# Long-stroke grippers HGPL

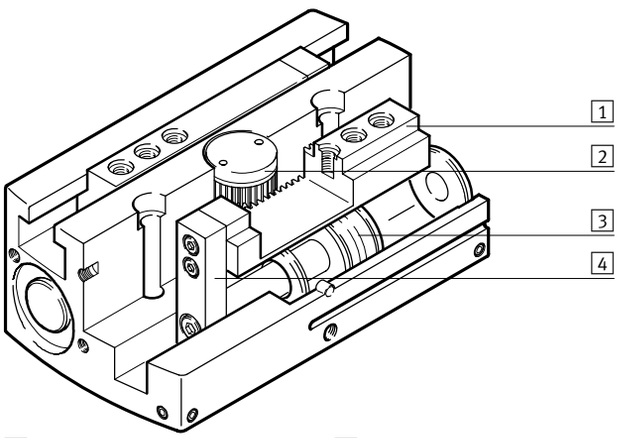

- Sturdy
- Gripping forces of up to 754 N
- Reliable
- Space-saving

# Long-stroke grippers HGPL

Key features

## At a glance

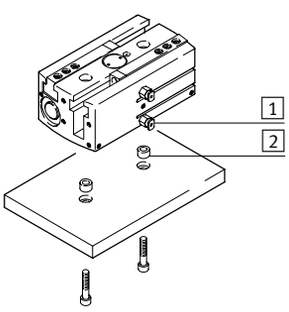
- Space-saving and suitable for high forces
  - Two parallel and opposing pistons move the gripper jaws directly and without loss of force
- Reliable
  - A pinion that synchronises the movement of both gripper jaws ensures controlled, precise and centred gripping
  - The space-saving design of the parallel 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



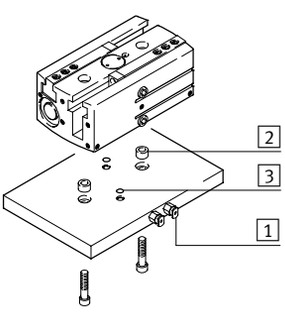

1 Gripper jaw
2 Synchronising gear
3 Piston with magnet
4 Driver

## Versatile compressed air connections

Direct from the front



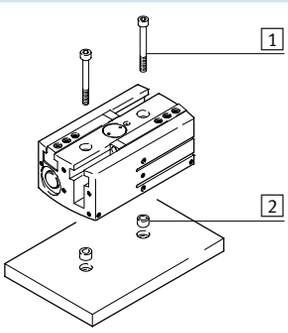

Via adapter plate from underneath



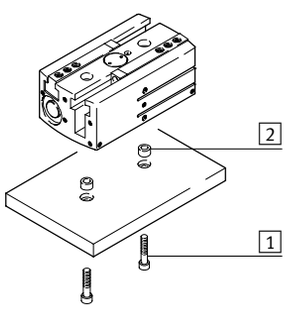

1 Compressed air connections
2 Centring sleeves
3 O-rings

## Mounting options

Direct mounting from above



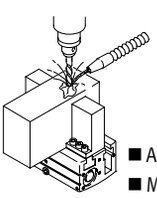

from underneath



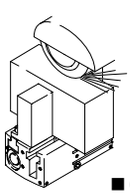

1 Mounting screws
2 Centring sleeves

Note

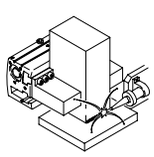
Long-stroke grippers are not designed for the following or similar applications:



- Aggressive media
- Machining



- Grinding dust



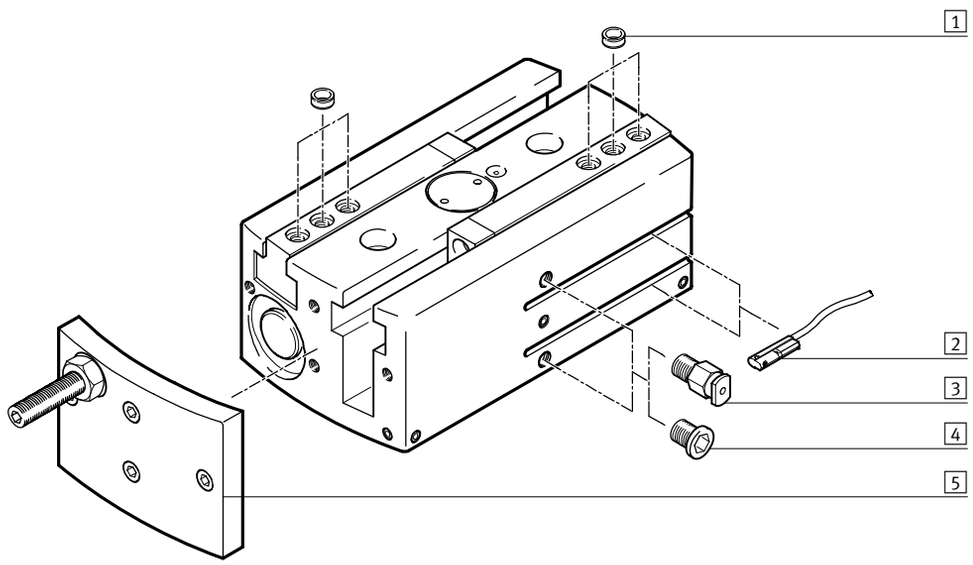
- Welding spatter

# Long-stroke grippers HGPL

Peripherals overview and type codes

FESTO

## Peripherals overview




**Accessories**

| | Type | Brief description | ➔ Page |
|---|---|---|---|
| 1 | Centring sleeve<br>ZBH | For centring when attaching gripper fingers | 1 / 7.7-17 |
| 2 | Proximity sensor<br>SME-/SMT-10 | For sensing the piston position | 1 / 7.7-18 |
| 3 | Push-in fitting<br>QS | For connecting compressed air tubing with standard external diameters | Volume 3<br>www.festo.com |
| 4 | Blanking plug<br>B | For sealing compressed air connections when using air connections at the front | 1 / 7.7-17 |
| 5 | Stroke reducing plate<br>HGPL-HR-... | For reducing the opening stroke | 1 / 7.7-16 |
| – | Unmachined gripper finger<br>BUB-HGPL | Unmachined part specially matched to the gripper jaws for custom building of gripper fingers | 1 / 7.7-17 |
| – | | Drive/gripper connections | Volume 5<br>www.festo.com<br>NO TAG |

## Type codes

HGPL – 14 – 40 – A

**Type**

| | |
|---|---|
| HGPL | Long-stroke gripper |

**Piston ∅**

**Stroke [mm]**

**Position sensing**

| | |
|---|---|
| A | Via proximity sensor |

# Long-stroke grippers HGPL

Technical data

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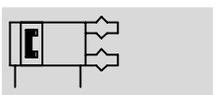
Function
Double-acting
HGPL-...-A



Repair service

Piston ∅
14 ... 40 mm

Stroke
80 ... 160 mm

| General technical data | | | | | | | |
|---|---|---|---|---|---|---|---|
| Piston ∅ | | 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[1] | [N] | 0.8 | | 2.5 | | 4.2 | |
| Stroke per gripper jaw | [mm] | 40 | 80 | 40 | 80 | 40 | 80 |
| Pneumatic connection | | M5 | | | | | |
| Repetition accuracy[2] | [mm] | < 0.03 | | | | | |
| Max. interchangeability | [mm] | < 0.2 | | | | | |
| Max. gripper jaw backlash[3] | [mm] | < 0.05 | | | | | |
| Max. operating frequency | [Hz] | < 1 | | | | | |
| Rotational symmetry | [mm] | < ∅ 0.2 | | | | | |
| Position sensing | | Via proximity sensor | | | | | |
| 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 | | | | |
|---|---|---|---|---|
| Piston ∅ | | 14 | 25 | 40 |
| Operating pressure | [bar] | 3 ... 8 | | |
| Operating medium | | Filtered compressed air, lubricated or unlubricated | | |
| Ambient temperature[1] | [°C] | +5 ... +60 | | |
| Corrosion resistance class CRC[2] | | 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] | | | | |
|---|---|---|---|---|
| Piston ∅ | | 14 | 25 | 40 |
| Stroke per gripper jaw | 40 mm | 440 | 1400 | 3300 |
| | 80 mm | 720 | 2200 | 4800 |

# Long-stroke grippers HGPL

Technical data

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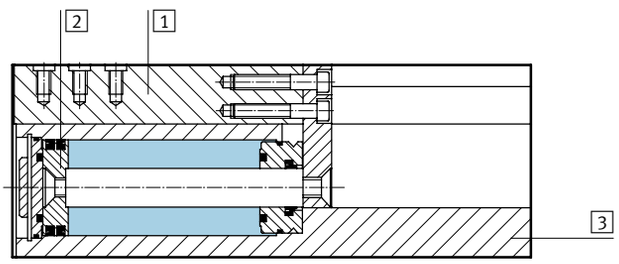
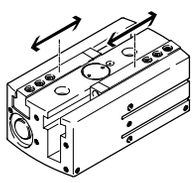
## Materials

Sectional view



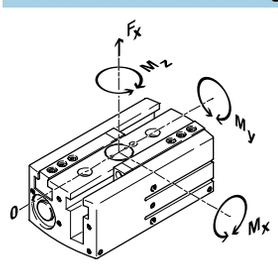

| Gripper | | |
|---|---|---|
| 1 | Gripper jaw | Hardened steel, Citrox-coated |
| 2 | Piston | High-alloy steel |
| 3 | Housing | Wrought aluminium alloy with CompCote |
| – | Seals | Nitrile rubber, polyurethane |
| | Note on materials | Free of copper, PTFE and silicone |

## Theoretical gripping force [N] at 6 bar per gripper jaw



| Piston ∅ | 14 | 25 | 40 |
|---|---|---|---|
| Opening | 75 | 247 | 633 |
| Closing | 92 | 295 | 754 |

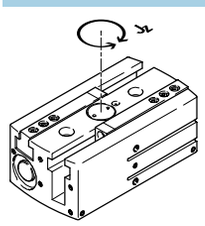
## Characteristic load values at the gripper jaws




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.

| Piston ∅ | | 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 |

## Mass moment of inertia [kgm²x10⁻⁴]



Mass moment of inertia [kgm²x10⁻⁴] for long-stroke grippers in relation to the central axis with no load.

