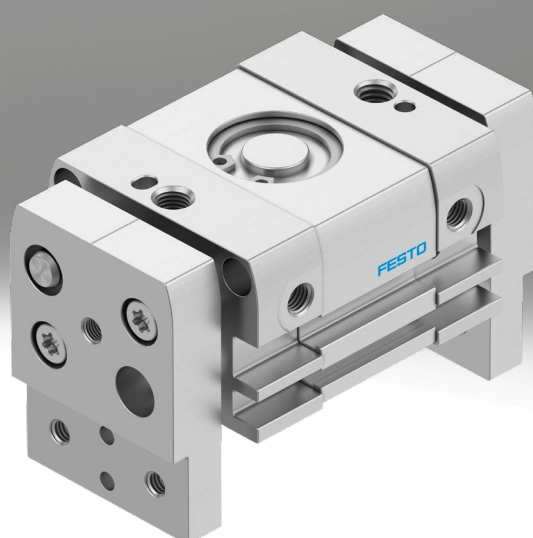


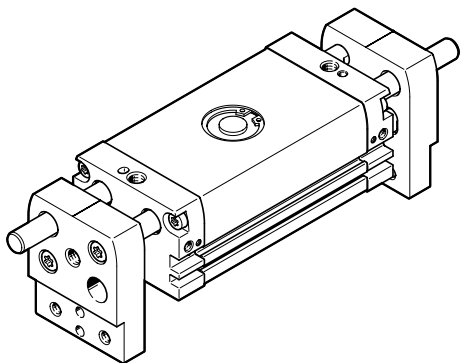
Parallel gripper DHPL

FESTO



Key features

At a glance



- Compact and sturdy design
- Ideal for gripping larger parts
- The grippers can absorb a high torque due to the guided gripper jaws.
- Double-acting piston drive
- Variable gripping direction: internal or external gripping
- Proximity switches can be mounted via T-slot or C-slot

Cushioning

The drive is fitted with pneumatic end-position cushioning, which can be adapted by the operator for maximum performance according to the moving mass and speed.

Position sensing

The position sensing function uses proximity switches to sense any required positions.



Note

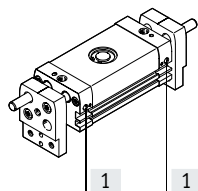
Engineering software

Gripper selection

→ www.festo.com

Key features

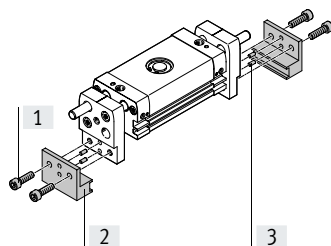
Supply ports



[1] Compressed air supply ports

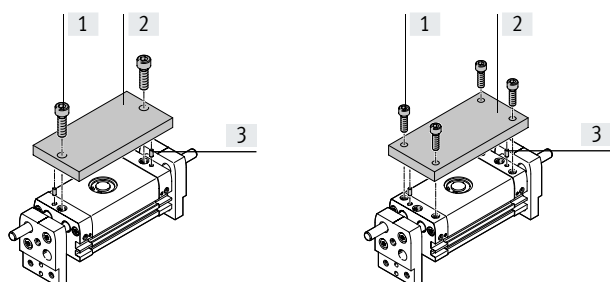
Mounting options

External gripper fingers

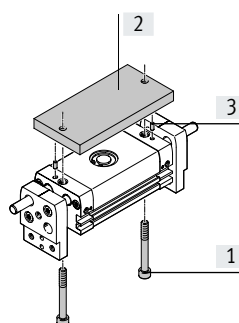


[1] Screws
 [2] Gripper finger (produced in-house by the customer)
 [3] Centring pin

From above

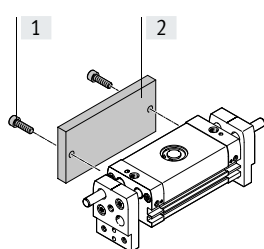


From underneath



[1] Screws
 [2] Mounting plate (produced in-house by the customer)
 [3] Centring pin

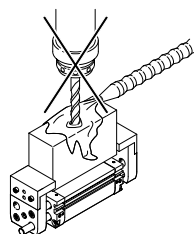
From the rear



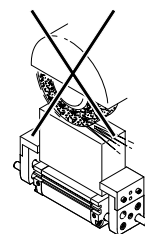
[1] Screws
 [2] Mounting plate (produced in-house by the customer)

 Note

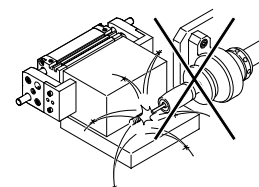
These grippers are not suitable for the following or similar applications:



- Machining
- Aggressive media

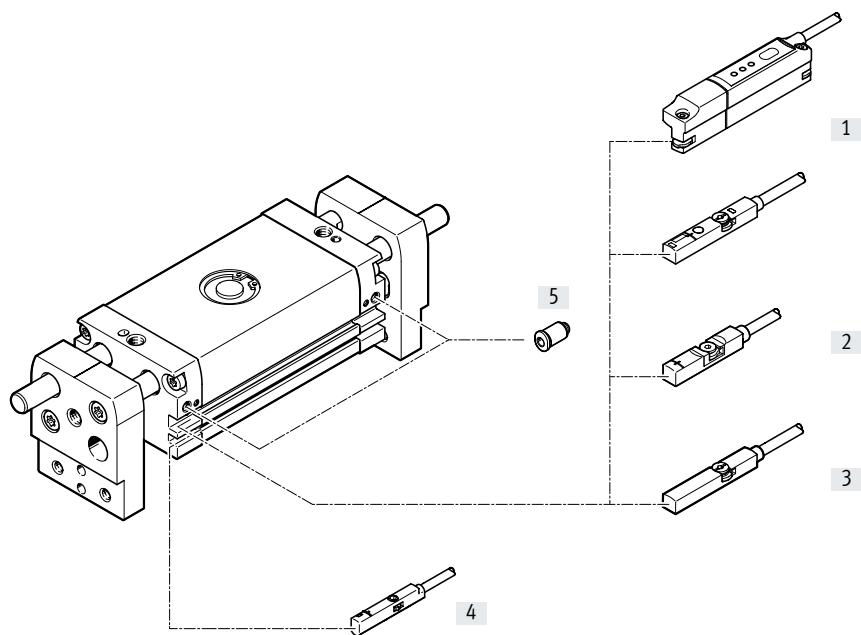


- Grinding dust



- Welding spatter

Peripherals overview



Accessories			
	Type/order code	Description	→ Page/Internet
[1]	Position transmitters SDAT/SDAS	For detecting the current position	19
[2]	Proximity switch SDBT	For position sensing	18
[3]	Proximity switch CRSMT-8	For position sensing	18
[4]	Proximity switch SME/SMT-10	For position sensing	18
[5]	Push-in fitting QS	For connecting tubing with standard O.D.	qs

