# Parallel grippers HGPLE, sturdy with long stroke, electric

FESTO

# Parallel grippers HGPLE, sturdy with long stroke, electric

Key features

## At a glance

With free, speed-controlled selection of the gripping positions, flexible access is no longer a problem with the parallel gripper HGPLE. Its long stroke means it can be used with workpieces of different sizes. The option to adjust the gripping force makes the HGPLE ideal for soft or very delicate workpieces. It also grips large and heavy workpieces reliably.

### Economical

- A "pre-holding" position enables the HGPLE to stop its gripper fingers just short of the workpiece, thus reducing access times to an absolute minimum. Even when the size of the workpiece requires the entire stroke, the HGPLE still offers impressively short opening and closing times of 0.6 s.
- The installation complexity is minimal as only one cable is required (from the controller to the gripper).

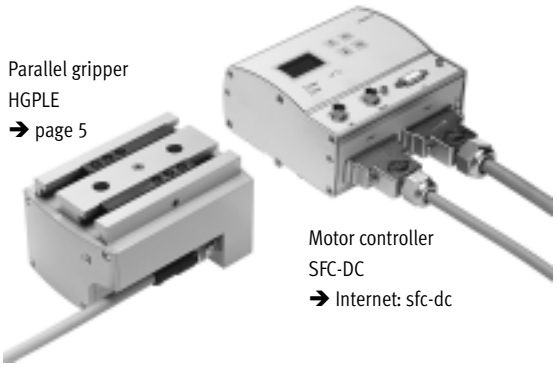
### Sturdy

The T-slot gives the HGPLE very high torque resistance as well as very high precision.

### Flexible

It is actuated on-site using the tried and tested motor controller SFC-DC.

## Everything from a single source



Parallel gripper
HGPLE
➔ page 5

Motor controller
SFC-DC
➔ Internet: sfc-dc

The parallel gripper and motor controller SFC form one unit.

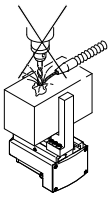
- Thanks to IP54 degree of protection, the SFC can be mounted close to the HGPLE, either:
  - via central supports or
  - via H-rail
- The motor controller SFC is available with or without control panel
- Easy actuation via:
  - PROFIBUS
  - CANopen
  - DeviceNet

Parameterisation possible via:

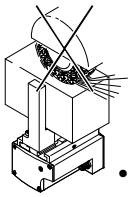
- Control panel:
  - Suitable for easy positioning sequences
- FCT (Festo Configuration Tool) configuration package:
  - Parameterisation via RS 232 interface
  - Windows-based PC user interface, Festo Configuration Tool
  - Tool is included in scope of delivery

Note

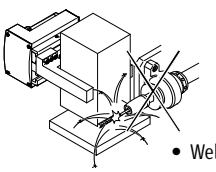
These grippers are not suitable for the following or similar applications:



- Aggressive media
- Machining



- Grinding dust



- Welding spatter

PROFIBUS®, DeviceNet®, CANopen® is a registered trademark of its respective trademark holder in certain countries.

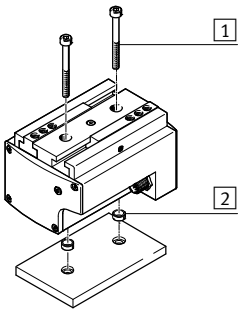
# Parallel grippers HGPLE, sturdy with long stroke, electric