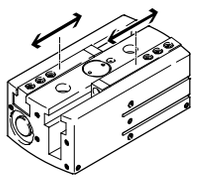
| Piston ∅ | | 14 | 25 | 40 |
|---|---|---|---|---|
| Stroke per gripper jaw | 40 mm | 4.69 | 18.88 | 66.83 |
| | 80 mm | 21.93 | 78.7 | 198.87 |

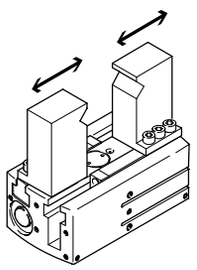
# Long-stroke grippers HGPL

Technical data

**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 operating 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.

| Piston ∅ | | 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 |

# Long-stroke grippers HGPL

Technical data

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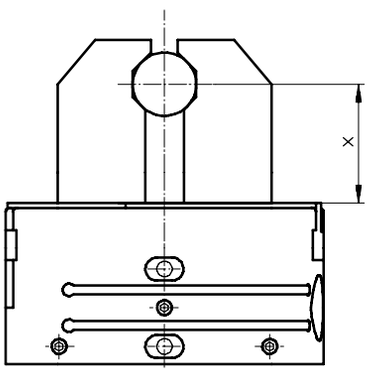
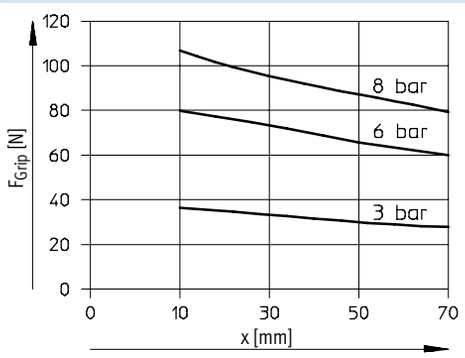
## Gripping force $F_{Grip}$ per gripper jaw as a function of operating pressure and lever arm x

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

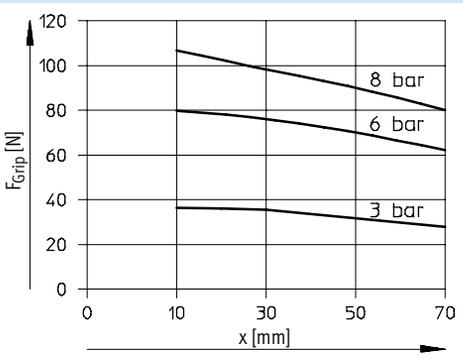



## As external gripper: Closing operation

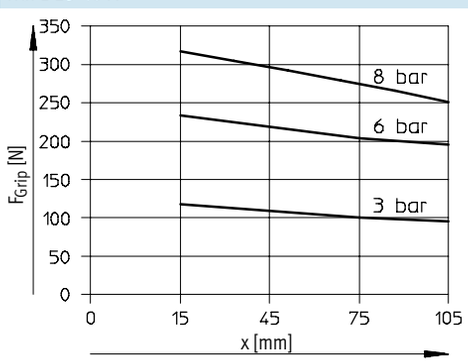
HGPL-14-40-A




HGPL-14-80-A




HGPL-25-40-A

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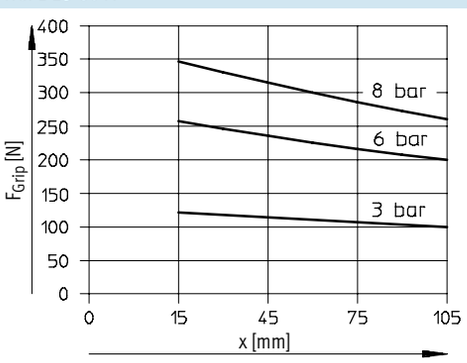
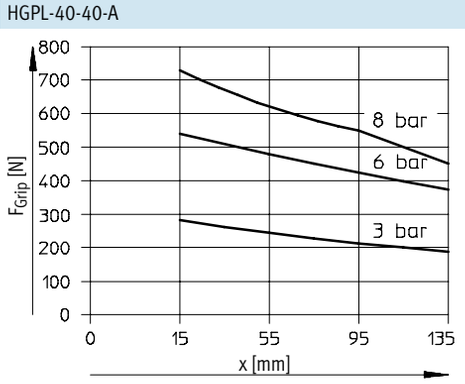



