

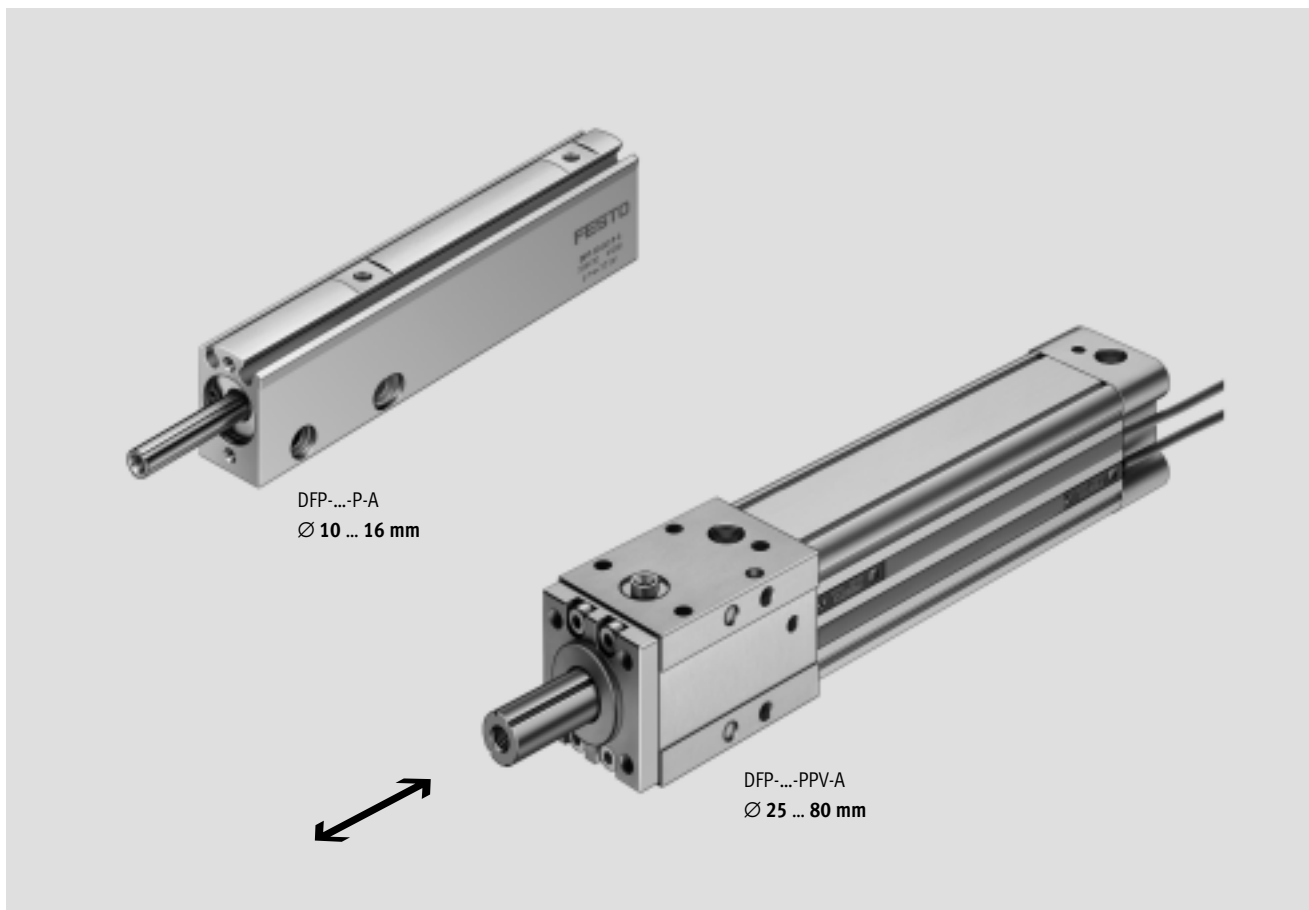
**Guided cylinders DFP**



## Guided cylinders DFP

Features

FESTO



### Brief description

- Double-acting
- High-precision guidance thanks to recirculating ball bearing guide
- Able to absorb high torques
- Saves space in comparison with standard cylinders with external guide unit
- Flexible cushioning rings/plates at both ends for Ø 10 ... 16 mm
- Pneumatic cushioning adjustable at both ends for Ø 25 ... 80 mm
- For contactless position sensing

