

**Standard grippers HGP/HGD/HGR/HGW**  
**Micro grippers HGPM/HGWM**

**FESTO**



Whether it's standard or  
miniaturised objects – secure  
gripping is guaranteed.

**Info 116**

## Festo gripper technology: Flexible handling and secure gripping by design

The standard and micro grippers integrate seamlessly into Festo's modular handling and assembly technology systems and service portfolio. This includes not only 2D drawings and 3D models in 80 CAD formats, but also a convenient selection software program for reliable and fast planning and design.



**Standard grippers HGP, HGD, HGR, HGW** – the first choice for a wide range of applications

- Low-cost
- Parallel, 3-point, angle or radial grippers
- Sizes 6 to 50 mm
- With seamless integration into the modular handling and assembly technology systems

### Impressive technology

- Double-acting piston drive
- Self-centring
- Optional gripping action: external/internal gripping
- Adaptable Hall sensors for the smallest standard grippers and integratable proximity sensors for the remaining grippers
- Externally adaptable gripper fingers
- Wide range of options for mounting on drive units

### Micro grippers HGPM/HGWM

Secure gripping of extremely small workpieces in tight spaces.

### Compact

- Maximum service life with more than 10 million switching cycles
- Quick and easy to assemble
- Compact and handy
- Optional stroke compensation

### Highly cost-effective

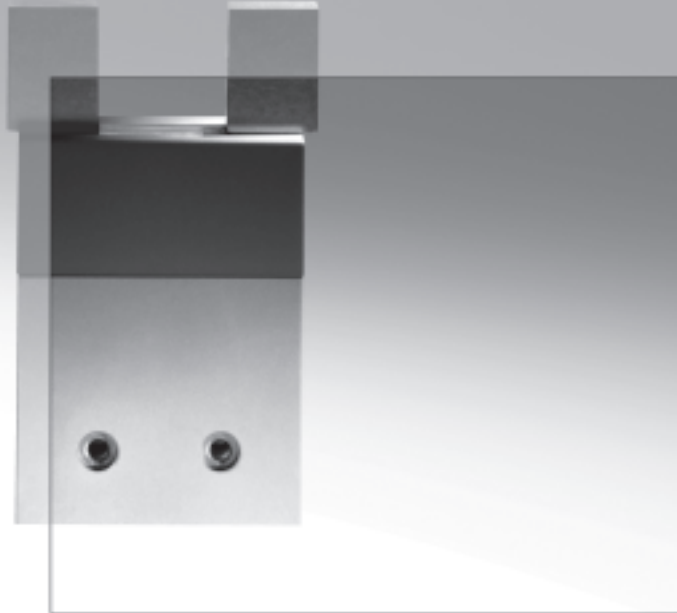
Attractive cost price and extremely long service life.

### Highly flexible

The gripper fingers can be adapted externally and there is a wide range of options for mounting on drive units.

### Highly specialised

Used in applications such as feeding in the assembly of electronic or precision mechanical components. Ideal for low weights and process forces and where high precision is required.



Powerful gripping, long service life and diverse adaptation possibilities combined with excellent economy – the Festo gripper range addresses the needs of both the designer and the buyer. Don't take our word for it – see for yourself.

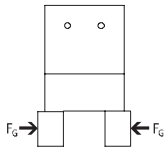
	<b>Advantages for designers</b>	<b>Advantages for purchasers</b>
Standardised, application-oriented design	<ul style="list-style-type: none"> <li>• Reduced planning costs</li> <li>• General reduction in fitting space</li> <li>• High gripping forces – small size</li> <li>• Excellent precision and load capacity</li> </ul>	<ul style="list-style-type: none"> <li>• Reduced ordering expenses</li> <li>• Reduced follow-up costs through long service life</li> <li>• Favourable price/performance ratio</li> </ul>
Modular gripper system	<ul style="list-style-type: none"> <li>• Simple, clearly defined interfaces</li> <li>• Straightforward system integration</li> </ul>	<ul style="list-style-type: none"> <li>• Solution from a single source</li> <li>• Reduced logistics</li> </ul>
Miniaturised series	<ul style="list-style-type: none"> <li>• For handling the smallest components</li> <li>• For use in all industries producing miniature components</li> </ul>	<ul style="list-style-type: none"> <li>• Favourable entry price</li> <li>• Reduces unnecessary costs for oversizing</li> </ul>

# Forces at the gripper

Basic principles

## Calculation tools for determining gripping force

What is meant by gripping force?



Action = Reaction  
The gripping force  $F_G$  refers to the gripping force per gripper jaw.

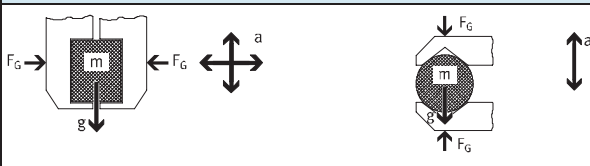
When selecting a gripper you need to determine the gripping force required to hold a workpiece of mass  $m$  [kg]

and move this workpiece at an acceleration of  $a$  [ $m/s^2$ ].

## How does the gripping force act in the case of 2-jaw grippers?

Parallel, radial and angle grippers

Mechanical locking



$$F_G = m \times (g + a) \times S$$

$F_G$  Required gripping force [N] per gripper jaw

For angle and radial grippers, gripping force  $F_G$  must be converted to gripping torque  $M_G$ .

$r, x$  Distance between the gripper zero point and the gripping point (lever arm)

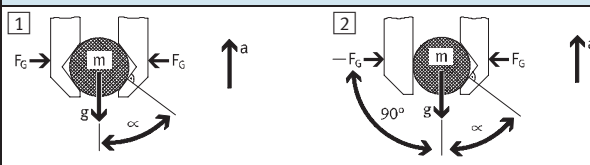
→ Catalogue specifications:

“Gripping force as a function of the lever arm”

$$M_G = F_G \times r$$

$m$  Workpiece mass [kg]

Mechanical locking with V-gripper



$$F_G = \frac{m \times (g + a)}{2} \times \tan \alpha \times S$$

$$F_G = m \times (g + a) \times \tan \alpha \times S$$

$g$  Acceleration due to gravity ( $\approx 10 m/s^2$ ) is required if acting against the acceleration  $a$

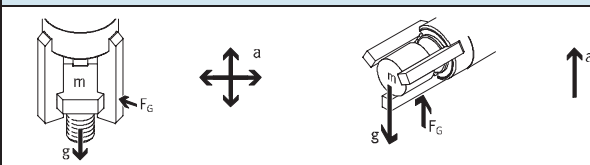
$a$  Acceleration [ $m/s^2$ ] arising from the dynamic movement

$S$  Safety factor

## How does the gripping force act in the case of 3-jaw grippers?

Three-point gripper

Mechanical locking

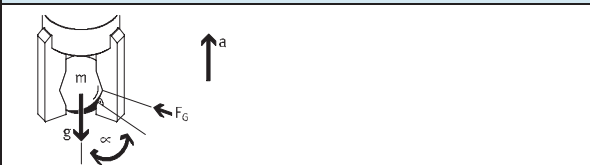


$$F_G = m \times (g + a) \times S$$

$\alpha$  Angle of V-gripper finger

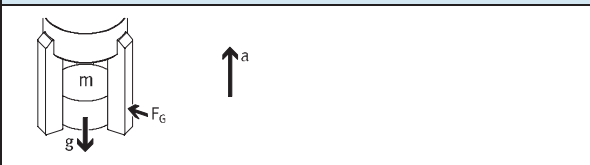
$\mu$  Coefficient of friction between gripper finger and workpiece

Mechanical locking with V-gripper



$$F_G = \frac{m \times (g + a)}{3} \times \tan \alpha \times S$$

Frictional locking



$$F_G = \frac{m \times (g + a)}{3 \times \mu} \times S$$

# Forces at the gripper

Basic principles

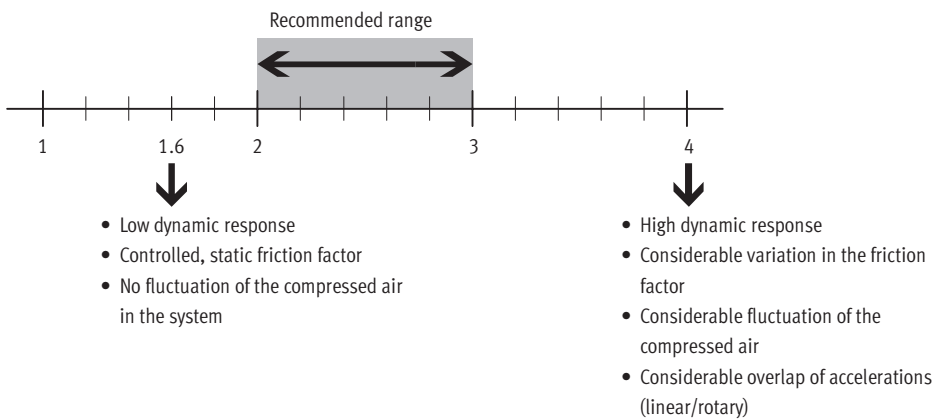
## Max. acceleration values with different drive types

Peak acceleration values occur:

- In an emergency stop
- Shortly before the end position is reached

Drive function	Pneumatic			Servopneumatic	Electrical		
	with fixed cushioning	with adjustable cushioning	with shock absorber		Axis with toothed belt	Axis with spindle	with linear motor
Max. acceleration [m/s <sup>2</sup> ]	50 ... 300	10 ... 300	10 ... 300	5 ... 15	0 ... 15	0 ... 6	0 ... 30

## Recommended safety factor



## Coefficient of friction $\mu$

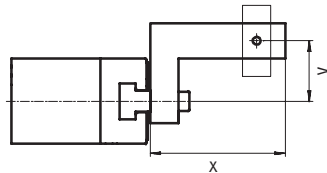
		Workpiece surface				
		ST	STL	AL	ALI	R
Gripper finger surface	ST	0.25	0.15	0.35	0.20	0.50
	STL	0.15	0.09	0.21	0.12	0.30
	AL	0.35	0.21	0.49	0.28	0.70
	ALI	0.20	0.12	0.28	0.16	0.40
	R	0.50	0.30	0.70	0.40	1.00

- ST Steel
- STL Lubricated steel
- AL Aluminium
- ALI Lubricated aluminium
- R Rubber

## Limits of this analysis

Eccentricity of the centre of gravity of the mass referred to the gripping point

- Graphs with grippers in the catalogue
- In the electronic catalogue



## Calculation program in the electronic catalogue on CD-ROM



Optimum entry of


- Workpiece and gripper finger geometry
- Direction of motion, dynamic response
- Coefficient of friction, pressure, temperature and safety factor




# Parallel gripper

Selection aid

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-  - Note

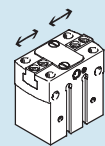

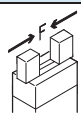
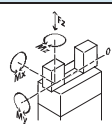
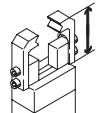
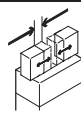
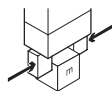
1) The workpiece mass has been calculated based on the gripping principle "Positive locking with V-gripper" using the variable values specified below.  
 → 4:  
 - Parallel gripper



- Variable values:
  - $a = 50 \text{ m/s}^2$
  - $g + a = 60 \text{ m/s}^2$
  - $\alpha = 45^\circ$
  - $\tan \alpha = 1$
  - S and x → Workpiece mass

2) Possible applications:

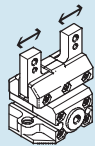
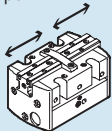
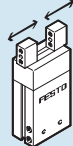
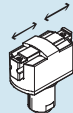
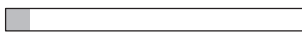
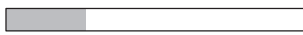
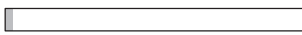




- Workpiece retention in case of loss of compressed air
- As a single-acting gripper
- Acts to increase gripping force

Selection criteria/gripper types			
Parallel gripper HGPT		Parallel gripper HGPL	
Workpiece mass <sup>1)</sup> [kg]			
	Up to 12 kg S = 2 x = 40 mm	Up to 9.7 kg S = 2 x = 40 mm	
Gripping force (external gripping) [N] at 6 bar			
	F per gripper jaw		
	36 ... 770	80 ... 605	
	F total		
	72 ... 1 540	160 ... 1 210	
Maximum permissible characteristic load values per gripper jaw			
	Fz [N]	4 000	2 500
	Mx [Nm]	140	125
	My [Nm]	120	80
	Mz [Nm]	80	100
Gripper finger length [mm]			
	Max. 180	Max. 135	
Gripper stroke per gripper jaw [mm]			
	3 ... 16 ↔↔↔	40 ... 80 ↔↔↔↔↔↔	
Repetition accuracy [mm]			
	≤ 0.04	≤ 0.03	
Gripping force retention <sup>2)</sup> , opening and closing			
	■	-	
Proximity sensors/sensors for position sensing at the gripper			
	■	■	
Advantages			
	<ul style="list-style-type: none"> <li>- Sturdy T-slot</li> <li>- Sealing air</li> <li>- Integrated sensors</li> </ul>	<ul style="list-style-type: none"> <li>- Sturdy T-slot</li> <li>- Adjustable opening stroke</li> <li>- Integrated sensors</li> </ul>	
Technical data and dimensions			
Further information	→ Info 139	→ Info 139	

# Parallel gripper

Selection aid

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Selection criteria/gripper types			
Parallel gripper HGPC 	Precision parallel gripper HGPP 	Parallel gripper HGP 	Micro-parallel gripper HGPM 
Workpiece mass <sup>1)</sup> [kg]			
Up to 1.05 kg      S = 3 x = 40 mm 	Up to 6.7 kg      S = 2 x = 40 mm 	Up to 3.4 kg      S = 3 x = 40 mm 	Up to 0.17 kg      S = 3 x = 10 mm 
Gripping force (external gripping) [N] at 6 bar			
F per gripper jaw			
22 ... 63	40 ... 415	10 ... 350	8 ... 14
F total			
44 ... 126	80 ... 830	20 ... 700	16 ... 28
Maximum permissible characteristic load values per gripper jaw			
120	720	380	30
5	50	25	0.5
5	50	25	0.5
5	50	25	0.5
Gripper finger length [mm]			
Max. 60	Max. 160	Max. 100	Max. 30
Gripper stroke per gripper jaw [mm]			
3 ... 7 	2 ... 12.5 	2 ... 12.5 	2 ... 3 
Repetition accuracy [mm]			
≤ 0.05	≤ 0.02	≤ 0.04	≤ 0.05
Gripping force retention <sup>2)</sup> , opening and closing			
■	■	■	–
Proximity sensors/sensors for position sensing at the gripper			
■	■	■	–
Advantages			
– Cost-effective – Integrated sensors	– High precision thanks to gripper jaw with ball bearing guide – Integrated sensors – 3 positions can be sensed	– Dust-protected variant: HGP-16/-25...-SSK – Cost-effective – Integrated sensors	– Single-acting – Compact
Technical data and dimensions			
→ Info 154	→ Info 157	→ 12	→ 60

# Parallel gripper

Selection aid



- - Note

1) The workpiece mass has been calculated based on the gripping principle "Positive locking with V-gripper" using the variable values specified below.  
 → 4:  
 - Parallel gripper


- Variable values:
  - $a = 50 \text{ m/s}^2$
  - $g + a = 60 \text{ m/s}^2$
  - $\alpha = 45^\circ$
  - $\tan \alpha = 1$
  - $S$  and  $x \rightarrow$  Workpiece mass
- 2) Possible applications:
  - Workpiece retention in case of loss of compressed air
  - As a single-acting gripper
  - Acts to increase gripping force

Selection criteria/gripper types			
Swivel/gripper unit HGDS	Precision proportional parallel gripper HGPP1		
Workpiece mass <sup>1)</sup> [kg]			
	Up to 1.2 kg $S = 2$ $x = 40 \text{ mm}$	Up to 1 kg $S = 2$ $x = 40 \text{ mm}$	
Gripping force (external gripping) [N] at 6 bar			
	F per gripper jaw		
	26 ... 65	10 ... 60 (adjustable)	
	F total		
	52 ... 130	20 ... 120 (adjustable)	
Maximum permissible characteristic load values per gripper jaw			
	Fz [N]	60	70
	Mx [Nm]	8	3
	My [Nm]	8	3
	Mz [Nm]	8	3
Gripper finger length [mm]			
	Max. 70	Max. 70	
Gripper stroke per gripper jaw [mm]			
	2.5 ... 7 ↔	Swivel angle 0 ... 210° ↻	0 ... 10 ↔↔ Can be positioned freely and independently
Repetition accuracy [mm]			
	≤ 0.02	≤ 0.02	
Gripping force retention <sup>2)</sup> , opening and closing			
	-	-	
Proximity sensors/sensors for position sensing at the gripper			
	■	Absolute displacement encoder	
Advantages			
	- Swivelling and gripping in one unit - Compact - Integrated sensors	- Gripper jaws can be positioned freely and independently - High precision thanks to gripper jaw with ball bearing guide	
Technical data and dimensions			
Further information	→ Info 135	→ Info 157	



# Three-point gripper

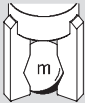
Selection aid

-  - Note

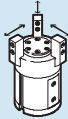
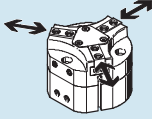

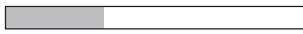

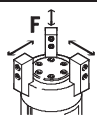


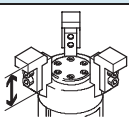


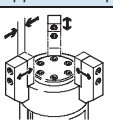


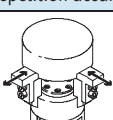
1) The workpiece mass has been calculated based on the gripping principle "Positive locking with V-gripper" using the variable values specified below.

→ 4:

- Three-point gripper




- Variable values:
  - $a = 50 \text{ m/s}^2$
  - $g + a = 60 \text{ m/s}^2$
  - $\alpha = 45^\circ$
  - $\tan \alpha = 1$
  - S and r → Workpiece mass

Selection criteria/gripper types			
	Three-point gripper HGD 	Three-point gripper HGDT 	
Workpiece mass <sup>1)</sup> [kg]			
	Up to 3.8 kg S = 3 x = 40 mm 	Up to 12.7 kg S = 2 x = 40 mm 	
Gripping force (external gripping) [N] at 6 bar			
	F per gripper jaw		
	30 ... 300	70 ... 550	
	F total		
	90 ... 900	210 ... 1 650 	
Maximum permissible characteristic load values at the gripper jaw			
	Fz [N]	170	2 500
	Mx [Nm]	5	80
	My [Nm]	8	50
	Mz [Nm]	5	60
Gripper finger length [mm]			
	Max. 100 	Max. 140 	
Gripper stroke per gripper jaw [mm]			
	2.5 ... 6 	3 ... 10 	
Repetition accuracy [mm]			
	≤ 0.04	≤ 0.03	
Gripping force retention			
	-	■	
Proximity sensors/sensors for position sensing at the gripper			
	■	■	
Advantages			
	- Simple, position-centred gripping of perfectly round parts - Integrated sensors	- Sturdy T-slot - Sealing air - Integrated sensors	
Technical data and dimensions			
Further information	→ 26	→ Info 139	

# Radial gripper


Selection aid

-  - Note

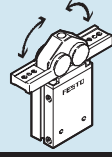

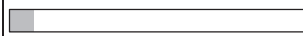
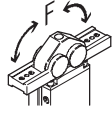
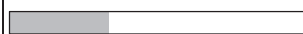
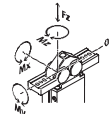
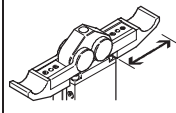

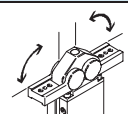
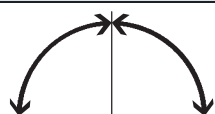
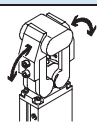
1) The workpiece mass has been calculated based on the gripping principle "Positive locking with V-gripper" using the variable values specified below.

→ 4:

- Radial grippers



- Variable values:
  - $a = 50 \text{ m/s}^2$
  - $g + a = 60 \text{ m/s}^2$
  - $\alpha = 45^\circ$
  - $\tan \alpha = 1$
  - $s$  and  $r \rightarrow$  Workpiece mass

Selection criteria/gripper types									
Radial gripper HGR									
Workpiece mass <sup>1)</sup> [kg]									
	Up to 1 kg  $S = 3$ $r = 30 \text{ mm}$								
Total gripping torque (external gripping) [Ncm] at 6 bar									
	13 ... 500 								
Maximum permissible characteristic load values at the gripper jaw									
	<table border="1"> <tr> <td><math>F_z</math> [N]</td> <td>80</td> </tr> <tr> <td><math>M_x</math> [Nm]</td> <td>2</td> </tr> <tr> <td><math>M_y</math> [Nm]</td> <td>10</td> </tr> <tr> <td><math>M_z</math> [Nm]</td> <td>7</td> </tr> </table>	$F_z$ [N]	80	$M_x$ [Nm]	2	$M_y$ [Nm]	10	$M_z$ [Nm]	7
$F_z$ [N]	80								
$M_x$ [Nm]	2								
$M_y$ [Nm]	10								
$M_z$ [Nm]	7								
Gripper finger length [mm]									
	Max. 120 								
Gripping angle per gripper jaw [°]									
	-1 ... +90 								
Repetition accuracy [mm]									
	$\leq 0.1$								
Gripping force retention									
	-								
Proximity sensors/sensors for position sensing at the gripper									
	■								
Advantages									
	<ul style="list-style-type: none"> <li>- Linear axes can be avoided</li> <li>- Integrated sensors</li> </ul>								
Technical data and dimensions									
Further information	→ 36								

# Angle gripper


Selection aid

- Note

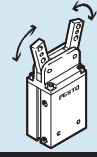

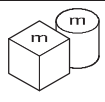
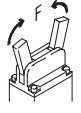
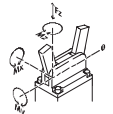
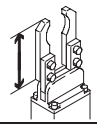
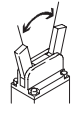
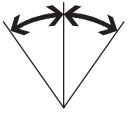
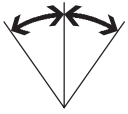
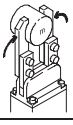
1) The workpiece mass has been calculated based on the gripping principle "Positive locking with V-gripper" using the variable values specified below.

→ 4:

- Angle gripper

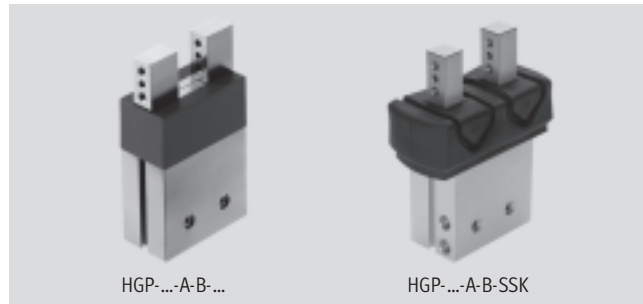


- Variable values:
  - $a = 50 \text{ m/s}^2$
  - $g + a = 60 \text{ m/s}^2$
  - $\alpha = 45^\circ$
  - $\tan \alpha = 1$
  - S and r → Workpiece mass

Selection criteria/gripper types		
	Angle gripper HGW 	Micro-angle gripper HGWM 
Workpiece mass <sup>1)</sup> [kg]		
	Up to 2 kg S = 3 r = 30 mm	Up to 0.2 kg S = 3 r = 20 mm
Total gripping torque (external gripping) [Ncm] at 6 bar		
	22 ... 880	22 ... 64
Maximum permissible characteristic load values at the gripper jaw		
	Fz [N] 124	20
	Mx [Nm] 5.7	0.4
	My [Nm] 2.2	0.4
	Mz [Nm] 3.6	0.4
Gripper finger length [mm]		
	Max. 120	Max. 40
Gripping angle per gripper jaw [°]		
	-3 ... +18 	-4 ... +18 
Repetition accuracy [mm]		
	≤ 0.04	≤ 0.02
Gripping force retention		
	-	-
Proximity sensors/sensors for position sensing at the gripper		
	■	-
Advantages		
	<ul style="list-style-type: none"> <li>- Sturdy</li> <li>- Cost-effective</li> <li>- Integrated sensors</li> </ul>	<ul style="list-style-type: none"> <li>- Compact</li> <li>- Single-acting</li> </ul>
Technical data and dimensions		
Further information	→ 48	→ 72

# Parallel grippers HGP

Key features



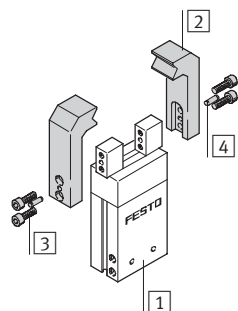
## At a glance

- Double-acting piston drive
- Self-centring
- Variable gripping action:
  - External/internal gripping
- Versatility thanks to externally adaptable gripper fingers
- Wide range of options for mounting on drive units
- High gripping force and compact size
- Max. repetition accuracy
- Gripping force retention
- Internal fixed flow control
- With protective dust cap for use in dusty environments (protection class IP54)
- Sensor technology:
  - Adaptable proximity sensors on the small grippers
  - Integral proximity sensors for medium and large grippers

Gripper selection software  
[www.festo.com/en/engineering](http://www.festo.com/en/engineering)

## Mounting options for external gripper fingers (customer-specific)

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



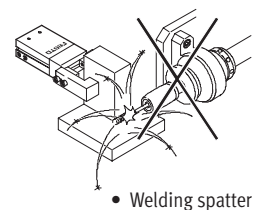
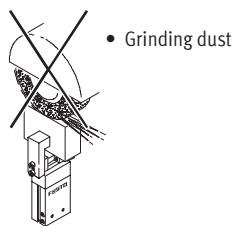
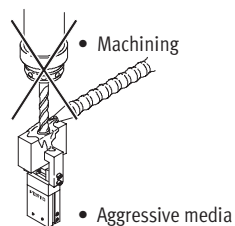
## With protective dust cap

The sizes 16 and 25 can be adapted for use in dusty environments. They fulfil the requirements for protection class IP54.