Type codes

001	Series
DHPL	Parallel gripper

002	Size
10	10
16	16
20	20
25	25
32	32
40	40

003	Complete stroke [mm]
20	20
30	30
40	40
50	50
60	60
70	70
80	80
100	100
120	120
160	160
200	200

004	Cushioning
P	Elastic cushioning rings/plates on both sides

005	Position sensing
A	For proximity sensor

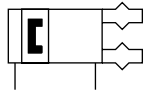
Data sheet

Function

Double-acting



www.festo.com



Size
10 ... 40 mm

Total stroke
20 ... 200 mm



General technical data

General technical data

Size	10	16	20	25	32	40
Design	Gear rack/pinion					
Mode of operation	Double-acting					
Guide	Plain-bearing guide					
Gripper function	Parallel					
Cushioning	Elastic cushioning rings/pads at both ends					
Number of gripper jaws	2					
Max. load per external gripper finger ¹⁾	54 g	93 g	170 g	305 g	498 g	801 g
Total stroke	20 mm; 60 mm	30 mm; 80 mm	40 mm; 100 mm	50 mm; 120 mm	70 mm; 160 mm	100 mm; 200 mm
Stroke per gripper jaw	10 mm; 30 mm	15 mm; 40 mm	20 mm; 50 mm	25 mm; 60 mm	35 mm; 80 mm	50 mm; 100 mm
Pneumatic connection	M5				G1/8	
Gripper repetition accuracy ²⁾	≤0.03 mm					
Rotational symmetry	≤0.2 mm					
Max. interchangeability	≤0.2 mm					
Max. operating frequency of gripper	≤2 Hz				≤1 Hz	
Position sensing	Via proximity switch					
Type of mounting	Optionally: direct fastening via thread, with through-hole					
Mounting position	Any					

1) Valid for unthrottled operation

2) Under constant exposure to operating conditions, end-position drift occurs in the direction of movement of the gripper jaws, at 100 consecutive strokes

Operating and environmental conditions

Size	10	16	20	25	32	40
Operating pressure ¹⁾	0.25 ... 0.8 MPa	0.15 ... 0.8 MPa				
Operating pressure ¹⁾	36 ... 116 psi	21.75 ... 116 psi				
Operating pressure ¹⁾	2.5 ... 8 bar	1.5 ... 8 bar				
Operating medium	Compressed air to ISO 8573-1:2010 [7:4:4]					
Note on the operating/pilot medium	Lubricated operation possible (in which case lubricated operation will always be required)					
Ambient temperature ²⁾	-10 ... 60°C					
Maintenance interval	Lifetime lubrication					
Corrosion resistance class CRC ³⁾	1 - Low corrosion stress					

1) DHPL-10: After a longer period of downtime, the min. operating pressure of 0.25 MPa (2.5 bar, 36 psi) may be slightly higher (0.4 MPa (4 bar, 58 psi)).

2) Note operating range of proximity switches

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

Low corrosion stress. Dry indoor application or transport and storage protection. Also applies to parts behind covers, in the non-visible interior area, and parts which are covered in the application (e.g. drive trunnions).

Data sheet

Weight						
Size	10	16	20	25	32	40
Product weight	251 ... 377 g	499 ... 802 g	883 ... 1407 g	1447 ... 2297 g	2634 ... 4154 g	4480 ... 6480 g

Materials						
Size	10	16	20	25	32	40
Housing material	Anodised wrought aluminium alloy					
Cover material	Anodised wrought aluminium alloy					
Cover cap material	Anodised wrought aluminium alloy					
End plate material	Anodised wrought aluminium alloy					
Gripper jaw material	Anodised wrought aluminium alloy					
Piston rod material	High-alloy stainless steel					
Piston seal material	TPE-U(PU)					
Gear rack material	High-alloy stainless steel					
Gear wheel material	Sintered bronze					
Screws material	Galvanised steel					
Note on materials	RoHS-compliant					
O-ring material	NBR					

Measured gripping force ¹⁾						
Size	10	16	20	25	32	40
Total gripping force at 6 bar, closing	21 ... 24 N	71 ... 73 N	116 ... 120 N	185 ... 193 N	285 ... 289 N	462 ... 496 N
Total gripping force at 6 bar, opening	29 ... 31 N	86 ... 92 N	142 ... 150 N	226 ... 237 N	352 ... 385 N	490 ... 536 N
Gripping force per gripper jaw at 6 bar, closing	10.5 ... 12 N	35.5 ... 36.5 N	58 ... 60 N	92.5 ... 96.5 N	142.5 ... 144.5 N	231 ... 248 N
Gripping force per gripper jaw at 6 bar, opening	14.5 ... 15.5 N	43 ... 46 N	71 ... 75 N	113 ... 118.5 N	176 ... 192.5 N	245 ... 268 N

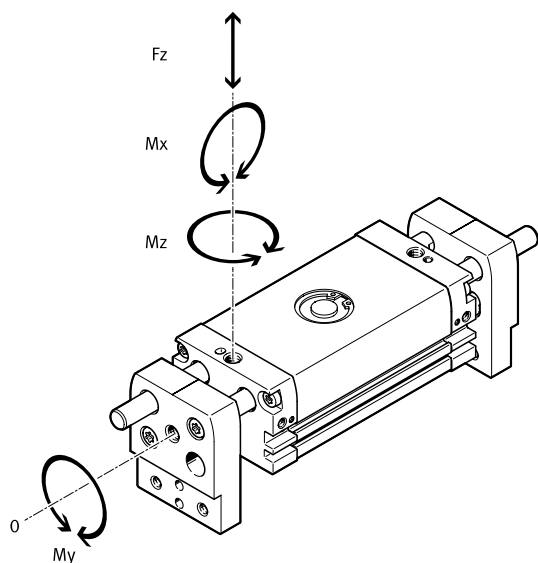
1) Graphs relating to this are on the following pages.

Opening and closing times ¹⁾						
Size	10	16	20	25	32	40
Min. opening time at 6 bar	41 ... 110 ms	53 ... 157 ms	71 ... 189 ms	81 ... 201 ms	112 ... 272 ms	220 ... 427 ms
Min. closing time at 6 bar	70 ... 174 ms	75 ... 221 ms	108 ... 274 ms	116 ... 274 ms	209 ... 473 ms	281 ... 524 ms

1) The indicated opening and closing times [ms] were measured at room temperature at an operating pressure of 6 bar with a horizontally mounted gripper without additional gripper fingers.
The grippers must be throttled for larger loads [g]. Opening and closing times must then be adjusted accordingly.

