

**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

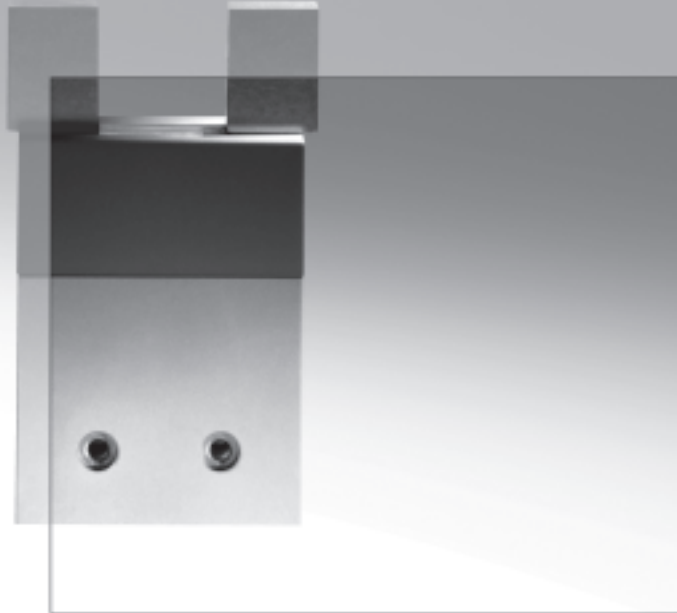
Attractive cost price and extremely long service life.

### 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.

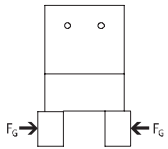
|   | <b>Advantages for designers</b>  | <b>Advantages for purchasers</b>   |
|---|--|--|
| Standardised, application-oriented design | <ul style="list-style-type: none"> <li>• Reduced planning costs</li> <li>• General reduction in fitting space</li> <li>• High gripping forces – small size</li> <li>• 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.

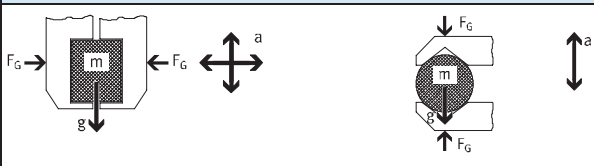
When selecting a gripper you need to determine the gripping force required to hold a workpiece of mass  $m$  [kg]

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

## 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  $M_G$ .

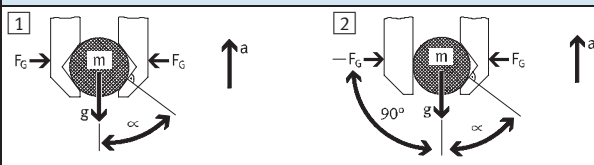
$r, x$  Distance between the gripper zero point and the gripping point (lever arm)

→ 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 ( $\approx 10 \text{ m/s}^2$ ) is required if acting against the acceleration  $a$

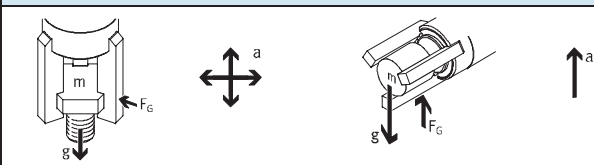
$a$  Acceleration [m/s<sup>2</sup>] arising from the dynamic movement

$S$  Safety factor

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

Three-point gripper

Mechanical locking

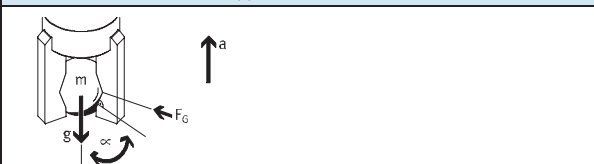


$$F_G = m \times (g + a) \times S$$

$\alpha$  Angle of V-gripper finger

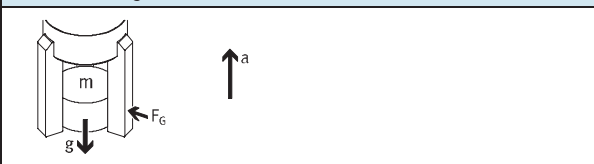
$\mu$  Coefficient of friction between gripper finger and workpiece

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

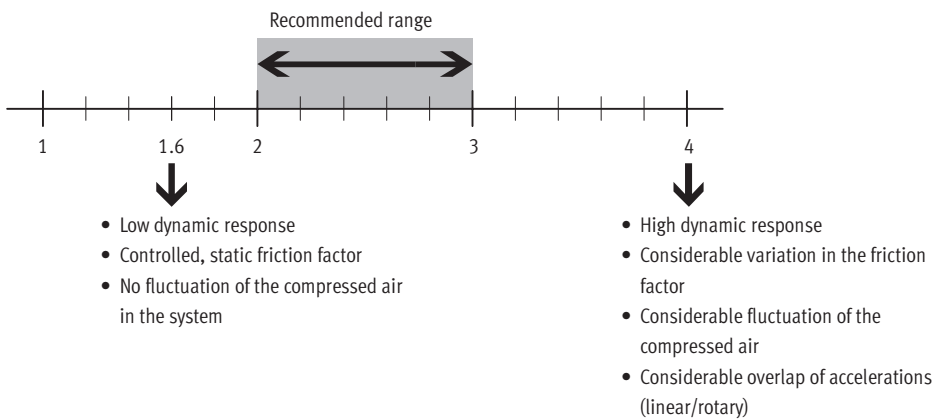
## Max. acceleration values with different drive types

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 $\mu$

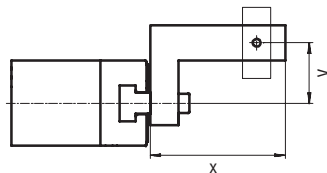
|                        |     | Workpiece surface |      |      |      |      |
|------------------------|-----|-------------------|------|------|------|------|
|                        |     | ST                | STL  | AL   | ALI  | R    |
| Gripper finger surface | ST  | 0.25              | 0.15 | 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

-  - Note

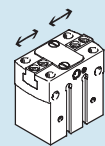

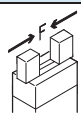
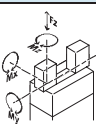
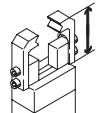
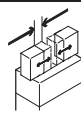
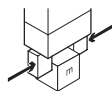
1) The workpiece mass has been calculated based on the gripping principle "Positive locking with V-gripper" using the variable values specified below.  
 → 4:  
 - Parallel gripper



- 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:

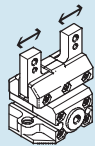
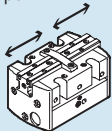
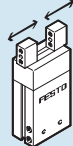
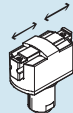
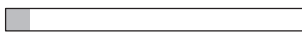
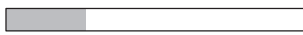
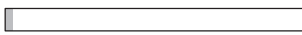





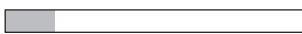


- Workpiece retention in case of loss of compressed air
- As a single-acting gripper
- Acts to increase gripping force

| Selection criteria/gripper types  |  |  |       |
|---|--|--|-------|
| Parallel gripper HGPT   |                                      | Parallel gripper HGPL  |       |
| Workpiece mass <sup>1)</sup> [kg]   |  |  |       |
|    | Up to 12 kg<br>S = 2<br>x = 40 mm  | Up to 9.7 kg<br>S = 2<br>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<br>↔↔↔  | 40 ... 80<br>↔↔↔↔↔   |       |
| 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

FESTO

| Selection criteria/gripper types  |   |   |   |
|---|---|---|---|
| Parallel gripper<br>HGPC             | Precision parallel gripper<br>HGPP   | Parallel gripper<br>HGP            | Micro-parallel gripper<br>HGPM       |
| Workpiece mass <sup>1)</sup> [kg]   |   |   |   |
| Up to 1.05 kg<br>S = 3<br>x = 40 mm  | Up to 6.7 kg<br>S = 2<br>x = 40 mm   | Up to 3.4 kg<br>S = 3<br>x = 40 mm  | Up to 0.17 kg<br>S = 3<br>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<br>                       | 80 ... 830<br>                       | 20 ... 700<br>                      | 16 ... 28<br>                        |
| 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<br>                        | Max. 160<br>                       | Max. 100<br>                      | Max. 30<br>                        |
| Gripper stroke per gripper jaw [mm]   |   |   |   |
| 3 ... 7<br>                        | 2 ... 12.5<br>                     | 2 ... 12.5<br>                    | 2 ... 3<br>                        |
| 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<br>– Integrated sensors  | – High precision thanks to gripper jaw with ball bearing guide<br>– Integrated sensors<br>– 3 positions can be sensed | – Dust-protected variant: HGP-16/-25...-SSK<br>– Cost-effective<br>– Integrated sensors                               | – Single-acting<br>– 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<br>HGDS                                    |  | Precision proportional parallel gripper<br>HGPP1  |   |
| Workpiece mass <sup>1)</sup> [kg]                              |  |   |   |
|  | Up to 1.2 kg<br>$S = 2$<br>$x = 40 \text{ mm}$                             | Up to 1 kg<br>$S = 2$<br>$x = 40 \text{ mm}$  |   |
| 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<br>↔   | Swivel angle<br>0 ... 210°<br>↻   | 0 ... 10<br>↔<br>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<br>- Compact<br>- Integrated sensors | - Gripper jaws can be positioned freely and independently<br>- High precision thanks to gripper jaw with ball bearing guide |   |
| Technical data and dimensions                                  |  |   |   |
| Further information  | → Info 135   | → Info 157  |   |



# Three-point gripper

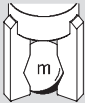
Selection aid

-  - Note

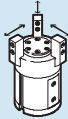
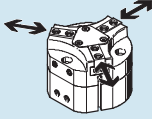

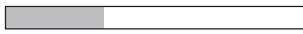

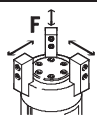


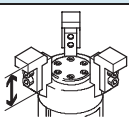


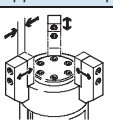


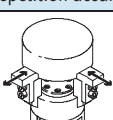
1) The workpiece mass has been calculated based on the gripping principle "Positive locking with V-gripper" using the variable values specified below.

→ 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<br>HGD             | Three-point gripper<br>HGDT             |       |
| Workpiece mass <sup>1)</sup> [kg]   |  |  |       |
|    | Up to 3.8 kg<br>S = 3<br>x = 40 mm<br> | Up to 12.7 kg<br>S = 2<br>x = 40 mm<br> |       |
| Gripping force (external gripping) [N] at 6 bar                                     |  |  |       |
|    | F per gripper jaw  |  |       |
|   | 30 ... 300   | 70 ... 550   |       |
|   | F total  |  |       |
|   | 90 ... 900   | 210 ... 1 650<br>                        |       |
| 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<br>                         | Max. 140<br>                          |       |
| Gripper stroke per gripper jaw [mm]   |  |  |       |
|  | 2.5 ... 6<br>                        | 3 ... 10<br>                          |       |
| 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<br>- Integrated sensors                                     | - Sturdy T-slot<br>- Sealing air<br>- Integrated sensors   |       |
| Technical data and dimensions   |  |  |       |
| Further information   | → 26   | → Info 139   |       |

# Radial gripper


Selection aid

-  - Note

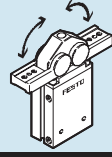

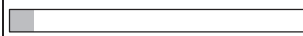
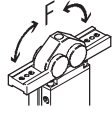
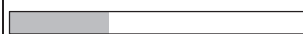
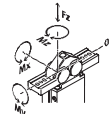
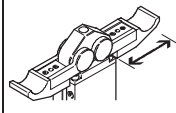

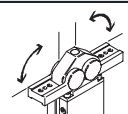
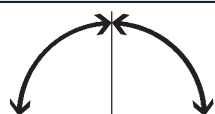
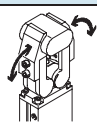
1) The workpiece mass has been calculated based on the gripping principle "Positive locking with V-gripper" using the variable values specified below.

→ 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<br>HGR   |   |        |    |         |   |         |    |         |   |
| Workpiece mass <sup>1)</sup> [kg]   |  |        |    |         |   |         |    |         |   |
|    | Up to 1 kg<br><br>$S = 3$<br>$r = 30 \text{ mm}$   |        |    |         |   |         |    |         |   |
| Total gripping torque (external gripping) [Ncm] at 6 bar                            |  |        |    |         |   |         |    |         |   |
|    | 13 ... 500<br>   |        |    |         |   |         |    |         |   |
| Maximum permissible characteristic load values at the gripper jaw                   |  |        |    |         |   |         |    |         |   |
|   | <table border="1"> <tr><td>Fz [N]</td><td>80</td></tr> <tr><td>Mx [Nm]</td><td>2</td></tr> <tr><td>My [Nm]</td><td>10</td></tr> <tr><td>Mz [Nm]</td><td>7</td></tr> </table> | Fz [N] | 80 | Mx [Nm] | 2 | My [Nm] | 10 | Mz [Nm] | 7 |
| Fz [N]  | 80   |        |    |         |   |         |    |         |   |
| Mx [Nm]   | 2  |        |    |         |   |         |    |         |   |
| My [Nm]   | 10   |        |    |         |   |         |    |         |   |
| Mz [Nm]   | 7  |        |    |         |   |         |    |         |   |
| Gripper finger length [mm]  |  |        |    |         |   |         |    |         |   |
|  | Max. 120<br>   |        |    |         |   |         |    |         |   |
| Gripping angle per gripper jaw [°]  |  |        |    |         |   |         |    |         |   |
|  | -1 ... +90<br>  |        |    |         |   |         |    |         |   |
| Repetition accuracy [mm]  |  |        |    |         |   |         |    |         |   |
|  | ≤ 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

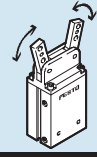
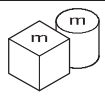
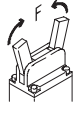
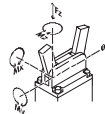
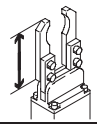
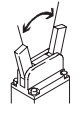
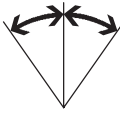
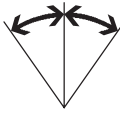
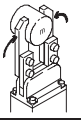
1) The workpiece mass has been calculated based on the gripping principle "Positive locking with V-gripper" using the variable values specified below.

