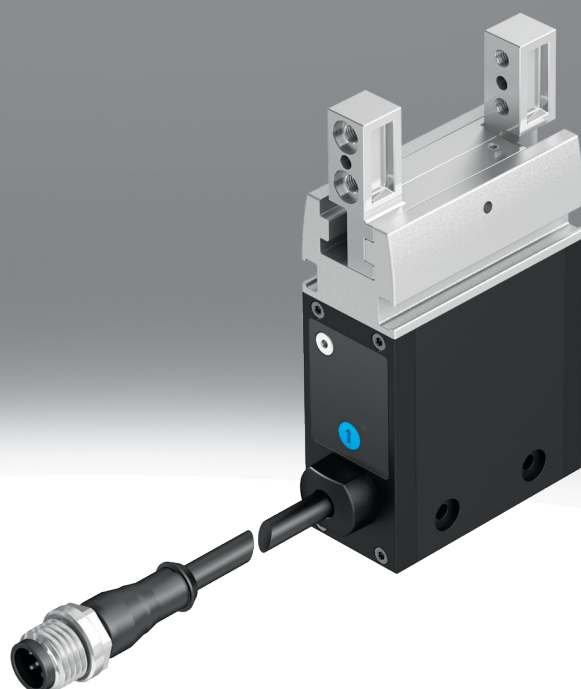


Parallel gripper EHPS

FESTO



Characteristics

At a glance

- Minimal installation effort – no valves, tubing or air preparation required
- Low noise pollution
- No external controller required
- Adaptation of the gripping force to sensitive workpieces
- Easy to adjust
- Electrical safety according to DIN EN 61010-1:2010
- Suitable for the production of Li-ion batteries

These grippers are not designed for the following or similar application examples:

- Welding spatter
- Machining
- Aggressive media
- Grinding dust

Note:

- Specially developed gripper jaws enable microwell plates to be picked or transported (for SBS/ANSI formats).
- (See accessories)

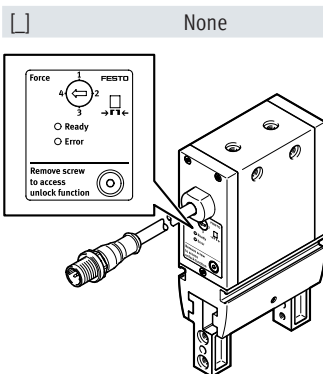
Diagrams

[Link](#) [ehps](#)



The diagrams shown in this document are also available online. These can be used to display precise values.

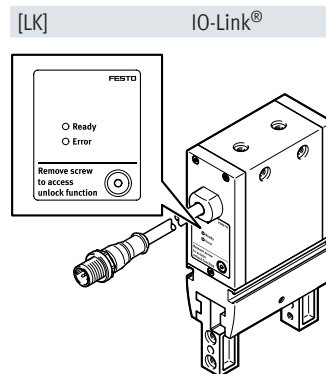
Bus protocol/activation



Gripping force adjustment for grippers with digital I/O

The rotary switch can be used to set the speed for the gripping force of the gripper. The switch has four positions and therefore four force levels, with no intermediate levels. The speed affects the gripping force and cannot be adjusted linearly.

- Setting 1: approx. 50% of the max. force
- Setting 2: approx. 70% of the max. force
- Setting 3: approx. 85% of the max. force
- Setting 4: max. force



Gripping force adjustment for grippers with IO-Link®

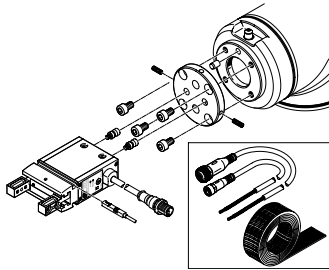
The gripping force is set via an IO-Link master. There are four positions for the settings and therefore four force levels. No intermediate stages are possible. (Values of position 1 to 4 identical with I/O version). There are also three gripping modes that can be selected. This enables a shorter gripping time in the application.

- External gripping: the object is gripped from the outside. The gripper jaws move at the specified gripping force/speed during the gripping process. On releasing, the gripper jaws move at the maximum speed
- Internal gripping: the object is gripped on the inside. The gripper jaws move at the specified gripping force/speed during the gripping process. On releasing, the gripper jaws move at the maximum speed
- Universal gripping: The specified gripping force is used in both directions of movement during the gripping process

Characteristics

Robot connection

[RA50] Flange ISO 9409-1-50-4-M6



Fast and intuitive integration on a robot arm

- The gripper with robot connection EHPS-...-RA50 can be quickly integrated in a lightweight robot environment.
- The gripper is connected to a robot via the DIN ISO 9409-1-50-4-M6 interface.
- In order to mount the gripper on the robot arm, an adapter plate and the necessary mounting accessories are included in the kit, in addition to the gripper itself.
- The connecting cables can optionally be attached to the outside of the robot arm using the Velcro straps provided to avoid overloading the robot's internal cabling.

The gripper can be connected to a wide range of robots with the DIN ISO 9409-1-50-4-M6 interface. For example, to robots from the manufacturers:

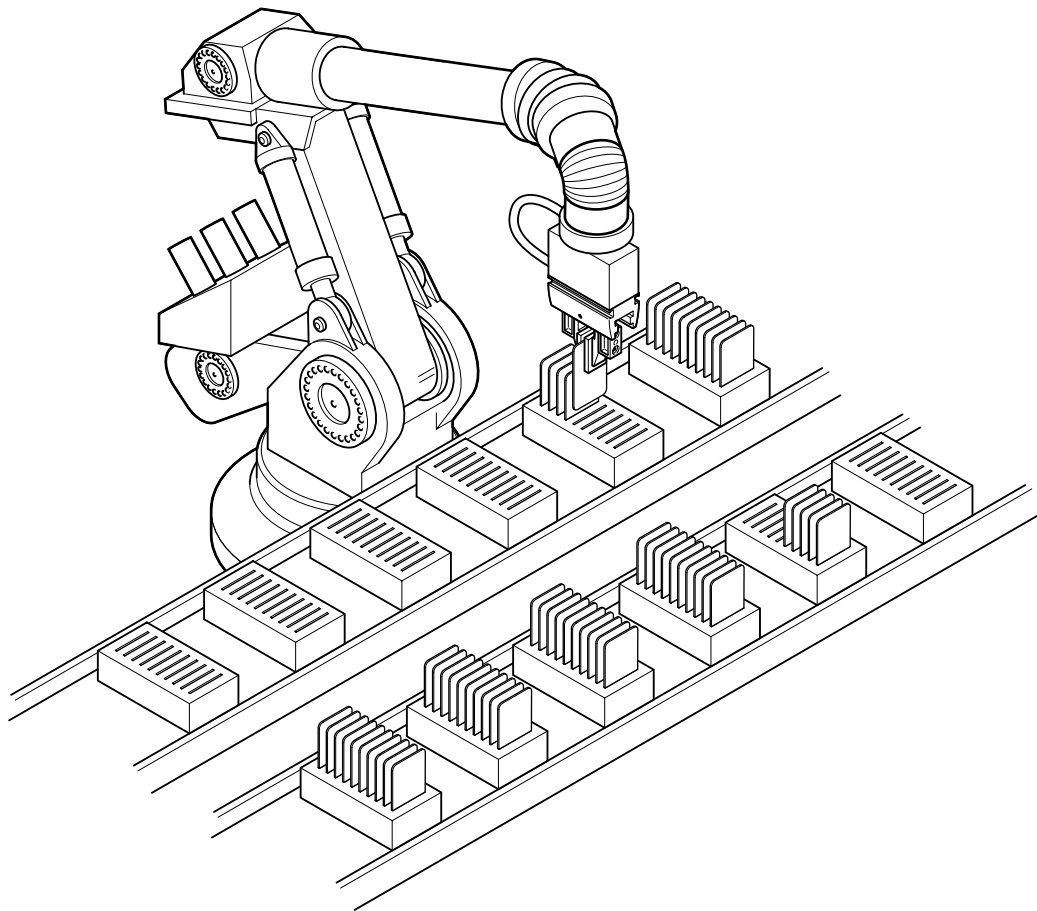
- Universal Robots
- Fanuc
- Hanwha
- Aubo
- Doosan

If the feature EHPS-...-RA50 is used, the delivery includes all the connecting components in addition to the gripper:

- Proximity switch
- Connecting cable for connecting the gripper and proximity switch
- Velcro strip for fixing the connecting cables in place
- Adapter kit for mounting on the robot arm

Characteristics

Application example



Card handling

Type code

001	Series	
EHPS	Parallel gripper	
002	Size [mm]	
16	16	
20	20	
25	25	
003	Position sensing	
A	For proximity sensor	

004	Bus protocol/activation	
	None	
LK	IO-Link®	
005	Robot connection	
	None	
RA50	Flange ISO 9409-1-50-4-M6	

Datasheet

General technical data			
Size	16	20	25
Robot connection	None		
Design	Worm gear unit T-shape Rack and pinion Electric gripper		
Guide	Plain-bearing guide		
Operator controls	Latched switch		
Ready status indication	LED		
Gripper function	Parallel		
Number of gripper jaws	2		
Stroke per gripper jaws ¹⁾	10 mm	13 mm	16 mm
Total gripping force	154 N	218 N	312 N
Max. mass per external gripper finger	100 g	150 g	230 g
Max. cycle frequency ²⁾	1.1 Hz	0.7 Hz	0.8 Hz
Repetition accuracy, gripper	≤0.03 mm		
Max. replacement accuracy	≤0.2 mm		
Rotationally symmetrical	≤0.2 mm		
Max. gripper jaw backlash Sz	0.05 mm		0.04 mm
Max. angular gripper jaw backlash ax, ay	0.4 deg	0.3 deg	
Position detection	Via proximity switch With Hall sensor With integrated displacement encoder Via IO-Link interface		
Type of mounting	Either: Via female thread and centring sleeve Via through-hole and centring sleeve		
Electrical connection	5-pin Cable with plug M12x1		
Mounting position	optional		
Product weight	296 g	532 g	904 g

1) The maximum gripping force is only achieved if the gripper jaws are moved by the minimum travel distance without a load.

2) At the maximum switching frequency, the gripper heats up over 60 °C.

Electrical data			
Size	16	20	25
Type of motor	DC servo motor		
Nominal operating voltage DC	24 V		
Permissible voltage fluctuations	±10%		
Max. current consumption ¹⁾	1 A	2 A	

1) During travel.

Datasheet

Operating and environmental conditions

Ambient temperature	5 ... 60°C
Degree of protection	IP40
Sound pressure level	≤70 dB(A)
Corrosion resistance class CRC ¹⁾	1 - Low corrosion stress
CE mark (see declaration of conformity) ²⁾	To EU EMC Directive In accordance with EU RoHS Directive
UKCA marking (see declaration of conformity)	To UK instructions for EMC To UK RoHS instructions
KC mark	KC-EMV
Approval	RCM trademark
Lubrication interval for guide components	2

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

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

2) More information www.festo.com/sp_d certificates.

Technical data IO-Link®

IO-Link, SIO-Mode support	No
IO-Link, communication mode	COM3 (230.4 kBaud)
IO-Link, Port class	Device B
IO-Link, Number of ports	Device 1
IO-Link, Process data length OUT	8 bytes
IO-Link, Process data content OUT	16 bit (ControlWord) 16 bit (GrippingPosition) 8-bit (GrippingForce) 8 bit (GrippingMode) 8 bit (GrippingTolerance) 8 bit (WorkpieceNo)
IO-Link, Process data length IN	6 bytes
IO-Link, Process data content IN	16-bit (ActualPosition) 16 bit (ErrorNumber) 16 bit (StatusWord)
IO-Link, Min. cycle time	5 ms
Protocol	IO-Link®
IO-Link, Protocol version	Device V 1.1

Materials

Material housing	Anodised wrought aluminium alloy, Anodised aluminium
Material gripper jaws	High-alloy stainless steel
LABS (PWIS) conformity	VDMA24364-B2-L
Note on materials	RoHS-compliant
Suitability for the production of Li-ion batteries	Metals with more than 5% by mass of copper are excluded from use. Exceptions are printed circuit boards, cables, electrical plug connectors and coils

Opening and closing times as a function of setting 1 ... 4

The indicated opening and closing times were measured with the gripper installed vertically, gripper jaws pointing upwards and without gripper fingers.

EHPS: 16 / 20 / 25

Position 1: 337 ms / 470 ms / 580 ms

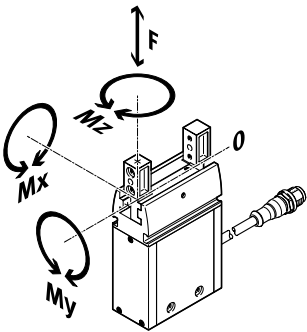
Position 2: 291 ms / 408 ms / 507 ms

Position 3: 271 ms / 362 ms / 449 ms

Position 4: 245 ms / 295 ms / 404 ms

Datasheet

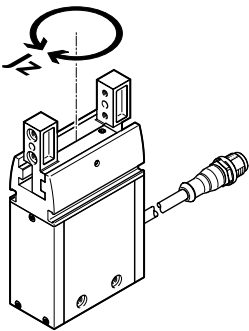
Static characteristic load values at the gripper jaws



The indicated permissible forces and torques apply to a single gripper jaw. They include the lever arm, additional applied loads created by the workpiece or external gripper fingers and acceleration forces occurring during movement. The zero coordinate line (gripper jaw guide) must be taken into account when calculating torques.