The technical data corresponds to the data for parallel gripper HGP without protective dust cap.



**Note**  
 Grippers should always be used with exhaust air flow control. They are not suitable for the following, or for similar applications:

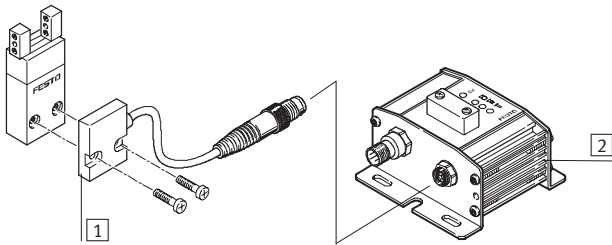


# Parallel grippers HGP

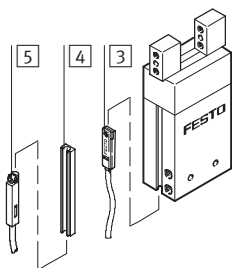
Peripherals overview and type codes

## Peripherals overview

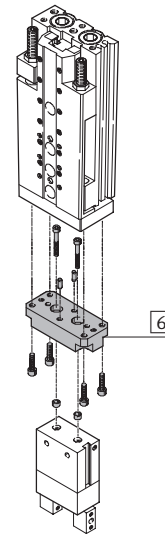
HGP-06



HGP-10 ... 35



## System product for handling and assembly technology



Accessories			
Type	Brief description	→ Page	
1	Position sensor SMH-S1 Adaptable and integratable sensor technology, for sensing the piston position	23	
2	Evaluation unit SMH-AE1 For position sensor SMH-S1	23	
3	Proximity sensor SME/SMT-8 For sensing the piston position	24	
4	Bondable sensor rail HGP-SL Allows the use of proximity sensors SME/SMT-10	23	
5	Proximity sensor SME/SMT-10 For sensing the piston position	25	
6	– Drive/gripper connections	www.festo.com	

## Type codes

HGP		–	16	–	A	–	B	–	G1	–	SSK
<b>Type</b>											
HGP	Parallel gripper										
<b>Size</b>											
<b>Position sensing</b>											
A	For proximity sensing										
<b>Generation</b>											
B	B series										
<b>Gripping force retention</b>											
G1	Open										
G2	Closed										
<b>Protective dust cap</b>											
SSK	Protective dust cap										

# Parallel grippers HGP

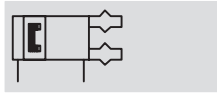
Technical data



## Function

Double-acting

HGP-06-A, HGP-...-A-B



⌀ - Size  
6 ... 35 mm

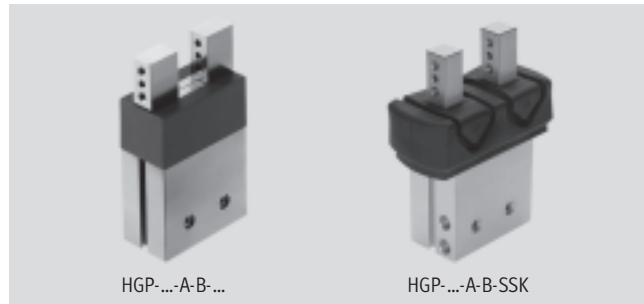
- | - Stroke  
4 ... 25 mm

## Variants

- With gripping force retention...  
... open HGP-...-G1  
... closed HGP-...-G2
- With protective dust cap



[www.festo.com/en/  
Spare\\_parts\\_service](http://www.festo.com/en/Spare_parts_service)  
Wearing parts kits  
➔ 22



General technical data						
Size	6	10	16	20	25	35
Design	Wedge-shaped		Lever mechanism			
Mode of operation	Double-acting					
Gripper function	Parallel					
Number of gripper jaws	2					
Max. applied load per external gripper finger <sup>1)</sup> [N]	0.1	0.2	0.4	0.6	0.8	1.2
Stroke per gripper jaw [mm]	2	3	5	6.5	7.5	12.5
Pneumatic connection	M3			M5	G1/8	
Repetition accuracy <sup>2)</sup> [mm]	≤ 0.04					
Max. interchangeability [mm]	0.2					
Max. operating frequency [Hz]	4					
Position sensing	For proximity sensing					
Type of mounting	With female thread and centring sleeve					
	-		Via through-holes and centring sleeve			

1) Valid for unthrottled operation

2) End position drift under constant conditions of use with 100 consecutive strokes in the direction of movement of the gripper jaws

Operating and environmental conditions						
Size	6	10	16	20	25	35
Min. operating pressure HGP-...-A/-B [bar]	2					
Min. operating pressure HGP-...-G... [bar]	5					
Max. operating pressure [bar]	8					
Operating medium	Filtered compressed air, lubricated or unlubricated					
Ambient temperature [°C]	+5 ... +60					
Corrosion resistance class CRC <sup>1)</sup>	2	1				

1) Corrosion resistance class 1 according to Festo standard 940 070

Components requiring low corrosion resistance. Transport and storage protection. Parts that do not have primarily decorative surface requirements, e.g. in internal areas that are not visible or behind covers.

Corrosion resistance class 2 according to Festo standard 940 070

Components requiring moderate corrosion resistance. Externally visible parts with primarily decorative surface requirements which are in direct contact with a normal industrial environment or media such as coolants or lubricating agents

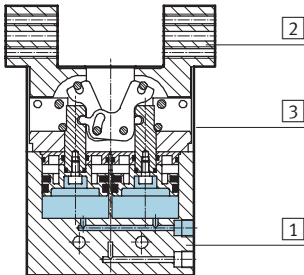
Weights [g]						
Size	6	10	16	20	25	35
HGP-...-A	18	75	194	396	725	1 369
HGP-...-G1	-	76	197	402	737	1 387
HGP-...-G2	-	76	197	402	737	1 387
With protective dust cap						
HGP-...-SSK	-	-	197	-	737	-

# Parallel grippers HGP

Technical data

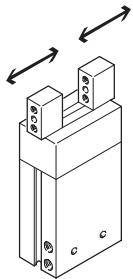
## Materials

Sectional view



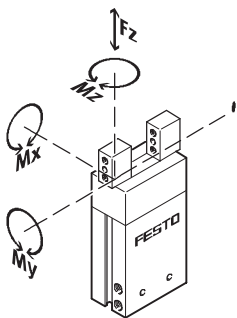
Parallel gripper	6	10	16	20	25	35
1 Body	Nickel-plated aluminium	Hard anodised aluminium				
2 Gripper jaw	Nickel-plated steel	High-alloy steel				
3 Cover cap	Polyamide					
- Protective dust cap SSK	-		Thermoplastic vulcanizate	-	Thermoplastic vulcanizate	-
- Note on materials	Copper, PTFE and silicone-free					

## Gripping force [N] at 6 bar



Size	6	10	16	20	25	35
Gripping force per gripper jaw						
Opening	10	22	70	120	185	375
Closing	10	17	80	115	170	350
Total gripping force						
Opening	20	44	140	240	370	750
Closing	20	34	160	230	340	700

## 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 applied loads caused

by the workpiece or external gripper fingers, as well as forces which occur during movement.

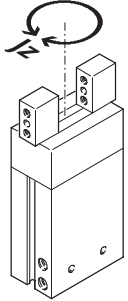
The zero co-ordinate line (gripper jaw guide) must be taken into consideration for the calculation of torques.

Size	6	10	16	20	25	35	
Max. permissible force $F_z$	[N]	14	25	90	150	240	380
Max. permissible torque $M_x$	[Nm]	0.1	0.5	3.3	6	11	25
Max. permissible torque $M_y$	[Nm]	0.1	0.5	3.3	6	11	25
Max. permissible torque $M_z$	[Nm]	0.1	0.5	3.3	6	11	25

# Parallel grippers HGP

Technical data

## Mass moment of inertia [ $\text{kgm}^2 \times 10^{-4}$ ]



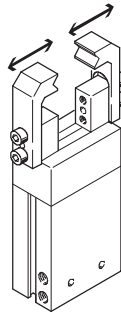
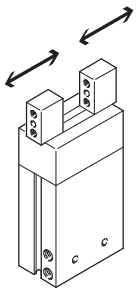
Mass moment of inertia [ $\text{kgm}^2 \times 10^{-4}$ ] for parallel grippers in relation to the central axis, without external gripper fingers, without load.

Size	6	10	16	20	25	35
HGP-...-A	0.01	0.08	0.47	1.49	3.83	12.70
HGP-...-G1	–	0.08	0.47	1.52	3.92	12.83
HGP-...-G2	–	0.08	0.47	1.49	3.84	12.73

## 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 external gripper fingers.

The grippers must be throttled for greater applied loads. Opening and closing times must then be adjusted accordingly.

Size		6	10	16	20	25	35
<b>Without external gripper fingers</b>							
HGP-...-A	Opening	5	22	44	32	47	77
	Closing	5	31	60	44	50	77
HGP-...-G1	Opening	–	17	39	30	39	71
	Closing	–	29	62	48	60	82
HGP-...-G2	Opening	–	33	66	39	62	90
	Closing	–	29	44	42	49	72
<b>With external gripper fingers (as a function of applied load)</b>							
HGP	0.06 N	5	–	–	–	–	–
	0.08 N	10	–	–	–	–	–
	0.10 N	20	–	–	–	–	–
	0.20 N	50	–	–	–	–	–
	0.50 N	–	100	–	–	–	–
	1.00 N	–	200	100	–	–	–
	1.25 N	–	–	–	100	–	–
	1.50 N	–	300	200	–	100	–
	1.75 N	–	–	–	200	–	–
	2.00 N	–	–	300	–	200	100
2.50 N	–	–	–	300	–	–	
3.00 N	–	–	–	–	300	200	
4.00 N	–	–	–	–	–	300	

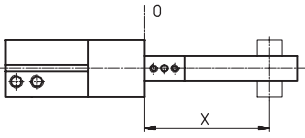


# Parallel grippers HGP

Technical data

## Gripping force $F_{Grip}$ per gripper jaw as a function of operating pressure and lever arm $x$

External and internal gripping (closing and opening)

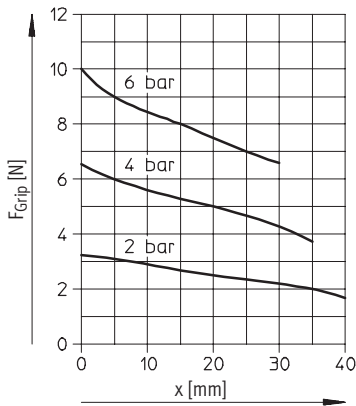


Gripping forces can be determined with the following diagrams for the various sizes in relation to operating

pressure and lever arm (distance from the zero co-ordinate line shown

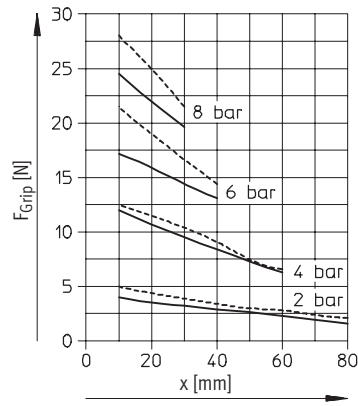
opposite to the pressure point at which the fingers grip the workpiece).

### HGP-06-A<sup>1)</sup>

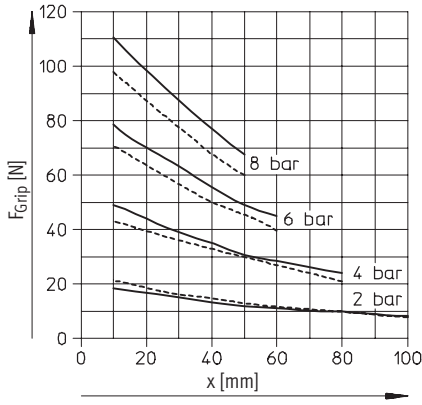


1) Due to the design, the opening and closing gripping forces for HGP-06-A are identical

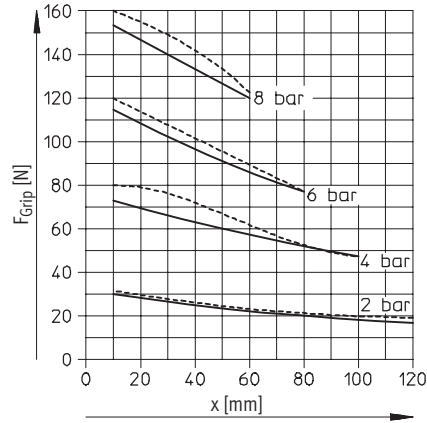
### HGP-10-A-B



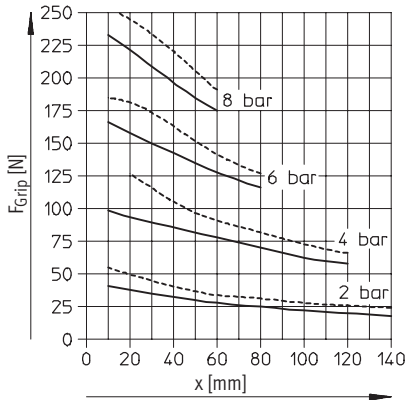
### HGP-16-A-B



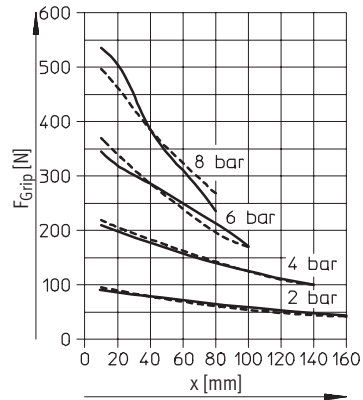
### HGP-20-A-B



### HGP-25-A-B



### HGP-35-A-B

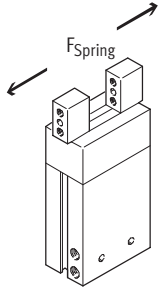


— Closing  
 - - - Opening

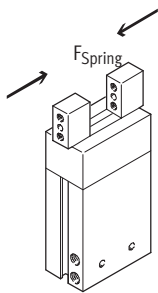
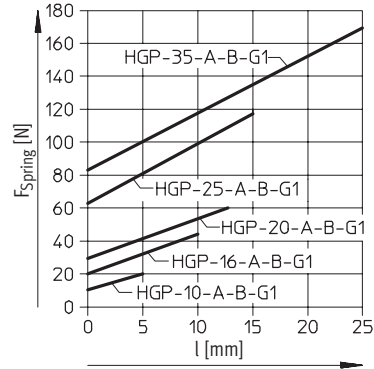
# Parallel grippers HGP

Technical data

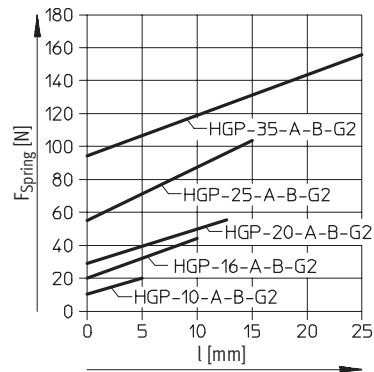
## Spring force $F_{Spring}$ as a function of the gripper size and overall stroke length $l$



Gripper retention force, opening: the spring forces  $F_{Spring}$  of the parallel gripper HGP-...-G1 can be determined from the following graphs.



Gripper retention force, closing: the spring forces  $F_{Spring}$  of the parallel gripper HGP-...-G2 can be determined from the following graphs.



## Determination of actual gripping forces for parallel grippers HGP-...-G1 and HGP-...-G2 depending upon the application

The parallel grippers with integrated spring can be used as:

- single-acting grippers
- grippers with supplementary gripping force and
- grippers with gripping force retention

In order to calculate available gripping forces  $F_{Gr}$  (per gripper jaw), the gripping force  $F_{Grip}$  and spring

force ( $F_{Spring}$ ) must be combined accordingly.

### Application

The resulting gripping force  $F_{Gr}$ , conditional on the application, depends on the gripping action (external/internal gripping) and the gripper design (with/without spring return). The spring force is supplemented in accordance with the design and gripping action.

#### Single-acting

- Gripping with spring force:  
 $F_{Gr} = F_{Spring}$
- Gripping with pressure force:  
 $F_{Gr} = F_{Grip} - F_{Spring}$

#### Supplementary gripping force

- Gripping with pressure and spring force:  
 $F_{Gr} = F_{Grip} + F_{Spring}$

#### Gripping force retention

- Gripping with spring force:  
 $F_{Gr} = F_{Spring}$

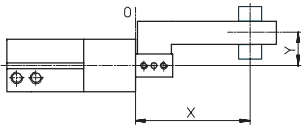
		Pressurised (in gripping action)	Unpressurised
HGP	Opening	$F_{Gr} = F_{Grip}$	$F_{Gr} = 0$
	Closing	$F_{Gr} = F_{Grip}$	$F_{Gr} = 0$
HGP-...-G1	Opening	$F_{Gr} = F_{Grip} + F_{Spring}$	$F_{Gr} = F_{Spring}$
	Closing	$F_{Gr} = F_{Grip} - F_{Spring}$	$F_{Gr} = 0$
HGP-...-G2	Opening	$F_{Gr} = F_{Grip} - F_{Spring}$	$F_{Gr} = 0$
	Closing	$F_{Gr} = F_{Grip} + F_{Spring}$	$F_{Gr} = F_{Spring}$

# Parallel grippers HGP

Technical data

## Gripping force $F_{Grip}$ per gripper jaw at 6 bar as a function of lever arm $x$ and eccentricity $y$

External and internal gripping (closing and opening)



Gripping forces can be determined with the following diagrams for the various sizes at 6 bar in relation to

eccentric application of force (distance from the zero co-ordinate line shown opposite to the pressure point at

which the fingers grip the workpiece) and the maximum permissible off-centre point at which force is applied.

### Calculation example

Given:

HGP-16-A-B

Lever arm  $x = 20$  mm

Eccentricity  $y = 22$  mm

To be found:

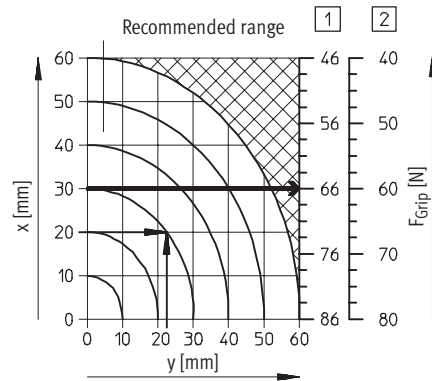
Gripping force at 6 bar

Procedure:

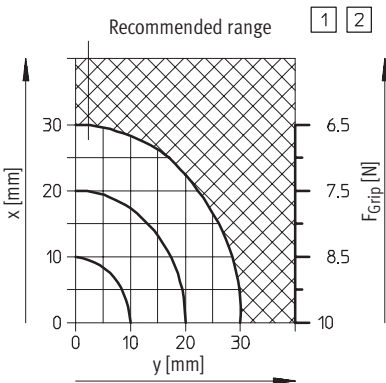
- Determine the intersection  $xy$  between lever arm  $x$  and eccentricity  $y$  in the graph for HGP-16-A-B
- Draw an arc (with centre at origin) through intersection  $xy$
- Determine the intersection between the arc and the X axis
- Read the gripping force

Result:

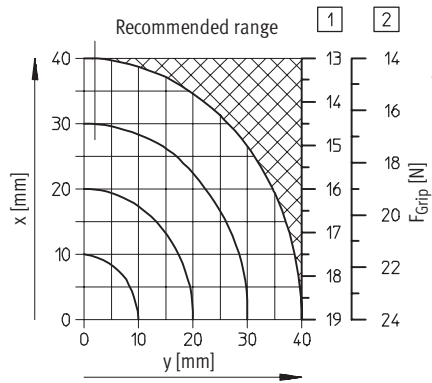
Gripping force = approx. 66 N



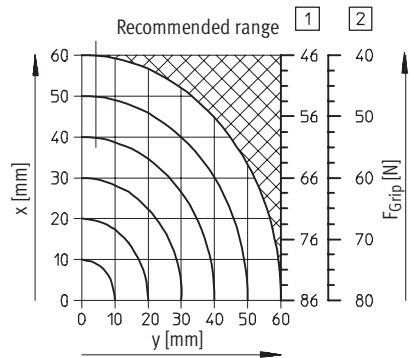
HGP-06-A



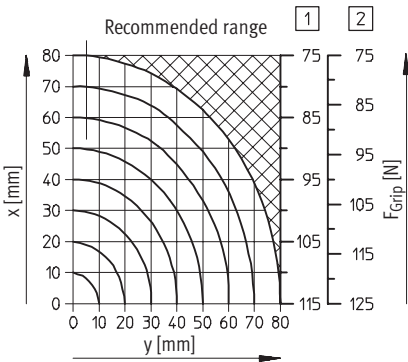
HGP-10-A-B



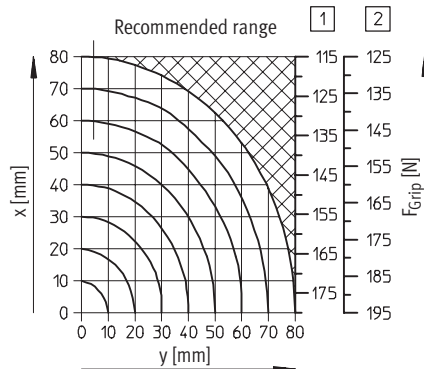
HGP-16-A-B



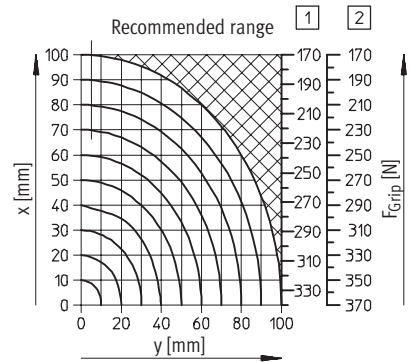
HGP-20-A



HGP-25-A-B



HGP-35-A-B



- 1 Closing
- 2 Opening

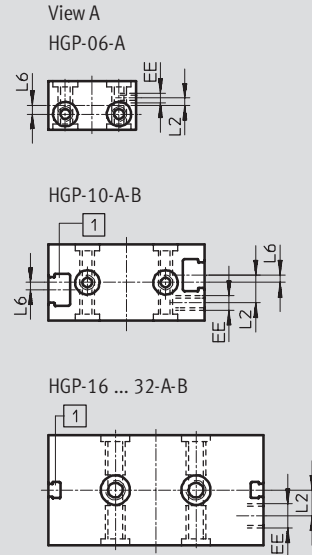
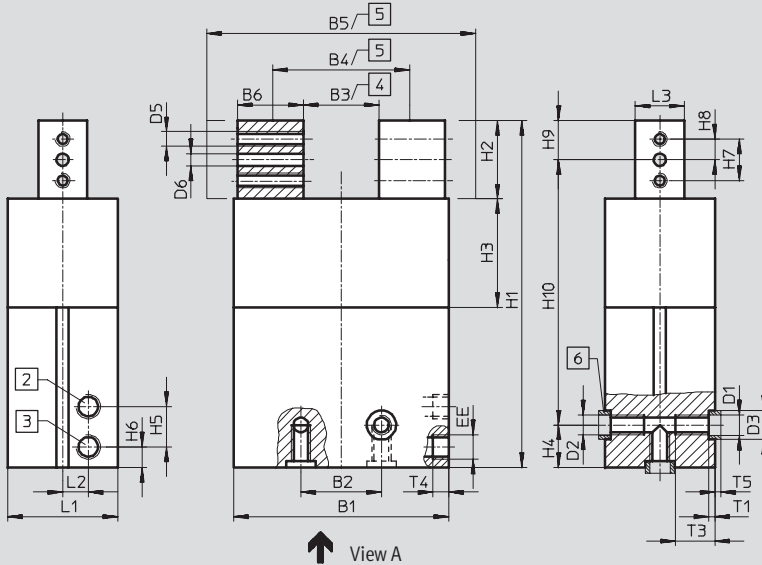
# Parallel grippers HGP

Technical data



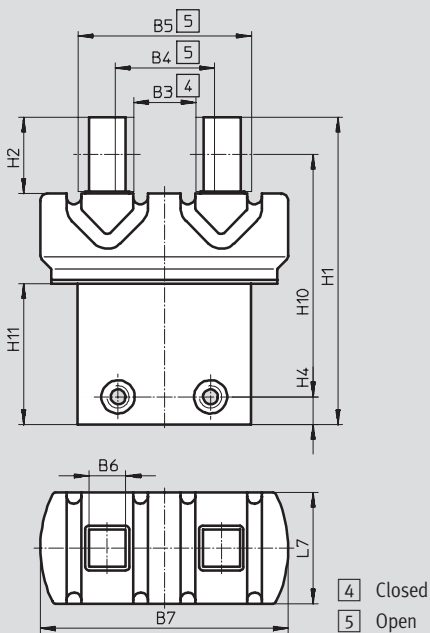
## Dimensions

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



- |   |  |
|---|--|
| <p><b>1</b> Sensor slot for proximity sensor SME/SMT-8 (not with HGP-06-A). Proximity sensors SME/SMT-10 can also be used in combination with the sensor strip HGP-SL... (can be glued into place).</p> | <p><b>2</b> Compressed air connection, opening</p> <p><b>3</b> Compressed air connection, closing</p> <p><b>4</b> Closed</p> <p><b>5</b> Open</p> <p><b>6</b> Centring sleeves ZBH (2 included in scope of delivery)</p> |
|---|--|