# Guided cylinders DFP

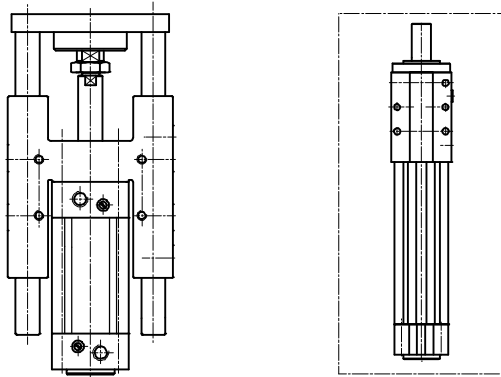
Features

FESTO

## Less installation space required

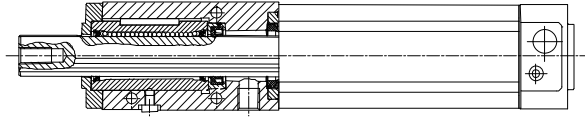
Standard cylinder with guide unit

Guided cylinder  
DFP



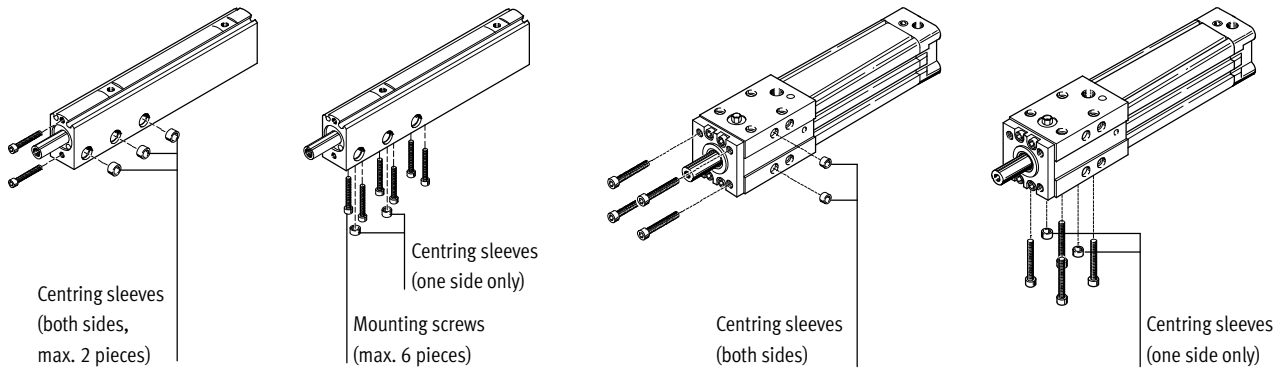
## High precision

Grooved piston rod with recirculating ball bearing guide

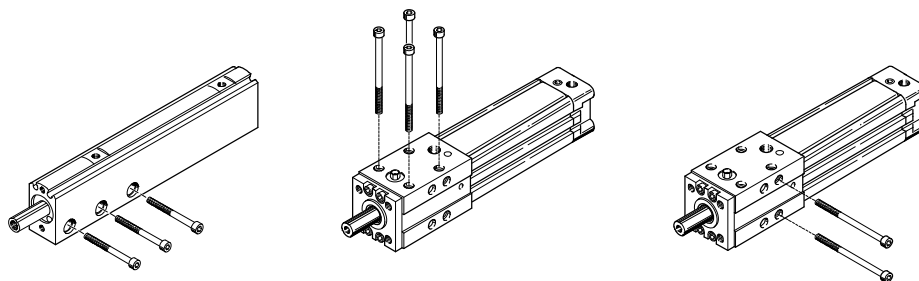


## Mounting options

Via female thread



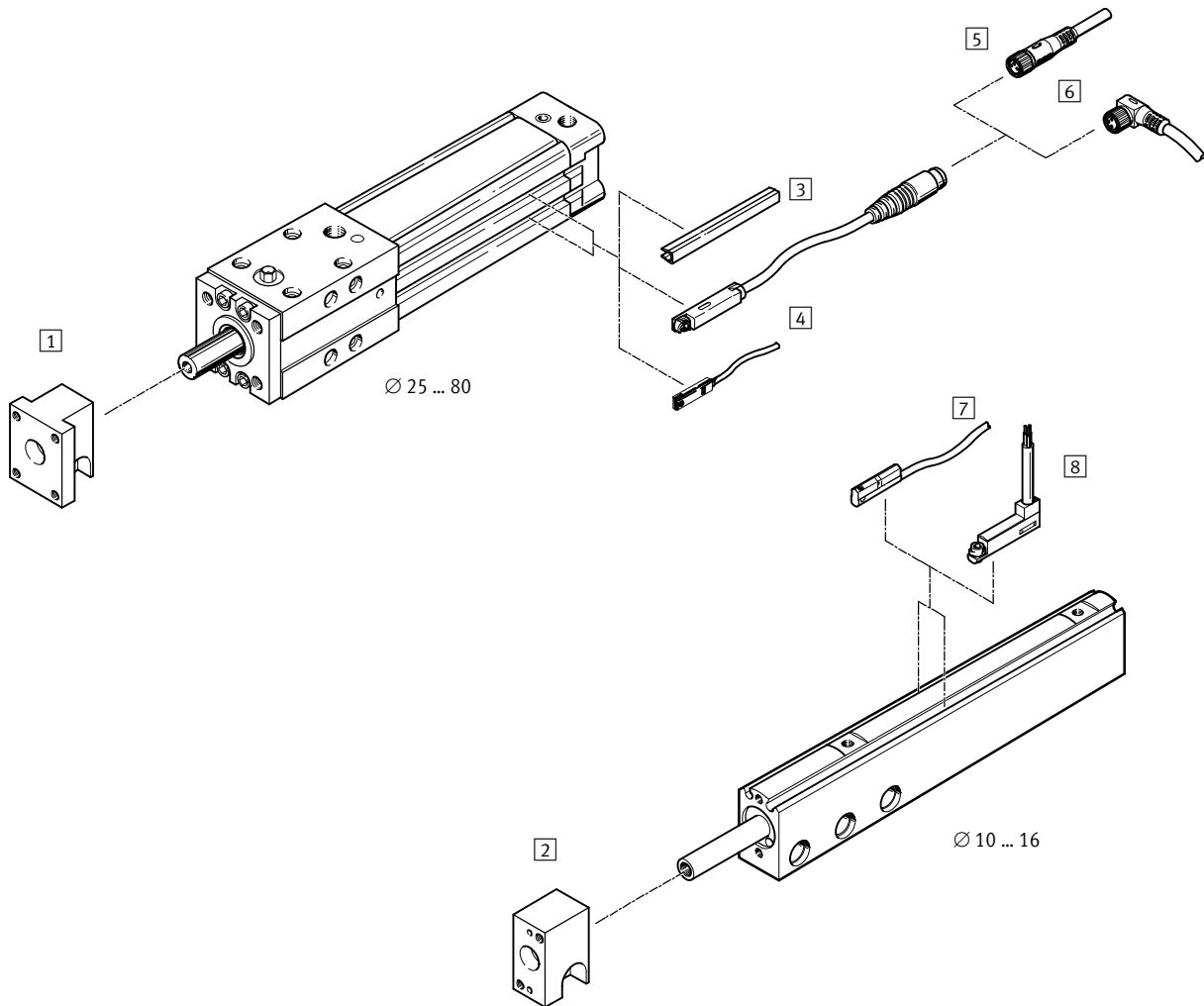
Via through-holes



# Guided cylinders DFP

Peripherals overview

FESTO



Accessories					
	Brief description	Piston $\varnothing$ [mm]		→ Page/Internet	
		10 ... 16	25 ... 32		
1	Push-on flange FFP	For piston $\varnothing 25 \dots 32$ mm	-	■	16
2	Push-on flange FFP	For piston $\varnothing 10 \dots 16$ mm	■	-	16
3	Slot cover ABP-5-S	To protect the sensor cable and keep dirt out of the sensor slots	-	■	18
4	Proximity sensors SME/SMT-8	Can be integrated in the cylinder profile barrel	-	■	18
5	Connecting cable, straight NEBU	-	-	■	18
6	Connecting cable, angled NEBU	-	-	■	18
7	Proximity sensors SME/SMT-10	Can be integrated in the cylinder profile barrel	■	-	17
8	Proximity sensors SME/SMT-10F	Can be integrated in the cylinder profile barrel	■	-	17
-	Centring pins/sleeves ZBH	-	■	■	17