HGPL-40-40-A

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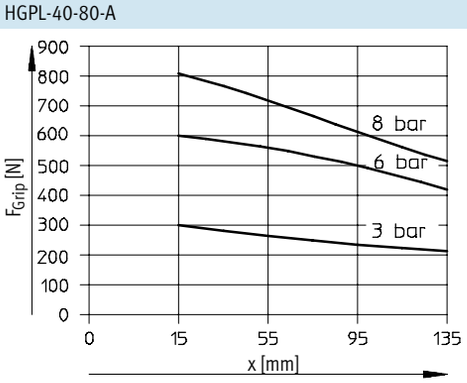


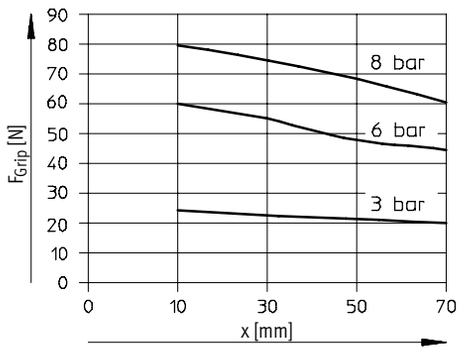
# Long-stroke grippers HGPL

Technical data

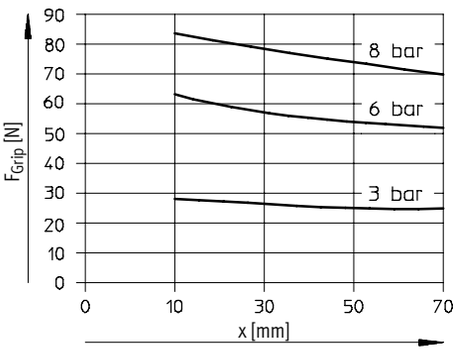
FESTO

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

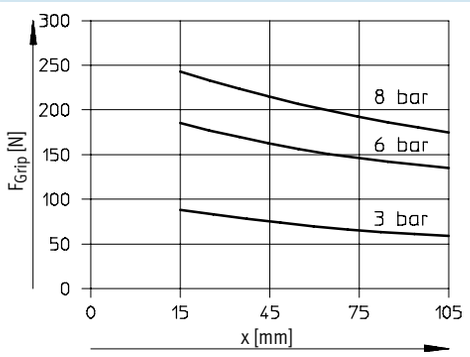
HGPL-14-40-A




HGPL-14-80-A




HGPL-25-40-A

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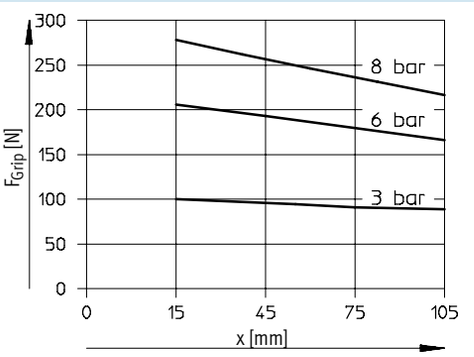
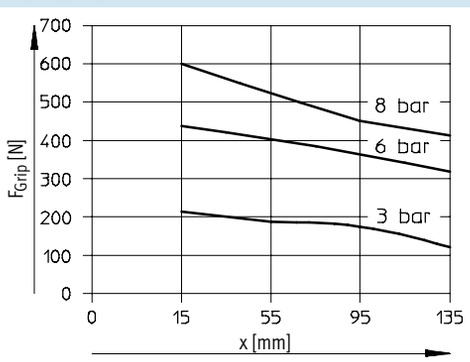
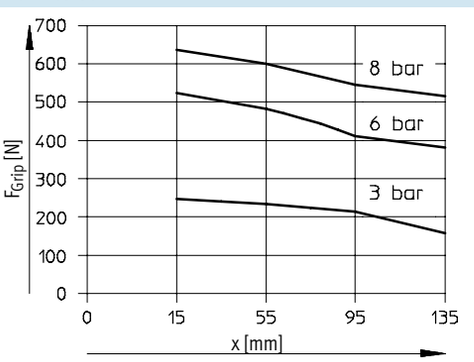



HGPL-40-40-A




HGPL-40-80-A

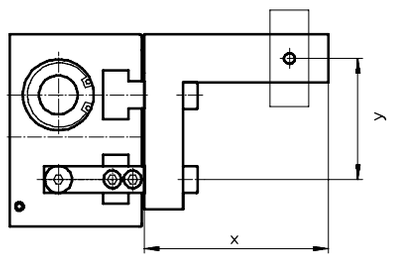


# Long-stroke grippers HGPL

Technical data

FESTO

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



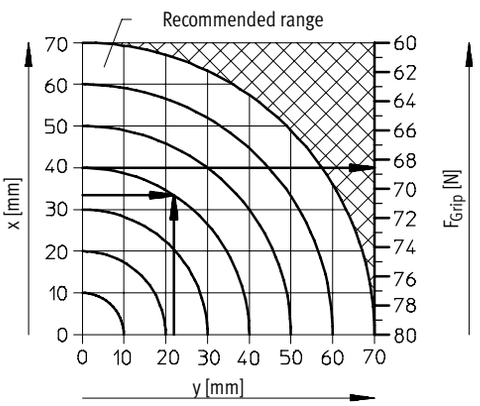

Gripping forces at 6 bar dependent upon eccentric application of force and the maximum permissible off-centre point of force application can be determined for the various sizes using the following graphs.