## With protective dust cap HGP-...-SSK



# Parallel grippers HGP


Technical data

FESTO

Type	B1	B2 <sup>1)</sup>	B3	B4	B5	B6	B7	D1	D2	D3	D5	D6	EE	H1	H2	H3	H4 <sup>2)</sup>
		±0.1	±0.5	±0.5	±0.5	-0.03	±0.5	∅		∅		∅					±0.1
								H8/h7		H8							
HGP-06-A	18	11	6	10	21	5.5	-	3.2	M3	5	M2	1.5	M3	45.5	9.9	10.2	7.5
HGP-10-A-B	32	16	15.8	21.8	35.8	7	-	3.2	M3	5	M3	2	M3	66	15	16	7.5
HGP-16-A-B	47	25	17.8	27.8	53.8	13	-	5.3	M4	7	M4	3	M3	80	20	21.9	7.5
HGP-20-A-B	55.6	25	17.4	30.4	65.4	17.5	-	5.3	M4	7	M4	4	M5	101	24.9	26.1	7.5
HGP-25-A-B	68.2	29	21	36	80	22	-	6.4	M6	9	M5	4	G1/8	121	30	32.2	17.5
HGP-35-A-B	88	33	31	56	110	27	-	8.4	M8	12	M6	5	G1/8	142	31.9	44.8	17.5
With protective dust cap																	
HGP-16-A-B-SSK	47	25	16.4	26.4	46.4	10	67	5.3	M4	7	M4	3	M3	83	20.5	21.9	7.5
HGP-25-A-B-SSK	68.2	29	21	36	66	15	101	6.4	M6	9	M5	4	G1/8	126.8	31.5	32.2	17.5

Type	H5	H6	H7	H8	H9	H10	H11	L1	L2	L3	L6	L7	T1	T3	T4	T5
						±0.2				-0.03			+0.1	+1	+0.5	-0.3
HGP-06-A	7	4	5.8	2.9	5	33	-	10	1.5	5	1.8	-	1.2	-	3.5	1.2
HGP-10-A-B	7	4	8	4	7.5	51	-	15.5	4.2	7	1.5	-	1.2	6	3.5	1.2
HGP-16-A-B	7	4	11	5.5	10	62.5	-	22	5.7	10	-	-	1.6	7.5	3.5	1.4
HGP-20-A-B	10.5	11.5	14	7	12.5	81	-	30	9	12	-	-	1.6	8	6	1.4
HGP-25-A-B	16.5	8.3	16	8	15	88.5	-	37	10.5	15	-	-	2.1	15	6.5	1.9
HGP-35-A-B	16.5	8.5	17	8.5	16	108.5	-	45	10.5	20	-	-	2.6	16	6.5	2.4
With protective dust cap																
HGP-16-A-B-SSK	7	4	11	5.5	10	65.5	38.1	22	5.7	10	-	30	1.6	7.5	3.5	1.4
HGP-25-A-B-SSK	16.5	8.3	16	8	15	94.3	58.8	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

 - Note

Due to the distance H5 between the two air connections on types HGP-06/-10/-16 which measures 7 mm, only the following tube fittings can be used

- QSM-M3-3
- QSML-M3-3
- QSMML-M3-3
- CN-M3-PK-3
- LCN-M3-PK-3
- ➔ [www.festo.com](http://www.festo.com)

# Parallel grippers HGP

Technical data



Ordering data						
Size [mm]	Double-acting Without compression spring		Gripper retention force G1 Open		Gripper retention force G2 Closed	
	Part No.	Type	Part No.	Type	Part No.	Type
6	174 815	HGP-06-A	–		–	
10	197 542	HGP-10-A-B	197 543	HGP-10-A-B-G1	197 544	HGP-10-A-B-G2
16	197 545	HGP-16-A-B	197 546	HGP-16-A-B-G1	197 547	HGP-16-A-B-G2
20	525 889	HGP-20-A-B	525 890	HGP-20-A-B-G1	525 891	HGP-20-A-B-G2
25	197 548	HGP-25-A-B	197 549	HGP-25-A-B-G1	197 550	HGP-25-A-B-G2
35	197 551	HGP-35-A-B	197 552	HGP-35-A-B-G1	197 553	HGP-35-A-B-G2
With protective dust cap						
16	539 636	HGP-16-A-B-SSK	–		–	
25	539 635	HGP-25-A-B-SSK	–		–	

Ordering data – Wearing parts kits		
Size [mm]	Part No.	Type
6	378 516	HGP-06-A
10	397 376	HGP-10
16	397 377	HGP-16
20	397 378	HGP-20
25	397 397	HGP-25
32	397 380	HGP-35

# Parallel grippers HGP

Accessories

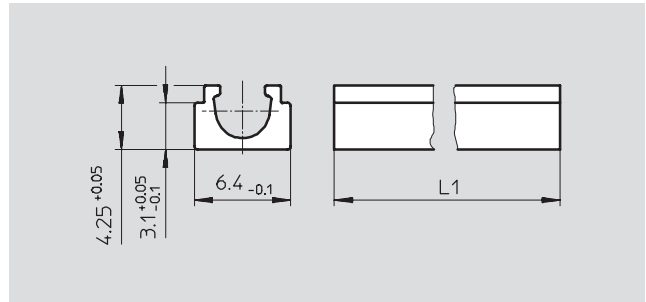


## Sensor rail HGP-SL

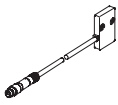


can be glued into place

Material:

Wrought aluminium alloy



Dimensions and ordering data				
For size [mm]	L1	Weight [g]	Part No.	Type
10	35	1.4	535 582	HGP-SL-10-10
16	38	1.5	535 583	HGP-SL-10-16
20	50	2.0	535 584	HGP-SL-10-20
25	58	2.3	535 585	HGP-SL-10-25
35	65	2.6	535 586	HGP-SL-10-35




Ordering data					
Type	For size	Weight [g]	Part No.	Type	PU <sup>1)</sup>
Position sensor SMH-S1 <span style="float: right;">Technical data → <a href="http://www.festo.com">www.festo.com</a></span>					
	6	20	175 710	SMH-S1-HGP06	1
Evaluation unit SMH-AE1 <span style="float: right;">Technical data → <a href="http://www.festo.com">www.festo.com</a></span>					
	6	170	175 708	SMH-AE1-PS3-M12	1
			175 709	SMH-AE1-NS3-M12	
Centring sleeve ZBH <span style="float: right;">Technical data → <a href="http://www.festo.com">www.festo.com</a></span>					
	6, 10	1	189 652	ZBH-5	10
	16, 20		186 717	ZBH-7	
	25		150 927	ZBH-9	
	35		189 653	ZBH-12	




1) Packaging unit quantity





# Parallel grippers HGP

Accessories

FESTO

Ordering data – Proximity sensors for T-slot, magneto-resistive							Technical data → <a href="http://www.festo.com">www.festo.com</a>	
	Assembly	Switch output	Electrical connection			Cable length [m]	Part No.	Type
			Cable	M8 plug	M12 plug			
<b>N/O contact</b>								
	Insertable from above	PNP	3-wire	–	–	2.5	525 898	SMT-8F-PS-24V-K2,5-OE
		NPN		–	–		525 909	SMT-8F-NS-24V-K2,5-OE
		–	2-wire	–	–	2.5	525 908	SMT-8F-ZS-24V-K2,5-OE
		PNP	–	3-pin	–	0.3	525 899	SMT-8F-PS-24V-K0,3-M8D
		NPN	–		525 910		SMT-8F-NS-24V-K0,3-M8D	
		PNP	–	–	3-pin	0.3	525 900	SMT-8F-PS-24V-K0,3-M12
	Insertable from end, flush with the cylinder profile	PNP	3-wire	–	–	2.5	175 436	SMT-8-PS-K-LED-24-B
			–	3-pin	–		0.3	175 484
<b>N/C contact</b>								
	Insertable from above	PNP	3-wire	–	–	7.5	525 911	SMT-8F-PO-24V-K7,5-OE

Ordering data – Proximity sensors for T-slot, magnetic reed						Technical data → <a href="http://www.festo.com">www.festo.com</a>		
	Assembly	Electrical connection		Cable length [m]	Part No.	Type		
		Cable	M8 plug					
<b>N/O contact</b>								
	Insertable from above	3-wire		–	2.5	525 895	SME-8F-DS-24V-K2,5-OE	
		2-wire		–		5.0	525 897	SME-8F-DS-24V-K5,0-OE
		–		3-pin	–	2.5	525 907	SME-8F-ZS-24V-K2,5-OE
		–			–	0.3	525 896	SME-8F-DS-24V-K0,3-M8D
	Insertable from end, flush with the cylinder profile	3-wire		–	2.5	150 855	SME-8-K-LED-24	
		–		3-pin		0.3	150 857	SME-8-S-LED-24
		–		–	–	–	–	–
<b>N/C contact</b>								
	Insertable from end, flush with the cylinder profile	3-wire		–	7.5	160 251	SME-8-O-K-LED-24	



Ordering data – Plug sockets with cable						Technical data → <a href="http://www.festo.com">www.festo.com</a>	
	Assembly	Switch output		Connection	Cable length [m]	Part No.	Type
		PNP	NPN				
<b>Straight plug socket</b>							
	M8 union nut	■	■	3-pin	2.5	159 420	SIM-M8-3GD-2,5-PU
		■	■		5	159 421	SIM-M8-3GD-5-PU
	M12 union nut	■	■	3-pin	2.5	159 428	SIM-M12-3GD-2,5-PU
		■	■		5	159 429	SIM-M12-3GD-5-PU
<b>Angled plug socket</b>							
	M8 union nut	■	■	3-pin	2.5	159 422	SIM-M8-3WD-2,5-PU
		■	■		5	159 423	SIM-M8-3WD-5-PU
	M12 union nut	■	■	3-pin	2.5	159 430	SIM-M12-3WD-2,5-PU
		■	■		5	159 431	SIM-M12-3WD-5-PU







# Parallel grippers HGP

Accessories

**FESTO**

Ordering data – Proximity sensors for C-slot, magneto-resistive							Technical data → <a href="http://www.festo.com">www.festo.com</a>	
	Assembly	Switch output	Electrical connection		Cable length [m]	Connection direction	Part No.	Type
			Cable	M8 plug				
N/O contact								
	Insertable from above	PNP	3-wire	–	2.5	In-line	525 915	SMT-10F-PS-24V-K2,5L-OE
			–	3-pin	0.3	In-line	525 916	SMT-10F-PS-24V-K0,3L-M8D
			–	3-pin	0.3	Lateral	526 675	SMT-10F-PS-24V-K0,3Q-M8D
	Insertable from end	PNP	–	3-pin	0.3	In-line	173 220	SMT-10-PS-SL-LED-24
			3-wire	–	2.5		173 218	SMT-10-PS-KL-LED-24

Ordering data – Proximity sensors for C-slot, magnetic reed							Technical data → <a href="http://www.festo.com">www.festo.com</a>	
	Assembly	Electrical connection		Cable length [m]	Connection direction	Part No.	Type	
		Cable	M8 plug					
N/O contact								
	Insertable from above	–	3-pin	0.3	In-line	525 914	SME-10F-DS-24V-K0,3L-M8D	
		3-wire	–	2.5	In-line	525 913	SME-10F-DS-24V-K2,5L-OE	
		2-wire	–	2.5		526 672	SME-10F-ZS-24V-K2,5L-OE	
	Insertable from end	–	3-pin	0.3	In-line	173 212	SME-10-SL-LED-24	
		3-wire	–	2.5		173 210	SME-10-KL-LED-24	

Ordering data – Plug sockets with cable							Technical data → <a href="http://www.festo.com">www.festo.com</a>	
	Assembly	Switch output		Connection	Cable length [m]	Part No.	Type	
		PNP	NPN					
Straight plug socket								
	M8 union nut	■	■	3-pin	2.5	159 420	SIM-M8-3GD-2,5-PU	
		■	■		5	159 421	SIM-M8-3GD-5-PU	
Angled plug socket								
	M8 union nut	■	■	3-pin	2.5	159 422	SIM-M8-3WD-2,5-PU	
		■	■		5	159 423	SIM-M8-3WD-5-PU	

# Three-point grippers HGD

Key features



## At a glance

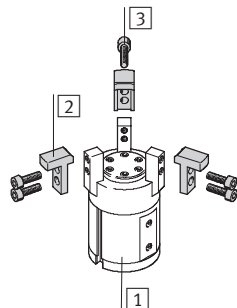
- Double-acting piston drive
- Self-centring
- Variable gripping action:
  - External/internal gripping
- Versatility thanks to externally adaptable gripper fingers
- Wide range of options for mounting on drive units
- Maximum precision
- High holding force
- Sensor technology:
  - Adaptable proximity sensors on the small grippers
  - Integral proximity sensors for medium and large grippers




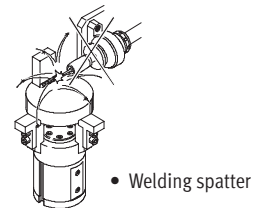
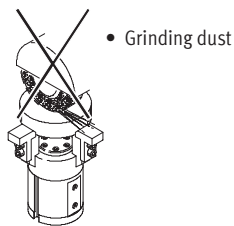
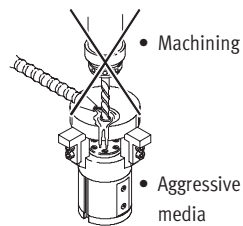
Gripper selection software  
[www.festo.com/en/engineering](http://www.festo.com/en/engineering)

## Mounting options for external gripper fingers (customer-specific)

- 1 Three-point gripper
- 2 External gripper fingers
- 3 Mounting screws



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

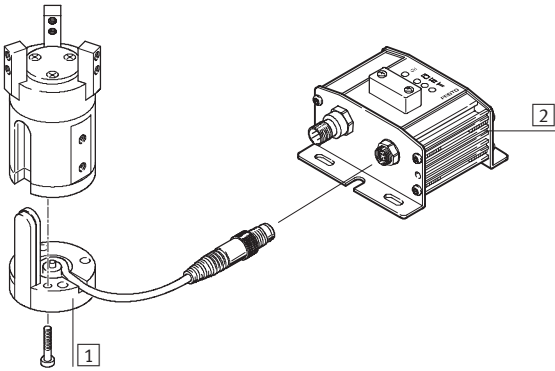


# Three-point grippers HGD

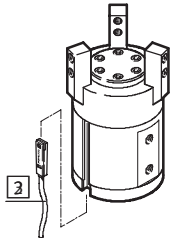
Peripherals overview and type codes

## Peripherals overview

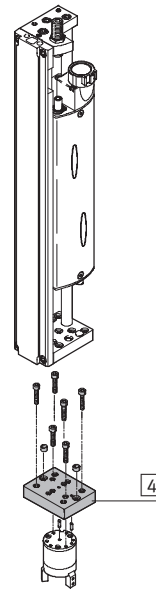
HGD-16



HGD-32/-50



## System product for handling and assembly technology



Accessories			
Type	Brief description	→ Page	
1	Position sensor SMH-S1 Adaptable and integratable sensor technology, for sensing the piston position	34	
2	Evaluation unit SMH-AE1 For position sensor SMH-S1	34	
3	Proximity sensor SME/SMT-8 For sensing the piston position	34	
4	– Drive/gripper connections	www.festo.com	

## Type codes

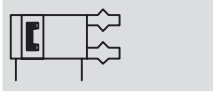
HGD	–	16	–	A
<b>Type</b>				
HGD	Three-point gripper			
<b>Size</b>				
<b>Position sensing</b>				
A	For proximity sensing			

# Three-point grippers HGD

Technical data

FESTO

Function  
Double-acting



[www.festo.com/en/  
Spare\\_parts\\_service](http://www.festo.com/en/Spare_parts_service)

Wearing parts kits  
→ 33



∅ - Size  
16 ... 50 mm

— - Stroke  
5 ... 12 mm

General technical data				
Size	16	32	50	
Design	Lever mechanism			
Mode of operation	Double-acting			
Gripper function	3-point			
Number of gripper jaws	3			
Max. applied load per external gripper finger <sup>1)</sup>	[N]	0.08	0.3	0.75
Stroke	per gripper jaw [mm]	2.5	3.9	6
	smallest gripping ∅ <sup>2)</sup> [mm]	23	33.2	50
	largest gripping ∅ <sup>2)</sup> [mm]	28	41	62
Pneumatic connection	M3	M5	G1/8	
Repetition accuracy <sup>3)</sup>	[mm]	≤ 0.04		
Max. interchangeability	[mm]	0.2		
Max. operating frequency	[Hz]	4		
Position sensing	For proximity sensing			
Type of mounting	With female thread and locating hole			

- 1) Valid for unthrottled operation
- 2) Without external gripper fingers
- 3) Concentric to the central shaft

Operating and environmental conditions	
Min. operating pressure [bar]	2
Max. operating pressure [bar]	8
Operating medium	Filtered compressed air, lubricated or unlubricated
Ambient temperature [°C]	+5 ... +60
Corrosion resistance class CRC <sup>1)</sup>	2

- 1) Corrosion resistance class 2 according to Festo standard 940 070  
Components requiring moderate corrosion resistance. Externally visible parts with primarily decorative surface requirements which are in direct contact with a normal industrial environment or media such as coolants or lubricating agents

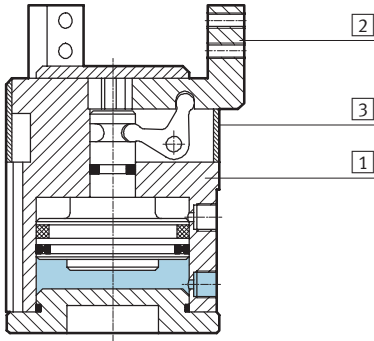
Weights [g]			
Size	16	32	50
HGD	110	300	985

# Three-point grippers HGD

Technical data

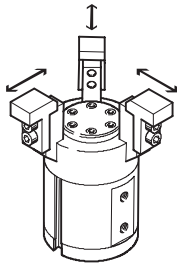
## Materials

Sectional view



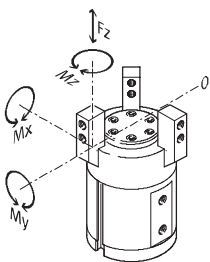
Three-point gripper		
1	Body	Nickel-plated aluminium
2	Gripper jaw	High-alloy steel, nickel plated
3	Cover cap	Polyacetate
–	Note on materials	Copper, PTFE and silicone-free

## Gripping force [N] at 6 bar



Size	16	32	50
Gripping force per gripper jaw			
Opening	40	137	323
Closing	30	120	293
Total gripping force			
Opening	120	410	970
Closing	90	360	880

## Characteristic load values at the gripper jaws



The indicated permissible forces and torques apply to a single gripper jaw. Static forces and torques relate to additional applied loads caused by

the workpiece or external gripper fingers, as well as forces which occur during handling. The zero co-ordinate

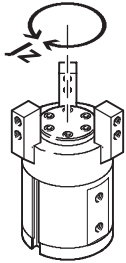
line (gripper jaws point of rotation) must be taken into consideration for the calculation of torques.

Size	16	32	50	
Max. permissible force $F_z$	[N]	34	90	173
Max. permissible torque $M_x$	[Nm]	0.5	1.6	4.7
Max. permissible torque $M_y$	[Nm]	0.8	2.8	8.1
Max. permissible torque $M_z$	[Nm]	0.5	1.9	5.3

# Three-point grippers HGD

Technical data

## Mass moment of inertia [ $\text{kgm}^2 \times 10^{-4}$ ]



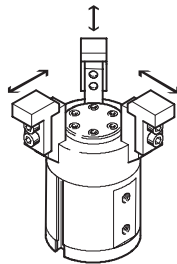
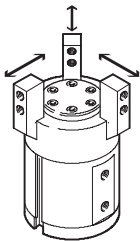
Mass moment of inertia [ $\text{kgm}^2 \times 10^{-4}$ ] for three-point grippers in relation to the central axis, without external gripper fingers, without load.

Size	16	32	50
HGD	0.14	0.79	6.10

## 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 external gripper fingers.

The grippers must be throttled for greater applied loads. Opening and closing times must then be adjusted accordingly.

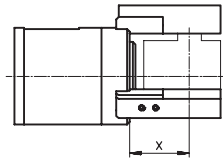
Size		16	32	50
Without external gripper fingers				
HGD	Opening	5	10	10
	Closing	5	10	10
With external gripper fingers (as a function of applied load)				
HGD	0.08 N	5	–	–
	0.11 N	10	–	–
	0.15 N	20	–	–
	0.30 N	50	–	–
	0.50 N	–	100	–
	0.75 N	–	200	–
	1.00 N	–	300	100
	1.50 N	–	–	200
	2.00 N	–	–	300

# Three-point grippers HGD

Technical data

## Gripping force F per gripper as a function of operating pressure and the lever arm x

Gripping forces

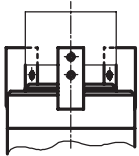


Gripping torques can be determined with the following diagrams for the various sizes in relation to operating

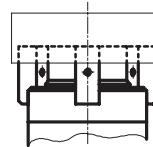
pressure and lever arm (distance from the zero co-ordinate line shown above

to the pressure point at which the external fingers grip the workpiece).