# Guided cylinders DFP

Type codes

DFP – 50 – 80 – PPV – A – S2

**Type**

Double-acting	
DFP	Guided cylinder

**Piston Ø [mm]**

**Stroke [mm]**

**Cushioning**

P	Flexible cushioning rings/plates at both ends
PPV	Pneumatic cushioning adjustable at both ends

**Sensing**

A	For proximity sensing
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**Variant**

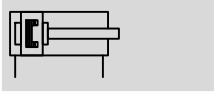
S2	Through piston rod
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# Guided cylinders DFP

Technical data

FESTO

Function



- $\varnothing$  - Diameter  
10 ... 16 mm
- | - Stroke length  
25 ... 100 mm

- - [www.festo.com](http://www.festo.com)

Variant

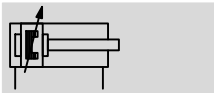


S2



DFP-...-P-A

Function



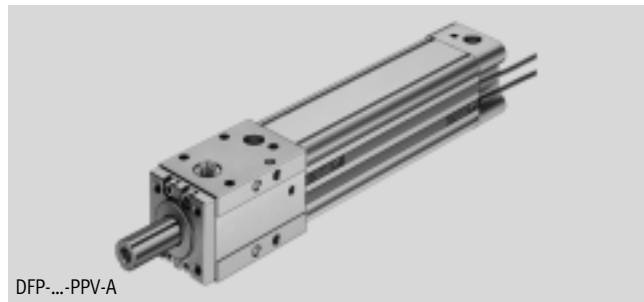
- $\varnothing$  - Diameter  
25 ... 80 mm
- | - Stroke length  
25 ... 500 mm

- - [www.festo.com](http://www.festo.com)

Variant



S2



DFP-...-PPV-A

General technical data						
Piston $\varnothing$	10	16	25	32	50	80
Pneumatic connection	M3	M5	G1/8	G1/8	G1/4	G3/8
Operating medium	Compressed air in accordance with ISO 8573-1:2010 [7:4:4]					
Note on operating/pilot medium	Operation with lubricated medium possible (in which case lubricated operation will always be required)					
Guide	Via ball bearings					
Cushioning	Flexible cushioning rings/plates at both ends			Adjustable at both ends		
Cushioning length [mm]	-	-	17	20	22	32
Position sensing	For proximity sensing					
Type of mounting	Via female threads Using through holes					
Mounting position	Any					

Operating and environmental conditions		
Operating pressure [bar]	0.5 ... 10	
Ambient temperature <sup>1)</sup> [°C]	-10 ... +60	

1) Note operating range of proximity sensors

Forces [N] and impact energy [Nm]						
Piston $\varnothing$	10	16	25	32	50	80
Theoretical force at 6 bar, advancing <sup>1)</sup>	47	121	295	483	1178	3016
Theoretical force at 6 bar, retracting	31	91	217	364	884	2262
Max. impact energy at the end positions	0.05	0.07	0.2	0.35	0.6	1.6

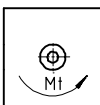
1) The force in the advance stroke is the same as the force in the return stroke with the variant S2.

# Guided cylinders DFP

Technical data

FESTO

Speed [m/s]							
Piston Ø		10	16	25	32	50	80
Maximum speed advancing	$v_{maxA}$	0.8	0.8	1.5	1.5	1	0.9
Maximum speed retracting	$v_{maxL}$	0.8	0.8	1.5	1.5	1	0.7

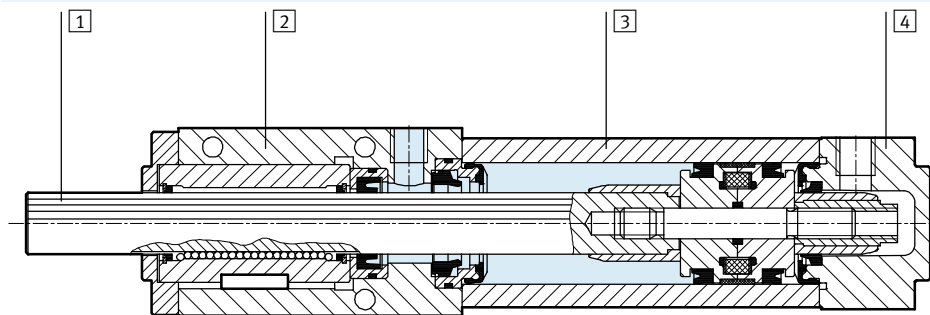
Max. torque <sup>1)</sup> [Nm]							
Piston Ø		10	16	25	32	50	80
	dynamic	0.2	0.4	1.1	5.8	19	75
	static	0.4	0.6	2.7	8.5	25	100

1) Torque at piston rod

Weights [g]													
Stroke [mm]	Piston Ø												
	10		16		25		32		50		80		
	Basic version	S2	Basic version	S2	Basic version	S2	Basic version	S2	Basic version	S2	Basic version	S2	
25	118	124	180	195	590	652	-	-	-	-	-	-	
50	147	156	218	238	660	737	1180	1297	2960	3351	8077	8814	
80	173	185	263	290	740	836	1295	1439	3150	3570	8561	9414	
100	198	212	293	325	794	902	1357	1519	3340	3855	8856	9787	
160	-	-	-	-	957	1102	1590	1805	3804	4468	9786	10949	
200	-	-	-	-	-	-	1732	1983	4100	4863	10460	11778	
250	-	-	-	-	-	-	1914	2210	4490	5377	11289	12801	
320	-	-	-	-	-	-	-	-	5030	6091	12436	14220	
400	-	-	-	-	-	-	-	-	5610	6869	13750	15844	
500	-	-	-	-	-	-	-	-	-	-	15442	17924	

## Materials

Sectional view



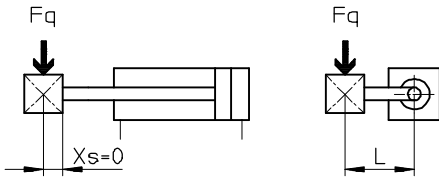
Guided cylinder	
1	Piston rod Tempered steel
2	Bearing end cap Aluminium
3	Cylinder barrel Anodised aluminium
4	End cap Aluminium
-	Seals Polyurethane, polyacetal, nitrile rubber
Note on material Free of copper and PTFE	

