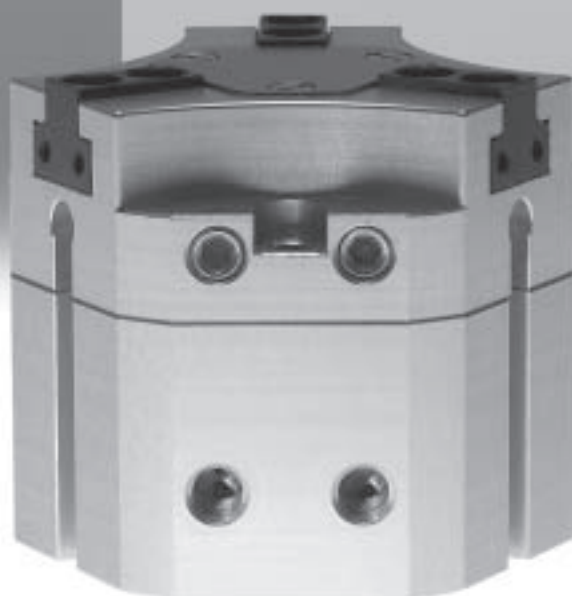


## Parallel grippers HGPT, HGPL and Three-point grippers HGDT

**FESTO**

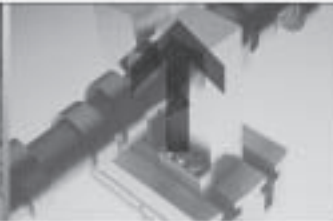


Heavy-duty grippers  
for mechanical engineering

## HGPT, HGPL, HGDT: sturdy, reliable and versatile



HGPT: for sturdy parallel gripping



HGPL: ideal for long strokes



HGDT: very high load capacity

### 3 grippers – 1 convincing concept

#### Space-saving design

Low-cost SM...-10 proximity sensors are fully integrated into the housing.

#### Team players

Free and easy combination with a wide range of drives from the Festo modular handling system, for example slides, handling axes and rotary drives.

#### Simple choice

Easy selection and sizing thanks to the software tool available with the digital catalogue.

#### Sturdy

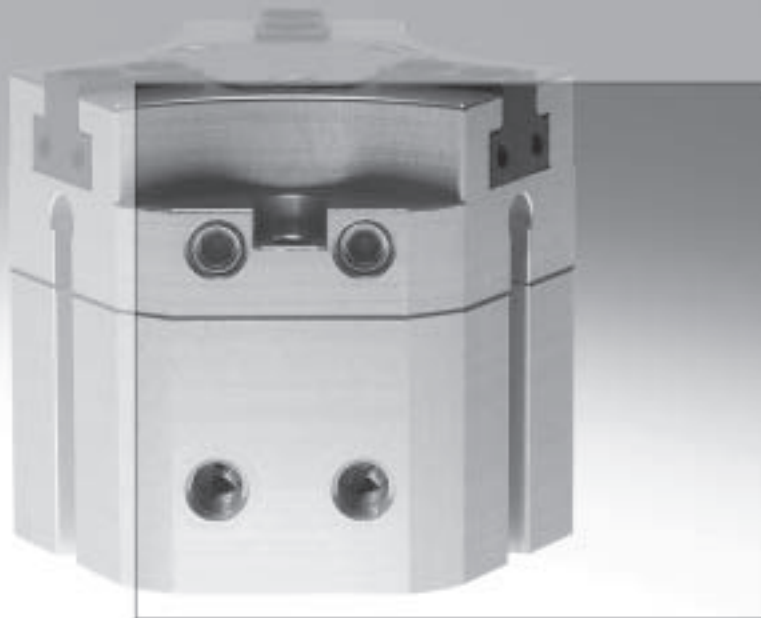
Can cope with very high forces and torsional loads thanks to precision ground and paired T-slots. The HGPT and HGDT use sealing air to protect against the ingress of soluble oil and dust.

#### Versatile

Mounting options on different sides permit maximum freedom in design. Gripping force retention, for example in the case of multiple gripping of plates, further increases flexibility: for single-acting operation, two or more grippers can be installed more quickly.

#### Reliable

HGPT and HGDT are ideal for dynamic applications: thanks to gripping force retention, the grippers hold the workpiece securely in the event of a pressure drop. If more gripping force is needed for the gripping process, the spring force adds to the gripping force – there is no need to choose the next gripper size!



|                                                                | Advantages for designers                                                                                                                                                                                                                                                                                                                                                            | Advantages for purchasers                                                                                                                                                            |
|----------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| High gripping forces and high load capacity                    | <ul style="list-style-type: none"> <li>• Reliable, even under the most difficult operating conditions</li> </ul>                                                                                                                                                                                                                                                                    | <ul style="list-style-type: none"> <li>• Reduced follow-up costs through long service life</li> <li>• Excellent value for money</li> </ul>                                           |
| Sturdy housing with integrated sensor slots                    | <ul style="list-style-type: none"> <li>• Reliable sensing via low-cost slot fitting sensors</li> <li>• Easy installation of the sensors</li> <li>• High process reliability, as there are no switch lugs protruding from the housing</li> <li>• Maintenance-free operation under normal conditions</li> <li>• Very easy maintenance under difficult operating conditions</li> </ul> | <ul style="list-style-type: none"> <li>• Cost savings through low wear and long service life</li> <li>• Low-cost sensing option using standard proximity sensors SM...-10</li> </ul> |
| Fully compatible with the modular handling and assembly system | <ul style="list-style-type: none"> <li>• Quick and easy system integration thanks to clearly defined interfaces</li> </ul>                                                                                                                                                                                                                                                          | <ul style="list-style-type: none"> <li>• Everything from a single source means reduced logistics</li> </ul>                                                                          |
| Demand-driven, customer-specific solutions                     | <ul style="list-style-type: none"> <li>• Inductive sensors for gripper jaw sensing and heat-resistant designs in the case of HGPT and HGDT</li> <li>• Single-acting design for gripping force retention or gripping force support in the case of HGPL</li> </ul>                                                                                                                    | <ul style="list-style-type: none"> <li>• Festo offers the right technical solution for virtually every application at the most economical price</li> </ul>                           |

**HGPT, HGPL and HGDT:**  
giving you a threefold advantage



HGPT



HGPL



HGDT

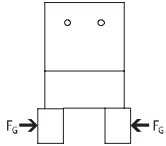
# Forces at the gripper

Basic principles

FESTO

## Calculation tools for determining gripping force

What is meant by gripping force?



Action = Reaction

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

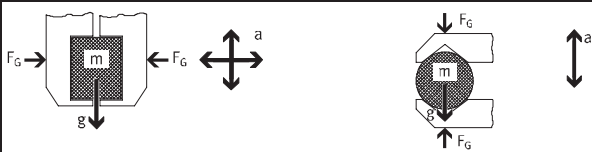
When selecting a gripper you need to determine the gripping force required to hold a workpiece of mass  $m$  [kg]

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

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

Parallel, radial and angle grippers

#### Mechanical locking



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

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

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

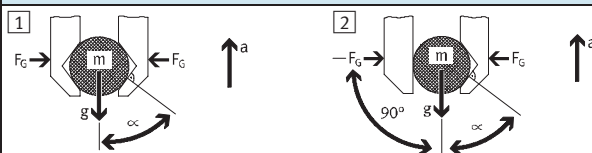
$r, x$  Distance between the gripper zero point and the gripping point (lever arm)

→ Catalogue specifications:  
“Gripping force as a function of the lever arm”

$$M_G = F_G \times r$$

$m$  Workpiece mass [kg]

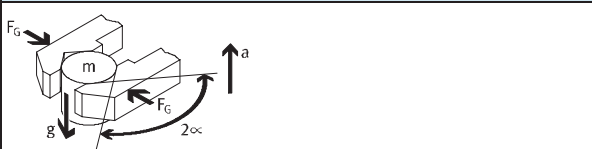
#### Mechanical locking with V-gripper



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

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

#### Frictional locking



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

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

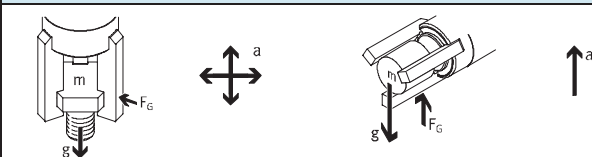
$a$  Acceleration [ $m/s^2$ ] arising from the dynamic movement

$S$  Safety factor

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

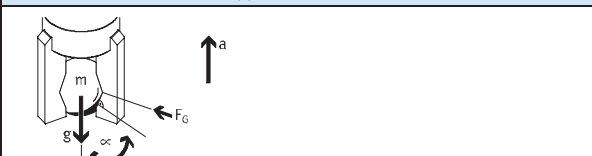
Three-point gripper

#### Mechanical locking



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

#### Mechanical locking with V-gripper

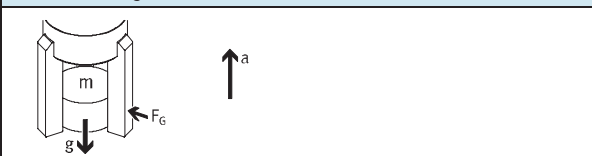


$$F_G = \frac{m \times (g + a)}{3} \times \tan \alpha \times S$$

$\alpha$  Angle of V-gripper finger

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

#### Frictional locking



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

# Forces at the gripper

Basic principles

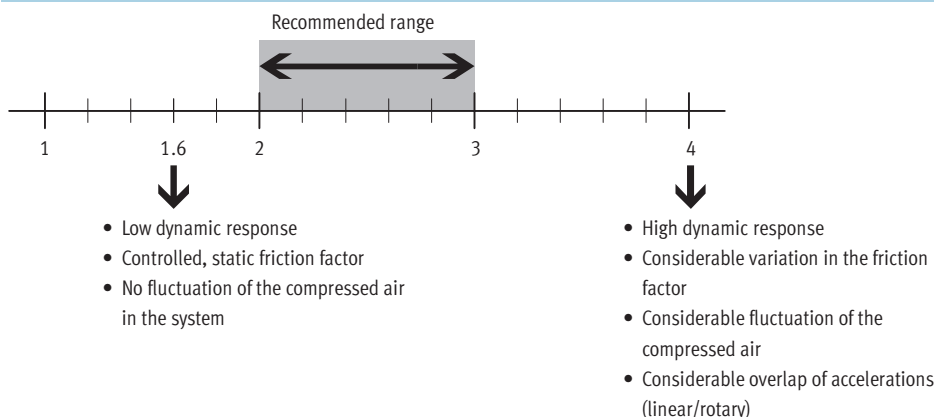
## Max. acceleration values with different drive types

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



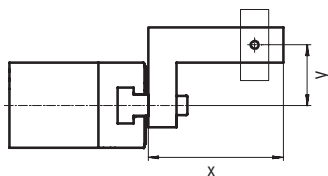
## Coefficient of friction $\mu$

|                        |     | Workpiece surface |      |      |      |      |                          |
|------------------------|-----|-------------------|------|------|------|------|--------------------------|
|                        |     | ST                | STI  | AL   | ALI  | R    |                          |
| Gripper finger surface | ST  | 0.25              | 0.15 | 0.35 | 0.20 | 0.50 | ST Steel                 |
|                        | STI | 0.15              | 0.09 | 0.21 | 0.12 | 0.30 | STI Lubricated steel     |
|                        | AL  | 0.35              | 0.21 | 0.49 | 0.28 | 0.70 | AL Aluminium             |
|                        | ALI | 0.20              | 0.12 | 0.28 | 0.16 | 0.40 | ALI Lubricated aluminium |
|                        | R   | 0.50              | 0.30 | 0.70 | 0.40 | 1.00 | R Rubber                 |

## Limits of this analysis

Eccentricity  $y$  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

FESTO

 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:

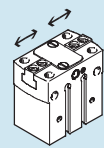
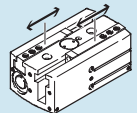
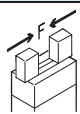
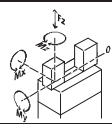
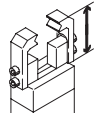
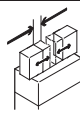
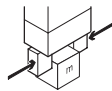
– Parallel gripper



- 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:

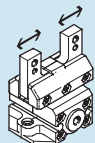
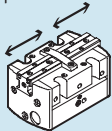
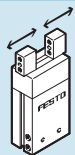
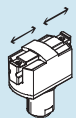
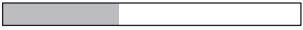
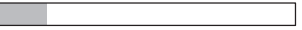
- Workpiece retention in case of loss of compressed air
- As a single-acting gripper
- Acts to increase gripping force

| Selection criteria/gripper types                                                    |                                                                                                                        |                                                                                                                                      |
|-------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------|
|                                                                                     | Parallel gripper HGPT                | Parallel gripper HGPL                             |
| Workpiece mass <sup>1)</sup> [kg]                                                   |                                                                                                                        |                                                                                                                                      |
|    | Up to 12 kg<br>$S = 2$<br>$x = 40 \text{ mm}$                                                                          | Up to 9.7 kg<br>$S = 2$<br>$x = 40 \text{ mm}$                                                                                       |
| 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                                                                                                                                |
|                                                                                     | Mx [Nm]                                                                                                                | 140                                                                                                                                  |
|                                                                                     | My [Nm]                                                                                                                | 120                                                                                                                                  |
|                                                                                     | Mz [Nm]                                                                                                                | 80                                                                                                                                   |
| 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                                                                 | → 12                                                                                                                   | → 26                                                                                                                                 |

# Parallel gripper

Selection aid

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| 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<br> | Up to 6.7 kg<br>S = 2<br>x = 40 mm<br>                                                             | Up to 3.4 kg<br>S = 3<br>x = 40 mm<br>                              | Up to 0.17 kg<br>S = 3<br>x = 10 mm<br> |
| 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                                                                                                               |                                                                                                                                                                                     |                                                                                                                                                       |                                                                                                                            |
| <ul style="list-style-type: none"> <li>– Cost-effective</li> <li>– Integrated sensors</li> </ul>                         | <ul style="list-style-type: none"> <li>– High precision thanks to gripper jaw with ball bearing guide</li> <li>– Integrated sensors</li> <li>– 3 positions can be sensed</li> </ul> | <ul style="list-style-type: none"> <li>– Dust-protected variant: HGP-16/-25...-SSK</li> <li>– Cost-effective</li> <li>– Integrated sensors</li> </ul> | <ul style="list-style-type: none"> <li>– Single-acting</li> <li>– Compact</li> </ul>                                       |
| Technical data and dimensions                                                                                            |                                                                                                                                                                                     |                                                                                                                                                       |                                                                                                                            |
| ➔ Info 154                                                                                                               | ➔ Info 157                                                                                                                                                                          | ➔ Info 116                                                                                                                                            | ➔ Info 116                                                                                                                 |

# Parallel gripper

Selection aid

FESTO

 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:

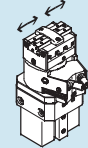
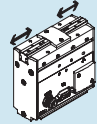
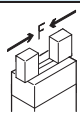
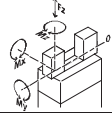
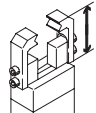
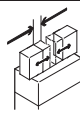
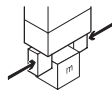
- Parallel gripper



- 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                                                                                                                                                                              |
|                                                                                     | Mx [Nm]                                                                                                                            | 8                                                                                                                                                                               |
|                                                                                     | My [Nm]                                                                                                                            | 8                                                                                                                                                                               |
|                                                                                     | Mz [Nm]                                                                                                                            | 8                                                                                                                                                                               |
| Gripper finger length [mm]                                                          |                                                                                                                                    |                                                                                                                                                                                 |
|  | Max. 70                                                                                                                            | Max. 70                                                                                                                                                                         |
| Gripper stroke per gripper jaw [mm]                                                 |                                                                                                                                    |                                                                                                                                                                                 |
|  | 2.5 ... 7<br>$\longleftrightarrow$                                                                                                 | Swivel angle<br>0 ... 210°<br>                                                              |
|                                                                                     |                                                                                                                                    | 0 ... 10<br>$\longleftrightarrow$<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                                                                          |                                                                                                                                    |                                                                                                                                                                                 |
|                                                                                     | <ul style="list-style-type: none"> <li>Swivelling and gripping in one unit</li> <li>Compact</li> <li>Integrated sensors</li> </ul> | <ul style="list-style-type: none"> <li>Gripper jaws can be positioned freely and independently</li> <li>High precision thanks to gripper jaw with ball bearing guide</li> </ul> |
| Technical data and dimensions                                                       |                                                                                                                                    |                                                                                                                                                                                 |
| Further information                                                                 | → Info 135                                                                                                                         | → Info 157                                                                                                                                                                      |

# Three-point gripper

Selection aid

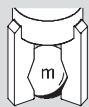
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Note

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

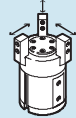
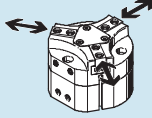
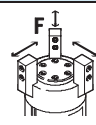
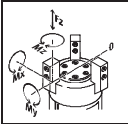
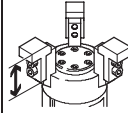
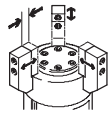
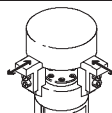
→ 4:

- 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  $r \rightarrow$  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>$x = 40 \text{ mm}$                                                                                           | Up to 12.7 kg<br>$S = 2$<br>$x = 40 \text{ mm}$                                                                  |
| Gripping force (external gripping) [N] at 6 bar                                     |                                                                                                                                          |                                                                                                                  |
|    | F per gripper jaw                                                                                                                        |                                                                                                                  |
|                                                                                     | 30 ... 300                                                                                                                               | 70 ... 550                                                                                                       |
|                                                                                     | F total                                                                                                                                  |                                                                                                                  |
|                                                                                     | 90 ... 900                                                                                                                               | 210 ... 1 650                                                                                                    |
| Maximum permissible characteristic load values at the gripper jaw                   |                                                                                                                                          |                                                                                                                  |
|   | $F_z$ [N]                                                                                                                                | 170                                                                                                              |
|                                                                                     | $M_x$ [Nm]                                                                                                                               | 5                                                                                                                |
|                                                                                     | $M_y$ [Nm]                                                                                                                               | 8                                                                                                                |
|                                                                                     | $M_z$ [Nm]                                                                                                                               | 5                                                                                                                |
| Gripper finger length [mm]                                                          |                                                                                                                                          |                                                                                                                  |
|  | Max. 100                                                                                                                                 | Max. 140                                                                                                         |
| Gripper stroke per gripper jaw [mm]                                                 |                                                                                                                                          |                                                                                                                  |
|  | 2.5 ... 6<br>                                        | 3 ... 10<br>                |
| Repetition accuracy [mm]                                                            |                                                                                                                                          |                                                                                                                  |
|  | $\leq 0.04$                                                                                                                              | $\leq 0.03$                                                                                                      |
| Gripping force retention                                                            |                                                                                                                                          |                                                                                                                  |
|                                                                                     | —                                                                                                                                        | ■                                                                                                                |
| Proximity sensors/sensors for position sensing at the gripper                       |                                                                                                                                          |                                                                                                                  |
|                                                                                     | ■                                                                                                                                        | ■                                                                                                                |
| Advantages                                                                          |                                                                                                                                          |                                                                                                                  |
|                                                                                     | <ul style="list-style-type: none"> <li>Simple, position-centred gripping of perfectly round parts</li> <li>Integrated sensors</li> </ul> | <ul style="list-style-type: none"> <li>Sturdy T-slot</li> <li>Sealing air</li> <li>Integrated sensors</li> </ul> |
| Technical data and dimensions                                                       |                                                                                                                                          |                                                                                                                  |
| Further information                                                                 | → Info 116                                                                                                                               | → 42                                                                                                             |

# Radial gripper

Selection aid

FESTO

-  - Note

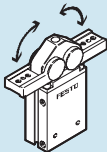
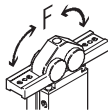
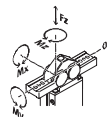
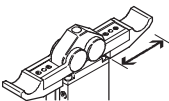
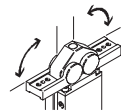
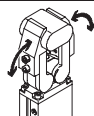
1) The workpiece mass has been calculated based on the gripping principle "Positive locking with V-gripper" using the variable values specified below.

→ 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><div><div></div></div>                                                                                                                                                         | S = 3<br>r = 30 mm                                                                  |     |    |    |      |   |    |      |    |    |      |   |  |
| Total gripping torque (external gripping) [Ncm] at 6 bar                            |                                                                                                                                                                                              |                                                                                     |     |    |    |      |   |    |      |    |    |      |   |  |
|    | 13 ... 500<br><div><div></div></div>                                                                                                                                                         |                                                                                     |     |    |    |      |   |    |      |    |    |      |   |  |
| Maximum permissible characteristic load values at the gripper jaw                   |                                                                                                                                                                                              |                                                                                     |     |    |    |      |   |    |      |    |    |      |   |  |
|   | <table><tr><td>Fz</td><td>[N]</td><td>80</td></tr><tr><td>Mx</td><td>[Nm]</td><td>2</td></tr><tr><td>My</td><td>[Nm]</td><td>10</td></tr><tr><td>Mz</td><td>[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><div><div></div></div>                                                                                                                                                           |                                                                                     |     |    |    |      |   |    |      |    |    |      |   |  |
| 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                                                                 | ➔ Info 116                                                                                                                                                                                   |                                                                                     |     |    |    |      |   |    |      |    |    |      |   |  |

# Angle gripper

Selection aid

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Note

- 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  $r \rightarrow$  Workpiece mass

| Selection criteria/gripper types                                  |                                                                                                                    |                                                                                      |
|-------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|
|                                                                   | Angle gripper<br>HGW                                                                                               | Micro-angle gripper<br>HGWM                                                          |
|                                                                   |                                                                                                                    |                                                                                      |
| Workpiece mass <sup>1)</sup> [kg]                                 |                                                                                                                    |                                                                                      |
|                                                                   | Up to 2 kg<br>$S = 3$<br>$r = 30 \text{ mm}$                                                                       | Up to 0.2 kg<br>$S = 3$<br>$r = 20 \text{ mm}$                                       |
|                                                                   |                                                                                                                    |                                                                                      |
| 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                                                                                  |
|                                                                   | Mx [Nm]                                                                                                            | 5.7                                                                                  |
|                                                                   | My [Nm]                                                                                                            | 2.2                                                                                  |
|                                                                   | Mz [Nm]                                                                                                            | 3.6                                                                                  |
|                                                                   |                                                                                                                    | 20                                                                                   |
|                                                                   |                                                                                                                    | 0.4                                                                                  |
|                                                                   |                                                                                                                    | 0.4                                                                                  |
|                                                                   |                                                                                                                    | 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                                               | → Info 116                                                                                                         | → Info 116                                                                           |

# Parallel grippers HGPT, robust

Key features

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## At a glance

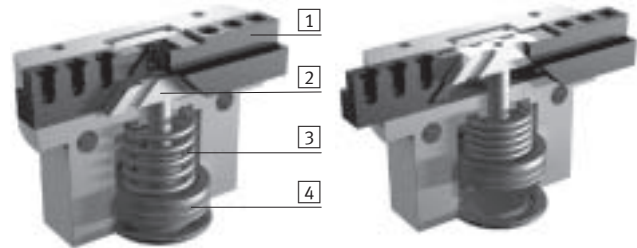
The force generated by the linear motion is translated into the gripper jaw movement via a wedge mechanism with guided motion sequence. This also guarantees synchronous movement of the gripper jaw. The virtually backlash-free slideway is realised using ground-in gripper jaws.