### Calculation example

Given:
Lever arm x = 32 mm
Eccentricity y = 22 mm
To be found:
Gripping force at 6 bar

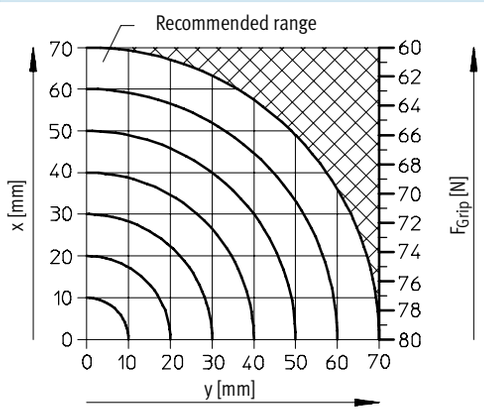
Procedure:
- Determine the intersection xy between lever arm x and eccentricity y in the graph for HGPL-14-40-A
- Draw an arc (with centre at origin) through intersection xy
- Determine the intersection between the arc and the X axis
- Read the gripping force

Result:
Gripping force = approx. 68.3 N

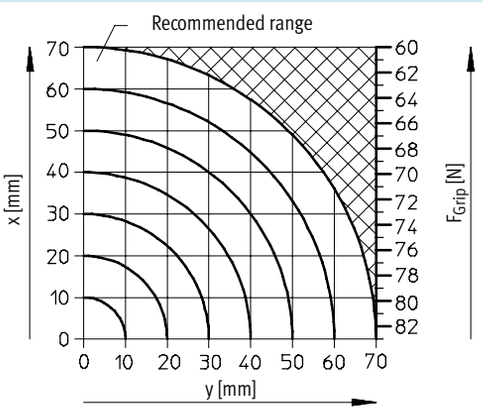



## As external gripper: Closing operation

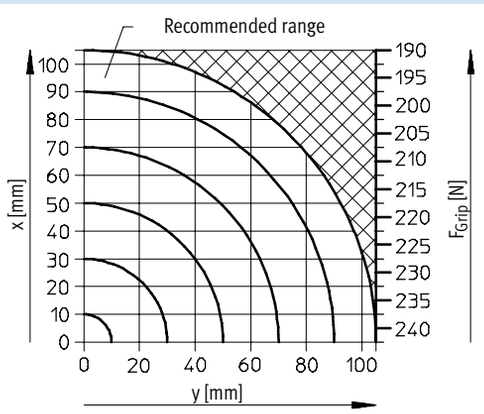
### HGPL-14-40-A



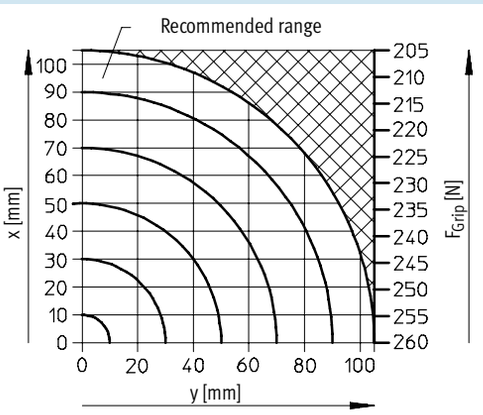

### HGPL-14-80-A




### HGPL-25-40-A




### HGPL-25-80-A



# Long-stroke grippers HGPL

Technical data

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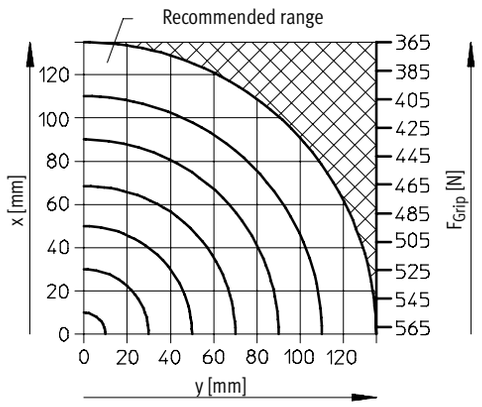
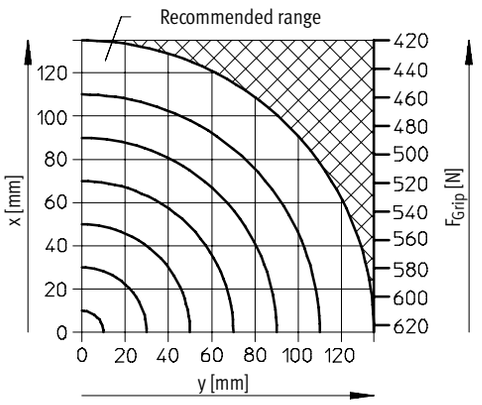
**Gripping force $F_{Grip}$ per gripper jaw as a function of lever arm x and eccentricity y**