→ 4:

- Angle gripper

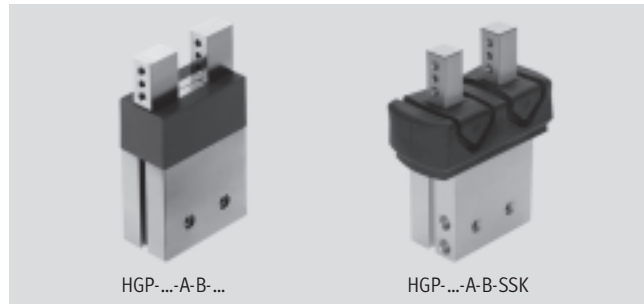


- Variable values:
  - $a = 50 \text{ m/s}^2$
  - $g + a = 60 \text{ m/s}^2$
  - $\alpha = 45^\circ$
  - $\tan \alpha = 1$
  - S and r → Workpiece mass

| Selection criteria/gripper types  |  |  |
|---|--|--|
| Angle gripper HGW   |                                 | Micro-angle gripper HGWM   |
| Workpiece mass <sup>1)</sup> [kg]   |  |  |
|    | Up to 2 kg<br>S = 3<br>r = 30 mm   | Up to 0.2 kg<br>S = 3<br>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



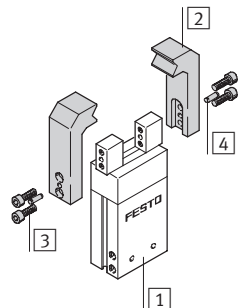
## At a glance

- 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



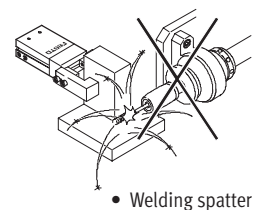
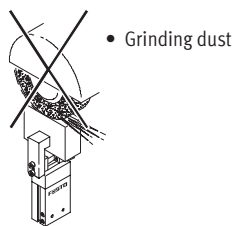
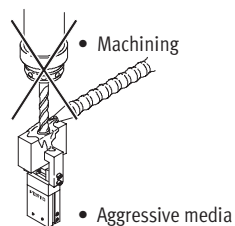
## With protective dust cap

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:

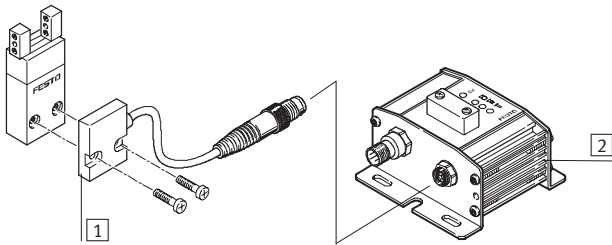


# Parallel grippers HGP

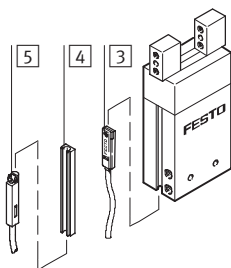
Peripherals overview and type codes

## Peripherals overview

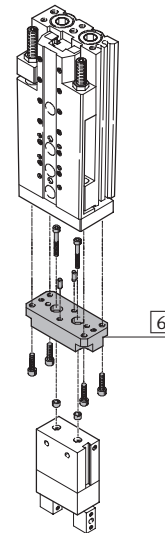
HGP-06



HGP-10 ... 35



## System product for handling and assembly technology



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

## Type codes

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

# Parallel grippers HGP

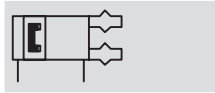
Technical data



## Function

Double-acting

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



⌀ - Size  
6 ... 35 mm

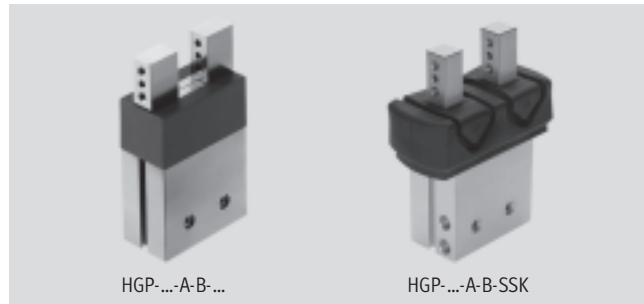
- | - Stroke  
4 ... 25 mm

## 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   |    |    |    |    |
|  | 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

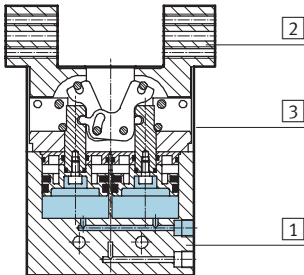
| Weights [g]              |    |    |     |     |     |       |
|--------------------------|----|----|-----|-----|-----|-------|
| Size                     | 6  | 10 | 16  | 20  | 25  | 35    |
| HGP-...-A                | 18 | 75 | 194 | 396 | 725 | 1 369 |
| HGP-...-G1               | -  | 76 | 197 | 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

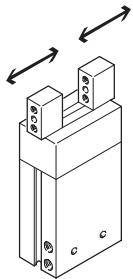
## Materials

Sectional view



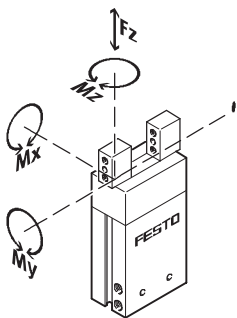
| Parallel gripper          | 6                              | 10                      | 16                        | 20 | 25                        | 35 |
|---------------------------|--------------------------------|-------------------------|---------------------------|----|---------------------------|----|
| 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.

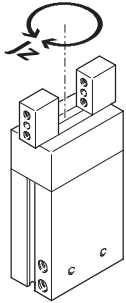
The zero co-ordinate line (gripper jaw guide) must be taken into consideration for the calculation of torques.

| 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 [ $\text{kgm}^2 \times 10^{-4}$ ]



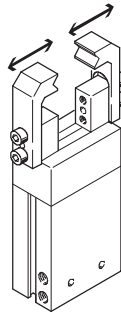
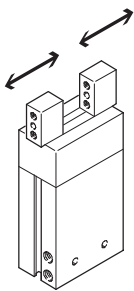
Mass moment of inertia [ $\text{kgm}^2 \times 10^{-4}$ ] for parallel grippers in relation to the central axis, without external gripper fingers, without load.

| 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 |     |

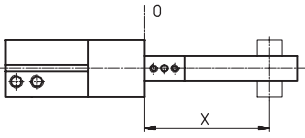


# Parallel grippers HGP

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)

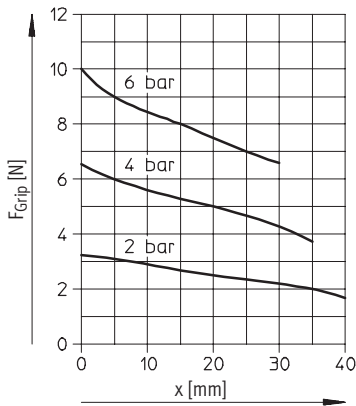


Gripping forces can be determined with the following diagrams for the various sizes in relation to operating

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

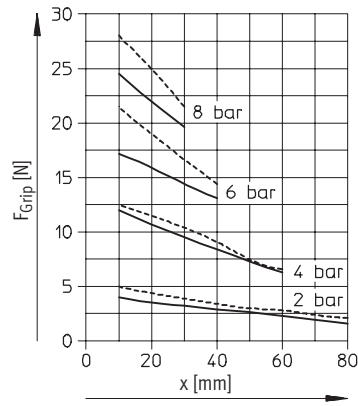
opposite to the pressure point at which the fingers grip the workpiece).

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

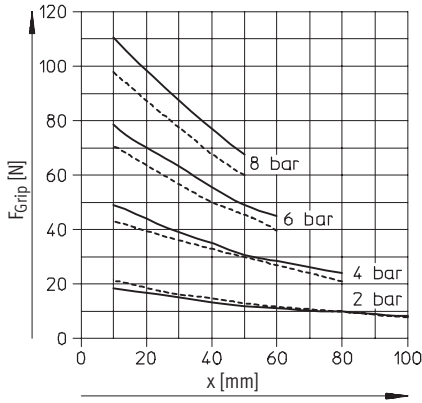


1) Due to the design, the opening and closing gripping forces for HGP-06-A are identical

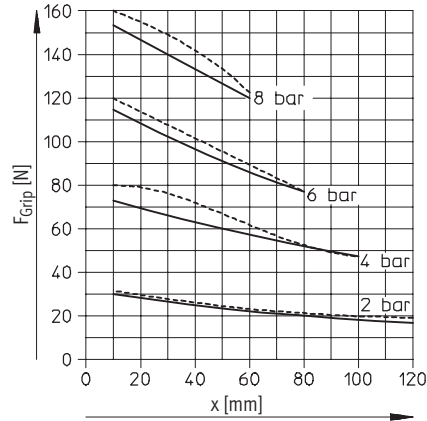
### HGP-10-A-B



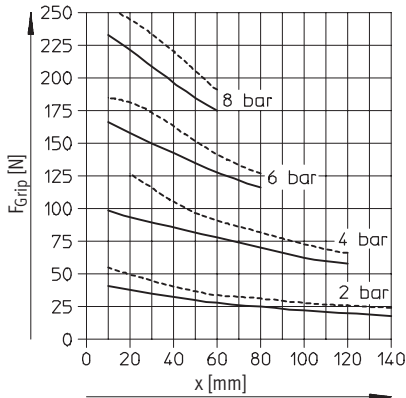
### HGP-16-A-B



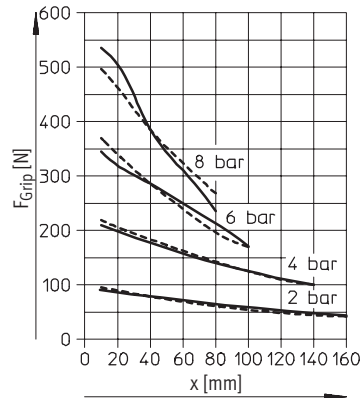
### HGP-20-A-B



### HGP-25-A-B



### HGP-35-A-B

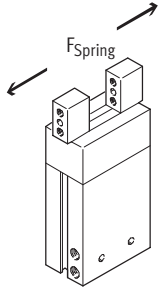


— Closing  
 - - - Opening

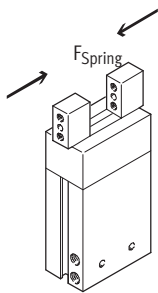
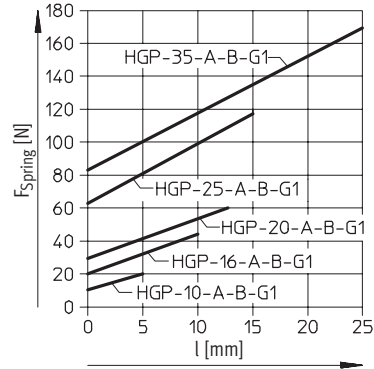
# Parallel grippers HGP

Technical data

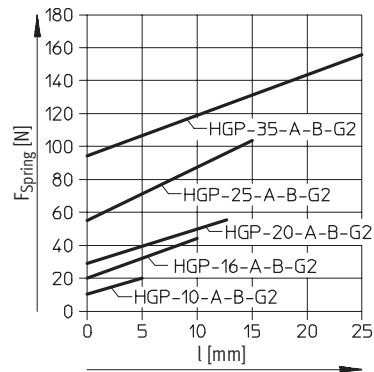
## Spring force $F_{Spring}$ as a function of the gripper size and overall stroke length $l$



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:  
 $F_{Gr} = F_{Spring}$

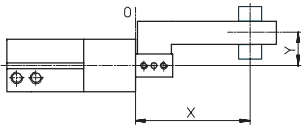
|            |         | Pressurised (in gripping action) | Unpressurised         |
|------------|---------|----------------------------------|-----------------------|
| HGP        | Opening | $F_{Gr} = F_{Grip}$              | $F_{Gr} = 0$          |
|            | Closing | $F_{Gr} = F_{Grip}$              | $F_{Gr} = 0$          |
| 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:

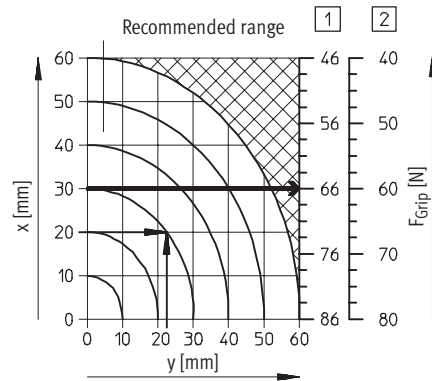
Gripping force at 6 bar

Procedure:

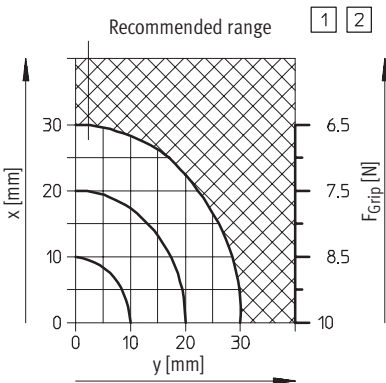
- Determine the intersection  $xy$  between lever arm  $x$  and eccentricity  $y$  in the graph for HGP-16-A-B
- Draw an arc (with centre at origin) through intersection  $xy$
- Determine the intersection between the arc and the X axis
- Read the gripping force

Result:

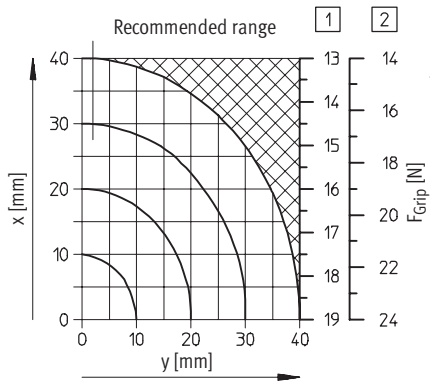
Gripping force = approx. 66 N



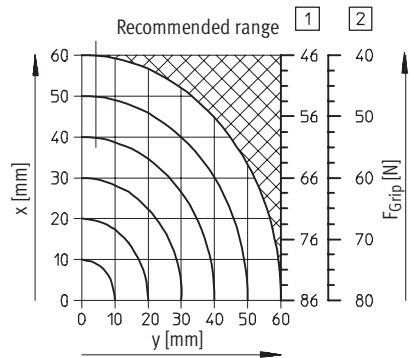
HGP-06-A



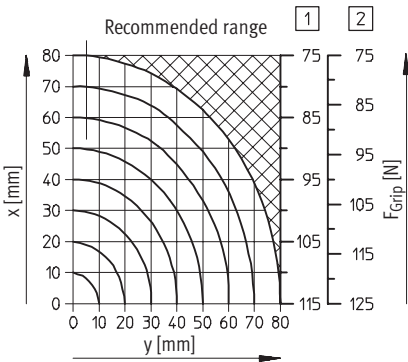
HGP-10-A-B



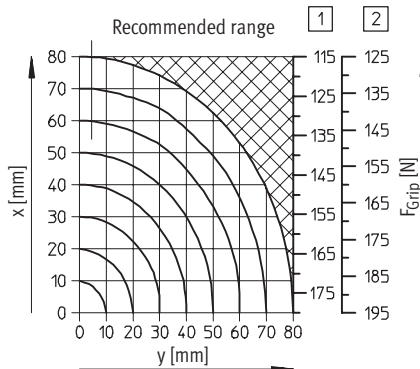
HGP-16-A-B



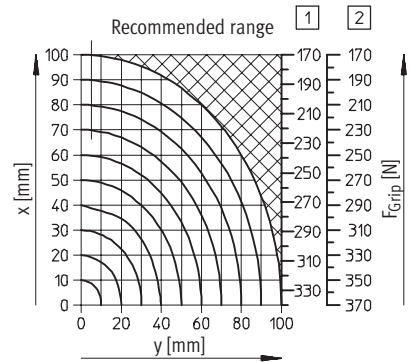
HGP-20-A



HGP-25-A-B



HGP-35-A-B



- 1 Closing
- 2 Opening

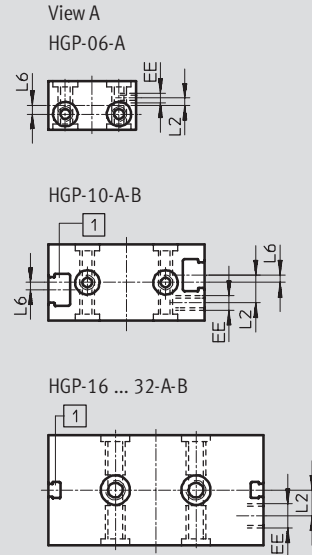
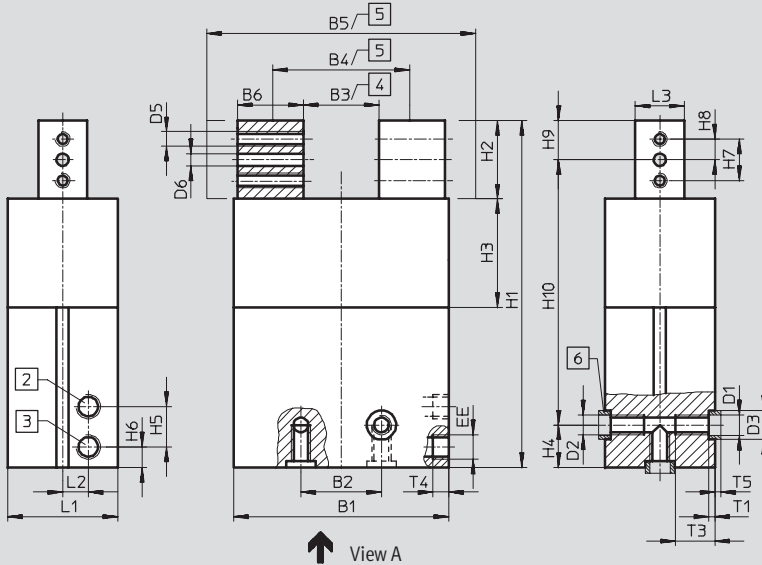
# Parallel grippers HGP