# Guided cylinders DFP

Technical data

FESTO

## Max. permissible dynamic lateral force $F_q$ at the piston rod



## Calculation of the max. permissible dynamic lateral force $F_q$

$$F_q = \frac{A}{(B + X_s + H) \times K + 1 + C \times L}$$

$F_q$  = Permissible lateral force [N]     $H$  = Stroke [mm]  
 $A$  = Equivalent bearing load [N]     $L$  = Lever arm [mm]  
 $B$  = Constant [mm]     $K$  = Constant [1/mm]  
 $C$  = Constant [1/mm]     $X_s$  = Distance from centre of mass [mm]

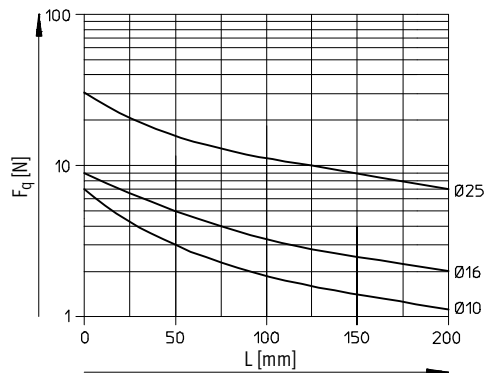
## Calculation parameters

	Piston $\varnothing$ [mm]					
	10	16	25	32	50	80
A	220	274	725	1460	2430	5620
B	37.5	37.5	48	57	75.5	96
C	0.84	0.51	0.4	0.22	0.14	0.09
K	0.47	0.47	0.3	0.19	0.13	0.088

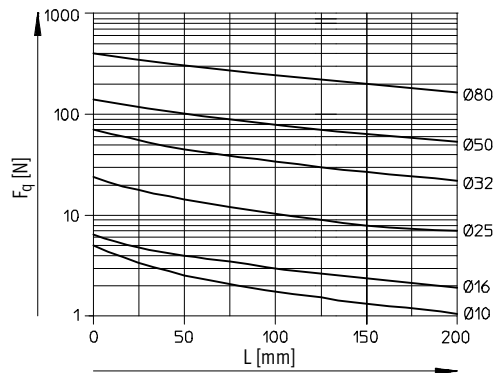
## Max. permissible dynamic lateral force $F_q$ at the piston rod as a function of the lever arm $L$

Distance from the centre of mass  $X_s = 0$  mm

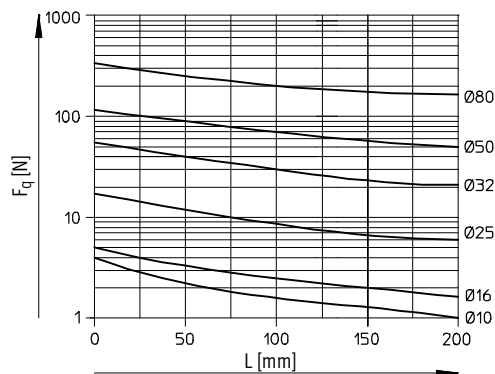
Fq with 25 mm stroke



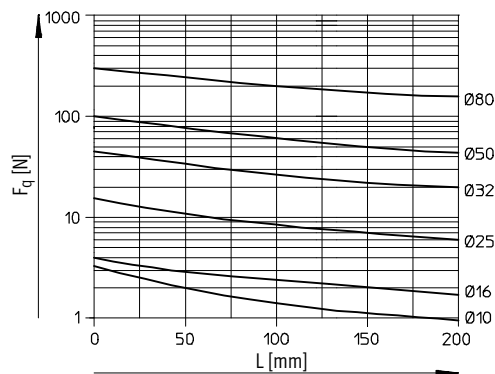
Fq with 50 mm stroke



Fq with 80 mm stroke



Fq with 100 mm stroke





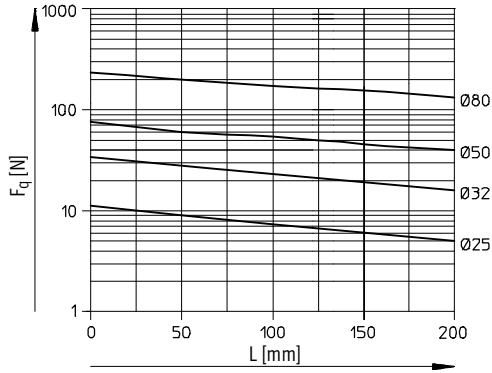
# Guided cylinders DFP

Technical data

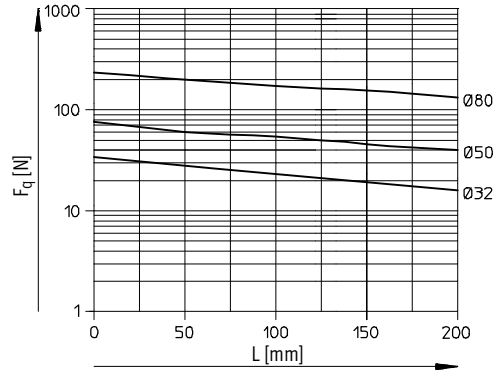
## Max. permissible dynamic lateral force $F_q$ at the piston rod as a function of the lever arm $L$