Size	16	20	25
Max. force on gripper jaw F_z static	200 N	325 N	450 N
Max. torque at gripper M_x static	7 Nm	13 Nm	28 Nm
Max. torque at gripper M_y static	4.4 Nm	8 Nm	16 Nm
Max. torque at gripper M_z static	7 Nm	13 Nm	28 Nm

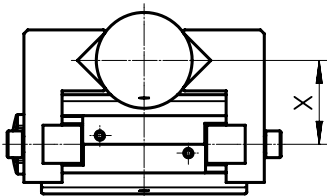
Mass moment of inertia



- Under the following conditions:
- The reference point is the central axis
 - Without external gripper fingers
 - In the unloaded state

Size	16	20	25
Robot connection	None		
Mass moment of inertia	0.78 kgcm ²	2.02 kgcm ²	5.24 kgcm ²

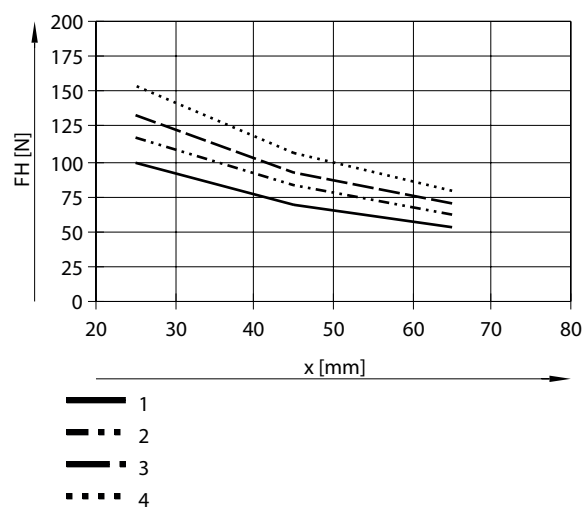
Total gripping force F as a function of lever arm x , horizontal mounting position, external/internal gripper and position 1 ... 4



The max. achievable forces apply exclusively to centric gripping of non-elastic components. The gripping position and gripping force are not readjusted. The design of the gripper jaws has a major influence on the forces that can be achieved. For special gripping situations, it may be necessary to transmit an additional gripping signal (max. 3x in one direction).

Datasheet

EHPS-16: External gripper, horizontal



1 = Position 1

2 = Position 2

3 = Position 3

4 = Position 4

Lever arm: 25 mm / 45 mm / 65 mm

Gripping force at:

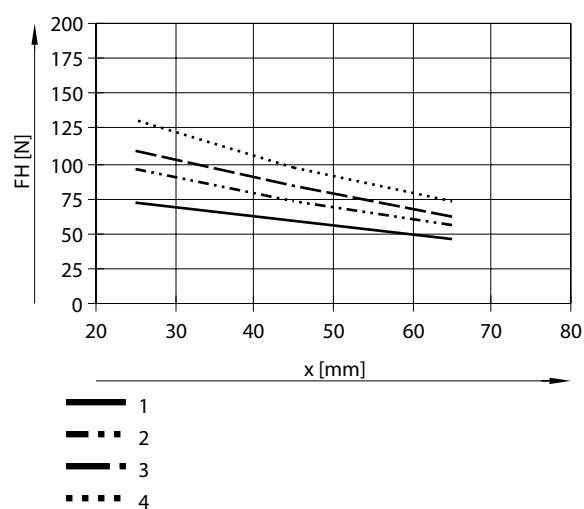
Position 1: 98 N / 68 N / 54 N

Position 2: 116 N / 84 N / 62 N

Position 3: 132 N / 92 N / 70 N

Position 4: 154 N / 106 N / 78 N

EHPS-16: Internal gripper, horizontal



1 = Position 1

2 = Position 2

3 = Position 3

4 = Position 4

Lever arm: 25 mm / 45 mm / 65 mm

Gripping force at:

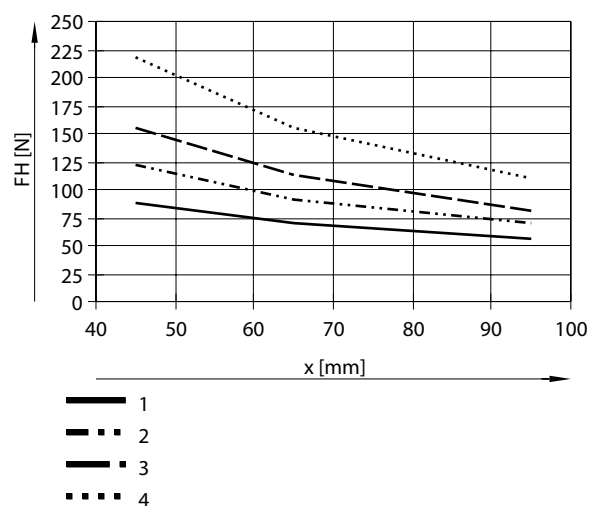
Position 1: 72 N / 58 N / 46 N

Position 2: 96 N / 72 N / 56 N

Position 3: 108 N / 84 N / 62 N

Position 4: 130 N / 96 N / 74 N

EHPS-20: External gripper, horizontal



1 = Position 1

2 = Position 2

3 = Position 3

4 = Position 4

Lever arm: 45 mm / 65 mm / 95 mm

Gripping force at:

Position 1: 88 N / 70 N / 56 N

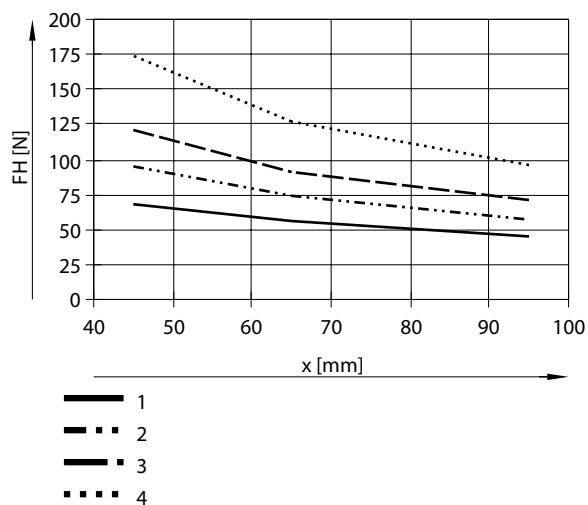
Position 2: 122 N / 90 N / 70 N

Position 3: 156 N / 114 N / 82 N

Position 4: 218 N / 154 N / 110 N

Datasheet

EHPS-20: Internal gripper, horizontal



1 = Position 1
2 = Position 2
3 = Position 3
4 = Position 4

Lever arm: 45 mm / 65 mm / 95 mm

Gripping force at:

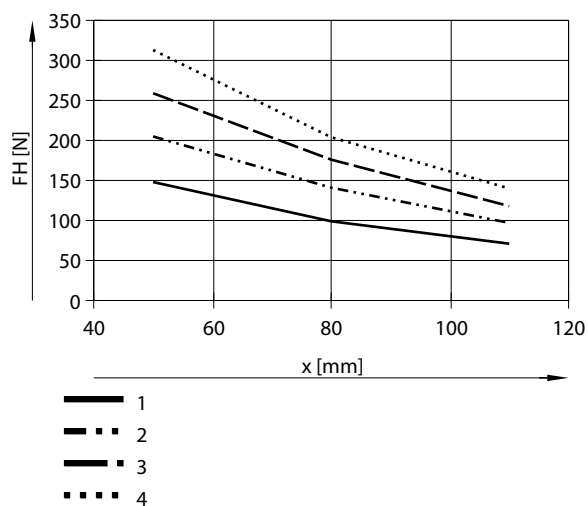
Position 1: 68 N / 56 N / 46 N

Position 2: 96 N / 74 N / 58 N

Position 3: 120 N / 92 N / 72 N

Position 4: 174 N / 128 N / 96 N

EHPS-25: External gripper, horizontal



1 = Position 1
2 = Position 2
3 = Position 3
4 = Position 4

Lever arm: 50 mm / 80 mm / 110 mm

Gripping force at:

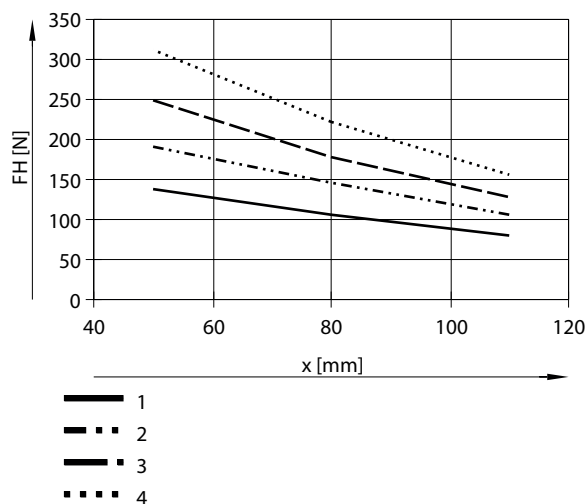
Position 1: 148 N / 98 N / 70 N

Position 2: 204 N / 140 N / 96 N

Position 3: 260 N / 176 N / 118 N

Position 4: 312 N / 204 N / 140 N

EHPS-25: Internal gripper, horizontal



1 = Position 1
2 = Position 2
3 = Position 3
4 = Position 4

Lever arm: 50 mm / 80 mm / 110 mm

Gripping force at:

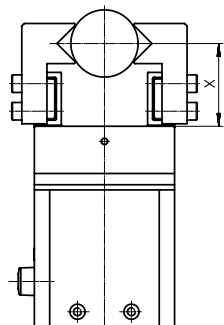
Position 1: 138 N / 106 N / 80 N

Position 2: 192 N / 146 N / 106 N

Position 3: 250 N / 178 N / 128 N

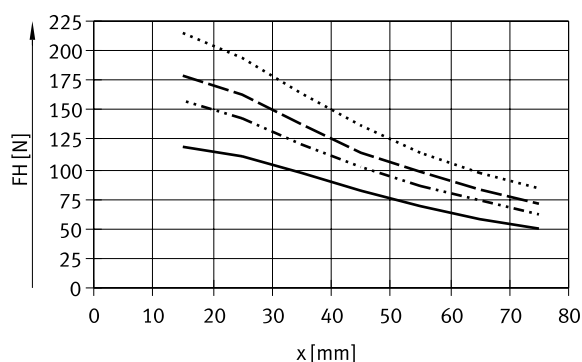
Position 4: 312 N / 222 N / 156 N

Datasheet

Total gripping force F as a function of lever arm x , vertical mounting position, external/internal gripper and position 1 ... 4

The max. achievable forces apply exclusively to centric gripping of non-elastic components. The gripping position and gripping force are not readjusted. The design of the gripper jaws has a major influence on the forces that can be achieved. For special gripping situations, it may be necessary to transmit an additional gripping signal (max. 3x in one direction).

EHPS-16: External gripper, vertical



- 1 = Position 1
- 2 = Position 2
- 3 = Position 3
- 4 = Position 4

Lever arm: 15 mm / 45 mm / 75 mm

Gripping force at:

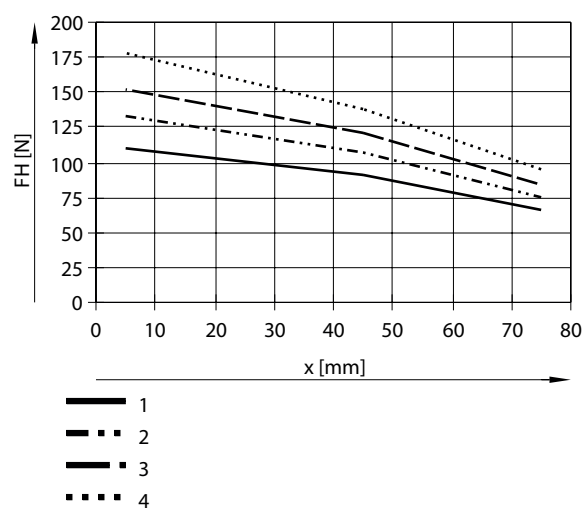
Position 1: 118 N / 82 N / 50 N

Position 2: 158 N / 102 N / 62 N

Position 3: 178 N / 114 N / 72 N

Position 4: 214 N / 138 N / 84 N

EHPS-16: Internal gripper, vertical



- 1 = Position 1
- 2 = Position 2
- 3 = Position 3
- 4 = Position 4

Lever arm: 15 mm / 45 mm / 75 mm

Gripping force at:

Position 1: 110 N / 90 N / 66 N

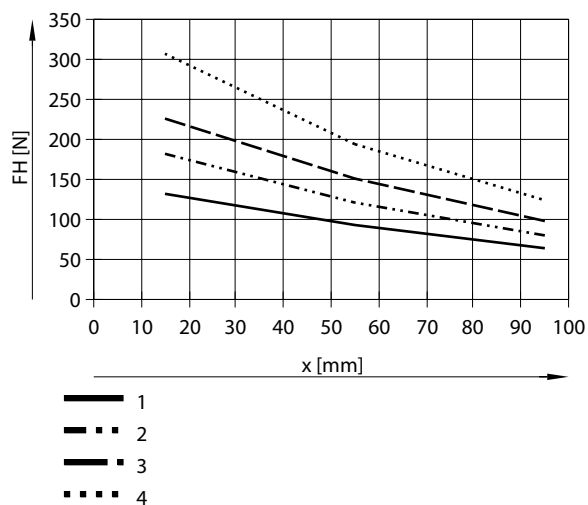
Position 2: 134 N / 108 N / 74 N

Position 3: 152 N / 122 N / 84 N

Position 4: 178 N / 138 N / 94 N

Datasheet

EHPS-20: External gripper, vertical



1 = Position 1
2 = Position 2
3 = Position 3
4 = Position 4

Lever arm: 15 mm / 55 mm / 95 mm

Gripping force at:

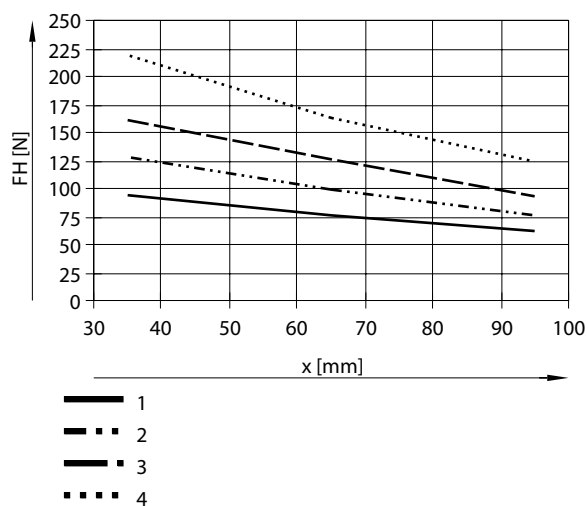
Position 1: 132 N / 94 N / 64 N

Position 2: 182 N / 120 N / 80 N

Position 3: 226 N / 150 N / 98 N

Position 4: 306 N / 194 N / 124 N

EHPS-20: Internal gripper, vertical



1 = Position 1
2 = Position 2
3 = Position 3
4 = Position 4

Lever arm: 35 mm / 65 mm / 95 mm

Gripping force at:

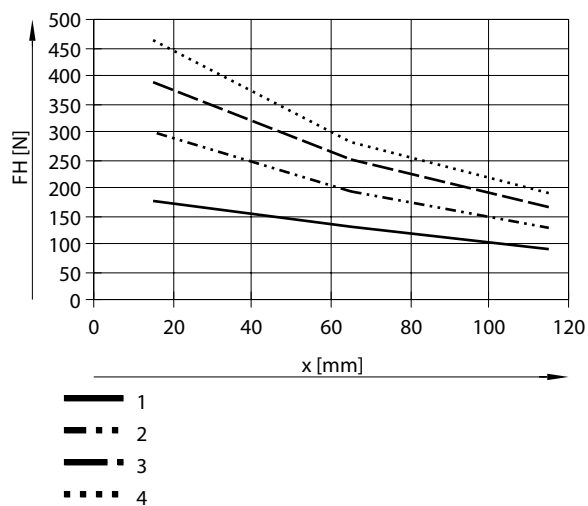
Position 1: 94 N / 76 N / 62 N

Position 2: 128 N / 100 N / 76 N

Position 3: 160 N / 126 N / 92 N

Position 4: 220 N / 162 N / 124 N

EHPS-25: External gripper, vertical



1 = Position 1
2 = Position 2
3 = Position 3
4 = Position 4

Lever arm: 15 mm / 65 mm / 115 mm

Gripping force at:

Position 1: 176 N / 130 N / 90 N

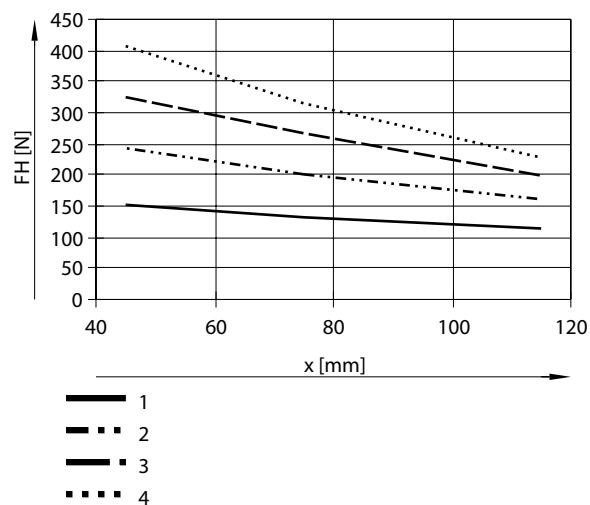
Position 2: 298 N / 194 N / 128 N

Position 3: 388 N / 250 N / 166 N

Position 4: 462 N / 280 N / 190 N

Datasheet

EHPS-25: Internal gripper, vertical



1 = Position 1

2 = Position 2

3 = Position 3

4 = Position 4

Lever arm: 45 mm / 75 mm / 115 mm

Gripping force at:

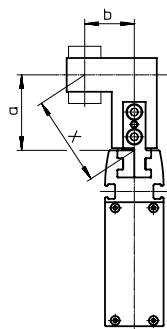
Position 1: 152 N / 132 N / 114 N

Position 2: 242 N / 200 N / 162 N

Position 3: 326 N / 266 N / 198 N

Position 4: 406 N / 314 N / 228 N

Gripping force F per gripper jaw as a function of lever arm x and eccentricity a and b



Calculation example:

Assuming:

Distance a = 20 mm

Distance b = 25 mm

To be determined:

The gripping force in setting 4, with an EHPS-16-A, used as an external gripper and in horizontal mounting position.