Data sheet

Characteristic load values

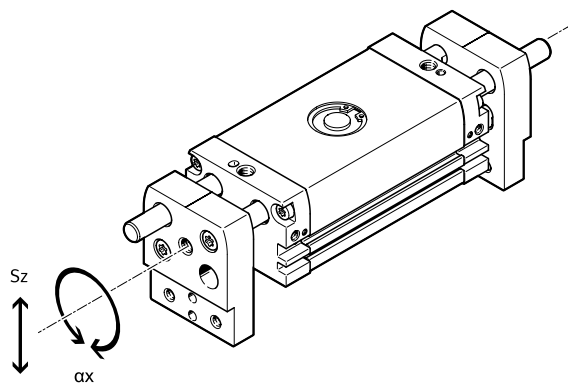


The indicated permissible forces and torques apply to a single gripper jaw. The indicated values include the lever arm, additional weight forces caused by the work-piece or external gripper fingers, as well as forces which occur during movement. The zero coordinate line (gripper jaw guide) must be taken into consideration when calculating torques.

Characteristic load values at the gripper jaws

Size	10	16	20	25	32	40
Maximum force on gripper jaw F_z , static	40 N	240 N	280 N	320 N	750 N	
Maximum torque on gripper jaw M_x , static	0.5 Nm	3.5 Nm	5 Nm	6.5 Nm	18 Nm	22 Nm
Maximum torque on gripper jaw M_y , static	0.5 Nm	3.5 Nm	5 Nm	6.5 Nm	18 Nm	22 Nm
Maximum torque on gripper jaw M_z , static	0.5 Nm	3.5 Nm	5 Nm	6.5 Nm	18 Nm	22 Nm

Gripper jaw backlash



The plain-bearing guide used in the grippers means that there is backlash between the gripper jaws and the housing. The values listed in the table apply when new.

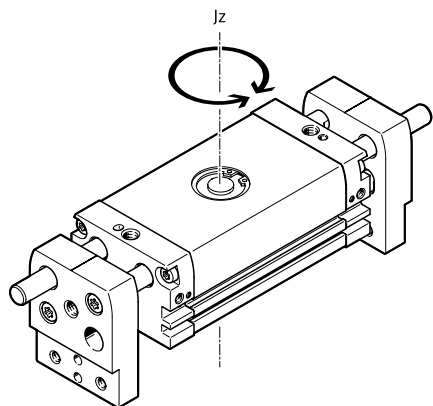
Gripper jaw backlash¹⁾

Size	10	16	20	25	32	40
Max. gripper jaw backlash S_z	≤ 0.064 mm	≤ 0.072 mm	≤ 0.068 mm	≤ 0.064 mm	≤ 0.066 mm	≤ 0.065 mm
Max. gripper jaw angular backlash α_x , α_y	≤ 0.22 deg	≤ 0.15 deg	≤ 0.14 deg	≤ 0.13 deg	≤ 0.12 deg	≤ 0.1 deg

1) The values apply only in the closed state of the gripper.

Data sheet

Mass moments of inertia



Mass moment of inertia of the parallel grippers in relation to the central axis, without external gripper fingers, without load.

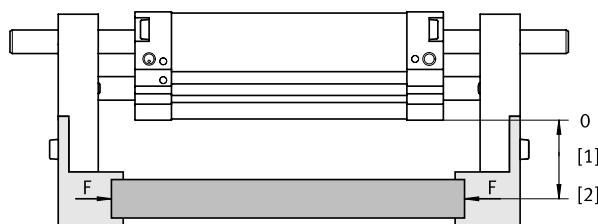
Mass moments of inertia						
Size	10	16	20	25	32	40
Mass moment of inertia	1.6 ... 9.6 kgcm ²	4.3 ... 12.6 kgcm ²	15.4 ... 104.5 kgcm ²	50.4 ... 258.9 kgcm ²	101.8 ... 727 kgcm ²	249.5 ... 1625 kgcm ²

Data sheet

Gripping force F_h per gripper jaw as a function of the operating pressure and lever arm x

The gripping forces as a function of the operating pressure and lever arm can be determined from the following graphs.

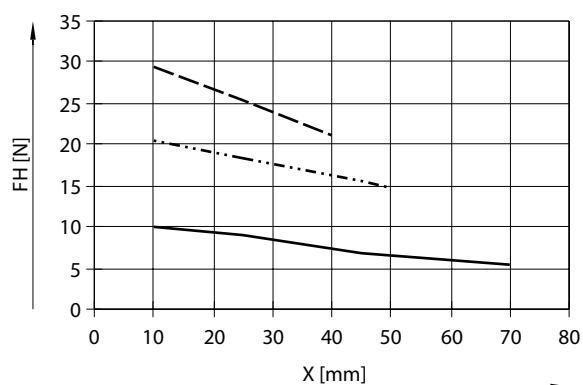
— 3 bar
 - - - 6 bar
 - - - 8 bar



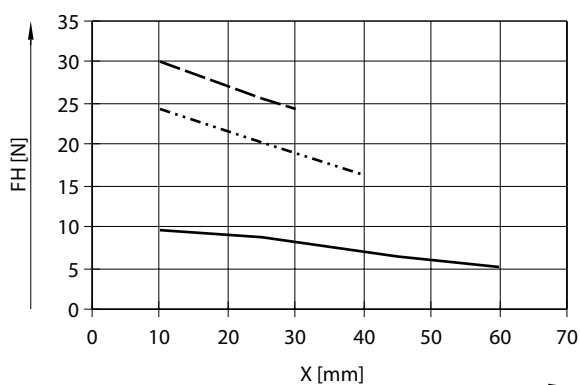
[1] Lever arm x
 [2] Load point

External gripping (closing)