Distance from the centre of mass  $X_s = 0$  mm

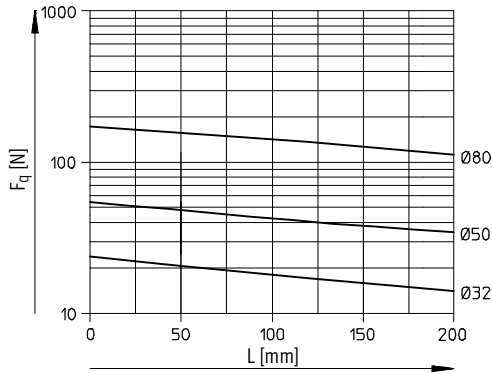
F<sub>q</sub> with 160 mm stroke



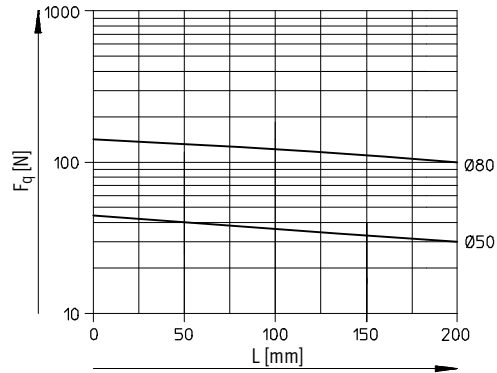
F<sub>q</sub> with 200 mm stroke



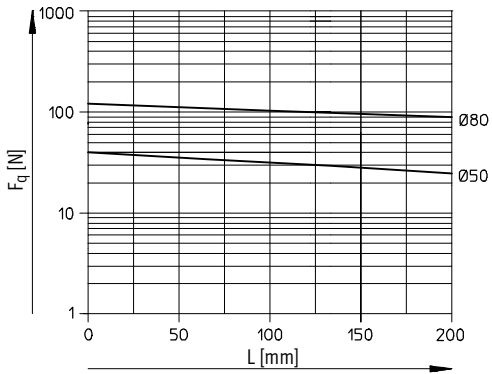
F<sub>q</sub> with 250 mm stroke



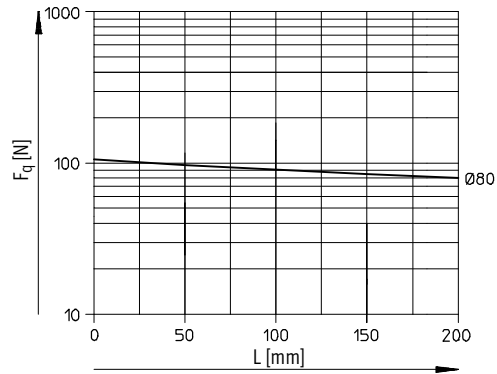
F<sub>q</sub> with 320 mm stroke



F<sub>q</sub> with 400 mm stroke



F<sub>q</sub> with 500 mm stroke

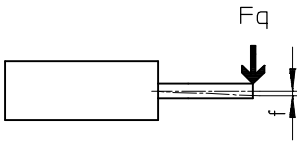


# Guided cylinders DFP

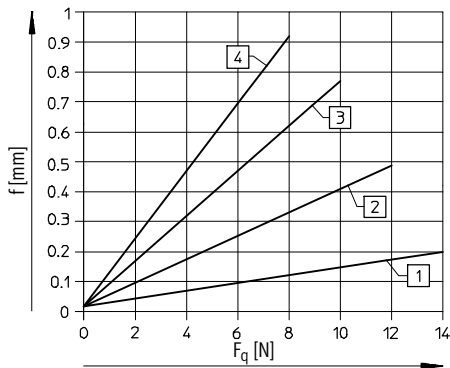
Technical data

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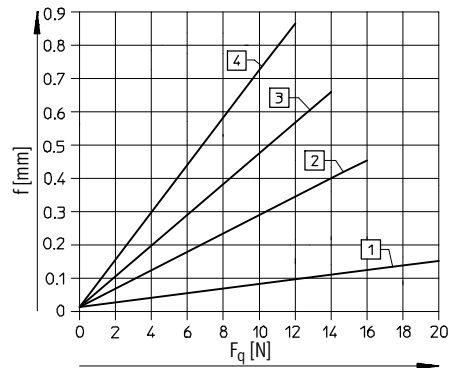
## Deflection $f$ at the piston rod as a function of the lateral force $F_q$