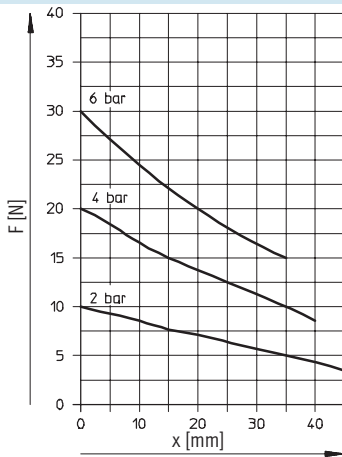
### External gripping (closing)



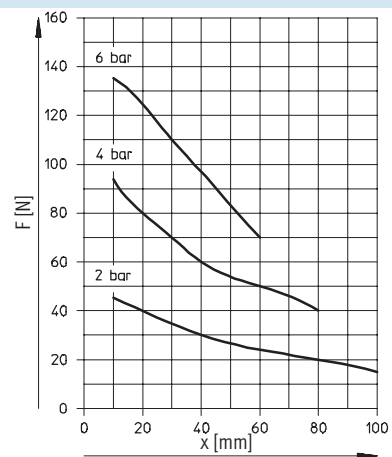
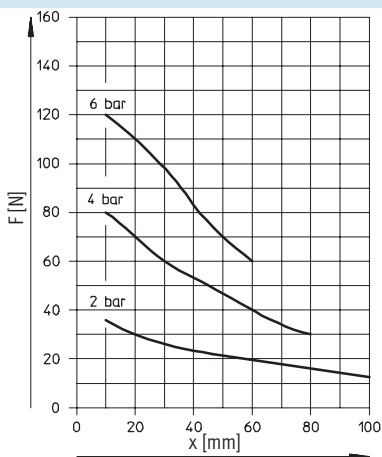
### Internal gripping (opening)



### HGD-16-A



### HGD-32-A



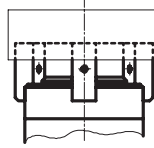
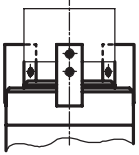
# Three-point grippers HGD

Technical data

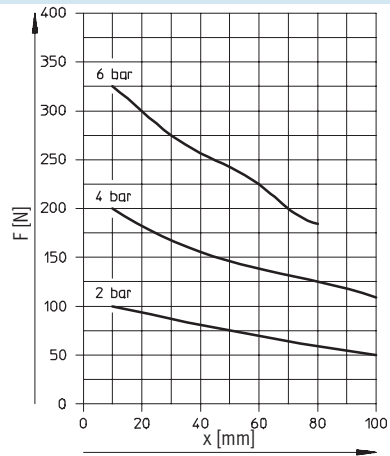
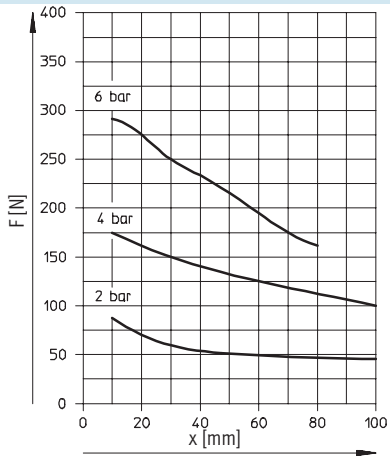
## Gripping force F per gripper as a function of operating pressure and the lever arm x

External gripping (closing)

Internal gripping (opening)



### HGD-50-A





# Three-point grippers HGD

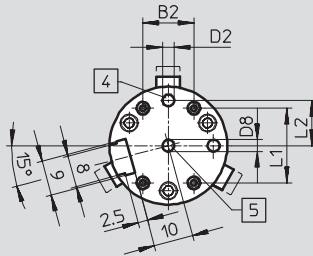
Technical data



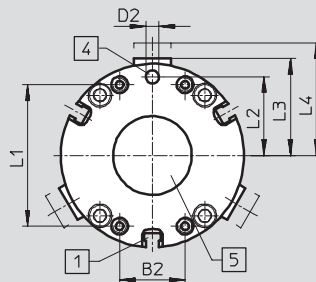
## Dimensions

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

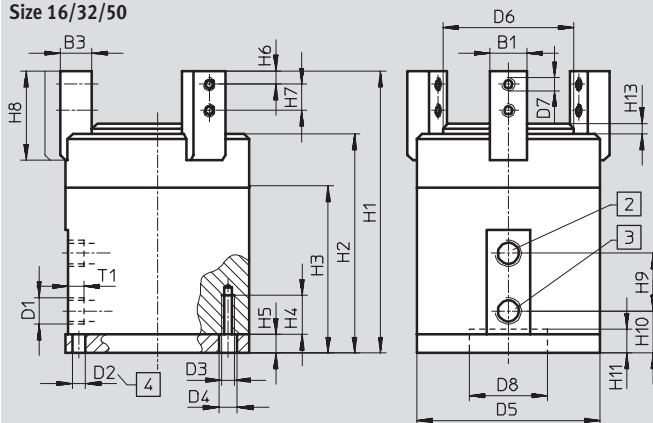
### Size 16



### Size 32/50



### Size 16/32/50



- 1 Sensor slot for proximity sensor SME/SMT-8 (not with HGD-16-A)
- 2 Compressed air connection, closing
- 3 Compressed air connection, opening
- 4 Drilled hole for locating pin (locating pins not included in scope of delivery)
- 5 Centring hole (user configured)

Size	B1	B2	B3	D1	D2	D3	D4	D5	D6	D7	D8	H1	H2
[mm]	-0.02		-0.02/-0.05		∅ H8		∅	∅	∅		∅		
16	6	13	7	M3	3	M3	3.2	30	21	M3	3 H7	60	46
32	10	13	8	M5	4	M3	3.7	45	32.4	M3	20+0.02/+0.05	78	62
50	14	25	12	G½	5	M5	6	70	49.4	M5	30+0.02/+0.05	107.5	83.5

Size	H3	H4	H5	H6	H7	H8	H9	H10	H11	H13	L1	L2	L3	L4	T1
[mm]		+1										±0.02			-0.5
16	32.6	8	4.5	3	6	21	12	11	4.5	2	19	11.5	17.5	20	4
32	44	10	6.5	3.5	6.5	22.5	16	11.8	8	3	36	19	24.6	28.5	4
50	56	16	7	5	10	34	22	16	9	4	54	30	37	43	6

## Ordering data

Size	Double-acting	
[mm]	Part No.	Type
16	174 819	HGD-16-A
32	161 837	HGD-32-A
50	161 838	HGD-50-A

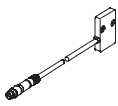

## Ordering data – Wearing parts kits

Size	Wearing parts kits	
[mm]	Part No.	Type
16	378 535	HGD-16-A
32	125 694	HGD-32-A
50	125 695	HGD-50-A




# Three-point grippers HGD




Accessories

**FESTO**

Ordering data						
Type	For size	Weight [g]	Part No.	Type	PU <sup>1)</sup>	
Position sensor SMH-S1			Technical data → <a href="http://www.festo.com">www.festo.com</a>			
	16	30	175 713	SMH-S1-HGD16	1	
Evaluation unit SMH-AE1			Technical data → <a href="http://www.festo.com">www.festo.com</a>			
	16	170	175 708	SMH-AE1-PS3-M12	1	
			175 709	SMH-AE1-NS3-M12		

1) Packaging unit quantity





Ordering data – Proximity sensors for T-slot, magneto-resistive							Technical data → <a href="http://www.festo.com">www.festo.com</a>	
	Assembly	Switch output	Electrical connection			Cable length [m]	Part No.	Type
			Cable	M8 plug	M12 plug			
N/O contact								
	Insertable from above	PNP	3-wire	–	–	2.5	525 898	SMT-8F-PS-24V-K2,5-OE
		NPN					525 909	SMT-8F-NS-24V-K2,5-OE
		–	2-wire	–	–	2.5	525 908	SMT-8F-ZS-24V-K2,5-OE
		PNP	–	3-pin	–	0.3	525 899	SMT-8F-PS-24V-K0,3-M8D
		NPN					525 910	SMT-8F-NS-24V-K0,3-M8D
	PNP	–	–	3-pin	0.3	525 900	SMT-8F-PS-24V-K0,3-M12	
	Insertable from end, flush with the cylinder profile	PNP	3-wire	–	–	2.5	175 436	SMT-8-PS-K-LED-24-B
		–	3-pin	–	0.3	175 484	SMT-8-PS-S-LED-24-B	
N/C contact								
	Insertable from above	PNP	3-wire	–	–	7.5	525 911	SMT-8F-PO-24V-K7,5-OE

Ordering data – Proximity sensors for T-slot, magnetic reed							Technical data → <a href="http://www.festo.com">www.festo.com</a>	
	Assembly	Electrical connection		Cable length [m]	Part No.	Type		
		Cable	M8 plug					
N/O contact								
	Insertable from above	3-wire	–	2.5	525 895	SME-8F-DS-24V-K2,5-OE		
				5.0	525 897	SME-8F-DS-24V-K5,0-OE		
		2-wire	–	2.5	525 907	SME-8F-ZS-24V-K2,5-OE		
		–	3-pin	0.3	525 896	SME-8F-DS-24V-K0,3-M8D		
	Insertable from end, flush with the cylinder profile	3-wire	–	2.5	150 855	SME-8-K-LED-24		
		–	3-pin	0.3	150 857	SME-8-S-LED-24		
N/C contact								
	Insertable from end, flush with the cylinder profile	3-wire	–	7.5	160 251	SME-8-O-K-LED-24		

# Three-point grippers HGD

Accessories



Ordering data – Plug sockets with cable						Technical data → <a href="http://www.festo.com">www.festo.com</a>	
	Assembly	Switch output		Connection	Cable length [m]	Part No.	Type
		PNP	NPN				
<b>Straight plug socket</b>							
	M8 union nut	■	■	3-pin	2.5	159 420	SIM-M8-3GD-2,5-PU
					5	159 421	SIM-M8-3GD-5-PU
	M12 union nut	■	■	3-pin	2.5	159 428	SIM-M12-3GD-2,5-PU
					5	159 429	SIM-M12-3GD-5-PU
<b>Angled plug socket</b>							
	M8 union nut	■	■	3-pin	2.5	159 422	SIM-M8-3WD-2,5-PU
					5	159 423	SIM-M8-3WD-5-PU
	M12 union nut	■	■	3-pin	2.5	159 430	SIM-M12-3WD-2,5-PU
					5	159 431	SIM-M12-3WD-5-PU

# Radial grippers HGR

Key features



## At a glance

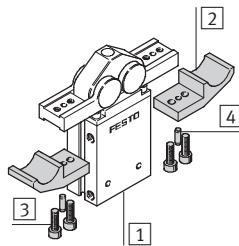
- Double-acting piston drive
- Self-centring
- Variable gripping action:
  - External/internal gripping
- Versatility thanks to externally adaptable gripper fingers
- Wide range of options for mounting on drive units
- Constant gripping torque over the entire angle range
- 180° opening angle
- Internal fixed flow control
- Sensor technology:
  - Adaptable proximity sensors on the small grippers
  - Integral proximity sensors for medium and large grippers




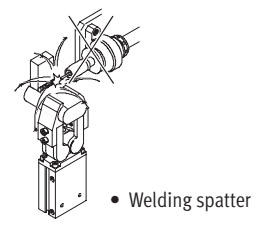
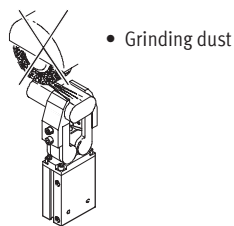
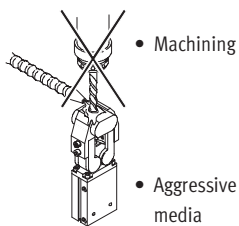
Gripper selection software  
[www.festo.com/en/engineering](http://www.festo.com/en/engineering)

## Mounting options for external gripper fingers (customer-specific)

- 1 Radial gripper
- 2 External gripper finger
- 3 Mounting screws
- 4 Centring pins



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

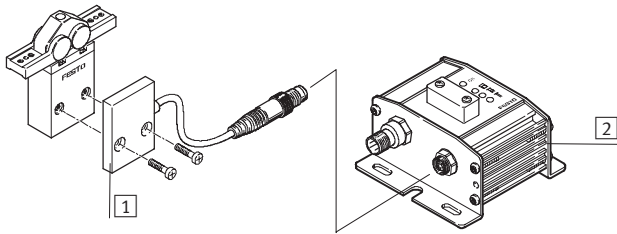


# Radial grippers HGR

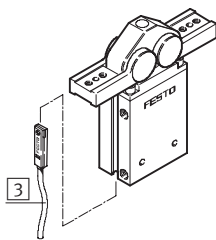
Peripherals overview and type codes

## Peripherals overview

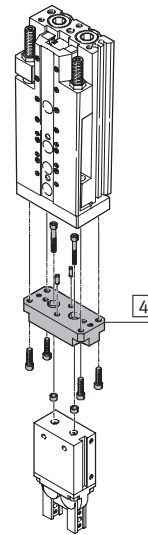
HGP-10



HGP-16 ... 40



## System product for handling and assembly technology



## Accessories

Type	Brief description	→ Page
1 Position sensor SMH-S1	Adaptable and integratable sensor technology, for sensing the piston position	45
2 Evaluation unit SMH-AE1	For position sensor SMH-S1	45
3 Proximity sensor SME/SMT-8	For sensing the piston position	45
4 –	Drive/gripper connections	www.festo.com

## Type codes

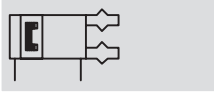
HGR		–	16	–	A
<b>Type</b>					
HGR	Radial gripper				
<b>Size</b>					
<b>Position sensing</b>					
A	For proximity sensing				

# Radial grippers HGR

Technical data

FESTO

Function  
Double-acting



[www.festo.com/en/Spare\\_parts\\_service](http://www.festo.com/en/Spare_parts_service)

Wearing parts kits  
→ 44



Size  
10 ... 40 mm

General technical data					
Size	10	16	25	32	40
Design	Rack and pinion				
Mode of operation	Double-acting				
Gripper function	Radial				
Number of gripper jaws	2				
Opening angle [°]	180				
Pneumatic connection	M3		M5	G1/8	
Repetition accuracy <sup>1)</sup> [mm]	≤ 0.1				
Max. interchangeability [mm]	0.2				
Max. operating frequency [Hz]	4				
Position sensing	For proximity sensing				
Type of mounting	With female thread and centring hole				

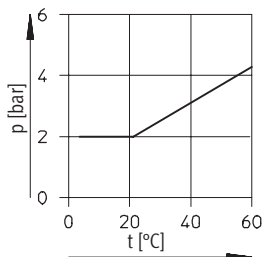
1) End position drift under constant conditions of use with 100 consecutive strokes in the direction of movement of the gripper jaws

Operating and environmental conditions		
Min. operating pressure [bar]		2
Max. operating pressure [bar]		8
Operating medium	Filtered compressed air, lubricated or unlubricated	
Ambient temperature [°C]	+5 ... +60	
Corrosion resistance class CRC <sup>1)</sup>	2	

1) Corrosion resistance class 2 according to Festo standard 940 070  
Components requiring moderate corrosion resistance. Externally visible parts with primarily decorative surface requirements which are in direct contact with a normal industrial environment or media such as coolants or lubricating agents

## Min. operating pressure p as a function of temperature range t

The required minimum operating pressure may vary depending on the temperature range of the device



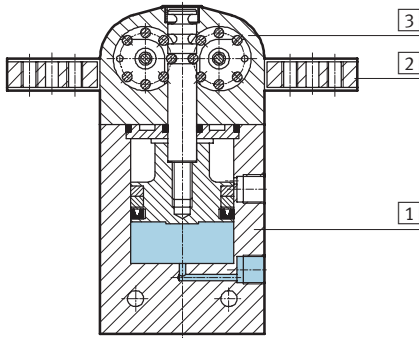
Weights [g]					
Size	10	16	25	32	40
HGR	39	110	250	420	710

# Radial grippers HGR

Technical data

## Materials

Sectional view

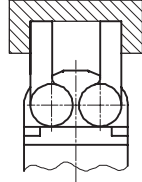
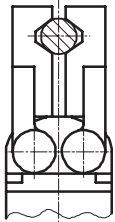


Radial gripper		
1	Body	Hard anodised aluminium
2	Gripper jaw	Hard anodised aluminium
3	Cover cap	Polyacetate
–	Note on materials	Copper, PTFE and silicone-free

## Total gripping torque [Ncm] at 6 bar, with external gripper fingers

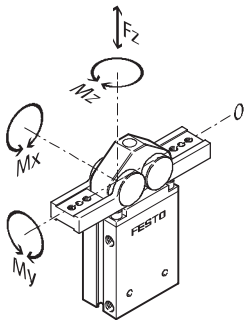
External gripping

Internal gripping



Size	10	16	25	32	40
Total gripping torque					
Opening	15	56	195	360	600
Closing	13	50	160	300	500

## Characteristic load values at the gripper jaws



The indicated permissible forces and torques apply to a single gripper jaw. Static forces and torques relate to additional applied loads caused by

the workpiece or external gripper fingers, as well as forces which occur during handling. The zero co-ordinate

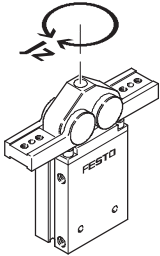
line (gripper jaws point of rotation) must be taken into consideration for the calculation of torques.

Size	10	16	25	32	40
Max. permissible force $F_z$	[N] 14	25	39	55	83
Max. permissible torque $M_x$	[Nm] 0.1	0.3	0.6	1	1.9
Max. permissible torque $M_y$	[Nm] 0.5	1.5	3	4.7	9.9
Max. permissible torque $M_z$	[Nm] 0.4	1	2	3.2	6.7

# Radial grippers HGR

Technical data

## Mass moment of inertia [kgm<sup>2</sup>x10<sup>-4</sup>]



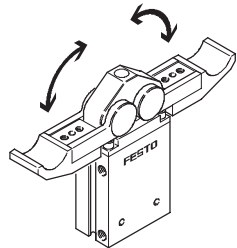
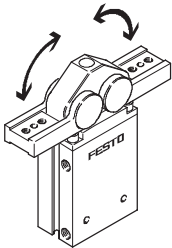
Mass moment of inertia [kgm<sup>2</sup>x10<sup>-4</sup>] for radial grippers in relation to the central axis, without external gripper fingers, without load.

Size	10	16	25	32	40
HGR	0.03	0.14	0.62	1.45	3.58

## 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 external gripper fingers.

The grippers must be throttled for greater applied loads. Opening and closing times must then be adjusted accordingly.

Size		10	16	25	32	40
Without external gripper fingers						
HGR	Opening	5	40	95	85	105
	Closing	5	45	80	75	100
With external gripper fingers → 41						

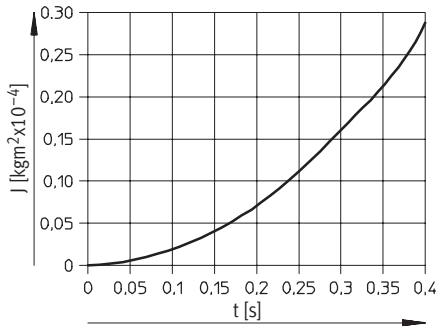


# Radial grippers HGR

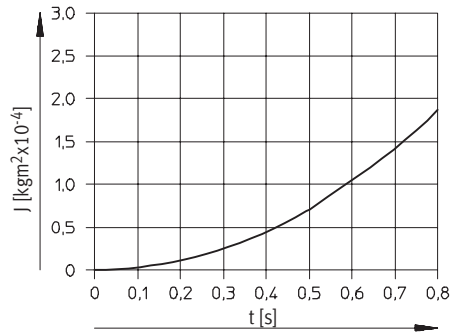
Technical data

## Opening and closing times $t$ as a function of gripper finger mass moment of inertia $J$

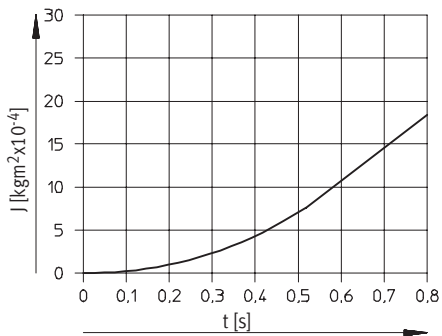
HGR-10-A



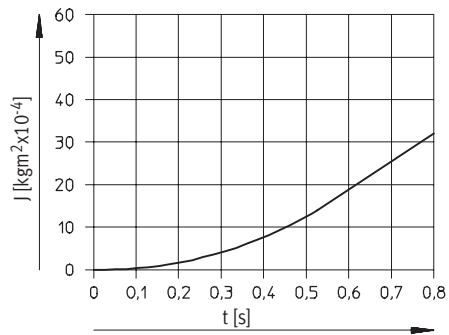
HGR-16-A



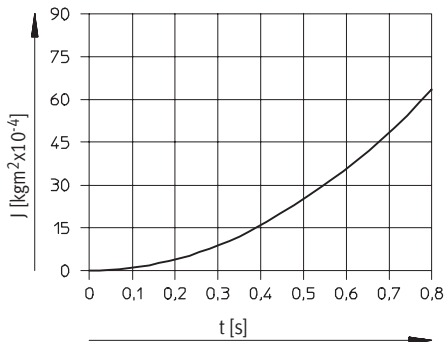
HGR-25-A



HGR-32-A



HGR-40-A



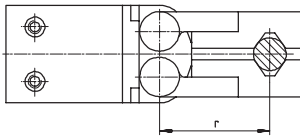
# Radial grippers HGR

Technical data



## Gripping force $F$ per gripper as a function of operating pressure and the lever arm $r$

Gripping forces

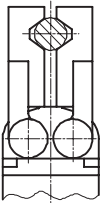


Gripping forces can be determined with the following diagrams for the various sizes in relation to operating

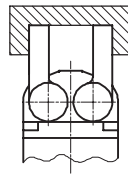
pressure and lever arm (distance from the zero co-ordinate line shown oppo-

site to the pressure point at which the external fingers grip the workpiece).

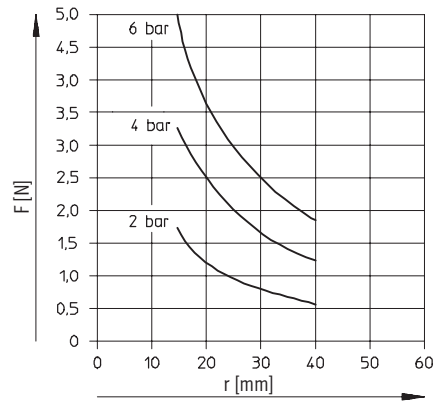
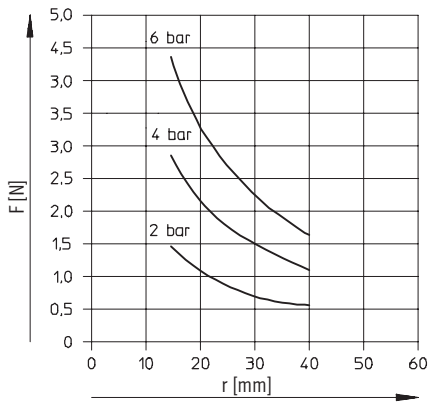
### External gripping (closing)



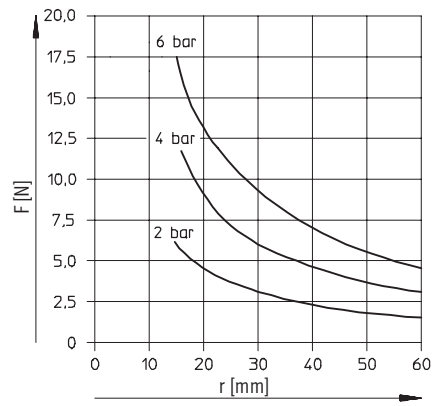
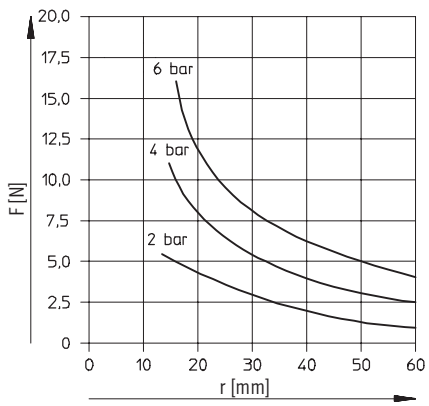
### Internal gripping (opening)



### HGR-10-A



### HGR-16-A



# Radial grippers HGR

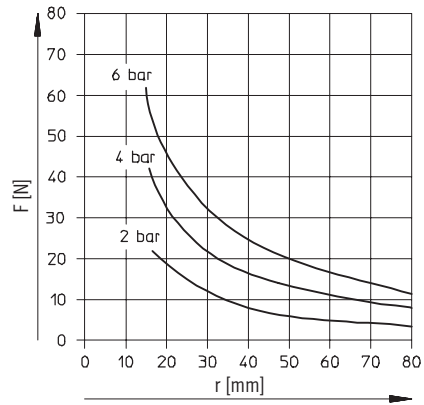
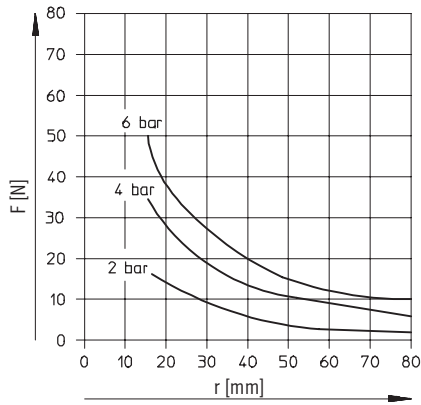
Technical data

## Gripping force F per gripper as a function of operating pressure and the lever arm r

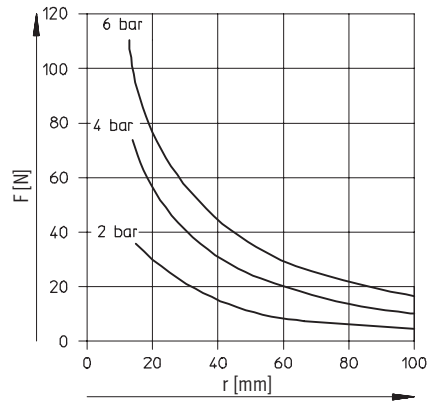
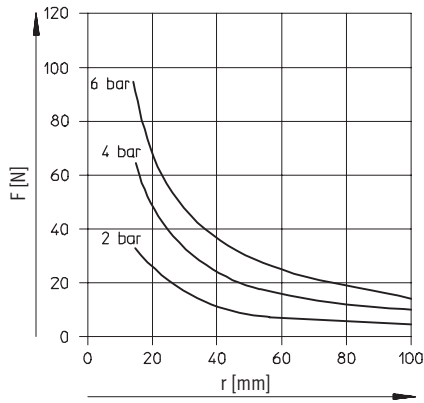
External gripping (closing)

Internal gripping (opening)

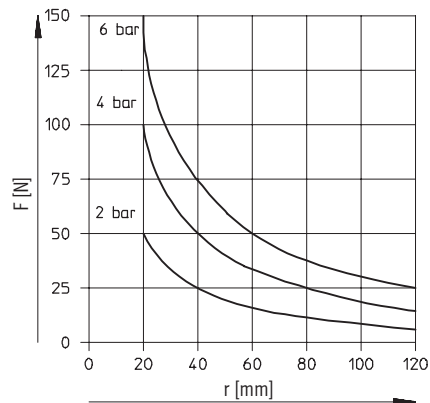
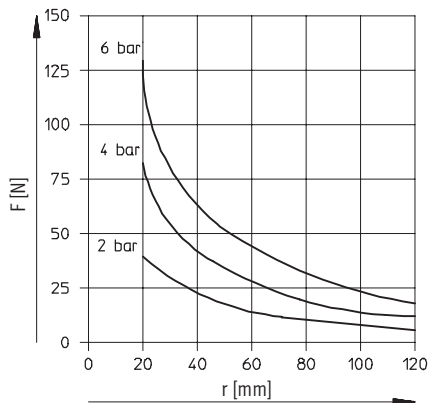
HGR-25-A



HGR-32-A



HGR-40-A



# Radial grippers HGR

Technical data



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

**1** Sensor slot for proximity sensor SME/SMT-8 (not with HGR-10-A)

**2** Compressed air connection, closing

**3** Compressed air connection, opening

**4** Centring sleeves ZBH (2 included in scope of delivery)

Size	B1	B2	B3	B4	B5	B6	D2	D3	D4	D5	D6	EE	H1	H2	H3	H4	H5	H6
[mm]		±0.02						∅ H8/h7	∅ +0.1	∅	∅ H8							
10	24	15	11	10.5	5	0.5	M3	5	2.5	M2.5	2	M3	60.8	34.5	16	8.8	8	4
16	33.4	16	16	15.5	6	1	M3	5	2.5	M3	2	M3	88.2	53.2	23	12.25	8	4
25	44	25	19.2	18.6	8	1	M4	7	3.3	M4	3	M5	107.2	63.5	24.7	14.3	10.5	5.25
32	51	29	22.8	21.4	10	1	M6	9	5.1	M5	4	G $\frac{3}{8}$	128.5	75	25	20	14	7
40	59	33	27.6	25.8	12	1	M8	12	6.4	M6	5	G $\frac{3}{8}$	140	80.5	47	8	16	8

