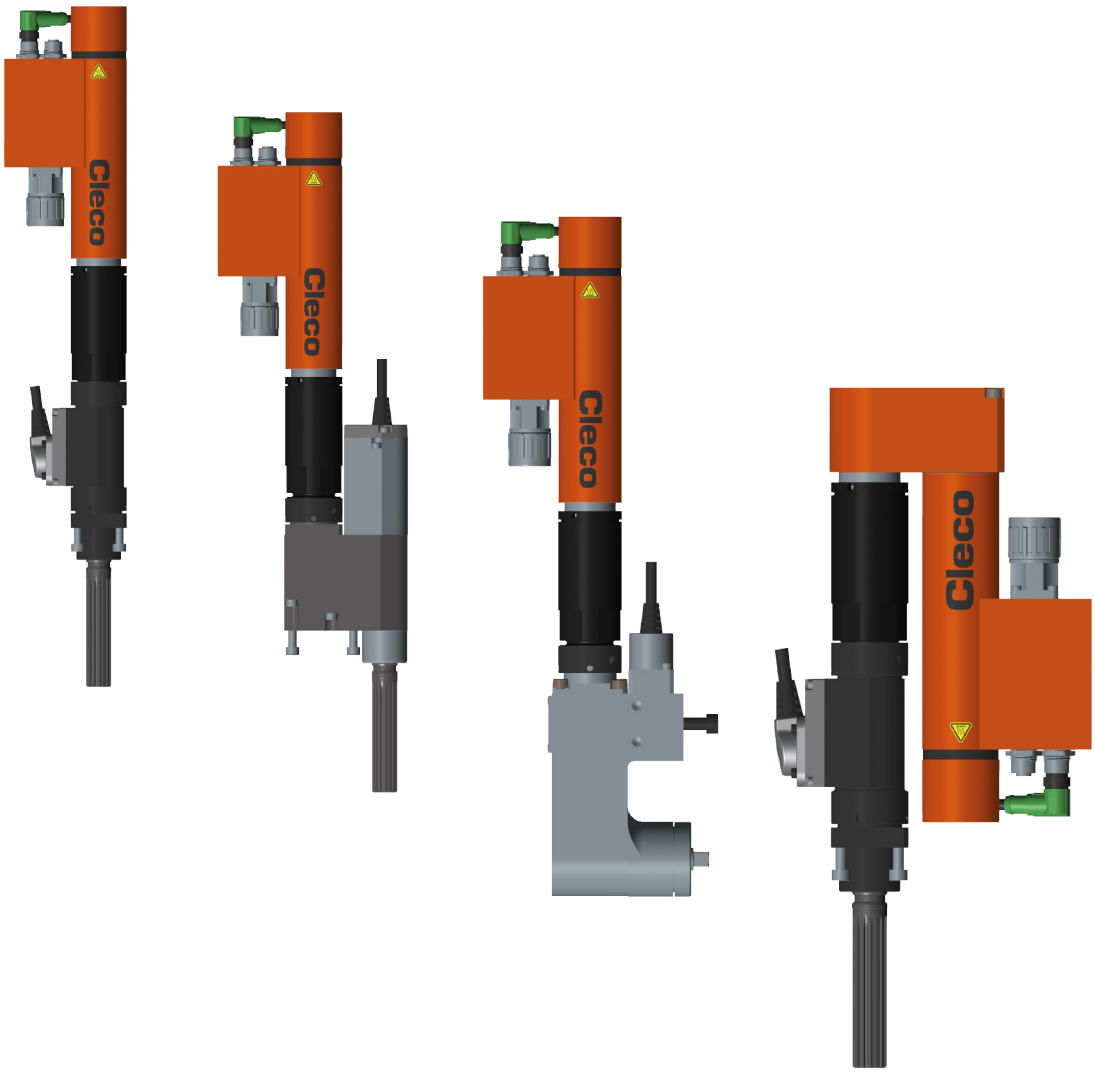
Cleco®
Production Tools

Installation Manual
P2585JH-EN
2022-03

BD Series

Cable management



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Content

1 About this document

This document is intended for specialists in cable installation and maintenance (administrators, maintenance staff, service personnel).
It contains information

- on installation
- on configuration and function.