Technical data



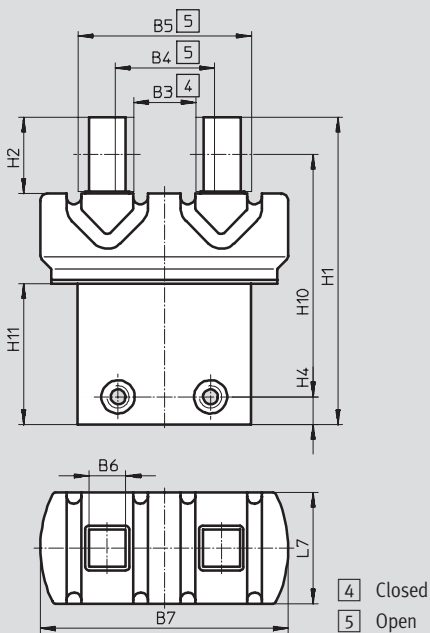
## Dimensions

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



- |   |   |
|---|---|
| <p>1 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>2 Compressed air connection, opening</p> <p>3 Compressed air connection, closing</p> <p>4 Closed</p> <p>5 Open</p> <p>6 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
- QSMLL-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<br>[mm]             | Double-acting<br>Without compression spring |                | Gripper retention force G1<br>Open |               | Gripper retention force G2<br>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<br>[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

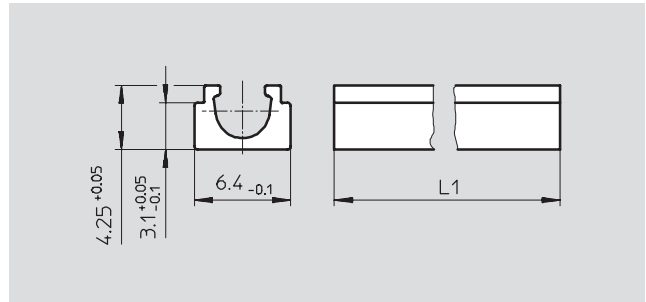


## Sensor rail HGP-SL

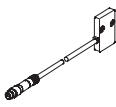


can be glued into place

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   | SMT-8-PS-S-LED-24-B    |
| <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 | 0.3              | 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  |  |







# 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                | –       | –                | –                    | 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

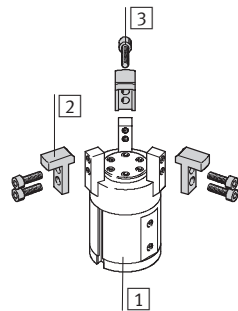
- Double-acting piston drive
- Self-centring
- Variable gripping action:
  - External/internal gripping
- Versatility thanks to externally adaptable gripper fingers
- Wide range of options for mounting on drive units
- Maximum precision
- High holding force
- Sensor technology:
  - Adaptable proximity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




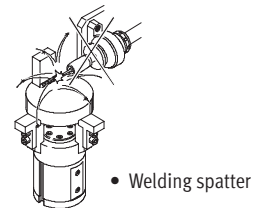
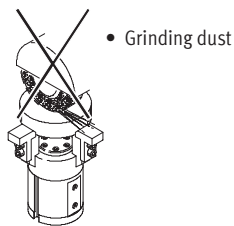
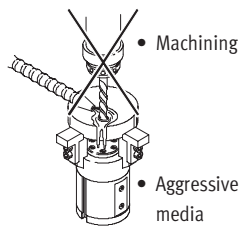
Gripper selection software  
[www.festo.com/en/engineering](http://www.festo.com/en/engineering)

## 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:

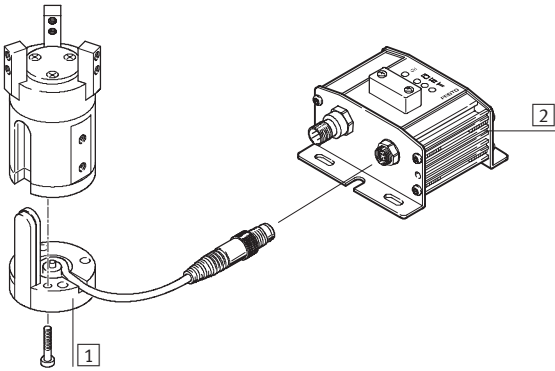


# Three-point grippers HGD

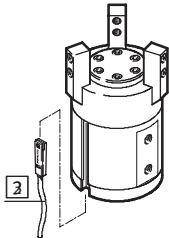
Peripherals overview and type codes

## Peripherals overview

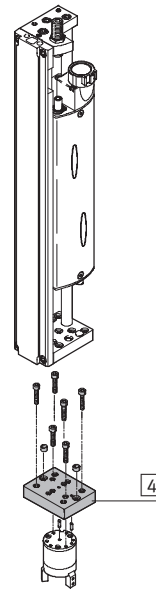
HGD-16



HGD-32/-50



## System product for handling and assembly technology



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

## Type codes

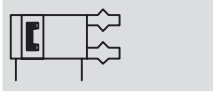
|                         |                       |   |    |   |   |
|-------------------------|-----------------------|---|----|---|---|
| HGD                     |                       | – | 16 | – | A |
| <b>Type</b>             |                       |   |    |   |   |
| HGD                     | 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

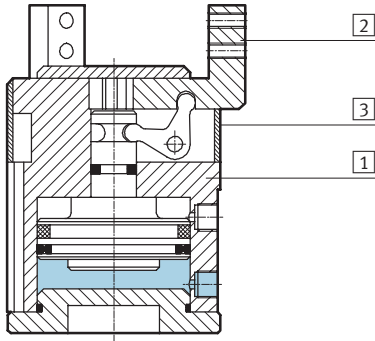
| Weights [g] |     |     |     |
|-------------|-----|-----|-----|
| Size        | 16  | 32  | 50  |
| HGD         | 110 | 300 | 985 |

# Three-point grippers HGD

Technical data

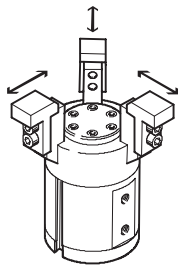
## Materials

Sectional view



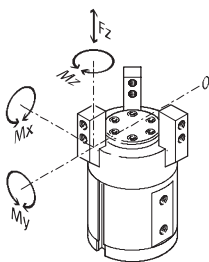
| Three-point gripper |                   |                                 |
|---------------------|-------------------|---------------------------------|
| 1                   | Body              | Nickel-plated aluminium         |
| 2                   | Gripper jaw       | High-alloy steel, nickel 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

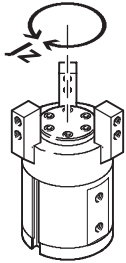
line (gripper jaws point of rotation) must be taken into consideration for the calculation of torques.

| 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 [ $\text{kgm}^2 \times 10^{-4}$ ]



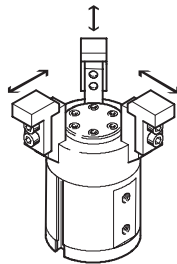
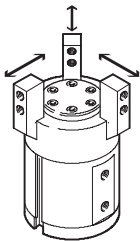
Mass moment of inertia [ $\text{kgm}^2 \times 10^{-4}$ ] for three-point grippers in relation to the central axis, without external gripper fingers, without load.

| 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.

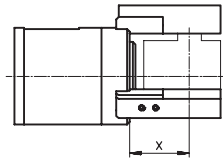
| Size  |         | 16 | 32  | 50  |
|---|---------|----|-----|-----|
| Without external gripper fingers                              |         |    |     |     |
| HGD   | Opening | 5  | 10  | 10  |
|   | Closing | 5  | 10  | 10  |
| With external gripper fingers (as a function of applied load) |         |    |     |     |
| 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

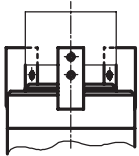


Gripping torques can be determined with the following diagrams for the various sizes in relation to operating

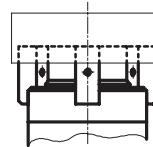
pressure and lever arm (distance from the zero co-ordinate line shown above

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

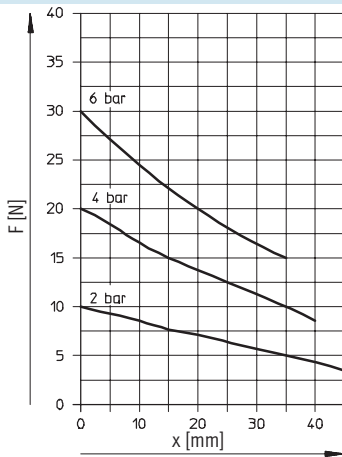
### External gripping (closing)



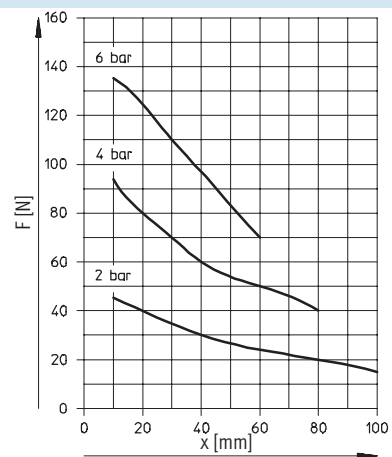
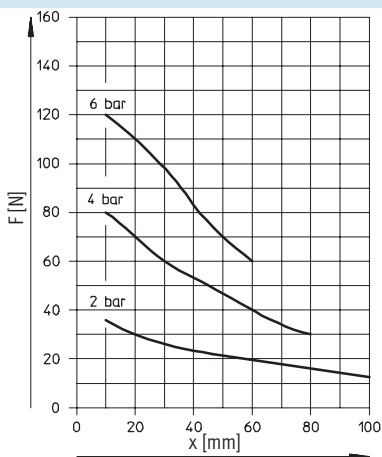
### Internal gripping (opening)



### HGD-16-A



### HGD-32-A



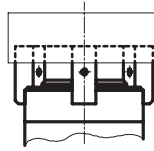
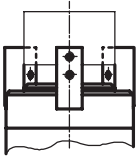
# Three-point grippers HGD

Technical data

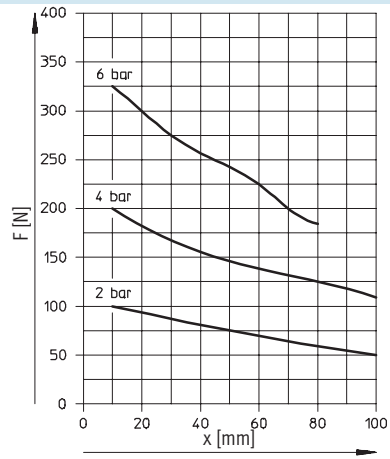
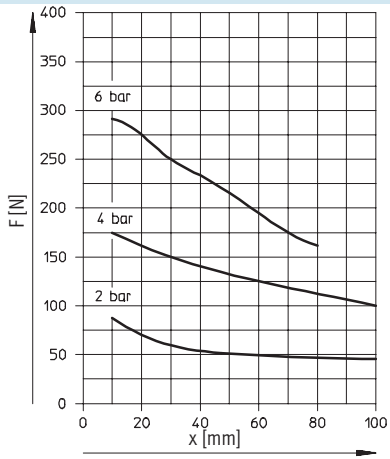
## Gripping force F per gripper as a function of operating pressure and the lever arm x

External gripping (closing)

Internal gripping (opening)



### HGD-50-A





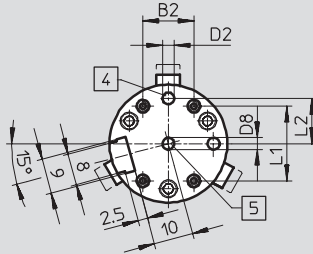
# Three-point grippers HGD

Technical data

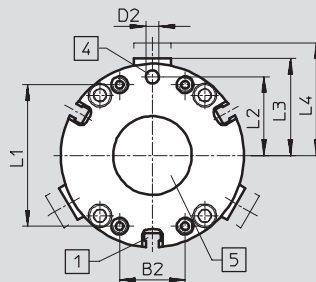


Dimensions Download CAD data → [www.festo.com/en/engineering](http://www.festo.com/en/engineering)

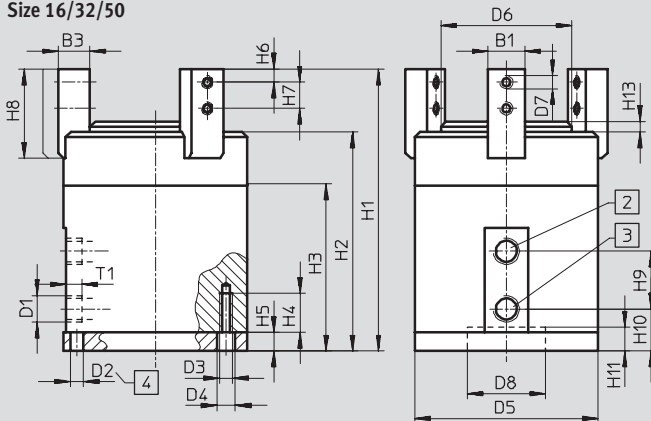
## Size 16



## 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 |    | ∅<br>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    |

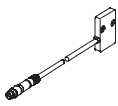

| Ordering data |               |          |
|---------------|---------------|----------|
| Size          | Double-acting |          |
| [mm]          | Part No.      | Type     |
| 16            | 174 819       | HGD-16-A |
| 32            | 161 837       | HGD-32-A |
| 50            | 161 838     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

| Ordering data – Wearing parts kits |          |          |
|------------------------------------|----------|----------|
| Size                               |          |          |
| [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

FESTO

| 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

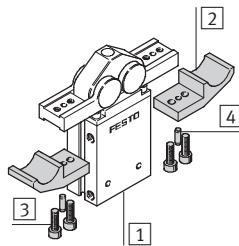
- Double-acting piston drive
- Self-centring
- Variable gripping action:
  - External/internal gripping
- Versatility thanks to externally adaptable gripper fingers
- Wide range of options for mounting on drive units
- Constant gripping torque over the entire angle range
- 180° opening angle
- Internal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




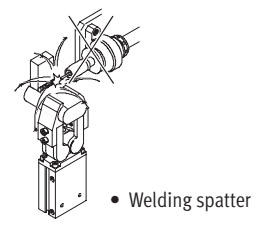
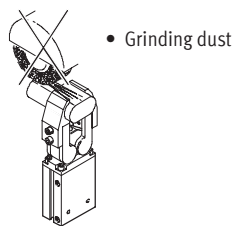
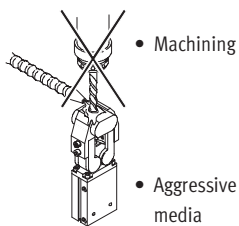
Gripper selection software  
[www.festo.com/en/engineering](http://www.festo.com/en/engineering)

## 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:

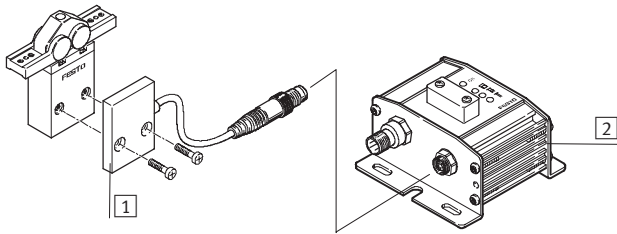


# Radial grippers HGR

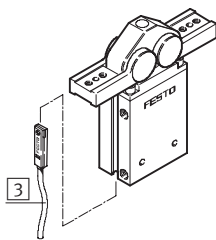
Peripherals overview and type codes

## Peripherals overview

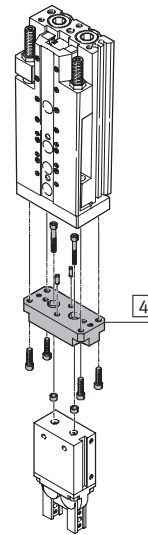
HGP-10



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

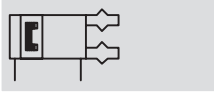
|                         |                       |   |    |   |   |
|-------------------------|-----------------------|---|----|---|---|
| HGR                     |                       | – | 16 | – | A |
| <b>Type</b>             |                       |   |    |   |   |
| HGR                   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