Size	H7	H8	H9	H10	H11	H12	L1	L2	L3	L4	L5	L6	T1	T2	T3	T4	T5
[mm]	-0.3	±0.05			-0.05	±0.2			+0.01/+0.03			±0.02	+0.1			+1	+0.5
10	6.25	14.75	49.3	27.5	12.3	12.5	14	2	6.5	10.5	12	2	1.2	12.3	-	3.5	1.2
16	7	20	73.7	53.7	7.5	17.5	19	5.5	10	16	18.5	-	1.2	7	7	4.5	1.2
25	10.25	23.95	87.7	65.5	7.5	20.8	29.5	8.75	13	20	24	-	1.6	7	8	6.5	1.4
32	14	29	101.9	74.5	11	27.5	38	9.5	14	22	26	-	2.1	10	15	6.5	1.9
40	14	33.2	112.5	75.5	17.5	29.7	49	11	20	30	34	-	2.6	15	16	6.5	2.4

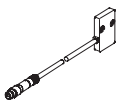


Ordering data		
Size	Double-acting	
[mm]	Part No.	Type
10	174 817	HGR-10-A
16	161 829	HGR-16-A
25	161 830	HGR-25-A
32	161 831	HGR-32-A
40	161 832	HGR-40-A

Ordering data – Wearing parts kits		
Size		
[mm]	Part No.	Type
10	378 522	HGR-10-A
16	125 668	HGR-16-A
25	125 669	HGR-25-A
32	125 670	HGR-32-A
40	125 671	HGR-40-A




# Radial grippers HGR

Accessories



Ordering data						
Type	For size	Weight [g]	Part No.	Type	PU <sup>1)</sup>	
Position sensor SMH-S1			Technical data → <a href="http://www.festo.com">www.festo.com</a>			
	10	20	175 712	SMH-S1-HGR10	1	
Evaluation unit SMH-AE1			Technical data → <a href="http://www.festo.com">www.festo.com</a>			
	10	170	175 708	SMH-AE1-PS3-M12	1	
			175 709	SMH-AE1-NS3-M12		
Centring sleeve ZBH			Technical data → <a href="http://www.festo.com">www.festo.com</a>			
	10, 16	1	189 652	ZBH-5	10	
	25		186 717	ZBH-7		
	32		150 927	ZBH-9		
	40		189 653	ZBH-12		




1) Packaging unit quantity





Ordering data – Proximity sensors for T-slot, magneto-resistive							Technical data → <a href="http://www.festo.com">www.festo.com</a>	
	Assembly	Switch output	Electrical connection			Cable length [m]	Part No.	Type
			Cable	M8 plug	M12 plug			
N/O contact								
	Insertable from above	PNP	3-wire	–	–	2.5	525 898	SMT-8F-PS-24V-K2,5-OE
		NPN					525 909	SMT-8F-NS-24V-K2,5-OE
		–	2-wire	–	–	2.5	525 908	SMT-8F-ZS-24V-K2,5-OE
		PNP	–	3-pin	–	0.3	525 899	SMT-8F-PS-24V-K0,3-M8D
		NPN					525 910	SMT-8F-NS-24V-K0,3-M8D
		PNP	–	–	3-pin	0.3	525 900	SMT-8F-PS-24V-K0,3-M12
	Insertable from end, flush with the cylinder profile	PNP	3-wire	–	–	2.5	175 436	SMT-8-PS-K-LED-24-B
		–	3-pin	–	–	0.3	175 484	SMT-8-PS-S-LED-24-B
N/C contact								
	Insertable from above	PNP	3-wire	–	–	7.5	525 911	SMT-8F-PO-24V-K7,5-OE

# Radial grippers HGR

Accessories

**FESTO**

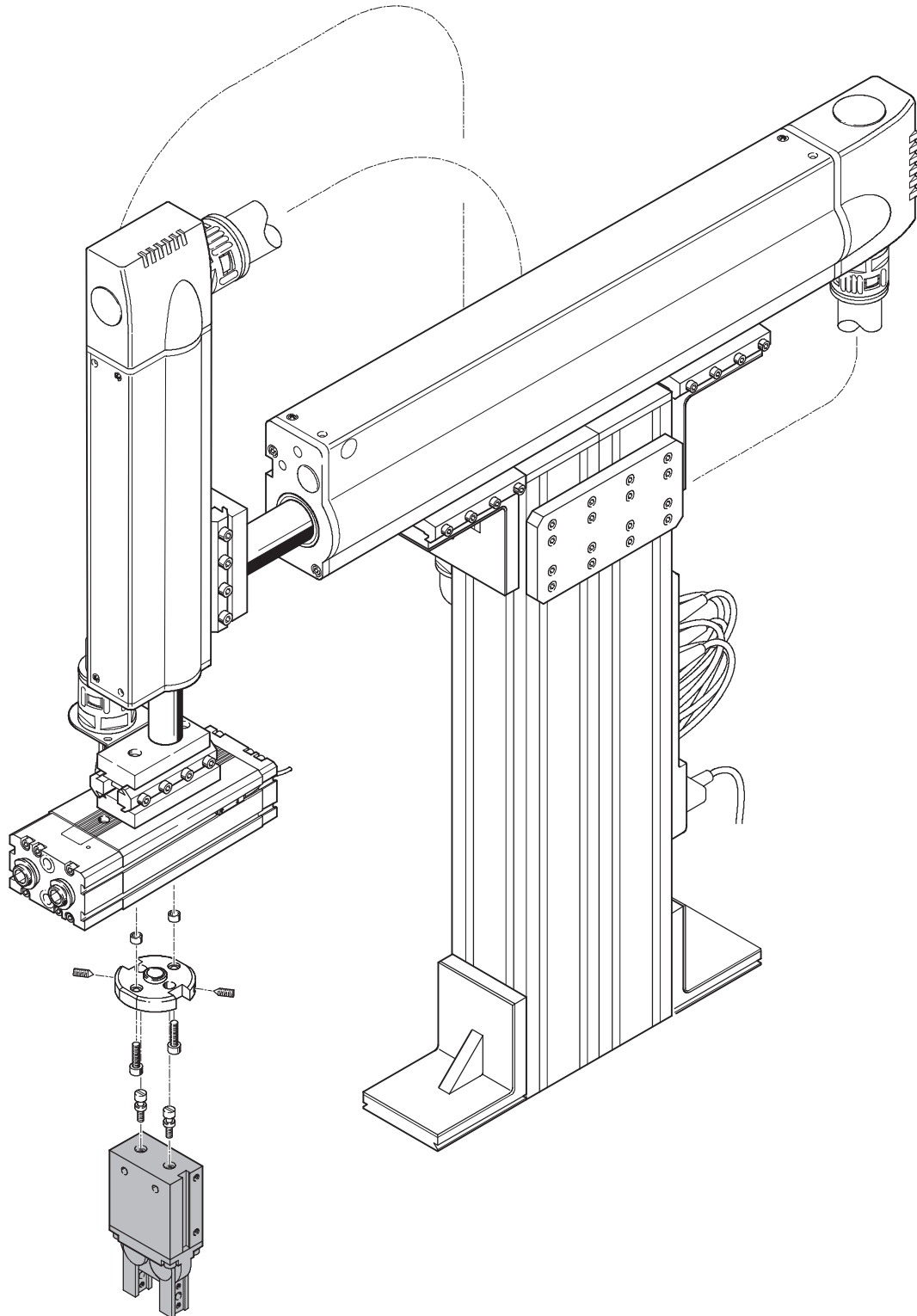
Ordering data – Proximity sensors for T-slot, magnetic reed					Technical data → <a href="http://www.festo.com">www.festo.com</a>	
	Assembly	Electrical connection		Cable length [m]	Part No.	Type
		Cable	M8 plug			
<b>N/O contact</b>						
	Insertable from above	3-wire	–	2.5	525 895	SME-8F-DS-24V-K2,5-OE
		–	–	5.0	525 897	SME-8F-DS-24V-K5,0-OE
	–	2-wire	–	2.5	525 907	SME-8F-ZS-24V-K2,5-OE
		–	3-pin	0.3	525 896	SME-8F-DS-24V-K0,3-M8D
	Insertable from end, flush with the cylinder profile	3-wire	–	2.5	150 855	SME-8-K-LED-24
		–	3-pin	0.3	150 857	SME-8-S-LED-24
		–	–	–	–	–
<b>N/C contact</b>						
	Insertable from end, flush with the cylinder profile	3-wire	–	7.5	160 251	SME-8-O-K-LED-24

Ordering data – Plug sockets with cable					Technical data → <a href="http://www.festo.com">www.festo.com</a>		
	Assembly	Switch output		Connection	Cable length [m]	Part No.	Type
		PNP	NPN				
<b>Straight plug socket</b>							
	M8 union nut	■	■	3-pin	2.5	159 420	SIM-M8-3GD-2,5-PU
		■	■		5	159 421	SIM-M8-3GD-5-PU
	M12 union nut	■	■	3-pin	2.5	159 428	SIM-M12-3GD-2,5-PU
		■	■		5	159 429	SIM-M12-3GD-5-PU
<b>Angled plug socket</b>							
	M8 union nut	■	■	3-pin	2.5	159 422	SIM-M8-3WD-2,5-PU
		■	■		5	159 423	SIM-M8-3WD-5-PU
	M12 union nut	■	■	3-pin	2.5	159 430	SIM-M12-3WD-2,5-PU
		■	■		5	159 431	SIM-M12-3WD-5-PU

# Radial grippers HGR

Everything from a single source

## Flexible combinations



# Angle grippers HGW

Key features



## At a glance

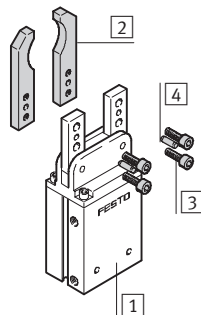
- Double-acting piston drive
- Self-centring
- Variable gripping action:
  - External/internal gripping
- Versatility thanks to externally adaptable gripper fingers
- Wide range of options for mounting on drive units
- Constant gripping torque over the entire angle range
- 40° opening angle
- Internal fixed flow control
- Sensor technology:
  - Adaptable proximity sensors on the small grippers
  - Integral proximity sensors for medium and large grippers




Gripper selection software  
[www.festo.com/en/engineering](http://www.festo.com/en/engineering)

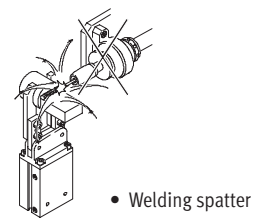
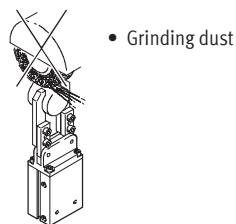
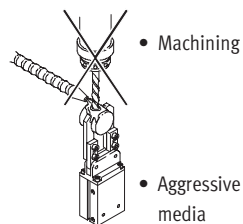
## Mounting options for external gripper fingers (customer-specific)

- 1 Angle gripper
- 2 External gripper fingers
- 3 Mounting screws
- 4 Centring pins



-  - Note

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



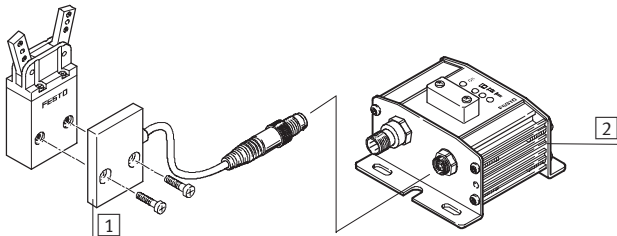


# Angle grippers HGW

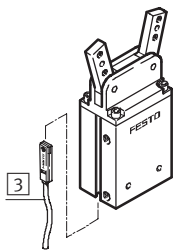
Peripherals overview and type codes

## Peripherals overview

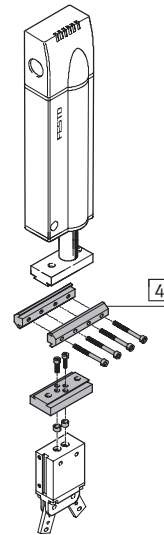
HGW-10



HGW-16 ... 40



## System product for handling and assembly technology



## Accessories

Type	Brief description	→ Page
1 Position sensor SMH-S1	Adaptable and integratable sensor technology, for sensing the piston position	57
2 Evaluation unit SMH-AE1	For position sensor SMH-S1	57
3 Proximity sensor SME/SMT-8	For sensing the piston position	57
4 –	Drive/gripper connections	www.festo.com

## Type codes

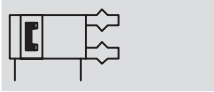
	HGW	–	16	–	A
<b>Type</b>					
HGW	Angle gripper				
<b>Size</b>					
<b>Position sensing</b>					
A	For proximity sensing				

# Angle grippers HGW

Technical data

FESTO

Function  
Double-acting



[www.festo.com/en/Spare\\_parts\\_service](http://www.festo.com/en/Spare_parts_service)

Wearing parts kits  
→ 56



Size  
10 ... 40 mm

General technical data					
Size	10	16	25	32	40
Design	Lever mechanism				
Mode of operation	Double-acting				
Gripper function	Angle				
Number of gripper jaws	2				
Opening angle [°]	40				
Pneumatic connection	M3		M5	G1/8	
Repetition accuracy <sup>1)</sup> [mm]	≤ 0.04				
Max. interchangeability [mm]	0.2				
Max. operating frequency [Hz]	4				
Position sensing	For proximity sensing				
Type of mounting	With female thread and centring hole				

1) End position drift under constant conditions of use with 100 consecutive strokes in the direction of movement of the gripper jaws

Operating and environmental conditions		
Min. operating pressure [bar]	2	
Max. operating pressure [bar]	8	
Operating medium	Filtered compressed air, lubricated or unlubricated	
Ambient temperature [°C]	+5 ... +60	
Corrosion resistance class CRC <sup>1)</sup>	2	

1) Corrosion resistance class 2 according to Festo standard 940 070  
Components requiring moderate corrosion resistance. Externally visible parts with primarily decorative surface requirements which are in direct contact with a normal industrial environment or media such as coolants or lubricating agents

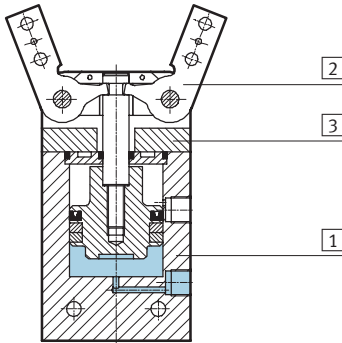
Weights [g]					
Size	10	16	25	32	40
HGW	39	100	250	420	720

# Angle grippers HGW

Technical data

## Materials

Sectional view

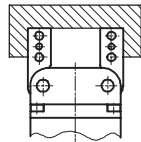
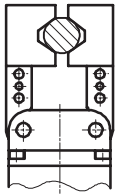


Angle gripper		
1	Body	Hard anodised aluminium
2	Gripper jaw	Nickel-plated tool steel
3	Cover cap	Polyacetate
–	Note on materials	Copper, PTFE and silicone-free

## Total gripping torque [Ncm] at 6 bar, with external gripper fingers

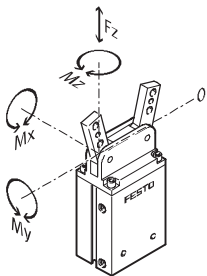
External gripping

Internal gripping



Size	10	16	25	32	40
Total gripping torque					
Opening	25	120	360	680	965
Closing	22	106	320	600	880

## Characteristic load values at the gripper jaws



The indicated permissible forces and torques apply to a single gripper jaw. Static forces and torques relate to additional applied loads caused by

the workpiece or external gripper fingers, as well as forces which occur during handling. The zero co-ordinate

line (gripper jaws point of rotation) must be taken into consideration for the calculation of torques.

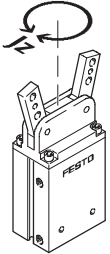
Size	10	16	25	32	40	
Max. permissible force $F_z$	[N]	16	31	54	74	124
Max. permissible torque $M_x$	[Nm]	0.3	0.9	1.7	3	5.7
Max. permissible torque $M_y$	[Nm]	0.1	0.3	0.6	1	2.2
Max. permissible torque $M_z$	[Nm]	0.2	0.5	1.1	1.8	3.6

# Angle grippers HGW

Technical data



## Mass moment of inertia [ $\text{kgm}^2 \times 10^{-4}$ ]



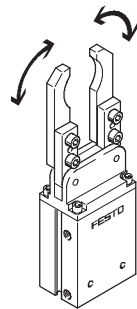
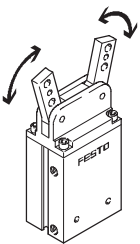
Mass moment of inertia [ $\text{kgm}^2 \times 10^{-4}$ ] for angle grippers in relation to the central axis, without external gripper fingers, without load.

Size	10	16	25	32	40
HGW	0.03	0.13	0.60	1.48	3.54

## 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 external gripper fingers.

The grippers must be throttled for greater applied loads. Opening and closing times must then be adjusted accordingly.

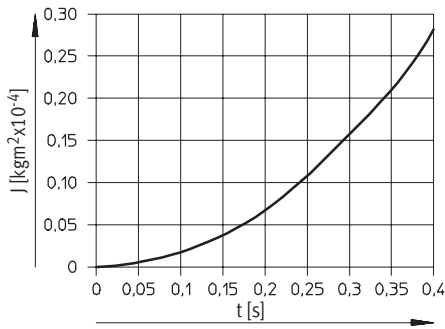
Size		10	16	25	32	40
Without external gripper fingers						
HGW	Opening	5	25	50	50	60
	Closing	5	30	40	40	50
With external gripper fingers → 53						

# Angle grippers HGW

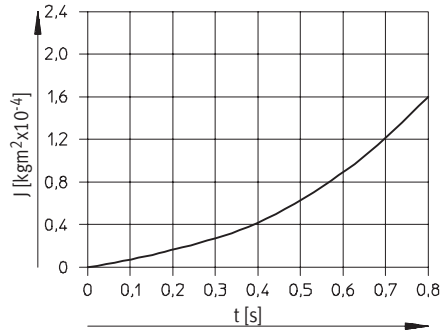
Technical data

## Opening and closing times $t$ as a function of gripper finger mass moment of inertia $J$

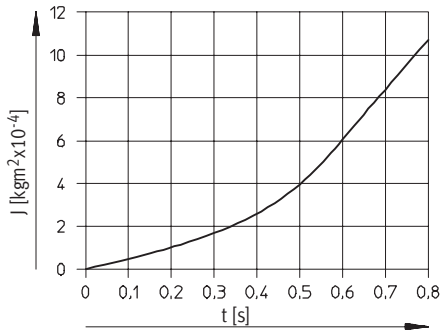
HGW-10-A



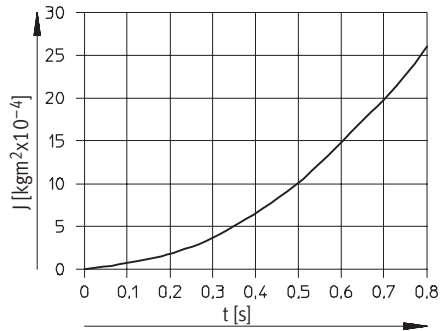
HGW-16-A



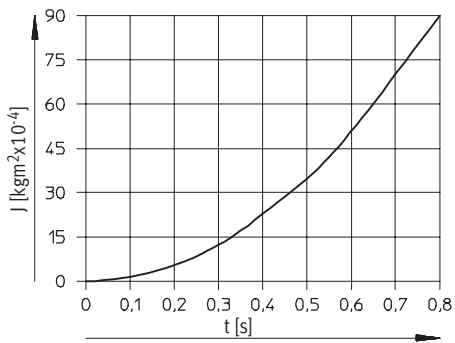
HGW-25-A



HGW-32-A



HGW-40-A



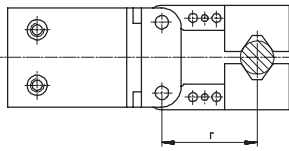
# Angle grippers HGW

Technical data



## Gripping force $F$ per gripper as a function of operating pressure and the lever arm $r$

Gripping forces

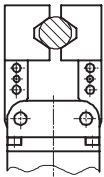


Gripping forces can be determined with the following diagrams for the various sizes in relation to operating

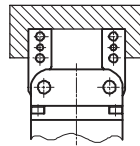
pressure and lever arm (distance from the zero co-ordinate line shown oppo-

site to the pressure point at which the external fingers grip the workpiece).

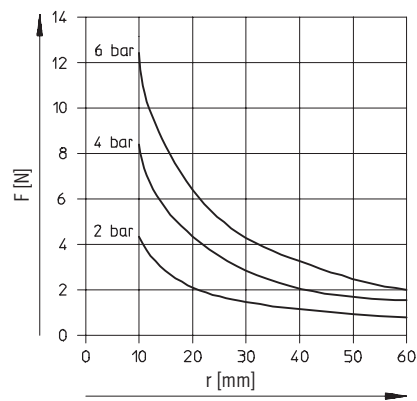
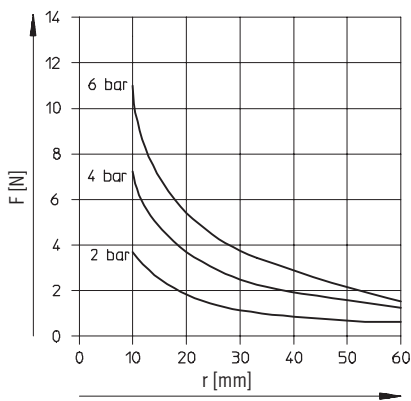
### External gripping (closing)



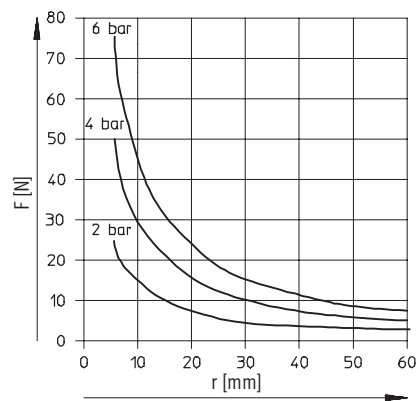
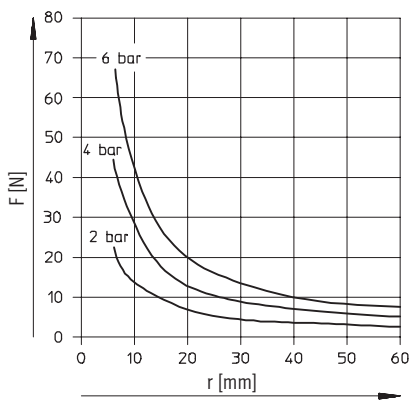
### Internal gripping (opening)



### HGW-10-A



### HGW-16-A



# Angle grippers HGW

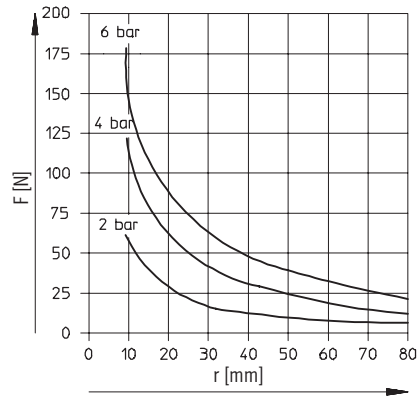
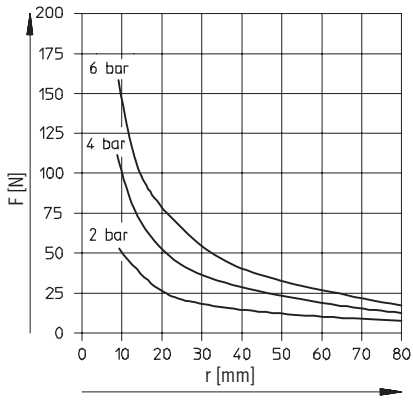
Technical data

## Gripping force $F$ per gripper as a function of operating pressure and the lever arm $r$

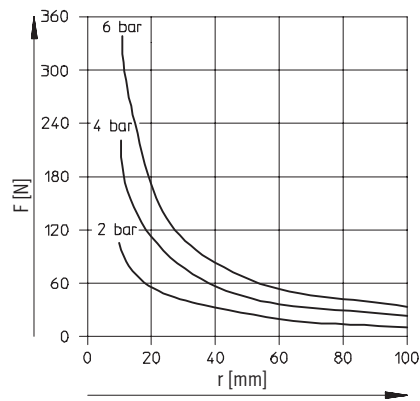
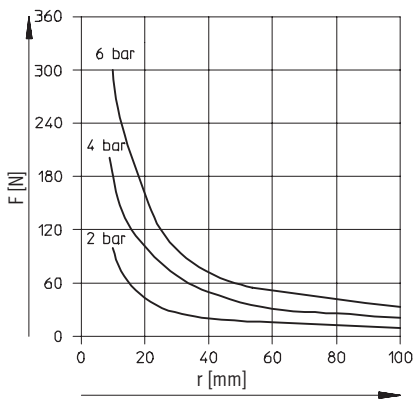
External gripping (closing)

Internal gripping (opening)

