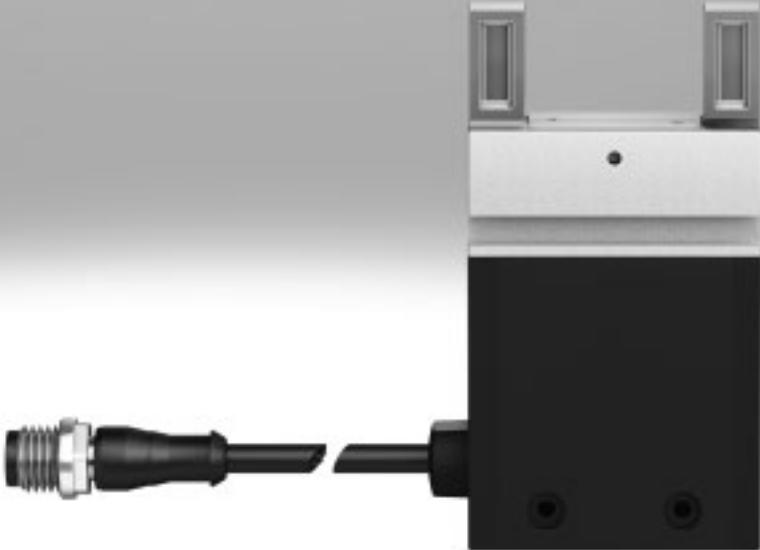


Parallel grippers EHPs, electric



# Parallel grippers EHPs, electric

Key features

### At a glance

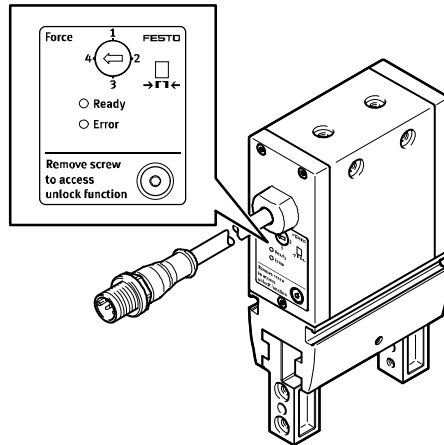
Electrically driven	Actuation via digital I/O	Adjustable gripping force (4 settings)	T-slot on the gripping head
<ul style="list-style-type: none"> <li>Minimal installation effort – no valves, tubing or compressed air preparation required</li> <li>Low noise pollution</li> <li>Electrical safety to DIN EN 61010-1:2010</li> </ul>	<ul style="list-style-type: none"> <li>No external controller required</li> <li>Connection via terminal strip to terminal CPX or controller CECC</li> </ul>	<ul style="list-style-type: none"> <li>Adaptation of the gripping force to sensitive workpieces</li> <li>Simple adjustment</li> <li>Very powerful</li> </ul>	<ul style="list-style-type: none"> <li>Direct position sensing of the gripper jaws possible</li> <li>Process reliability is guaranteed</li> </ul>

### Gripping force adjustment and status indication

**Gripping force adjustment:**  
The gripping force of the gripper can be adjusted via the rotary switch. The switch has four settings and therefore four force levels, with no intermediate levels.

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

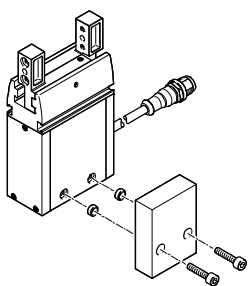
**Status indication:**  
Ready lights up green:  
Gripper ready for operation  
Error lights up red:  
Problem with supply voltage  
Error flashing red:  
Device error



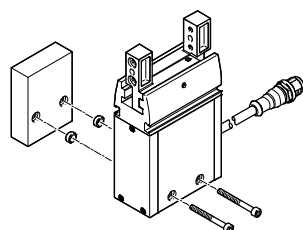
### Mounting options

On the side	On the front face
-------------	-------------------

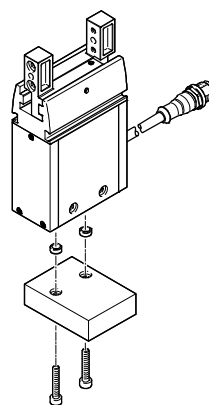
#### Via thread



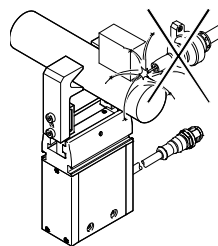
#### Via through-hole



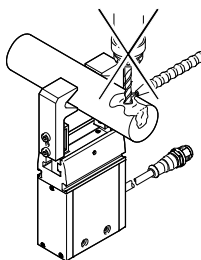
#### On the front face



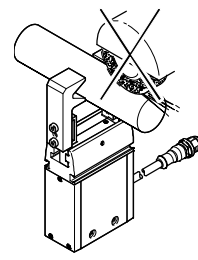
**Note**  
These grippers are not designed for the following or similar sample applications:



