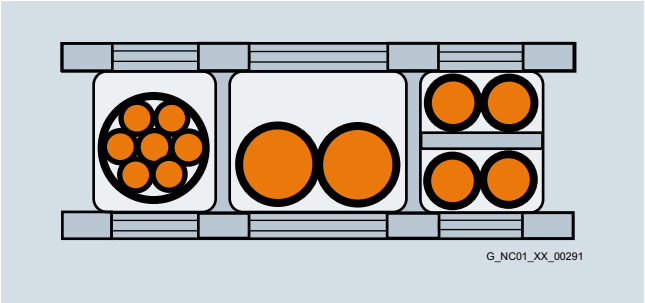
Compatibility between SPEED-CONNECT and full-thread connectors:

Connector on motor with external thread	Connector with cap nut on cable	Compatibility
SPEED-CONNECT	SPEED-CONNECT	✔
SPEED-CONNECT	Full-thread	✔
Full-thread	Full-thread	✔
Full-thread	SPEED-CONNECT	–

Function



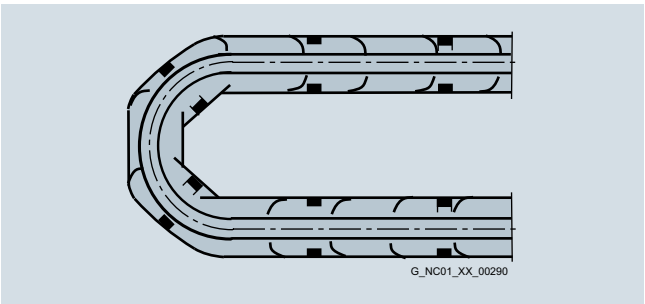
The cables must be removed from the drum without twisting, i.e., the cables must be unwound and must never be lifted over the drum flange in loops.



To maximize the service life of the cable carrier and cables, cables in the carrier made from different materials must be separated by spacers in the cable carrier. The spacers must be filled evenly to ensure that the position of the cables does not change during operation. The cables should be distributed as symmetrically as possible according to their weights and dimensions. Cables with very different outer diameters should also be separated by spacers.

When inserting pre-assembled cables into the cable carrier, do **not** pull at the connector, as this may damage the strain relief or cable clamping.

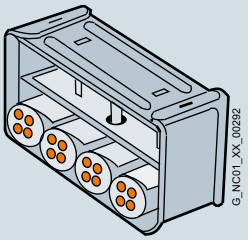
The cables must not be fixed in the cable carrier. They must be freely movable.



The cables must be able to be moved without applying force in particular in the bending radii of the carrier. The specified minimum bending radii must be adhered to.

The cable fixings must be attached at both ends at an appropriate distance away from the end points of the moving parts in a dead zone.

Function (continued)



MOTION-CONNECT cables are tested in a cable carrier. The cables are attached at one end by means of strain relief to the moving ends of the cable carrier. Strain relief is applied over a wide area of the cable jacket surface without crimping the cable.

Cables must be installed in accordance with the instructions supplied by the cable carrier manufacturer.

Note:

If, for example, pre-assembled cables are installed in a cable carrier in such a way that the connector would inhibit assembly, pre-assembled cables without assembled connectors can also be supplied (power and signal cables [1]). In this case, the contacts of the cables are crimped and the connector is supplied separately. After installing the cables, the customer assembles the connector.

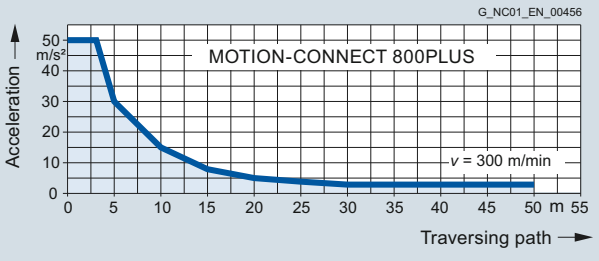
In case of vibration load and with horizontal or vertical cable entries, we recommend that the cable is additionally fixed if between the cable strain relief on the cable carrier and the terminal at the motor part of the cable is hanging loose or is not routed. To prevent machine vibrations being transmitted to the connectors, the cable should be fixed at the moving part where the motor is mounted.

