Parallel grippers HGP, with protective dust cap

FESTO

Key features

At a glance

- Double-acting piston drive
- With protective dust cap for use in dusty environments (degree of protection IP54)
- Self-centring
- Variable gripping action:
  – External/internal gripping
- High gripping force and compact size
- Max. repetition accuracy
- Internal fixed flow control
- Versatile thanks to externally adaptable gripper fingers
- Wide range of adaptation options on the drives
- Sensor technology:
  – Adaptable proximity switches for the small grippers
  – Integrated proximity switches for the medium and large gripper sizes

Note

Engineering software
Gripper selection
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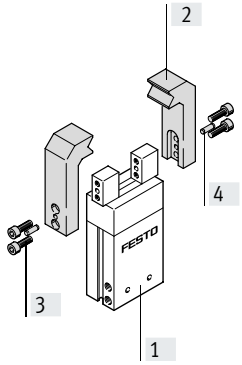
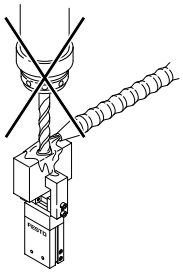
Mounting options for external gripper fingers (customer-specific)

[1] Parallel gripper
[2] External gripper fingers
[3] Mounting screws
[4] Centring pins

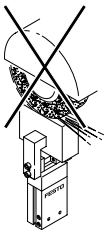


Note

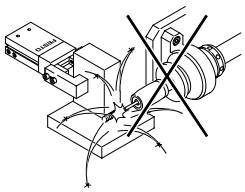
These grippers should always be used with exhaust air flow control. They are not suitable for the following or similar applications:



- Machining
- Aggressive media



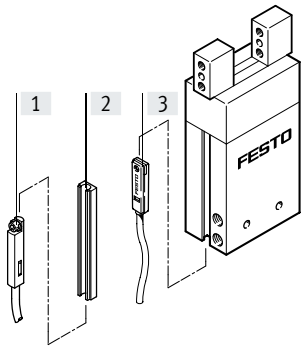
- Grinding dust



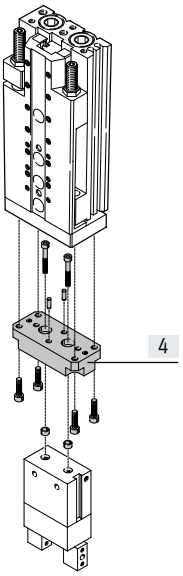
- Welding spatter

Peripherals overview and type codes

Peripherals overview



System product for handling and assembly technology



Accessories

	Type	Description	→ Page/Internet
[1]	Proximity switch SME/SMT-10	For sensing the piston position	10
[2]	Bondable sensor rail HGP-SL	Enables the use of proximity switches SME/SMT-10	9
[3]	Proximity switch SME/SMT-8	For sensing the piston position	9
[4]	–	Drive/gripper connections	adapter kit

Type codes

001	Series	
HGP	Parallel gripper	

002	Size	
16	16	
25	25	

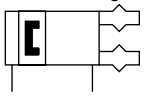
003	Position sensing	
A	For proximity sensor	

004	Generation	
B	Series B	

005	Dust protection	
SSK	protective dust cap	

Data sheet

Function
Double-acting



- Size
  16, 25 mm
- Stroke
  10, 14 mm

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General technical data			
Size		16	25
Design		Lever	
Mode of operation		Double-acting	
Gripper function		Parallel	
Number of gripper jaws		2	
Max. mass per gripper finger[1]	[g]	40	80
Stroke per gripper jaw	[mm]	5	7.5
Pneumatic connection		M3	G1/8
Repetition accuracy[2]	[mm]	≤ 0.04	
Max. interchangeability	[mm]	0.2	
Max. operating frequency	[Hz]	4	
Position sensing		Via proximity switch	
Type of mounting		Via female thread and centring sleeve	
		Via through-hole and centring sleeve	
Mounting position		Any	
Product weight	[g]	197	737

1) Applies to 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

- Note: This product conforms to ISO 1179-1 and ISO 228-1.