• Welding spatter



• Machining  
• Aggressive media

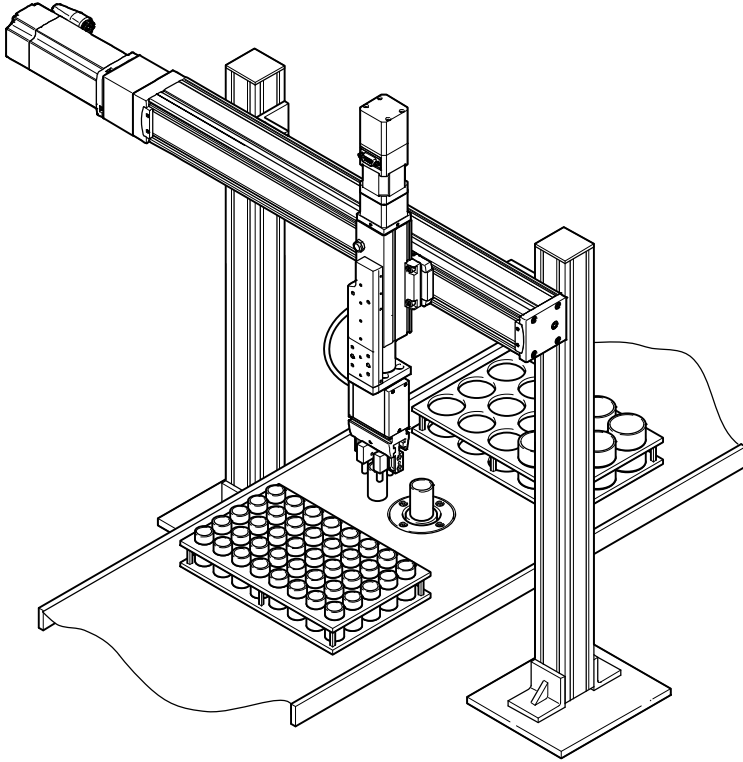


• Grinding dust

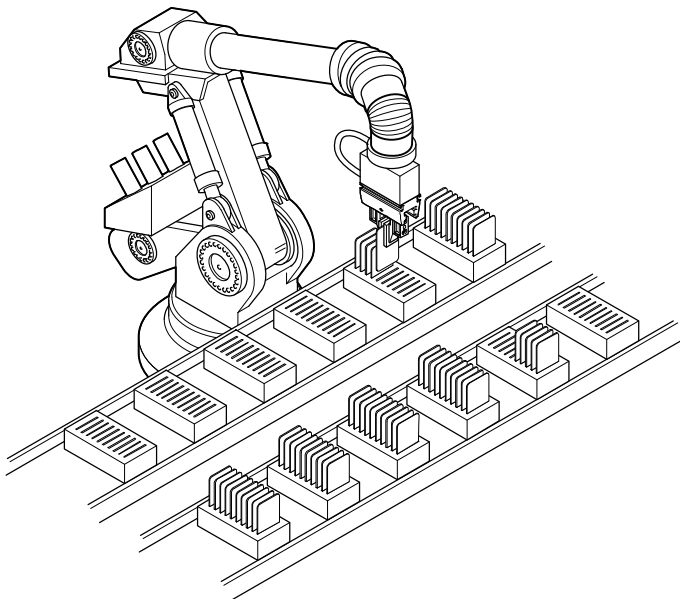
# Parallel grippers EHPs, electric

Sample application

## Sample preparation device with liquid dosing



## Card handling



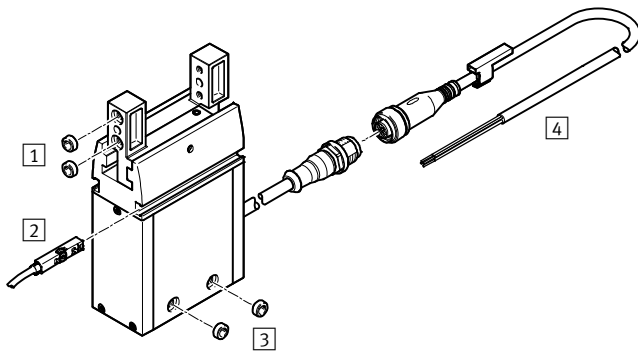
# Parallel grippers EHPS, electric

Type codes and peripherals overview

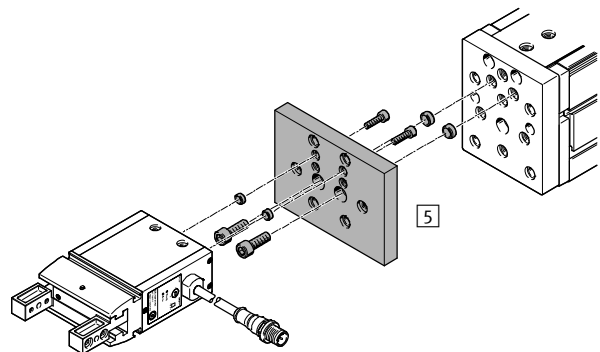
## Type codes

		EHPS	-	20	-	A
<b>Type</b>						
EHPS	Parallel gripper					
<b>Size</b>						
16	16					
20	20					
25	25					
<b>Position sensing</b>						
A	Via proximity sensor					

## Peripherals overview



## System product for handling and assembly technology



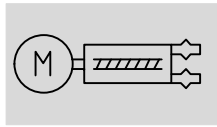
## Accessories


Type/order code	Description	→ Page/Internet
1 Centring sleeve ZBH	<ul style="list-style-type: none"> <li>For centring the gripper fingers on the gripper jaws</li> <li>4 centring sleeves included in the scope of delivery of the gripper</li> </ul>	15
2 Proximity sensor SMT-8M-A, SMT-8G	<ul style="list-style-type: none"> <li>For sensing the gripper jaw position</li> </ul>	15
Position sensor SMAT-8M	<ul style="list-style-type: none"> <li>Continuously senses the position of the gripper jaws. It has an analogue output with an output signal in proportion to the gripper jaw position</li> </ul>	16
3 Centring sleeve ZBH	<ul style="list-style-type: none"> <li>For centring the gripper during mounting</li> <li>2 centring sleeves included in the scope of delivery of the gripper</li> </ul>	15
4 Connecting cable NEBU-M12G5	<ul style="list-style-type: none"> <li>For actuating the parallel gripper</li> </ul>	15
5 Adapter kit DHAA-G-H1	<ul style="list-style-type: none"> <li>Connecting plate between drive and gripper</li> </ul>	14