Flexible range of applications

- Double-acting gripper
- Compression spring for supplementary or retaining gripping forces
- For use as a single-acting gripper with only one compressed air connection
- Suitable for external and internal gripping

Gripper closed

Gripper open



- |                                  |                      |
|----------------------------------|----------------------|
| 1 Gripper jaw                    | 3 Spring             |
| 2 Wedge with restricted guidance | 4 Piston with magnet |

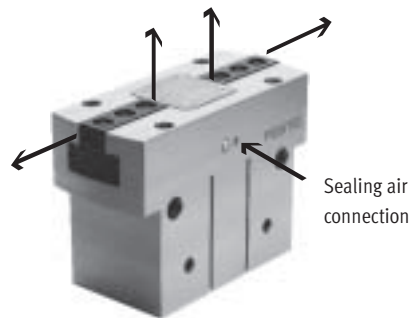


Gripper selection software  
[www.festo.com/en/engineering](http://www.festo.com/en/engineering)

## Sealing air connection

Compressed air flows past the gripper jaw when sealing air (max. 0.5 bar) is connected.

This prevents, for example, particles and soluble cutting oil from entering the gripper jaw guides.



## Versatile compressed air connections

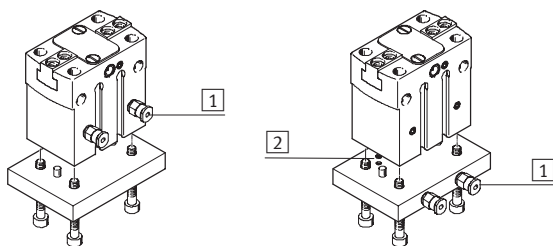
Direct  
from the front

Via adapter plate  
from underneath

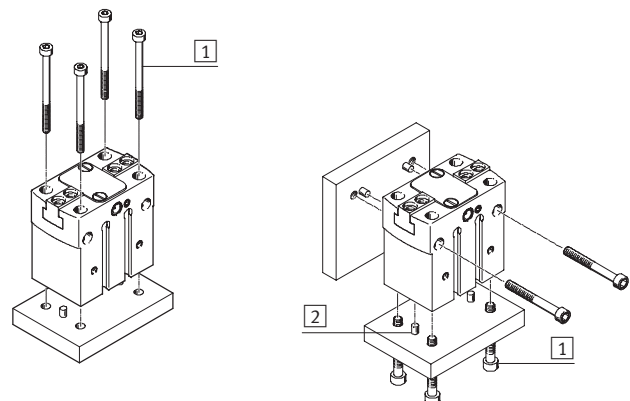
## Mounting options

Direct mounting  
from above

from underneath and from the side



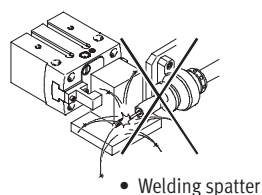
- |                              |
|------------------------------|
| 1 Compressed air connections |
| 2 O-rings                    |



- |                   |
|-------------------|
| 1 Mounting screws |
| 2 Centring pins   |

-  Note

Grippers are not designed for the following application:

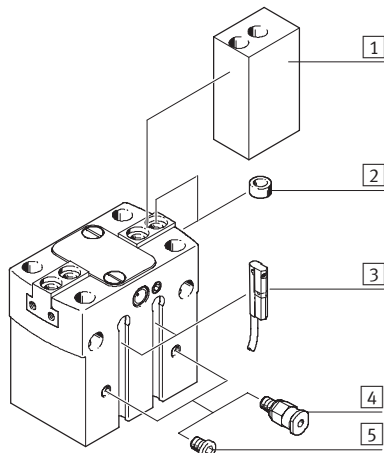


# Parallel grippers HGPT, robust

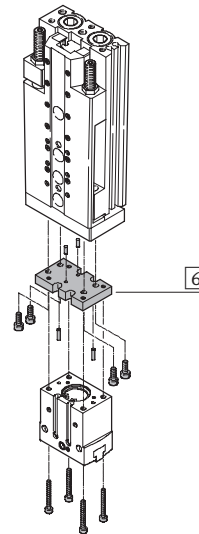
Peripherals overview and type codes

FESTO

## Peripherals overview



## System product for handling and assembly technology



| Accessories |                                       |                                                                                              |               |
|-------------|---------------------------------------|----------------------------------------------------------------------------------------------|---------------|
| Type        | Brief description                     |                                                                                              | → Page        |
| 1           | Unmachined gripper finger<br>BUB-HGPT | Unmachined part specially matched to the gripper jaws for custom building of gripper fingers | 24            |
| 2           | Centring sleeve<br>ZBH                | For centring when attaching gripper fingers                                                  | 25            |
| 3           | Proximity sensor<br>SME/SMT-10        | For sensing the piston position                                                              | 25            |
| 4           | Push-in fitting<br>QS                 | For connecting compressed air tubing with standard external diameters                        | www.festo.com |
| 5           | Blanking plug<br>B                    | For sealing compressed air connections when using air connections at the front               | 25            |
| 6           | –                                     | Drive/gripper connections                                                                    | www.festo.com |

## Type codes

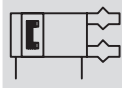
|                                 |                       |      |   |    |   |   |   |    |
|---------------------------------|-----------------------|------|---|----|---|---|---|----|
|                                 |                       | HGPT | – | 16 | – | A | – | G1 |
| <b>Type</b>                     |                       |      |   |    |   |   |   |    |
| HGPT                            | Parallel gripper      |      |   |    |   |   |   |    |
| <b>Size</b>                     |                       |      |   |    |   |   |   |    |
| <b>Position sensing</b>         |                       |      |   |    |   |   |   |    |
| A                               | For proximity sensing |      |   |    |   |   |   |    |
| <b>Gripping force retention</b> |                       |      |   |    |   |   |   |    |
| G1                              | Open                  |      |   |    |   |   |   |    |
| G2                              | Closed                |      |   |    |   |   |   |    |

# Parallel grippers HGPT, robust

Technical data

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Function  
Double-acting  
HGPT-...-A



- Ø - Size  
16 ... 63 mm

- I - Stroke  
6 ... 32 mm



Single-acting or  
with gripping force retention ...  
... open HGPT-...-G1



... closed HGPT-...-G2



| General technical data                                          |                                 |        |     |        |     |                 |                 |
|-----------------------------------------------------------------|---------------------------------|--------|-----|--------|-----|-----------------|-----------------|
| Size                                                            | 16                              | 20     | 25  | 35     | 40  | 50              | 63              |
| Design                                                          | Wedge mechanism                 |        |     |        |     |                 |                 |
|                                                                 | Guided motion sequence          |        |     |        |     |                 |                 |
| Mode of operation                                               | Double-acting                   |        |     |        |     |                 |                 |
| Gripper function                                                | Parallel                        |        |     |        |     |                 |                 |
| Number of gripper jaws                                          | 2                               |        |     |        |     |                 |                 |
| Max. applied load per external gripper finger <sup>1)</sup> [N] | 0.5                             | 1      | 1.5 | 2      | 2.5 | 3               | 4               |
| Stroke per gripper jaw [mm]                                     | 3                               | 4      | 6   | 8      | 10  | 12              | 16              |
| Pneumatic connection                                            | M3                              | M3     | M5  | M5     | M5  | G $\frac{1}{8}$ | G $\frac{1}{8}$ |
| Pneumatic connection                                            | M3                              | M3     | M5  | M5     | M5  | M5              | M5              |
| Sealing air                                                     |                                 |        |     |        |     |                 |                 |
| Repetition accuracy <sup>2)</sup> [mm]                          | < 0.03                          | < 0.04 |     | < 0.05 |     |                 |                 |
| Max. interchangeability [mm]                                    | 0.2                             |        |     |        |     |                 |                 |
| Max. gripper jaw backlash <sup>3)</sup> [mm]                    | 0.02                            |        |     |        |     |                 |                 |
| Max. gripper jaw angular backlash [°]                           | 0.1                             |        |     |        |     |                 |                 |
| Max. operating frequency [Hz]                                   | 3                               |        |     |        | 2   |                 |                 |
| Rotational symmetry [mm]                                        | < Ø 0.2                         |        |     |        |     |                 |                 |
| Position sensing                                                | For proximity sensing           |        |     |        |     |                 |                 |
| Type of mounting                                                | Via through-hole and dowel pin  |        |     |        |     |                 |                 |
|                                                                 | Via female thread and dowel pin |        |     |        |     |                 |                 |
| Fitting position                                                | Any                             |        |     |        |     |                 |                 |

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

3) In the direction of the gripper jaw movement

| Operating and environmental conditions       |                                                     |       |            |
|----------------------------------------------|-----------------------------------------------------|-------|------------|
| Min. operating pressure                      | HGPT-...-A                                          | [bar] | 3          |
|                                              | HGPT-...-G...                                       | [bar] | 5          |
| Max. operating pressure                      |                                                     | [bar] | 8          |
| Operating medium                             | Filtered compressed air, lubricated or unlubricated |       |            |
| Ambient temperature <sup>1)</sup>            |                                                     | [°C]  | +5 ... +60 |
| Corrosion resistance class CRC <sup>2)</sup> | 2                                                   |       |            |

1) Note operating range of proximity sensors

2) 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

# Parallel grippers HGPT, robust

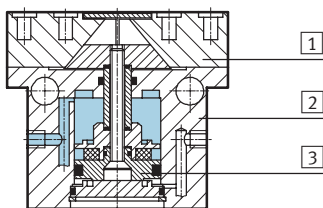
Technical data

FESTO

| Weight [g]  |     |     |     |     |      |      |      |
|-------------|-----|-----|-----|-----|------|------|------|
| Size        | 16  | 20  | 25  | 35  | 40   | 50   | 63   |
| HGPT-...-A  | 102 | 183 | 361 | 625 | 1209 | 1984 | 3633 |
| HGPT-...-G1 | 104 | 186 | 371 | 645 | 1252 | 2102 | 3763 |
| HGPT-...-G2 | 104 | 186 | 371 | 645 | 1252 | 2102 | 3763 |

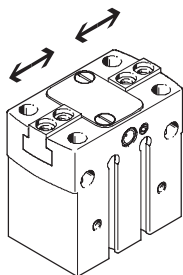
## Materials

Sectional view



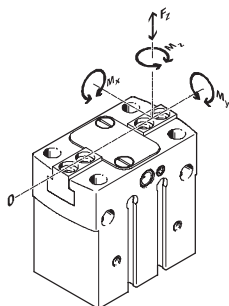
| Parallel gripper  |             |                                   |
|-------------------|-------------|-----------------------------------|
| 1                 | Gripper jaw | Hardened steel                    |
| 2                 | Housing     | Aluminium, coated with CompCote   |
| 3                 | Piston      | Gunmetal (red brass)              |
| –                 | Seals       | Nitrile rubber                    |
| Note on materials |             | Free of copper, PTFE and silicone |

## Gripping force [N] at 6 bar



| Size                           | 16 | 20  | 25  | 35  | 40  | 50  | 63   |
|--------------------------------|----|-----|-----|-----|-----|-----|------|
| Gripping force per gripper jaw |    |     |     |     |     |     |      |
| Opening                        | 42 | 75  | 110 | 250 | 300 | 480 | 825  |
| Closing                        | 36 | 70  | 100 | 230 | 270 | 440 | 770  |
| Total gripping force           |    |     |     |     |     |     |      |
| Opening                        | 84 | 150 | 220 | 500 | 600 | 960 | 1650 |
| Closing                        | 72 | 140 | 200 | 460 | 540 | 880 | 1540 |

## Characteristic load values at the gripper jaws



The indicated permissible forces and torques refer 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 coordinate line (gripper finger guide) must be taken into consideration for the calculation of torques.

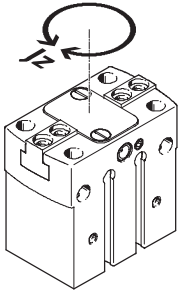
| Size                          | 16   | 20  | 25  | 35  | 40  | 50   | 63   |      |
|-------------------------------|------|-----|-----|-----|-----|------|------|------|
| Max. permissible force $F_z$  | [N]  | 200 | 300 | 500 | 900 | 1500 | 2500 | 4000 |
| Max. permissible torque $M_x$ | [Nm] | 10  | 15  | 30  | 50  | 80   | 100  | 140  |
| Max. permissible torque $M_y$ | [Nm] | 7   | 10  | 25  | 40  | 60   | 90   | 120  |
| Max. permissible torque $M_z$ | [Nm] | 5   | 8   | 15  | 30  | 40   | 60   | 80   |

# Parallel grippers HGPT, robust

Technical data

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



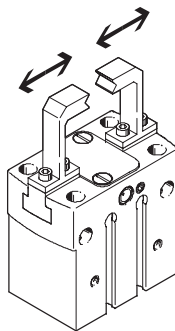
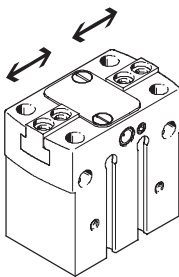
Mass moment of inertia [kgm<sup>2</sup>x10<sup>-4</sup>]  
for parallel grippers in relation to the  
central axis with no load.

| Size        | 16    | 20    | 25    | 35    | 40    | 50     | 63     |
|-------------|-------|-------|-------|-------|-------|--------|--------|
| HGPT-...-A  | 0.177 | 0.391 | 1.263 | 3.383 | 9.673 | 25.147 | 74.991 |
| HGPT-...-G1 | 0.178 | 0.392 | 1.272 | 3.411 | 9.786 | 25.460 | 75.409 |
| HGPT-...-G2 | 0.178 | 0.392 | 1.272 | 3.411 | 9.786 | 25.460 | 75.409 |

## 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 at 6 bar oper-  
ating pressure with horizontally  
mounted gripper without external

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

| Size                                                        |         | 16  | 20  | 25  | 35  | 40  | 50  | 63  |
|-------------------------------------------------------------|---------|-----|-----|-----|-----|-----|-----|-----|
| without external gripper fingers                            |         |     |     |     |     |     |     |     |
| HGPT-...-A                                                  | Opening | 20  | 31  | 30  | 40  | 66  | 85  | 150 |
|                                                             | Closing | 21  | 31  | 33  | 40  | 61  | 76  | 135 |
| HGPT-...-G1                                                 | Opening | 10  | 26  | 30  | 39  | 57  | 65  | 123 |
|                                                             | Closing | 44  | 51  | 64  | 92  | 130 | 150 | 282 |
| HGPT-...-G2                                                 | Opening | 41  | 52  | 50  | 78  | 100 | 130 | 260 |
|                                                             | Closing | 21  | 31  | 30  | 39  | 61  | 70  | 130 |
| with external gripper fingers as a function of applied load |         |     |     |     |     |     |     |     |
| HGPT-...                                                    | 1 N     | 100 | –   | –   | –   | –   | –   | –   |
|                                                             | 2 N     | 200 | 150 | 100 | –   | –   | –   | –   |
|                                                             | 3 N     | 300 | 250 | 200 | 150 | 100 | –   | –   |
|                                                             | 4 N     | –   | 350 | 300 | 250 | 200 | 150 | –   |
|                                                             | 5 N     | –   | –   | 400 | 350 | 300 | 250 | 200 |
|                                                             | 6 N     | –   | –   | –   | 450 | 400 | 300 | 250 |
|                                                             | 8 N     | –   | –   | –   | –   | –   | 450 | 400 |
|                                                             | 10 N    | –   | –   | –   | –   | –   | –   | 500 |

# Parallel grippers HGPT, robust

Technical data

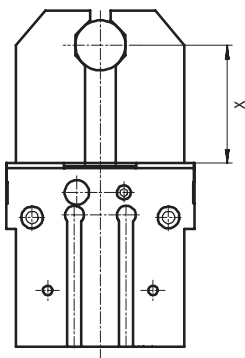
FESTO

## Max. permissible applied load [N] of the add-on gripper fingers, with unthrottled operation

| Size      | 16  | 20 | 25  | 35 | 40  | 50 | 63 |
|-----------|-----|----|-----|----|-----|----|----|
| HGPT-...- | 0.5 | 1  | 1.5 | 2  | 2.5 | 3  | 4  |

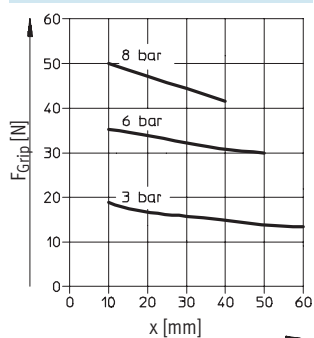
## Gripping force $F_{Grip}$ per gripper jaw as a function of operating pressure and lever arm $x$

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

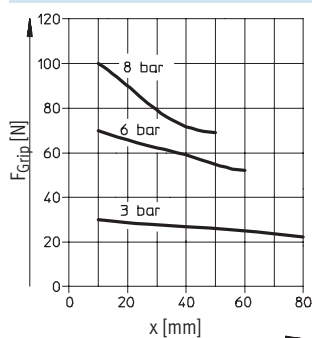


## As external gripper: Closing operation

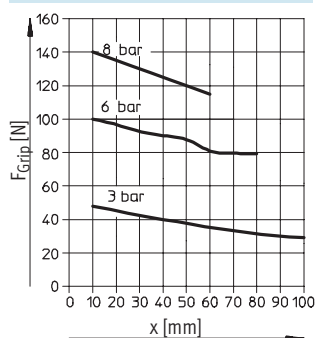
HGPT-16-A



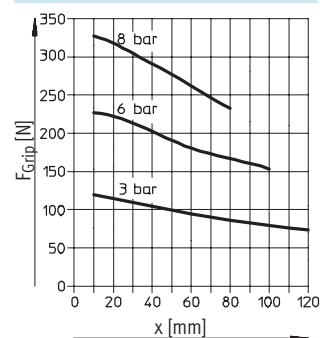
HGPT-20-A



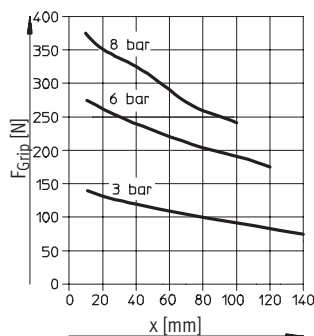
HGPT-25-A



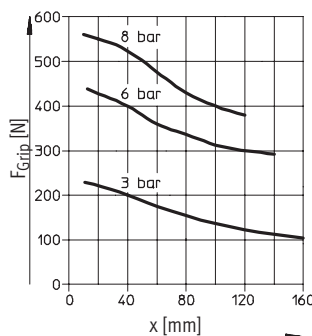
HGPT-35-A



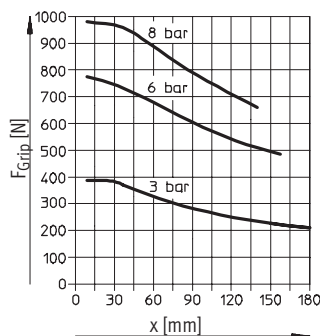
HGPT-40-A



HGPT-50-A



HGPT-63-A



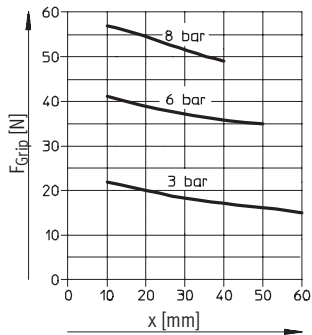
# Parallel grippers HGPT, robust

Technical data

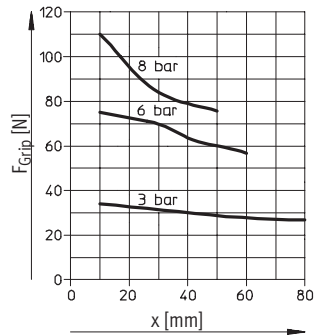
FESTO

Gripping force  $F_{Grip}$  per gripper jaw as a function of operating pressure and lever arm  $x$   
As internal gripper: Opening operation

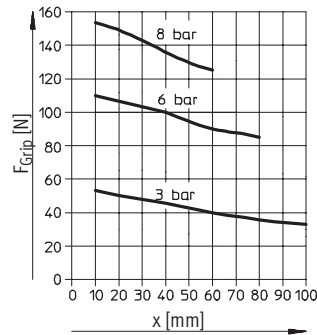
HGPT-16-A



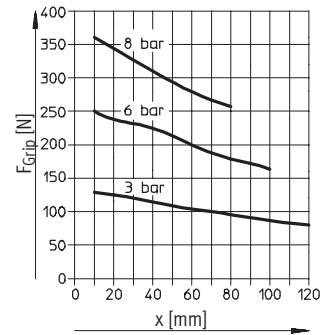
HGPT-20-A



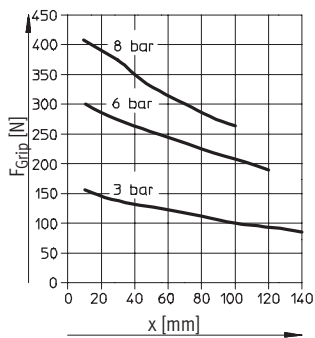
HGPT-25-A



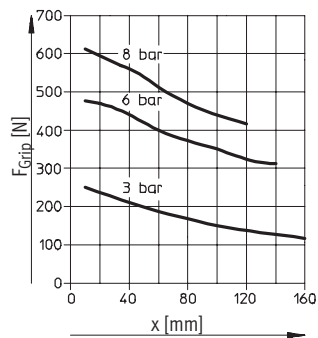
HGPT-35-A



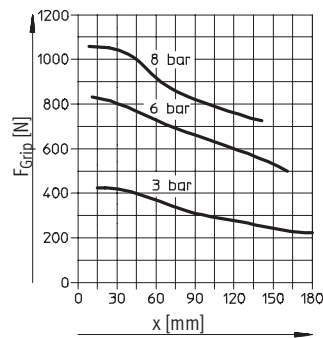
HGPT-40-A



HGPT-50-A



HGPT-63-A



# Parallel grippers HGPT, robust

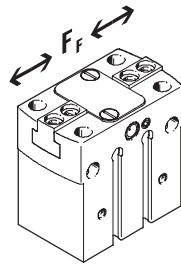
Technical data

FESTO

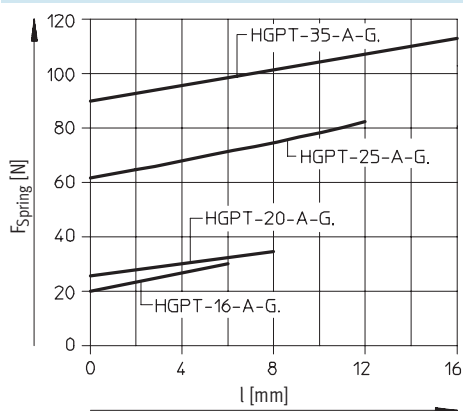
## Spring force $F_{Spring}$ as a function of gripper size and overall stroke $l$

Gripping force retention for HGPT-...-G...