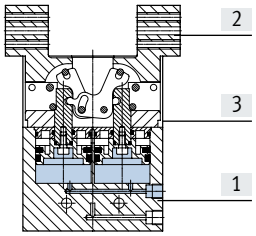
Operating and environmental conditions		
Min. operating pressure	[bar]	2
Max. operating pressure	[bar]	8
Operating medium		Compressed air to ISO 8573-1:2010 [7:4:4]
Note on the operating/pilot medium		Lubricated operation possible (in which case lubricated operation will always be required)
Ambient temperature	[°C]	+5 ... +60
Corrosion resistance class CRC[1]		1

1) 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

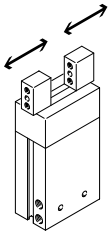
Materials

Sectional view



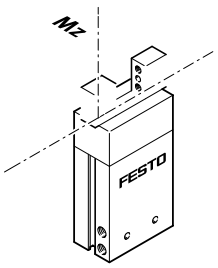
Cylinder with holding brake		
[1]	Housing	Hard-anodised aluminium
[2]	Gripper jaw	High-alloy steel
[3]	Cover cap	Polyamide
–	Protective dust cap	Vulcanised thermoplastic
–	Note on materials	Free of copper and PTFE
		RoHS-compliant

Gripping force [N] at 6 bar



Size	16	25
Gripping force per gripper jaw		
Opening	70	185
Closing	80	170
Total gripping force		
Opening	140	370
Closing	160	340

Characteristic load values per gripper jaw

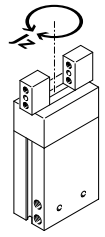


The indicated permissible forces and torques apply to a single gripper jaw. The indicated values include the lever arm, additional weight forces caused by the workpiece or external gripper fingers, as well as forces which occur during movement. The zero coordinate line (gripper jaw guide) must be taken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

Size		16	25
Max. permissible force F_Z	[N]	90	240
Max. permissible torque M_X	[Nm]	3.3	11
Max. permissible torque M_Y	[Nm]	3.3	11
Max. permissible torque M_Z	[Nm]	3.3	11

Data sheet

Mass moments of inertia [kgm²x10⁻⁴]

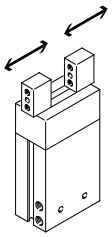


Mass moment of inertia [kgm²x10⁻⁴] for parallel grippers in relation to the central axis, without external gripper fingers, without load.

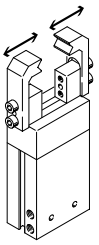
Size	16	25
HGP-...	0.47	3.83

Opening and closing times [ms] at 6 bar

Without external gripper fingers



With external gripper fingers



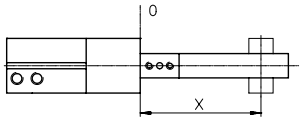
The indicated opening and closing times [ms] have been measured at room temperature and 6 bar operating pressure without additional gripper fingers. The grippers must be throttled for larger masses [g]. Opening and closing times must then be adjusted accordingly.

Size		16	25
Without external gripper fingers			
HGP-...	Opening	44	47
	Closing	60	50
With external gripper fingers (as a function of the mass per gripper finger)			
HGP-...	100 g	100	–
	150 g	200	100
	200 g	300	200
	300 g	–	300

Data sheet

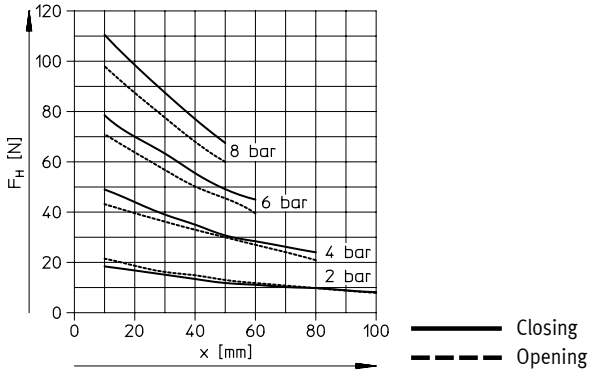
Gripping force F_H per gripper jaw as a function of operating pressure and lever arm x

External and internal gripping (closing and opening)