# Parallel grippers EHPS, electric

Technical data

## Function



 Size  
 16 ... 25 mm

 Stroke  
 10 ... 16 mm



General technical data				
Size		16	20	25
Design		Worm gear unit Rack and pinion principle		
Guide		Plain-bearing guide with T-slot		
Control components		Latched switch		
Ready status indication		LED		
Gripper function		Parallel		
Number of gripper jaws		2		
Stroke per gripper jaw	[mm]	10	13	16
Max. load per gripper finger	[g]	100	150	230
Max. cycle rate <sup>1)</sup>	[Hz]	2.2	1.7	1.3
Repetition accuracy	[mm]	≤ 0.03	≤ 0.01	≤ 0.01
Max. interchangeability	[mm]	≤ 0.2		
Rotational symmetry	[mm]	≤ 0.2		
Max. gripper jaw backlash	[mm]	≤ 0.05	≤ 0.05	≤ 0.04
Max. gripper jaw angular backlash	[°]	0.4	0.3	0.3
Position sensing		Via proximity sensor and position sensor		
Type of mounting		Via through-holes and centring sleeves Via female thread and centring sleeves		
Electrical connection		M12x1 5-pin Cable with plug		
Mounting position		Optional		
Product weight	[g]	296	532	904

1) At a housing temperature of > 60°C

Electrical data				
Size		16	20	25
Motor type		DC servo motor		
Nominal operating voltage	[V DC]	24 ±10%		
Max. current consumption <sup>1)</sup>	[A]	1	2	2
Quiescent current	[mA]	30		

1) During travel.

# Parallel grippers EHPS, electric

Technical data

Operating and environmental conditions		
Ambient temperature	[°C]	+5 ... +60
Degree of protection		IP40
Noise level	[dB(A)]	70
Corrosion resistance class CRC <sup>1)</sup>		1
CE mark (see declaration of conformity) <sup>3)</sup>		To EU EMC Directive <sup>2)</sup>
		To EU RoHS Directive
KC mark		KC EMC
Approval		RCM compliance mark

- 1) Corrosion resistance class CRC 1 to Festo standard FN 940070  
Low corrosion stress. For dry indoor applications 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).
- 2) The product is suitable for industrial purposes only (Class A). Measures to suppress radio interference may be required in residential areas (Class B).
- 3) Additional information [www.festo.com/sp](http://www.festo.com/sp) → Certificates.

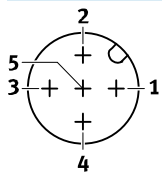
## Opening and closing times [ms] as a function of position 1 ... 4

The opening and closing times stated have been measured with vertically mounted gripper, gripper jaws pointing up and without gripper fingers.

Size Position	16	20	25
1	337	470	580
2	291	408	507
3	271	362	449
4	245	295	404

Materials	
Housing	Anodised aluminium
Gripper jaws	High-alloy stainless steel
O-ring	NBR

## Pin allocation of the connector plug



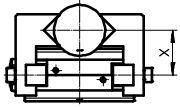
Plug M12, 5-pin		
Pin	Connection	Function
1	+24 V DC	Supply voltage
2	Input 1	Gripper jaw opening (with external gripping)
3	0 V	–
4	Input 2	Gripper jaw closing (with external gripping)
5	n.c.	Not connected

# Parallel grippers EHPS, electric

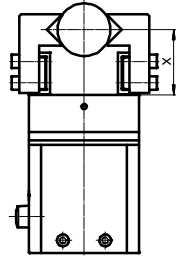
Technical data

## Total gripping force $F_H$ as a function of lever arm $x$ , mounting position, external/internal gripping and setting 1 ... 4

Horizontal mounting position

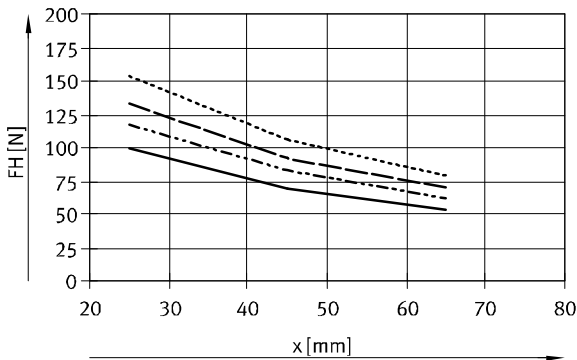


Vertical mounting position



### EHPS-16

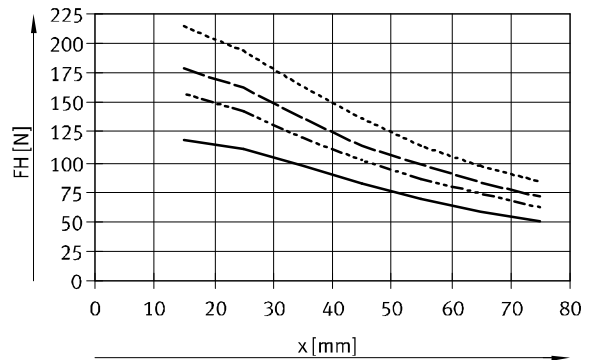
#### External gripping, horizontal



— Setting 1      - - - - - Setting 3  
 - - - - - Setting 2      ······· Setting 4