Representation in connection overviews

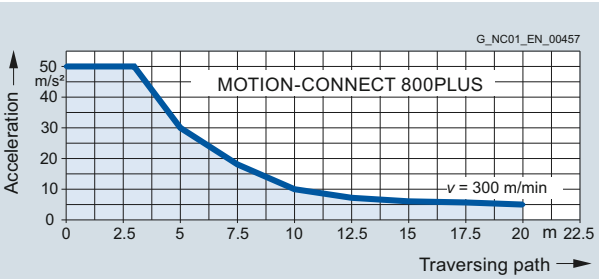
Symbol	Explanation
	Connector with pin contacts
	Connector with socket contacts
	Exposed core ends
	Cable must be supplied by the customer

Characteristic curves

The shaded area beneath the characteristic represents the potential range of use for the cables. The characteristics represent the tested operating points.



Acceleration for MOTION-CONNECT 800PLUS signal and power cables up to 16 mm^2



Permissible acceleration for MOTION-CONNECT 800PLUS cables of 25 mm^2, 35 mm^2, and 50 mm^2

[1] Not applicable to DRIVE-CLiQ signal cables.

More information

Current carrying capacity for power and signal cables

The current carrying capacity of PVC/PUR-insulated copper cables is specified for installation types B1, B2, C, and E under continuous operating conditions in the table with reference to an ambient air temperature of 40 °C (104 °F). For other ambient temperatures, the values must be corrected by the derating factors from the table.

Cross-section	**Current carrying capacity** rms AC 50/60 Hz or DC in amps for installation type			
	B1 Single-core cables in conduits or installation ducts	**B2** Multi-core cables in conduits or cable ducts	**C** Multi-core cables, vertically or horizontally on walls/open, without conduits and installation ducts/with contact	**E** Multi-core cables, horizontally or vertically on perforated cable racks/ open, without conduits and installation ducts/with contact
mm²				
Electronics [1]				
0.20	–	4.3	4.4	4.4
0.50	–	7.5	7.5	7.8
0.75	–	9	9.5	10
Power [2]				
0.75	8.6	8.5	9.8	10.4
1.00	10.3	10.1	11.7	12.4
1.50	13.5	13.1	15.2	16.1
2.50	18.3	17.4	21	22
4	24	23	28	30
6	31	30	36	37
10	44	40	50	52
16	59	54	66	70
25	77	70	84	88
35	96	86	104	110
50	117	103	125	133
70	149	130	160	171
95	180	165	194	207
120	208	179	225	240

Derating factors for power and signal cables

Ambient air temperature °C (°F)	**Derating factor** according to EN 60204-1, Table D.1
30 (86)	1.15
35 (95)	1.08
40 (104)	1.00
45 (113)	0.91
50 (122)	0.82
55 (131)	0.71
60 (140)	0.58

[1] One control circuit pair.
[2] One symmetrically loaded three-phase AC cable.

Overview

Power cable for connecting a SIMOTICS motor to a SINAMICS S120 Motor Module, C/D type

Power cable with separately supplied connector for connecting a SIMOTICS motor to a SINAMICS S120 Motor Module, C/D type

Power cables

The synchronous and asynchronous motors are connected to the Motor Modules or Power Modules by means of MOTION-CONNECT power cables.

The pre-assembled MOTION-CONNECT power cables are of high quality and offer safety with problem-free functioning.

Depending on the design, the MOTION-CONNECT power cables are either pre-assembled at one end or at both ends.

If pre-assembled power cables are to be installed in a cable carrier in such a way that the connector would inhibit assembly, pre-assembled cables without assembled connector can also be supplied. In this case, the contacts of the cables are crimped and the connector is supplied separately. After installing the cables, the customer assembles the connector.

The 6FX.002-5....-.... power cables are available with crimped contacts and with the connector supplied separately as an option (not applicable to power cables with open core ends or cable lugs).

Power cables with separately supplied **module-end** connector: in this case, the 6th position of the Article No. must be changed from **0** to **1**: 6FX.0**1**2-5....-.... (not for power cables for SINAMICS S120 Power Modules or Motor Modules in booksize compact format).

Power cables without **module-end** connector:
in this case, the 6th position of the Article No. must be changed from **0** to **2**: 6FX.0**2**2-5....-....
The connector can be ordered separately (see page 12/53).

Power cables with separately supplied **motor-end** connector: in this case, the 6th position of the Article No. must be changed from **0** to **4**: 6FX.0**4**2-5....-.... (not for power cables with open core ends on the motor end).