# Radial grippers HGR

Technical data



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 |    |    |      |    |

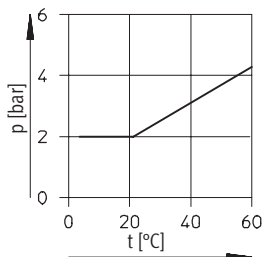
1) End position drift under constant conditions of use with 100 consecutive strokes in the direction of movement of the gripper jaws

| 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



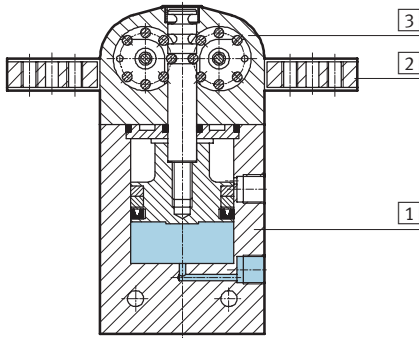
| Weights [g] |    |     |     |     |     |
|-------------|----|-----|-----|-----|-----|
| Size        | 10 | 16  | 25  | 32  | 40  |
| HGR         | 39 | 110 | 250 | 420 | 710 |

# Radial grippers HGR

Technical data

## Materials

Sectional view

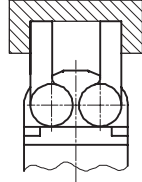
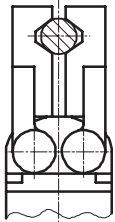


| Radial gripper |                   |                                |
|----------------|-------------------|--------------------------------|
| 1              | Body              | Hard anodised aluminium        |
| 2              | Gripper jaw       | Hard anodised aluminium        |
| 3         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

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

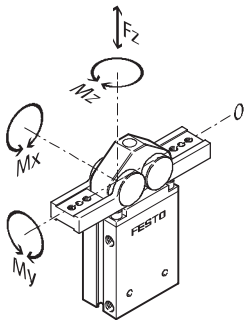
External gripping

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

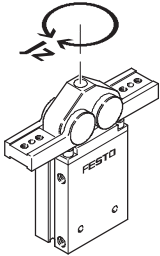
line (gripper jaws point of rotation) must be taken into consideration for the calculation of torques.

| 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 [ $\text{kgm}^2 \times 10^{-4}$ ]



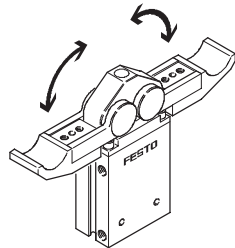
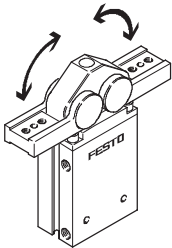
Mass moment of inertia [ $\text{kgm}^2 \times 10^{-4}$ ] for radial grippers in relation to the central axis, without external gripper fingers, without load.

| 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 |         |    |    |    |    |     |

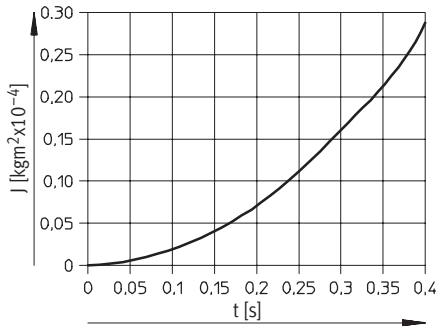


# Radial grippers HGR

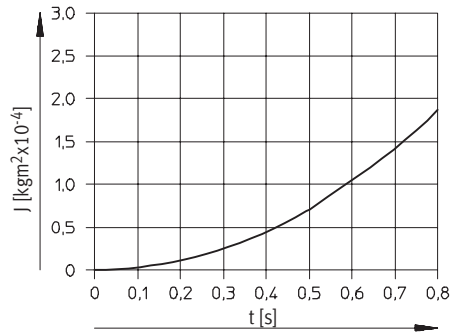
Technical data

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

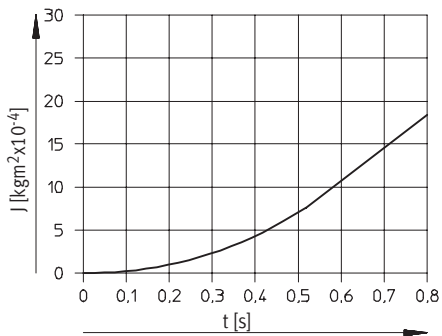
HGR-10-A



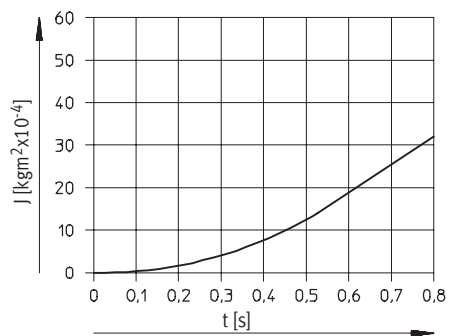
HGR-16-A



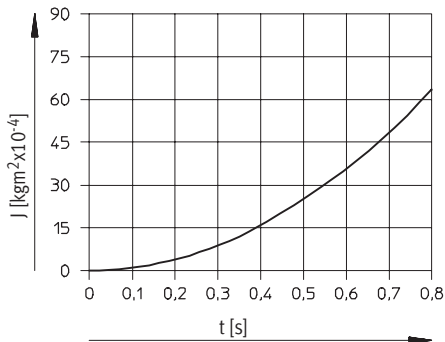
HGR-25-A



HGR-32-A



HGR-40-A



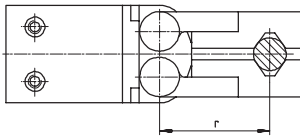
# Radial grippers HGR

Technical data



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

Gripping forces

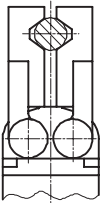


Gripping forces can be determined with the following diagrams for the various sizes in relation to operating

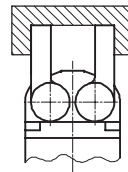
pressure and lever arm (distance from the zero co-ordinate line shown oppo-

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

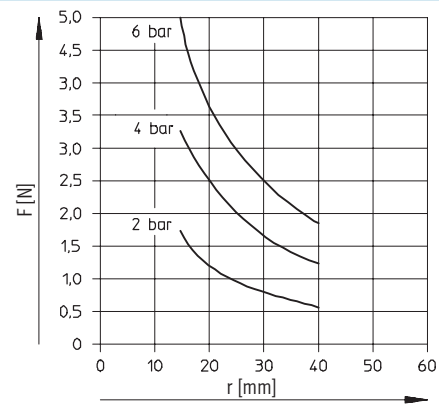
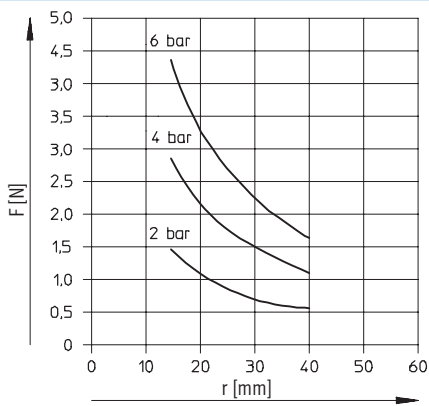
### External gripping (closing)



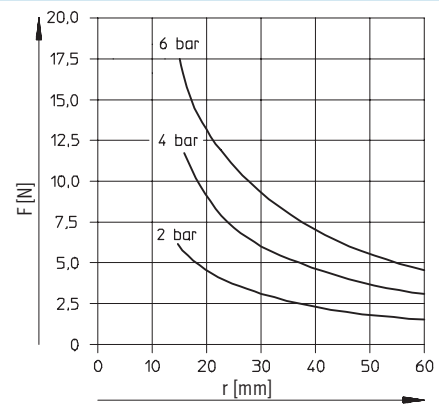
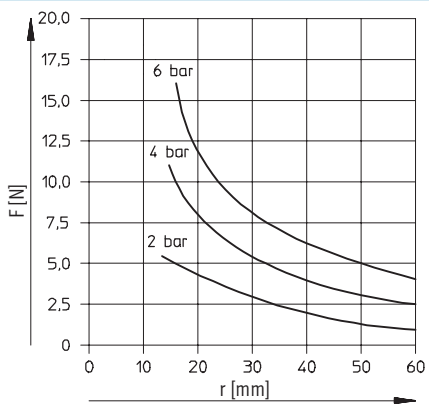
### Internal gripping (opening)



### HGR-10-A



### HGR-16-A



# Radial grippers HGR

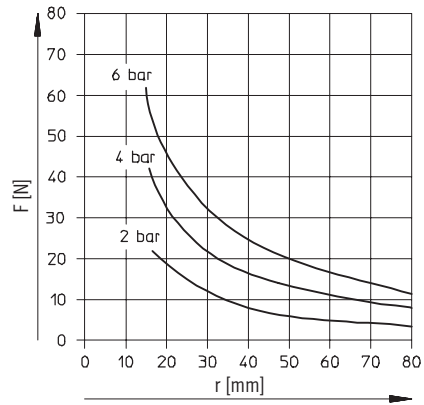
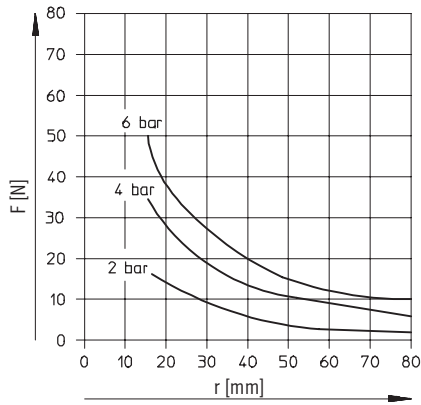
Technical data

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

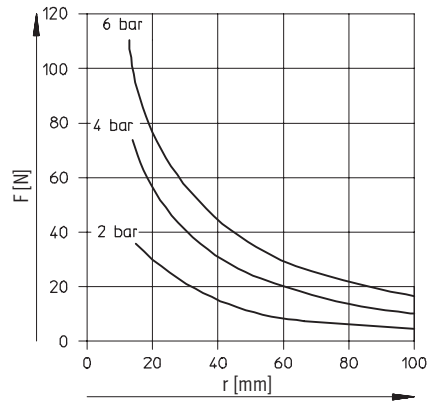
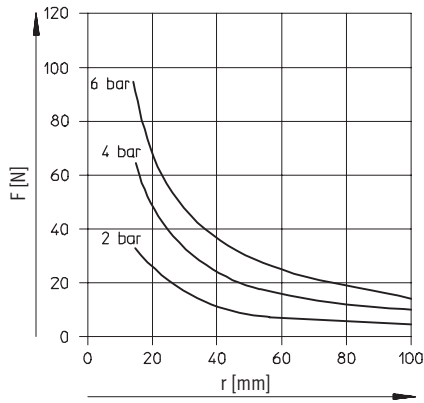
External gripping (closing)

Internal gripping (opening)

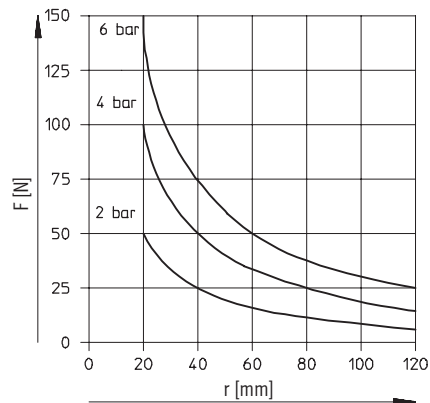
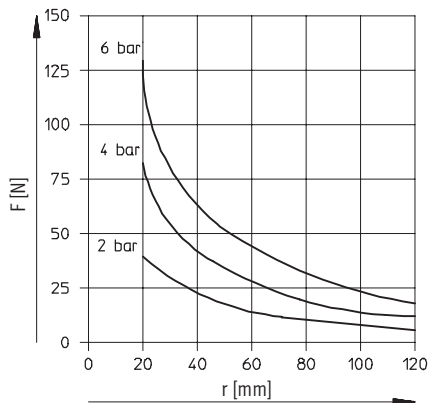
HGR-25-A



HGR-32-A



HGR-40-A



# Radial grippers HGR

Technical data

FESTO

**Dimensions** 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 |      |      |    |     |    | ∅<br>H8/h7 | ∅<br>+0.1 | ∅    | ∅<br>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  |

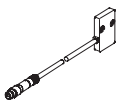


| Ordering data |               |          |
|---------------|---------------|----------|
| Size          | Double-acting |          |
| [mm]          | Part No.      | Type     |
| 10            | 174 817       | HGR-10-A |
| 16            | 161 829       | HGR-16-A |
| 25            | 161 830     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

**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         | <b>175 712</b>  | <b>SMH-S1-HGR10</b>    | 1                |  |
| Evaluation unit SMH-AE1   |          |            | Technical data → <a href="http://www.festo.com">www.festo.com</a> |                        |                  |  |
|  | 10       | 170        | <b>175 708</b>  | <b>SMH-AE1-PS3-M12</b> | 1                |  |
|   |          |            | <b>175 709</b>  | <b>SMH-AE1-NS3-M12</b> |                  |  |
| Centring sleeve ZBH   |          |            | Technical data → <a href="http://www.festo.com">www.festo.com</a> |                        |                  |  |
|  | 10, 16   | 1          | <b>189 652</b>  | <b>ZBH-5</b>           | 10               |  |
|   | 25       |            | <b>186 717</b>  | <b>ZBH-7</b>           |                  |  |
|   | 32       |            | <b>150 927</b>  | <b>ZBH-9</b>           |                  |  |
|   | 40       |            | <b>189 653</b>  | <b>ZBH-12</b>          |                  |  |




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              | <b>525 898</b>  | <b>SMT-8F-PS-24V-K2,5-OE</b>  |
|   |  | NPN           |                       |         |          |                  | <b>525 909</b>  | <b>SMT-8F-NS-24V-K2,5-OE</b>  |
|   |  | –             | 2-wire                | –       | –        | 2.5              | <b>525 908</b>  | <b>SMT-8F-ZS-24V-K2,5-OE</b>  |
|   |  | PNP           | –                     | 3-pin   | –        | 0.3              | <b>525 899</b>  | <b>SMT-8F-PS-24V-K0,3-M8D</b> |
|   |  | NPN           |                       |         |          |                  | <b>525 910</b>  | <b>SMT-8F-NS-24V-K0,3-M8D</b> |
|   |  | PNP           | –                     | –       | 3-pin    | 0.3              | <b>525 900</b>  | <b>SMT-8F-PS-24V-K0,3-M12</b> |
|  | Insertable from end, flush with the cylinder profile | PNP           | 3-wire                | –       | –        | 2.5              | <b>175 436</b>  | <b>SMT-8-PS-K-LED-24-B</b>    |
|   |  | –             | 3-pin                 | –       | –        | 0.3              | <b>175 484</b>  | <b>SMT-8-PS-S-LED-24-B</b>    |
| N/C contact   |  |               |                       |         |          |                  |   |                               |
|  | Insertable from above                                | PNP           | 3-wire                | –       | –        | 7.5              | <b>525 911</b>  | <b>SMT-8F-PO-24V-K7,5-OE</b>  |