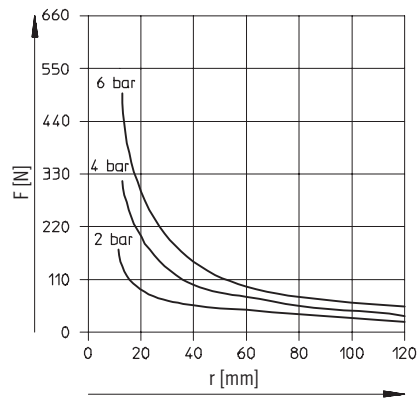
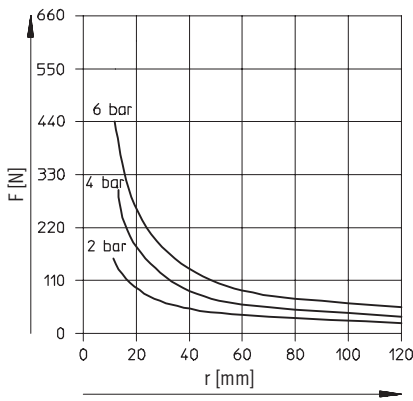
HGW-25-A



HGW-32A



HGW-40A



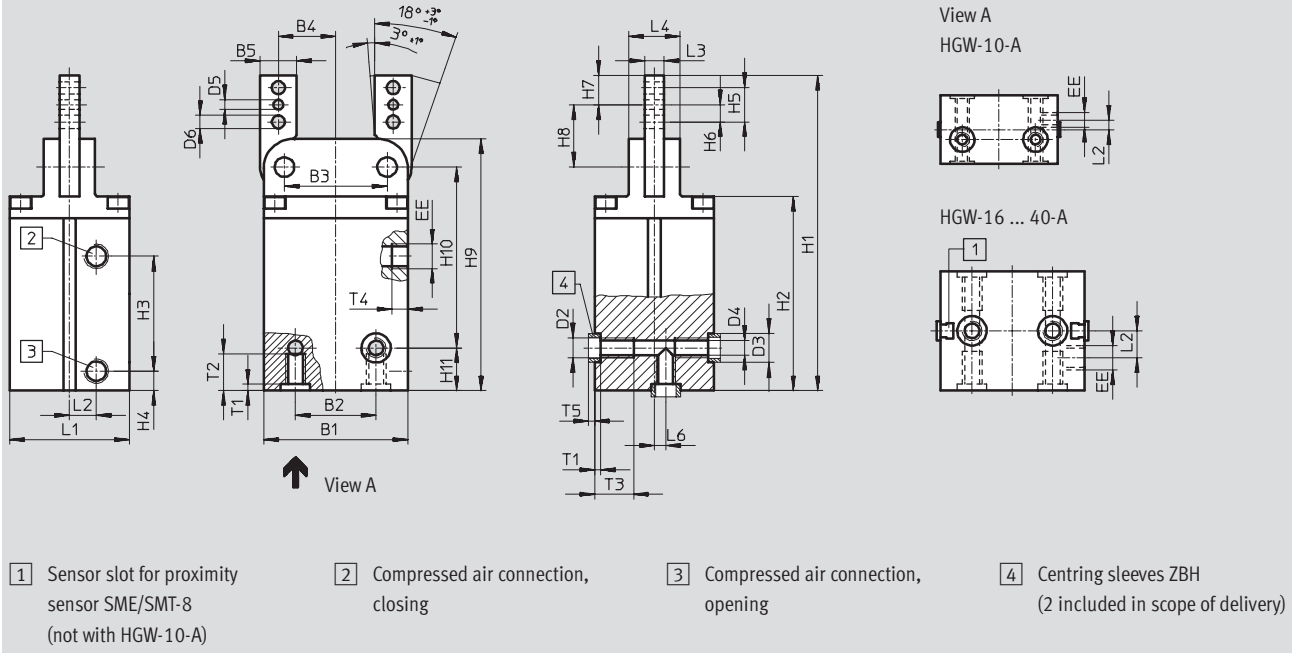
# Angle grippers HGW

Technical data

FESTO

## Dimensions

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



Size	B1	B2	B3	B4	B5	D2	D3	D4	D5	D6	EE	H1	H2	H3	H4	H5
[mm]		±0.02	±0.02		-0.02/-0.05		∅ H8/h7	∅ +0.1	∅ H8	∅						
10	24	15	17	9.75	5.5	M3	5	2.5	2	2.2	M3	56.3	34.5	16	8.8	7
16	33.4	16	24	13	8	M3	5	2.5	2.5	3.2	M3	81	53.2	23	12.25	9
25	44	25	32	18	10	M4	7	3.3	3	3.2	M5	100	63.5	24.7	14.3	11
32	51	29	37	20.5	12	M6	9	5.1	3	4.3	G $\frac{1}{8}$	116	73	25	20	13
40	59	33	42	23.5	15	M8	12	6.4	4	5.3	G $\frac{1}{8}$	129	79.5	47	8	14

Size	H6	H7	H8	H9	H10	H11	L1	L2	L3	L4	L6	T1	T2	T3	T4	T5
[mm]			±0.05			-0.05			-0.01/-0.02		±0.02	+0.1		+1	+0.5	
10	3.5	5.75	10.75	44.8	27.5	12.3	14	2	3	7	2	1.2	12.3	-	3.5	1.2
16	4.5	7.5	13.7	65.5	52.3	7.5	19	5.5	4	10	-	1.2	7	7	4.5	1.2
25	5.5	8.8	18.7	80.7	65	7.5	29.5	8.75	5	14	-	1.6	7	8	6.5	1.4
32	6.5	11	22	92.5	72	11	38	9.5	6	17	-	2.1	10	15	6.5	1.9
40	7	12	25.5	103	74	17.5	49	11	8	21	-	2.6	15	16	6.5	2.4

Ordering data		
Size	Double-acting	
[mm]	Part No.	Type
10	174 818	HGW-10-A
16	161 833	HGW-16-A
25	161 834	HGW-25-A
32	161 835	HGW-32-A
40	161 836	HGW-40-A

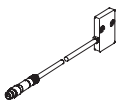


Ordering data – Wearing parts kits		
Size		
[mm]	Part No.	Type
10	378 527	HGW-10-A
16	125 680	HGW-16-A
25	125 681	HGW-25-A
32	125 682	HGW-32-A
40	125 683	HGW-40-A






# Angle grippers HGW

Accessories

**FESTO**

Ordering data						
Type	For size	Weight [g]	Part No.	Type	PU <sup>1)</sup>	
Position sensor SMH-S1			Technical data → <a href="http://www.festo.com">www.festo.com</a>			
	10	20	175 711	SMH-S1-HGW10	1	
Evaluation unit SMH-AE1			Technical data → <a href="http://www.festo.com">www.festo.com</a>			
	10	170	175 708	SMH-AE1-PS3-M12	1	
			175 709	SMH-AE1-NS3-M12		
Centring sleeve ZBH			Technical data → <a href="http://www.festo.com">www.festo.com</a>			
	10, 16	1	189 652	ZBH-5	10	
	25		186 717	ZBH-7		
	32		150 927	ZBH-9		
	40		189 653	ZBH-12		




1) Packaging unit quantity





Ordering data – Proximity sensors for T-slot, magneto-resistive							Technical data → <a href="http://www.festo.com">www.festo.com</a>	
	Assembly	Switch output	Electrical connection			Cable length [m]	Part No.	Type
			Cable	M8 plug	M12 plug			
N/O contact								
	Insertable from above	PNP	3-wire	–	–	2.5	525 898	SMT-8F-PS-24V-K2,5-OE
		NPN					525 909	SMT-8F-NS-24V-K2,5-OE
		–	2-wire	–	–	2.5	525 908	SMT-8F-ZS-24V-K2,5-OE
		PNP	–	3-pin	–	0.3	525 899	SMT-8F-PS-24V-K0,3-M8D
		NPN					525 910	SMT-8F-NS-24V-K0,3-M8D
		PNP	–	–	3-pin	0.3	525 900	SMT-8F-PS-24V-K0,3-M12
	Insertable from end, flush with the cylinder profile	PNP	3-wire	–	–	2.5	175 436	SMT-8-PS-K-LED-24-B
		–	3-pin	–	–	0.3	175 484	SMT-8-PS-S-LED-24-B
N/C contact								
	Insertable from above	PNP	3-wire	–	–	7.5	525 911	SMT-8F-PO-24V-K7,5-OE

# Angle grippers HGW

Accessories

**FESTO**

Ordering data – Proximity sensors for T-slot, magnetic reed					Technical data → <a href="http://www.festo.com">www.festo.com</a>	
	Assembly	Electrical connection		Cable length [m]	Part No.	Type
		Cable	M8 plug			
<b>N/O contact</b>						
	Insertable from above	3-wire	–	2.5	525 895	SME-8F-DS-24V-K2,5-OE
		–	–	5.0	525 897	SME-8F-DS-24V-K5,0-OE
	–	2-wire	–	2.5	525 907	SME-8F-ZS-24V-K2,5-OE
		–	3-pin	0.3	525 896	SME-8F-DS-24V-K0,3-M8D
	Insertable from end, flush with the cylinder profile	3-wire	–	2.5	150 855	SME-8-K-LED-24
		–	3-pin	0.3	150 857	SME-8-S-LED-24
		–	–	–	–	–
<b>N/C contact</b>						
	Insertable from end, flush with the cylinder profile	3-wire	–	7.5	160 251	SME-8-O-K-LED-24

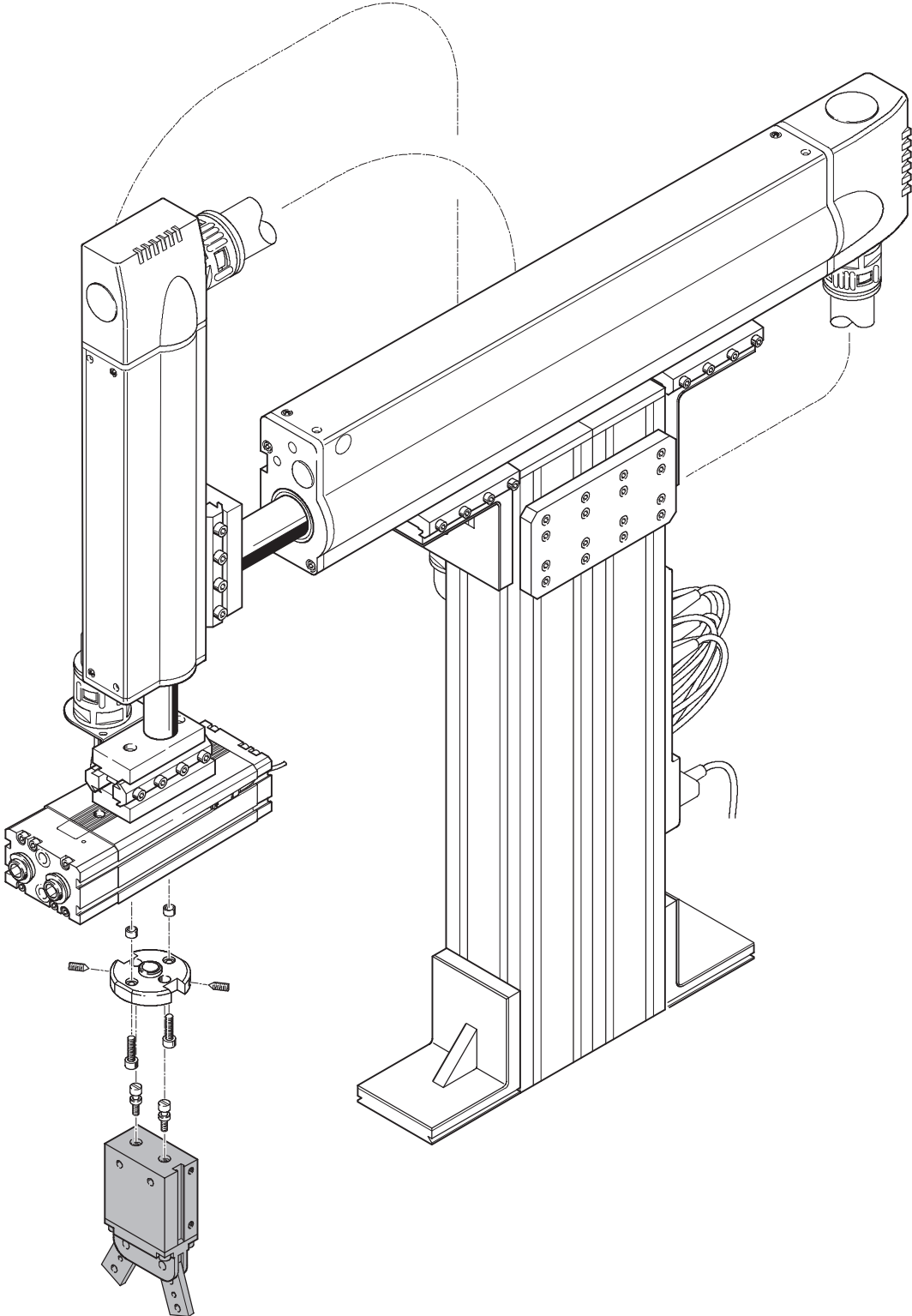
Ordering data – Plug sockets with cable					Technical data → <a href="http://www.festo.com">www.festo.com</a>		
	Assembly	Switch output		Connection	Cable length [m]	Part No.	Type
		PNP	NPN				
<b>Straight plug socket</b>							
	M8 union nut	■	■	3-pin	2.5	159 420	SIM-M8-3GD-2,5-PU
		■	■		5	159 421	SIM-M8-3GD-5-PU
	M12 union nut	■	■	3-pin	2.5	159 428	SIM-M12-3GD-2,5-PU
		■	■		5	159 429	SIM-M12-3GD-5-PU
<b>Angled plug socket</b>							
	M8 union nut	■	■	3-pin	2.5	159 422	SIM-M8-3WD-2,5-PU
		■	■		5	159 423	SIM-M8-3WD-5-PU
	M12 union nut	■	■	3-pin	2.5	159 430	SIM-M12-3WD-2,5-PU
		■	■		5	159 431	SIM-M12-3WD-5-PU

# Angle grippers HGW

Everything from a single source

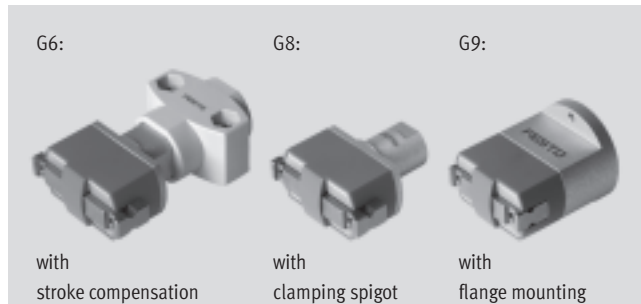


## Flexible combinations



# Parallel grippers HGPM, micro

Key features



## At a glance

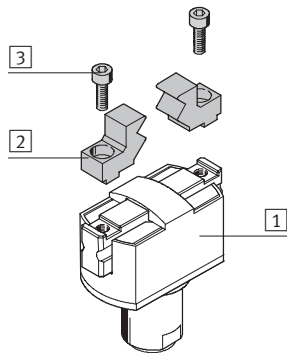
- Compact, handy design
- With open or closed gripper jaws
- Versatility thanks to externally adaptable gripper fingers
- Wide range of options for attaching drive units
- With stroke compensation after installation
- Mounting options:
  - Clamping spigot
  - Flange mounting




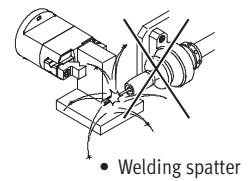
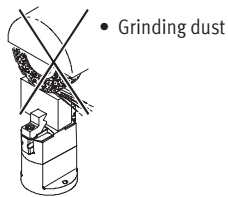
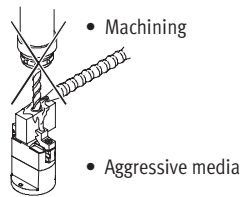
Gripper selection software  
[www.festo.com/en/engineering](http://www.festo.com/en/engineering)

## Mounting options for external gripper fingers (customer-specific)

- 1 Parallel gripper
- 2 External gripper fingers
- 3 Mounting screws



-  - Note  
 Grippers are not suitable for the following, or for similar applications:



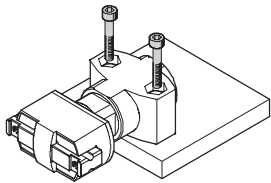
# Parallel grippers HGPM, micro

Key features

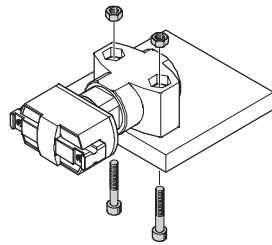


## Mounting options

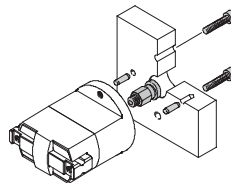
With through-holes



With through-holes, screws and retaining nuts

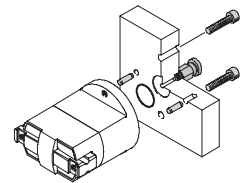


With flange mounting, screws and dowel pins



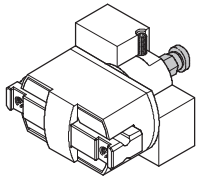
Direct air supply

Integrated air supply

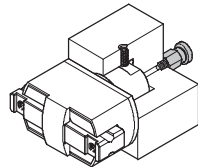


With set screw

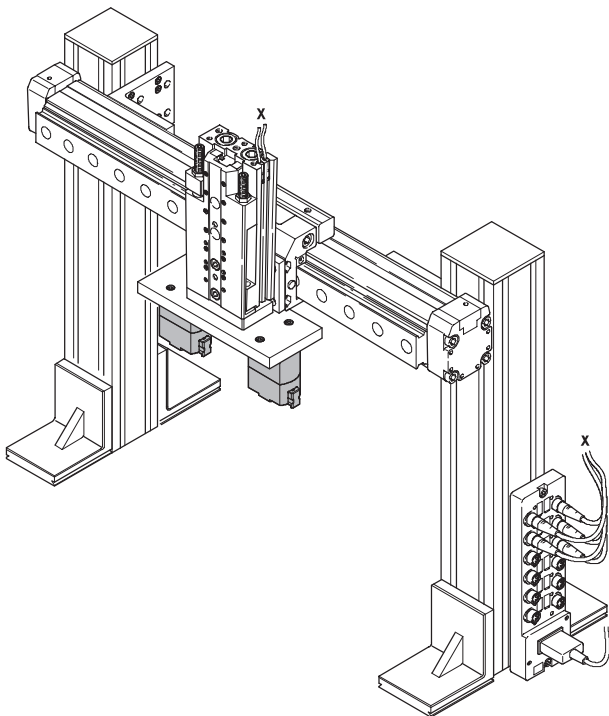
Direct air supply



Integrated air supply



## System product for handling and assembly technology



	→ Page
Drives	<a href="http://www.festo.com">www.festo.com</a>
Grippers	<a href="http://www.festo.com">www.festo.com</a>
Adapters	<a href="http://www.festo.com">www.festo.com</a>
Basic mounting components	<a href="http://www.festo.com">www.festo.com</a>
Installation components	<a href="http://www.festo.com">www.festo.com</a>
Axes	<a href="http://www.festo.com">www.festo.com</a>
Motors	<a href="http://www.festo.com">www.festo.com</a>

# Parallel grippers HGPM, micro

Type codes

HGPM – 12 – EO – G8

**Type**

HGPM	Parallel gripper
------	------------------

**Size**

**Gripper jaw position**

EO	Open
EZ	Closed

**Mounting options**

G6	With stroke compensation
G8	With clamping spigot
G9	With flange mounting

# Parallel grippers HGPM, micro

Technical data

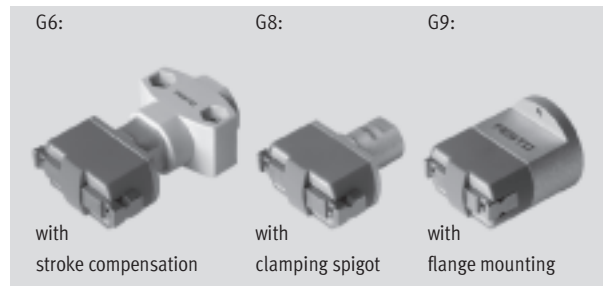
Function  
Single-acting  
with open gripper jaws  
HGPM-...-EO-G...



with closed gripper jaws  
HGWM-...-EZ-G...



- $\varnothing$  - Size  
8 ... 12 mm
- | - Stroke  
4 ... 6 mm



General technical data			
Size	8	12	
Constructional design	Wedge-shaped drive		
Mode of operation	Single-acting		
Gripper function	Parallel		
Number of gripper jaws	2		
Max. applied load per external gripper finger <sup>1)</sup>	[N]	0.05	
Resetting force <sup>2)</sup>	Gripper jaws open	[N]	1.5
	Gripper jaws closed	[N]	2
Stroke per gripper jaw	[mm]	2	
Pneumatic connection	M3		
Repetition accuracy <sup>3) 4)</sup>	[mm]	< 0.05	
Max. interchangeability	[mm]	0.4	
Max. operating frequency	[Hz]	4	
Centring precision <sup>4)</sup>	[mm]	< $\varnothing$ 0.15 (valid only for HGPM-...-G8 and HGPM-...-G9)	
Position sensing	Without		
Type of mounting	HGPM-...-E...-G6	Via through-holes	
	HGPM-...-E...-G8	Clamped	
	HGPM-...-E...-G9	With female thread and locating hole	

- 1) Valid for unthrottled operation
- 2) Spring resetting force between the jaws
- 3) End position drift under constant conditions of use with 100 consecutive strokes in the direction of movement of the gripper jaws
- 4) The indicated values are only valid when gripping with compressed air, not with spring force

Operating and environmental conditions		
Min. operating pressure	[bar]	4
Max. operating pressure	[bar]	8
Operating medium	Filtered compressed air, lubricated or unlubricated (grade of filtration 40 $\mu$ m)	
Ambient temperature	[°C]	+5 ... +60
Corrosion resistance class CRC <sup>1)</sup>	1	

- 1) Corrosion resistance class 1 according to Festo standard 940 070  
Components requiring low corrosion resistance. Transport and storage protection. Parts that do not have primarily decorative surface requirements, e.g. in internal areas that are not visible or behind covers

Weights [g]		
Size	8	12
With stroke compensation	19	62
With clamping spigot	11	41
With flange mounting	18	62

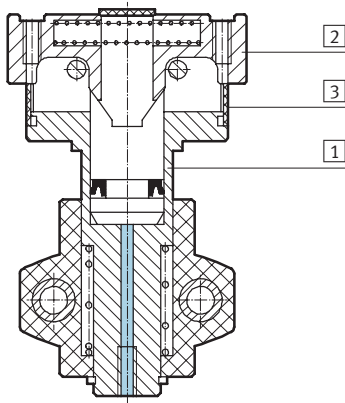
# Parallel grippers HGPM, micro

Technical data



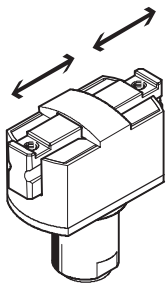
## Materials

Sectional view



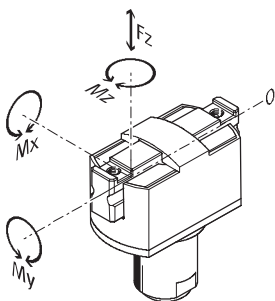
Parallel gripper		
1	Body	Anodised aluminium
2	Gripper jaw	Stainless steel
3	Cover cap	Polyacetate
–	Material note	Copper, PTFE and silicone-free

## Gripping force [N] at 6 bar



Size	8		12	
	HGPM-...EO-...	HGPM-...EZ-...	HGPM-...EO-...	HGPM-...EZ-...
Gripping force per gripper jaw				
Opening	–	8	–	17.5
Closing	8	–	13.5	–
Total gripping force				
Opening	–	16	–	35
Closing	16	–	27	–

## 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 applied loads caused

by the workpiece or external gripper fingers, as well as forces which occur during movement. The zero co-ordinate line (gripper jaw

guide slot) must be taken into consideration for the calculation of torques.

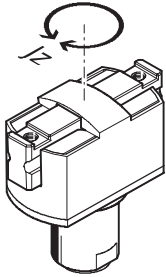
Size		8	12
Max. permissible force $F_z$	[N]	10	30
Max. permissible torque $M_x$	[Nm]	0.15	0.5
Max. permissible torque $M_y$	[Nm]	0.15	0.5
Max. permissible torque $M_z$	[Nm]	0.15	0.5



# Parallel grippers HGPM, micro

Technical data

## Mass moment of inertia [ $\text{kgm}^2 \times 10^{-4}$ ]

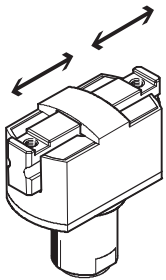


Mass moment of inertia [ $\text{kgm}^2 \times 10^{-4}$ ] for parallel grippers in relation to the central axis, without external gripper fingers, without load.