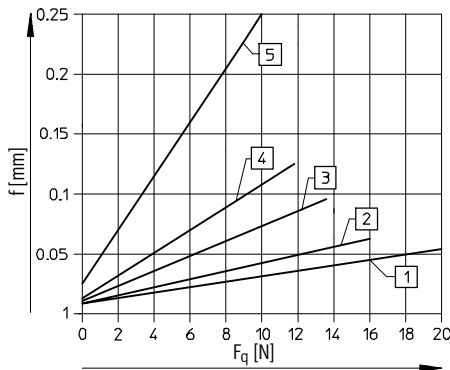
DFP-10



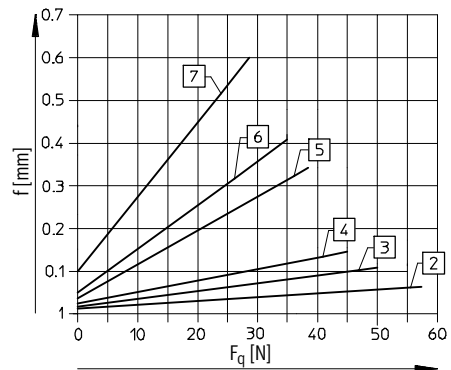
DFP-16



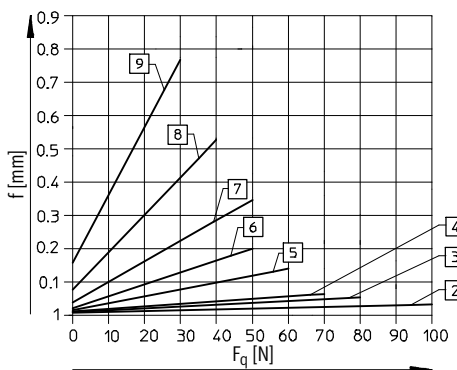
DFP-25



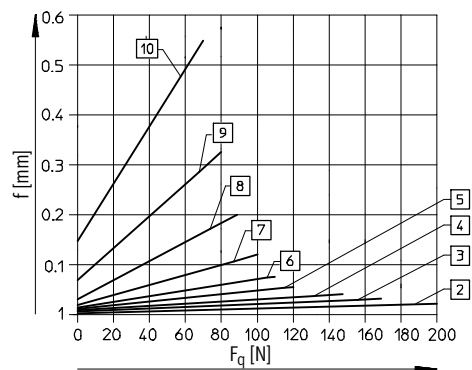
DFP-32



DFP-50



DFP-80



- 1 25 mm stroke
- 2 50 mm stroke
- 3 80 mm stroke

- 4 100 mm stroke
- 5 160 mm stroke
- 6 200 mm stroke

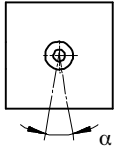
- 7 250 mm stroke
- 8 320 mm stroke

- 9 400 mm stroke
- 10 500 mm stroke

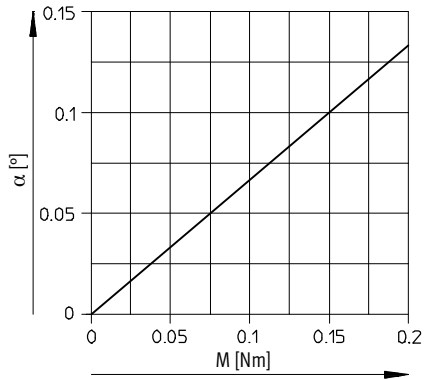
# Guided cylinders DFP

Technical data

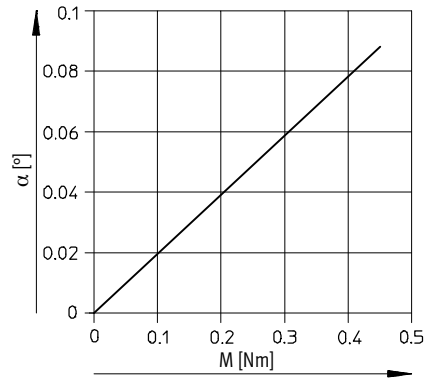
## Torsion angle $\alpha$ of the piston rod as a function of the torque M



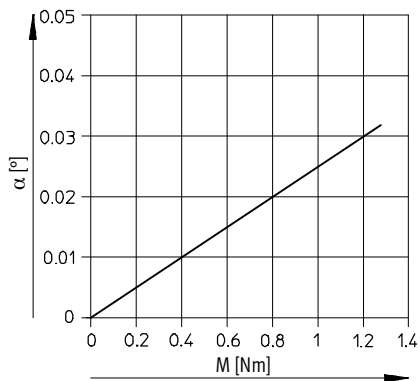
DFP-10



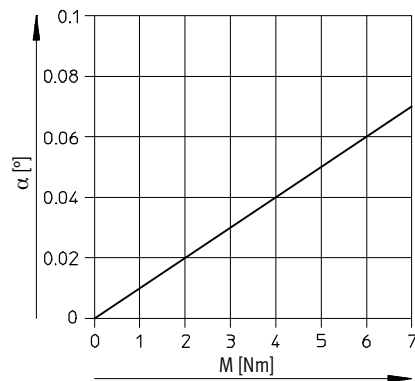
DFP-16



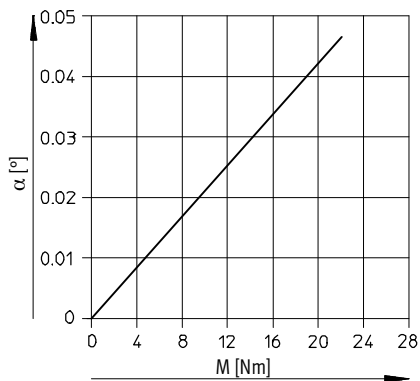
DFP-25



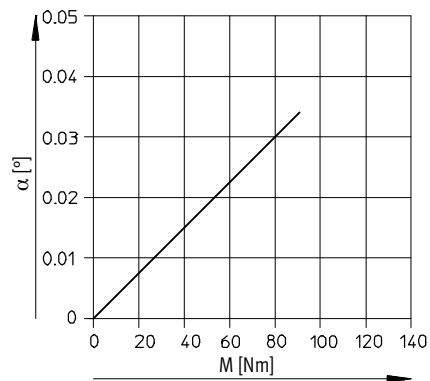
DFP-32



DFP-50



DFP-80








# Guided cylinders DFP

Technical data

FESTO


Ordering data – Basic version						
Design	Stroke [mm]	Part No.	Type <sup>1)</sup>	Stroke [mm]	Part No. Type <sup>1)</sup>	
	Piston Ø 10 mm			Piston Ø 16 mm		
	25	186729	DFP-10-25-P-A	25	186733	DFP-16-25-P-A
	50	186730	DFP-10-50-P-A	50	186734	DFP-16-50-P-A
	80	186731	DFP-10-80-P-A	80	186735	DFP-16-80-P-A
	100	186732	DFP-10-100-P-A	100	186736	DFP-16-100-P-A
	Piston Ø 25 mm			Piston Ø 32 mm		
	25	186737	DFP-25-25-PPV-A	25	–	–
	50	186738	DFP-25-50-PPV-A	50	186742	DFP-32-50-PPV-A
	80	186739	DFP-25-80-PPV-A	80	186743	DFP-32-80-PPV-A
	100	186740	DFP-25-100-PPV-A	100	186744	DFP-32-100-PPV-A
	160	186741	DFP-25-160-PPV-A	160	186745	DFP-32-160-PPV-A
	200	–	–	200	186746	DFP-32-200-PPV-A
	250	–	–	250	186747	DFP-32-250-PPV-A
	Piston Ø 50 mm			Piston Ø 80 mm		
	50	186748	DFP-50-50-PPV-A	50	186756	DFP-80-50-PPV-A
	80	186749	DFP-50-80-PPV-A	80	186757	DFP-80-80-PPV-A
	100	186750	DFP-50-100-PPV-A	100	186758	DFP-80-100-PPV-A
	160	186751	DFP-50-160-PPV-A	160	186759	DFP-80-160-PPV-A
	200	186752	DFP-50-200-PPV-A	200	186760	DFP-80-200-PPV-A
	250	186753	DFP-50-250-PPV-A	250	186761	DFP-80-250-PPV-A
	320	186754	DFP-50-320-PPV-A	320	186762	DFP-80-320-PPV-A
	400	186755	DFP-50-400-PPV-A	400	186763	DFP-80-400-PPV-A
	500	–	–	500	186764	DFP-80-500-PPV-A

1) In each case the scope of delivery includes 2 of the centring sleeves listed as accessories. Centring sleeves are supplied to repeat order in packs of 10. Proximity sensors and mounting screws are not included in the scope of delivery for guided cylinders.