# 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       |

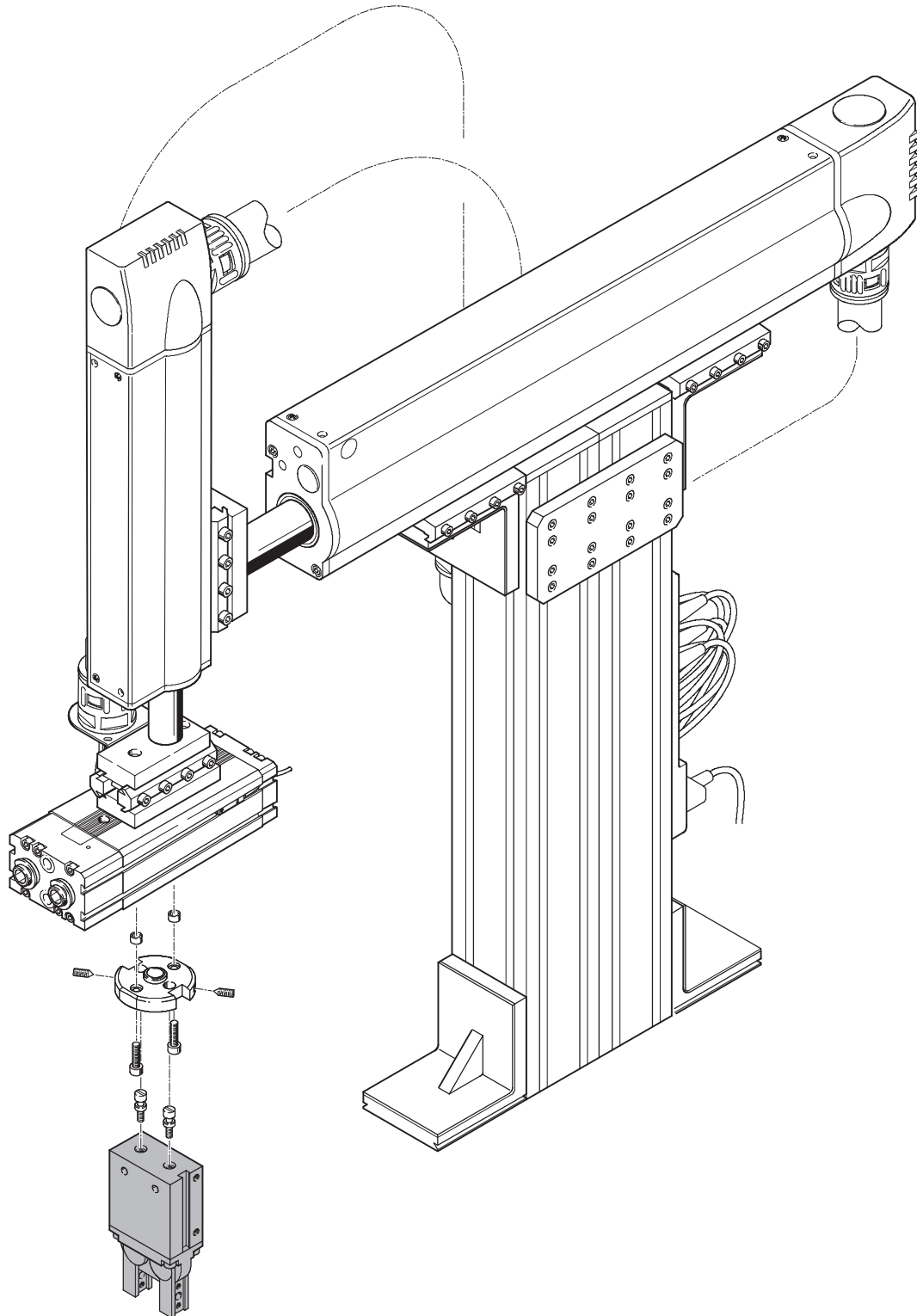
| Ordering data – Plug sockets with cable   |               |               |     |            | Technical data → <a href="http://www.festo.com">www.festo.com</a> |          |                    |
|---|---------------|---------------|-----|------------|---|----------|--------------------|
|   | Assembly      | 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

FESTO

Flexible combinations



# Angle grippers HGW

Key features



## At a glance

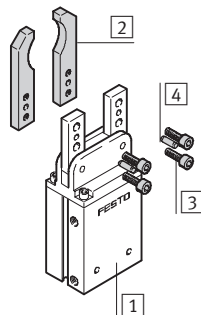
- Double-acting piston drive
- Self-centring
- Variable gripping action:
  - External/internal gripping
- Versatility thanks to externally adaptable gripper fingers
- Wide range of options for mounting on drive units
- Constant gripping torque over the entire angle range
- 40° opening angle
- Internal 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)

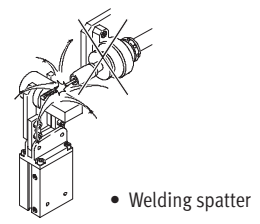
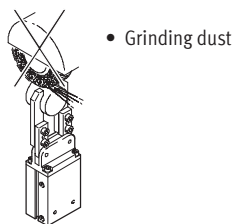
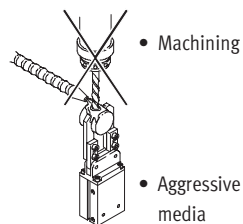
## Mounting options for external gripper fingers (customer-specific)

- 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:



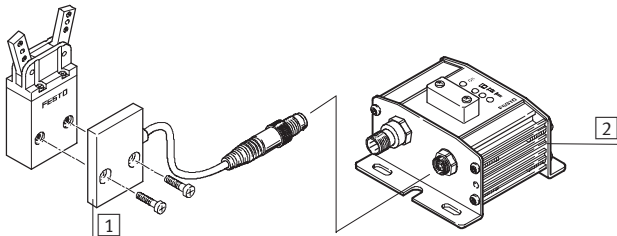


# Angle grippers HGW

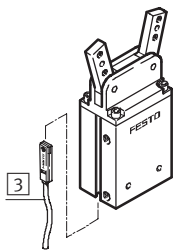
Peripherals overview and type codes

## Peripherals overview

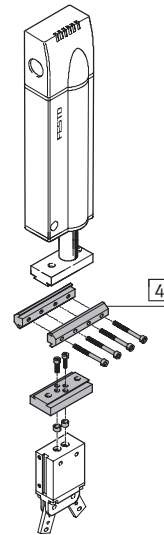
HGW-10



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

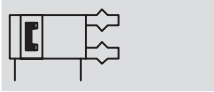
|                         |                       |   |    |   |   |
|-------------------------|-----------------------|---|----|---|---|
|                         | HGW                   | – | 16 | – | A |
| <b>Type</b>             |                       |   |    |   |   |
| HGW                     | 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

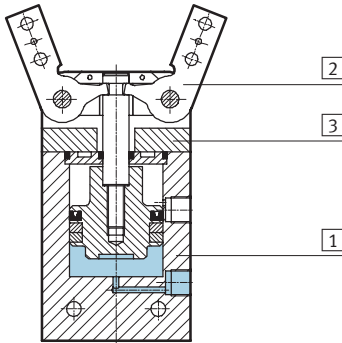
| Weights [g] |    |     |     |     |     |
|-------------|----|-----|-----|-----|-----|
| Size        | 10 | 16  | 25  | 32  | 40  |
| HGW         | 39 | 100 | 250 | 420 | 720 |

# Angle grippers HGW

Technical data

## Materials

Sectional view

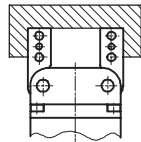
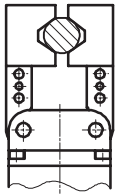


| Angle gripper |                   |                                |
|---------------|-------------------|--------------------------------|
| 1             | Body              | Hard anodised aluminium        |
| 2             | Gripper jaw       | Nickel-plated tool steel       |
| 3             |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

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

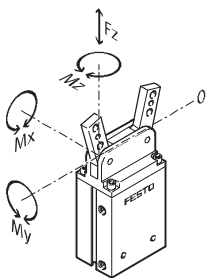
External gripping

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.

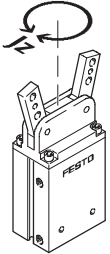
| Size                          | 10   | 16  | 25  | 32  | 40  |     |
|-------------------------------|------|-----|-----|-----|-----|-----|
| Max. permissible force $F_z$  | [N]  | 16  | 31  | 54  | 74  | 124 |
| Max. permissible torque $M_x$ | [Nm] | 0.3 | 0.9 | 1.7 | 3   | 5.7 |
| Max. permissible 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 [ $\text{kgm}^2 \times 10^{-4}$ ]



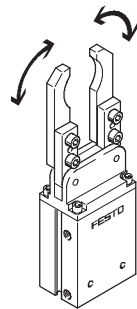
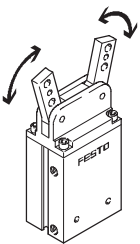
Mass moment of inertia [ $\text{kgm}^2 \times 10^{-4}$ ] for angle grippers in relation to the central axis, without external gripper fingers, without load.

| 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.

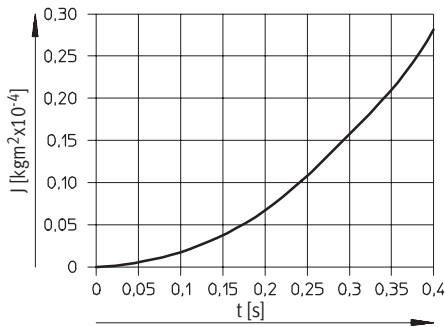
| Size                               |         | 10 | 16 | 25 | 32 | 40 |
|------------------------------------|---------|----|----|----|----|----|
| Without external gripper fingers   |         |    |    |    |    |    |
| HGW                                | Opening | 5  | 25 | 50 | 50 | 60 |
|   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

# Angle grippers HGW

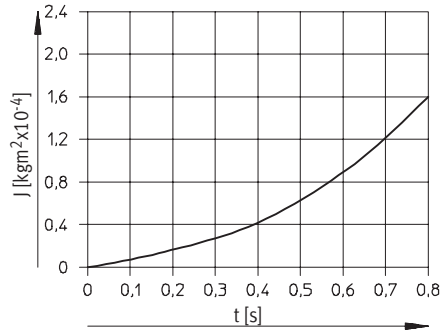
Technical data

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

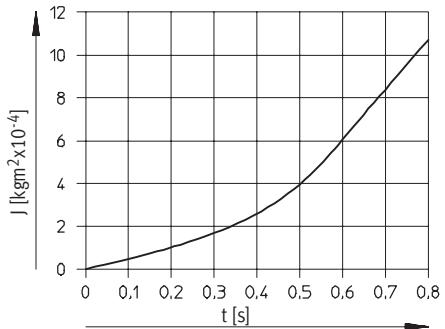
HGW-10-A



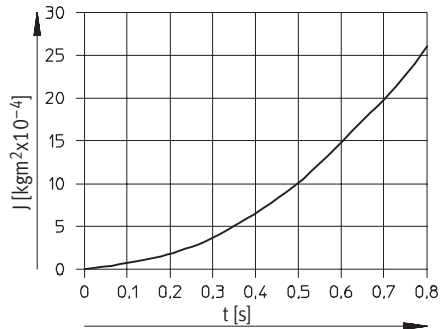
HGW-16-A



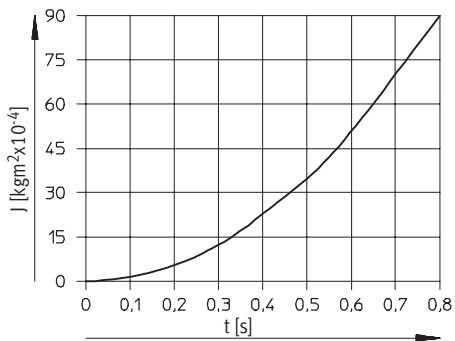
HGW-25-A



HGW-32-A



HGW-40-A



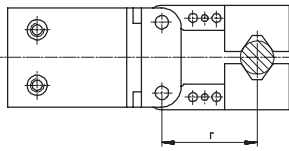
# Angle grippers HGW

Technical data



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

Gripping forces

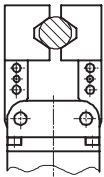


Gripping forces can be determined with the following diagrams for the various sizes in relation to operating

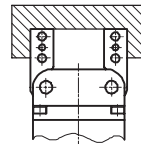
pressure and lever arm (distance from the zero co-ordinate line shown oppo-

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

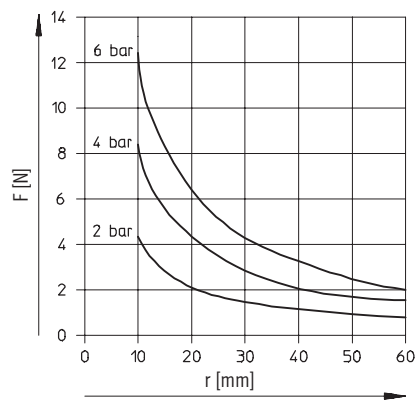
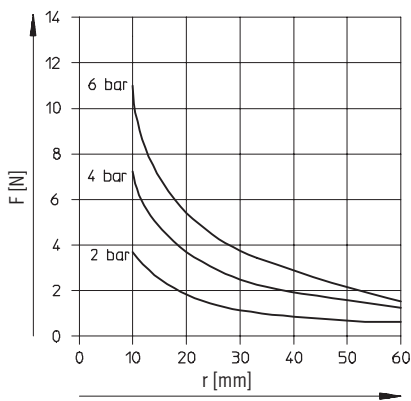
### External gripping (closing)



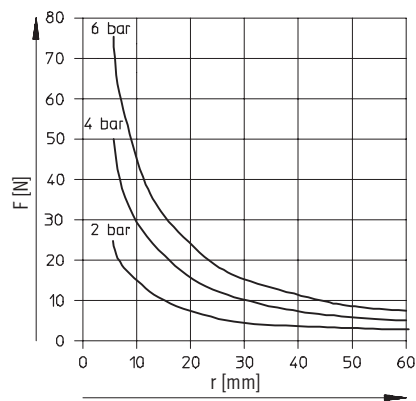
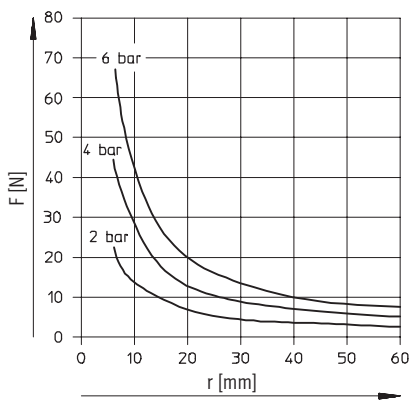
### Internal gripping (opening)



### HGW-10-A



### HGW-16-A



# Angle grippers HGW

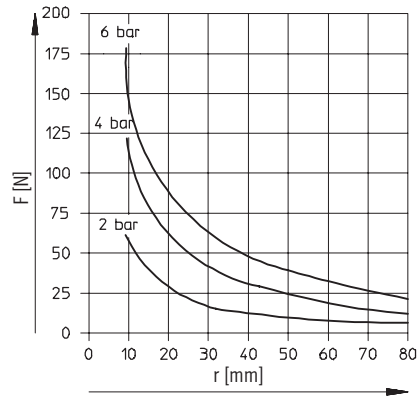
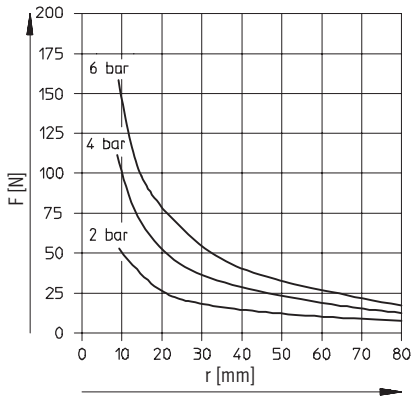
Technical data

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

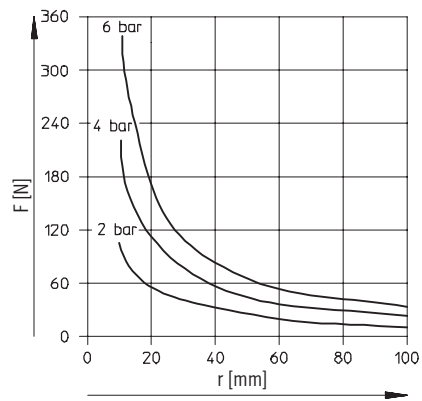
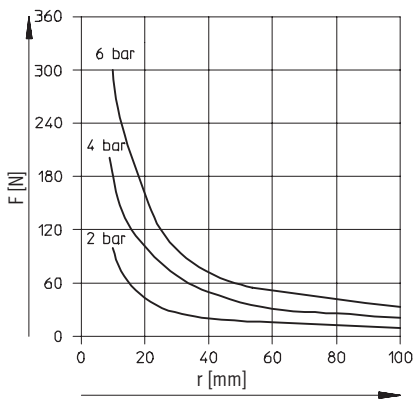
External gripping (closing)