Key features and peripherals overview

## Mounting options

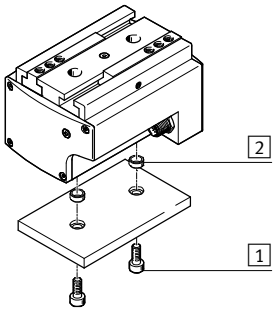
Direct mounting

From above



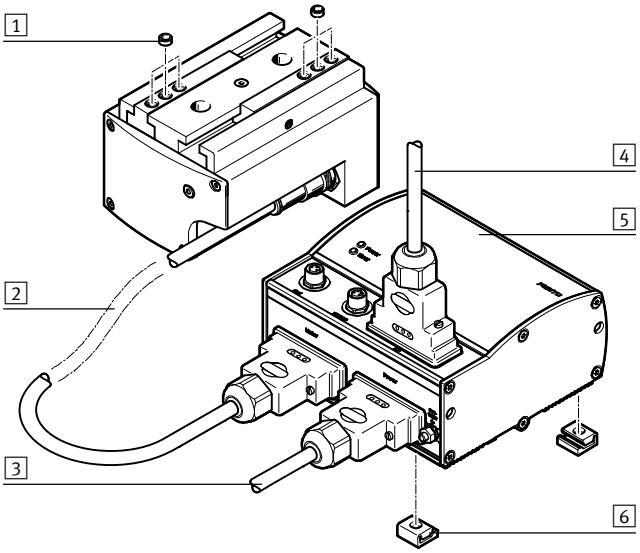

1 Mounting screws
2 Centring sleeves

From underneath

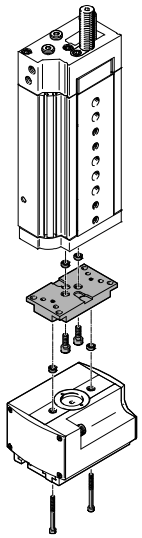



1 Mounting screws
2 Centring sleeves

## Peripherals overview




## System product for handling and assembly technology

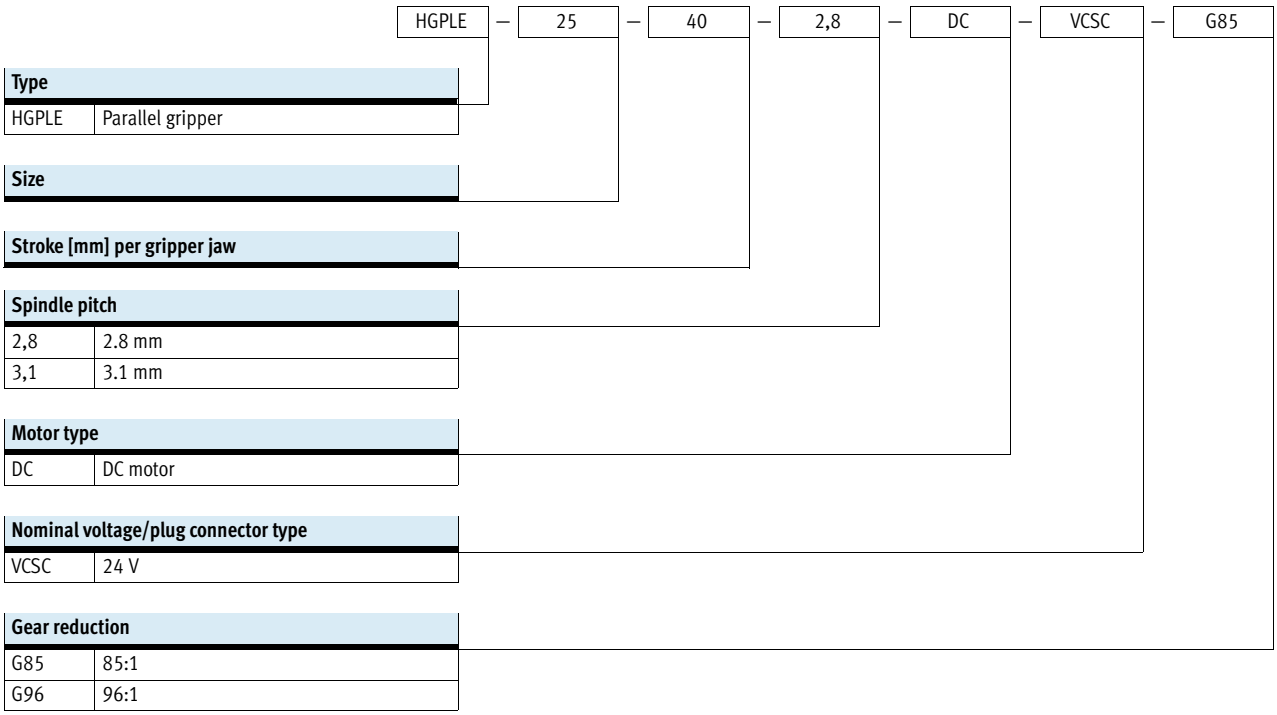


## Accessories

| | Type | Description | ➔ Page/Internet |
|---|---|---|---|
| 1 | Centring sleeve<br>ZBH | For centring attachments | 11 |
| 2 | Motor cable<br>KMTR | Connecting cable between motor and motor controller | sfc-dc |
| 3 | Supply cable<br>KPWR | Power supply cable; load and logic power supplies are separate | sfc-dc |
| 4 | Plug connector<br>FBS, FBA | For fieldbus interface | sfc-dc |
| 5 | Motor controller<br>SFC | For parameterising and positioning the parallel gripper | sfc-dc |
| 6 | Central support<br>MUP | – For mounting the motor controller<br>– Motor controller can also be mounted on an H-rail | sfc-dc |
| – | Gripper jaw blank<br>BUB-HGPL | Unmachined part specially matched to the gripper jaws for custom fabrication of gripper fingers | 11 |