Type of delivery for pre-assembled power cables

Pre-assembled power cables can be ordered in units of 10 cm (3.94 in) up to a maximum length of 299 m (981 ft).

The cables are supplied on reels up to 30 kg (66.1 lb) or 100 m (328 ft). Above 30 kg or 100 m (66.1 lb or 328 ft), cable drums are used instead of reels. This applies to both pre-assembled power cables and for cables sold by the meter.

Type of delivery for power cables sold by the meter

Fixed lengths

Cross-section	Brake cores	MOTION-CONNECT 500 MOTION-CONNECT 800PLUS
1.5 mm^2	without/with	50 m (164 ft), 100 m (328 ft), 200 m (656 ft), 500 m (1641 ft)
2.5 mm^2	without/with	50 m (164 ft), 100 m (328 ft), 200 m (656 ft), 500 m (1641 ft)

Variable length, available in exact meter lengths

Cross-section	Brake cores	MOTION-CONNECT 500	MOTION-CONNECT 800PLUS
4 mm^2	without/with	≤ 500 m (1641 ft)	≤ 500 m (1641 ft)
6 mm^2	without/with	≤ 500 m (1641 ft)	≤ 500 m (1641 ft)
10 mm^2	without/with	≤ 500 m (1641 ft)	≤ 500 m (1641 ft)
16 mm^2	without/with	≤ 200 m (656 ft)	≤ 200 m (656 ft)
25 mm^2	without with	≤ 200 m (656 ft) ≤ 200 m (656 ft)	– ≤ 200 m (656 ft)
35 mm^2	without with	≤ 200 m (656 ft) ≤ 200 m (656 ft)	– ≤ 200 m (656 ft)
50 mm^2	without with	≤ 200 m (656 ft) ≤ 200 m (656 ft)	– ≤ 200 m (656 ft)
70 mm^2	without	≤ 100 m (328 ft)	–
95 mm^2	without	≤ 100 m (328 ft)	–
120 mm^2	without	≤ 100 m (328 ft)	–

Hybrid cables

Hybrid cables connect AM600 Adapter Modules to the distributed components Hybrid Cabinet Bushings, DRIVE-CLiQ Extension and SINAMICS S120M, as well as the distributed components to one another. Hybrid cables are only delivered pre-assembled.

Type of delivery for pre-assembled hybrid cables

The pre-assembled cables can be delivered in length units of 10 cm (3.94 in) up to 75 m (246 ft) to suit the system.

Technical specifications

Power cables	MOTION-CONNECT 500 6FX50..-.....-....	MOTION-CONNECT 800PLUS 6FX80..-.....-....	MOTION-CONNECT 800PLUS [1] 6FX8002-7HY..-....
Certificate of suitability			
• VDE [2]	Yes	Yes	Yes
• cURus or UR/CSA	UL 758, CSA-C22.2-N.210.2-M90	UL 758, CSA-C22.2-N.210.2-M90	UL 758, CSA-C22.2-N.210.2-M90
• UR-CSA File No. [3]	Yes	Yes	Yes
• RoHS conformity	Yes	Yes	Yes
Rated voltage U_0/U according to EN 50395			
• Power conductors	600 V/1000 V	600 V/1000 V	4 mm^2: 600 V/1000 V 2.5 mm^2: 48 V (EN), 1000 V (UL/CSA)
• Signal conductors	24 V (EN), 1000 V (UL/CSA)	24 V (EN), 1000 V (UL/CSA)	AWG22: 30 V (EN), 1000 V (UL/CSA)
Test voltage, rms			
• Power conductors	4 kV	4 kV	4 kV
• Signal conductors	2 kV	2 kV	4 kV
Operating temperature on the surface			
• Fixed installation	-20 … +80 °C (-4 ... +176 °F)	-50 … +80 °C (-58 ... +176 °F)	-50 … +80 °C (-58 ... +176 °F)
• Flexible installation	0 … 60 °C (32 ... 140 °F)	-20 … +60 °C (-4 ... +140 °F)	-20 … +60 °C (-4 ... +140 °F)
Tensile stress, max.			
• Fixed installation	50 N/mm^2 (7252 lb_f/in^2)	50 N/mm^2 (7252 lb_f/in^2)	50 N/mm^2 (7252 lb_f/in^2)
• Flexible installation	20 N/mm^2 (2901 lb_f/in^2)	20 N/mm^2 (2901 lb_f/in^2)	20 N/mm^2 (2901 lb_f/in^2)
Smallest bending radius			
• Fixed installation	5 × D_{max}	4 × D_{max}	4 × D_{max}
• Flexible installation	See selection and ordering data	See selection and ordering data	See selection and ordering data
Torsional stress	Absolute 30°/m	Absolute 30°/m	Absolute 30°/m
Bending	100000	10 million	10 million
Traversing velocity	30 m/min (98.4 ft/min)	Up to 300 m/min (984 ft/min)	Up to 300 m/min (984 ft/min)
Acceleration	2 m/s^2 (6.56 ft/s^2)	Up to 50 m/s^2 (164 ft/s^2), see characteristics on page 12/5	Up to 50 m/s^2 (164 ft/s^2), see characteristics on page 12/5
Insulation material, incl. jacket	CFC/silicone-free	CFC/halogen-free/silicon-free IEC 60754-1/DIN VDE 0472-815	CFC/halogen-free/silicon-free IEC 60754-1/DIN VDE 0472-815
Oil resistance	EN 60811-2-1 (mineral oil only)	EN 60811-2-1	EN 60811-2-1
Outer jacket	PVC DESINA color orange RAL 2003	PUR, HD22.10 S2 (VDE 0282, Part 10) DESINA color orange RAL 2003	PUR, HD22.10 S2 (VDE 0282, Part 10) DESINA color orange RAL 2003
Flame-retardant	EN 60332-1-1 to 1-3	EN 60332-1-1 to 1-3	EN 60332-1-1 to 1-3