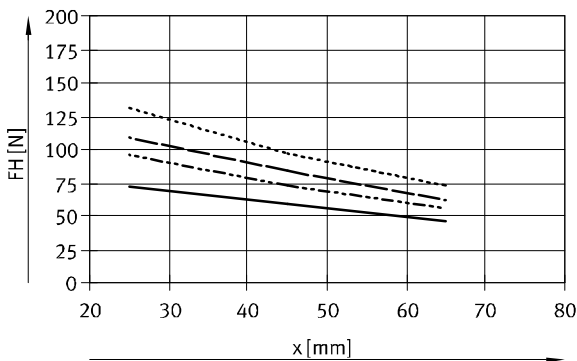
Lever arm [mm]	$F_H$ [N] with setting			
	1	2	3	4
25	98	116	132	154
45	68	84	92	106
65	54	62	70	78

#### External gripping, vertical



Lever arm [mm]	$F_H$ [N] with setting			
	1	2	3	4
15	118	158	178	214
45	82	102	114	138
75	50	62	72	84

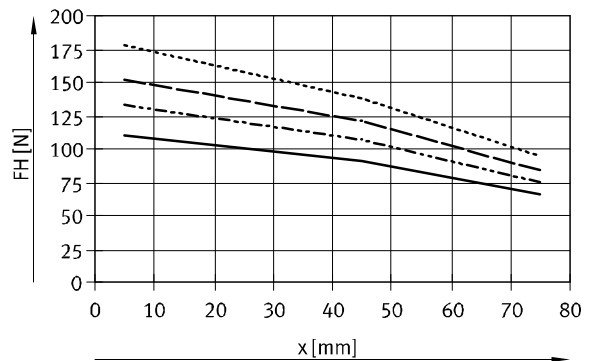
#### Internal gripping, horizontal



— Setting 1      - - - - - Setting 3  
 - - - - - Setting 2      ······· Setting 4

Lever arm [mm]	$F_H$ [N] with setting			
	1	2	3	4
25	72	96	108	130
45	58	72	84	96
65	46	56	62	74

#### Internal gripping, vertical



Lever arm [mm]	$F_H$ [N] with setting			
	1	2	3	4
15	110	134	152	178
45	90	108	122	138
75	66	74	84	94

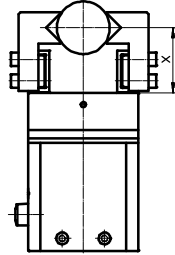
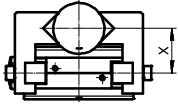
# Parallel grippers EHPs, electric

Technical data

## Total gripping force $F_H$ as a function of lever arm $x$ , mounting position, external/internal gripping and setting 1 ... 4

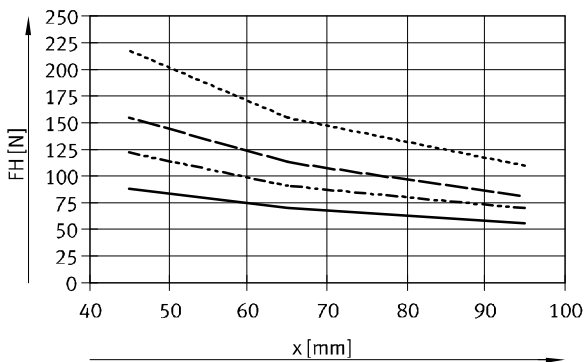
Horizontal mounting position

Vertical mounting position



### EHPs-20

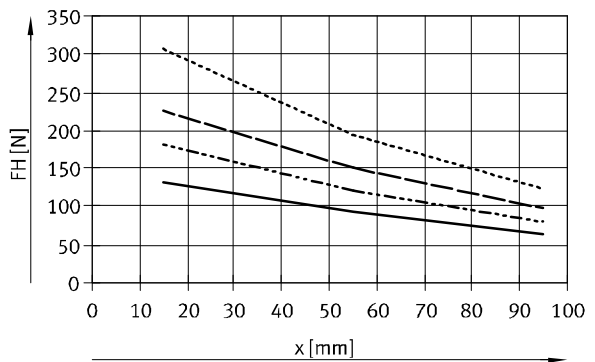
#### External gripping, horizontal



Setting 1 (solid line), Setting 2 (dashed line), Setting 3 (dash-dot line), Setting 4 (dotted line)

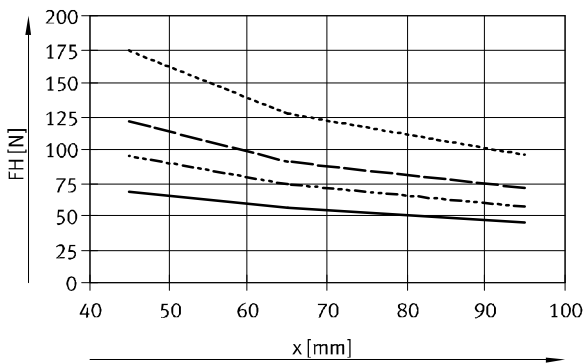
Lever arm [mm]	$F_H$ [N] with setting			
	1	2	3	4
45	88	122	156	218
65	70	90	114	154
95	56	70	82	110

#### External gripping, vertical



Lever arm [mm]	$F_H$ [N] with setting			
	1	2	3	4
15	132	182	226	306
55	94	120	150	194
95	64	80	98	124