# Parallel grippers HGPLE, sturdy with long stroke, electric

Type codes




| Type | |
|---|---|
| HGPLE | Parallel gripper |

**Size**

**Stroke [mm] per gripper jaw**

| Spindle pitch | |
|---|---|
| 2,8 | 2.8 mm |
| 3,1 | 3.1 mm |

| Motor type | |
|---|---|
| DC | DC motor |

| Nominal voltage/plug connector type | |
|---|---|
| VCSC | 24 V |

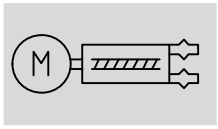
| Gear reduction | |
|---|---|
| G85 | 85:1 |
| G96 | 96:1 |

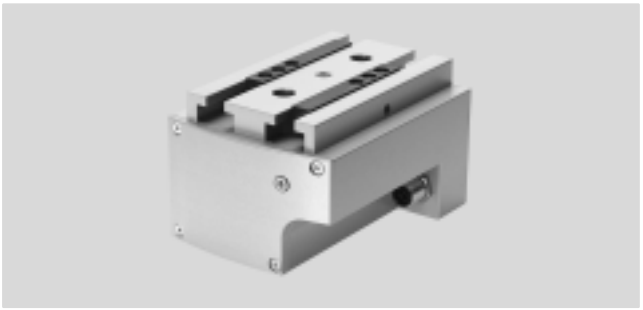
# Parallel grippers HGPLE, sturdy with long stroke, electric

Technical data

FESTO

Function



- Size
  14 and 25 mm
- Stroke
  30 ... 80 mm

| General technical data | | | | | | |
|---|---|---|---|---|---|---|
| Size | | 14 | | 25 | | |
| Stroke | | 30 | 60 | 40 | 80 | |
| Design | | Worm gear unit with integrated displacement encoder | | | | |
| | | Rack and pinion | | | | |
| Guidance | | Plain-bearing guide with T-slot | | | | |
| Mode of operation | | Double-acting | | | | |
| Gripper function | | Parallel | | | | |
| Number of gripper jaws | | 2 | | | | |
| Stroke per gripper jaw, adjustable | [mm] | 0 ... 30 | 0 ... 60 | 0 ... 40 | 0 ... 80 | |
| Max. load per gripper finger[1] | [g] | 150 | 150 | 500 | 500 | |
| Repetition accuracy[2] | [mm] | ≤ 0.05 | | | | |
| Max. interchangeability | [mm] | ≤ 0.2 | | | | |
| Reversing backlash[3] | [mm] | ≤ 0.35 | | | | |
| Rotational symmetry | [mm] | ≤ 0.2 | | | | |
| Max. gripper jaw backlash | [mm] | ≤ 0.05 | | | | |
| Max. gripper jaw angular backlash | [°] | ≤ 0.2 | | | | |
| Homing | | Negative fixed stop block | | | | |
| | | Positive fixed stop block | | | | |
| Position sensing | | Via integrated angular displacement encoder | | | | |
| Type of mounting | | Via through-holes and centring sleeves | | | | |
| | | Via female thread and centring sleeves | | | | |
| Electrical connection | | 12-pin | | | | |
| | | M12x1 | | | | |
| | | Plug connector | | | | |
| Mounting position | | Any | | | | |
| Product weight | [g] | 520 | 700 | 1680 | 2030 | |

1) Applies to unthrottled operation
2) End-position drift under constant operating conditions with 100 consecutive strokes in the direction of movement of the gripper jaws
3) In new condition

| Electrical data for motor | | |
|---|---|---|
| Motor type | | DC servo motor |
| Nominal operating voltage | [V DC] | 24 |

| Operating and environmental conditions | | |
|---|---|---|
| Ambient temperature | [°C] | 5 ... 40 |
| Degree of protection | | IP40 |
| Noise level | [db (A)] | ≤60 |
| CE mark (see declaration of conformity)[1] | | To EU EMC Directive |
| Corrosion resistance class CRC[2] | | 2 |

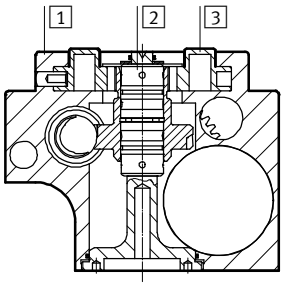
1) For information about the applicability of the component see the manufacturer's EC declaration of conformity at: www.festo.com/sp ➔ Certificates.
If the component is subject to restrictions on usage in residential, office or commercial environments or small businesses, further measures to reduce the emitted interference may be necessary.
2) Corrosion resistance class CRC 2 to Festo standard FN 940070
Moderate corrosion stress. Indoor applications in which condensation may occur. External visible parts with primarily decorative requirements for the surface and which are in direct contact with the ambient atmosphere typical for industrial applications.