Degree of protection of the pre-assembled power cables and their extensions when closed and inserted: IP67.

12

[1] Hybrid cables
[2] The respective registration number is printed on the cable jacket (only applies to power cables).
[3] The File No. is printed on the cable jacket.

Overview

Power cables, pre-assembled

Data position in Article No.		1	2	3	4	5	6	7		8	9	10	11	12		13	14	15	16
MOTION-CONNECT 500		**6**	**F**	**X**	**5**	**0**	■	**2**	**–**	**5**	■	■	■	■	**–**	.	.	.	.
MOTION-CONNECT 800PLUS		**6**	**F**	**X**	**8**	**0**	■	**2**	**–**	**5**	■	■	■	■	**–**	.	.	.	.
Pre-assembled at motor and module ends							**0**												
Pre-assembled at motor end, connector at module end supplied separately							**1**												
Pre-assembled at motor end, connector at module end not supplied							**2**												
Connector at motor end supplied separately, pre-assembled at module end							**4**												
Without brake cores											**C**								
With brake cores											**D**								
Basic cable between	and																		
SINAMICS S120 Motor Module C/D type, booksize format, up to 30 A	Motor connector, full-thread, size 0.5										**D**	**A**	**2**	**7**					
	Motor connector, full-thread, size 1 or 1.5											**S**		**6**					
	Motor connector, full-thread, size 3											**S**	**1**	**7**					
	Motor with terminal box (exposed core ends)											**W**		**2**					
	Motor connector, SPEED-CONNECT, size 0.5										**D**	**N**	**2**	**7**					
	Motor connector, SPEED-CONNECT, size 1 or 1.5											**N**		**6**					
SINAMICS S120 Motor Module, booksize format, 45 A or higher	Motor connector, full-thread, size 1 or 1.5											**S**		**4**					
	Motor connector, full-thread, size 3											**S**	**2**	**3**					
	Motor connector, SPEED-CONNECT, size 1 or 1.5											**N**		**4**					
SINAMICS S120 Power Module/ Motor Module, booksize compact format	Motor connector, full-thread, size 0.5										**D**	**A**	**3**	**0**					
	Motor connector, full-thread, size 1 or 1.5											**G**		**1**					
	Motor connector, full-thread, size 3											**G**		**3**					
	Motor connector, SPEED-CONNECT, size 0.5										**D**	**N**	**3**	**0**					
	Motor connector, SPEED-CONNECT, size 1											**G**	**1**						
	Motor connector, SPEED-CONNECT, size 1.5											**G**	**2**						
SINAMICS S120 Power Module, Combi format [1]	Motor connector, SPEED-CONNECT, size 1 or 1.5											**F**							
SINAMICS S120 Power Module/ Motor Module, booksize format	SIMOTICS M-1PH8 with terminal box										**C**	**R**							
SINAMICS S120 Power Module, Combi format [1]	SIMOTICS M-1PH8 with terminal box										**C**	**E**							
Extension between basic cable with connector	and motor connector																		
Full-thread, size 0.5	Full-thread, size 0.5										**M**	**E**	**0**	**5**					
Full-thread, size 1	Full-thread, size 1											**A**		**5**					
Full-thread, size 1.5	Full-thread, size 1.5											**A**		**8**					
Full-thread, size 3	Full-thread, size 3											**X**		**8**					
SPEED-CONNECT, size 0.5	SPEED-CONNECT, size 0.5										**M**	**N**	**0**	**5**					
SPEED-CONNECT, size 1	SPEED-CONNECT, size 1											**Q**		**5**					
SPEED-CONNECT, size 1.5	SPEED-CONNECT, size 1.5											**Q**		**8**					
Adapter cable for SIMOTICS L-1FN3		**6**	**F**	**X**	**7**	**0**	**0**	**2**	**–**	**5**	**L**	**M**	.	.	**–**	.	.	.	.
Cross-section													.	.					
Length code																			
Units of 10 cm (3.94 in) or 1 meter (3.28 ft) or in fixed lengths																.	.	.	.