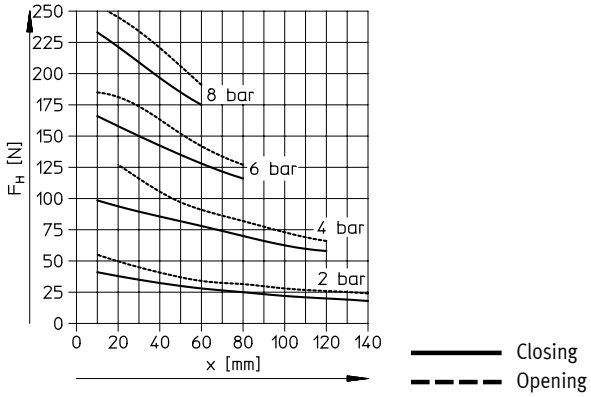


The gripping forces as a function of operating pressure and lever arm (distance from the zero co-ordinate line shown above to the pressure point at which the fingers grip the workpiece) can be determined for the various sizes using the following graphs.

HGP-16-...

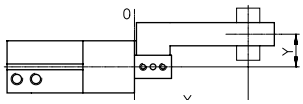


HGP-25-...



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

External and internal gripping (closing and opening)



The gripping forces at 6 bar as a function of eccentric application of force (distance from the zero co-ordinate line shown above to the pressure point at which the fingers grip the workpiece) and the maximum permissible off-centre point at which force is applied can be determined for the various sizes using the following graphs.

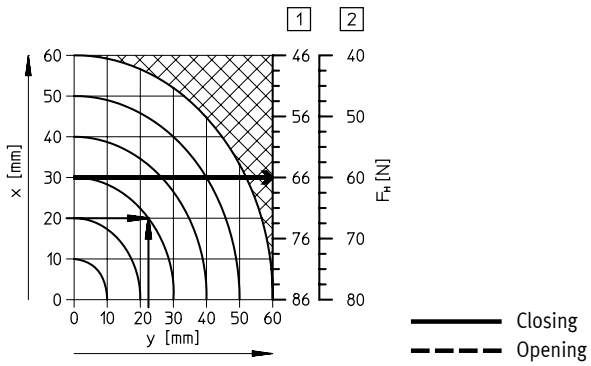
Calculation example

Assuming:
HGP-16-A-B-SSK
Lever arm x = 20 mm
Eccentricity y = 22 mm
Required:
Gripping force at 6 bar

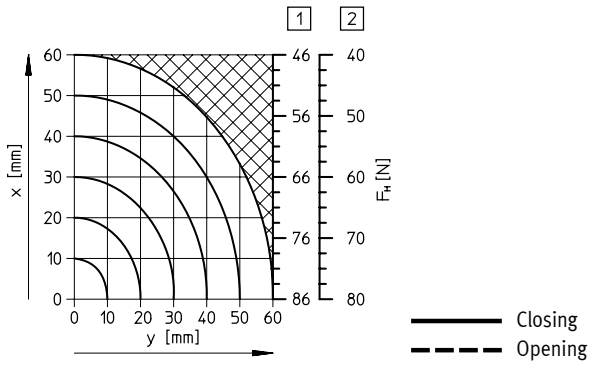
Procedure:

- Determine the intersection xy between lever arm x and eccentricity y in the graph for HGP-16-...
- Draw an arc (with centre at origin) through intersection xy
- Determine the intersection between the arc and X-axis
- Read the gripping force

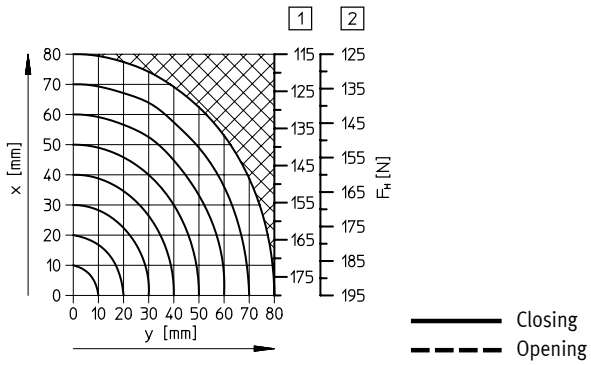
Result:
gripping force = approx. 66 N



HGP-16-...