HGPL-40-40-A

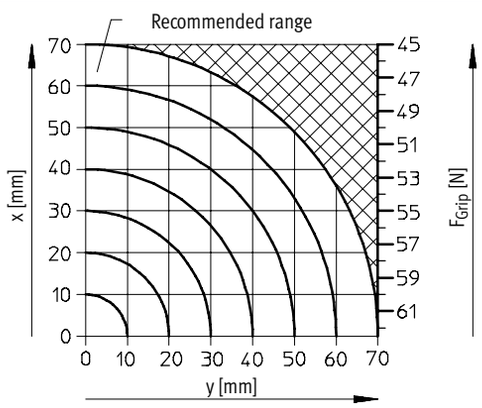



HGPL-40-80-A

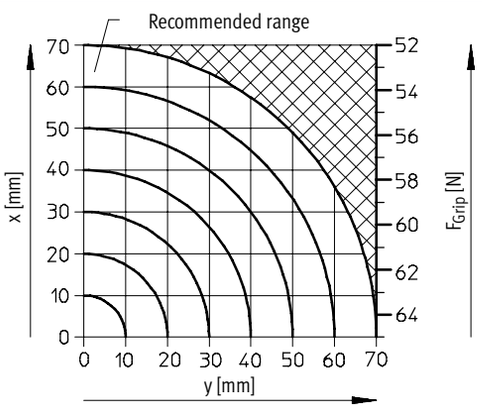



**As internal gripper: Closing operation**

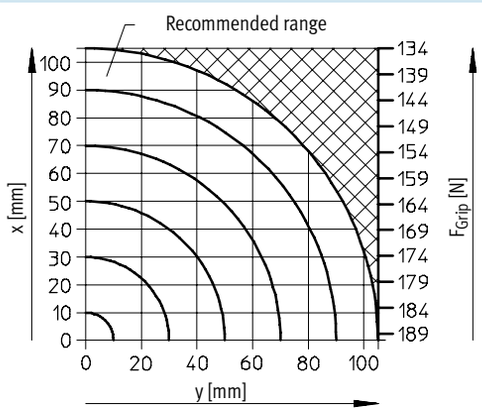
HGPL-14-40-A



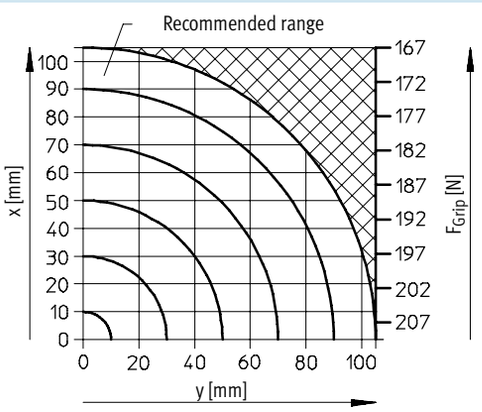

HGPL-14-80-A




HGPL-25-40-A




HGPL-25-80-A



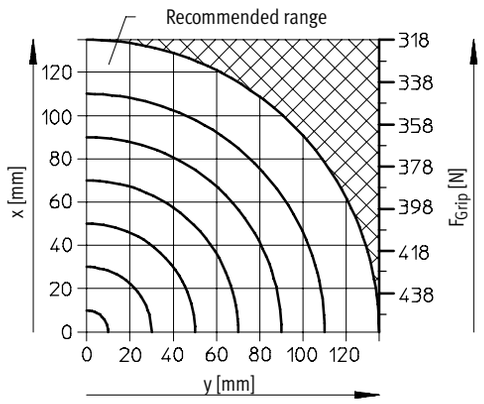
# Long-stroke grippers HGPL

Technical data

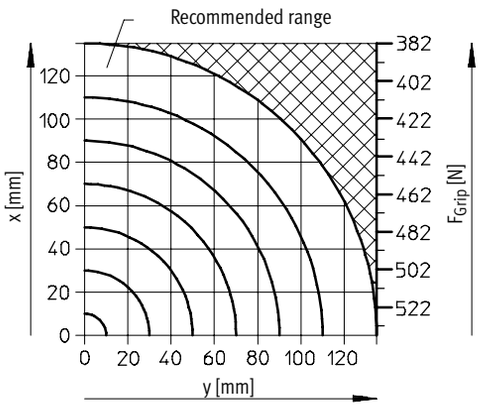
FESTO

**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

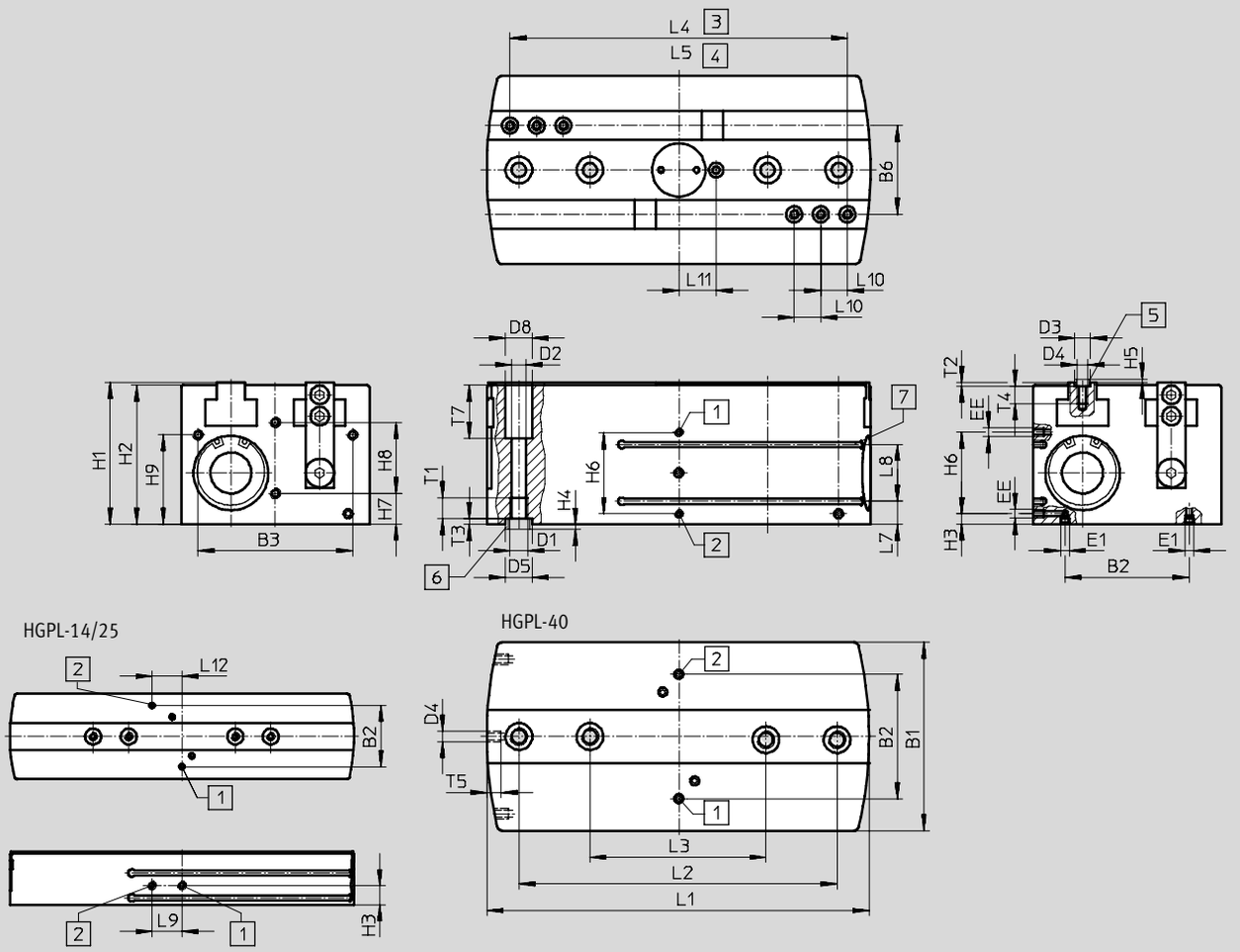


# Long-stroke grippers HGPL

Technical data

FESTO

**Dimensions** Download CAD data ➔ **www.festo.com/en/engineering**




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
4 Gripper jaw closed
5 Centring sleeves ZBH (4 included in scope of delivery)

6 Centring sleeves ZBH (2 included in scope of delivery)
7 Slot for proximity sensor SME-10/SMT-10