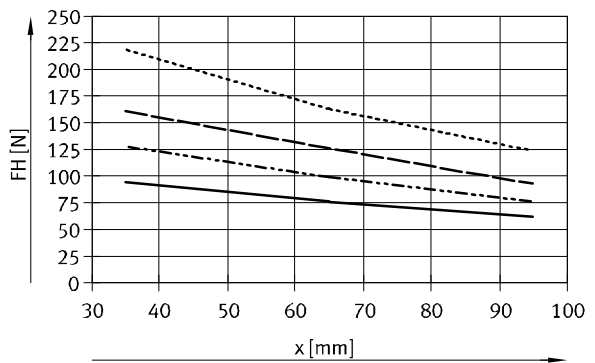
#### Internal gripping, horizontal



Setting 1 (solid line), Setting 2 (dashed line), Setting 3 (dash-dot line), Setting 4 (dotted line)

Lever arm [mm]	$F_H$ [N] with setting			
	1	2	3	4
45	68	96	120	174
65	56	74	92	128
95	46	58	72	96

#### Internal gripping, vertical



Lever arm [mm]	$F_H$ [N] with setting			
	1	2	3	4
35	94	128	160	220
65	76	100	126	162
95	62	76	92	124



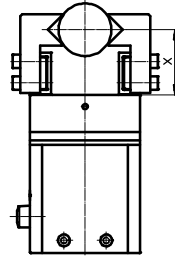
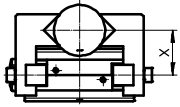
# Parallel grippers EHPS, electric

Technical data

## Total gripping force $F_H$ as a function of lever arm $x$ , mounting position, external/internal gripping and setting 1 ... 4

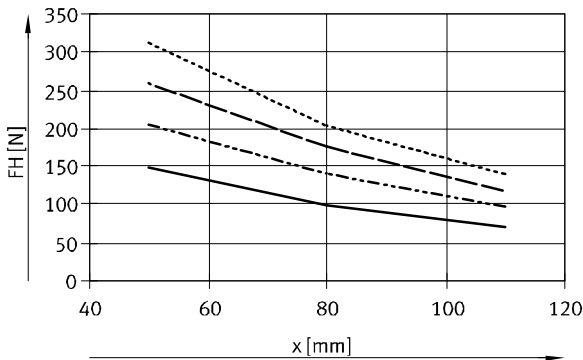
Horizontal mounting position

Vertical mounting position



### EHPS-25

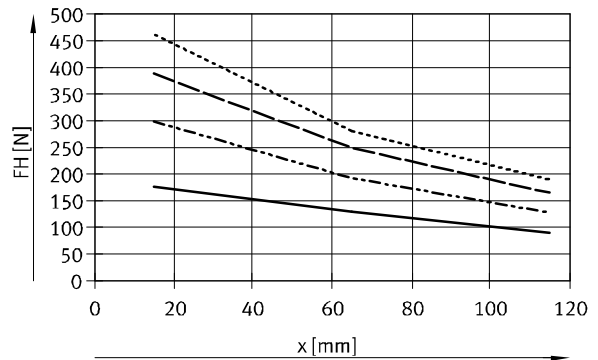
#### External gripping, horizontal



Setting 1 (solid line), Setting 2 (dashed line), Setting 3 (dash-dot line), Setting 4 (dotted line)

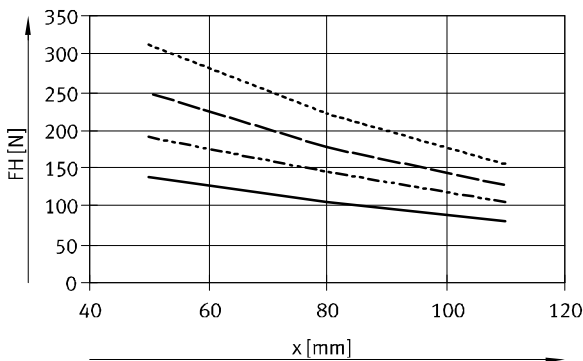
Lever arm [mm]	$F_H$ [N] with setting			
	1	2	3	4
50	148	204	260	312
80	98	140	176	204
110	70	96	118	140

#### External gripping, vertical



Lever arm [mm]	$F_H$ [N] with setting			
	1	2	3	4
15	176	298	388	462
65	130	194	250	280
115	90	128	166	190

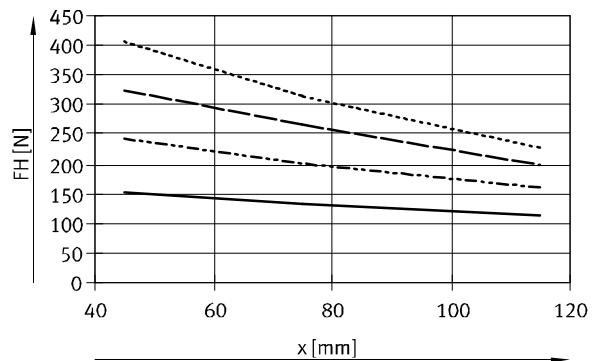
#### Internal gripping, horizontal



Setting 1 (solid line), Setting 2 (dashed line), Setting 3 (dash-dot line), Setting 4 (dotted line)

Lever arm [mm]	$F_H$ [N] with setting			
	1	2	3	4
50	138	192	250	312
80	106	146	178	222
110	80	106	128	156

#### Internal gripping, vertical

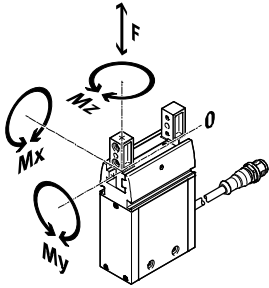


Lever arm [mm]	$F_H$ [N] with setting			
	1	2	3	4
45	152	242	326	406
75	132	200	266	314
115	114	162	198	228

# Parallel grippers EHPS, electric

Technical data

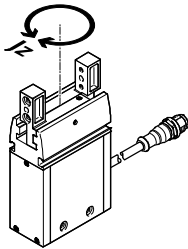
## Static characteristic load values at the gripper jaws



The indicated permissible forces and torques apply to a single gripper jaw. They include the lever arm, additional weight forces due to the workpiece or external gripper fingers and acceleration forces during movement. The zero coordinate line (gripper jaw guide groove) must be taken into consideration when calculating the torques.