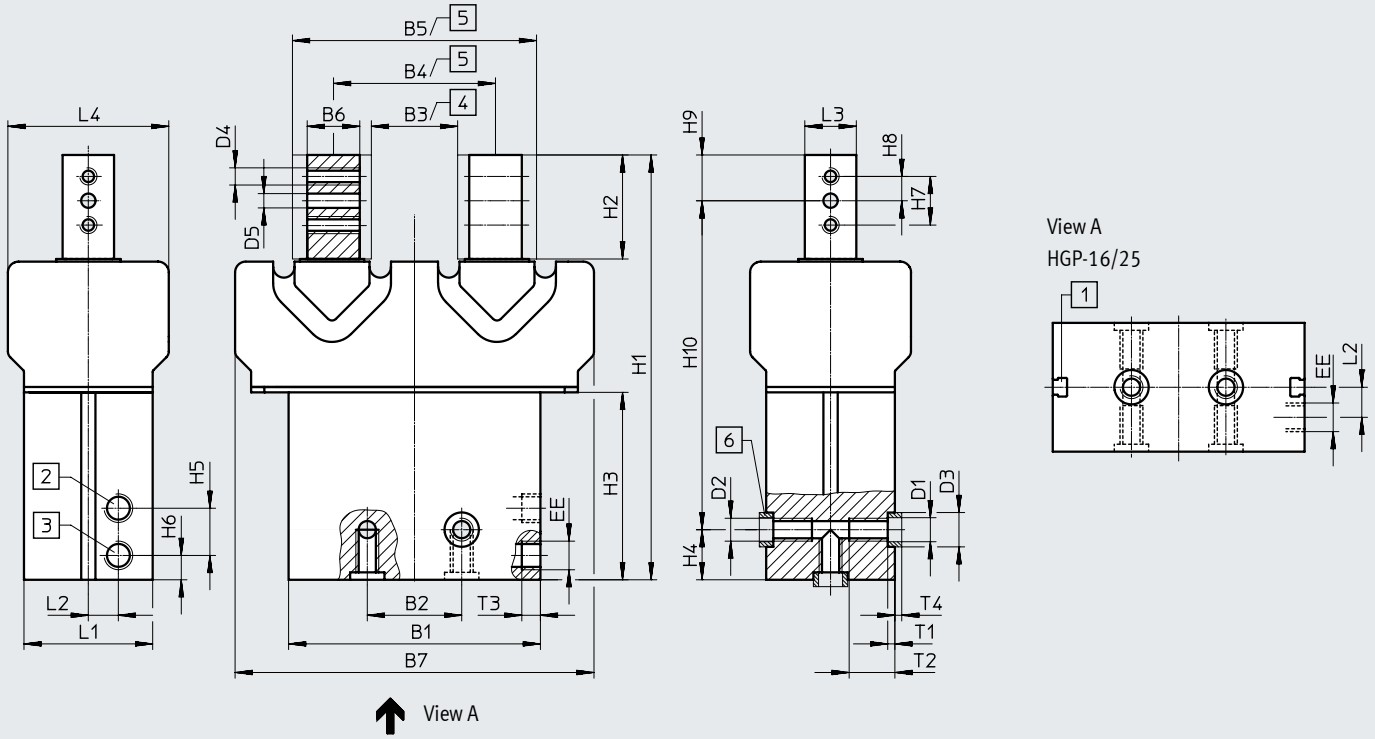


HGP-25-...



Data sheet

Dimensions Download CAD data ➔ www.festo.com



View A

[1] Sensor slot for proximity switch SME/SMT-8
Proximity switches SME-/SMT-10 can also be used in combination with the bondable sensor rail.
[2] Compressed air supply port, opening
[3] Compressed air supply port, closing
[4] Closed
[5] Open
[6] Centring sleeves ZBH (2 included in the scope of delivery)

The distance H5 = 7 mm between the two air connections on types HGP-16 means that only the following fittings can be used:
- QSM-M3-3
- QSML-M3-3
- QSMLL-M3-3
- CN-M3-PK-3
- LCN-M3-PK-3

Size	B1	B2[1]	B3	B4	B5	B6	B7	D1	D2	D3	D4	D5	EE	H1	H2	H3
								ø		ø		ø				
[mm]		±0.1	±0.5	±0.5	±0.5	–0.03	±0.5			H8/h7		H8				
16	47	25	16.4	26.4	46.4	10	67	5.3	M4	7	M4	3	M3	83	20.5	38.1
25	68.2	29	21	36	66	15	101	6.4	M6	9	M5	4	G1/8	126.8	31.5	58.8

Size	H4[2]	H5	H6	H7	H8	H9	H10	L1	L2	L3	L4	T1	T2	T3	T4
[mm]	±0.1						±0.2			–0.03		+0.1	+1	+0.5	–0.3
16	7.5	7	4	11	5.5	10	65.5	22	5.7	10	30	1.6	7.5	3.5	1.4
25	17.5	16.5	8.3	16	8	15	94.3	37	10.5	15	47	2.1	15	6.5	1.9

1) Tolerance for centring hole: ±0.02
2) Tolerance for centring hole: –0.05
- ǂ - Note: This product conforms to ISO 1179-1 and ISO 228-1.