# Long-stroke grippers HGPL

Technical data

FESTO

| Type | B1 ±0.05 | B2 ±0.1 | B3 ±0.1 | B6 ±0.01 | D1 | D2 ∅ +0.1 | D3 ∅ H8/h7 | D4 | D5 ∅ H8/h7 | D8 ∅ 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 ±0.1 | H3 ±0.1 | H4 −0.3 | H5 −0.3 | H6 ±0.1 | H7 ±0.1 | H8 ±0.1 | H9 ±0.1 | L1 ±0.1 | L2 ±0.02[1] ±0.1[2] | L3 ±0.02[1] ±0.1[2] | L4 ±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 | 100 | 180 | 190 |

| Type | L5 ±0.5 | L7 ±0.1 | L8 ±0.1 | L9 ±0.2 | L10 ±0.02[1] ±0.1[2] | L11 ±0.5 | L12 ±0.1 | T1 min. | T2 +0.1 | T3 +0.1 | T4 min. | T5 min. | T7 +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

# Long-stroke grippers HGPL

Technical data and accessories

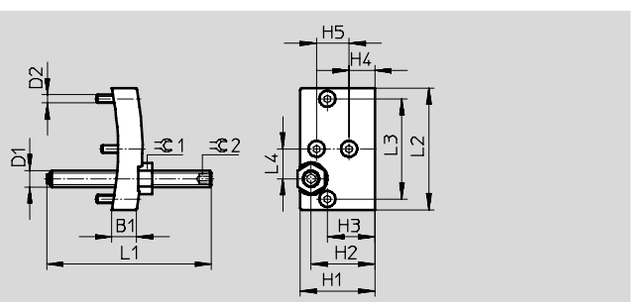
FESTO

| Ordering data | | | |
|---|---|---|---|
| Piston ∅ [mm] | Stroke per gripper jaw [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** |