Size	8	12
With stroke compensation	0.00922	0.06674
With clamping spigot	0.00573	0.04252
With flange mounting	0.01712	0.07939

## Opening and closing times [ms] at 6 bar

Without external gripper fingers



The indicated opening and closing times [ms] have been measured at room temperature and 6 bar operating pressure with vertically mounted gripper and without external gripper fingers. Load is increased if external gripper fingers are attached. This means that kinetic energy is also

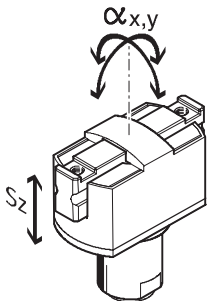
increased, as this is determined by gripper finger weight and velocity. If permissible kinetic energy is exceeded, various parts of the gripper may be damaged. This occurs when the applied load reaches the end-position and the cushioning is only

able to partially convert the kinetic energy into potential energy and heat energy. It thus becomes apparent that the indicated max. permissible applied load due to the external gripper fingers must be checked and maintained.

Size	8	12	
HGPM-...EO-...	Opening	4.9	11
	Closing	2.3	3.7
HGPM-...EZ-...	Opening	1.9	3
	Closing	4.1	8.3

## Gripper jaw backlash

Without external gripper fingers



With parallel grippers, backlash occurs between the gripper jaws and the guide element due to the plain-bearing guide. The backlash values listed in the table have been

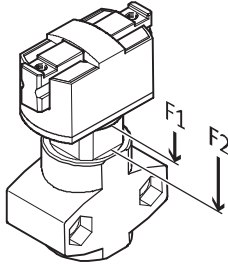
calculated based upon the traditional accumulative tolerance method and usually do not occur with mounted grippers.

Size	8	12
Gripper jaw backlash $s_z$	[mm]	< 0.03
Gripper jaw angular backlash $a_x, a_y$	[°]	< 0.5

# Parallel grippers HGPM, micro

Technical data

## Spring displacement forces [N]



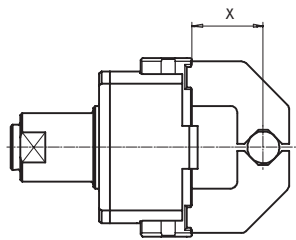
Theoretical actuating force due to stroke compensation for design variant with stroke compensation.

Size	8	12
Spring displacement forces $F_1$	4	10
Spring displacement forces $F_2$	6	23

## Gripping force $F_{Grip}$ per gripper jaw as a function of operating pressure and lever arm $x$

External and internal gripping (closing and opening)

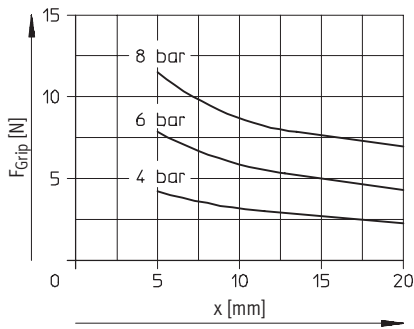
Gripping forces related to operating pressure and lever arm can be determined for the various sizes using the following graphs.



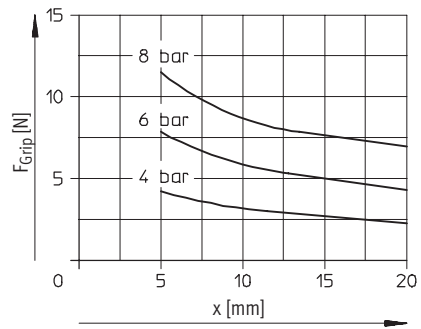
EO = External gripping (closing)

EZ = Internal gripping (opening)

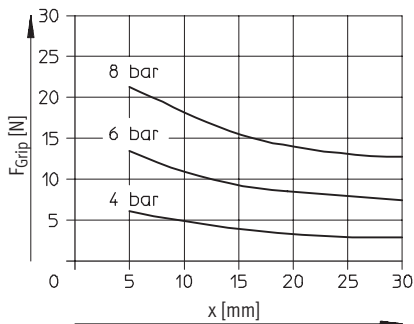
### HGPM-08-EO...



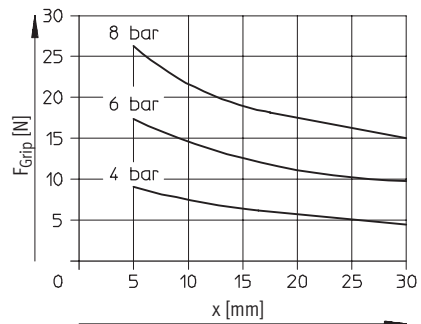
### HGPM-08-EZ...



### HGPM-12-EO...



### HGPM-12-EZ...



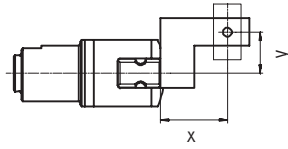
# Parallel grippers HGPM, micro

Technical data



## Gripping force $F_{Grip}$ per gripper jaw at 6 bar as a function of lever arm $x$ and eccentricity $y$

External and internal gripping (closing and opening)



Gripping forces at 6 bar dependent upon eccentric application of force and the maximum permissible off-

centre point of force application can be determined for the various sizes using the following graphs.

### Calculation example

Given:

HGPM-12-EZ...

Lever arm  $x = 10$  mm

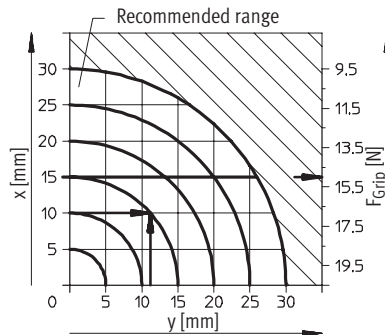
Eccentricity  $y = 11$  mm

To be found:

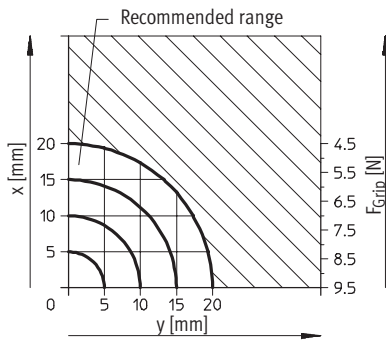
Gripping force at 6 bar

Procedure:

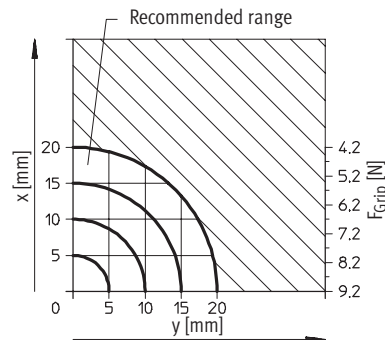
- Determine the intersection  $xy$  between lever arm  $x$  and eccentricity  $y$  in the graph for HGPM-12-EZ
  - Draw an arc (with centre at origin) through intersection  $xy$
  - Determine the intersection between the arc and the X axis
  - Read the gripping force
- Result:  
Gripping force = approx. 15 N



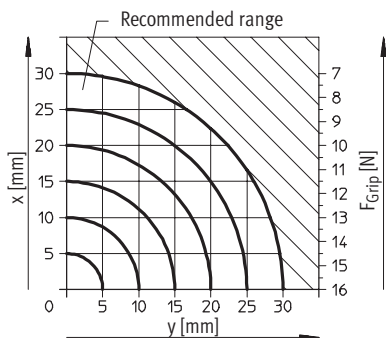
### HGPM-08-EO...



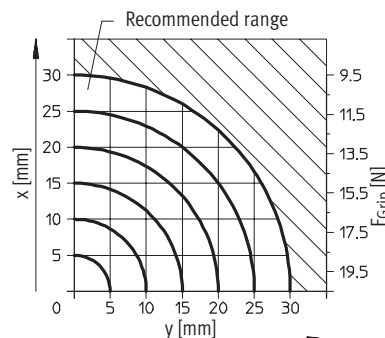
### HGPM-08-EZ...



### HGPM-12-EO...



### HGPM-12-EZ...



EO = External gripping (closing)

EZ = Internal gripping (opening)

# Parallel grippers HGPM, micro

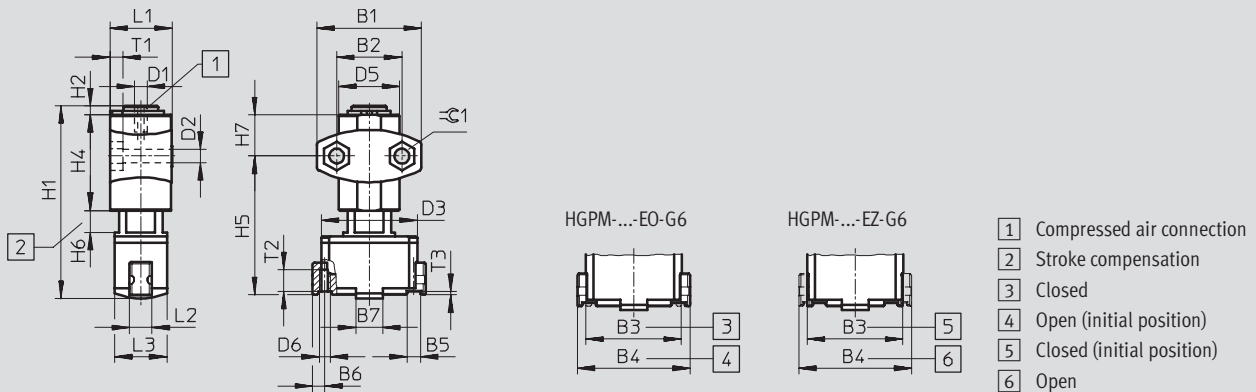
Technical data



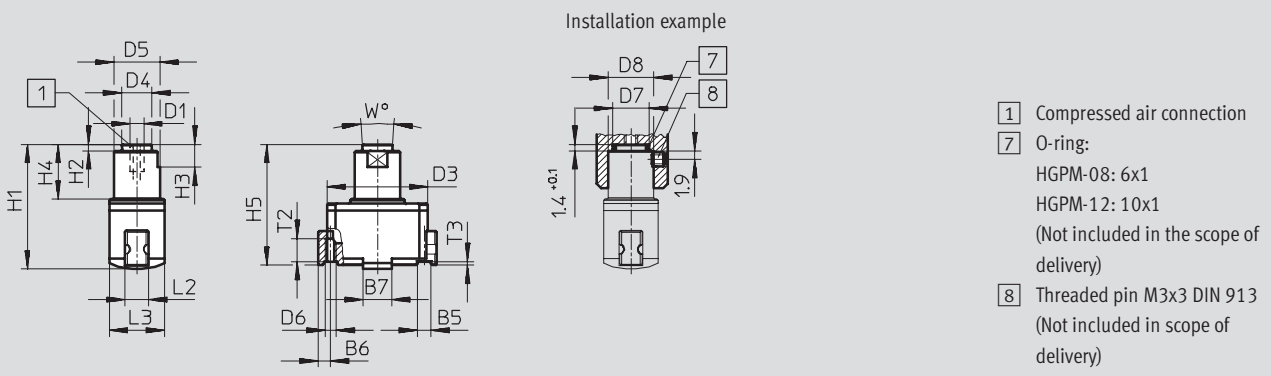
## Dimensions

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

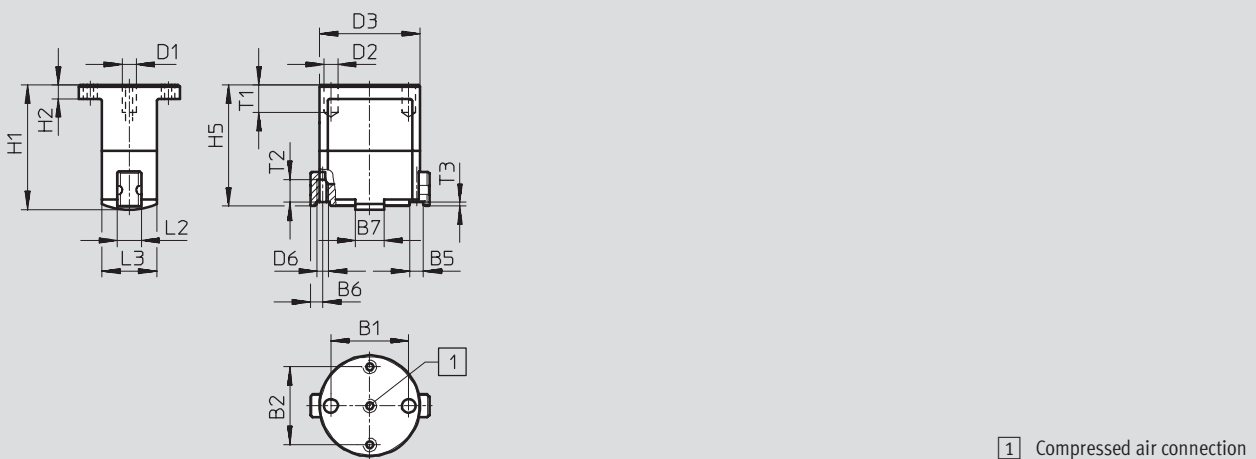
With stroke compensation – HGPM-...-E...-G6



With clamping spigot – HGPM-...-E...-G8



With flange mounting – HGPM-...-E...-G9



# Parallel grippers HGPM, micro

Technical data

FESTO

Type	B1	B2	B3 ±0.3	B4 ±0.3	B5 +0.05/+0.02	B6 +0.19/-0.23	B7 ±0.1	D1	D2 ∅	D3 ∅
HGPM-08-EO-G6	24 ±0.1	15 ±0.25	22	26	3	2.75	6.2	M3	3.4 ±0.2	22
HGPM-08-EZ-G6										
HGPM-12-EO-G6	35 ±0.1	24 ±0.25	33	39	4	4	9	M3	4.5 ±0.2	33
HGPM-12-EZ-G6										
HGPM-08-EO-G8	-	-	22	26	3	2.75	6.2	M3	-	22
HGPM-08-EZ-G8										
HGPM-12-EO-G8	-	-	33	39	4	4	9	M3	-	33
HGPM-12-EZ-G8										
HGPM-08-EO-G9	17 ±0.02	17 ±0.1	22	26	3	2.75	6.2	M3	3 F8	22
HGPM-08-EZ-G9										
HGPM-12-EO-G9	27 ±0.02	27 ±0.1	33	39	4	4	9	M3	3 F8	33
HGPM-12-EZ-G9										

Type	D4 ∅ ±0.1	D5 ∅	D6	D7 ∅ +0.1	D8 ∅ +0.1	H1 ±0.3	H2	H3	H4	H5
HGPM-08-EO-G6	-	15 ±0.5	M2.5	-	-	44.2	2 +0.1/-0.3	-	22 -0.3	31.9 +0.8/-0.65
HGPM-08-EZ-G6										
HGPM-12-EO-G6	-	22 ±0.5	M3	-	-	63	3 +0.2/-0.3	-	29 -0.3	46.65 +0.8/-0.7
HGPM-12-EZ-G6										
HGPM-08-EO-G8	6.6	10 h8	M2.5	8	10	27.2	1.4 -0.1	5	12 ±0.1	26.4 +0.2/-0.25
HGPM-08-EZ-G8										
HGPM-12-EO-G8	10.6	15 h8	M3	12	15	41	1.4 -0.1	7 ±0.1	18 ±0.1	40.15 +0.2/-0.25
HGPM-12-EZ-G8										
HGPM-08-EO-G9	-	-	M2.5	-	-	27.2	3 ±0.2	-	-	26.4 +0.2/-0.25
HGPM-08-EZ-G9										
HGPM-12-EO-G9	-	-	M3	-	-	41	5 ±0.2	-	-	40.15 +0.2/-0.25
HGPM-12-EZ-G9										

Type	H6 +0.7/-0.2	H7 ±0.3	L1 +0.1/-0.3	L2 -0.1	L3 ±0.1	T1	T2 <sup>1)</sup>	T3	W	≲C1
HGPM-08-EO-G6	0 ... 5	9.5	14.3	5	12	3 -0.2	4	0.8	-	5.7
HGPM-08-EZ-G6										
HGPM-12-EO-G6	0 ... 8	12.5	20.35	7	18	4 -0.2	6	1	-	7.5
HGPM-12-EZ-G6										
HGPM-08-EO-G8	-	-	-	5	12	-	4	0.8	8°	-
HGPM-08-EZ-G8										
HGPM-12-EO-G8	-	-	-	7	18	-	6	1	8°	-
HGPM-12-EZ-G8										
HGPM-08-EO-G9	-	-	-	5	12	min. 6	4	0.8	-	-
HGPM-08-EZ-G9										
HGPM-12-EO-G9	-	-	-	7	18	min. 6	6	1	-	-
HGPM-12-EZ-G9										


1) Do not exceed max. thread screw-in depth

# Parallel grippers HGPM, micro

Technical data and accessories



Ordering data							
Single-acting	Size [mm]	Mounting options					
		With stroke compensation		With clamping spigot		With flange mounting	
		Part No.	Type	Part No.	Type	Part No.	Type
Gripper jaws open	8	197 559	HGPM-08-EO-G6	197 560	HGPM-08-EO-G8	197 561	HGPM-08-EO-G9
	12	197 565	HGPM-12-EO-G6	197 566	HGPM-12-EO-G8	197 567	HGPM-12-EO-G9
Gripper jaws closed	8	197 562	HGPM-08-EZ-G6	197 563	HGPM-08-EZ-G8	197 564	HGPM-08-EZ-G9
	12	197 568	HGPM-12-EZ-G6	197 569	HGPM-12-EZ-G8	197 570	HGPM-12-EZ-G9

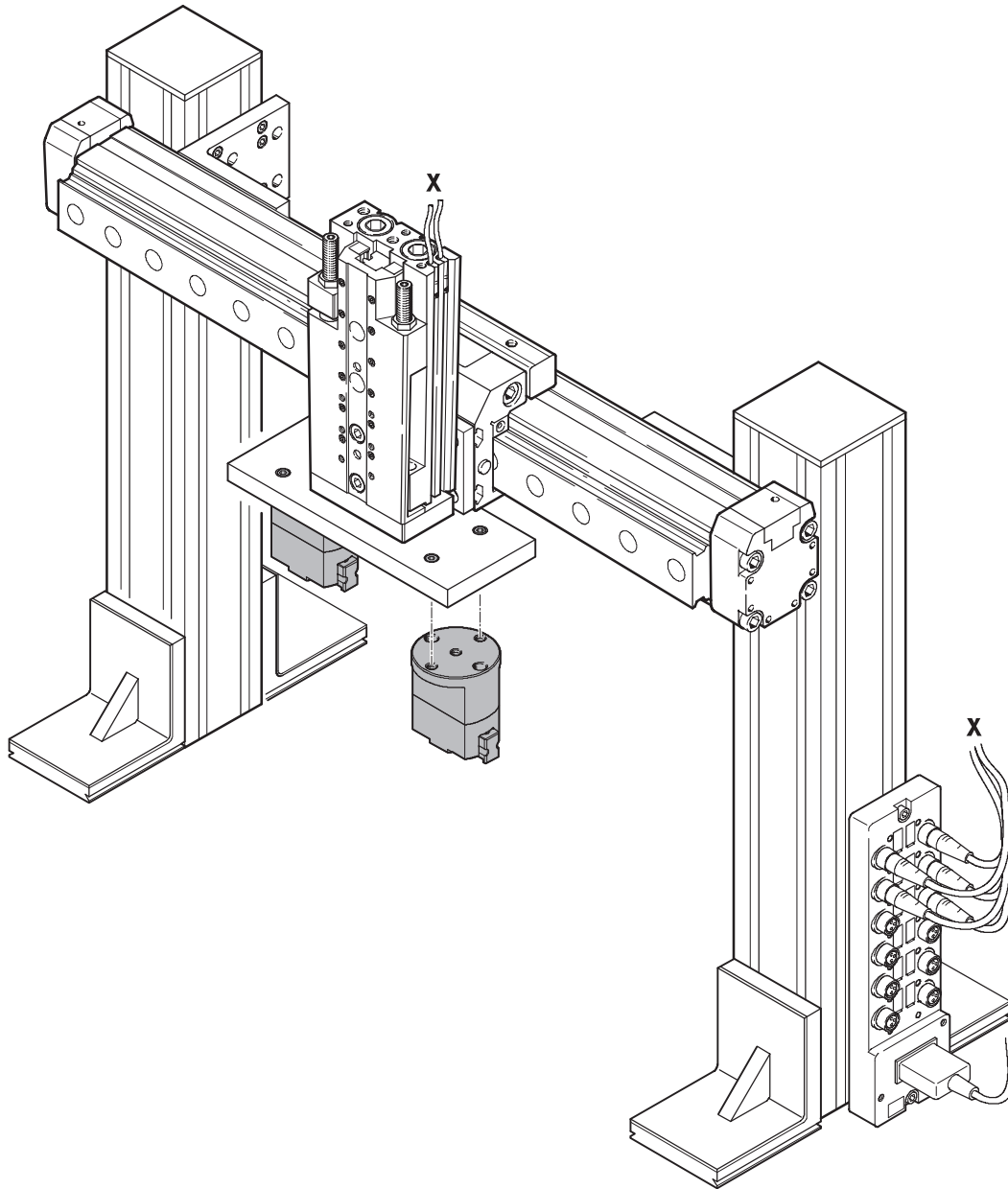
Accessories	
For parallel grippers with clamping flange	
Adapter kits A08 and A12	
	In combination with semi-rotary drives DRQD-6 to 12 → <a href="http://www.festo.com">www.festo.com</a> Adapter kits for drive/gripper combinations → <a href="http://www.festo.com">www.festo.com</a>

# Micro parallel grippers HGPM

Everything from a single source

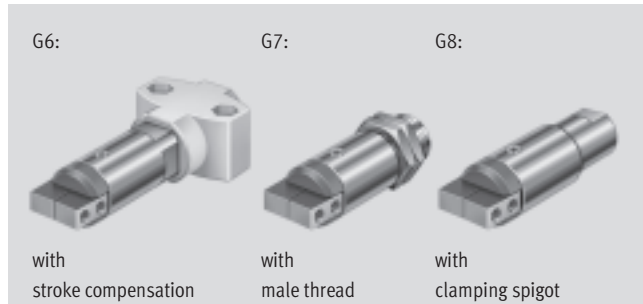
FESTO

## Flexible combinations



# Angle grippers HGWM, micro

Key features



## At a glance

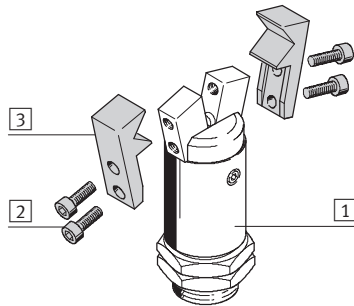
- Compact, handy design
- With open or closed gripper jaws
- Versatility thanks to externally adaptable gripper fingers
- Wide range of options for attaching drive units
- With stroke compensation after installation
- Mounting options:
  - Clamping spigot
  - Male thread




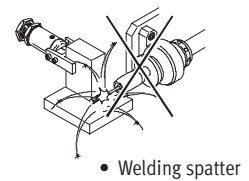
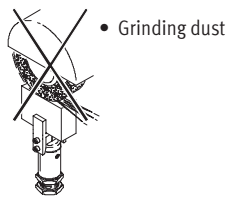
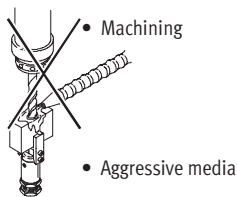
Gripper selection software  
[www.festo.com/en/engineering](http://www.festo.com/en/engineering)

## Mounting options for external gripper fingers (customer-specific)

- 1 Angle gripper
- 2 External gripper fingers
- 3 Mounting screws



-  - Note  
 Grippers are not suitable for the following, or for similar applications:



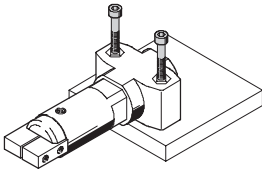


# Angle grippers HGWM, micro

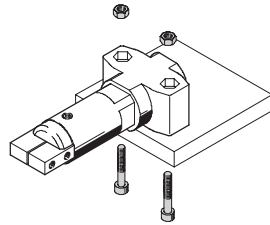
Key features

## Mounting options

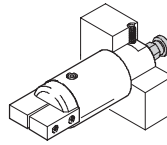
With through-holes



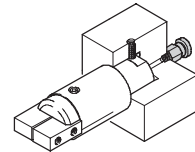
With through-holes, screws and retaining nuts



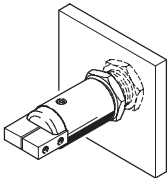
With set screw  
Direct air supply



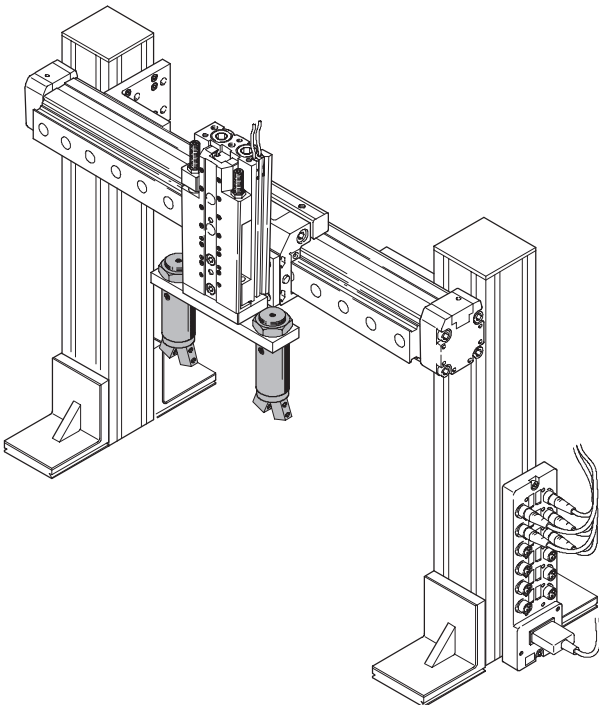
Integrated air supply



With male thread and lock nut



## System product for handling and assembly technology



	→ Page
Drives	<a href="http://www.festo.com">www.festo.com</a>
Grippers	<a href="http://www.festo.com">www.festo.com</a>
Adapters	<a href="http://www.festo.com">www.festo.com</a>
Basic mounting components	<a href="http://www.festo.com">www.festo.com</a>
Installation components	<a href="http://www.festo.com">www.festo.com</a>
Axes	<a href="http://www.festo.com">www.festo.com</a>
Motors	<a href="http://www.festo.com">www.festo.com</a>

# Angle grippers HGWM, micro

Type codes

HGWM – 12 – EO – G8

**Type**

HGWM	Angle gripper
------	---------------

**Size**

**Gripper jaw position**

EO	Open
EZ	Closed

**Mounting options**

G6	With stroke compensation
G7	With male thread
G8	With clamping spigot

# Angle grippers HGWM, micro



Technical data

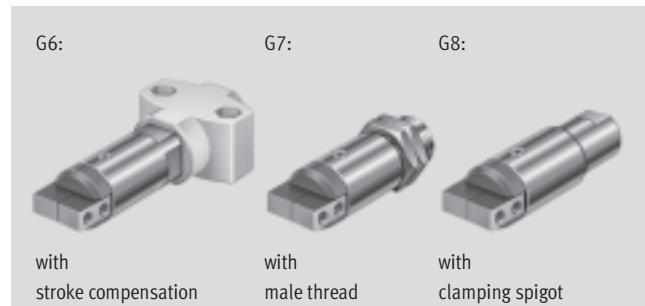
Function  
Single-acting  
with open gripper jaws  
HGWM-...-EO-G...



with closed gripper jaws  
HGWM-...-EZ-G...