# Guided cylinders DFP

Technical data

**FESTO**

Ordering data – Variants						
Design	Stroke [mm]	Part No.	Type <sup>1)2)</sup>	Stroke [mm]	Part No.	Type <sup>1)2)</sup>
<b>S2 – Through piston rod</b>						
	Piston Ø 10 mm			Piston Ø 16 mm		
	25	186765	DFP-10-25-P-A-S2	25	186769	DFP-16-25-P-A-S2
	50	186766	DFP-10-50-P-A-S2	50	186770	DFP-16-50-P-A-S2
	80	186767	DFP-10-80-P-A-S2	80	186771	DFP-16-80-P-A-S2
	100	186768	DFP-10-100-P-A-S2	100	186772	DFP-16-100-P-A-S2
	Piston Ø 25 mm			Piston Ø 32 mm		
	25	186773	DFP-25-25-PPV-A-S2	25	–	–
	50	186774	DFP-25-50-PPV-A-S2	50	186778	DFP-32-50-PPV-A-S2
	80	186775	DFP-25-80-PPV-A-S2	80	186779	DFP-32-80-PPV-A-S2
	100	186776	DFP-25-100-PPV-A-S2	100	186780	DFP-32-100-PPV-A-S2
	160	186777	DFP-25-160-PPV-A-S2	160	186781	DFP-32-160-PPV-A-S2
	200	–	–	200	186782	DFP-32-200-PPV-A-S2
	250	–	–	250	186783	DFP-32-250-PPV-A-S2
	Piston Ø 50 mm			Piston Ø 80 mm		
	50	186784	DFP-50-50-PPV-A-S2	50	186792	DFP-80-50-PPV-A-S2
	80	186785	DFP-50-80-PPV-A-S2	80	186793	DFP-80-80-PPV-A-S2
	100	186786	DFP-50-100-PPV-A-S2	100	186794	DFP-80-100-PPV-A-S2
	160	186787	DFP-50-160-PPV-A-S2	160	186795	DFP-80-160-PPV-A-S2
	200	186788	DFP-50-200-PPV-A-S2	200	186796	DFP-80-200-PPV-A-S2
	250	186789	DFP-50-250-PPV-A-S2	250	186797	DFP-80-250-PPV-A-S2
	320	186790	DFP-50-320-PPV-A-S2	320	186798	DFP-80-320-PPV-A-S2
	400	186791	DFP-50-400-PPV-A-S2	400	186799	DFP-80-400-PPV-A-S2
	500	–	–	500	186800	DFP-80-500-PPV-A-S2

- 1) In each case the scope of delivery includes 2 of the centring sleeves listed as accessories. Centring sleeves are supplied to repeat order in packs of 10. Proximity sensors and mounting screws are not included in the scope of delivery for guided cylinders.
- 2) The scope of delivery also includes a hex nut for the piston rod thread.

# Guided cylinders DFP

Accessories



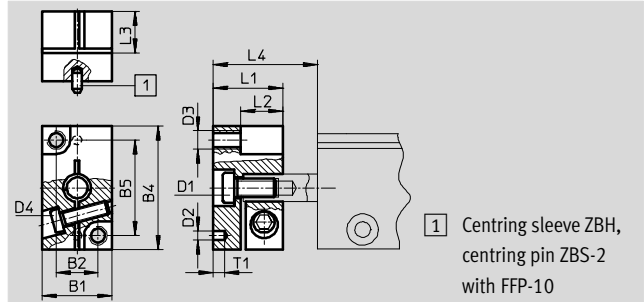
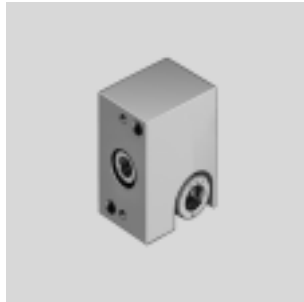
## Push-on flange FFP

for piston  $\varnothing$  10 ... 16 mm

Material:

Wrought aluminium alloy

Free of copper, PTFE and silicone



### Dimensions and ordering data

For $\varnothing$	B1	B2	B4	B5	D1	D2	D3	D4	L1	L2	L3	L4	T1	CRC <sup>1)</sup>	Part No.	Type
[mm]		$\pm 0.02$				$\varnothing$ H7							+0.2			
10	15	9	26	20	M4	2	M4	M3	15	8.5	9	31.5	2.5	2	<b>186801</b>	<b>FFP-10</b>
16	19	12	33	26	M4	5	M4	M4	17	10.5	11	31.5	1	2	<b>186802</b>	<b>FFP-16</b>

1) Corrosion resistance class CRC 2 to Festo standard FN 940070

Moderate corrosion stress. Indoor applications in which condensation may occur. External visible parts with primarily decorative requirements for the surface and which are in direct contact with the ambient atmosphere typical for industrial applications.

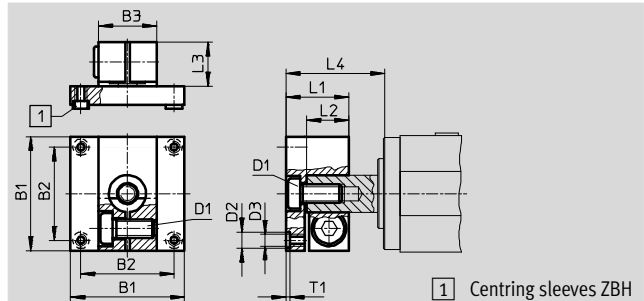
## Push-on flange FFP

for piston  $\varnothing$  25 ... 80 mm

Material:

Wrought aluminium alloy

Free of copper, PTFE and silicone



### Dimensions and ordering data

For $\varnothing$	B1	B2	B3	D1	D2	D3	L1	L2	L3	L4	T1	CRC <sup>1)</sup>	Part No.	Type
[mm]		$\pm 0.02$			$\varnothing$ H7						+0.2			
25	38	30	22	M6	7	M5	27	18	19	39	1.6	2	<b>186803</b>	<b>FFP-25</b>
32	49	40	25	M8	7	M5	27	18	19	41	1.6	2	<b>186804</b>	<b>FFP-32</b>
50	64	50	36	M10	9	M6	35	23	25	52	2.1	2	<b>186805</b>	<b>FFP-50</b>
80	94	70	54	M12	12	M8	40	25	27	56	2.6	2	<b>186806</b>	<b>FFP-80</b>

1) Corrosion resistance class CRC 2 to Festo standard FN 940070

Moderate corrosion stress. Indoor applications in which condensation may occur. External visible parts with primarily decorative requirements for the surface and which are in direct contact with the ambient atmosphere typical for industrial applications.