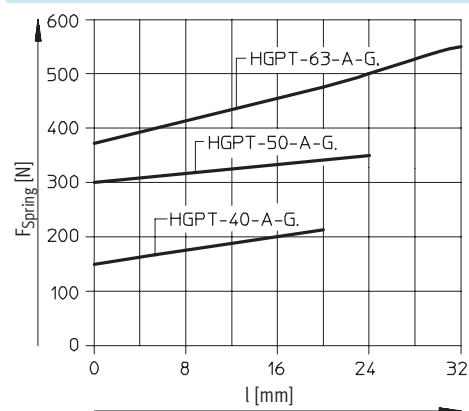
Spring forces  $F_{Spring}$  as a function of gripper size and overall stroke  $l$  can be determined for the various gripper types (HGPT-...-G...) using the following graphs.



### Size 16 ... 35



### Size 40 ... 63



The lever arm  $x$  must be taken into consideration when determining the actual spring force  $F_{Stotal}$ . The formulae for calculating the spring force are provided in the table opposite.

| Size | $F_{Stotal} =$                  |
|------|---------------------------------|
| 16   | $-0.2 * x + 0.8 * F_{Spring}$   |
| 20   | $-0.375 * x + 0.8 * F_{Spring}$ |
| 25   | $-0.25 * x + 0.8 * F_{Spring}$  |
| 35   | $-1 * x + 0.8 * F_{Spring}$     |
| 40   | $-0.9 * x + 0.8 * F_{Spring}$   |
| 50   | $-1.36 * x + 0.8 * F_{Spring}$  |
| 63   | $-2.2 * x + 0.8 * F_{Spring}$   |

## Determination of the actual gripping forces $F_{Gr}$ for HGPT-...-G1 and HGPT-...-G2 depending on the application

Parallel grippers with integrated spring type HGPT-...-G1 (opening gripping force retention) and HGPT-...-G2 (closing gripping force retention) can be used as:

- single-acting grippers
- grippers with supplementary gripping force and
- grippers with gripping force retention depending on requirements.

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

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

### Application

#### Single-acting

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

#### Supplementary gripping force

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

#### Gripping force retention

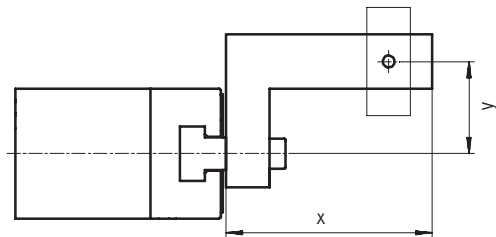
- Gripping with spring force:  
 $F_{Gr} = F_{Stotal}$

# Parallel grippers HGPT, robust

Technical data

FESTO

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



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:

Lever arm  $x = 40$  mm

Eccentricity  $y = 45$  mm

To be found:

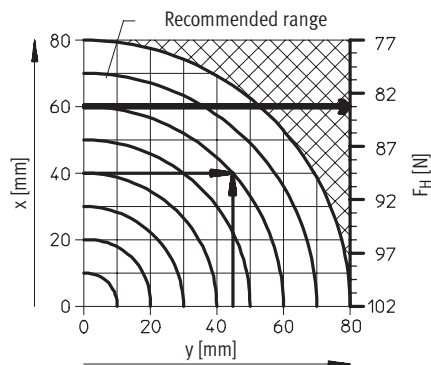
Gripping force at 6 bar

Procedure:

- Determine the intersection  $xy$  between lever arm  $x$  and eccentricity  $y$  in the graph for HGPT-25-A...
- Draw an arc (with centre at origin) through intersection  $xy$
- Determine the intersection between the arc and the X axis
- Read the gripping force

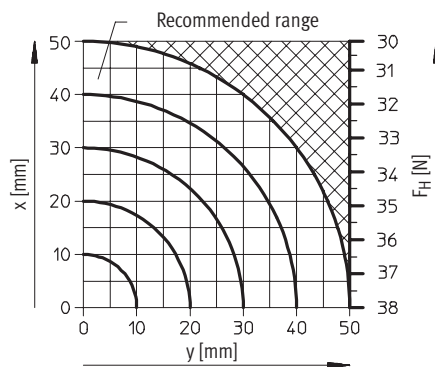
Result:

Gripping force = approx. 83 N

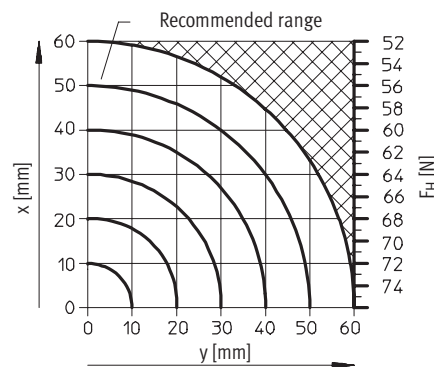


### As external gripper: Closing operation

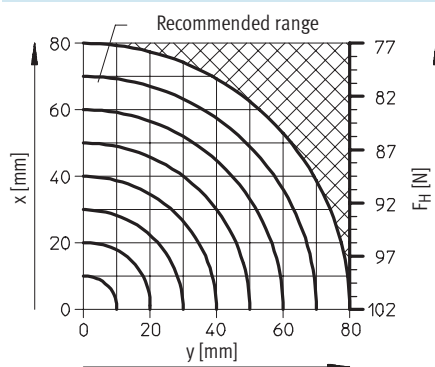
#### HGPT-16-A



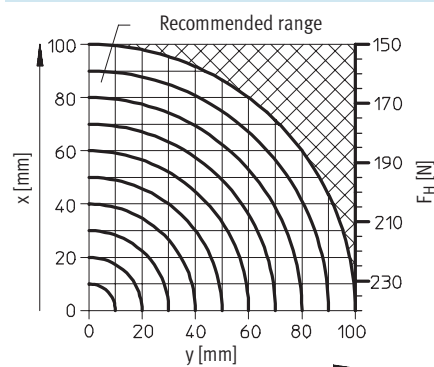
#### HGPT-20-A



#### HGPT-25-A



#### HGPT-35-A



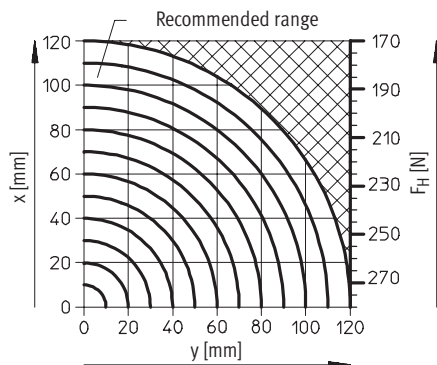
# Parallel grippers HGPT, robust

Technical data

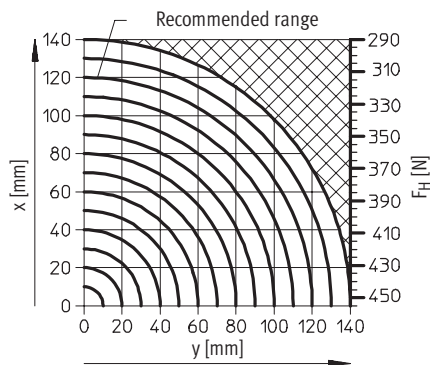
FESTO

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

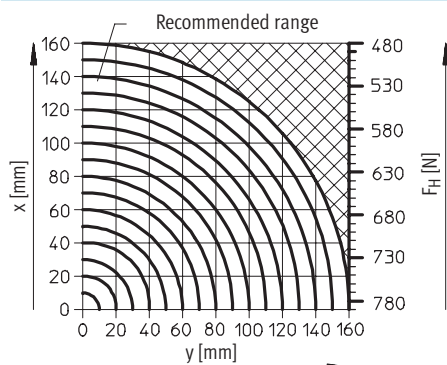
HGPT-40-A



HGPT-50-A

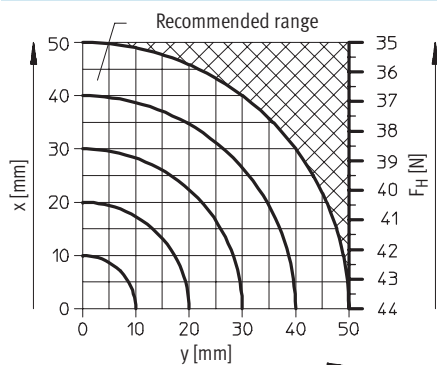


HGPT-63-A

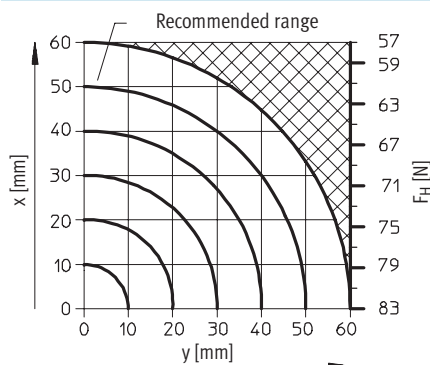


As internal gripper: Opening operation

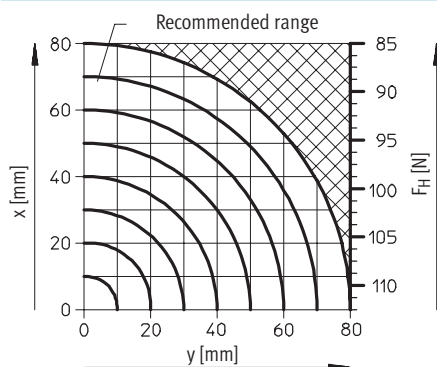
HGPT-16-A



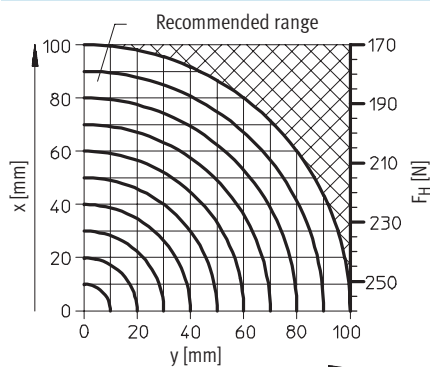
HGPT-20-A



HGPT-25-A



HGPT-35-A



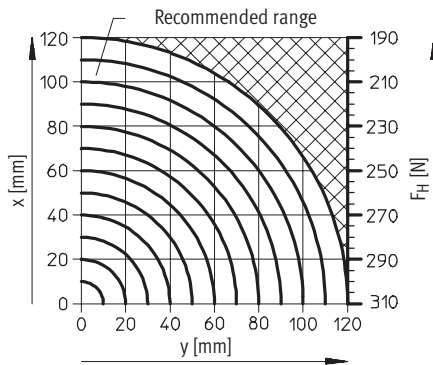
# Parallel grippers HGPT, robust

Technical data

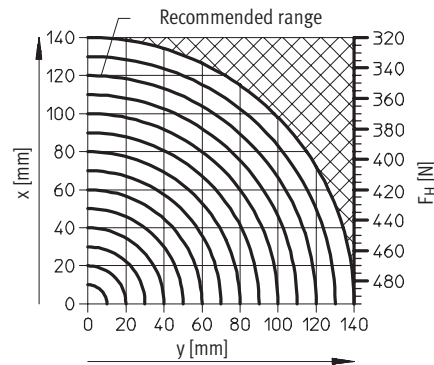
FESTO

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

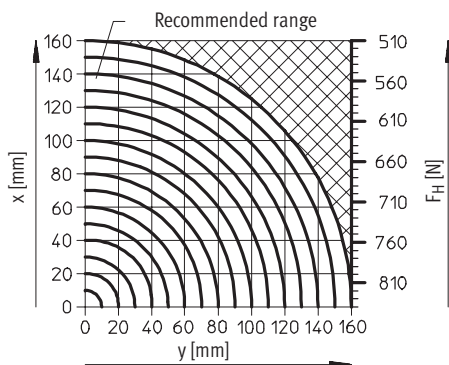
HGPT-40-A



HGPT-50-A

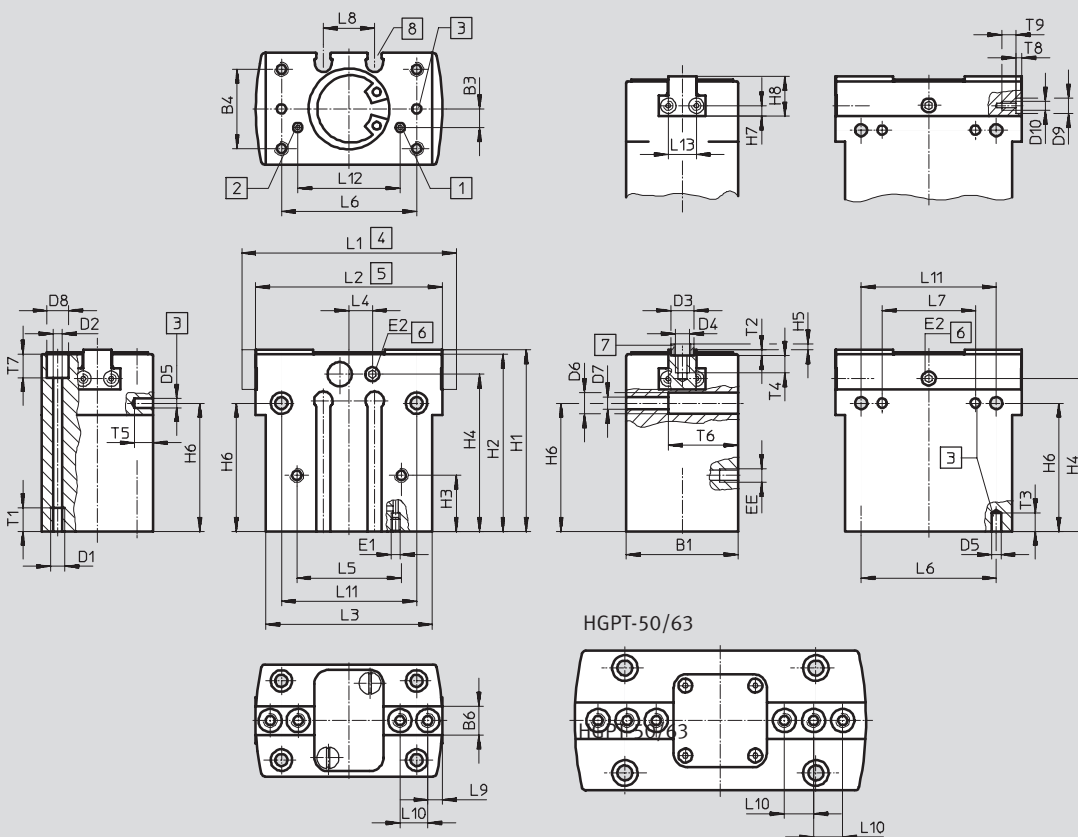


HGPT-63-A



Dimensions

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



# Parallel grippers HGPT, robust

Technical data

**FESTO**

|                                                                                                          |                                                                                                          |                                                          |                                                          |
|----------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------|----------------------------------------------------------|----------------------------------------------------------|
| 1 Compressed air connection opening, either on the side or bottom (bottom connection sealed on delivery) | 2 Compressed air connection closing, either on the side or bottom (bottom connection sealed on delivery) | 3 Hole for dowel pin (not included in scope of delivery) | 6 Sealing air connection (sealed on delivery)            |
|                                                                                                          |                                                                                                          | 4 Gripper jaw open                                       | 7 Centring sleeves ZBH (4 included in scope of delivery) |
|                                                                                                          |                                                                                                          | 5 Gripper jaw closed                                     | 8 Slot for proximity sensor                              |

| Size | B1    | B3   | B4   | B6<br>-0.05<br>-0.1 | D1 | D2<br>Ø | D3<br>Ø<br>H8/h7 | D4 | D5<br>Ø<br>H7 | D6<br>Ø  | D7<br>Ø | D8<br>Ø |
|------|-------|------|------|---------------------|----|---------|------------------|----|---------------|----------|---------|---------|
| [mm] | ±0.05 | ±0.1 | ±0.1 |                     |    |         |                  |    |               |          |         |         |
| 16   | 24    | 4    | 17   | 6                   | M3 | 2.6     | 5                | M3 | 2             | 4.6+0.1  | 2.6     | 4.6+0.1 |
| 20   | 28    | 7    | 22   | 6.5                 | M4 | 3.2     | 5                | M3 | 3             | 6+0.2    | 3.2     | 6+0.2   |
| 25   | 36    | 10   | 27   | 10                  | M5 | 4.2     | 7                | M4 | 4             | 8+0.3    | 4.2     | 8+0.3   |
| 35   | 42    | 9    | 32   | 12                  | M5 | 4.2     | 9                | M6 | 4             | 10+0.3   | 5.3     | 8+0.3   |
| 40   | 50    | 13   | 38   | 14                  | M6 | 5.1     | 9                | M6 | 5             | 11+0.3   | 6.4     | 9+0.3   |
| 50   | 60    | 14   | 45   | 15.5                | M8 | 6.4     | 9                | M6 | 6             | 13.5+0.3 | 8.4     | 11+0.3  |
| 63   | 72    | 12   | 56   | 20                  | M8 | 6.4     | 12               | M8 | 6             | 13.5+0.3 | 8.4     | 11+0.3  |

| Size | D9<br>Ø<br>H8 | D10 | EE                            | E1 | E2 | H1<br>±0.05 | H2<br>±0.05 | H3<br>±0.1 | H4   | H5<br>-0.3 | H6<br>±0.02 <sup>1)</sup><br>±0.1 <sup>2)</sup> | H7<br>±0.02 <sup>1)</sup><br>±0.1 <sup>2)</sup> |
|------|---------------|-----|-------------------------------|----|----|-------------|-------------|------------|------|------------|-------------------------------------------------|-------------------------------------------------|
| [mm] |               |     |                               |    |    |             |             |            |      |            |                                                 |                                                 |
| 16   | –             | M2  | M3                            | M2 | M3 | 39          | 38          | 12         | 33.7 | 1.2        | 27.5                                            | 2.25                                            |
| 20   | 5             | M3  | M3                            | M3 | M3 | 46          | 45          | 15         | 37   | 1.2        | 24                                              | 3                                               |
| 25   | 5             | M3  | M5                            | M3 | M5 | 57          | 56          | 20         | 46   | 1.4        | 34                                              | 4.5                                             |
| 35   | 7             | M5  | M5                            | M4 | M5 | 67          | 66          | 28         | 53   | 1.9        | 38                                              | 5.5                                             |
| 40   | 7             | M5  | M5                            | M5 | M5 | 83          | 82          | 36         | 68   | 1.9        | 53                                              | 5.5                                             |
| 50   | 7             | M5  | G <sup>1</sup> / <sub>8</sub> | M5 | M5 | 97          | 96          | 30         | 78   | 1.9        | 61                                              | 7.5                                             |
| 63   | 7             | M5  | G <sup>1</sup> / <sub>8</sub> | M5 | M5 | 117         | 116         | 26         | 92   | 2.4        | 67                                              | 9                                               |

| Size | H8    | L1   | L2   | L3   | L4  | L5   | L6<br>±0.02 <sup>1)</sup><br>±0.1 <sup>2)</sup> | L7    | L8   | L9<br>±0.02 <sup>1)</sup><br>±0.1 <sup>2)</sup> | L10<br>±0.02 <sup>1)</sup><br>±0.1 <sup>2)</sup> | L11  |
|------|-------|------|------|------|-----|------|-------------------------------------------------|-------|------|-------------------------------------------------|--------------------------------------------------|------|
| [mm] | -0.02 | ±0.5 | ±0.5 | ±0.1 |     | ±0.1 |                                                 | ±0.02 | +0.1 |                                                 |                                                  | ±0.1 |
| 16   | 8.5   | 46   | 40   | 35.8 | 3.8 | 22.4 | 29                                              | 20    | 11   | 3                                               | 6                                                | 29   |
| 20   | 12    | 58   | 50   | 44   | 0   | 28   | 35                                              | 24    | 18   | 4                                               | 8                                                | 35   |
| 25   | 16    | 76   | 64   | 52   | 0   | 28   | 42                                              | 20    | 17   | 5                                               | 12                                               | 42   |
| 35   | 19    | 96   | 80   | 64   | 0   | 40   | 52                                              | 40    | 24   | 6                                               | 15                                               | 52   |
| 40   | 22    | 120  | 100  | 80   | 0   | 48   | 66                                              | 50    | 32   | 10                                              | 18                                               | 66   |
| 50   | 25.5  | 149  | 125  | 100  | 0   | 56   | 82                                              | 60    | 32   | 10                                              | 12.5                                             | 82   |
| 63   | 32    | 192  | 160  | 125  | 0   | 74   | 100                                             | 76    | 34   | 10                                              | 18                                               | 100  |

| Size | L12  | L13<br>±0.02 <sup>1)</sup><br>±0.1 <sup>2)</sup> | T1   | T2   | T3   | T4   | T5   | T6 | T7   | T8   | T9 |
|------|------|--------------------------------------------------|------|------|------|------|------|----|------|------|----|
| [mm] | ±0.1 |                                                  | min. | +0.1 | min. | min. | min. |    | +0.2 | +0.1 |    |
| 16   | 22   | 6                                                | 5    | 1.3  | 4    | 5    | 4    | 15 | 24   | –    | 3  |
| 20   | 24   | 6                                                | 6    | 1.3  | 4    | 5    | 4    | 19 | 11   | 1.3  | 6  |
| 25   | 28   | 6                                                | 10   | 1.6  | 4    | 5    | 4    | 24 | 16   | 1.3  | 6  |
| 35   | 40   | 13                                               | 10   | 2.1  | 6    | 10   | 4    | 27 | 19   | 1.6  | 9  |
| 40   | 44   | 13                                               | 12   | 2.1  | 6    | 10   | 6    | 33 | 20   | 1.6  | 9  |
| 50   | 56   | 13                                               | 12   | 2.1  | 8    | 10   | 8    | 43 | 23   | 1.6  | 9  |
| 63   | 70   | 13                                               | 12   | 2.6  | 10   | 12   | 10   | 55 | 35   | 1.6  | 9  |