Size		16	20	25
Max. permitted force $F_z$	[N]	200	325	450
Max. permitted torque $M_x$	[Nm]	7	13	28
Max. permitted torque $M_y$	[Nm]	4.4	8	16
Max. permitted torque $M_z$	[Nm]	7	13	28

## Mass moment of inertia



Under the following conditions:

- The reference point is the central axis
- Without external gripper fingers
- In a load-free state

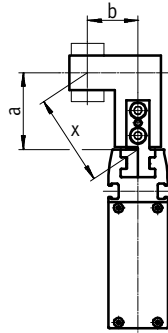
Size		16	20	25
Mass moment of inertia	[kgcm <sup>2</sup> ]	0.78	2.02	5.24

# Parallel grippers EHPS, electric

Technical data

## Gripping force $F_H$ per gripper jaw 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 7) using the calculated value  $x$ .

### Calculation example

Given:

Distance  $a = 40$  mm

Distance  $b = 50$  mm

To be calculated:

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

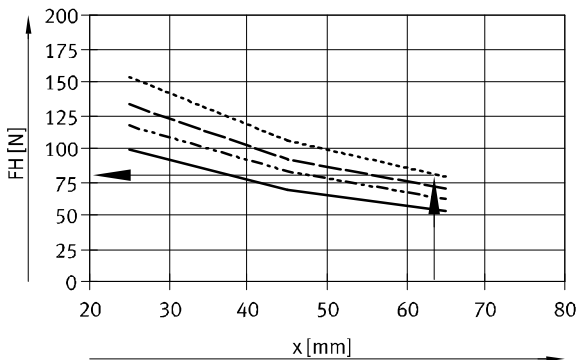
Approach:

Calculating the lever arm  $x$

$$x = \sqrt{40^2 + 50^2}$$

$$x = 64$$
 mm

The graph (→ page 7) gives a value of  $F_H =$  approx. 77 N for the gripping force.



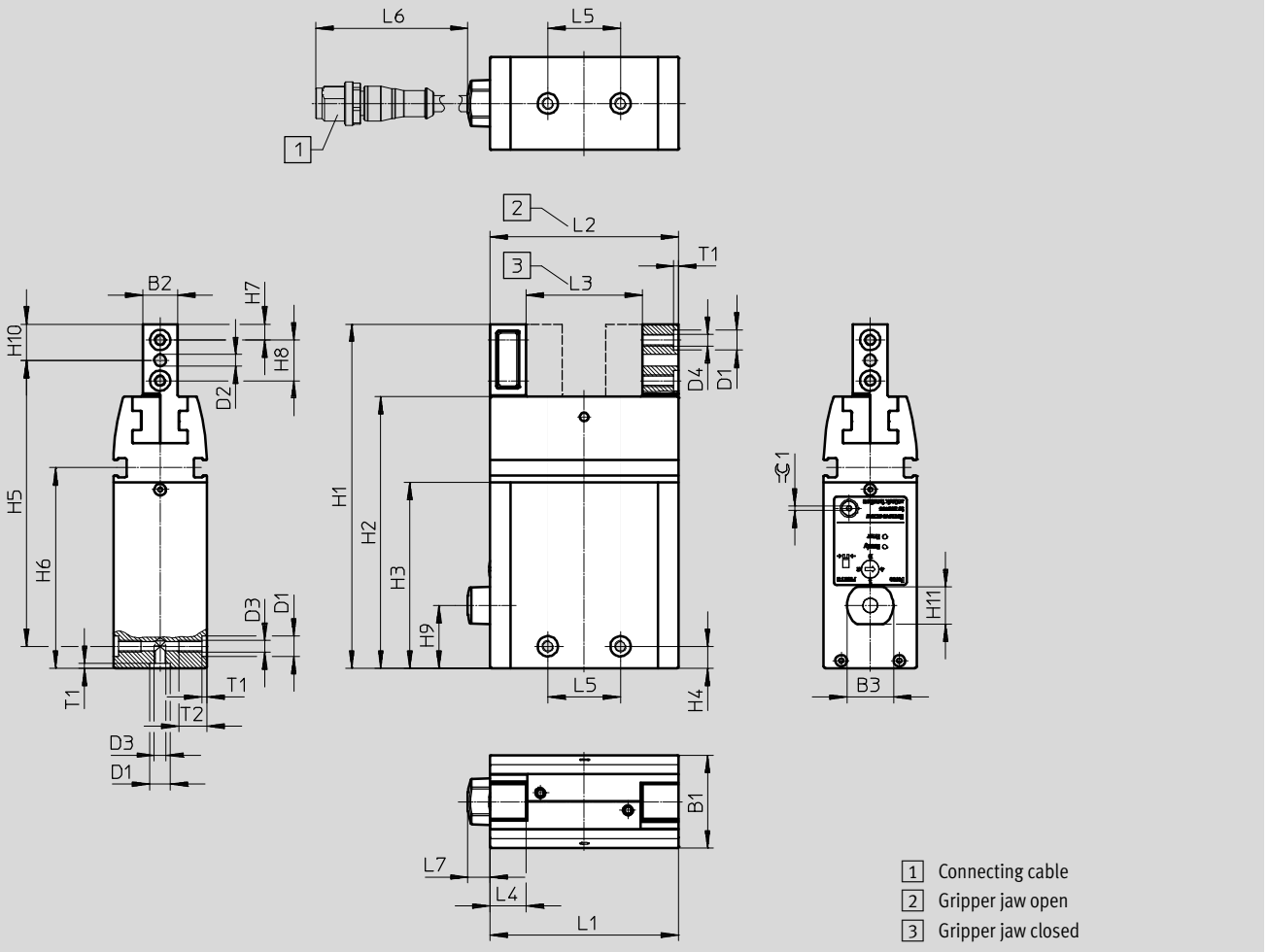
- Setting 1
- - - Setting 2
- · - Setting 3
- · · Setting 4