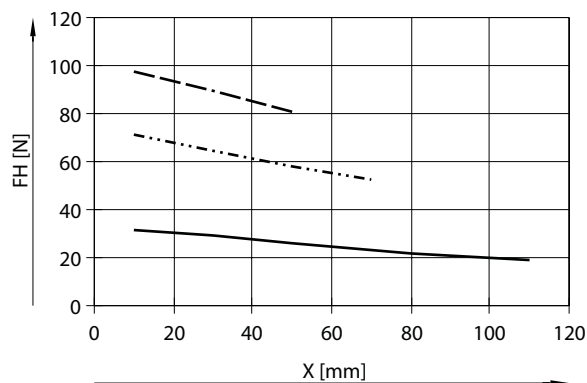
DHPL-10-20-...-A



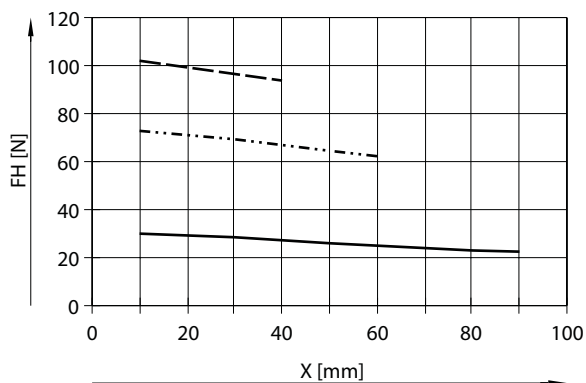
DHPL-10-60-...-A



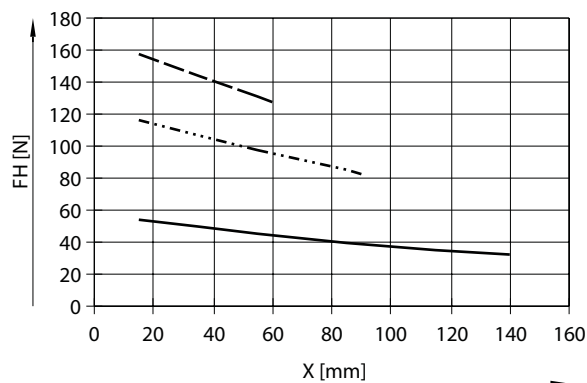
DHPL-16-30-...-A



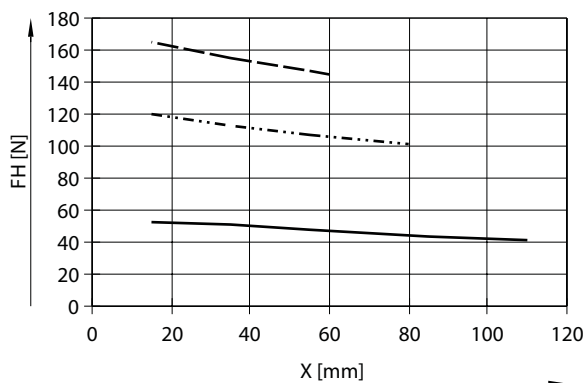
DHPL-16-80-...-A



DHPL-20-40-...-A



DHPL-20-100-...-A

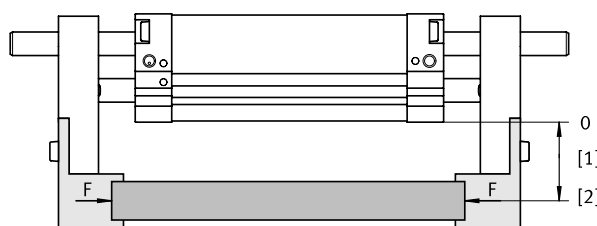


Data sheet

Gripping force F_h per gripper jaw as a function of the operating pressure and lever arm x

The gripping forces as a function of the operating pressure and lever arm can be determined from the following graphs.

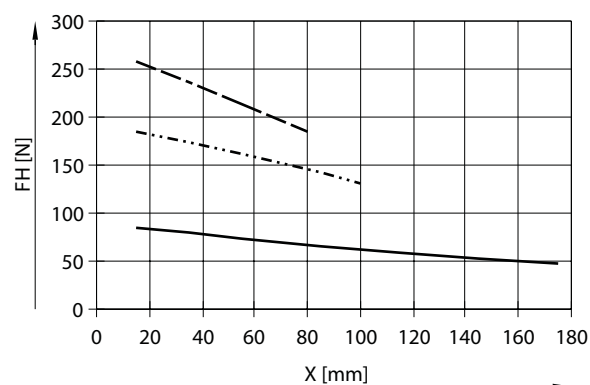
— 3 bar
 - · - · 6 bar
 - - - 8 bar



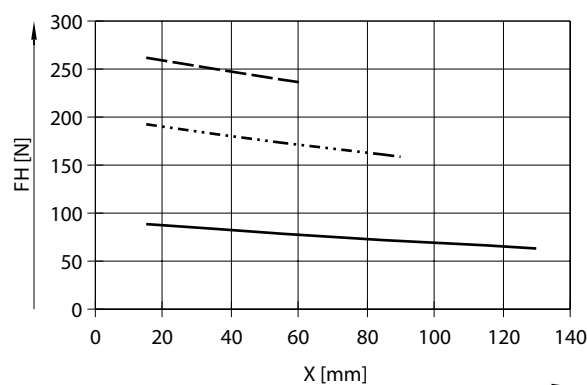
[1] Lever arm x
 [2] Load point

External gripping (closing)

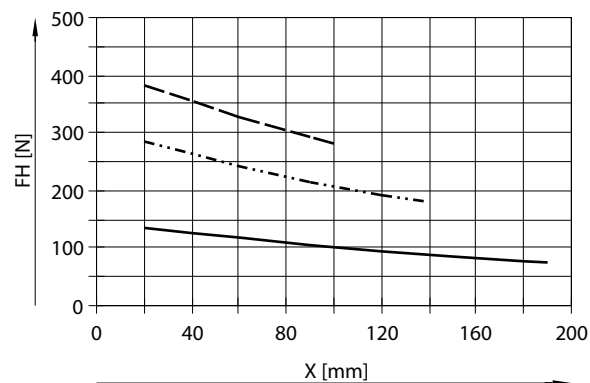
DHPL-25-50-...-A



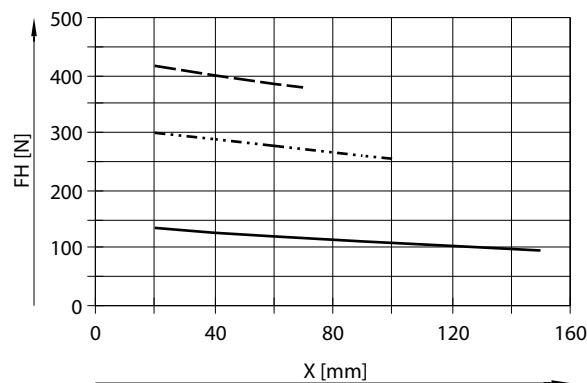
DHPL-25-120-...-A



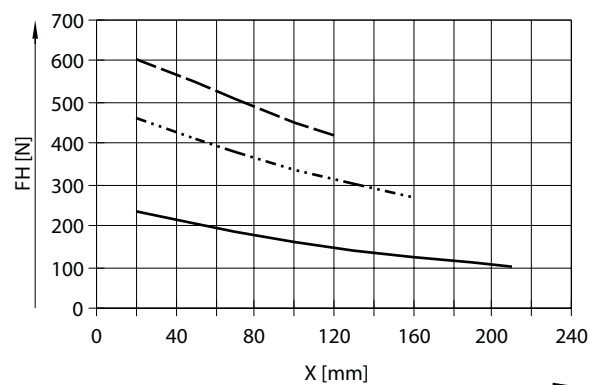
DHPL-32-70-...-A



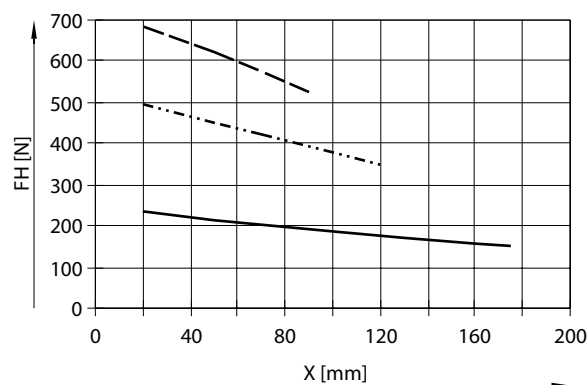
DHPL-32-160-...-A



DHPL-40-100-...-A



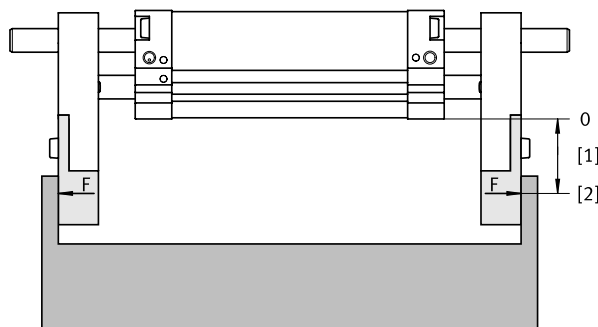
DHPL-40-200-...-A



Data sheet

Gripping force F_h per gripper jaw as a function of the operating pressure and lever arm x

The gripping forces as a function of the operating pressure and lever arm can be determined from the following graphs.