The original language of this document is German.

1.1 Other documents

Number	Document
P2577SB	System manual – BD Series
P2578WA	Maintenance instruction – Fixtured Spindle BD Series
P2579MA	Assembly instructions – Fixtured Spindle BD Series

1.2 Symbols in the text

italic	Menu options (e.g., Diagnostics) input fields, check boxes, radio buttons or dropdown menus.
>	Indicates selection of a menu option from a menu, e.g., *File* > *Print*.
<...>	Specifies switches, pushbuttons or the keys of an external keyboard, e.g., <F5>.
`Courier`	Indicates Filenames and paths, e.g., `setup.exe`.
•	Indicates lists, level 1.
–	Indicates lists, level 2.
a) b)	Indicates options.
➢	Indicates results.
1. (...) 2. (...)	Indicates action steps.
►	Indicates single action steps.

2 Measures

Why cable management?

Correct cable management increases service life and prevents failures. Comply with the following points when routing cables:

2.1 General information

Routing

- ► Route cables such that there is no risk of tripping.
- ► Route cables in light loops. Maximum freedom of movement should ensure that the cable is never tensioned.
- ► Do not use extra-long wires (reserve).
- ► Route cables such that they are free of torsion.
- ► Cables should not knock against parts, rub or hang loose.
- ► Make sure that the length of the cable compensates for torsional loads.
- ► Obverse the respective allowed bending radii and torsional lengths. The larger the bending radius and the torsional length, the longer the service life will be.
- ► Take appropriate measures to limit cable bending radii and torsion.
- ► All plug connections must be closed. Locks must be tightened firmly.

Strain relief

- ► There must be no tensile or transverse forces acting on plug connections.
- ► Fit strain relief elements at start and finish of all sections of an extension cable.
- ► Only use the specified auxiliaries (see 6.3 Strain relief., Page 20) to relive cables of tensile forces.
- ► Do not use cable ties. Cable ties stress the cable and reduce the expected service life.
- ► Keep the number of plug connectors as low as possible.

2.2 Manually operated tools

Additional measures *see chapter 2.1 General information, page 5*

- ► Use short wire cables to limit the possible travel of the carriages.
- ► After installing cables, run a number of motion cycles and optimize the routing as necessary.