# Parallel grippers EHPs, electric

Technical data

**Dimensions**

Download CAD data → [www.festo.com](http://www.festo.com)



## Parallel grippers EHPS, electric

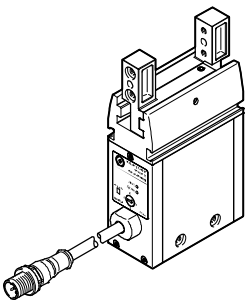
Technical data

Size	B1 ±0.03	B2 ±0.05	B3	D1 ∅ H8	D2 ∅ H8	D3	D4	H1 ±0.1	H2
16	26	10	16	7	3	M4	M4	99.5	78
20	32	12	16	7	4	M4	M4	118.5	93.5
25	39	15	16	9	4	M6	M5	139.5	110

Size	H3	H4 <sup>1)</sup>	H5 ±0.2	H6	H7 <sup>1)</sup>	H8 <sup>1)</sup>	H9	H10	H11
16	55	7.5	82	59.8	4.5	11	14.5	10	13
20	64	7.5	98.5	69	5.5	14	21.6	12.5	32
25	75	12.5	112	80	7	16	28.6	15	39

Size	L1 ±0.3	L2 +1	L3 ±0.5	L4 ±0.05	L5 <sup>1)</sup>	L6	L7	T1 +0.1	T2 min.	≈ 1
16	53.8	53.8	33.8	10.5	25	300	7.5	1.6	9.5	1.5
20	65	65	39	12.5	25	300	7.5	1.6	9.5	1.5
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


Ordering data		Size	Part No.	Type
		16	<b>8070832</b>	<b>EHPS-16-A</b>
		20	<b>8070831</b>	<b>EHPS-20-A</b>
		25	<b>8070830</b>	<b>EHPS-25-A</b>



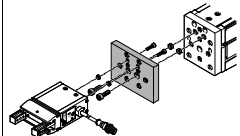
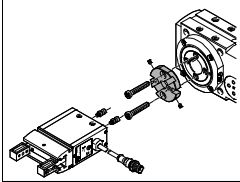
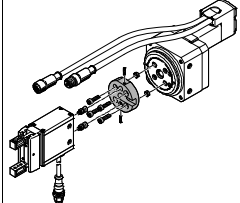
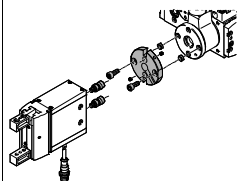
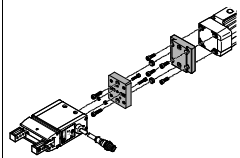
# Parallel grippers EHPS, electric

Accessories

**Adapter kit**  
DHAA, HAPG, HMSV

Material:  
Wrought aluminium alloy  
Free of copper and PTFE  
RoHS-compliant

 **Note**  
The kit includes the individual mounting interface as well as the necessary mounting material.

Permissible drive/gripper combinations with adapter kit							Download CAD data → <a href="http://www.festo.com">www.festo.com</a>		
Combination	Drive	Gripper	Mounting option		Adapter kit				
					CRC <sup>1)</sup>	Part No.	Type		
 EGSL/EHPS	EGSL	EHPS			HMSV				
	45, 55	16	■	■	2	548785	HMSV-55		
	75	20, 25	■	■		548786	HMSV-56		
 ERMB/EHPS	ERMB	EHPS			HAPG				
	20	16, 20	■	■	2	184479	HAPG-SD2-3		
	25	16, 20	■	■		184482	HAPG-SD2-6		
	20	25	■	■		184480	HAPG-SD2-4		
	25	25	■	■		184483	HAPG-SD2-7		
	32	25	■	■		184485	HAPG-SD2-9		
 ERMO/EHPS	ERMO	EHPS			DHAA				
	16	16	■	■	2	8079173	DHAA-G-R3-16-B18-16		
	25	16, 20	■	■		8071956	DHAA-G-R3-25-B18-16		
	32	20	■	■		8079214	DHAA-G-R3-32-B18-20		
	32	25	■	■		8079208	DHAA-G-R3-32-B18-25		
 EHMB/EHPS	EHMB	EHPS			HAPG				
	20	25	■	■	2	184485	HAPG-SD2-9		
	25, 32	25	■	■		8078739	DHAA-G-H1-25-B18-25		
 DGPL, DGE-..., DGEA/EHPS	DG...	EHPS			HMVA, HAPG, HMSV				
	Direct mounting								
	18 <sup>2)</sup> , 25, 32 <sup>3)</sup>	16	■	■	2	196788	HMVA-DLA18/25		
						193922	HAPG-37-S4		
	40	16	■	■		196790	HMVA-DLA40		
						193922	HAPG-37-S4		
	Dovetail mounting								
	18 <sup>2)</sup> , 25	16	■	■	2	196788	HMVA-DLA18/25		
						177768	HMSV-28		
	40	16, 20	■	■		196790	HMVA-DLA40		
				177768		HMSV-28			
40	25	■	■	196790		HMVA-DLA40			
				177769	HMSV-29				