Solution

$$x = \sqrt{a^2 + b^2} = \sqrt{20^2 + 25^2} = 32 \text{ mm}$$

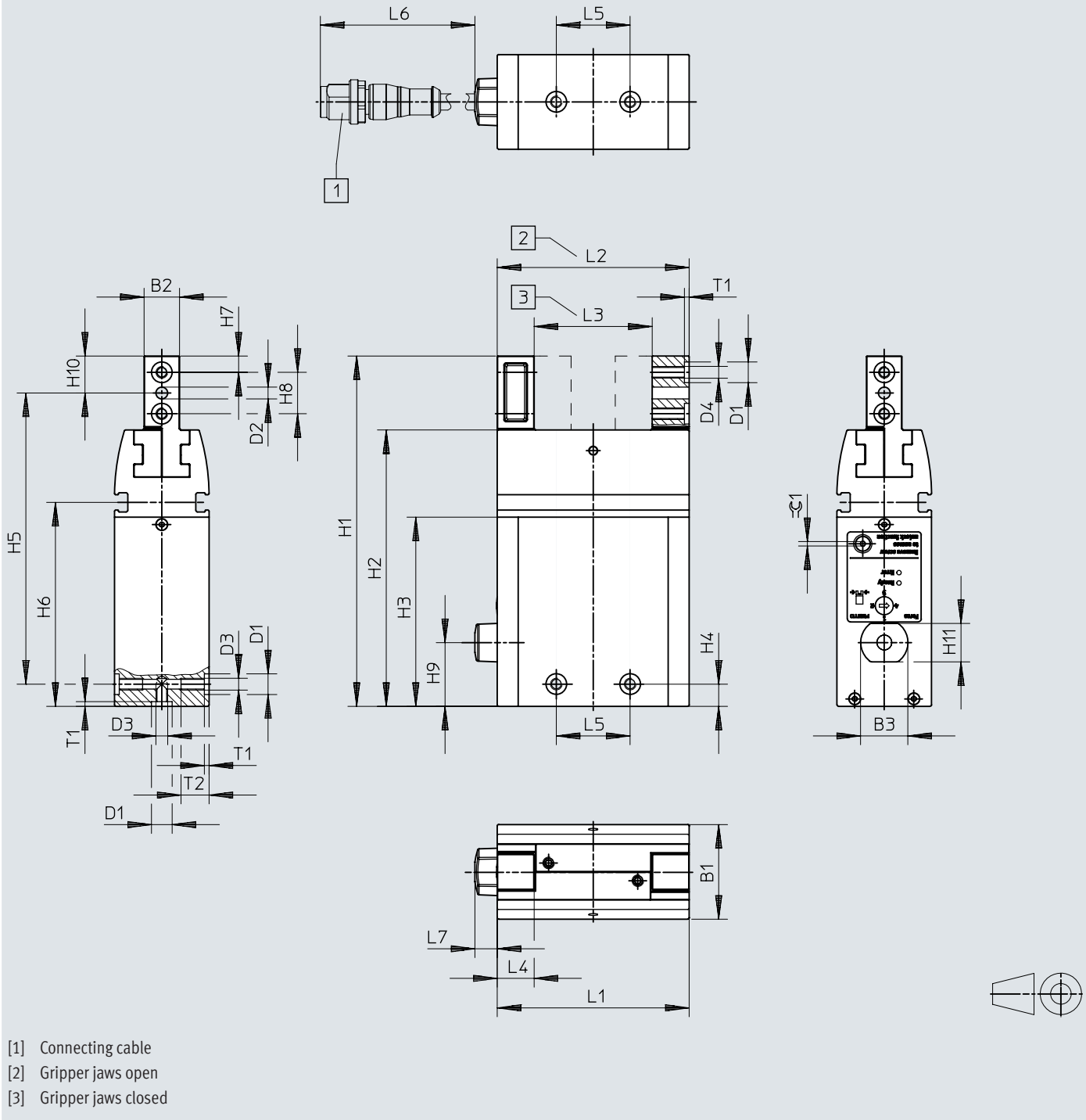
The formula below must be used to calculate the lever arm x with eccentric gripping.

The graph gives a value for the gripping force FH = approx. 140 N.

Dimensions

Dimensions – Gripper

Download CAD data www.festo.com



Dimensions

	B1 ±0,03	B2 ±0,05	B3	D1 Ø H8	D2 Ø H8	D3	D4	H1 ±0,1	H2
EHPS-16	26	10	16	7	3	M4	M4	99,5	78
EHPS-20	32	12	16	7	4	M4	M4	118,5	93,5
EHPS-25	39	15	16	9	4	M6	M5	139,5	110

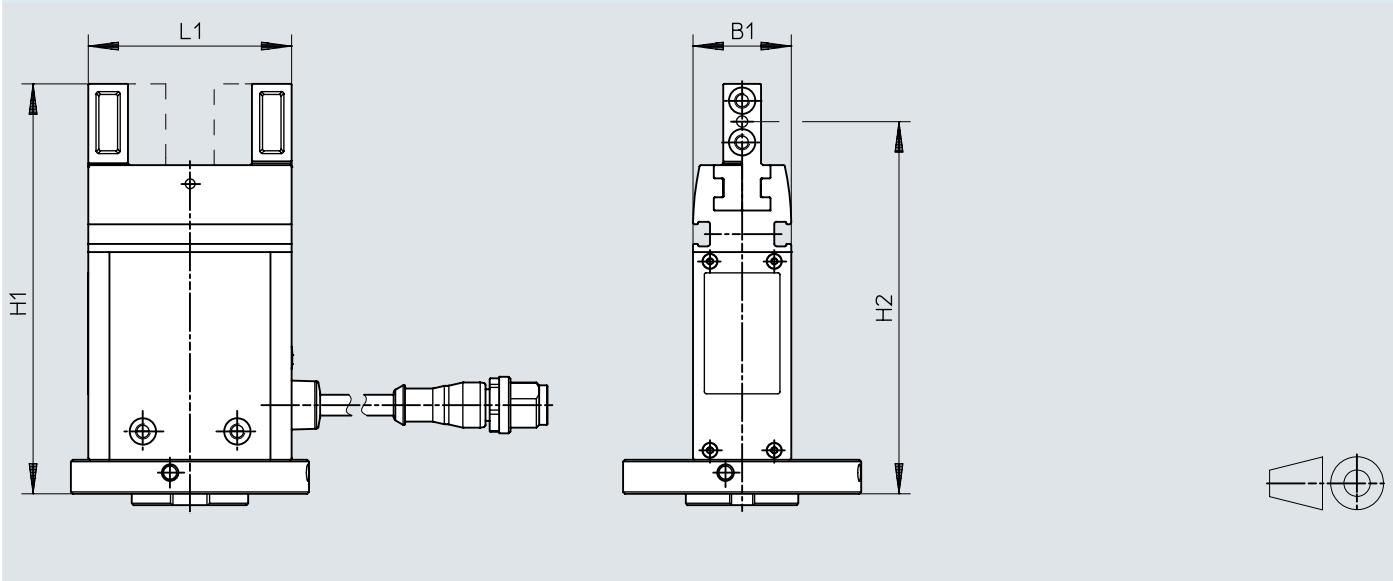
	H3	H4 ¹⁾	H5 ±0,2	H6	H7 ¹⁾	H8 ¹⁾	H9	H10	H11
EHPS-16	55	7,5	82	59,8	4,5	11	14,5	10	13
EHPS-20	64	7,5	98,5	69	5,5	14	21,6	12,5	32
EHPS-25	75	12,5	112	80	7	16	28,6	15	39