1) For centring

2) For through-and threaded hole

# Parallel grippers HGPT, robust

Technical data and accessories

**FESTO**

| Ordering data |                                             |           |                                                |              |                         |
|---------------|---------------------------------------------|-----------|------------------------------------------------|--------------|-------------------------|
| Size<br>[mm]  | Double-acting<br>without compression spring |           | Single-acting or with gripping force retention |              |                         |
|               | Part No.                                    | Type      | open<br>Part No.                               | Type         | closed<br>Part No. Type |
| 16            | 535 858                                     | HGPT-16-A | 535 859                                        | HGPT-16-A-G1 | 535 860 HGPT-16-A-G2    |
| 20            | 535 861                                     | HGPT-20-A | 535 862                                        | HGPT-20-A-G1 | 535 863 HGPT-20-A-G2    |
| 25            | 535 864                                     | HGPT-25-A | 535 865                                        | HGPT-25-A-G1 | 535 866 HGPT-25-A-G2    |
| 35            | 535 867                                     | HGPT-35-A | 535 868                                        | HGPT-35-A-G1 | 535 869 HGPT-35-A-G2    |
| 40            | 535 870                                     | HGPT-40-A | 535 871                                        | HGPT-40-A-G1 | 535 872 HGPT-40-A-G2    |
| 50            | 535 873                                     | HGPT-50-A | 535 874                                        | HGPT-50-A-G1 | 535 875 HGPT-50-A-G2    |
| 63            | 535 876                                     | HGPT-63-A | 535 877                                        | HGPT-63-A-G1 | 535 878 HGPT-63-A-G2    |

## Accessories

### Unmachined gripper finger

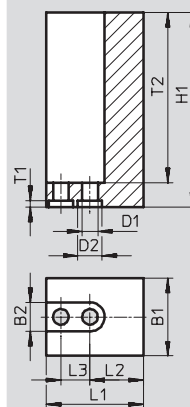
#### BUB-HGPT

(Scope of delivery: 2 pcs.)

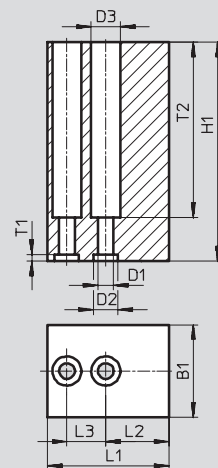
Material:  
Aluminium



BUB-HGPT-16



BUB-HGPT-20 ... 63



| Dimensions and ordering data |       |       |          |         |            |       |       |
|------------------------------|-------|-------|----------|---------|------------|-------|-------|
| For size                     | B1    | B2    | D1       | D2      | D3         | H1    | L1    |
| [mm]                         | ±0.05 | +0.22 | Ø<br>H13 | Ø<br>H8 | Ø<br>+0.22 | ±0.05 | ±0.05 |
| 16                           | 16    | 6     | 3.2      | 5       | –          | 40    | 20    |
| 20                           | 19    | –     | 3.2      | 5       | 6          | 45    | 25    |
| 25                           | 24    | –     | 4.3      | 7       | 8          | 60    | 32    |
| 35                           | 28    | –     | 6.4      | 9       | 11         | 70    | 40    |
| 40                           | 34    | –     | 6.4      | 9       | 11         | 75    | 50    |
| 50                           | 40    | –     | 6.4      | 9       | 11         | 100   | 62.5  |
| 63                           | 50    | –     | 8.4      | 12      | 13.5       | 120   | 80    |

| For size | L2                                        | L3                                        | T1   | T2  | Weight<br>per unmanipulated<br>gripper finger<br>[g] | Part No. | Type        |
|----------|-------------------------------------------|-------------------------------------------|------|-----|------------------------------------------------------|----------|-------------|
| [mm]     | ±0.02 <sup>1)</sup><br>±0.1 <sup>2)</sup> | ±0.01 <sup>1)</sup><br>±0.1 <sup>1)</sup> | +0.1 |     |                                                      |          |             |
| 16       | 11                                        | 6                                         | 1.3  | 35  | 28                                                   | 537 198  | BUB-HGPT-16 |
| 20       | 13                                        | 8                                         | 1.3  | 36  | 53                                                   | 537 199  | BUB-HGPT-20 |
| 25       | 15                                        | 12                                        | 1.6  | 51  | 112                                                  | 537 200  | BUB-HGPT-25 |
| 35       | 19                                        | 15                                        | 2.1  | 61  | 182                                                  | 537 201  | BUB-HGPT-35 |
| 40       | 22                                        | 18                                        | 2.1  | 71  | 312                                                  | 537 202  | BUB-HGPT-40 |
| 50       | 27.5                                      | 25                                        | 2.1  | 91  | 638                                                  | 537 203  | BUB-HGPT-50 |
| 63       | 34                                        | 36                                        | 2.6  | 110 | 1 230                                                | 537 204  | BUB-HGPT-63 |

1) For centring

2) For through-hole

# Parallel grippers HGPT, robust

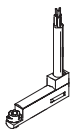
Accessories

**FESTO**

| Ordering data                                                                     |                  |                                                                          |               |                                                                   |         |                  |
|-----------------------------------------------------------------------------------|------------------|--------------------------------------------------------------------------|---------------|-------------------------------------------------------------------|---------|------------------|
|                                                                                   | For size<br>[mm] | Remarks                                                                  | Weight<br>[g] | Part No.                                                          | Type    | PU <sup>1)</sup> |
| Centring sleeve ZBH                                                               |                  |                                                                          |               | Technical data → <a href="http://www.festo.com">www.festo.com</a> |         |                  |
|  | 16, 20           | For centring unmachined gripper jaws/gripper fingers on the gripper jaws | 1             | 189 652                                                           | ZBH-5   | 10               |
|                                                                                   | 25               |                                                                          | 1             | 186 717                                                           | ZBH-7   | 10               |
|                                                                                   | 35, 40, 50       |                                                                          | 1             | 150 927                                                           | ZBH-9   | 10               |
|                                                                                   | 63               |                                                                          | 1             | 189 653                                                           | ZBH-12  | 10               |
|                                                                                   | 20, 25           | For lateral centring of gripper fingers on the gripper jaws              | 1             | 189 652                                                           | ZBH-5   | 10               |
|                                                                                   | 35, 40, 50, 63   |                                                                          | 1             | 186 717                                                           | ZBH-7   | 10               |
|                                                                                   |                  |                                                                          |               |                                                                   |         |                  |
| Blanking plug B                                                                   |                  |                                                                          |               | Technical data → <a href="http://www.festo.com">www.festo.com</a> |         |                  |
|  | 16, 20           | For sealing the compressed air connections                               | 0.6           | 30 979                                                            | B-M3-S9 | 10               |
|                                                                                   | 25, 35, 40       |                                                                          | 1             | 174 308                                                           | B-M5-B  | 10               |
|                                                                                   | 50, 63           |                                                                          | 5             | 3 568                                                             | B-1/8   | 10               |

1) Packaging unit quantity

| Ordering data – Proximity sensors for C-slot, in-line connecting cable              |                       |                       |         |                     | Technical data → <a href="http://www.festo.com">www.festo.com</a> |                          |
|-------------------------------------------------------------------------------------|-----------------------|-----------------------|---------|---------------------|-------------------------------------------------------------------|--------------------------|
|                                                                                     | Assembly              | Electrical connection |         | Cable length<br>[m] | Part No.                                                          | Type                     |
|                                                                                     |                       | Cable                 | Plug M8 |                     |                                                                   |                          |
| NO contact, magneto-resistive                                                       |                       |                       |         |                     |                                                                   |                          |
|  | Insertable from above | 3-core                | –       | 2.5                 | 525 915                                                           | SMT-10F-PS-24V-K2,5L-OE  |
|                                                                                     |                       | –                     | 3-pin   | 0.3                 | 525 916                                                           | SMT-10F-PS-24V-K0,3L-M8D |
|  | Insertable from end   | –                     | 3-pin   | 0.3                 | 173 220                                                           | SMT-10-PS-SL-LED-24      |
|                                                                                     |                       | 3-core                | –       | 2.5                 | 173 218                                                           | SMT-10-PS-KL-LED-24      |
| NO contact, magnetic reed                                                           |                       |                       |         |                     |                                                                   |                          |
|  | Insertable from above | –                     | 3-pin   | 0.3                 | 525 914                                                           | SME-10F-DS-24V-K0,3L-M8D |
|                                                                                     |                       | 3-core                | –       | 2.5                 | 525 913                                                           | SME-10F-DS-24V-K2,5L-OE  |
|  | Insertable from end   | –                     | 3-pin   | 0.3                 | 173 212                                                           | SME-10-SL-LED-24         |
|                                                                                     |                       | 3-core                | –       | 2.5                 | 173 210                                                           | SME-10-KL-LED-24         |

| Ordering data – Proximity sensors for C-slot, connecting cable at right angles      |                               |                       |         |                     |          | Technical data → <a href="http://www.festo.com">www.festo.com</a> |  |
|-------------------------------------------------------------------------------------|-------------------------------|-----------------------|---------|---------------------|----------|-------------------------------------------------------------------|--|
|                                                                                     | Assembly                      | Electrical connection |         | Cable length<br>[m] | Part No. | Type                                                              |  |
|                                                                                     |                               | Cable                 | Plug M8 |                     |          |                                                                   |  |
|  | NO contact, magneto-resistive |                       |         |                     |          |                                                                   |  |
|                                                                                     | Insertable from<br>above      | 3-core                | –       | 2.5                 | 526 674  | SMT-10F-PS-24V-K2,5Q-OE                                           |  |
|                                                                                     |                               | –                     | 3-pin   | 0.3                 | 526 675  | SMT-10F-PS-24V-K0,3Q-M8D                                          |  |
|                                                                                     | NO contact, magnetic reed     |                       |         |                     |          |                                                                   |  |
|                                                                                     | Insertable from<br>above      | 3-core                | –       | 2.5                 | 526 670  | SME-10F-DS-24V-K2,5Q-OE                                           |  |
|                                                                                     |                               | –                     | 3-pin   | 0.3                 | 526 671  | SME-10F-DS-24V-K0,3Q-M8D                                          |  |

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

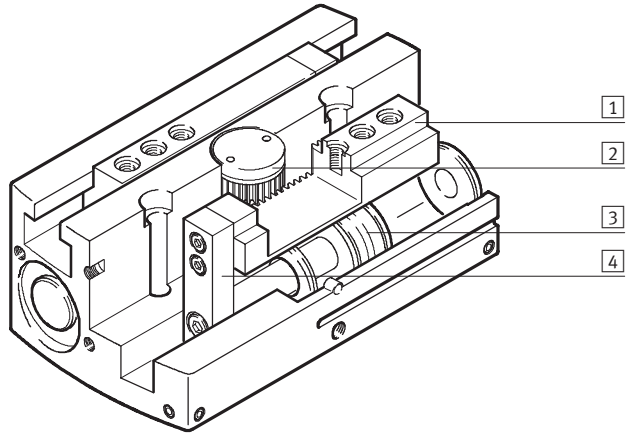
# Parallel grippers HGPL, robust, with long stroke

Key features

FESTO

## At a glance

- Space-saving and suitable for high forces
  - Two parallel and opposing pistons move the gripper jaws directly and without loss of force
- Reliable
  - A pinion that synchronises the movement of both gripper jaws ensures controlled, precise and centred gripping
  - The space-saving design of the parallel gripper jaws permits a long guide length for the gripper jaws
- Sturdy
  - The T-slot in combination with a long guide length allows the gripper jaws to withstand high forces and torques
- Flexible range of applications
  - Double-acting gripper suitable for external and internal gripping.
  - Versatile mounting options and compressed air connections
  - Opening stroke can be adjusted to optimise time



- 1 Gripper jaw
- 2 Synchronising gear
- 3 Piston with magnet
- 4 Driver

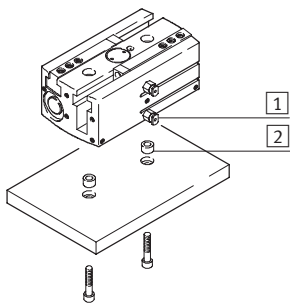


Gripper selection software  
[www.festo.com/en/engineering](http://www.festo.com/en/engineering)

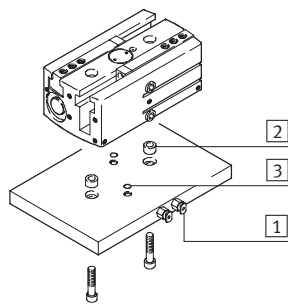
## Versatile compressed air connections

Direct  
from the front

Via adapter plate  
from underneath



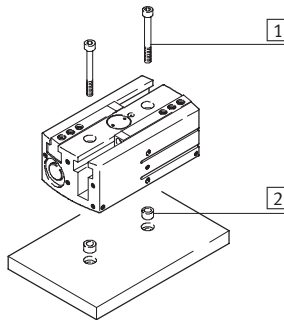
- 1 Compressed air connections
- 2 Centring sleeves
- 3 O-rings



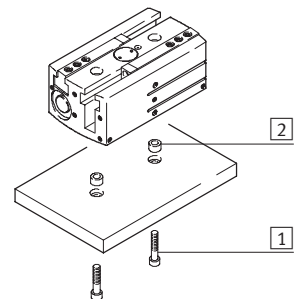
## Mounting options

Direct mounting  
from above

from underneath

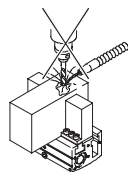


- 1 Mounting screws
- 2 Centring sleeves

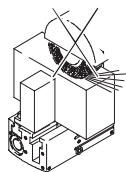


- - Note

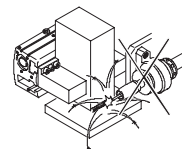
Grippers are not designed for the following or similar applications:



- Aggressive media
- Machining



- Grinding dust



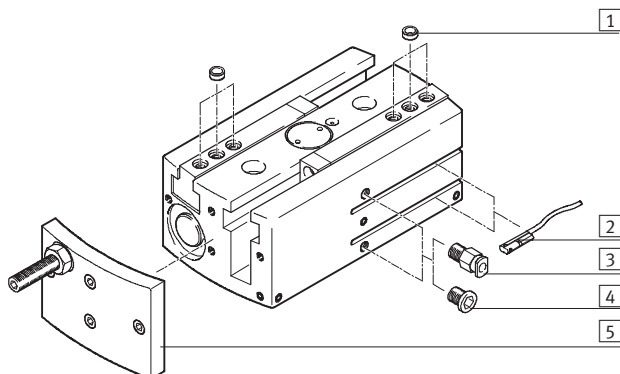
- Welding spatter

# Parallel grippers HGPL, robust, with long stroke

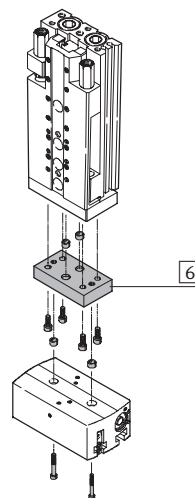
Peripherals overview and type codes

FESTO

## Peripherals overview



## System product for handling and assembly technology



| Accessories                          |                                                                                              |  |               |
|--------------------------------------|----------------------------------------------------------------------------------------------|--|---------------|
| Type                                 | Brief description                                                                            |  | → Page        |
| 1 Centring sleeve ZBH                | For centring when attaching gripper fingers                                                  |  | 40            |
| 2 Proximity sensor SME/SMT-10        | For sensing the piston position                                                              |  | 41            |
| 3 Push-in fitting QS                 | For connecting compressed air tubing with standard external diameters                        |  | www.festo.com |
| 4 Blanking plug B                    | For sealing compressed air connections when using air connections at the front               |  | 40            |
| 5 Stroke reducing plate HGPL-HR-...  | For reducing the opening stroke                                                              |  | 39            |
| 6 –                                  | Drive/gripper connections                                                                    |  | www.festo.com |
| – Unmachined gripper finger BUB-HGPL | Unmachined part specially matched to the gripper jaws for custom building of gripper fingers |  | 40            |

## Type codes

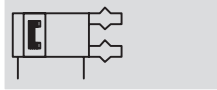
|                  |                       |      |   |    |   |    |   |   |
|------------------|-----------------------|------|---|----|---|----|---|---|
|                  |                       | HGPL | – | 14 | – | 40 | – | A |
| Type             |                       |      |   |    |   |    |   |   |
| HGPL             | Parallel gripper      |      |   |    |   |    |   |   |
| Size             |                       |      |   |    |   |    |   |   |
| Stroke [mm]      |                       |      |   |    |   |    |   |   |
| Position sensing |                       |      |   |    |   |    |   |   |
| A                | For proximity sensing |      |   |    |   |    |   |   |

# Parallel grippers HGPL, robust, with long stroke

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## Technical data

Function  
Double-acting  
HGPL-...-A



[www.festo.com/en/](http://www.festo.com/en/)  
Spare\_parts\_service  
Wearing parts kits  
→ 38



-  - Size  
14 ... 40 mm
-  - Stroke  
80 ... 160 mm

| General technical data                                      |                                         |         |    |     |    |     |    |
|-------------------------------------------------------------|-----------------------------------------|---------|----|-----|----|-----|----|
| Size                                                        | 14                                      |         |    | 25  |    | 40  |    |
| Design                                                      | Synchronised pneumatic pistons          |         |    |     |    |     |    |
|                                                             | Guided motion sequence                  |         |    |     |    |     |    |
| Mode of operation                                           | Double-acting                           |         |    |     |    |     |    |
| Gripper function                                            | Parallel                                |         |    |     |    |     |    |
| Number of gripper jaws                                      | 2                                       |         |    |     |    |     |    |
| Max. applied load per external gripper finger <sup>1)</sup> | [N]                                     | 0.8     |    | 2.5 |    | 4.2 |    |
| Stroke per gripper jaw                                      | [mm]                                    | 40      | 80 | 40  | 80 | 40  | 80 |
| Pneumatic connection                                        | M5                                      |         |    |     |    |     |    |
| Repetition accuracy <sup>2)</sup>                           | [mm]                                    | < 0.03  |    |     |    |     |    |
| Max. interchangeability                                     | [mm]                                    | < 0.2   |    |     |    |     |    |
| Max. gripper jaw backlash <sup>3)</sup>                     | [mm]                                    | < 0.05  |    |     |    |     |    |
| Max. operating frequency                                    | [Hz]                                    | < 1     |    |     |    |     |    |
| Rotational symmetry                                         | [mm]                                    | < Ø 0.2 |    |     |    |     |    |
| Position sensing                                            | For proximity sensing                   |         |    |     |    |     |    |
| Type of mounting                                            | Via through-holes and centring sleeves  |         |    |     |    |     |    |
|                                                             | With female thread and centring sleeves |         |    |     |    |     |    |
| Fitting position                                            | Any                                     |         |    |     |    |     |    |

- 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  
 3) In the direction of the gripper jaw movement

| Operating and environmental conditions       |                                                     |
|----------------------------------------------|-----------------------------------------------------|
| Operating pressure                           | [bar] 3 ... 8                                       |
| Operating medium                             | Filtered compressed air, lubricated or unlubricated |
| Ambient temperature <sup>1)</sup>            | [°C] +5 ... +60                                     |
| Corrosion resistance class CRC <sup>2)</sup> | 2                                                   |

- 1) Note operating range of proximity sensors  
 2) 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

| Weight [g]             |       |     |      |      |
|------------------------|-------|-----|------|------|
| Size                   | 14    | 25  | 40   |      |
| Stroke per gripper jaw | 40 mm | 440 | 1400 | 3300 |
|                        | 80 mm | 720 | 2200 | 4800 |

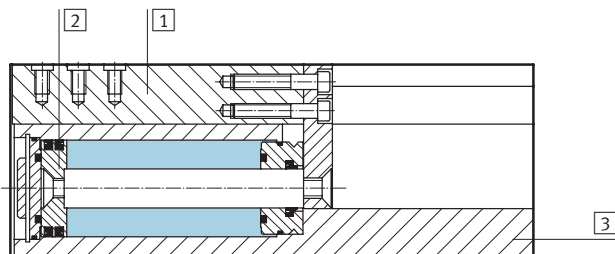
# Parallel grippers HGPL, robust, with long stroke

FESTO

Technical data

## Materials

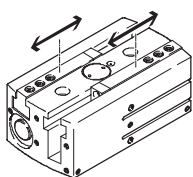
Sectional view



## Parallel gripper

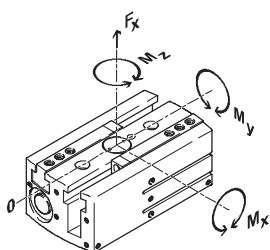
|                   |             |                                       |
|-------------------|-------------|---------------------------------------|
| 1                 | Gripper jaw | Hardened steel, Citrox-coated         |
| 2                 | Piston      | High-alloy steel                      |
| 3                 | Housing     | Wrought aluminium alloy with CompCote |
| –                 | Seals       | Nitrile rubber, polyurethane          |
| Note on materials |             | Free of copper, PTFE and silicone     |

## Gripping force [N] at 6 bar



| Size                           | Stroke | 14  | 25  | 40   |
|--------------------------------|--------|-----|-----|------|
| Gripping force per gripper jaw |        |     |     |      |
| Opening                        | 40 mm  | 60  | 180 | 440  |
|                                | 80 mm  | 64  | 205 | 520  |
| Closing                        | 40 mm  | 80  | 240 | 550  |
|                                | 80 mm  | 80  | 255 | 605  |
| Total gripping force           |        |     |     |      |
| Opening                        | 40 mm  | 120 | 360 | 880  |
|                                | 80 mm  | 128 | 410 | 1040 |
| Closing                        | 40 mm  | 160 | 480 | 1100 |
|                                | 80 mm  | 160 | 510 | 1210 |

## Characteristic load values at the gripper jaws



The indicated permissible forces and torques refer 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 coordinate line (gripper finger guide slot) must be

taken into consideration for the calculation of torques.