Internal gripping (opening)

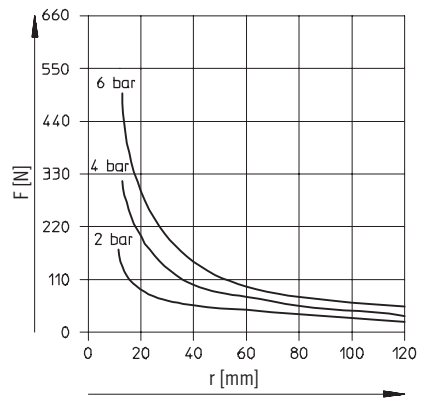
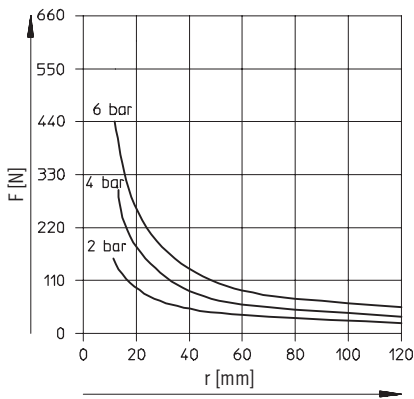
HGW-25-A



HGW-32A



HGW-40A



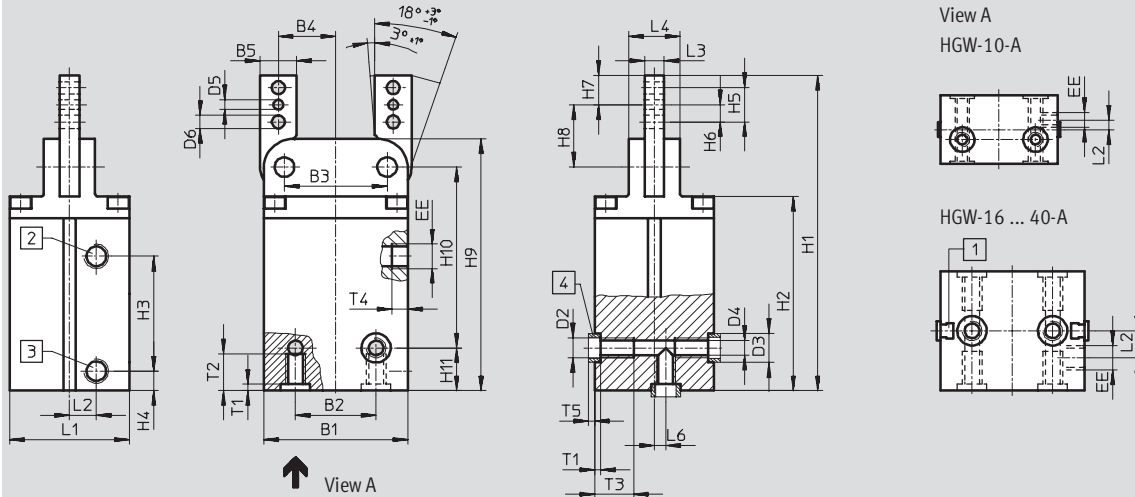
# Angle grippers HGW

Technical data

FESTO

## Dimensions

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



- 1** Sensor slot for proximity sensor SME/SMT-8 (not with HGW-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          | 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 |

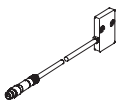


| Ordering data – Wearing parts kits |          |          |
|------------------------------------|----------|----------|
| Size                               |          |          |
| [mm]                               | Part No. | Type     |
| 10                                 | 378 527  | HGW-10-A |
| 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 <span style="float: right;">Technical data → <a href="http://www.festo.com">www.festo.com</a></span>  |          |            |          |                 |                  |  |
|   | 10       | 20         | 175 711  | SMH-S1-HGW10    | 1                |  |
| Evaluation unit SMH-AE1 <span style="float: right;">Technical data → <a href="http://www.festo.com">www.festo.com</a></span> |          |            |          |                 |                  |  |
|   | 10       | 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>     |          |            |          |                 |                  |  |
|   | 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       |

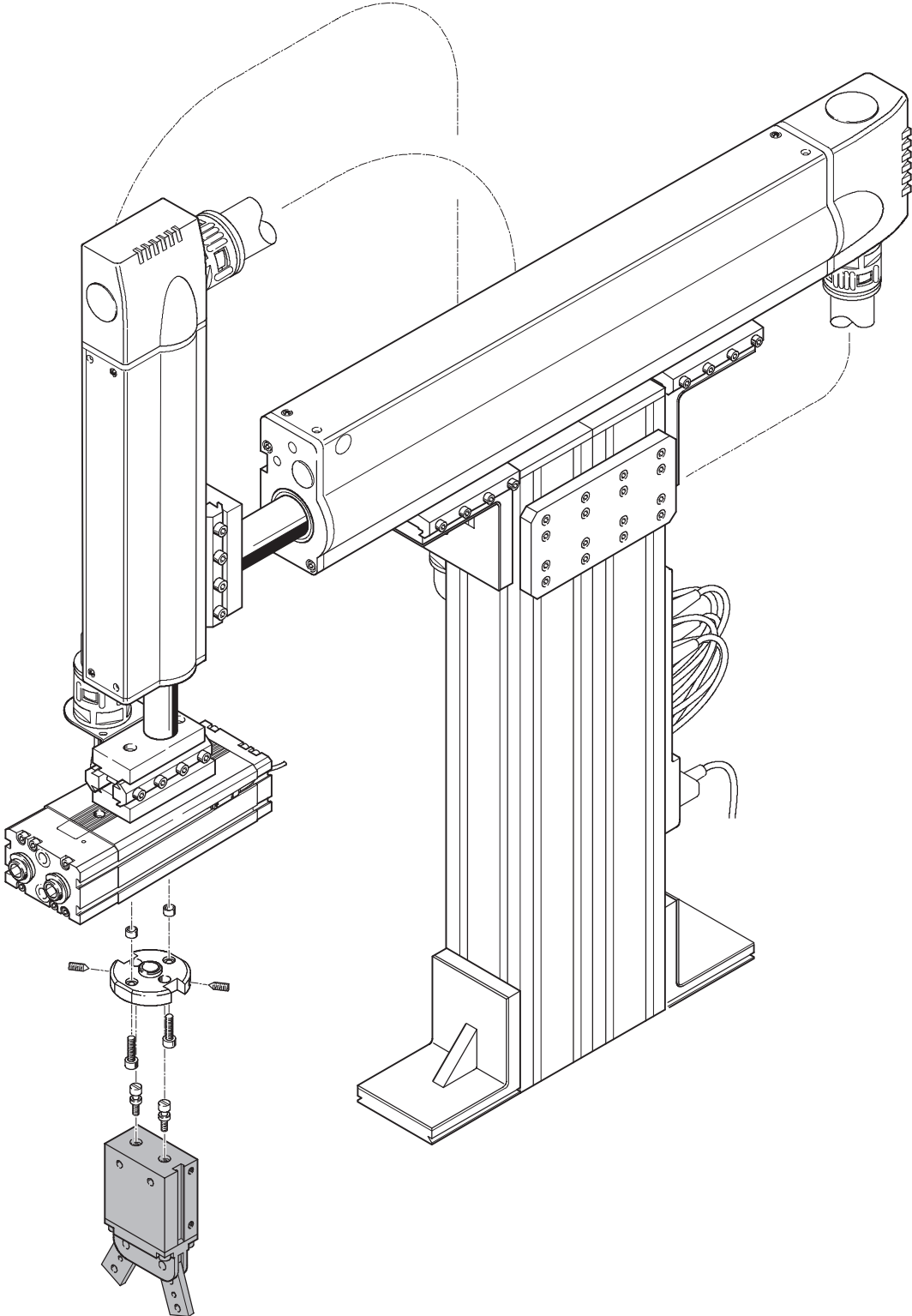
| Ordering data – Plug sockets with cable   |               |     |            |                  | Technical data → <a href="http://www.festo.com">www.festo.com</a> |         |                    |
|---|---------------|-----|------------|------------------|---|---------|--------------------|
| Assembly  | 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

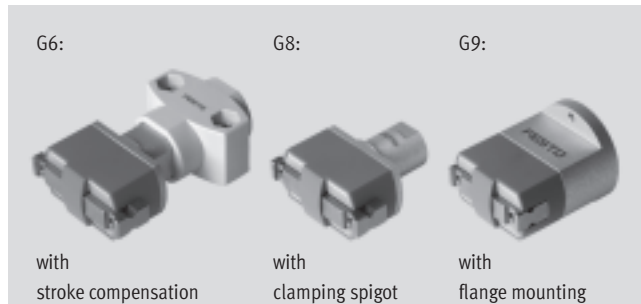


## Flexible combinations



# Parallel grippers HGPM, micro

Key features



## At a glance

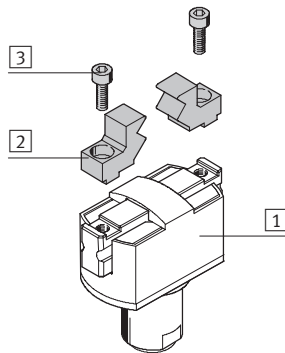
- Compact, handy design
- With open or closed gripper jaws
- Versatility thanks to externally adaptable gripper fingers
- Wide range of options for attaching drive units
- With stroke compensation after installation
- Mounting options:
  - Clamping spigot
  - Flange mounting



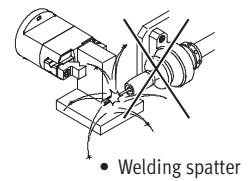
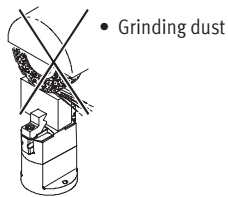
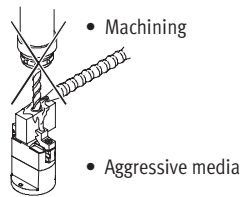
Gripper selection software  
[www.festo.com/en/engineering](http://www.festo.com/en/engineering)

## 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:



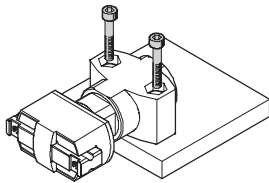
# Parallel grippers HGPM, micro

Key features

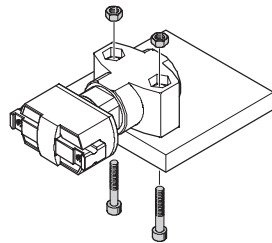


## Mounting options

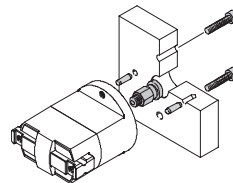
With through-holes



With through-holes, screws and retaining nuts

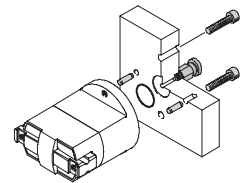


With flange mounting, screws and dowel pins



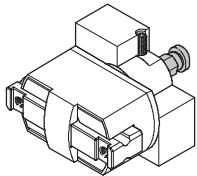
Direct air supply

Integrated air supply

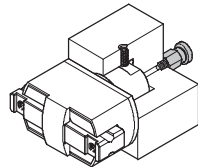


With set screw

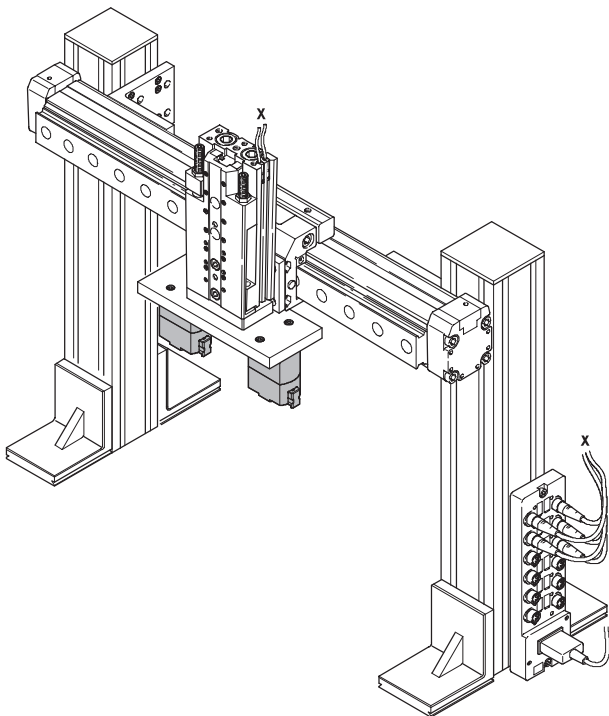
Direct air supply



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

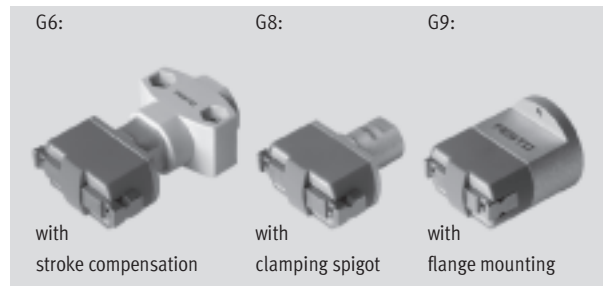
Function  
Single-acting  
with open gripper jaws  
HGPM-...-EO-G...



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   | 3   |
| 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 |

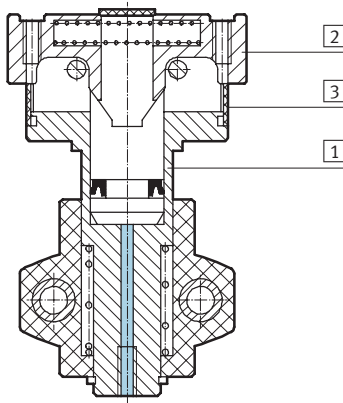
# Parallel grippers HGPM, micro

Technical data



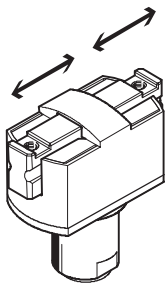
## Materials

Sectional view



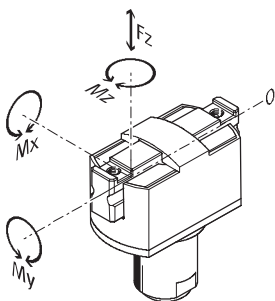
| Parallel gripper |               |                                |
|------------------|---------------|--------------------------------|
| 1                | Body          | Anodised aluminium             |
| 2                | Gripper jaw   | Stainless steel                |
| 3                | 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.

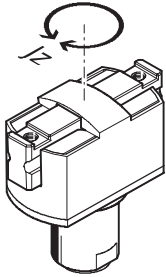
| Size                          |      | 8    | 12  |
|-------------------------------|------|------|-----|
| Max. permissible force $F_z$  | [N]  | 10   | 30  |
| Max. permissible torque $M_x$ | [Nm] | 0.15 | 0.5 |
| Max. permissible torque $M_y$ | [Nm] | 0.15 | 0.5 |
| Max. permissible torque $M_z$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



# Parallel grippers HGPM, micro

Technical data

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

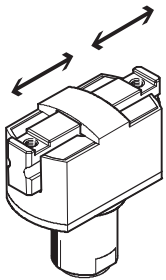


Mass moment of inertia [kgm<sup>2</sup>x10<sup>-4</sup>] for parallel grippers in relation to the central axis, without external gripper fingers, without load.

| 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

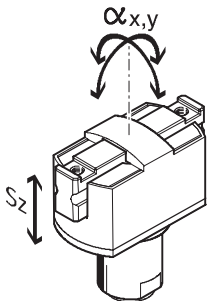
increased, as this is determined by gripper finger weight and velocity. If permissible kinetic energy is exceeded, various parts of the gripper may be damaged. This occurs when the applied load reaches the end-position and the cushioning is only

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

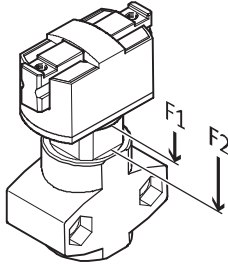
calculated based upon the traditional accumulative tolerance method and usually do not occur with mounted grippers.

| 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]



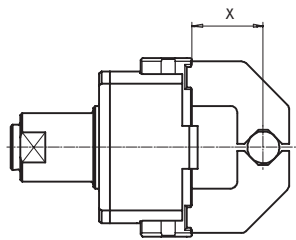
Theoretical actuating force due to stroke compensation for design variant with stroke compensation.

|                                  |   |    |
|----------------------------------|---|----|
| 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)

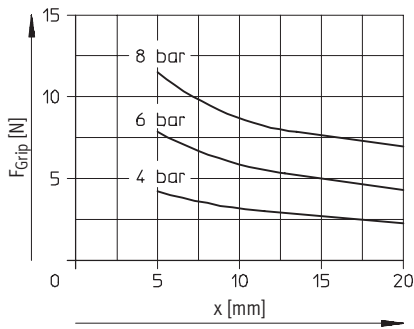
Gripping forces related to operating pressure and lever arm can be determined for the various sizes using the following graphs.