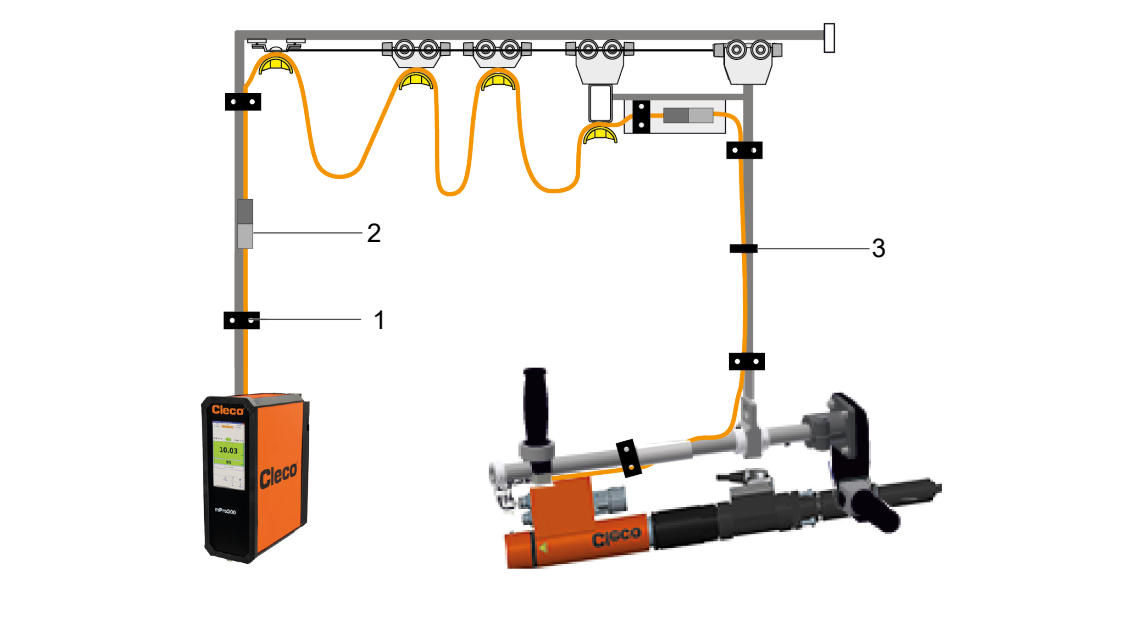


Fig. 2-1: Example of the use of a manually-operated fixtured spindle

1	**Strain relief clamp**
2	Tool cable plug connection
3	Strain relief strap

2.3 Robotics applications

Great care must be taken when routing cables and hoses in robotics applications.
Additional measures *see chapter 2.1 General information, page 5*:

- ► When routing cables in robotics applications, make sure that the cables do not make contact with any other parts, and that they do not rub or sag.
- ► After installing cables, run a number of motion cycles and optimize the routing as necessary.

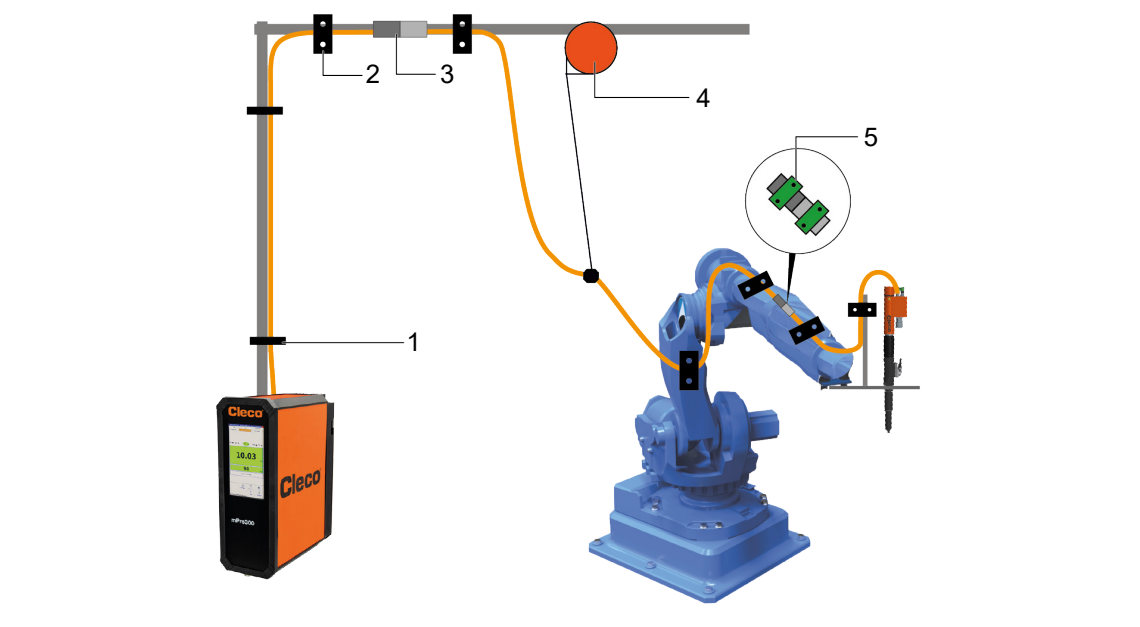


Fig. 2-2: Example of a robotics application

1	**Strain relief strap**
2	Strain relief clamp
3	Tool cable plug connection
4	Balancer
5	Plug connection fixing

2.4 Use of cable ducts

Great care must be taken when routing cables and protective hoses in cable ducts.
Additional measures *see chapter 2.1 General information, page 5*:

- ► Choose cable ducts with a length that ensures that the routed cables are never subjected to tensile or compressive strain.
- ► There must be no plug connections in the area of the cable duct. Secure the plug connections with clamps