[1] See Industry Mall for MOTION-CONNECT connection system for SINAMICS S120 Combi.

Length code

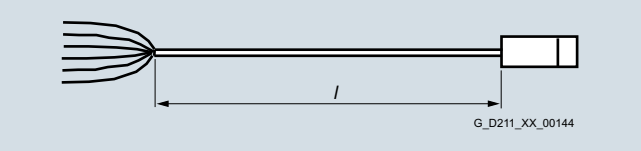
Overview

Description	Article No. supplement				
Length code for pre-assembled cables					
	6FX.0.2-.....-	■	■	■	■
0 m 100 m (328 ft) 200 m (656 ft)		**1** **2** **3**			
0 m 10 m (32.8 ft) 20 m (65.6 ft) 30 m (98.4 ft) 40 m (131 ft) 50 m (164 ft) 60 m (197 ft) 70 m (230 ft) 80 m (262 ft) 90 m (295 ft)			**A** **B** **C** **D** **E** **F** **G** **H** **J** **K**		
0 m 1 m (3.28 ft) 2 m (6.56 ft) 3 m (9.84 ft) 4 m (13.1 ft) 5 m (16.4 ft) 6 m (19.7 ft) 7 m (23.0 ft) 8 m (26.2 ft) 9 m (29.5 ft)				**A** **B** **C** **D** **E** **F** **G** **H** **J** **K**	
0 m 0.1 m (3.94 in) 0.2 m (7.87 in) 0.3 m (11.81 in) 0.4 m (15.75 in) 0.5 m (19.96 in) 0.6 m (23.62 in) 0.7 m (27.56 in) 0.8 m (31.5 in)					**0** **1** **2** **3** **4** **5** **6** **7** **8**
Examples:	1.0 m (3.28 ft):	1	A	B	0
	2.2 m (7.22 ft):	1	A	C	2
	8.0 m (26.3 ft):	1	A	J	0
	299.0 m (981 ft):	3	K	K	0

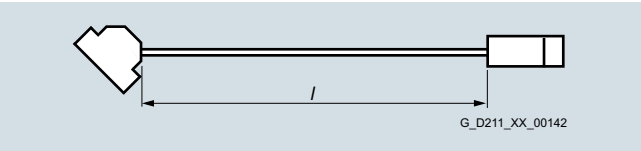
Description	Article No. supplement				
Length code for power and signal cables, sold by the meter [1]					
	6FX.008-.....-	■	■	**A**	**0**
50 m (164 ft)		**1**	**F**		
100 m (328 ft)		**2**	**A**		
200 m (656 ft)		**3**	**A**		
500 m (1641 ft)		**6**	**A**		

More information

Definition of lengths for pre-assembled cables



Cable with exposed core ends and pre-assembled connector



Cable with pre-assembled connectors at both ends

Tolerance:

- Cable lengths up to 10 m (32.8 ft): ± 2%
- Cable lengths of 10 m (32.8 ft) and longer: ± 1%

[1] Note type of delivery. Cables with core cross-section 4 × 4 mm^2 or 4 × 4 mm^2 with brake cores can be delivered in units of 1 m (3.28 ft).