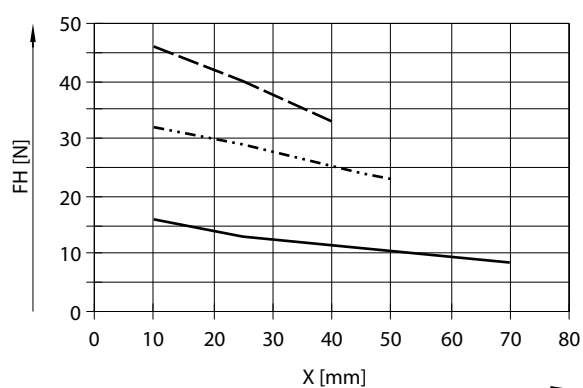


— 3 bar
 - · - · 6 bar
 - - - 8 bar

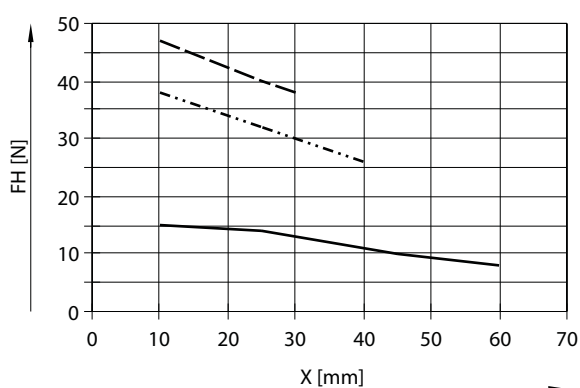
[1] Lever arm x
 [2] Load point

Internal gripping (opening)

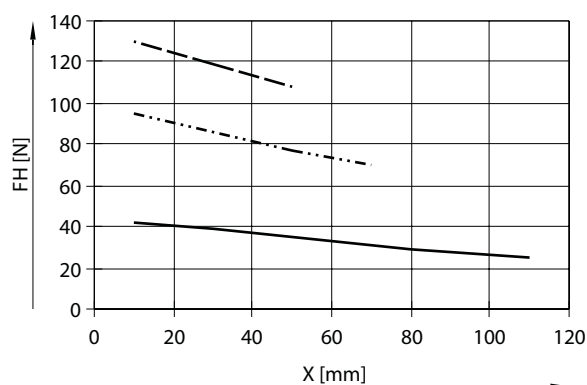
DHPL-10-20-...-A



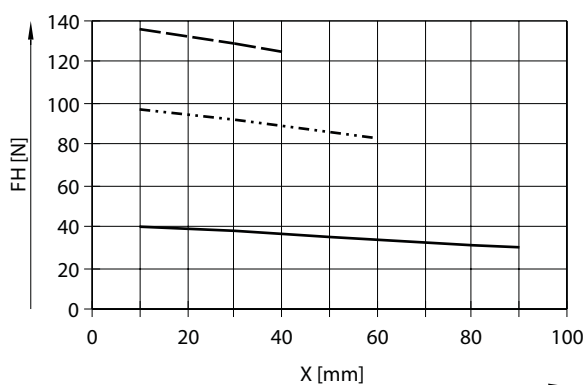
DHPL-10-60-...-A



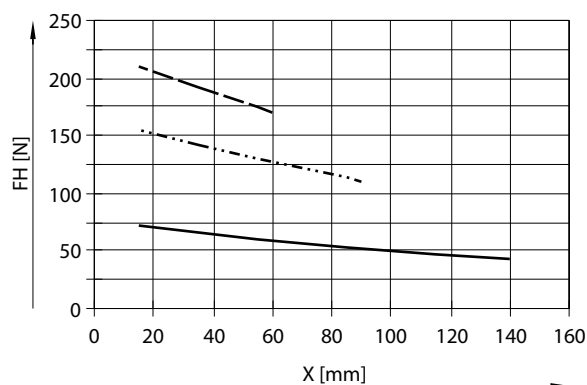
DHPL-16-30-...-A



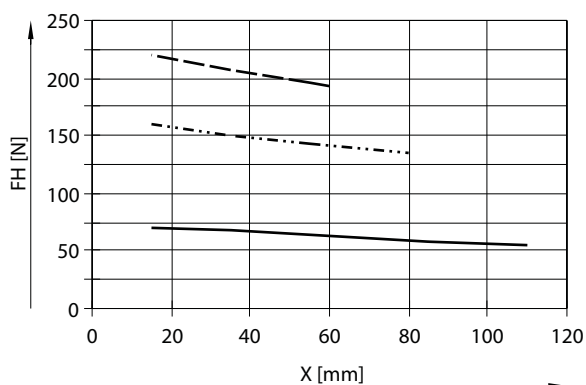
DHPL-16-80-...-A



DHPL-20-40-...-A



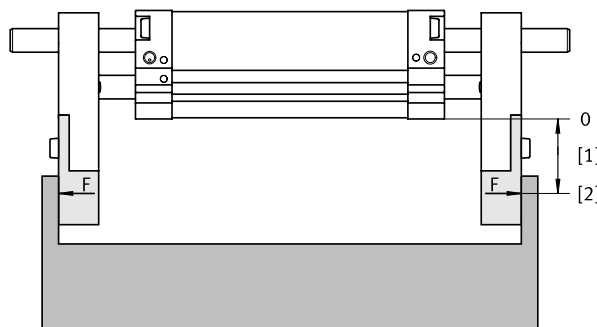
DHPL-20-100-...-A



Data sheet

Gripping force F_h per gripper jaw as a function of the operating pressure and lever arm x

The gripping forces as a function of the operating pressure and lever arm can be determined from the following graphs.