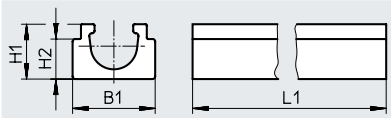
Ordering data

Size [mm]	Part no.	Type
16	**539636**	**HGP-16-A-B-SSK**
25	**539635**	**HGP-25-A-B-SSK**

Accessories

Sensor rail HGP-SL
Bondable

Material:
Wrought aluminium alloy



Dimensions and ordering data

For size [mm]	H1 +0.05	H2 +0.05/-0.1	B1 -0.1	L1	Weight [g]	Part no.	Type
16	4.25	3.1	6.4	38	1.5	**535583**	**HGP-SL-10-16**
25	4.25	3.1	6.4	58	2.3	**535585**	**HGP-SL-10-25**

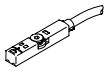
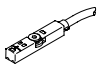
Ordering data

Type	For size	Weight [g]	Part no.	Type	PU[1]
Centring sleeve ZBH					Data sheets → Internet: zbh
	16	1	**8146544**	**ZBH-7-B**	10
	25		**8137184**	**ZBH-9-B**	

1) Packaging unit

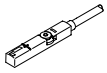
Ordering data – Proximity switch for T-slot, magneto-resistive

Data sheets → Internet: smt

	Type of mounting	Switching output	Electrical connection	Cable length [m]	Part no.	Type
N/O contact						
	Inserted in the slot from above, flush with the 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**
N/C contact						
	Inserted in the slot from above, flush with the cylinder profile, short design	PNP	Cable, 3-wire	7.5	**574340**	**SMT-8M-A-PO-24V-E-7.5-OE**

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

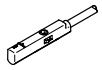
Data sheets → Internet: sme

	Type of mounting	Switching output	Electrical connection	Cable length [m]	Part no.	Type
N/O contact						
	Inserted in the slot from above, flush with the cylinder profile	Contacting	Cable, 3-wire	2.5	**543862**	**SME-8M-DS-24V-K-2.5-OE**
				5.0	**543863**	**SME-8M-DS-24V-K-5.0-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**
	Inserted 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**
N/C contact						
	Inserted in the slot lengthwise, flush with the cylinder profile	Contacting	Cable, 3-wire	7.5	**160251**	**SME-8-O-K-LED-24**

Accessories

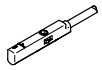
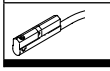
Ordering data – Proximity switch for C-slot, magneto-resistive

Data sheets → Internet: smt

	Type of mounting	Switching output	Electrical connection, outlet direction of connection	Cable length [m]	Part no.	Type
N/O contact						
	Inserted in the slot from above	PNP	Cable, 3-wire, lengthwise	2.5	**551373**	**SMT-10M-PS-24V-E-2.5-L-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**

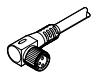
Ordering data – Proximity switch for C-slot, magnetic reed

Data sheets → Internet: sme

	Type of mounting	Switching output	Electrical connection, outlet direction of connection	Cable length [m]	Part no.	Type
N/O contact						
	Inserted in the slot from above	Contacting	Plug M8x1, 3-pin, in-line	0.3	**551367**	**SME-10M-DS-24V-E-0.3-L-M8D**
			Cable, 3-wire, lengthwise	2.5	**551365**	**SME-10M-DS-24V-E-2.5-L-OE**
			Cable, 2-wire, lengthwise	2.5	**551369**	**SME-10M-ZS-24V-E-2.5L-OE**
	Inserted in the slot lengthwise	Contacting	Plug M8x1, 3-pin, in-line	0.3	**173212**	**SME-10-SL-LED-24**
			Cable, 3-wire, lengthwise	2.5	**173210**	**SME-10-KL-LED-24**

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**