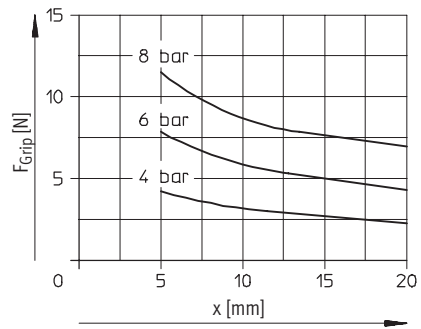
EO = External gripping (closing)

EZ = Internal gripping (opening)

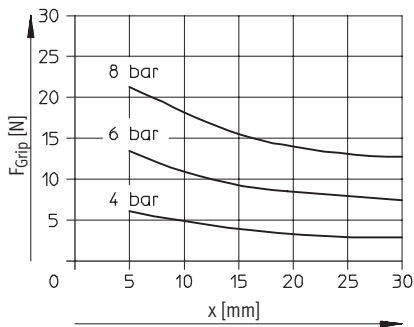
### HGPM-08-EO...



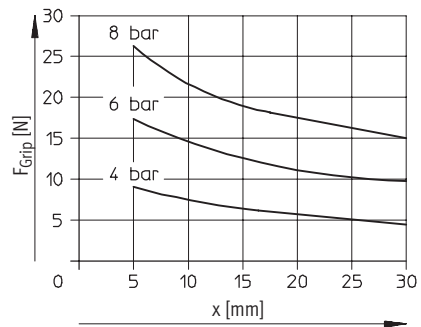
### HGPM-08-EZ...



### HGPM-12-EO...



### HGPM-12-EZ...

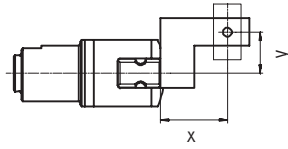


# Parallel grippers HGPM, micro

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

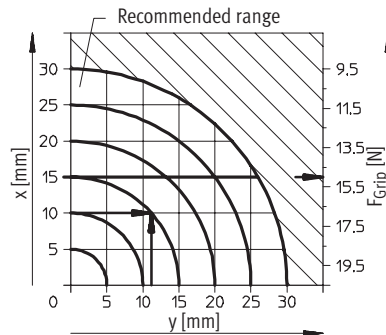
Eccentricity  $y = 11$  mm

To be found:

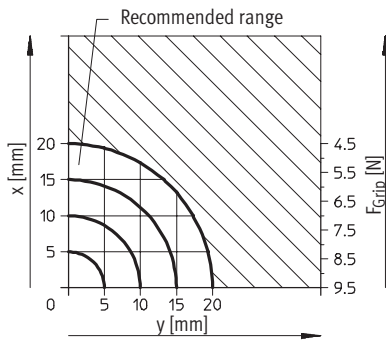
Gripping force at 6 bar

Procedure:

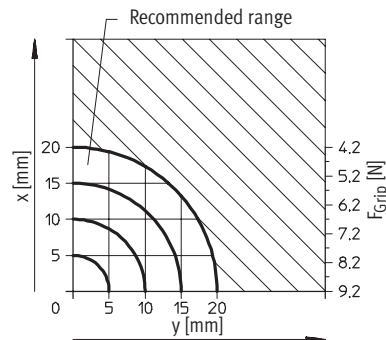
- Determine the intersection  $xy$  between lever arm  $x$  and eccentricity  $y$  in the graph for HGPM-12-EZ
  - Draw an arc (with centre at origin) through intersection  $xy$
  - Determine the intersection between the arc and the X axis
  - Read the gripping force
- Result:  
Gripping force = approx.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



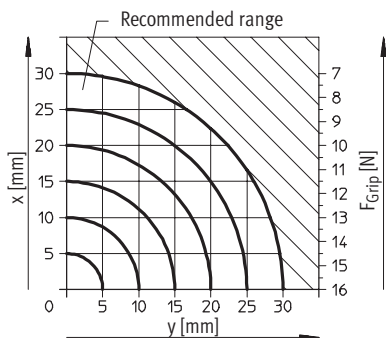
### HGPM-08-EO...



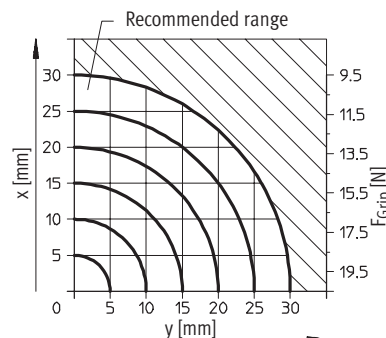
### HGPM-08-EZ...



### HGPM-12-EO...



### HGPM-12-EZ...



EO = External gripping (closing)

EZ = Internal gripping (opening)

# Parallel grippers HGPM, micro

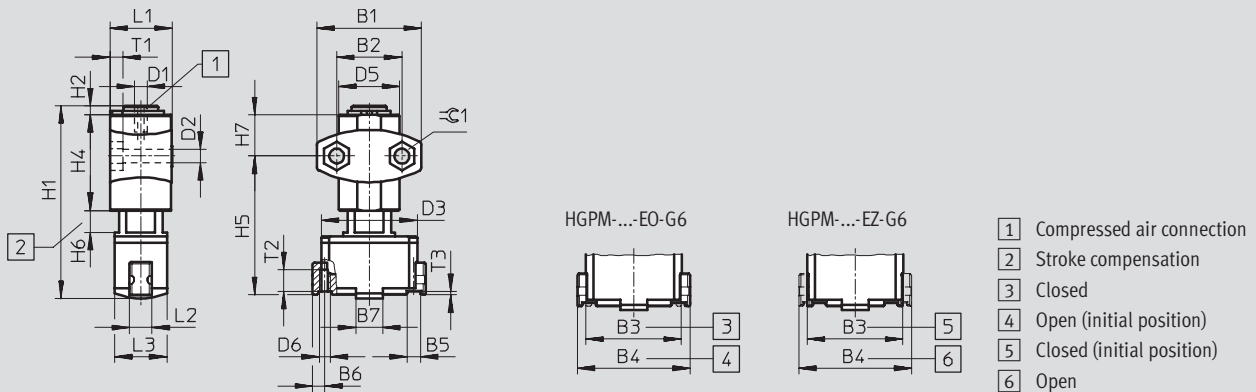
Technical data



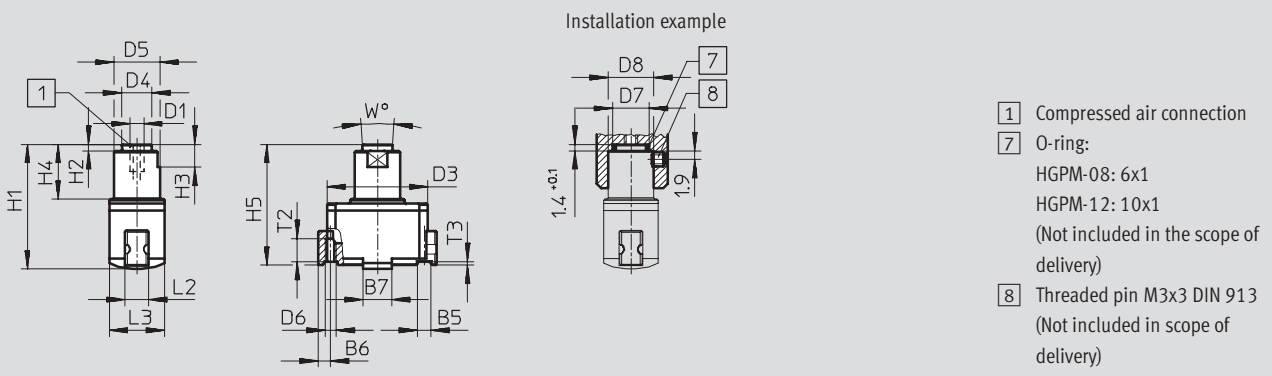
## Dimensions

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

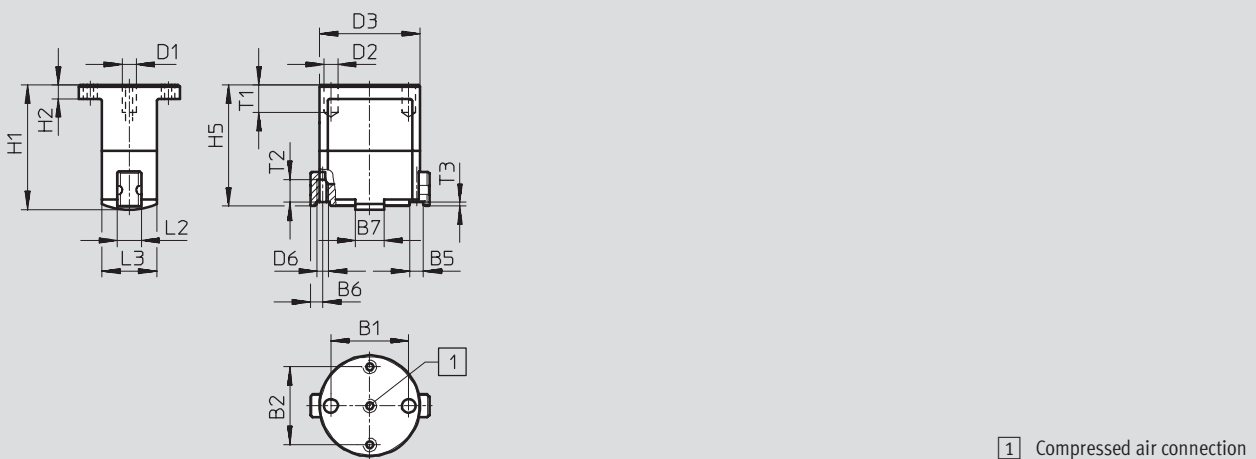
With stroke compensation – HGPM-...-E...-G6



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



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



# Parallel grippers HGPM, micro

Technical data

FESTO

| Type          | B1       | B2       | B3<br>±0.3 | B4<br>±0.3 | B5<br>+0.05/+0.02 | B6<br>+0.19/-0.23 | B7<br>±0.1 | D1 | D2<br>∅  | D3<br>∅ |
|---------------|----------|----------|------------|------------|-------------------|-------------------|------------|----|----------|---------|
| 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<br>∅<br>±0.1 | D5<br>∅ | D6   | D7<br>∅<br>+0.1 | D8<br>∅<br>+0.1 | H1<br>±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<br>+0.7/-0.2 | H7<br>±0.3 | L1<br>+0.1/-0.3 | L2<br>-0.1 | L3<br>±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<br>[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 |

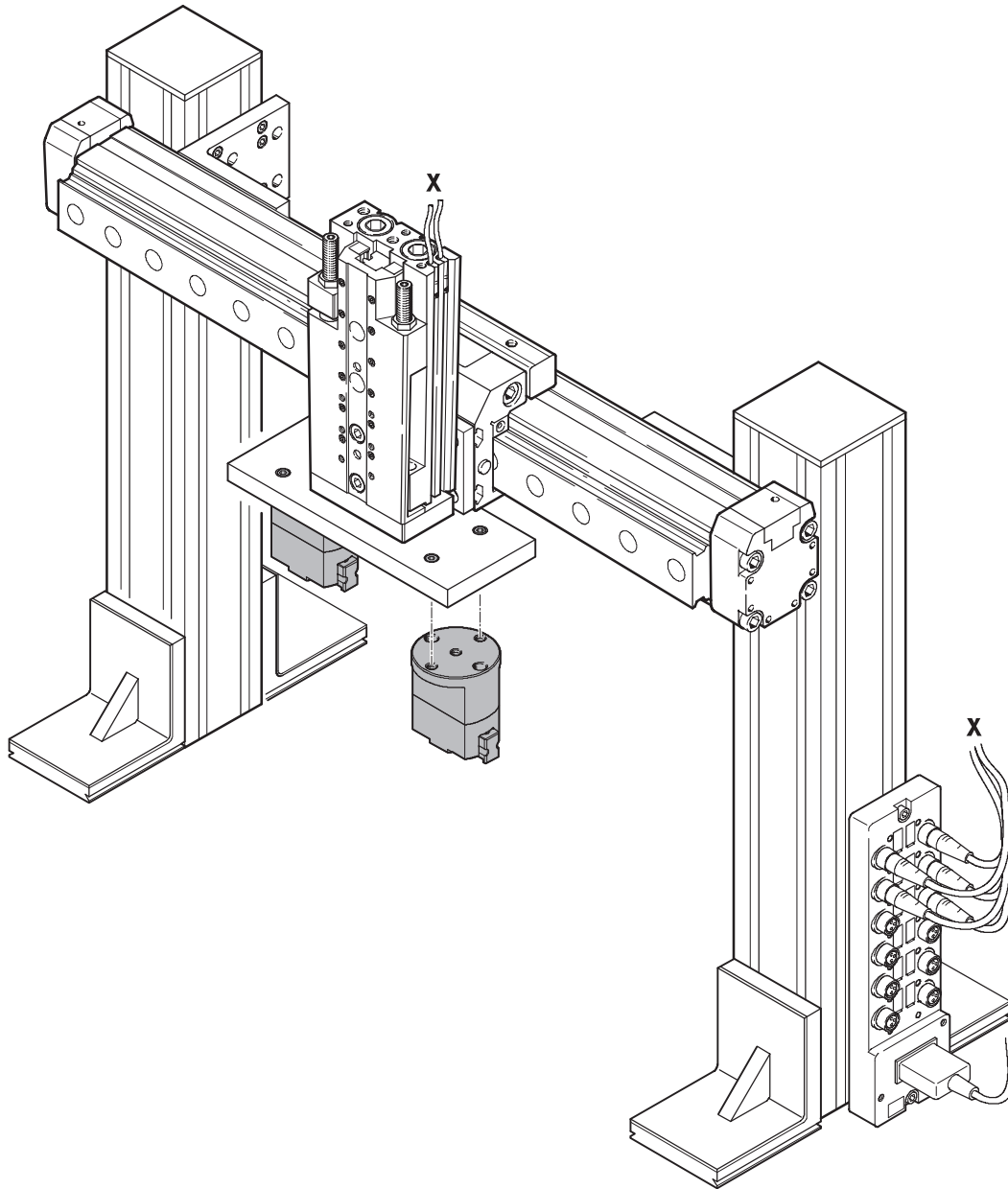
| Accessories   |  |
|---|--|
| For parallel grippers with clamping flange  |  |
| Adapter kits A08 and A12  |  |
|  | In combination with semi-rotary drives DRQD-6 to 12<br>→ <a href="http://www.festo.com">www.festo.com</a><br>Adapter kits for drive/gripper combinations<br>→ <a href="http://www.festo.com">www.festo.com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