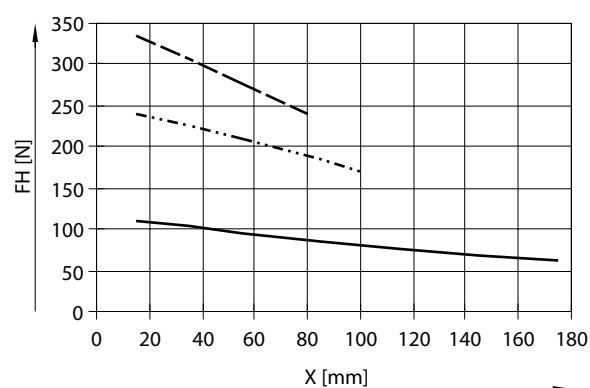


— 3 bar
 - · - · 6 bar
 - - - 8 bar

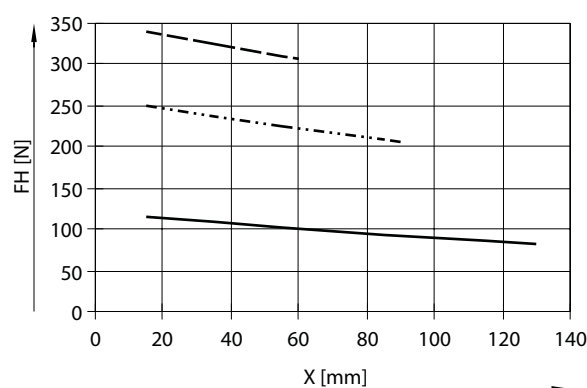
[1] Lever arm x
 [2] Load point

Internal gripping (opening)

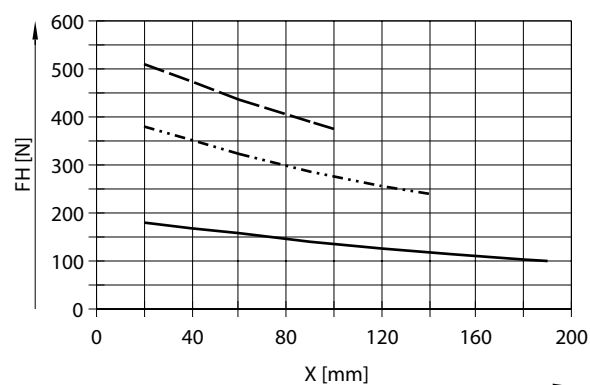
DHPL-25-50-...-A



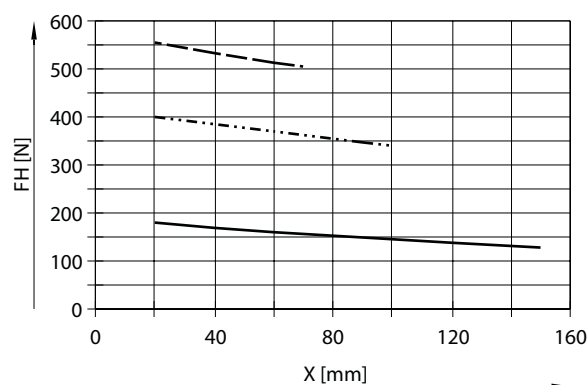
DHPL-25-120-...-A



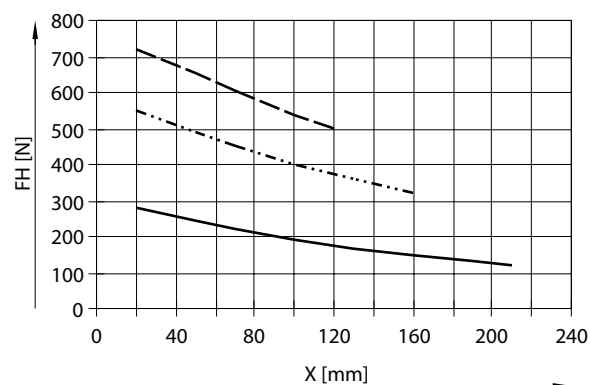
DHPL-32-70-...-A



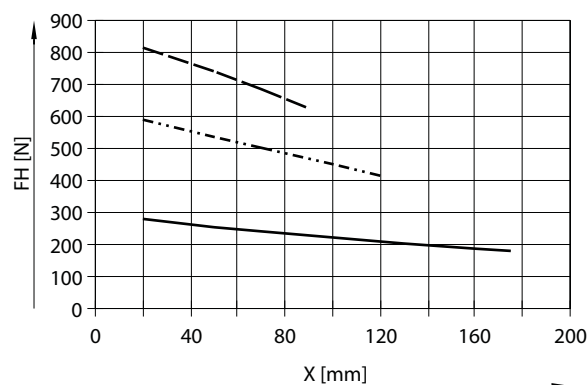
DHPL-32-160-...-A



DHPL-40-100-...-A



DHPL-40-200-...-A



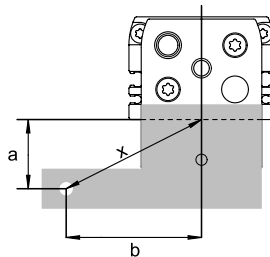
Data sheet

Gripping force F_h per gripper jaw at 6 bar as a function of lever arm x and eccentricity a and b

The following formula must be used to calculate the lever arm x with eccentric gripping:

$$x = \sqrt{a^2 + b^2}$$

The gripping force F_h can be read from the graphs
(→ page 10) using the calculated value x .

**Calculation example**

Assuming:

Distance $a = 40$ mm

Distance $b = 45$ mm

Required:

The gripping force at 6 bar
with a DHPL-25-50-P-A,
used as an external gripper

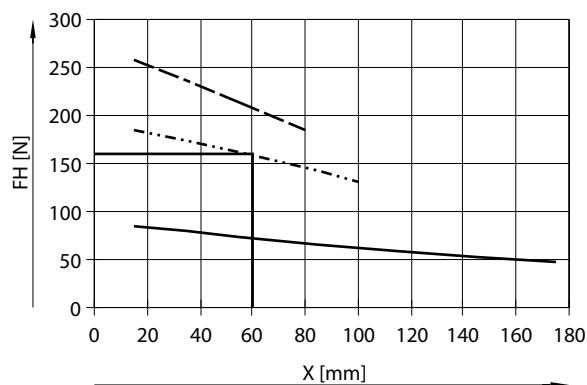
Procedure:

Calculating the lever arm x

$$x = \sqrt{40^2 + 45^2}$$

$$x = 60 \text{ mm}$$

The graph (→ page 10) gives a value of $F_h = 160$ N for the gripping force.