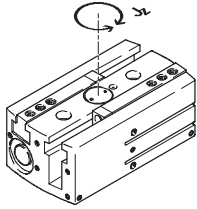
| Size                          |      | 14  | 25   | 40   |
|-------------------------------|------|-----|------|------|
| Max. permissible force $F_z$  | [N]  | 500 | 1500 | 2500 |
| Max. permissible torque $M_x$ | [Nm] | 35  | 100  | 125  |
| Max. permissible torque $M_y$ | [Nm] | 35  | 60   | 80   |
| Max. permissible torque $M_z$ | [Nm] | 35  | 70   | 100  |

# Parallel grippers HGPL, robust, with long stroke

Technical data

FESTO

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



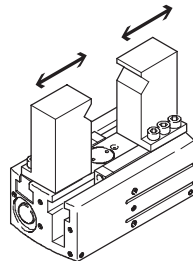
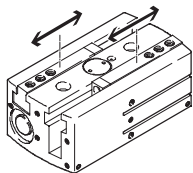
Mass moment of inertia [kgm<sup>2</sup>x10<sup>-4</sup>]  
for parallel grippers in relation to the  
central axis with no load.

| Size                   |       | 14    | 25    | 40     |
|------------------------|-------|-------|-------|--------|
| Stroke per gripper jaw | 40 mm | 4.69  | 18.88 | 66.83  |
|                        | 80 mm | 21.93 | 78.7  | 198.87 |

## 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 at 6 bar oper-  
ating pressure with horizontally  
mounted additional gripper fingers.

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

| Size                                                        |       | 14  | 25  | 40  |
|-------------------------------------------------------------|-------|-----|-----|-----|
| without external gripper fingers – opening                  |       |     |     |     |
| Stroke per gripper finger                                   | 40 mm | 104 | 194 | 238 |
|                                                             | 80 mm | 234 | 360 | 414 |
| without external gripper fingers – closing                  |       |     |     |     |
| Stroke per gripper finger                                   | 40 mm | 86  | 192 | 205 |
|                                                             | 80 mm | 217 | 366 | 438 |
| with external gripper fingers as a function of applied load |       |     |     |     |
| Stroke per gripper finger                                   | 40 mm |     |     |     |
| Applied load                                                | 1 N   | 108 | –   | –   |
|                                                             | 2 N   | 136 | –   | –   |
|                                                             | 3 N   | 167 | 210 | –   |
|                                                             | 4 N   | 192 | 243 | –   |
|                                                             | 5 N   | –   | 272 | 260 |
|                                                             | 6 N   | –   | –   | 284 |
|                                                             | 8 N   | –   | –   | 328 |
|                                                             |       |     |     |     |
| Stroke per gripper finger                                   | 80 mm |     |     |     |
| Applied load                                                | 1 N   | 243 | –   | –   |
|                                                             | 2 N   | 343 | –   | –   |
|                                                             | 3 N   | 420 | 401 | –   |
|                                                             | 4 N   | 485 | 463 | –   |
|                                                             | 5 N   | –   | 518 | 478 |
|                                                             | 6 N   | –   | –   | 524 |
|                                                             | 8 N   | –   | –   | 604 |

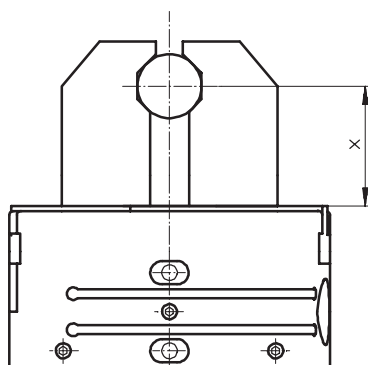
# Parallel grippers HGPL, robust, with long stroke

FESTO

Technical data

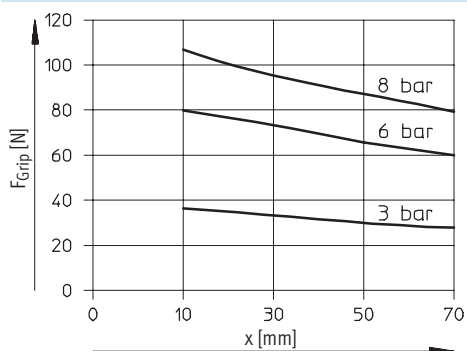
## Gripping force $F_{Grip}$ per gripper jaw as a function of operating pressure and lever arm $x$

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

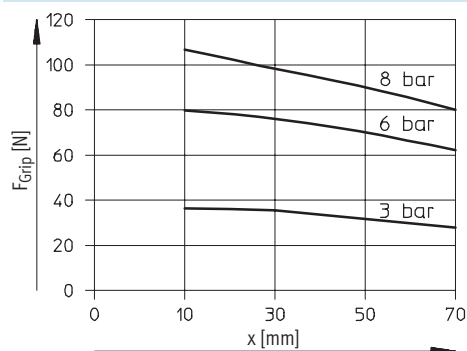


## As external gripper: Closing operation

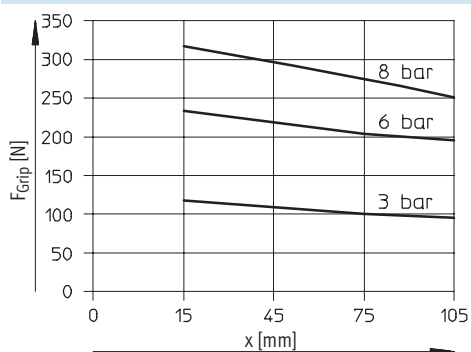
HGPL-14-40-A



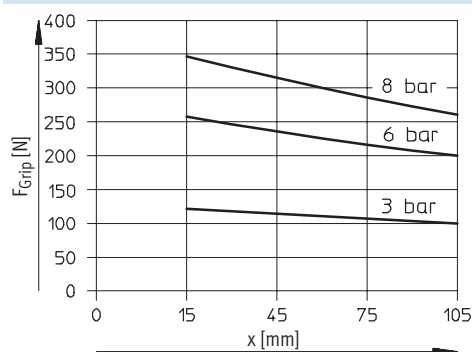
HGPL-14-80-A



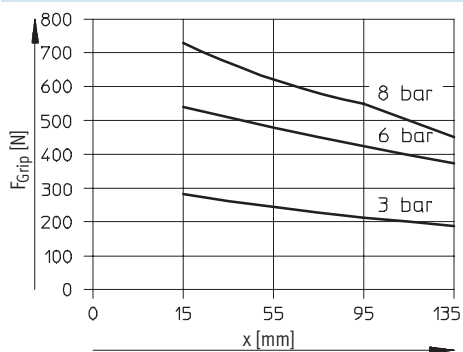
HGPL-25-40-A



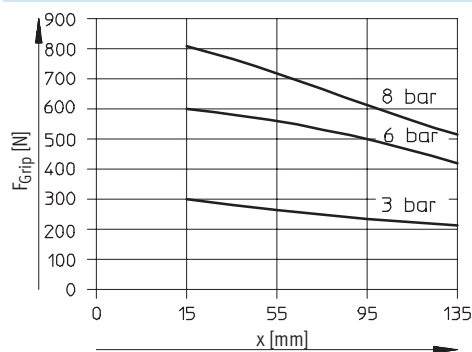
HGPL-25-80-A



HGPL-40-40-A



HGPL-40-80-A



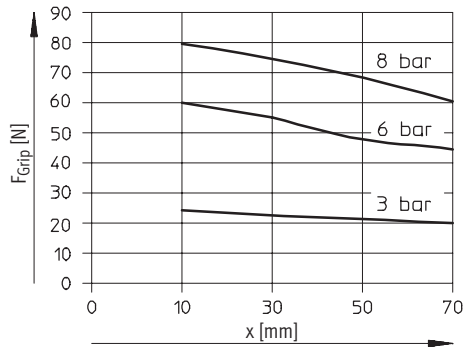
# Parallel grippers HGPL, robust, with long stroke

Technical data

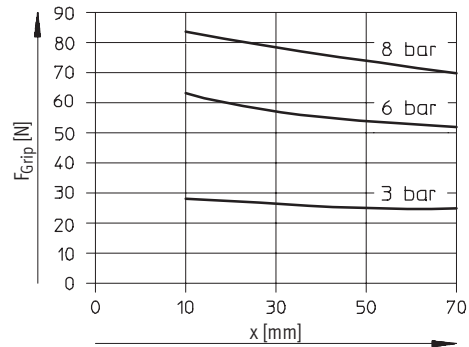
FESTO

Gripping force  $F_{Grip}$  per gripper jaw as a function of operating pressure and lever arm  $x$   
As internal gripper: Opening operation

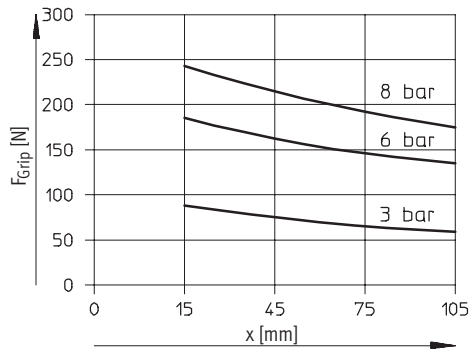
HGPL-14-40-A



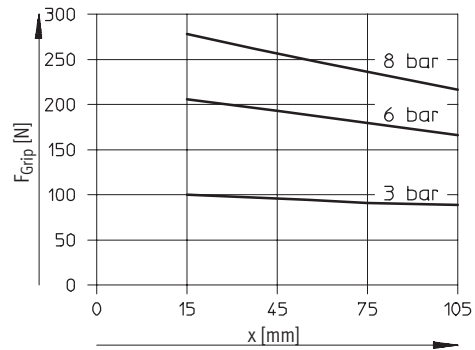
HGPL-14-80-A



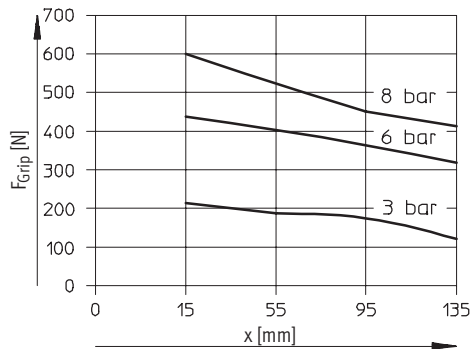
HGPL-25-40-A



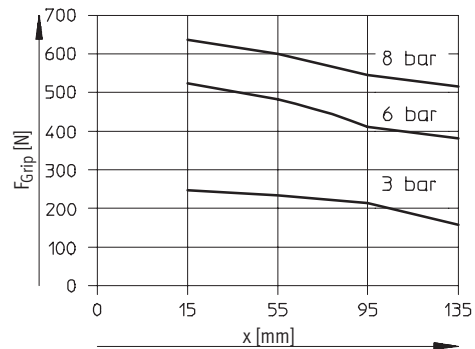
HGPL-25-80-A



HGPL-40-40-A



HGPL-40-80-A

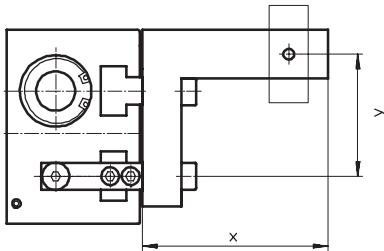


# Parallel grippers HGPL, robust, with long stroke

Technical data

FESTO

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



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:

Lever arm  $x = 32 \text{ mm}$

Eccentricity  $y = 22 \text{ mm}$

To be found:

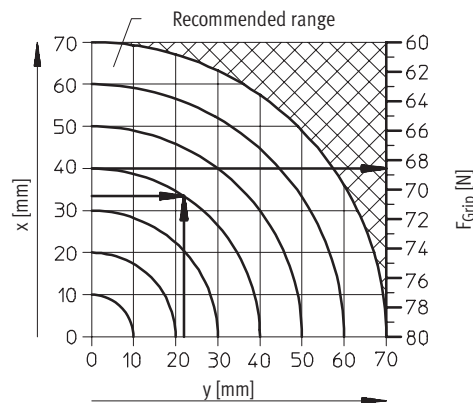
Gripping force at 6 bar

Procedure:

- Determine the intersection  $xy$  between lever arm  $x$  and eccentricity  $y$  in the graph for HGPL-14-40-A
- Draw an arc (with centre at origin) through intersection  $xy$
- Determine the intersection between the arc and the X axis
- Read the gripping force

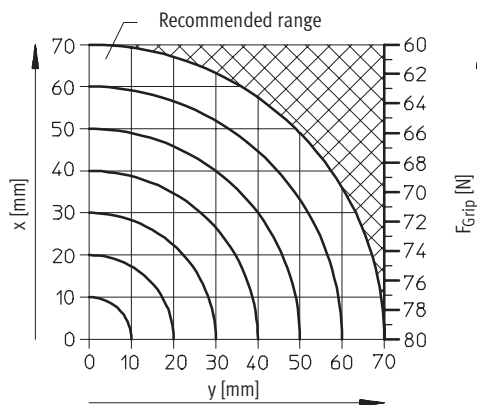
Result:

Gripping force = approx. 68.3 N

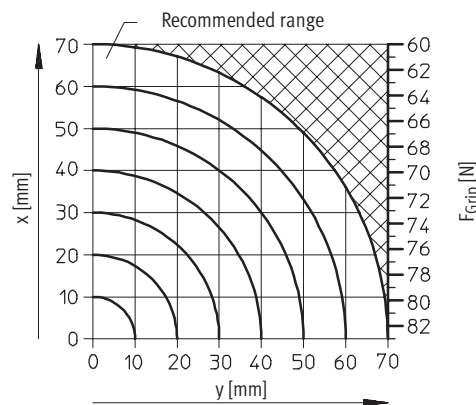


### As external gripper: Closing operation

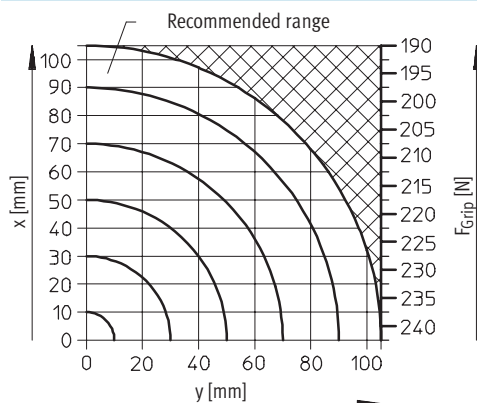
#### HGPL-14-40-A



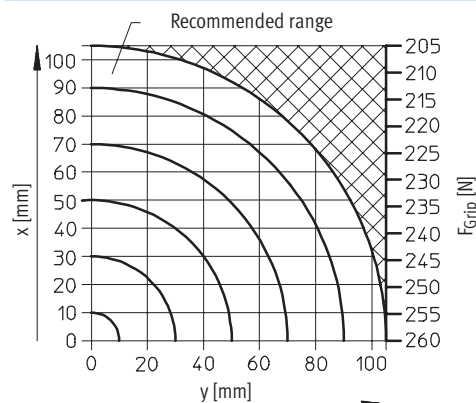
#### HGPL-14-80-A



#### HGPL-25-40-A



#### HGPL-25-80-A



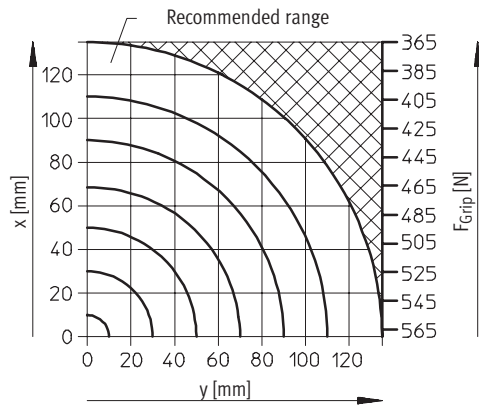
# Parallel grippers HGPL, robust, with long stroke

Technical data

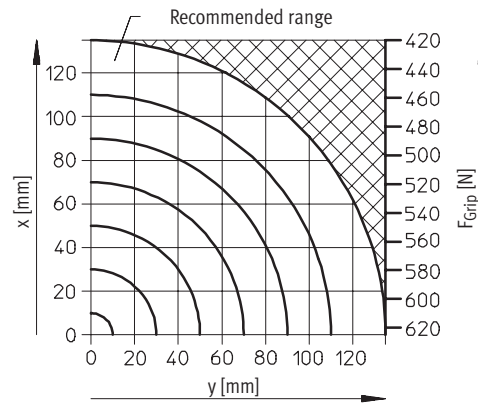
FESTO

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

HGPL-40-40-A

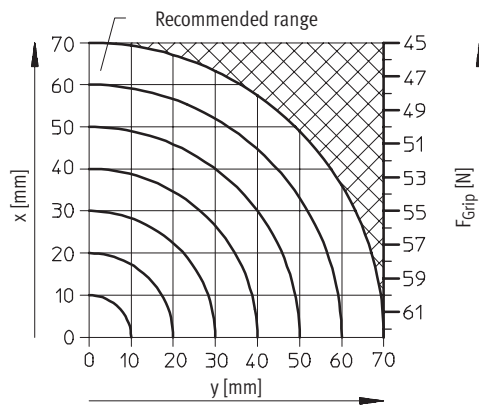


HGPL-40-80-A

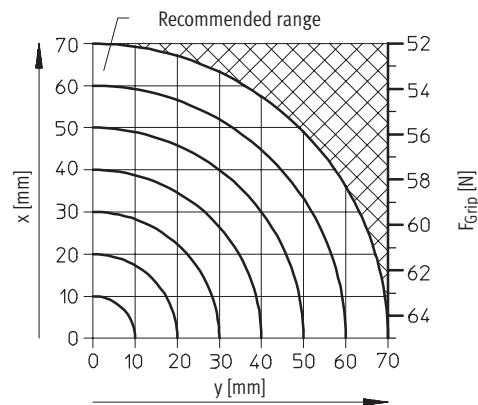


As internal gripper: Closing operation

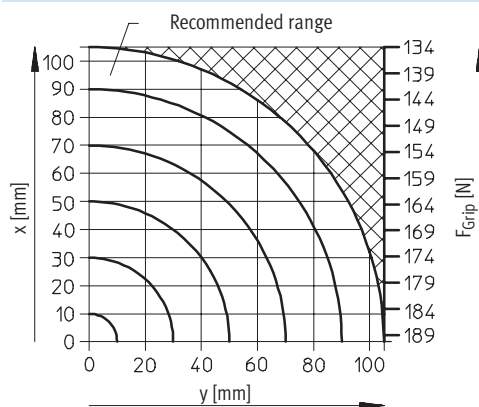
HGPL-14-40-A



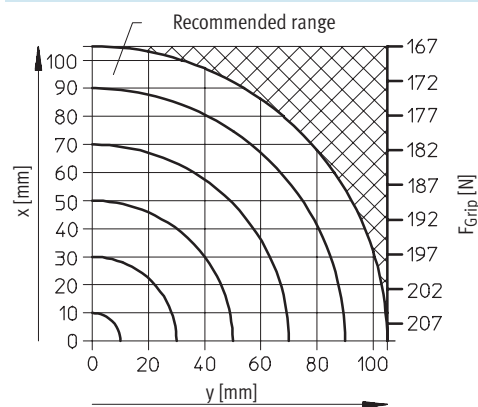
HGPL-14-80-A



HGPL-25-40-A



HGPL-25-80-A



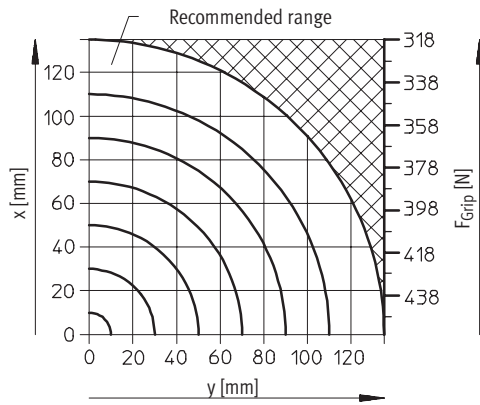
# Parallel grippers HGPL, robust, with long stroke