# Micro parallel grippers HGPM

Everything from a single source

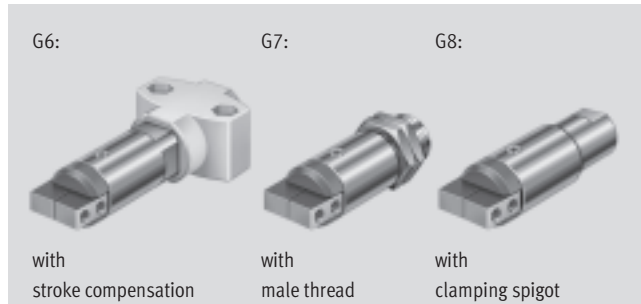
FESTO

## Flexible combinations



# Angle grippers HGWM, micro

Key features



## At a glance

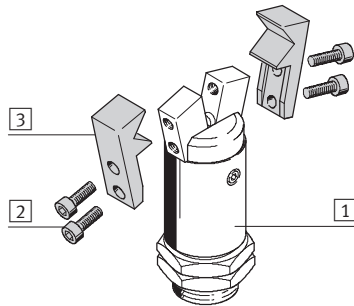
- Compact, handy design
- With open or closed gripper jaws
- Versatility thanks to externally adaptable gripper fingers
- Wide range of options for attaching drive units
- With stroke compensation after installation
- Mounting options:
  - Clamping spigot
  - Male thread




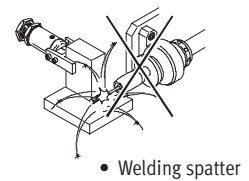
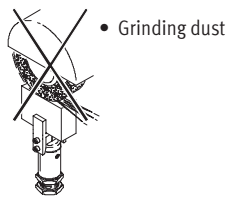
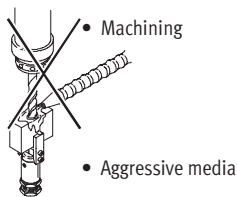
Gripper selection software  
[www.festo.com/en/engineering](http://www.festo.com/en/engineering)

## 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:





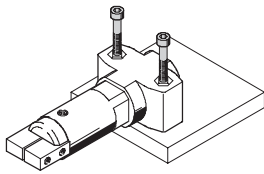
# Angle grippers HGWM, micro

Key features

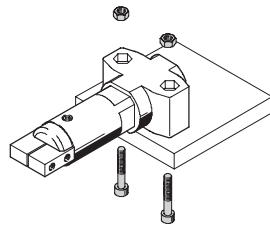


## Mounting options

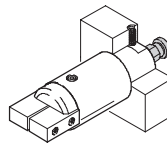
With through-holes



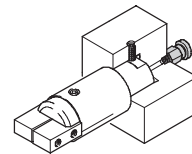
With through-holes, screws and retaining nuts



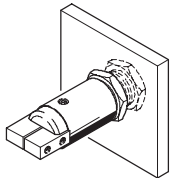
With set screw  
Direct air supply



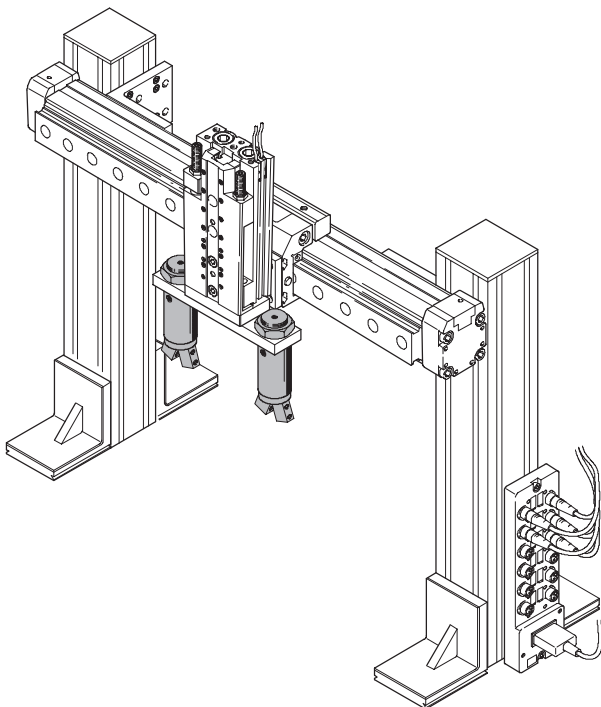
Integrated air supply



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

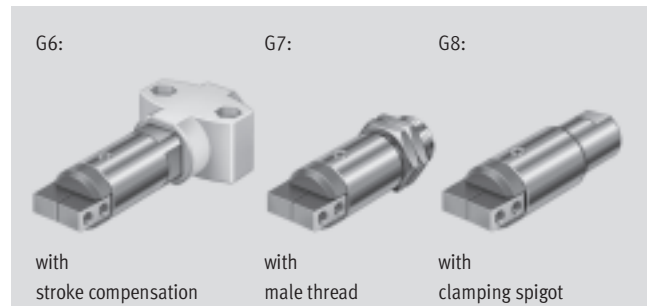
Function  
Single-acting  
with open gripper jaws  
HGWM-...-EO-G...



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

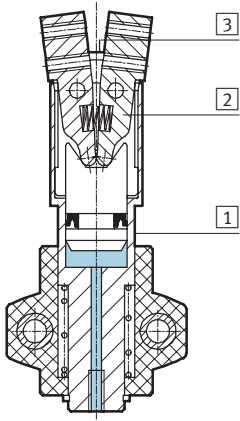
| Weights [g]              |    |    |
|--------------------------|----|----|
| Size                     | 8  | 12 |
| With stroke compensation | 23 | 75 |
| With male thread         | 14 | 52 |
| With clamping spigot     | 13 | 45 |

# Angle grippers HGWM, micro

Technical data

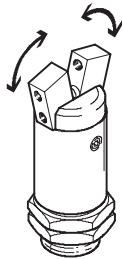
## Materials

Sectional view



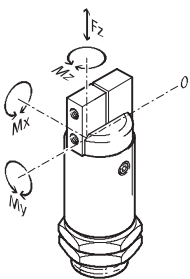
| Angle gripper |   |
|---------------|---|
| 1             | Body<br>Stainless steel                             |
| 2             | Gripper jaw<br>Stainless steel                      |
| 3             | Cover cap<br>Polyacetate                            |
| -             | Note on materials<br>Copper, 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

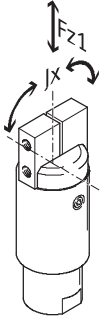
line (gripper jaws point of rotation) must be taken into consideration for the calculation of torques.

| 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

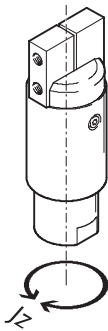
## Applied load [N] and mass moment of inertia [ $\text{kgm}^2 \times 10^{-4}$ ] per external gripper finger



| 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 [ $\text{kgm}^2 \times 10^{-4}$ ]

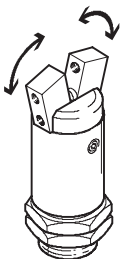


Mass moment of inertia [ $\text{kgm}^2 \times 10^{-4}$ ] for angle grippers in relation to the central axis without external gripper fingers.

| 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.

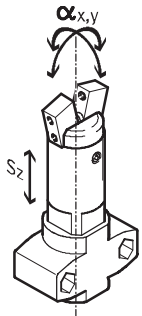
| Size           |         | 8   | 12  |
|----------------|---------|-----|-----|
| HGPM-...EO-... | Opening | 2.7 | 3.7 |
|                | Closing | 1.2 | 1.8 |
| HGPM-...EZ-... | Opening | 1   | 1.7 |
|                | Closing | 2.5 | 2.8 |

# Angle grippers HGWM, micro

Technical data

## Gripper jaw backlash

Without external gripper fingers

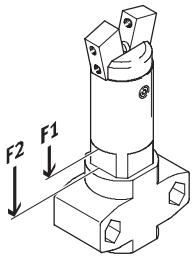


With angle grippers, backlash occurs between the gripper jaws and the guide element due to the plain-bearing guide. The backlash values listed

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

FESTO

### Application example



# Angle grippers HGWM, micro

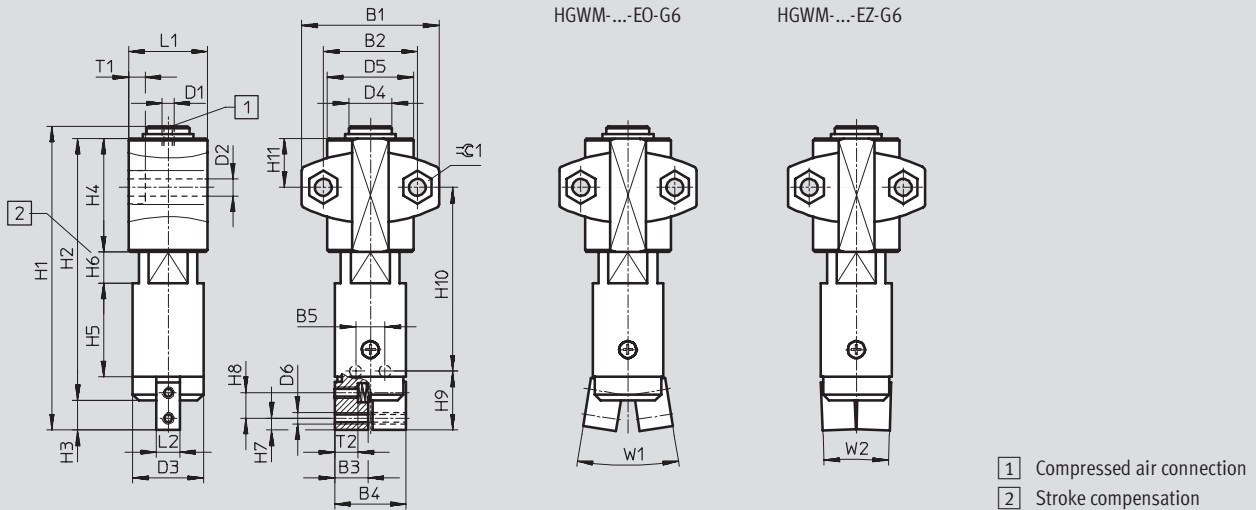
Technical data

FESTO

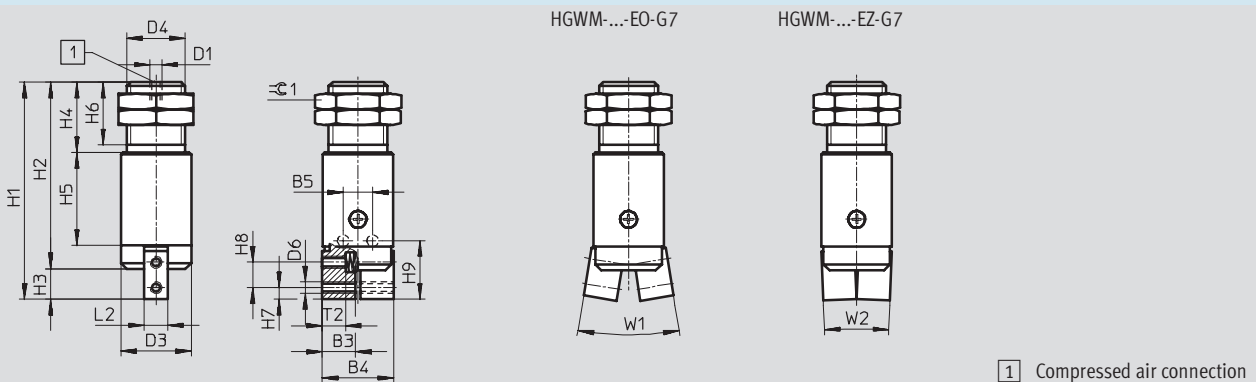
## Dimensions

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

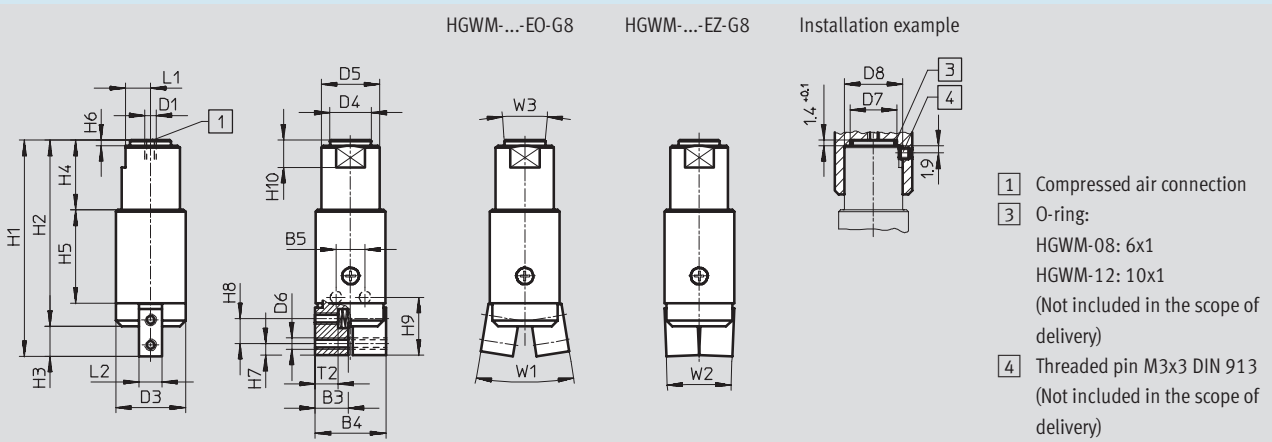
With stroke compensation – HGWM-...-E...-G6



With male thread – HGWM-...-E...-G7



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





# Angle grippers HGWM, micro

Technical data

FESTO

| Type          | B1<br>±0.1 | B2<br>±0.25 | B3  | B4<br>±0.3 | B5        | D1 | D2<br>∅<br>+0.1 | D3<br>∅<br>+0.1 | D4<br>∅        | D5<br>∅ | 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<br>∅<br>+0.1 | D8<br>+0.1 | H1<br>+0.25 | H2           | H3     | H4     | H5<br>+0.1 | H6                | H7 | H8  | H9<br>+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<br>±0.3 | L1        | L2<br>-0.02 | T1<br>-0.2 | T2 <sup>1)</sup> | W1<br>±2° | W2<br>±2° | W3<br>±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°       |           |           |     |
| 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°       |           |           |     |
| 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°       |           |           |     |


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<br>→ <a href="http://www.festo.com">www.festo.com</a><br>Adapter kits for drive/gripper combinations<br>→ <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.

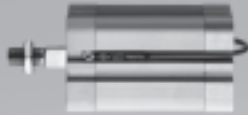
All technical data applies at the time of going to print.

All texts, representations, illustrations and drawings included in this catalogue are the intellectual property of Festo AG & Co. KG, and are protected by copyright law.

All rights reserved, including translation rights. No part of this publication may be reproduced or transmitted in any form or by any means, electronic, mechanical, photocopying or otherwise, without the prior written permission of Festo AG & Co. KG. All technical data subject to change according to technical update.

## 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

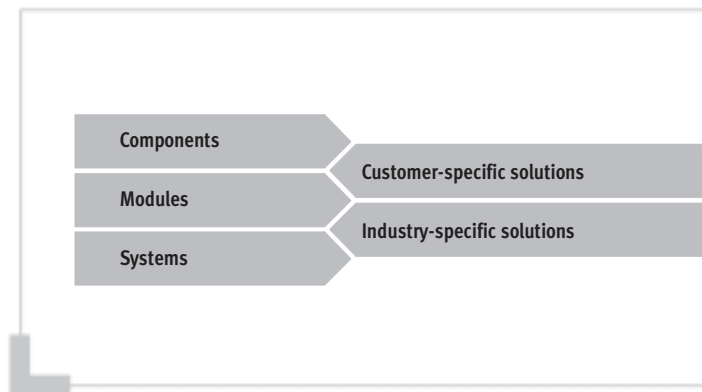
### Fieldbus systems/ electrical peripherals

- 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



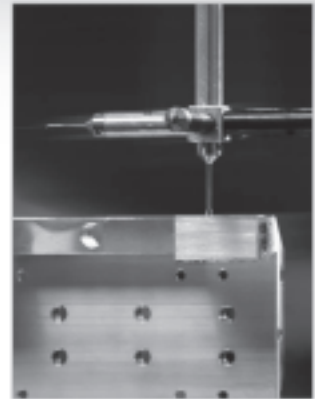
### Operation – for greater speed in the operational process

- 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.