Size  
8 ... 12 mm



General technical data				
Size	8		12	
Constructional design	Wedge-shaped drive			
Mode of operation	Single-acting			
Gripper function	Angle			
Number of gripper jaws	2			
Opening angle (±2°)	Gripper jaws open	Open	[°] 20	18.5
		Closed	[°] 4	3.5
	Gripper jaws closed	Open	[°] 14	14
		Closed	[°] 4	4
Spring resetting torque <sup>1)</sup>	Gripper jaws open	[Ncm]	0.5	1.3
	Gripper jaws closed	[Ncm]	0.55	1.5
Pneumatic connection	M3			
Repetition accuracy <sup>2) 3)</sup>	[mm]	< 0.02		
Max. operating frequency	[Hz]	4		
Position sensing	Without			
Type of mounting	HGWM-...-E...-G6	With internally threaded cap screws		
	HGWM-...-E...-G7	With lock nut		
	HGWM-...-E...-G8	Clamped		

- 1) Spring resetting force between the gripper jaws
- 2) End position drift under constant conditions of use with 100 consecutive strokes in the direction of movement of the gripper jaws
- 3) The indicated values are only valid when gripping with compressed air, not with spring force

Operating and environmental conditions	
Min. operating pressure	[bar] 2
Max. operating pressure	[bar] 8
Operating medium	Filtered compressed air, lubricated or unlubricated (grade of filtration 40µm)
Ambient temperature	[°C] +5 ... +60
Corrosion resistance class CRC <sup>1)</sup>	2

- 1) Corrosion resistance class 2 according to Festo standard 940 070  
Components requiring moderate corrosion resistance. Externally visible parts with primarily decorative surface requirements which are in direct contact with a normal industrial environment or media such as coolants or lubricating agents

Weights [g]		
Size	8	12
With stroke compensation	23	75
With male thread	14	52
With clamping spigot	13	45

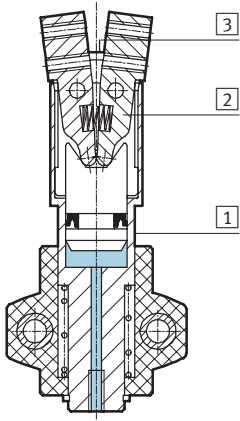
# Angle grippers HGWM, micro

Technical data



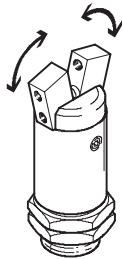
## Materials

Sectional view



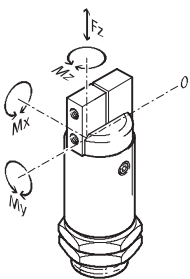
Angle gripper	
1	Body Stainless steel
2	Gripper jaw Stainless steel
3	Cover cap Polyacetate
–	Note on materials Copper, PTFE and silicone-free

## Total gripping torque [Ncm] at 6 bar



Size	8		12	
	HGPM-...EO-...	HGPM-...EZ-...	HGPM-...EO-...	HGPM-...EZ-...
Total gripping torque				
Opening	–	24	–	76
Closing	22	–	64	–

## Characteristic load values at the gripper jaws



The indicated permissible forces and torques apply to a single gripper jaw. Static forces and torques relate to additional applied loads caused by

the workpiece or external gripper fingers, as well as forces which occur during handling. The zero co-ordinate

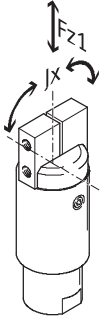
line (gripper jaws point of rotation) must be taken into consideration for the calculation of torques.

Size		8	12
Max. permissible force $F_z$	[N]	7	20
Max. permissible torque $M_x$	[Ncm]	20	40
Max. permissible torque $M_y$	[Ncm]	20	40
Max. permissible torque $M_z$	[Ncm]	20	40

# Angle grippers HGWM, micro

Technical data

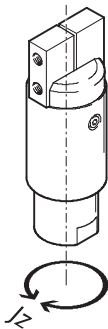
## Applied load [N] and mass moment of inertia [ $\text{kgm}^2 \times 10^{-4}$ ] per external gripper finger



Size	8	12
Applied load $F_{z1}^{1)}$	< 0.04	< 0.1
Mass moment of inertia $J_x^{1)}$	< 0.025	< 0.056

1) Valid for unthrottled operation

## Mass moment of inertia [ $\text{kgm}^2 \times 10^{-4}$ ]

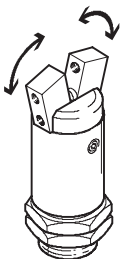


Mass moment of inertia [ $\text{kgm}^2 \times 10^{-4}$ ] for angle grippers in relation to the central axis without external gripper fingers.

Size	8	12
With stroke compensation	0.00705	0.0421
With male thread	0.00315	0.0267
With clamping spigot	0.00252	0.02154

## Opening and closing times [ms] at 6 bar

Without external gripper fingers



The indicated opening and closing times [ms] have been measured at room temperature and 6 bar operating pressure with vertically mounted

gripper and without external gripper fingers. Load is increased if external gripper fingers are attached. This means that kinetic energy is also

increased, as this is determined by gripper finger mass moment of inertia and angular velocity.

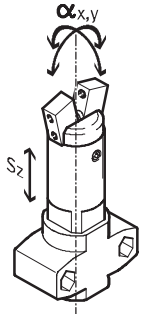
Size		8	12
HGPM-...EO-...	Opening	2.7	3.7
	Closing	1.2	1.8
HGPM-...EZ-...	Opening	1	1.7
	Closing	2.5	2.8

# Angle grippers HGWM, micro

Technical data

## Gripper jaw backlash

Without external gripper fingers

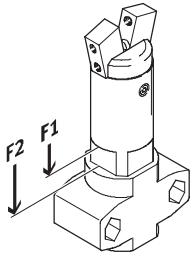


With angle grippers, backlash occurs between the gripper jaws and the guide element due to the plain-bearing guide. The backlash values listed

in the table have been calculated based upon the traditional accumulative tolerance method and usually do not occur with mounted grippers.

Size	8	12
Gripper jaw backlash $s_z$ [mm]	< 0.03	
Gripper jaw angular backlash $\alpha_x, \alpha_y$ [°]	< 0.5	

## Spring displacement forces [N]



Theoretical actuating force due to stroke compensation for design variant with stroke compensation.

Size	8	12
Spring displacement forces $F_1$	4	10
Spring displacement forces $F_2$	6	23

# Angle grippers HGWM, micro

Technical data

## Application example



# Angle grippers HGWM, micro

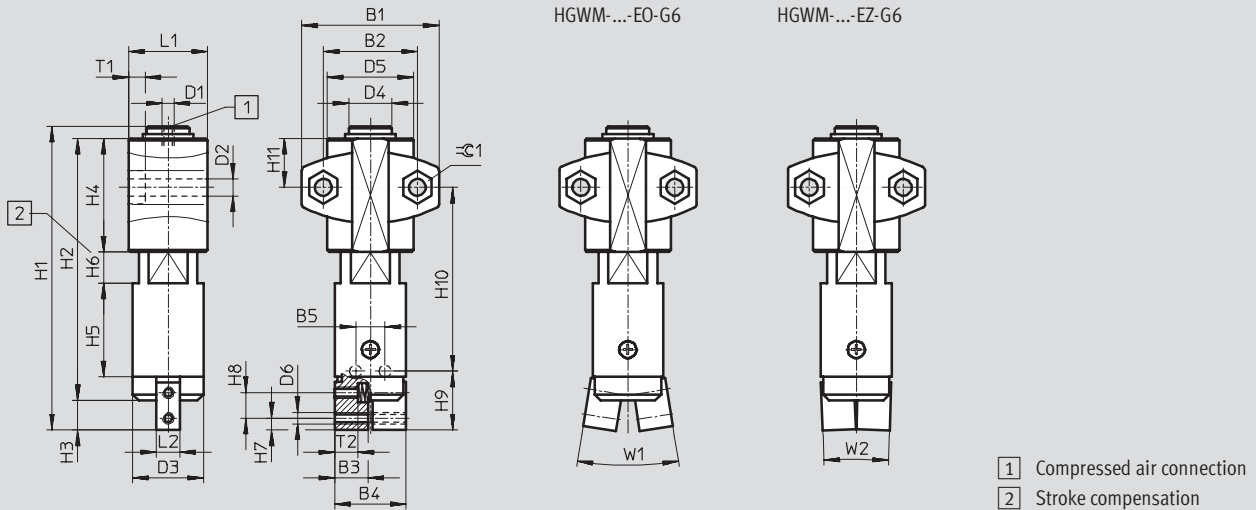
Technical data

FESTO

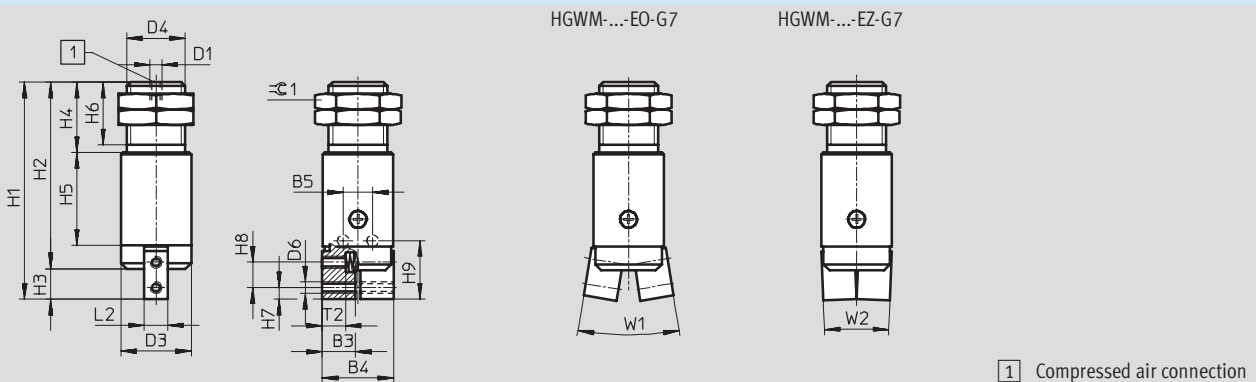
## Dimensions

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

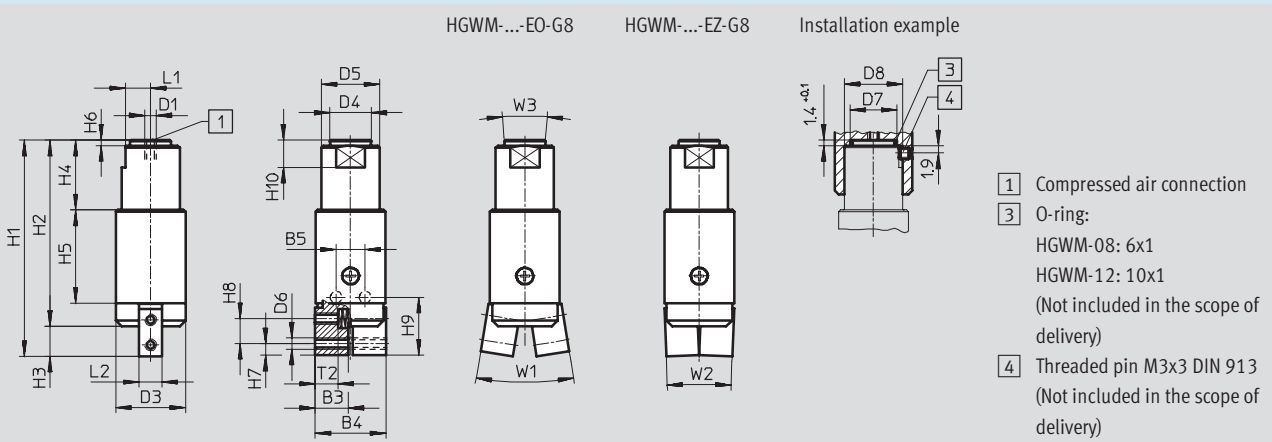
With stroke compensation – HGWM-...-E...-G6



With male thread – HGWM-...-E...-G7



With clamping spigot – HGWM-...-E...-G8





# Angle grippers HGWM, micro

Technical data

FESTO

Type	B1 ±0.1	B2 ±0.25	B3	B4 ±0.3	B5	D1	D2 ∅ +0.1	D3 ∅ +0.1	D4 ∅	D5 ∅	D6
HGWM-08-EO-G6	24	15	5.5	11.8	5 ±0.02	M3	3.4	12	8 -0.02/-0.05	15 ±0.5	M2
HGWM-08-EZ-G6											
HGWM-12-EO-G6	35	24	8.5	18.2	7.5 -0.05	M3	4.5	18	11 -0.02/-0.05	22 ±0.5	M3
HGWM-12-EZ-G6											
HGWM-08-EO-G7	-	-	5.5	11.8	5 ±0.02	M3	-	12	M10x1	-	M2
HGWM-08-EZ-G7											
HGWM-12-EO-G7	-	-	8.5	18.2	7.5 -0.05	M3	-	18	M15x1.5	-	M3
HGWM-12-EZ-G7											
HGWM-08-EO-G8	-	-	5.5	11.8	5 ±0.02	M3	-	12	6.6 -0.03	10 h8	M2
HGWM-08-EZ-G8											
HGWM-12-EO-G8	-	-	8.5	18.2	7.5 -0.05	M3	-	18	10.6 -0.03	15 h8	M3
HGWM-12-EZ-G8											

Type	D7 ∅ +0.1	D8 +0.1	H1 +0.25	H2	H3	H4	H5 +0.1	H6	H7	H8	H9 +0.1
HGWM-08-EO-G6	-	-	54	47 ±0.3	5 ±0.2	22-0.3	16	0 ... 5 +0.6/-0.3	2	4.3	10
HGWM-08-EZ-G6											
HGWM-12-EO-G6	-	-	77.5	67 ±0.3	7.5	29-0.3	24	0 ... 8 +0.6/-0.3	3	6.5	15
HGWM-12-EZ-G6											
HGWM-08-EO-G7	-	-	37	32 +0.3/-0.2	5 ±0.2	12	16	11	2	4.3	10
HGWM-08-EZ-G7											
HGWM-12-EO-G7	-	-	55.5	48 +0.3/-0.2	7.5	18	24	16	3	6.5	15
HGWM-12-EZ-G7											
HGWM-08-EO-G8	8	10	37	32 +0.3/-0.2	5 ±0.2	12	16	1.4 -0.1	2	4.3	10
HGWM-08-EZ-G8											
HGWM-12-EO-G8	12	15	55.5	48 +0.3/-0.2	7.5	18	24	1.4 -0.1	3	6.5	15
HGWM-12-EZ-G8											

Type	H10	H11 ±0.3	L1	L2 -0.02	T1 -0.2	T2 <sup>1)</sup>	W1 ±2°	W2 ±2°	W3 ±2°	≙C1
HGWM-08-EO-G6	32.4 ±0.6	9.5	14.2 -0.2	4	3	3.4 ±0.2	20°	4°	-	5.7
HGWM-08-EZ-G6						-	14°			
HGWM-12-EO-G6	47 ±0.6	12.5	20.2 -0.2	6	4	5.9	18.5°	3.5°	-	7.5
HGWM-12-EZ-G6						-	14°	4°		
HGWM-08-EO-G7	-	-	-	4	-	3.4 ±0.2	20°	4°	-	12
HGWM-08-EZ-G7						-	14°			
HGWM-12-EO-G7	-	-	-	6	-	5.9	18.5°	3.5°	-	19
HGWM-12-EZ-G7						-	14°	4°		
HGWM-08-EO-G8	5	-	4.5 -0.05	4	-	3.4 ±0.2	20°	4°	8°	-
HGWM-08-EZ-G8						-	14°			
HGWM-12-EO-G8	7	-	6.5 -0.05	6	-	5.9	18.5°	3.5°	8°	-
HGWM-12-EZ-G8						-	14°	4°		


1) Do not exceed max. thread screw-in depth

# Angle grippers HGWM, micro

Technical data and accessories

**FESTO**

Ordering data							
Single-acting	Size	Mounting options					
		With stroke compensation		With male thread		With clamping spigot	
	[mm]	Part No.	Type	Part No.	Type	Part No.	Type
Gripper jaws open	8	185 693	HGWM-08-EO-G6	185 694	HGWM-08-EO-G7	185 695	HGWM-08-EO-G8
	12	185 699	HGWM-12-EO-G6	185 700	HGWM-12-EO-G7	185 701	HGWM-12-EO-G8
Gripper jaws closed	8	185 696	HGWM-08-EZ-G6	185 697	HGWM-08-EZ-G7	185 698	HGWM-08-EZ-G8
	12	185 702	HGWM-12-EZ-G6	185 703	HGWM-12-EZ-G7	185 704	HGWM-12-EZ-G8

Accessories	
For angle grippers with clamping flange	
Adapter kits A08 and A12	
	In combination with semi-rotary drives DRQD-6 to 12 → <a href="http://www.festo.com">www.festo.com</a> Adapter kits for drive/gripper combinations → <a href="http://www.festo.com">www.festo.com</a>

## What must be observed when using Festo components?

Specified limit values for technical data and any specific instructions must be adhered to by the user in order to ensure recommended operating conditions.

When pneumatic components are used, the user shall ensure that they are operated using correctly prepared compressed air without aggressive media.

When Festo components are used in safety-oriented applications, the user shall ensure that all applicable

national and local safety laws and regulations, for example the machine directive, together with the relevant references to standards are observed. Unauthorised conversions or modifications to products and systems from Festo involve a safety risk and are thus not permissible.

Festo does not accept any liability for resulting damages.

You should contact Festo's advisors if one of the following apply to your application:

- The ambient conditions and conditions of use or the operating medium differ from the specified technical data.
- The product is to perform a safety function.
- A risk or safety analysis is required.
- You are unsure about the product's suitability for use in the planned application.
- You are unsure about the product's suitability for use in safety-oriented applications.

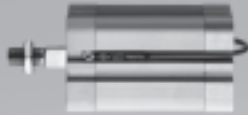
All technical data applies at the time of going to print.

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## Products and services – everything from a single source

Products incorporating new ideas are created when enthusiasm for technology and efficiency come together. Tailor-made service goes without saying when the customer is the focus of attention.



### Pneumatic and electrical drives

- Pneumatic cylinders
- Semi-rotary drives
- Handling modules
- Servopneumatic positioning systems
- Electromechanical drives
- Positioning controllers and controllers



### Valves and valve terminals

- Standard valves
- Universal and application-optimised valves
- Manually and mechanically actuated valves
- Shut-off, pressure control and flow control valves
- Proportional valves
- Safety valves

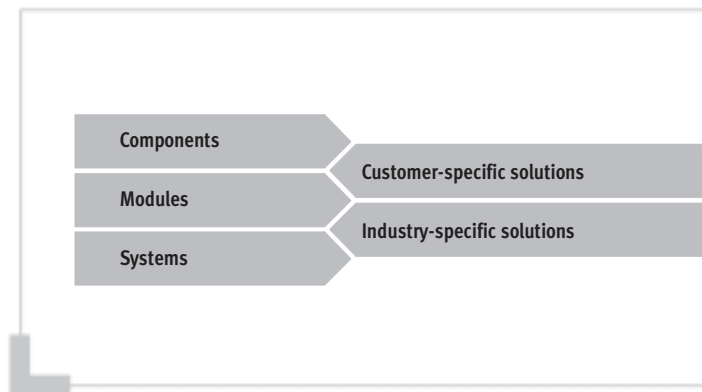
### Fieldbus systems/ electrical peripherals

- Fieldbus Direct
- Installation system CP/CPI
- Modular electrical terminal CPX



### Compressed air preparation

- Service unit combinations
- Filter regulators
- Filters
- Pressure regulators
- Lubricators
- On-off and soft-start valves
- Dryers
- Pressure amplifiers
- Accessories for compressed air preparation



## Services from Festo to increase your productivity – across the entire value creation sequence



### Engineering – for greater speed in the development process

- CAD models
- 14 engineering tools
- Digital catalogue
- FluidDRAW®
- More than 1,000 technical consultants and project engineers worldwide
- Technical hotlines



### Supply chain – for greater speed in the procurement process

- E-commerce and online shop
- Online order tracking
- Euro special manufacturing service
- Logistics optimisation



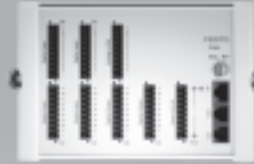
### Gripping and vacuum technology

- Vacuum generators
- Vacuum grippers
- Vacuum security valves
- Vacuum accessories
- Standard grippers
- Micro grippers
- Precision grippers
- Heavy-duty grippers



### Sensors and monitoring units

- Proximity sensors
- Pressure and flow sensors
- Display and operating units
- Inductive and optical proximity sensors
- Displacement encoders for positioning cylinders
- Optical orientation detection and quality inspection



### Controllers/bus systems

- Pneumatic and electropneumatic controllers
- Programmable logic controllers
- Fieldbus systems and accessories
- Timers/counters
- Software for visualisation and data acquisition
- Display and operating units



### Accessories

- Pipes
- Tubing
- Pipe connectors and fittings
- Electrical connection technology
- Silencers
- Reservoirs
- Air guns

### All in all, 100% product and service quality

A customer-oriented range with unlimited flexibility: Components combine to produce ready-to-install modules and systems. Included in this are special designs – since at Festo, most industry-specific products and customer-specific solutions are based on the 23,000 plus catalogue products. Combined with the services for the entire value creation sequence, the end result is unbeatable economy.



### Assembly – for greater speed in the assembly/commissioning process

- Prepack
- Preassembly
- Turnkey pneumatics
- Handling solutions



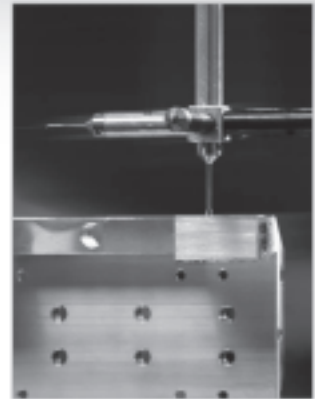
### Operation – for greater speed in the operational process

- Spare parts service
- Energy saving service
- Compressed air consumption analysis
- Compressed air quality analysis
- Customer service

## Aspects of quality

Quality can be viewed from a number of aspects. A short virtual tour of the Research and Development department, the Production department or the Customer Service Centre speaks more than a thousand words.

3D engineering and simulation



### Innovation quality

Let's look at some of the figures:

- 6.5% of turnover
- 2,800 patents with 100 new applications every year
- 3D engineering and simulation
- 10,600 employees worldwide
- Each and every one of them a lateral thinker

### Production quality

Your interest is quality and economy – therefore we place considerable value on:

- Minimum production tolerances
- Ultra-modern, proprietary production methods
- Core competencies in production
- Defined quality standards across the entire production chain
- Strict quality assurance systems: on that you can depend.



#### Price quality

**More service for less money.** Many of the new and further developments in the Festo product range have one thing in common: they are technically superior and more attractively priced than their predecessor product. Examples are to be found in all product segments: among the drives, valves, valve terminals; among the service units, and among the range of accessories.



#### Range quality

**For individual solutions.** Festo offers components as industry-specific catalogue products as well as standards-based and highly individual special designs. Ready-to-install combinations of these components play an integral part in the Festo product portfolio as modules or systems. Incidentally, an increasing number of components can be individually configured as modular products.



#### Didactic quality

**To complement the products and services for automation,** Festo Didactic offers exceptionally efficient training hardware, learning software and seminars of the highest quality. Optimally tailored to your value creation sequence. In short – training in practical applications for practical application.