Technical data

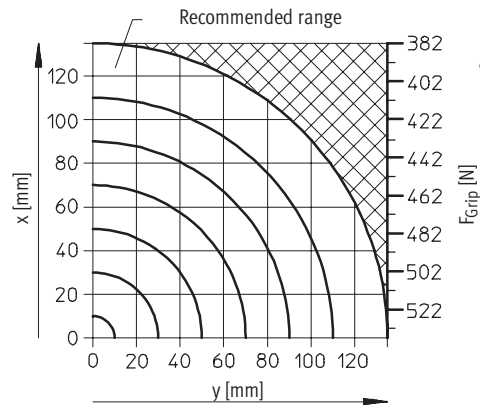


Gripping force  $F_{Grip}$  per gripper jaw as a function of lever arm  $x$  and eccentricity  $y$

HGPL-40-40-A



HGPL-40-80-A



# Parallel grippers HGPL, robust, with long stroke

Technical data

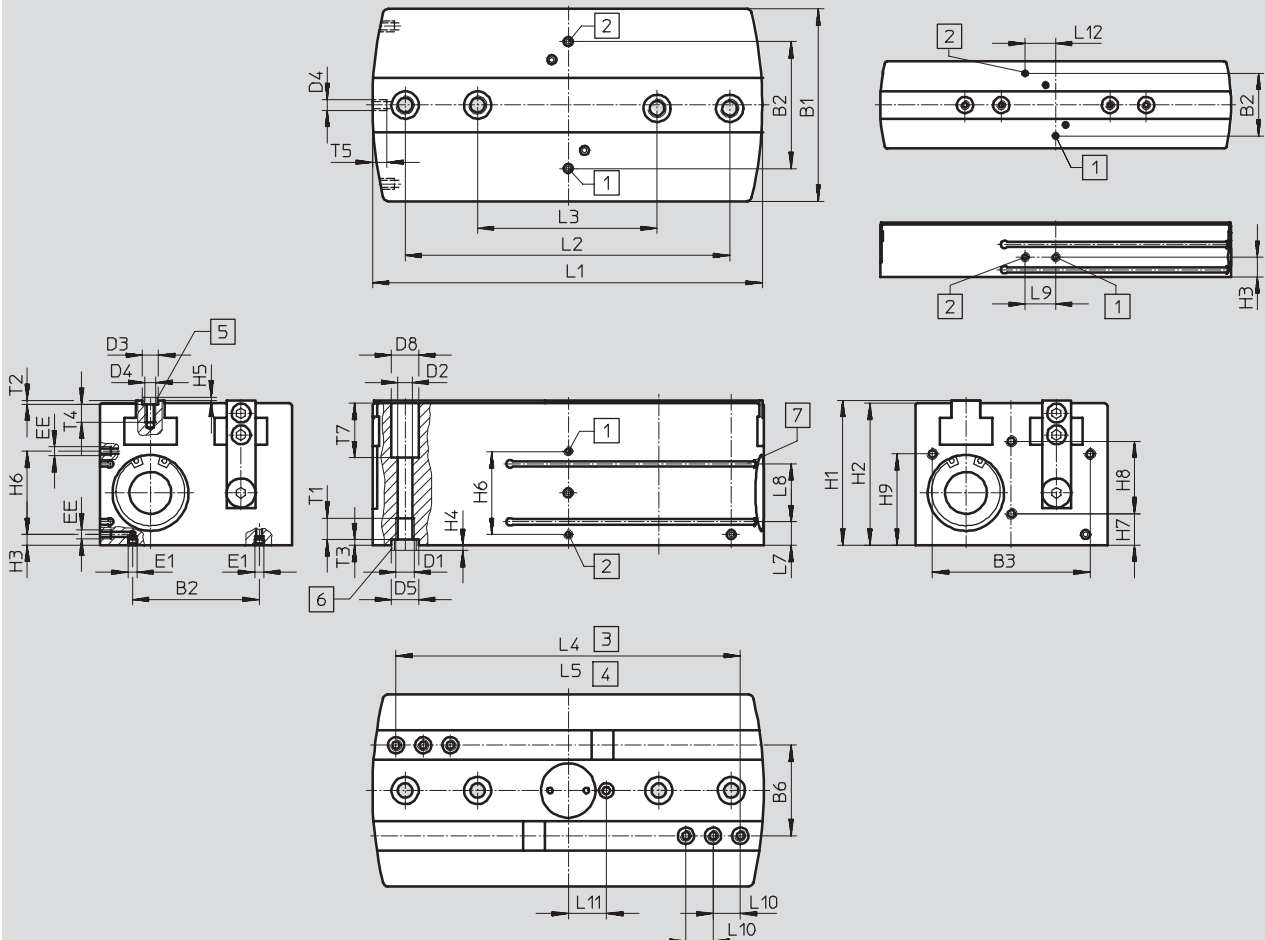
FESTO

## Dimensions

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

Size 40

Size 14/25



- |                                                                                                          |                                                                                                          |                                                          |                                                          |
|----------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------|----------------------------------------------------------|----------------------------------------------------------|
| 1 Compressed air connection opening, either on the side or bottom (bottom connection sealed on delivery) | 2 Compressed air connection closing, either on the side or bottom (bottom connection sealed on delivery) | 3 Gripper jaw open                                       | 6 Centring sleeves ZBH (2 included in scope of delivery) |
|                                                                                                          |                                                                                                          | 4 Gripper jaw closed                                     | 7 Slot for proximity sensor SME/SMT-10                   |
|                                                                                                          |                                                                                                          | 5 Centring sleeves ZBH (4 included in scope of delivery) |                                                          |

## Parallel grippers HGPL, robust, with long stroke

FESTO

Technical data

| Type       | B1<br>±0.05 | B2<br>±0.1 | B3<br>±0.1 | B6<br>±0.01 | D1  | D2<br>∅<br>+0.1 | D3<br>∅<br>H8/h7 | D4 | D5<br>∅<br>H8/h7 | D8<br>∅<br>H13 | EE | E1 |
|------------|-------------|------------|------------|-------------|-----|-----------------|------------------|----|------------------|----------------|----|----|
| HGPL-14-40 | 48          | 34.5       | 37         | 22          | M5  | 4.2             | 5                | M3 | 9                | 7.4            | M5 | M3 |
| HGPL-14-80 |             |            |            |             |     |                 |                  |    |                  |                |    |    |
| HGPL-25-40 | 80          | 60         | 65         | 38          | M6  | 5.1             | 7                | M5 | 9                | 10             | M5 | M5 |
| HGPL-25-80 |             |            |            |             |     |                 |                  |    |                  |                |    |    |
| HGPL-40-40 | 106         | 70         | 87         | 50          | M10 | 8.5             | 9                | M6 | 15               | 15             | M5 | M5 |
| HGPL-40-80 |             |            |            |             |     |                 |                  |    |                  |                |    |    |

| Type       | H1 | H2<br>±0.1 | H3<br>±0.1 | H4<br>-0.3 | H5<br>-0.3 | H6<br>±0.1 | H7<br>±0.1 | H8<br>±0.1 | H9<br>±0.1 | L1<br>±0.1 | L2<br>±0.02 <sup>1)</sup><br>±0.1 <sup>2)</sup> | L3<br>±0.02 <sup>1)</sup><br>±0.1 <sup>2)</sup> | L4<br>±0.5 |
|------------|----|------------|------------|------------|------------|------------|------------|------------|------------|------------|-------------------------------------------------|-------------------------------------------------|------------|
| HGPL-14-40 | 30 | 29         | 11         | 1.9        | 1.2        | -          | 10         | 12         | 18         | 113.6      | -                                               | 60                                              | 102        |
| HGPL-14-80 |    |            |            |            |            |            |            |            |            | 193.6      | 100                                             | 60                                              | 182        |
| HGPL-25-40 | 50 | 49         | 18         | 1.9        | 1.4        | -          | 18         | 20         | 30         | 126        | -                                               | 60                                              | 104        |
| HGPL-25-80 |    |            |            |            |            |            |            |            |            | 206        | 100                                             | 60                                              | 184        |
| HGPL-40-40 | 80 | 78.5       | 6          | 2.9        | 1.9        | 46         | 17.5       | 40         | 50.5       | 136        | -                                               | 100                                             | 110        |
| HGPL-40-80 |    |            |            |            |            |            |            |            |            | 216        | 180                                             | 100                                             | 190        |

| Type       | L5<br>±0.5 | L7<br>±0.1 | L8<br>±0.1 | L9<br>±0.2 | L10<br>±0.02 <sup>1)</sup><br>±0.1 <sup>2)</sup> | L11<br>±0.5 | L12<br>±0.1 | T1<br>min. | T2<br>+0.1 | T3<br>+0.1 | T4<br>min. | T5<br>min. | T7<br>+0.1 |
|------------|------------|------------|------------|------------|--------------------------------------------------|-------------|-------------|------------|------------|------------|------------|------------|------------|
| HGPL-14-40 | 22         | 4          | 14         | 16.8       | 8                                                | 9           | 16.8        | 12         | 1.3        | 2.1        | 5          | 6          | 10         |
| HGPL-14-80 | 22         |            |            |            |                                                  |             |             |            |            |            |            |            |            |
| HGPL-25-40 | 24         | 11         | 14         | 20         | 10                                               | 17.5        | 20          | 12         | 1.6        | 2.1        | 8          | 7          | 17         |
| HGPL-25-80 | 24         |            |            |            |                                                  |             |             |            |            |            |            |            |            |
| HGPL-40-40 | 30         | 13         | 32         | -          | 15                                               | 21          | -           | 15         | 2.1        | 3.1        | 10         | 8          | 30         |
| HGPL-40-80 | 30         |            |            |            |                                                  |             |             |            |            |            |            |            |            |

1) For centring

2) For through-hole

## Parallel grippers HGPL, robust, with long stroke

**FESTO**

Technical data

| Ordering data |                |                                          |              |
|---------------|----------------|------------------------------------------|--------------|
| Size<br>[mm]  | Stroke<br>[mm] | Double-acting without compression spring |              |
|               |                | Part No.                                 | Type         |
| 14            |                |                                          |              |
|               | 40             | 535 852                                  | HGPL-14-40-A |
|               | 80             | 535 853                                  | HGPL-14-80-A |
| 25            |                |                                          |              |
|               | 40             | 535 854                                  | HGPL-25-40-A |
|               | 80             | 535 855                                  | HGPL-25-80-A |
| 40            |                |                                          |              |
|               | 40             | 535 856                                  | HGPL-40-40-A |
|               | 80             | 535 857                                  | HGPL-40-80-A |

| Ordering data – Wearing parts kits |  |          |         |
|------------------------------------|--|----------|---------|
| Size<br>[mm]                       |  | Part No. | Type    |
| 14                                 |  | 701 585  | HGPL-14 |
| 25                                 |  | 701 586  | HGPL-25 |
| 40                                 |  | 701 587  | HGPL-40 |

## Parallel grippers HGPL, robust, with long stroke

FESTO

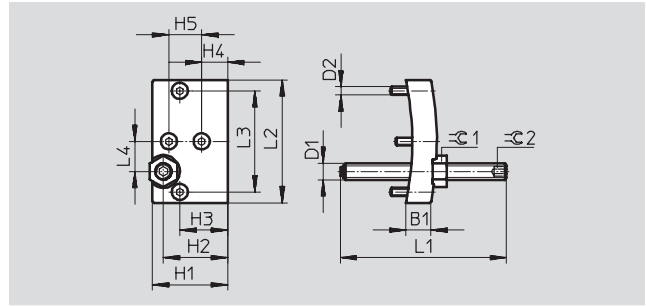
Accessories

### Stroke reducing plate HGPL-HR

Material:

Aluminium

Free of copper, PTFE and silicone



| Dimensions and ordering data |      |     |    |      |      |      |      |      |
|------------------------------|------|-----|----|------|------|------|------|------|
| For size                     | B1   | D1  | D2 | H1   | H2   | H3   | H4   | H5   |
| [mm]                         | ±0.1 |     |    | ±0.1 | ±0.1 | ±0.1 | ±0.1 | ±0.1 |
| 14                           | 9    | M6  | M3 | 27.5 | 23.5 | 17.5 | 9.5  | 12   |
| 25                           | 12   | M8  | M5 | 47.5 | 37.5 | 29.5 | 17.5 | 20   |
| 40                           | 18   | M12 | M6 | 77   | 63   | 50   | 17   | 40   |

| For size | L1 | L2   | L3   | L4   | ≈C1 | ≈C2 | Weight | Part No. | Type       |
|----------|----|------|------|------|-----|-----|--------|----------|------------|
| [mm]     | ±1 | ±0.1 | ±0.1 | ±0.1 |     |     | [g]    |          |            |
| 14       | 61 | 45   | 37   | 11   | 10  | 3   | 45     | 539 092  | HGPL-HR-14 |
| 25       | 61 | 77   | 65   | 19   | 13  | 4   | 150    | 539 093  | HGPL-HR-25 |
| 40       | 61 | 103  | 87   | 25   | 19  | 6   | 455    | 539 094  | HGPL-HR-40 |

# Parallel grippers HGPL, robust, with long stroke

FESTO

Accessories

## Unmachined gripper finger

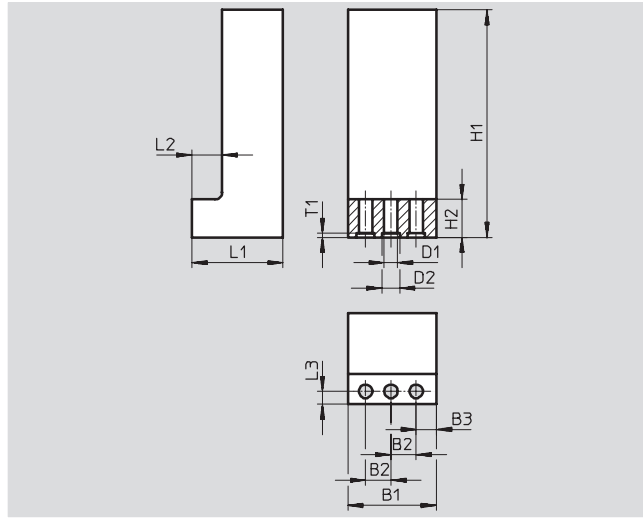
### BUB-HGPL

(Scope of delivery: 2 pcs.)

Material:

Aluminium

Free of copper, PTFE and silicone



| Dimensions and ordering data |      |       |    |         |         |         |    |
|------------------------------|------|-------|----|---------|---------|---------|----|
| For size                     | B1   | B2    | B3 | D1<br>Ø | D2<br>Ø | H1<br>Ø | H2 |
| [mm]                         | ±0.1 | +0.02 |    | +0.1    | H8      | ±0.1    |    |
| 14                           | 25   | 8     | 4  | 3.2     | 5       | 80      | 11 |
| 25                           | 35   | 10    | 8  | 5.3     | 7       | 120     | 15 |
| 40                           | 50   | 15    | 10 | 6.4     | 9       | 150     | 18 |

| For size | L1   | L2   | L3   | T1   | Weight<br>per unmachined<br>gripper finger<br>[g] | Part No. | Type        |
|----------|------|------|------|------|---------------------------------------------------|----------|-------------|
| [mm]     | ±0.1 | +0.1 | +0.1 | +0.1 |                                                   |          |             |
| 14       | 20.5 | 8    | 3.3  | 1.3  | 75                                                | 537 316  | BUB-HGPL-14 |
| 25       | 36   | 12   | 5    | 1.6  | 295                                               | 537 317  | BUB-HGPL-25 |
| 40       | 49.5 | 16.5 | 8    | 2.1  | 720                                               | 537 318  | BUB-HGPL-40 |

| Ordering data                                                                                                                                 |                  |               |          |         |                  |
|-----------------------------------------------------------------------------------------------------------------------------------------------|------------------|---------------|----------|---------|------------------|
|                                                                                                                                               | For size<br>[mm] | Weight<br>[g] | Part No. | Type    | PU <sup>1)</sup> |
| Centring sleeve for the gripper jaws ZBH <span style="float: right;">Technical data → <a href="http://www.festo.com">www.festo.com</a></span> |                  |               |          |         |                  |
|                                                                                                                                               | 14               | 1             | 189 652  | ZBH-5   | 10               |
|                                                                                                                                               | 25               | 1             | 186 717  | ZBH-7   | 10               |
|                                                                                                                                               | 40               | 1             | 150 927  | ZBH-9   | 10               |
| Centring sleeve for the gripper ZBH <span style="float: right;">Technical data → <a href="http://www.festo.com">www.festo.com</a></span>      |                  |               |          |         |                  |
|                                                                                                                                               | 14               | 1             | 189 652  | ZBH-9   | 10               |
|                                                                                                                                               | 25               |               |          |         |                  |
|                                                                                                                                               | 40               | 3             | 191 409  | ZBH-15  | 10               |
| Blanking plug B <span style="float: right;">Technical data → <a href="http://www.festo.com">www.festo.com</a></span>                          |                  |               |          |         |                  |
|                                                                                                                                               | 14 (at front)    | 0.6           | 30 979   | B-M3-S9 | 10               |
|                                                                                                                                               | 14, 25, 40       | 1             | 174 308  | B-M5-B  | 10               |

1) Packaging unit quantity

## Parallel grippers HGPL, robust, with long stroke

**FESTO**

Accessories

| 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<br>[m] | Connection direction | Part No. | Type                                                              |  |
|                                                                                   |                       |               | Cable                 | Plug M8 |                     |                      |          |                                                                   |  |
| NO contact                                                                        |                       |               |                       |         |                     |                      |          |                                                                   |  |
|  | Insertable from above | PNP           | 3-core                | –       | 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                                          |  |
|                                                                                   |                       |               |                       |         |                     | 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-core                | –       | 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<br>[m] | Connection direction | Part No. | Type                                                              |  |
|                                                                                   |                       | Cable                 | Plug M8 |                     |                      |          |                                                                   |  |
| NO contact                                                                        |                       |                       |         |                     |                      |          |                                                                   |  |
|  | Insertable from above | –                     | 3-pin   | 0.3                 | In-line              | 525 914  | SME-10F-DS-24V-K0,3L-M8D                                          |  |
|                                                                                   |                       | 3-core                | –       | 2.5                 | In-line              | 525 913  | SME-10F-DS-24V-K2,5L-OE                                           |  |
|                                                                                   |                       | 2-core                |         |                     |                      | 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-core                | –       | 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<br>[m] | Part No. | Type                                                              |  |
|                                                                                     |              | PNP                                                                                 | NPN                                                                                 |            |                     |          |                                                                   |  |
| Straight socket                                                                     |              |                                                                                     |                                                                                     |            |                     |          |                                                                   |  |
|  | Union nut M8 |  |  | 3-pin      | 2.5                 | 159 420  | SIM-M8-3GD-2,5-PU                                                 |  |
|                                                                                     |              |                                                                                     |                                                                                     |            | 5                   | 159 421  | SIM-M8-3GD-5-PU                                                   |  |
|                                                                                     |              |                                                                                     |                                                                                     |            |                     |          |                                                                   |  |
| Angled socket                                                                       |              |                                                                                     |                                                                                     |            |                     |          |                                                                   |  |
|  | Union nut M8 |  |  | 3-pin      | 2.5                 | 159 422  | SIM-M8-3WD-2,5-PU                                                 |  |
|                                                                                     |              |                                                                                     |                                                                                     |            | 5                   | 159 423  | SIM-M8-3WD-5-PU                                                   |  |

## Three-point grippers HGDT, robust

Features

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### At a glance

The force generated by the linear motion is translated into the gripper jaw movement via a force-guided triple wedge mechanism. This also guarantees synchronous movement of the gripper jaw. The virtually backlash-free slideway is realised using ground-in gripper jaws.

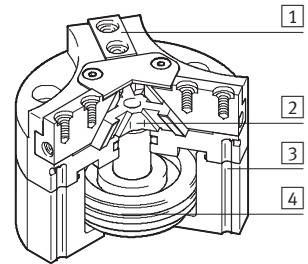
A wide range of uses:

- Double-acting gripper
- Compression springs for supplementing or retaining gripper forces, or for use as a single-acting gripper with only one compressed air connection
- Suitable for external and internal gripping

Sealing air connection:

Compressed air flows past the gripper jaw when sealing air (max. 0.5 bar) is connected.

This prevents particles and soluble oil, etc. from entering the gripper jaw guides.