	L1 ±0,3	L2 +1	L3 ±0,5	L4 ±0,05	L5 ¹⁾	L6	L7	T1 +0,1	T2 min.	≈ 1
EHPS-16	53,8	53,8	33,8	10,5	25	300	7,5	1,6	9,5	1,5
EHPS-20	65	65	39	12,5	25	300	7,5	1,6	9,5	1,5
EHPS-25	79,4	79,4	47,4	15	29	300	7,5	2,1	12	2

1) Tolerance for centring hole ±0.02 mm / tolerance for thread ±0.1 mm

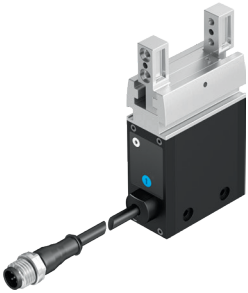
Dimensions

Dimensions – With robot connection Download CAD data www.festo.com

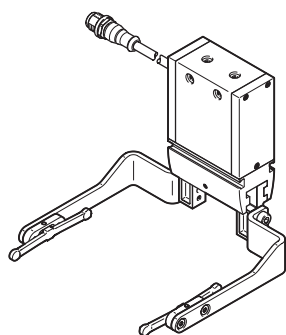


	B1	H1	H2	L1
EHPS-16	26	108,5	98,5	53,8
EHPS-20	32	127,5	115	65
EHPS-25	39	148,5	133,5	79,4

Ordering data

Ordering data					
	Size	Bus protocol/activation	Robot connection	Part no.	Type
	16	None	None	8070832	EHPS-16-A
			Flange ISO 9409-1-50-4-M6	8210808	EHPS-16-A-RA50
		IO-Link®	None	8103809	EHPS-16-A-LK
	20	None	None	8070831	EHPS-20-A
			Flange ISO 9409-1-50-4-M6	8210809	EHPS-20-A-RA50
		IO-Link®	None	8103810	EHPS-20-A-LK
	25	None	None	8070830	EHPS-25-A
			Flange ISO 9409-1-50-4-M6	8210810	EHPS-25-A-RA50
		IO-Link®	None	8103811	EHPS-25-A-LK

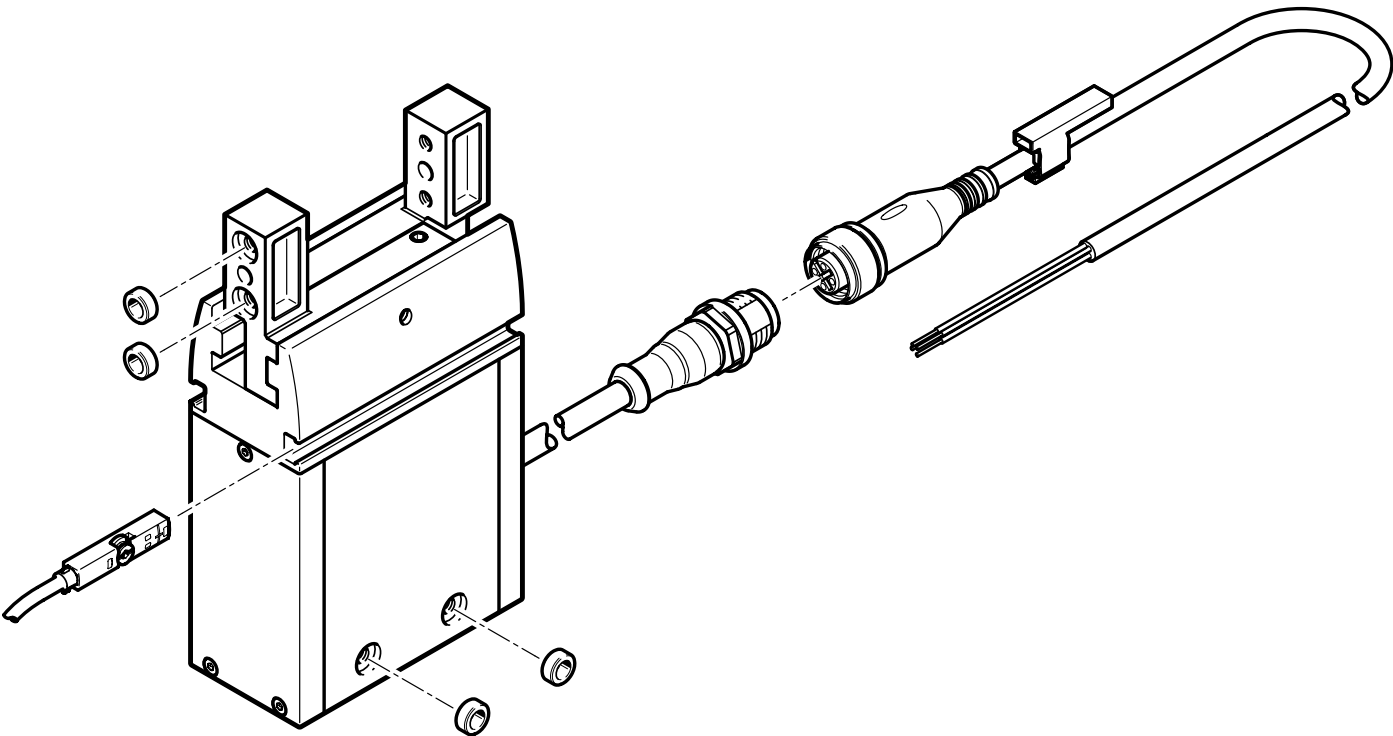
Transport of microwell plates



- Suitable for: EHPS-16
- Specially developed gripper jaws enable microwell plates to be picked up or transported (for SBS/ANSI formats)
- (see accessories for ordering details)