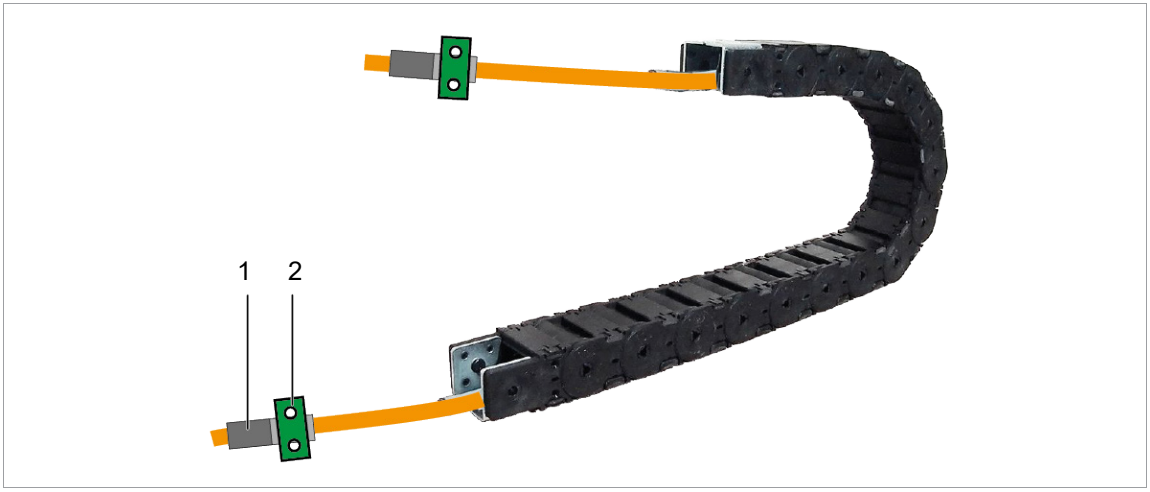


Fig. 2-3: Example of the use of cable ducts

1	**Plug connector**
2	Plug connection fixing

- ► All edges in the cable duct must have a radius to protect the cables against rubbing, overstressing and pinching.
- ► Route cables such that they are free of torsion. Prior to installation, lay the cables on an even surface so that they can be inserted while stretched out.
- ► Cables must be able to follow the radius of curvature without being forced around it.
- ► Do not cross cables or hoses in the cable duct.
- ► Do not bundle cables; if possible route them individually in the cable duct, loosely adjacent to each other. Route a maximum of two cables per partition.
- ► Separate cables lying adjacent to each other using cut-off bridges whenever possible.
- ► For vertical routing, allow approx. 20% clearance within the bridge height. The lines hang out downward due to the cable weight, including the chain. This lengthening due to sagging must be monitored at regular intervals and adjusted if necessary.
- ► Never lay cables with different diameters (difference > 3 mm) together in the same partition.
- ► Avoid pinching individual wires or subcomponents. We recommend applying a clamping force around the entire circumference of the cable.
- ► After installing cables, run a number of motion cycles and optimize the routing as necessary.

2.5 Cable routing, transducer cable

- ► With a Velcro strip,*see chapter 4 Auxiliaries, page 13* fasten the transducer cable tightly to the fixtured spindle.

Size	A Velcro strip length [cm]	B Velcro strip length [cm]
1	20	23
2	23	28
3	32	31
4	32	32

Examples of fastenings:

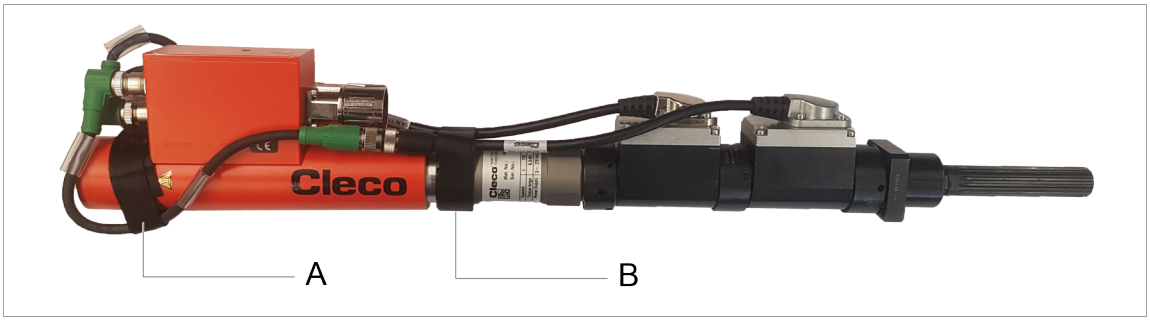


Fig. 2-4: 1BD-2K-ZB

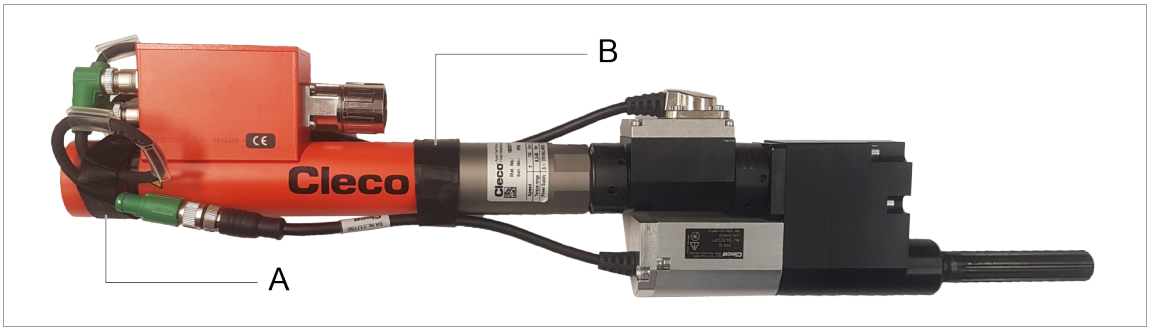


Fig. 2-5: 1BD-2K-VK

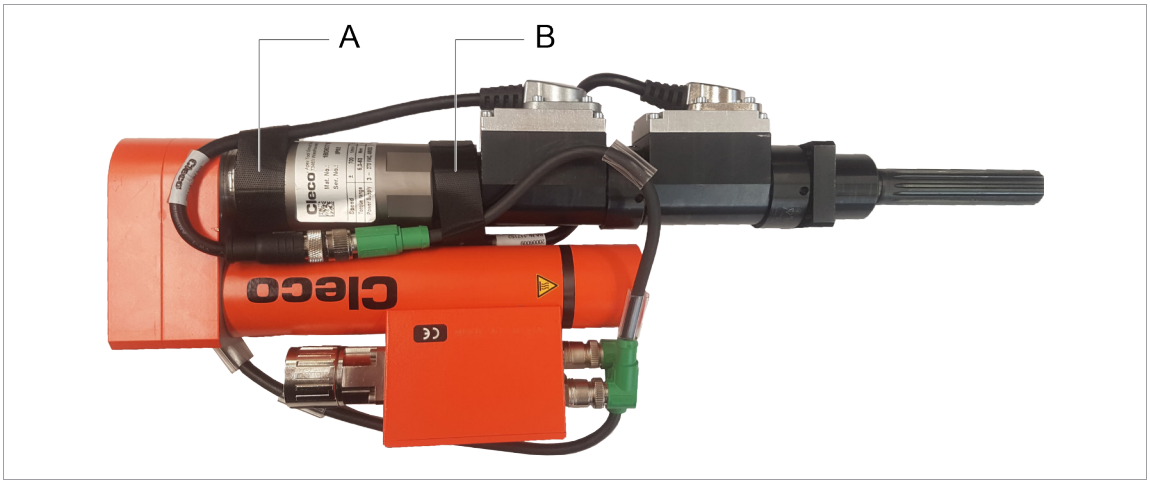


Fig. 2-6: 1BDU-2K-ZB

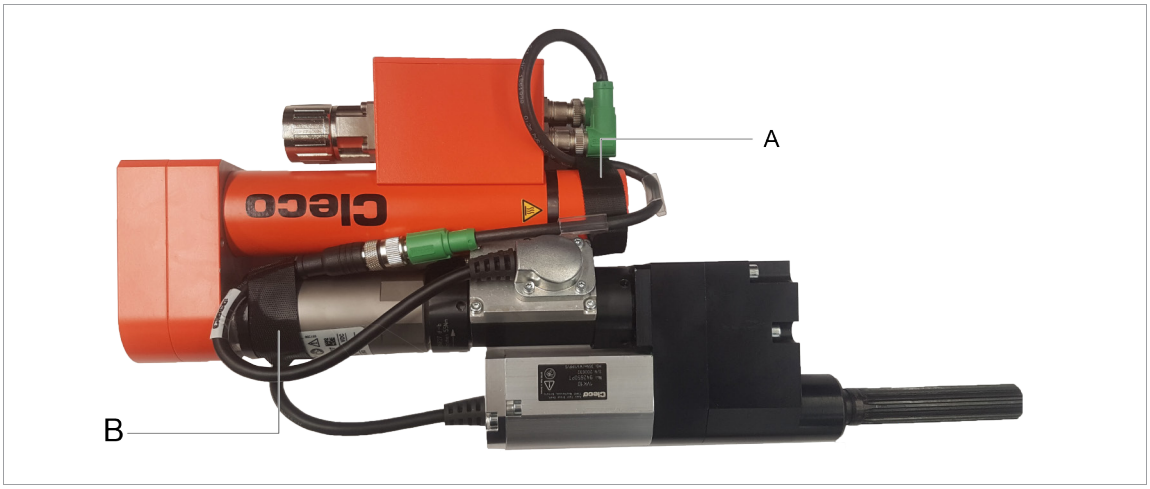


Fig. 2-7: 1BDU-2K-VK

3 Cable

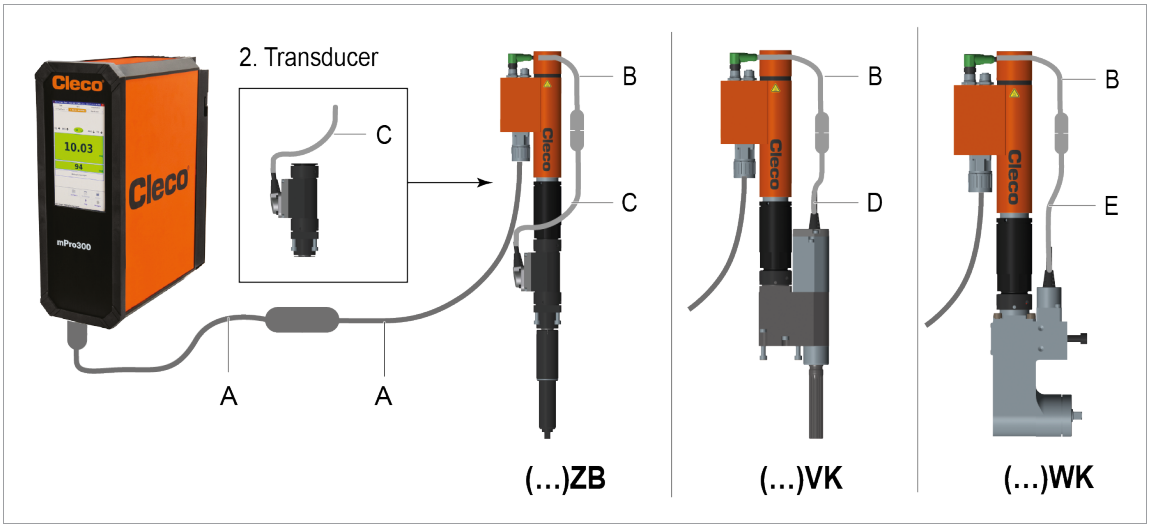


Fig. 3-1: Cable

Size	A		B	C	D	E
	Order No.	Length [m]	Order No.	Order No.	Order No.	Order No.
1	961561-010 … 961561-250	1 … 25	962343-002	942769PT-002	943290PT-002	943835PT-002
2	961923-010 ... 961923-340	1 … 34	962343-002	942769PT-002	943290PT-002	943835PT-002
3	961923-010 ... 961923-340	1 … 34	962343-003	942769PT-002	943290PT-002	943835PT-002
4	961923-010 ... 961923-340	1 … 34	962343-005 962343-007 (4Z2800G)	942769PT-002	943290PT-002	943835PT-002

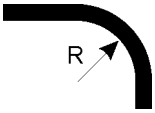
Note

Malfunction

The total length of the tool cable must not exceed 50 m.