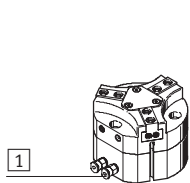
- 1 Three-point gripper jaw
- 2 Triple wedge mechanism
- 3 Slot for proximity sensor
- 4 Piston with magnet



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

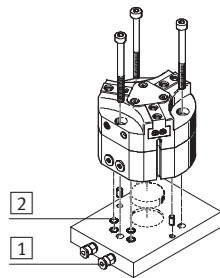
### Wide range of air connections

Direct  
from the front



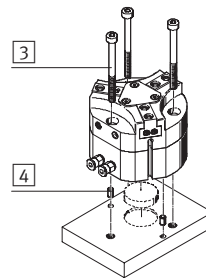
- 1 Compressed air connections
- 2 O-rings

Via adapter plate  
from underneath



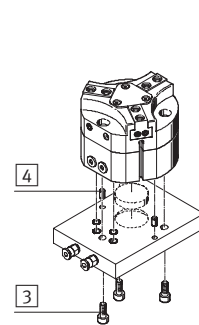
### Mounting options

Direct mounting  
from above



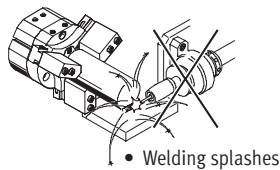
- 3 Mounting screws
- 4 Centring pins or centring disc

Via adapter plate  
from underneath



 **Note**

Grippers are not designed for use in the following applications:

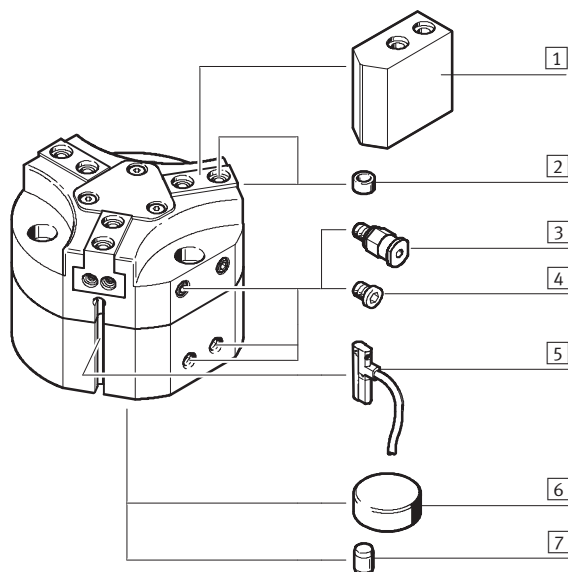


- Welding splashes

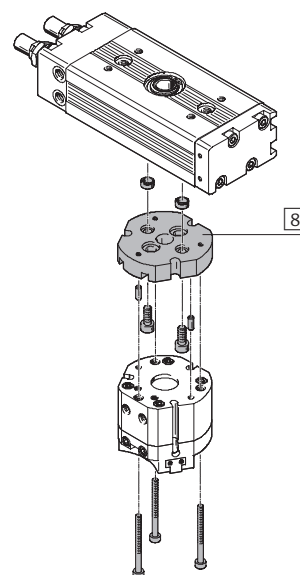
# Three-point grippers HGDT, robust

Peripherals overview and type codes

## Peripherals overview



## System product for handling and assembly technology



| Accessories |                                     |                                                                                              |               |
|-------------|-------------------------------------|----------------------------------------------------------------------------------------------|---------------|
| Type        | Brief description                   |                                                                                              | → Page        |
| 1           | Unmachined gripper finger BUB-HGDT  | Unmachined part specially matched to the gripper jaws for custom building of gripper fingers | 52            |
| 2           | Centring sleeve ZBH                 | For centring unmachined gripper jaws/gripper fingers on the gripper jaws                     | 53            |
| 3           | Push-in fitting QS                  | For connecting compressed air tubing with standard external diameters                        | www.festo.com |
| 4           | Blanking plugs B                    | For sealing compressed air connections when using air connections at the front               | 53            |
| 5           | With position sensing magnet SMT-10 | For sensing the piston position, 3 slots available                                           | 53            |
| 6           | Central mounting SLZZ               | For centring the gripper when mounting                                                       | 53            |
| 7           | Locating pin                        | For centring the gripper when mounting                                                       | –             |
| 8           | –                                   | Drive/gripper connections                                                                    | www.festo.com |

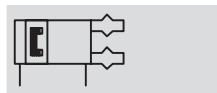
## Type code

|                                 |                       |      |   |    |   |   |   |    |
|---------------------------------|-----------------------|------|---|----|---|---|---|----|
|                                 |                       | HGDT | – | 25 | – | A | – | G1 |
| <b>Type</b>                     |                       |      |   |    |   |   |   |    |
| HGDT                            | Three-point gripper   |      |   |    |   |   |   |    |
| <b>Size</b>                     |                       |      |   |    |   |   |   |    |
| <b>Position sensing</b>         |                       |      |   |    |   |   |   |    |
| A                               | For proximity sensing |      |   |    |   |   |   |    |
| <b>Gripping force retention</b> |                       |      |   |    |   |   |   |    |
| G1                              | Open                  |      |   |    |   |   |   |    |
| G2                              | Closed                |      |   |    |   |   |   |    |

## Three-point grippers HGDT, robust

Technical data

Function  
Double-acting  
HGDT-...-A



Single-acting or  
with gripping force retention ...  
... open HGDT-...-G1



... closed HGDT-...-G2



 Size  
25 ... 63  
 Stroke  
3 ... 10 mm



| General technical data                                          |                                                                                                     |     |     |      |      |
|-----------------------------------------------------------------|-----------------------------------------------------------------------------------------------------|-----|-----|------|------|
| Size                                                            | 25                                                                                                  | 35  | 40  | 50   | 63   |
| Constructional design                                           | Wedge-shaped actuator<br>Force-guided motion sequence                                               |     |     |      |      |
| 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] | 0.1                                                                                                 | 0.3 | 0.7 | 1.6  | 2.5  |
| Stroke per gripper jaw [mm]                                     | 3                                                                                                   | 4   | 6   | 8    | 10   |
| Pneumatic connection                                            | M5                                                                                                  | M5  | M5  | G1/8 | G1/8 |
| Pneumatic connection<br>Sealing air                             | M5                                                                                                  |     |     |      |      |
| Repetition accuracy <sup>2)</sup> [mm]                          | ≤ 0.03                                                                                              |     |     |      |      |
| Max. operating frequency [Hz]                                   | ≤ 4                                                                                                 |     |     |      |      |
| Position sensing                                                | For proximity sensing                                                                               |     |     |      |      |
| Type of mounting                                                | Via through-hole, locating pin or centring disc<br>Via female thread, locating pin or centring disc |     |     |      |      |
| Mounting position                                               | Any                                                                                                 |     |     |      |      |

1) Valid for unthrottled operation

2) Concentric to the central shaft

| Operating and environmental conditions       |                                                     |       |            |
|----------------------------------------------|-----------------------------------------------------|-------|------------|
| Min. operating pressure                      | HGDT-...-A                                          | [bar] | 3          |
|                                              | HGDT-...-G...                                       | [bar] | 4          |
| Max. operating pressure                      |                                                     | [bar] | 8          |
| Sealing air operating pressure               |                                                     | [bar] | 0 ... 0.5  |
| Operating medium                             | Filtered compressed air, lubricated or unlubricated |       |            |
| Ambient temperature <sup>1)</sup>            |                                                     | [°C]  | +5 ... +60 |
| Corrosion resistance class CRC <sup>2)</sup> |                                                     |       | 2          |

1) Note operating range of proximity sensors

2) Corrosion resistance class 2 to Festo standard 940 070

Components subject to moderate corrosion stress. 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

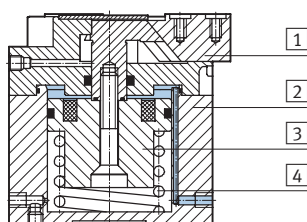
## Three-point grippers HGDT, robust

Technical data

| Weights [g] |     |     |     |       |       |
|-------------|-----|-----|-----|-------|-------|
| Size        | 25  | 35  | 40  | 50    | 63    |
| HGDT-...-A  | 185 | 307 | 712 | 1,104 | 1,873 |
| HGDT-...-G1 | 203 | 337 | 840 | 1,592 | 2,469 |
| HGDT-...-G2 | 203 | 385 | 837 | 1,440 | 2,543 |

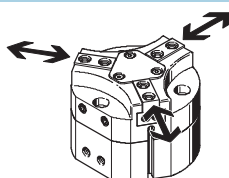
### Materials

Sectional view



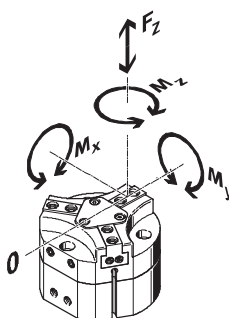
| Three-point gripper |             |                                 |
|---------------------|-------------|---------------------------------|
| 1                   | Gripper jaw | Hardened steel                  |
| 2                   | Housing     | Aluminium, coated with CompCote |
| 3                   | Piston      | Anodised aluminium              |
| 4                   | Spring      | Spring steel                    |
| -                   | Seals       | Nitrile rubber                  |
| Material note       |             | Copper, PTFE and silicone-free  |

### Gripping force [N] at 6 bar



| Size                                                                | 25  | 35  | 40  | 50    | 63    |
|---------------------------------------------------------------------|-----|-----|-----|-------|-------|
| Gripping force per gripper jaw                                      |     |     |     |       |       |
| opening                                                             | 82  | 164 | 229 | 347   | 576   |
| closing                                                             | 69  | 152 | 206 | 307   | 551   |
| Total gripping force                                                |     |     |     |       |       |
| opening                                                             | 246 | 492 | 687 | 1,041 | 1,728 |
| closing                                                             | 207 | 456 | 618 | 921   | 1,653 |
| Total gripping force with spring support (gripping force retention) |     |     |     |       |       |
| opening                                                             | 286 | 555 | 814 | 1,159 | 2,186 |
| closing                                                             | 228 | 547 | 712 | 1,052 | 2,172 |

### Characteristic load values at the gripper jaws



The indicated permissible forces and torques apply to a single gripper jaw. They include the lever arm, additional applied loads due to the workpiece or external gripper fingers, and acceleration forces occurring

during movement.

The zero coordinate line (gripper finger point of rotation) must be taken into consideration for the calculation of torques.

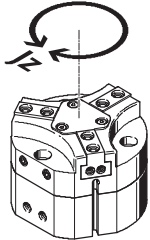
| Size                          | 25   | 35  | 40  | 50  | 63    |       |
|-------------------------------|------|-----|-----|-----|-------|-------|
| Max. permissible force $F_z$  | [N]  | 350 | 400 | 800 | 1,500 | 2,500 |
| Max. permissible torque $M_x$ | [Nm] | 7   | 15  | 30  | 50    | 80    |
| Max. permissible torque $M_y$ | [Nm] | 10  | 10  | 20  | 30    | 50    |
| Max. permissible torque $M_z$ | [Nm] | 5   | 10  | 25  | 40    | 60    |

## Three-point grippers HGDT, robust

Technical data

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### Moment of inertia [kgcm<sup>2</sup>]



Requirements:

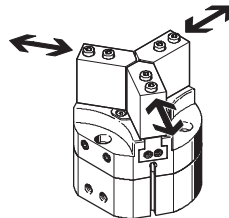
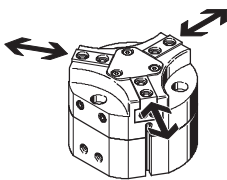
- The reference point is the central axis
- Without external gripper fingers
- In the load-free state

| Size        | 25   | 35   | 40   | 50    | 63    |
|-------------|------|------|------|-------|-------|
| HGDT-...-A  | 0.48 | 1.17 | 4.37 | 11.05 | 28.77 |
| HGDT-...-G1 | 0.5  | 1.37 | 5.59 | 15.33 | 42.44 |
| HGDT-...-G2 | 0.5  | 1.37 | 5.23 | 13.92 | 39.50 |

### 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 at an operating pressure of 6 bar with horizontally mounted gripper without additional

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

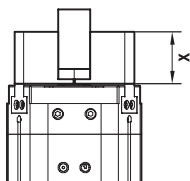
| Size                                                                             |         | 25  | 35  | 40  | 50  | 63  |
|----------------------------------------------------------------------------------|---------|-----|-----|-----|-----|-----|
| Without external gripper fingers                                                 |         |     |     |     |     |     |
| HGDT-...-A                                                                       | opening | 28  | 40  | 62  | 85  | 152 |
|                                                                                  | closing | 25  | 45  | 59  | 75  | 142 |
| HGDT-...-G1                                                                      | opening | 27  | 32  | 58  | 32  | 48  |
|                                                                                  | closing | 33  | 56  | 160 | 146 | 246 |
| HGDT-...-G2                                                                      | opening | 33  | 46  | 111 | 61  | 159 |
|                                                                                  | closing | 25  | 35  | 87  | 70  | 107 |
| With external gripper fingers per gripper finger (as a function of applied load) |         |     |     |     |     |     |
| HGDT-...                                                                         | 0.2 N   | 80  | –   | –   | –   | –   |
|                                                                                  | 0.3 N   | 100 | 130 | –   | –   | –   |
|                                                                                  | 0.7 N   | 150 | 200 | 115 | –   | –   |
|                                                                                  | 1 N     | 180 | 240 | 140 | –   | –   |
|                                                                                  | 1.5 N   | 220 | 290 | 170 | –   | –   |
|                                                                                  | 2 N     | –   | 335 | 200 | 190 | –   |
|                                                                                  | 2.5 N   | –   | –   | 220 | 210 | 190 |
|                                                                                  | 3 N     | –   | –   | –   | 230 | 200 |
|                                                                                  | 4 N     | –   | –   | –   | 270 | 230 |
|                                                                                  | 5 N     | –   | –   | –   | –   | 260 |

## Three-point grippers HGDT, robust

Technical data

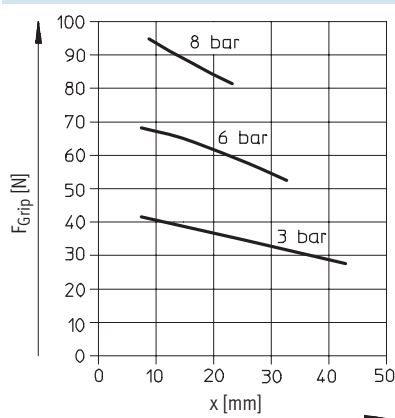
### Gripping force $F_{\text{Grip}}$ per gripper jaw as a function of operating pressure and lever arm $x$

The gripping forces, as a function of operating pressure and lever arm, can be determined from the following charts.

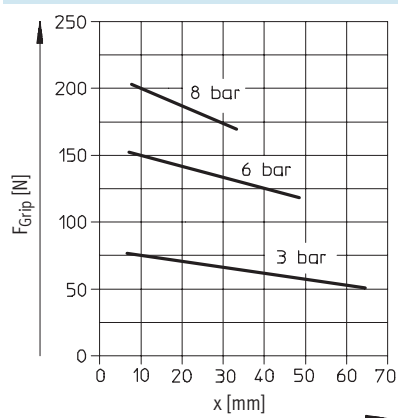


### External gripping (closing)

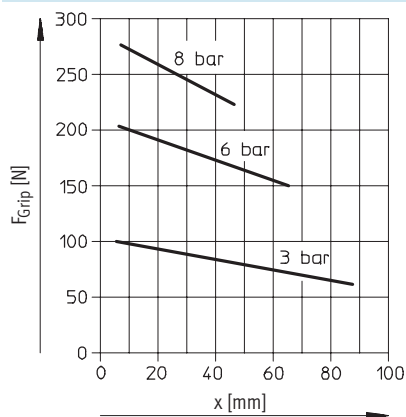
HGDT-25-A



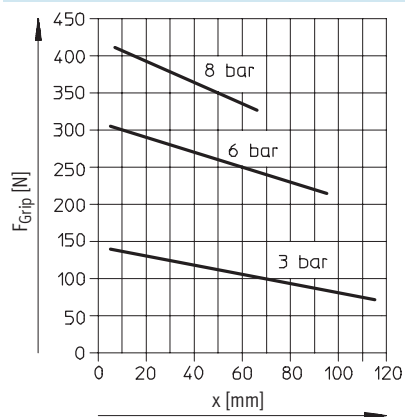
HGDT-35-A



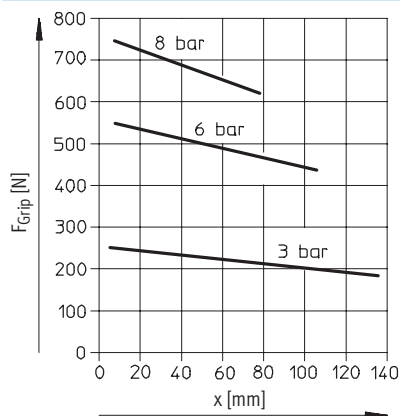
HGDT-40-A



HGDT-50-A



HGDT-63-A



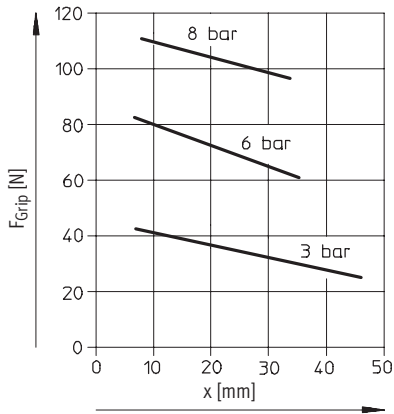
## Three-point grippers HGDT, robust

Technical data

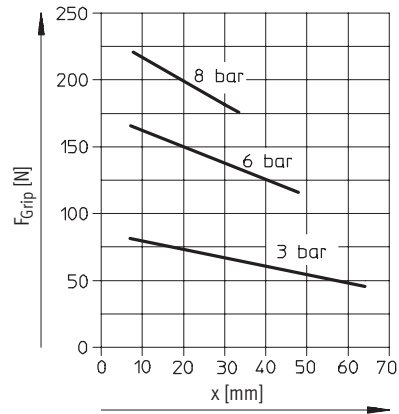
**FESTO**

Gripping force  $F_{\text{Grip}}$  per gripper jaw as a function of operating pressure and lever arm  $x$   
Internal gripping (opening)

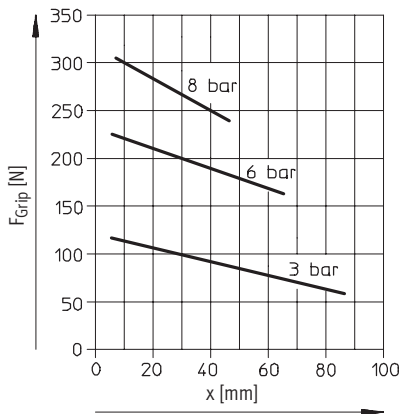
HGDT-25-A



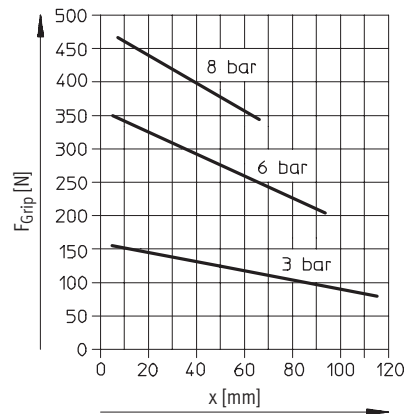
HGDT-35-A



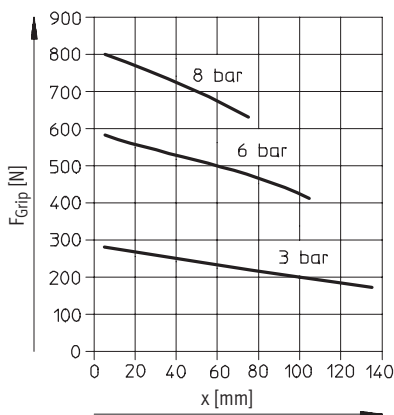
HGDT-40-A



HGDT-50-A



HGDT-63-A



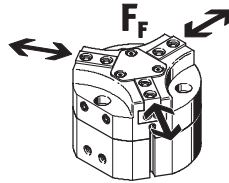
## Three-point grippers HGDT, robust

Technical data

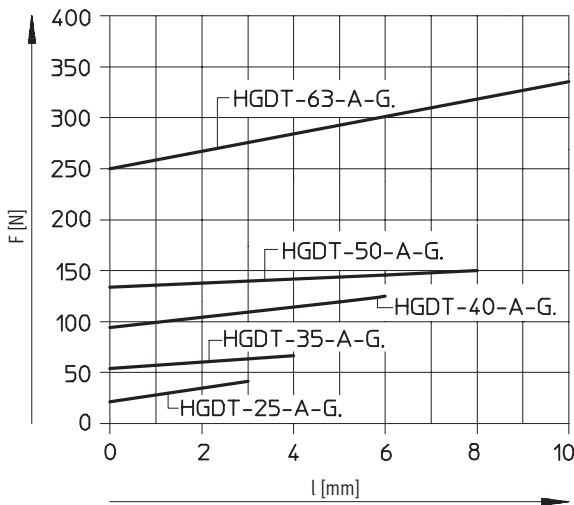
### Spring force $F_F$ as a function of size, gripper jaw stroke $l$ and gripper length $x$ , per gripper finger

Gripping force retention for HGDT-...-G...

The spring forces  $F_F$  as a function of the gripper jaw stroke can be determined from the following chart.



Size 25 ... 63



The lever arm  $x$  [mm] must be taken into consideration when determining the actual spring force  $F_{Stotal}$ .

The formulae for calculating the spring force are provided in the table opposite.

| Size | $F_{Stotal}$ , per gripper finger      |
|------|----------------------------------------|
| 25   | $-0.3 \cdot x + 0.85 \cdot F_{Spring}$ |
| 35   | $-0.5 \cdot x + 0.75 \cdot F_{Spring}$ |
| 40   | $-0.5 \cdot x + 0.8 \cdot F_{Spring}$  |
| 50   | $-0.6 \cdot x + 0.7 \cdot F_{Spring}$  |
| 63   | $-0.6 \cdot x + 0.75 \cdot F_{Spring}$ |

### Determining the actual gripping forces $F_{Gr}$ for HGDT-...-A-G1 and HGDT-...-A-G2 depending on the application, per gripper finger

The three-point slot grippers with integrated spring type HGDT-...-G1 (opening gripping force retention) and HGDT-...-G2 (closing gripping force retention) can be used as:

- single-acting grippers
- grippers with supplementary gripping force and
- grippers with gripping force retention depending on the requirements.