# Parallel grippers HGPLE, sturdy with long stroke, electric

Technical data

## Materials

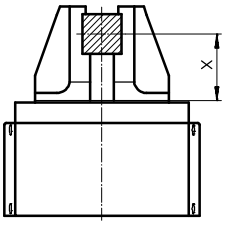
Sectional view




| Parallel gripper | | |
|---|---|---|
| 1 | Housing | Wrought aluminium alloy, hard-anodised |
| 2 | Bearing | Rolled steel |
| 3 | Gripper jaw | Hardened steel |
| – | Note on materials | Free of copper and PTFE |
| | | RoHS-compliant |

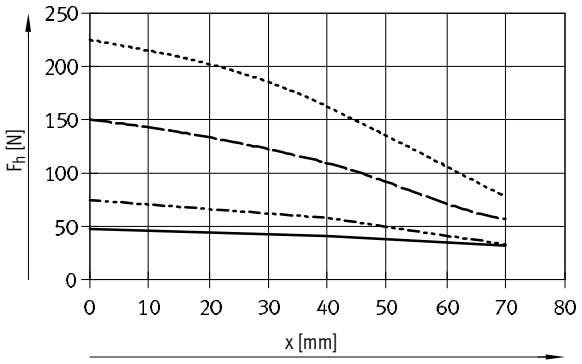
## Gripping force $F_h$ per gripper jaw as a function of travel speed v and lever arm x

The gripping forces as a function of travel speed and lever arm can be determined using following graphs.

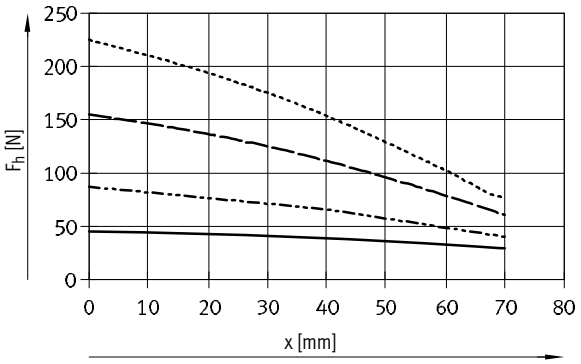



HGPLE-14

Opening



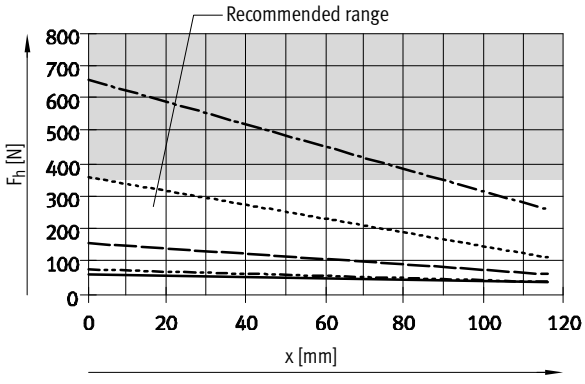

Closing



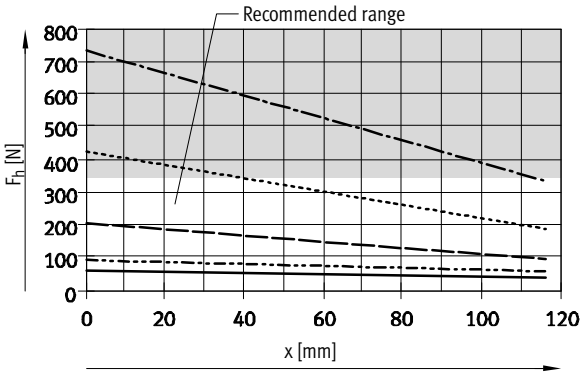

v = 2 mm/s
v = 10 mm/s
v = 20 mm/s
v = 30 mm/s

HGPLE-25

Opening




Closing




v = 2 mm/s
v = 10 mm/s
v = 20 mm/s
v = 40 mm/s
v = 60 mm/s

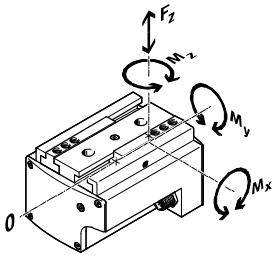
# Parallel grippers HGPLE, sturdy with long stroke, electric