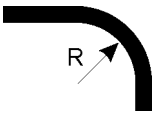
► Match the length of the tool cable with the extension cable.

Tool cable A/Size 1

Order No.	Length [m]	Weight[1] [kg]
961561-010	1	0.43
961561-020	2	0.61
961561-030	3	0.79
961561-035	3.5	0.88
961561-040	4	0.97
961561-050	5	1.15
961561-060	6	1.33
961561-070	7	1.51
961561-080	8	1.69
961561-100	10	2.05
961561-110	11	2.23
961561-150	15	2.95
961561-200	20	3.85
961561-250	25	4.75
Properties		
Thermal		
Ambient temperature		-20 °C to +90 °C
Flammability		In accordance with UL 1581
Chemical (jacket)		
Jacket material		PUR, low adhesion, hydrose and microbe resistant, UV resistant, abrasion resistant, tear resistant, cut resistant, gouge resistant DIN ISO 4649, DIN EN 5025-2-21
Oil resistance		In accordance with DIN EN 50363-10-2, IRM902
Resistance to hydrolysis		In accordance with DIN EN 50363-10-2
Color		Similar to RAL 2004
Mechanical		
Diameter [mm]		10.3 ± 0.3
Bending radius R [mm] Single bends Multiple bends 		25 min. 75 min. Rolling movement 110 min. Alternate bending
Torsion length [mm] (+180° around its own central axis)		500 min.
Max. acceleration [m/s²]		100 (10 G max.)

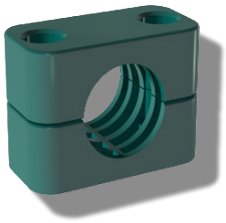
[1] Plug connection 0.25 g/cable 0.18 g/m

Tool cable A/Size 2–4

Order No.	Length [m]	Weight[1] [kg]
961923-010	1	0.56
961923-020	2	0.87
961923-030	3	1.18
961923-040	4	1.49
961923-050	5	1.80
961923-060	6	2.11
961923-080	8	2.73
961923-100	10	3.35
961923-150	15	4.90
961923-200	20	6.45
961923-250	25	8.00
961923-280	28	8.93
961923-340	34	10.79
Properties		
Thermal		
Ambient temperature		-20 °C to +90 °C
Flammability		In accordance with UL 1581
Chemical (jacket)		
Jacket material		PUR, low adhesion, hydrose and microbe resistant, UV resistant, abrasion resistant, tear resistant, cut resistant, gouge resistant DIN ISO 4649
Oil resistance		In accordance with DIN EN 50363-10-2, IRM902
Resistance to hydrolysis		In accordance with DIN EN 50363-10-2
Color		Similar to RAL 2004
Mechanical		
Diameter [mm]		13.9 ± 0.3
Bending radius R [mm] Single bends Multiple bends 		35 min. 105 min. Rolling movement 140 min. Alternate bending
Torsion length [mm] (+180° around its own central axis)		500 min.
Max. acceleration [m/s²]		100 (10 G max.)

[1] Plug connection 0.25 g/cable 0.18 g/m

4 Auxiliaries

Article		Use
Clamp body STAUFF with elastomer insert Type 410 PP-R (10 mm) Order No. – Type 414 PP-R (14 mm) Order No. 961509PT		Securing of cable and hose components at the beginning and end of the sections. Broad, padded clamping area. Adapts to the corresponding cable diameter, e.g.,
STAUFF clamp body Type 428-PP-H (28 mm) Order No. 917900		Securing of plug-in connections under extreme forces, such as vibrations, shocks or rotary movements.
Velcro strap e.g., type ONE_WRAP Strap		More cost-effective cable management solution for additionally fixing or bundling cables. Cables are not clamped too tightly and make the package flexible, in contrast to cable ties. Do not use as strain relief!

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