In order to calculate the available force ( $F_{Stotal}$ ) must be combined gripping forces  $F_{Gr}$  (per gripper finger), accordingly. the gripping force ( $F_{Grip}$ ) and spring

### Application forces per gripper finger

| Single-acting                                                                                                                                                                                             | Supplementary gripping force                                                                                                               | Gripping force retention                                                                                           |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------|
| <ul style="list-style-type: none"> <li>Gripping with spring force:<br/><math>F_{Gr} = F_{Stotal}</math></li> <li>Gripping with pressure force:<br/><math>F_{Gr} = F_{Grip} - F_{Stotal}</math></li> </ul> | <ul style="list-style-type: none"> <li>Gripping with pressure and spring force:<br/><math>F_{Gr} = F_{Grip} + F_{Stotal}</math></li> </ul> | <ul style="list-style-type: none"> <li>Gripping with spring force:<br/><math>F_{Gr} = F_{Stotal}</math></li> </ul> |

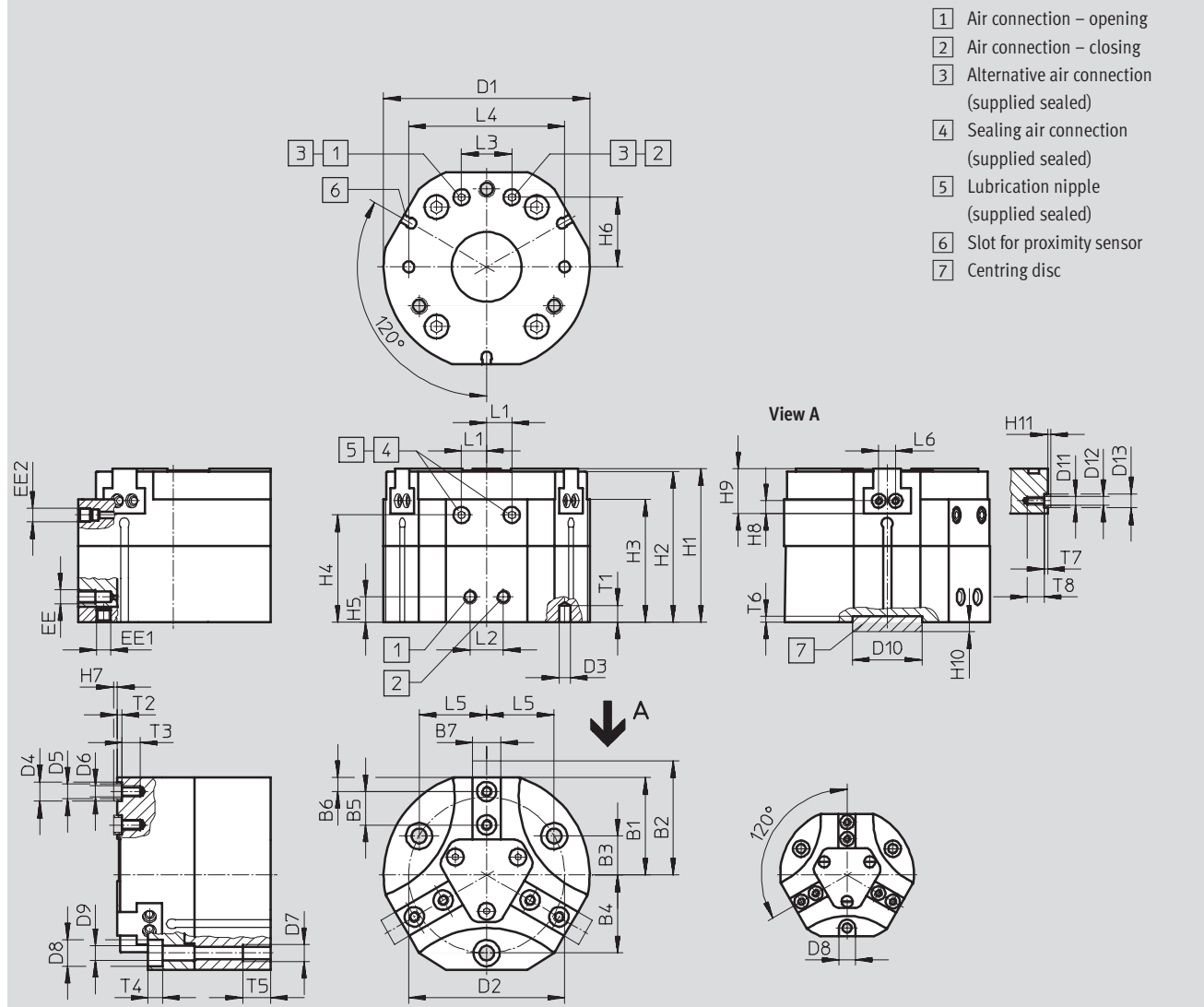
## Three-point grippers HGDT, robust

Technical data

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### Dimensions

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



| Size           | B1   | B2   | B3   | B4 | B5    | B6    | B7            | D1        | D2        | D3      | D4         | D5  |
|----------------|------|------|------|----|-------|-------|---------------|-----------|-----------|---------|------------|-----|
| [mm]           | ±0.5 | ±0.5 |      |    | ±0.02 | ±0.02 | -0.05<br>-0.1 | ∅<br>±0.1 | ∅<br>±0.1 | ∅<br>H8 | ∅<br>H8/h7 | ∅   |
| HGDT-25-A      | 22   | 25   | 9.5  | 19 | 6     | 3     | 6             | 48        | 38        | 3       | 5          | 3.2 |
| HGDT-25-A-G... |      |      |      |    |       |       |               |           |           |         |            |     |
| HGDT-35-A      | 27   | 31   | 11   | 22 | 8     | 4     | 6.5           | 58        | 44        | 3       | 5          | 3.2 |
| HGDT-35-A-G... |      |      |      |    |       |       |               |           |           |         |            |     |
| HGDT-40-A      | 35   | 41   | 14   | 28 | 12    | 5     | 10            | 74        | 56        | 4       | 7          | 5.3 |
| HGDT-40-A-G... |      |      |      |    |       |       |               |           |           |         |            |     |
| HGDT-50-A      | 43.5 | 51.5 | 17.5 | 35 | 15    | 6     | 12            | 93        | 70        | 5       | 9          | 6.4 |
| HGDT-50-A-G... |      |      |      |    |       |       |               |           |           |         |            |     |
| HGDT-63-A      | 54   | 64   | 22.5 | 45 | 18    | 10    | 14            | 116       | 90        | 5       | 9          | 6.4 |
| HGDT-63-A-G... |      |      |      |    |       |       |               |           |           |         |            |     |

## Three-point grippers HGDT, robust

Technical data

| Size<br>[mm]   | D6<br>Ø | D7<br>Ø | D8<br>Ø<br>H13 | D9<br>Ø<br>H13 | D10<br>Ø<br>H8 | D11 | D12<br>Ø | D13<br>Ø<br>H8/h7 | EE              | EE1 | EE2 | H1<br>±0.05 |
|----------------|---------|---------|----------------|----------------|----------------|-----|----------|-------------------|-----------------|-----|-----|-------------|
| HGDT-25-A      | M3      | M4      | 5.9            | 3.3            | 14             | M2  | –        | –                 | M5              | M3  | M5  | 41.5        |
| HGDT-25-A-G... |         |         |                |                |                |     |          |                   |                 |     |     |             |
| HGDT-35-A      | M3      | M4      | 5.9            | 3.3            | 25             | M3  | 3.2      | 5                 | M5              | M3  | M5  | 46          |
| HGDT-35-A-G... |         |         |                |                |                |     |          |                   |                 |     |     | 52          |
| HGDT-40-A      | M4      | M6      | 9.4            | 5.1            | 25             | M3  | 3.2      | 5                 | M5              | M5  | M5  | 55          |
| HGDT-40-A-G... |         |         |                |                |                |     |          |                   |                 |     |     | 72          |
| HGDT-50-A      | M6      | M8      | 10.2           | 6.4            | 25             | M5  | 5.3      | 7                 | G $\frac{1}{8}$ | M5  | M5  | 64.5        |
| HGDT-50-A-G... |         |         |                |                |                |     |          |                   |                 |     |     | 82          |
| HGDT-63-A      | M6      | M8      | 10.4           | 6.4            | 25             | M5  | 5.3      | 7                 | G $\frac{1}{8}$ | M5  | M5  | 69          |
| HGDT-63-A-G... |         |         |                |                |                |     |          |                   |                 |     |     | 96          |

| Size<br>[mm]   | H2<br>±0.05 | H3   | H4   | H5<br>±0.1 | H6<br>±0.1 | H7<br>–0.3 | H8       | H9<br>–0.02 | H10<br>–0.2 | H11<br>–0.3 | L1<br>±0.5 | L2<br>±0.1 |
|----------------|-------------|------|------|------------|------------|------------|----------|-------------|-------------|-------------|------------|------------|
| HGDT-25-A      | 40.5        | 32.5 | 29.3 | 9          | 13.5       | 1.1        | 2.25±0.1 | 8.5         | 3.5         | –           | 6          | 12         |
| HGDT-25-A-G... |             |      |      |            |            |            |          |             |             |             |            |            |
| HGDT-35-A      | 45          | 37   | 33.5 | 9          | 18.5       | 1.1        | 3±0.02   | 12          | 3.5         | 1.1         | 7          | 12         |
| HGDT-35-A-G... | 51          | 43   | 39.5 |            |            |            |          |             |             |             |            |            |
| HGDT-40-A      | 54          | 44   | 38.4 | 9          | 25         | 1.4        | 4.5±0.02 | 16          | 3.5         | 1.1         | 9          | 12         |
| HGDT-40-A-G... | 71          | 61   | 55.4 |            |            |            |          |             |             |             |            |            |
| HGDT-50-A      | 63.5        | 50.5 | 45   | 12         | 32         | 1.9        | 5.5±0.02 | 19          | 3.5         | 1.4         | 9          | 24         |
| HGDT-50-A-G... | 81          | 68   | 62.5 |            |            |            |          |             |             |             |            |            |
| HGDT-63-A      | 68          | 50   | 44.5 | 12         | 42         | 1.9        | 5.5±0.02 | 22          | 3.5         | 1.4         | 12         | 24         |
| HGDT-63-A-G... | 95          | 77   | 71.5 |            |            |            |          |             |             |             |            |            |

| Size<br>[mm]   | L3<br>±0.1 | L4<br>±0.02 | L5    | L6      | T1<br>min. | T2<br>+0.1 | T3<br>min. | T4<br>+0.2 | T5<br>min. | T6<br>+0.1 | T7<br>+0.1 | T8<br>min. |
|----------------|------------|-------------|-------|---------|------------|------------|------------|------------|------------|------------|------------|------------|
| HGDT-25-A      | 12         | 38          | 16.45 | 6±0.1   | 3.5        | 1.3        | 5          | 3.2        | 8          | 2          | –          | 3          |
| HGDT-25-A-G... |            |             |       |         |            |            |            |            |            |            |            |            |
| HGDT-35-A      | 15         | 45          | 19.05 | 6±0.02  | 5          | 1.3        | 5.5        | 3.2        | 8          | 2          | 1.3        | 6          |
| HGDT-35-A-G... |            |             |       |         |            |            |            |            |            |            |            |            |
| HGDT-40-A      | 18         | 56          | 24.25 | 6±0.02  | 6          | 1.6        | 6.5        | 5.1        | 10         | 2          | 1.3        | 6          |
| HGDT-40-A-G... |            |             |       |         |            |            |            |            |            |            |            |            |
| HGDT-50-A      | 18         | 70          | 30.31 | 13±0.02 | 8          | 2.1        | 10.5       | 6.1        | 12         | 2          | 1.6        | 9          |
| HGDT-50-A-G... |            |             |       |         |            |            |            |            |            |            |            |            |
| HGDT-63-A      | 24         | 90          | 38.97 | 13±0.02 | 8          | 2.1        | 10.5       | 6.1        | 12         | 2          | 1.6        | 9          |
| HGDT-63-A-G... |            |             |       |         |            |            |            |            |            |            |            |            |

| Ordering data |                                             |           |  |                                                |              |                      |
|---------------|---------------------------------------------|-----------|--|------------------------------------------------|--------------|----------------------|
| Size<br>[mm]  | Double-acting<br>without compression spring |           |  | Single-acting or with gripping force retention |              |                      |
|               | Part No.                                    | Type      |  | Part No.                                       | Type         |                      |
| 25            | 540 859                                     | HGDT-25-A |  | 540 860                                        | HGDT-25-A-G1 | 540 861 HGDT-25-A-G2 |
| 35            | 540 862                                     | HGDT-35-A |  | 540 863                                        | HGDT-35-A-G1 | 540 864 HGDT-35-A-G2 |
| 40            | 540 865                                     | HGDT-40-A |  | 540 866                                        | HGDT-40-A-G1 | 540 867 HGDT-40-A-G2 |
| 50            | 540 868                                     | HGDT-50-A |  | 540 869                                        | HGDT-50-A-G1 | 540 870 HGDT-50-A-G2 |
| 63            | 540 871                                     | HGDT-63-A |  | 540 872                                        | HGDT-63-A-G1 | 540 873 HGDT-63-A-G2 |

## Three-point grippers HGDT, robust

Accessories

**FESTO**

### Unmachined gripper finger

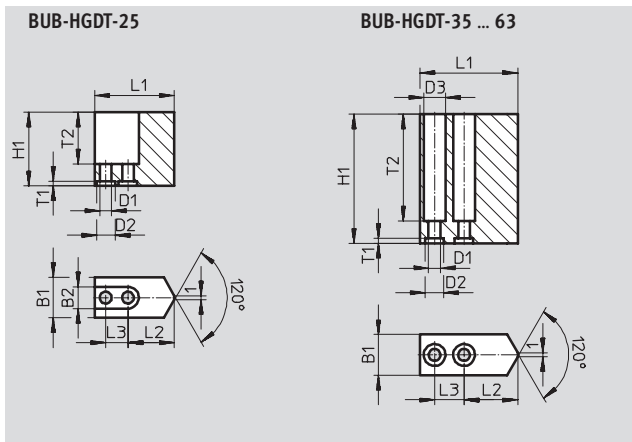
#### BUB-HGDT

(scope of delivery: 3 pieces)

Material:

Wrought aluminium alloy

Copper, PTFE and silicone-free



| Dimensions and ordering data |       |       |          |         |            |       |       |
|------------------------------|-------|-------|----------|---------|------------|-------|-------|
| For size                     | B1    | B2    | D1       | D2      | D3         | H1    | L1    |
| [mm]                         | ±0.05 | +0.22 | Ø<br>H13 | Ø<br>H8 | Ø<br>+0.22 | ±0.05 | ±0.05 |
| 25                           | 11    | 5.9   | 3.2      | 5       | –          | 20    | 21.6  |
| 35                           | 11    | –     | 3.2      | 5       | 5.9        | 35    | 26.5  |
| 40                           | 16    | –     | 4.3      | 7       | 7.4        | 50    | 34    |
| 50                           | 20    | –     | 6.3      | 9       | 10.4       | 65    | 42    |
| 63                           | 24    | –     | 6.3      | 9       | 10.4       | 80    | 52    |

| For size | L2<br>±0.02 <sup>1)</sup><br>±0.1 <sup>2)</sup> | L3<br>±0.01 <sup>1)</sup><br>±0.1 <sup>1)</sup> | T1<br>+0.1 | T2 | Weights per<br>unmachined part<br>[g] | Part No. | Type        |
|----------|-------------------------------------------------|-------------------------------------------------|------------|----|---------------------------------------|----------|-------------|
| [mm]     |                                                 |                                                 |            |    |                                       |          |             |
| 25       | 12.6                                            | 6                                               | 1.3        | 14 | 10                                    | 541 101  | BUB-HGDT-25 |
| 35       | 14.5                                            | 8                                               | 1.3        | 29 | 22                                    | 541 102  | BUB-HGDT-35 |
| 40       | 17                                              | 12                                              | 1.6        | 45 | 59                                    | 541 103  | BUB-HGDT-40 |
| 50       | 21                                              | 15                                              | 2.1        | 58 | 112                                   | 541 104  | BUB-HGDT-50 |
| 63       | 24                                              | 18                                              | 2.1        | 73 | 222                                   | 541 105  | BUB-HGDT-63 |

1) For centring

2) For through-hole

## Three-point grippers HGDT, robust

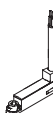
Accessories

**FESTO**

| Ordering data                                                                     |                  |                                                                          |                | Technical data → <a href="http://www.festo.com">www.festo.com</a> |                   |                  |
|-----------------------------------------------------------------------------------|------------------|--------------------------------------------------------------------------|----------------|-------------------------------------------------------------------|-------------------|------------------|
|                                                                                   | For size<br>[mm] | Remarks                                                                  | Weights<br>[g] | Part No.                                                          | Type              | PU <sup>1)</sup> |
| Centring sleeve                                                                   |                  |                                                                          |                |                                                                   |                   |                  |
|  | 25, 35           | For centring unmachined gripper jaws/gripper fingers on the gripper jaws | 1              | <b>189 652</b>                                                    | <b>ZBH-5</b>      | 10               |
|                                                                                   | 40               |                                                                          | 1              | <b>186 717</b>                                                    | <b>ZBH-7</b>      | 10               |
|                                                                                   | 50, 63           |                                                                          | 1              | <b>150 927</b>                                                    | <b>ZBH-9</b>      | 10               |
|                                                                                   | 35, 40           | For lateral centring of gripper fingers on the gripper jaws              | 1              | <b>189 652</b>                                                    | <b>ZBH-5</b>      | 10               |
|                                                                                   | 50, 63           |                                                                          | 1              | <b>186 717</b>                                                    | <b>ZBH-7</b>      | 10               |
|                                                                                   |                  |                                                                          |                |                                                                   |                   |                  |
| Central mounting                                                                  |                  |                                                                          |                |                                                                   |                   |                  |
|  | 25               | For centring the gripper when mounting                                   | 21             | <b>150 900</b>                                                    | <b>SLZZ-16/10</b> | –                |
|                                                                                   | 35, 40, 50, 63   |                                                                          | 40             | <b>150 901</b>                                                    | <b>SLZZ-25/16</b> | –                |
|                                                                                   |                  |                                                                          |                |                                                                   |                   |                  |
| Blanking plugs                                                                    |                  |                                                                          |                |                                                                   |                   |                  |
|  | 25 ... 63        | For sealing the compressed air connections                               | 0.6            | <b>30 979</b>                                                     | <b>B-M3-S9</b>    | 10               |
|                                                                                   |                  |                                                                          | 1              | <b>174 308</b>                                                    | <b>B-M5-B</b>     | 10               |
|                                                                                   |                  |                                                                          | 5              | <b>3 568</b>                                                      | <b>B-1/8</b>      | 10               |

1) Packaging unit quantity

| Ordering data – Proximity sensors for rounded slot, longitudinal connecting cable   |                     |                       |         |                     |                | Technical data → <a href="http://www.festo.com">www.festo.com</a> |  |
|-------------------------------------------------------------------------------------|---------------------|-----------------------|---------|---------------------|----------------|-------------------------------------------------------------------|--|
|                                                                                     | Assembly            | Electrical connection |         | Cable length<br>[m] | Part No.       | Type                                                              |  |
|                                                                                     |                     | Cable                 | M8 plug |                     |                |                                                                   |  |
| NO contact, magneto-resistive                                                       |                     |                       |         |                     |                |                                                                   |  |
|  | Insertable from end | –                     | 3-pin   | 0.3                 | <b>173 220</b> | <b>SMT-10-PS-SL-LED-24</b>                                        |  |
|                                                                                     |                     | 3-wire                | –       | 2.5                 | <b>173 218</b> | <b>SMT-10-PS-KL-LED-24</b>                                        |  |

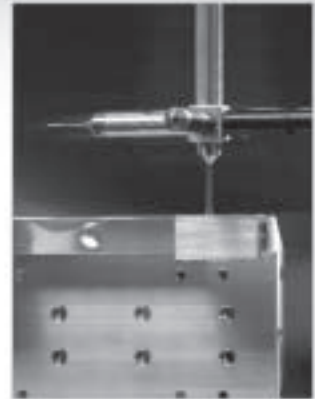
| Ordering data – Proximity sensors for rounded slot, lateral connecting cable        |                               |                       |         |                     |          | Technical data → <a href="http://www.festo.com">www.festo.com</a> |  |
|-------------------------------------------------------------------------------------|-------------------------------|-----------------------|---------|---------------------|----------|-------------------------------------------------------------------|--|
|                                                                                     | Assembly                      | Electrical connection |         | Cable length<br>[m] | Part No. | Type                                                              |  |
|                                                                                     |                               | Cable                 | M8 plug |                     |          |                                                                   |  |
|  | NO contact, magneto-resistive |                       |         |                     |          |                                                                   |  |
|                                                                                     | Insertable from<br>end        | 3-wire                | –       | 2.5                 | 173 219  | SMT-10-PS-KQ-LED-24                                               |  |
|                                                                                     |                               | –                     | 3-pin   | 0.3                 | 173 221  | SMT-10-PS-SQ-LED-24                                               |  |
|                                                                                     |                               |                       |         |                     |          |                                                                   |  |

| Ordering data – Plug socket with cable                                              |              |               |     |            |                     | Technical data → <a href="http://www.festo.com">www.festo.com</a> |                   |
|-------------------------------------------------------------------------------------|--------------|---------------|-----|------------|---------------------|-------------------------------------------------------------------|-------------------|
|                                                                                     | Assembly     | Switch output |     | Connection | Cable length<br>[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   |

## 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.

## 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

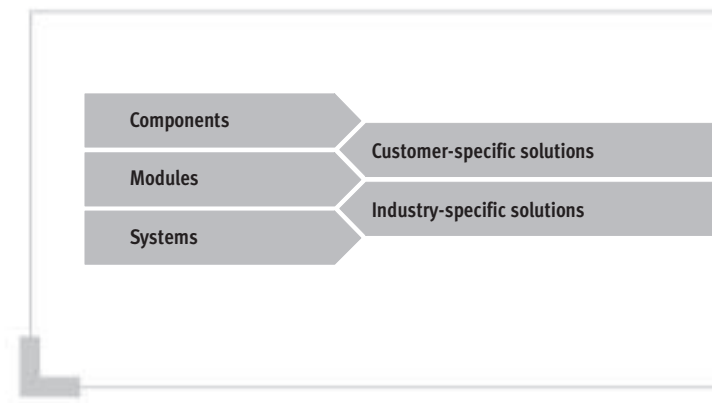
### Fieldbus systems/ electrical peripherals

- 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

## What must be observed when using Festo components?

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

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

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

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

Festo does not accept any liability for resulting damages.

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

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

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

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