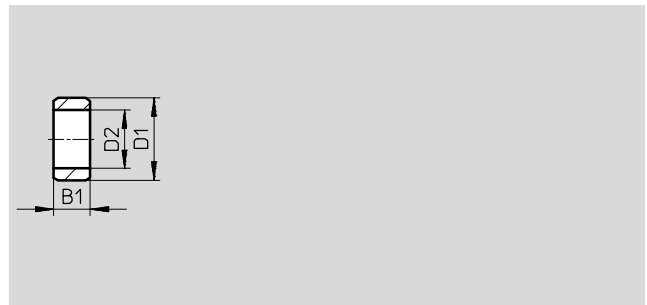


# Guided cylinders DFP

Accessories

## Centring sleeves ZBH

Material:  
Steel, corrosion resistant  
Free of copper, PTFE and silicone



Dimensions and ordering data							
D1	B1	D2	CRC <sup>1)</sup>	Weight	Part No.	Type	PU <sup>2)</sup>
∅		∅		[g]			
h7	-0.2						
5	2.4	3.2	2	1	<b>189652</b>	<b>ZBH-5</b>	10
7	3	5.3	2	1	<b>186717</b>	<b>ZBH-7</b>	10
9	4	6.4	2	1	<b>150927</b>	<b>ZBH-9</b>	10

- 1) Corrosion resistance class CRC 2 to Festo standard FN 940070  
Moderate corrosion stress. Indoor applications in which condensation may occur. External visible parts with primarily decorative requirements for the surface and which are in direct contact with the ambient atmosphere typical for industrial applications.
- 2) Packaging unit quantity

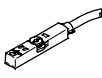
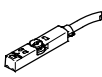
Ordering data – Proximity sensors for C-slot, magneto-resistive						Technical data → Internet: smt	
	Type of mounting	Switch output	Electrical connection, connection direction	Cable length [m]	Part No.	Type	
N/O contact							
	Insertable in the slot from above	PNP	Cable, 3-wire, in-line	2.5	<b>551373</b>	<b>SMT-10M-PS-24V-E-2,5-L-OE</b>	
			Plug M8x1, 3-pin, in-line	0.3	<b>551375</b>	<b>SMT-10M-PS-24V-E-0,3-L-M8D</b>	
			Plug M8x1, 3-pin, lateral	0.3	<b>551376</b>	<b>SMT-10M-PS-24V-E-0,3-Q-M8D</b>	

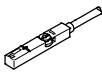


Ordering data – Proximity sensors for C-slot, magnetic reed						Technical data → Internet: sme	
	Type of mounting	Switch output	Electrical connection, connection direction	Cable length [m]	Part No.	Type	
N/O contact							
	Insertable in the slot from above	Contacting	Plug M8x1, 3-pin, in-line	0.3	<b>551367</b>	<b>SME-10M-DS-24V-E-0,3-L-M8D</b>	
			Cable, 3-wire, in-line	2.5	<b>551365</b>	<b>SME-10M-DS-24V-E-2,5-L-OE</b>	
			Cable, 2-wire, in-line	2.5	<b>551369</b>	<b>SME-10M-ZS-24V-E-2,5-L-OE</b>	
	Insertable in the slot lengthwise	Contacting	Plug M8x1, 3-pin, in-line	0.3	<b>173212</b>	<b>SME-10-SL-LED-24</b>	
			Cable, 3-wire, in-line	2.5	<b>173210</b>	<b>SME-10-KL-LED-24</b>	



# Guided cylinders DFP

Accessories

FESTO

Ordering data – Proximity sensors for T-slot, magneto-resistive					Technical data → Internet: smt	
	Type of mounting	Switch output	Electrical connection	Cable length [m]	Part No.	Type
<b>N/O contact</b>						
	Insertable in the slot from above, flush with cylinder profile, short design	PNP	Cable, 3-wire	2.5	574335	SMT-8M-A-PS-24V-E-2,5-OE
			Plug M8x1, 3-pin	0.3	574334	SMT-8M-A-PS-24V-E-0,3-M8D
			Plug M12x1, 3-pin	0.3	574337	SMT-8M-A-PS-24V-E-0,3-M12
		NPN	Cable, 3-wire	2.5	574338	SMT-8M-A-NS-24V-E-2,5-OE
			Plug M8x1, 3-pin	0.3	574339	SMT-8M-A-NS-24V-E-0,3-M8D
<b>N/C contact</b>						
	Insertable in the slot from above, flush with cylinder profile, short design	PNP	Cable, 3-wire	7.5	574340	SMT-8M-A-PO-24V-E-7,5-OE

Ordering data – Proximity sensors for T-slot, magnetic reed					Technical data → Internet: sme	
	Type of mounting	Switch output	Electrical connection	Cable length [m]	Part No.	Type
<b>N/O contact</b>						
	Insertable in the slot from above, flush with cylinder profile	Contacting	Cable, 3-wire	2.5	543862	SME-8M-DS-24V-K-2,5-OE
			Cable, 2-wire	2.5	543872	SME-8M-ZS-24V-K-2,5-OE
			Plug M8x1, 3-pin	0.3	543861	SME-8M-DS-24V-K-0,3-M8D
			Plug M8x1, 3-pin	0.3	543861	SME-8M-DS-24V-K-0,3-M8D
	Insertable in the slot lengthwise, flush with the cylinder profile	Contacting	Cable, 3-wire	2.5	150855	SME-8-K-LED-24
			Plug M8x1, 3-pin	0.3	150857	SME-8-S-LED-24
<b>N/C contact</b>						
	Insertable in the slot lengthwise, flush with the cylinder profile	Contacting	Cable, 3-wire	7.5	160251	SME-8-O-K-LED-24

Ordering data – Connecting cables				Technical data → Internet: nebu	
	Electrical connection, left	Electrical connection, right	Cable length [m]	Part No.	Type
	Straight socket, M8x1, 3-pin	Cable, open end, 3-wire	2,5	541333	NEBU-M8G3-K-2.5-LE3
			5	541334	NEBU-M8G3-K-5-LE3
	Straight socket, M12x1, 5-pin	Cable, open end, 3-wire	2,5	541363	NEBU-M12G5-K-2.5-LE3
			5	541364	NEBU-M12G5-K-5-LE3
	Angled socket, M8x1, 3-pin	Cable, open end, 3-wire	2,5	541338	NEBU-M8W3-K-2.5-LE3
			5	541341	NEBU-M8W3-K-5-LE3
	Angled socket, M12x1, 5-pin	Cable, open end, 3-wire	2,5	541367	NEBU-M12W5-K-2.5-LE3
			5	541370	NEBU-M12W5-K-5-LE3

Ordering data – Slot cover for T-slot			Part No.	Type
	Mounting	Length		
	Insertable from above	2x 0.5 m	151680	ABP-5-S