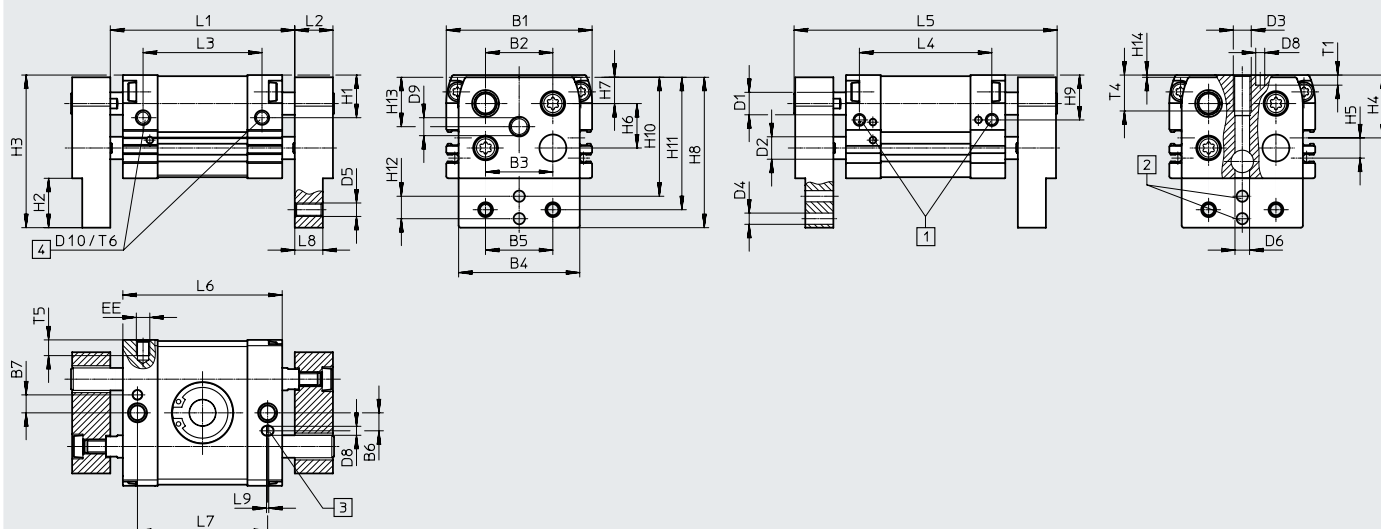


Data sheet

Dimensions

Download CAD data → www.festo.com

DHPL-10 ... 20



- [1] Supply ports
 [2] Centring holes
 [3] Centring hole, slot
 [4] Thread for mounting the gripper from the rear

Size	Stroke	B1	B2	B3	B4	B5	B6	B7	D1 Ø	D2 Ø	D3	D4 Ø H9	D5	D6 Ø H13	D8 H9	D9
[mm]	[mm]	±0.2			±0.25	±0.15		±0.1								
10	20	44	20	18	34	20	6	6	6	6	M6	3	M4	4.5	3	M4x0.5
	60															
16	30	55	22	23	43	25	9	9	8	8	M8	4	M5	5.5		M6x0.5
	80															
20	40	65	30	30	54	30	8	8	10	10		5	M6	6.5	4	M8x1
	100															

Size	Stroke	D10	EE	H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	H11	H12	H13
[mm]	[mm]			±0.35	±0.25	±0.7						±0.35	±0.15	±0.15	±0.05	±0.15
10	20	M4		11.5	15.5	46.5	18		12.5	9	46	10	34.5	38.5	8	15
	60							8								
16	30	M5	M5	16	19.5	58.5	24		17.5	10	58	16.5	44.5	49.5	10	20
	80															
20	40	M6		19	22	68	28	9	19.8	11.7	67	20	53	59		22
	100															

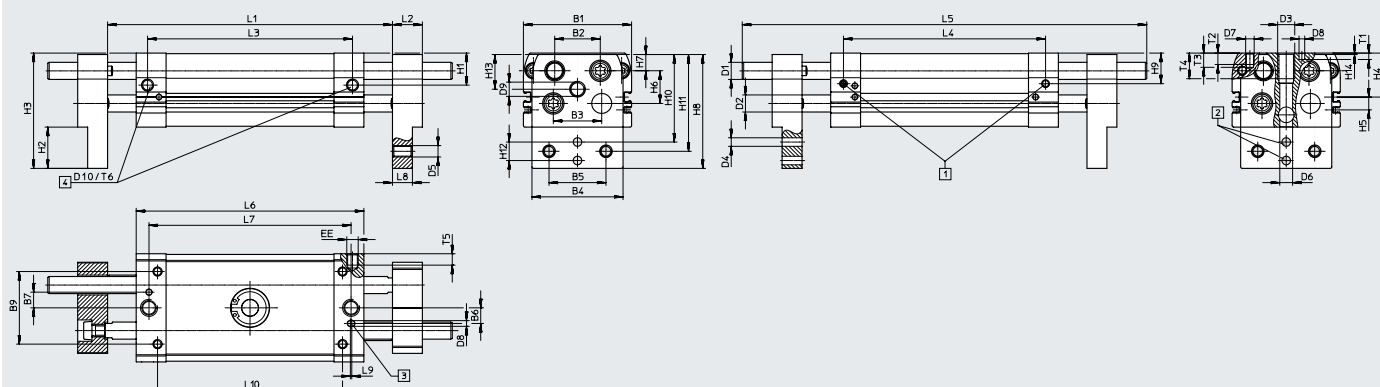
Size	Stroke	H14	L1		L2	L3	L4	L5	L6	L7	L8	L9	T1	T4	T5	T6
[mm]	[mm]		Gripper closed ±0.7	Gripper open ±0.7	±0.1	±0.25	±0.25	±1	±0.25	±0.25	±0.05		±0.2			
10	20		56	76	10	42.2	33	77	51	42	7		4	12	3.5	5
	60		96	156		76.2	67	151	85	76						
16	30	0.5	68	98	13	47	45	96	60	48	9	1	3	16	6	7
	80		130	210		97	95	196	110	98						
20	40	1	82	122	17	53	59	117	71	58	12.5		4.5		7	
	100		162	262		113	119	237	131	118						

Data sheet

Dimensions

Download CAD data → www.festo.com

DHPL-25 ... 40



- [1] Supply ports
 [2] Centring holes
 [3] Centring hole, slot
 [4] Thread for mounting the gripper from the rear

Size	Stroke	B1	B2	B3	B4	B5	B6	B7	B9	D1 Ø	D2 Ø	D3	D4 Ø H9	D5	D6 Ø H13	D7	D8	D9
[mm]	[mm]	±0.2			±0.25	±0.15		±0.1	±0.1									
25	50	76	32	34	64	40	11	11	51	12	12	M12	6	M8	9	M6	4	M10x1
	120																	
32	70	82		37	70	50	12	12	60	16	16		9	M10	10	M8	6	M12x1
	160																	
40	100	98	44	45	86	60			76			-	10	M12	11	M10		M14x1
	200																	

Size	Stroke	D10	EE	H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	H11	H12	H13	H14	L2
[mm]	[mm]			±0.35	±0.25	±0.7						±0.35	±0.15	±0.15	±0.05	±0.15		±0.1
25	50	M8	M5	22.5	29	81	30.9	9	22.9	11.5	80	21.5	61.5	68	13	24.4	1	21
	120																	
32	70	G1/8		25	32	100	34.5	24	31	14.5	99	24.5	76.5	84	15	30		24
	160																	
40	100	M10		30.5	38	117	41.5	26	37	16.5	116	30.5	87	98	20	34		28
	200																	