Peripherals

Peripherals overview



Accessories		→ Link
Type/order code	Description	
[1] Parallel gripper EHPS	Electric gripper	ehps
[2] Proximity switches SMT-8	• Magnetic proximity switches, for T-slot • For sensing the gripper jaw position	19
[2] Position transmitter SMAT-8M	Continuously detects the position of the gripper jaws. It has an analogue output with an output signal proportional to the gripper jaw position	20
[3] Centring sleeve ZBH	• For centring the gripper fingers on the gripper jaws • 4 centring sleeves are not included in the scope of delivery	19
[4] Connecting cable NEBU-M12	To control the parallel gripper	19
[5] Centring sleeve ZBH	• For centring the gripper during mounting • 2 centring sleeves are not included in the scope of delivery	19

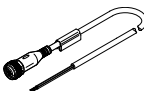
Accessories

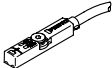
Centring sleeve ZBH-7						
	Description ¹⁾	Material sleeve	Size of pack	Product weight	Part no.	Type
	For sizes 16, 20	Steel	10	1 g	★ 8146544	ZBH-7-B

1) Included in the scope of delivery of the gripper: 4 centring sleeves for the gripper jaws and 2 for mounting the gripper

Centring sleeve ZBH-9						
	Description ¹⁾	Material sleeve	Size of pack	Product weight	Part no.	Type
	For size 25	Steel	10	2 g	★ 8137184	ZBH-9-B

1) Included in the scope of delivery of the gripper: 4 centring sleeves for the gripper jaws and 2 for mounting the gripper

Connecting cable NEBU, straight						
	Electrical connection 1, connector system	Electrical connection 2, connector system	Electrical connection 2, number of connections/cores	Cable length	Part no.	Type
	M12x1, A-coded to EN 61076-2-101	M12x1, A-coded to EN 61076-2-101	5	5 m	574321	NEBU-M12G5-E-5-Q8N-M12G5
				7.5 m	574322	NEBU-M12G5-E-7.5-Q8N-M12G5
		Open end	4	2.5 m	★ 8078239	NEBA-M12G5-U-2.5-N-LE4
				5 m	★ 8078240	NEBA-M12G5-U-5-N-LE4

Proximity switch for T-slot, magneto-resistive						
	Type of mounting	Switching output	Electrical connection 1, connection type	Cable length	Part no.	Type
	Screw-clamped, Insertable in the slot from above	NPN	Cable	2.5 m	★ 574338	SMT-8M-A-NS-24V-E-2,5-OE
			Cable with plug	0.3 m	★ 574339	SMT-8M-A-NS-24V-E-0,3-M8D
		PNP	Cable	2.5 m	★ 574335	SMT-8M-A-PS-24V-E-2,5-OE
			Cable with plug	0.3 m	★ 574334	SMT-8M-A-PS-24V-E-0,3-M8D

Link [smt](#)

Proximity switch for T-slot, magneto-resistive							Link  smt
	Type of mounting	Switching output	Connection outlet orientation	Electrical connection 1, connection type	Cable length	Part no.	Type
	Clamped in T-slot, Insertable in the slot length-wise	NPN	Lateral	Cable	2.5 m	8065028	SMT-8G-NS-24V-E-2,5Q-OE
				Cable with plug	0.3 m	8065027	SMT-8G-NS-24V-E-0,3Q-M8D
		PNP		Cable	2.5 m	547859	SMT-8G-PS-24V-E-2,5Q-OE
				Cable with plug	0.3 m	547860	SMT-8G-PS-24V-E-0,3Q-M8D

Link [smt](#)

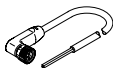
Connecting cable NEBA for SMT-8M, straight						
	Electrical connection 1, connector system	Electrical connection 2, connector system	Electrical connection 2, number of connections/cores	Cable length	Part no.	Type
	M8x1, A-coded, to EN 61076-2-104	Open end	3	2.5 m	★ 8078223	NEBA-M8G3-U-2.5-N-LE3
				5 m	★ 8078224	NEBA-M8G3-U-5-N-LE3

Link [neba](#)

Accessories

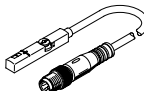
Connecting cable NEBA for SMT-8M, angled

Link [neba](#)

	Electrical connection 1, connector system	Electrical connection 2, connector system	Electrical connection 2, number of connections/cores	Cable length	Part no.	Type
	M8x1, A-coded, to EN 61076-2-104	Open end	3	2.5 m	★ 8078230	NEBA-M8W3-U-2.5-N-LE3
				5 m	★ 8078231	NEBA-M8W3-U-5-N-LE3

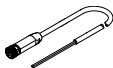
Position transmitter SMAT-8M, for T-slot

Link [smat](#)

	Sensing range	Analogue output	Electrical connection 1, number of connections/cores	Cable length	Part no.	Type
	52 mm	0 - 10 V	4	0.3 m	553744	SMAT-8M-U-E-0,3-M8D

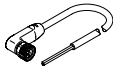
Connecting cable NEBA for SMAT-8M, straight

Link [neba](#)

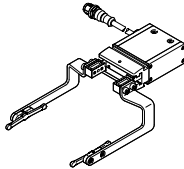
	Electrical connection 1, connector system	Electrical connection 2, connector system	Electrical connection 2, number of connections/cores	Cable length	Part no.	Type
	M8x1, A-coded, to EN 61076-2-104	Open end	4	2.5 m	★ 8078227	NEBA-M8G4-U-2.5-N-LE4
				5 m	★ 8078228	NEBA-M8G4-U-5-N-LE4

Connecting cable NEBA for SMAT-8M, angled

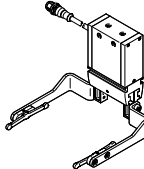
Link [neba](#)

	Electrical connection 1, connector system	Electrical connection 2, connector system	Electrical connection 2, number of connections/cores	Cable length	Part no.	Type
	M8x1, A-coded, to EN 61076-2-104	Open end	4	2.5 m	★ 8078233	NEBA-M8W4-U-2.5-N-LE4
				5 m	★ 8078234	NEBA-M8W4-U-5-N-LE4

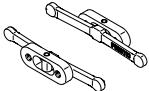
Gripper jaw mounting for microwell plates

	Description	Material bracket	Product weight	Part no.	Type
	For grippers installed horizontally	High-alloy stainless steel	100 g	8146633	EHAA-G1-B18-16-GGA1

Gripper jaw mounting for microwell plates

	Description	Material bracket	Product weight	Part no.	Type
	For grippers installed vertically	High-alloy stainless steel	95 g	8146634	EHAA-G1-B18-16-GGA1-AP

Accessories

Gripper jaws for microwell plates				
	Material gripper jaws	Product weight	Part no.	Type
	High-alloy stainless steel	24.4 g	8119108	DHAS-GG-B18-16-A1