## Accessories

**Stroke reducing plate HGPL-HR**

Material:
Aluminium
Free of copper, PTFE and silicone




| Dimensions and ordering data | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| For ∅ [mm] | B1 ±0.1 | D1 | D2 | H1 ±0.1 | H2 ±0.1 | H3 ±0.1 | H4 ±0.1 | H5 ±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 ∅ [mm] | L1 ±1 | L2 ±0.1 | L3 ±0.1 | L4 ±0.1 | ⌀C1 | ⌀C2 | Weight [g] | Part No. | Type |
|---|---|---|---|---|---|---|---|---|---|
| 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** |

# Long-stroke grippers HGPL

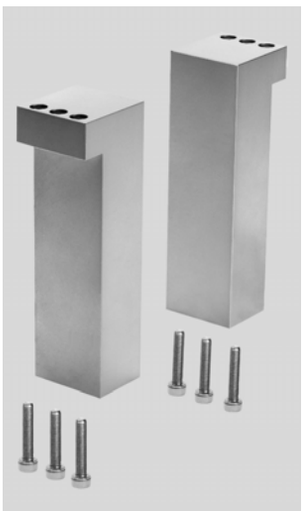
Accessories

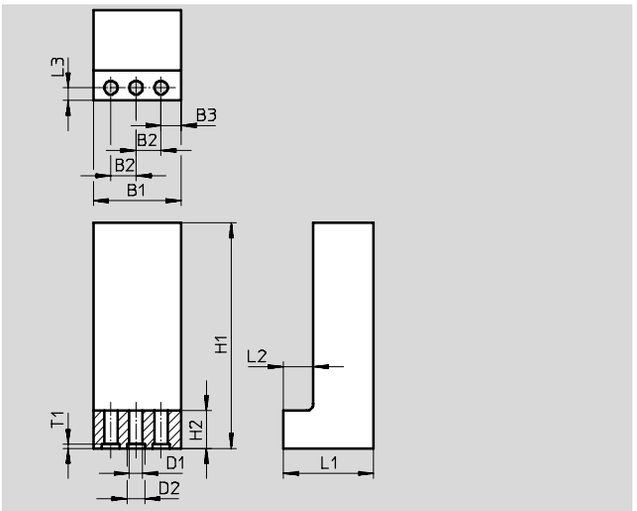
FESTO

## Accessories

**Unmachined gripper finger**
**BUB-HGPL**
(Scope of delivery: 2 pcs.)

Material:
Aluminium
Free of copper, PTFE and silicone






## Dimensions and ordering data

| For ∅ [mm] | B1 ±0.1 | B2 +0.02 | B3 | D1 ∅ +0.1 | D2 ∅ H8 | H1 ∅ ±0.1 | H2 |
|---|---|---|---|---|---|---|---|
| 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 ∅ [mm] | L1 ±0.1 | L2 +0.1 | L3 +0.1 | T1 +0.1 | Weight per unmachined gripper finger [g] | Part No. | Type |
|---|---|---|---|---|---|---|---|
| 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

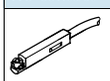
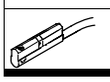
Technical data ➔ NO TAG
Technical data ➔ www.festo.com

| | For piston ∅ [mm] | Weight [g] | Part No. | Type | PU[1] |
|---|---|---|---|---|---|
| Centring sleeve for the gripper jaws | | | | | |
|  | 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 | | | | | |
|  | 14 | 1 | **189 652** | **ZBH-9** | 10 |
| | 25 | | | | |
| | 40 | 3 | **191 409** | **ZBH-15** | 10 |
| | | | | | |
| Blanking plug | | | | | |
|  | 14 (at front) | 0.6 | **30 979** | **B-M3-S9** | 10 |
| | 14, 25, 40 | 1 | **174 308** | **B-M5-B** | 10 |

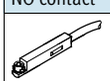
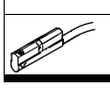
1) Packaging unit quantity

Core Range

**Ordering data – Proximity sensors for slot type 10, magneto-resistive** Technical data ➔ NO TAG
**Ordering data – Proximity sensors for slot type 10, magneto-resistive** Technical data ➔ www.festo.com

| | Assembly | Switch output | Electrical connection | | Cable length [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 slot type 10, magnetic reed** Technical data ➔ NO TAG
**Ordering data – Proximity sensors for slot type 10, magnetic reed** Technical data ➔ www.festo.com

| | Assembly | Electrical connection | | Cable length [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** Technical data ➔ NO TAG
**Ordering data – Plug sockets** Technical data ➔ www.festo.com

| | Assembly | Switch output | | Connection | Cable length [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** |



Core Range