Size	Stroke	L1		L3	L4	L5	L6	L7	L8	L9	L10	T1	T2	T3	T4	T5	T6
		Gripper closed	Gripper open														
[mm]	[mm]	±0.7	±0.7	±0.25	±0.25	±1	±0.25	±0.25	±0.05		±0.15	±0.2					
25	50	100	150	72	70	142	88	70	14	1	58	4.5	8	10	18	6	8
	120	200	320	144	142	284	160	142			130						
32	70	150	220	88	86	186	110	86	15		86	6	16	18	24	10	11
	160	242	402	178	176	366	200	176			176						
40	100	188	288	118	118	254	148	116	18		116	8	20	23	79		15
	200	286	486	216	216	454	246	214			214						

Data sheet

Ordering data			
Size [mm]	Stroke [mm]	Parallel gripper Part no.	Type
10	20	8112216	DHPL-10-20-P-A
	60	8112215	DHPL-10-60-P-A
16	30	8112217	DHPL-16-30-P-A
	80	8112218	DHPL-16-80-P-A
20	40	8112220	DHPL-20-40-P-A
	100	8112219	DHPL-20-100-P-A
25	50	8112222	DHPL-25-50-P-A
	120	8112221	DHPL-25-120-P-A
32	70	8112223	DHPL-32-70-P-A
	160	8112224	DHPL-32-160-P-A
40	100	8112225	DHPL-40-100-P-A
	200	8112226	DHPL-40-200-P-A

Accessories

Proximity switch

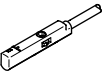
Ordering data – Proximity switch for C-slot, magnetic reed

Data sheets → Internet: sme

	Type of mounting	Electrical connection, outlet direction of connection	Switching output	Cable length [m]	Part no.	Type
N/O						
	Inserted in the slot from above	Cable, 3-wire, in-line	Contacting	2.5	551365	SME-10M-DS-24V-E-2.5-L-OE
		Cable, 2-wire, in-line		2.5	551369	SME-10M-ZS-24V-E-2.5-L-OE
		Plug M8x1, 3-pin, in-line		0.3	551367	SME-10M-DS-24V-E-0.3-L-M8D
		Cable, 3-wire, lateral		2.5	551366	SME-10M-DS-24V-E-2.5-Q-OE
		Cable, 2-wire, lateral		2.5	551370	SME-10M-ZS-24V-E-2.5-Q-OE
		Plug M8x1, 3-pin, lateral		0.3	551368	SME-10M-DS-24V-E-0.3-Q-M8D

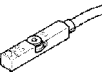
Ordering data – Proximity switch for C-slot, magneto-resistive

Data sheets → Internet: smt

	Type of mounting	Switching output	Electrical connection, outlet direction of connection	Cable length [m]	Part no.	Type
N/O						
	Inserted in the slot from above	PNP	Cable, 3-wire, in-line	2.5	551373	SMT-10M-PS-24V-E-2.5-L-OE
			Cable, 3-wire, lateral	2.5	551374	SMT-10M-PS-24V-E-2.5-Q-OE
			Plug M8x1, 3-pin, in-line	0.3	551375	SMT-10M-PS-24V-E-0.3-L-M8D
			Plug M8x1, 3-pin, lateral	0.3	551376	SMT-10M-PS-24V-E-0.3-Q-M8D
		NPN	Cable, 3-wire, in-line	2.5	551377	SMT-10M-NS-24V-E-2.5-L-OE
			Cable, 3-wire, lateral	2.5	551378	SMT-10M-NS-24V-E-2.5-Q-OE
			Plug M8x1, 3-pin, in-line	0.3	551379	SMT-10M-NS-24V-E-0.3-L-M8D
			Plug M8x1, 3-pin, lateral	0.3	551380	SMT-10M-NS-24V-E-0.3-Q-M8D
		Non-contact- ing, 2-wire	Cable, 2-wire, in-line	2.5	551382	SMT-10M-ZS-24V-E-2.5-L-OE
			Cable, 2-wire, lateral	2.5	551383	SMT-10M-ZS-24V-E-2.5-Q-OE

Ordering data – Proximity switch for T-slot, magneto-resistive

Data sheets → Internet: crsmt

	Type of mounting	Switching output	Electrical connection	Cable length [m]	Part no.	Type
N/O						
	Inserted in the slot from above	PNP	Cable, 3-wire	5.0	574380	CRSMT-8M-PS-24V-K-5.0-OE
			Cable, 3-wire	10.0	574381	CRSMT-8M-PS-24V-K-10.0-OE
			Plug M8x1, 3-pin	0.3	574383	CRSMT-8M-PS-24V-K-0.3-M8D
			Plug M12x1, 3-pin	0.3	574382	CRSMT-8M-PS-24V-K-0.3-M12

Ordering data – Proximity switch for T-slot, NAMUR

Data sheets → Internet: sdbt

	Switching output	Electrical connection	Cable length [m]	Part no.	Type
N/O					
	NAMUR	Cable, 2-wire	5	579071	SDBT-MS-20NL-ZN-E-5-LE-EX6
			10	579072	SDBT-MS-20NL-ZN-E-10-LE-EX6

Ordering data – Connecting cables

Data sheets → 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

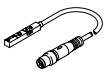
Accessories

Position transmitters

The position transmitter continuously senses the position of the piston. It has an analogue output with an output signal relative to the piston position.

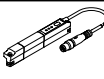
Ordering data – Position transmitters for T-slot

Data sheets → Internet: sdas

	Description	Type of mounting	Electrical connection	Cable length [m]	Part no.	Type
	Choice of two operating modes: • Two adjustable switching outputs • IO-Link	Inserted in the slot from above	Plug M8x1, 4-pin, in-line	0.3	8063974	SDAS-MHS-M40-1L-PNLK-PN-E-0.3-M8
			Cable, open end	2.5	8063975	SDAS-MHS-M40-1L-PNLK-PN-E-2.5-LE

Ordering data – Position transmitters for T-slot

Data sheets → Internet: sdat

	Analogue output		Type of mounting	Electrical connection	Cable length [m]	Part no.	Type
	[V]	[mA]					
	–	4 ... 20	Inserted in the slot from above	Plug M8x1, 4-pin, in-line	0.3	1531265	SDAT-MHS-M50-1L-SA-E-0.3-M8
						1531266	SDAT-MHS-M80-1L-SA-E-0.3-M8
						1531267	SDAT-MHS-M100-1L-SA-E-0.3-M8
						1531268	SDAT-MHS-M125-1L-SA-E-0.3-M8
						1531269	SDAT-MHS-M160-1L-SA-E-0.3-M8

Ordering data – Connecting cables

Data sheets → Internet: nebu

	Electrical connection, left	Electrical connection, right	Cable length [m]	Part no.	Type
	Straight socket, M8x1, 4-pin	Cable, open end, 4-wire	2.5	541342	NEBU-M8G4-K-2.5-LE4
			5	541343	NEBU-M8G4-K-5-LE4
	Angled socket, M8x1, 4-pin	Cable, open end, 4-wire	2.5	541344	NEBU-M8W4-K-2.5-LE4
			5	541345	NEBU-M8W4-K-5-LE4