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) For DGEA-... only

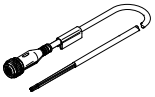
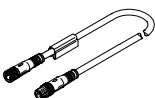
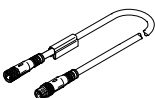
3) For DGPL only

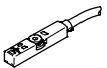
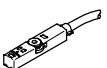
## Parallel grippers EHPS, electric


Accessories



Ordering data						
	For size [mm]	Description	Weight [g]	Part No.	Type	PU <sup>1)</sup>
Centring sleeve ZBH <span style="float: right;">Technical data → Internet: zbh</span>						
	16, 20	Included in the scope of delivery of the gripper: 4 centring sleeves for the gripper jaws and 2 for mounting the gripper	1	<b>186717</b>	<b>ZBH-7</b>	10
	25		1	<b>150927</b>	<b>ZBH-9</b>	

1) Packaging unit

Ordering data – Connecting cables for the gripper's connector plugs						
	Electrical connection, left	Electrical connection, right	Cable length [m]	Part No.	Type	
	Straight socket, M12x1, 5-pin	Cable, open end, 4-wire	2.5	<b>550326</b>	<b>NEBU-M12G5-K-2.5-LE4</b>	
			5	<b>541328</b>	<b>NEBU-M12G5-K-5-LE4</b>	
	Angled socket, M12x1, 5-pin	Cable, open end, 4-wire	2.5	<b>550325</b>	<b>NEBU-M12W5-K-2.5-LE4</b>	
			5	<b>541329</b>	<b>NEBU-M12W5-K-5-LE4</b>	
	Straight socket, M12x1, 5-pin	Straight socket, M12x1, 5-pin	5	<b>574321</b>	<b>NEBU-M12G5-E-5-Q8N-M12G5</b>	
			7.5	<b>574322</b>	<b>NEBU-M12G5-E-7.5-Q8N-M12G5</b>	
	Straight socket, M12x1, 5-pin	Angled socket, M12x1, 5-pin	0.5	<b>8003617</b>	<b>NEBU-M12G5-K-0.5-M12W5</b>	
			2	<b>8003618</b>	<b>NEBU-M12G5-K-2-M12W5</b>	

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

Ordering data – Proximity sensor for T-slot, magneto-resistive						Technical data → Internet: smt
	Type of mounting	Switching output	Electrical connection, connection direction	Cable length [m]	Part No.	Type
N/O contact						
	Insertable in the slot lengthwise	PNP	Cable, 3-wire, lateral	2.5	<b>547859</b>	<b>SMT-8G-PS-24V-E-2,5Q-OE</b>
			Plug M8x1, 3-pin, lateral	0.3	<b>547860</b>	<b>SMT-8G-PS-24V-E-0,3Q-M8D</b>
		NPN	Cable, 3-wire, lateral	2.5	<b>8065028</b>	<b>SMT-8G-NS-24V-E-2,5Q-OE</b>
			Plug M8x1, 3-pin, lateral	0.3	<b>8065027</b>	<b>SMT-8G-NS-24V-E-0,3Q-M8D</b>

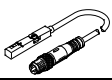
Ordering data – Connecting cables						Technical data → Internet: nebu
	Electrical connection, left	Electrical connection, right	Cable length [m]	Part No.	Type	
	Straight socket, M8x1, 3-pin	Cable, open end, 3-wire	2.5	<b>541333</b>	<b>NEBU-M8G3-K-2.5-LE3</b>	
			5	<b>541334</b>	<b>NEBU-M8G3-K-5-LE3</b>	
	Angled socket, M8x1, 3-pin	Cable, open end, 3-wire	2.5	<b>541338</b>	<b>NEBU-M8W3-K-2.5-LE3</b>	
			5	<b>541341</b>	<b>NEBU-M8W3-K-5-LE3</b>	



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## Position sensor

The position sensor continuously senses the position of the gripper jaws. It has an analogue output with an output signal in proportion to the gripper jaw position.

Ordering data – Position sensor for T-slot							Technical data → Internet: position sensor	
	For size	Position measuring range	Analogue output	Type of mounting	Electrical connection	Cable length [m]	Part No.	Type
			[V]					
	10 ... 35	0 ... 40	0 ... 10	Insertable in the slot from above	Plug M8x1, 4-pin, in-line	0.3	<b>553744</b>	<b>SMAT-8M-U-E-0,3-M8D</b>

Ordering data – Connecting cables				Technical data → Internet: nebu	
	Electrical connection, left	Electrical connection, right	Cable length [m]	Part No.	Type
		Straight socket, M8x1, 4-pin	Cable, open end, 4-wire		
			5	<b>541343</b>	<b>NEBU-M8G4-K-5-LE4</b>
	Angled socket, M8x1, 4-pin	Cable, open end, 4-wire	2.5	<b>541344</b>	<b>NEBU-M8W4-K-2.5-LE4</b>
			5	<b>541345</b>	<b>NEBU-M8W4-K-5-LE4</b>