Technical data

**Total gripping force F with a lever arm X = 20 mm**

| Travel speed v | [mm/s] | 2 | 5 | 10 | 20 | 30 | 40 | 60 |
|---|---|---|---|---|---|---|---|---|
| HGPLE-14 | | | | | | | | |
| Opening | [N] | 92 | 93 | 149 | 300 | 450 | – | – |
| Closing | [N] | 88 | 104 | 173 | 305 | 445 | – | – |
| HGPLE-25 | | | | | | | | |
| Opening | [N] | 120 | 120 | 148 | 293 | – | 652 | 1150 |
| Closing | [N] | 121 | 120 | 176 | 376 | – | 771 | 1300 |

**Characteristic load values at the gripper jaws**

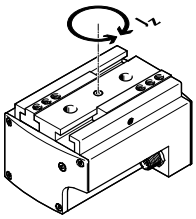



The indicated permissible forces and torques apply to a single gripper jaw. They include the lever arm, additional applied loads due to the workpiece or external gripper fingers and acceleration forces occurring during movement.

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

| Size | | 14 | | 25 | |
|---|---|---|---|---|---|
| Stroke | | 30 | 60 | 40 | 80 |
| Max. permissible force $F_z$ | [N] | 500 | 500 | 1500 | 1500 |
| Max. permissible torque $M_x$ | [Nm] | 25 | 35 | 100 | 140 |
| Max. permissible torque $M_y$ | [Nm] | 25 | 35 | 60 | 90 |
| Max. permissible torque $M_z$ | [Nm] | 25 | 35 | 70 | 100 |

**Mass moment of inertia [kgcm²]**

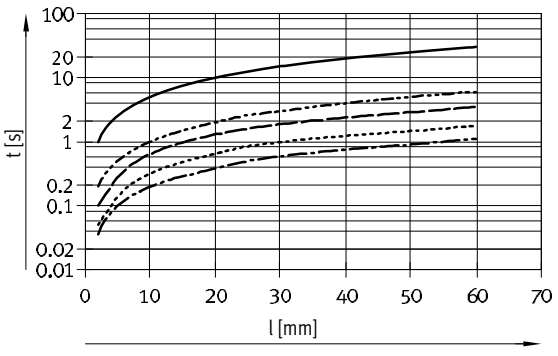



Under the following conditions:
- The reference point is the central axis
- Without external gripper fingers
- In a load-free state

| Size | | 14 | | 25 | |
|---|---|---|---|---|---|
| Stroke | | 30 | 60 | 40 | 80 |
| Mass moment of inertia Jz | [kgcm²] | 4.24 | 11.64 | 28.32 | 72.72 |

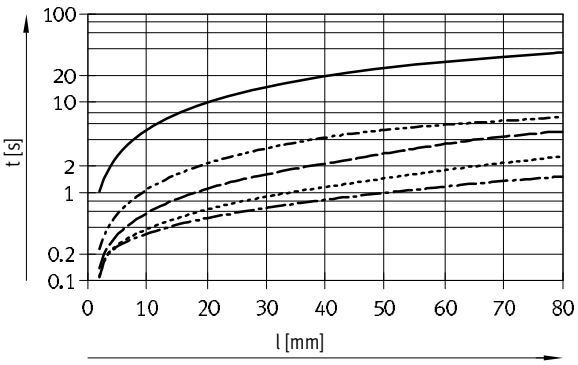
**Positioning time t as a function of stroke per gripper jaw l and travel speed v**

HGPLE-14




v = 2 mm/s
v = 10 mm/s
v = 20 mm/s
v = 40 mm/s
v = 55 mm/s

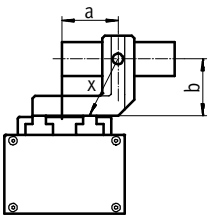
HGPLE-25




v = 2 mm/s
v = 10 mm/s
v = 20 mm/s
v = 40 mm/s
v = 65 mm/s

## Gripping force $F_h$ per gripper jaw as a function of lever arm x and eccentricity a and b

The following formula must be used to calculate the lever arm x with eccentric gripping:




$x = \sqrt{a^2 + b^2}$

The gripping force $F_h$ can then be read from the graphs (➔ page 6) using the calculated value x.

### Calculation example

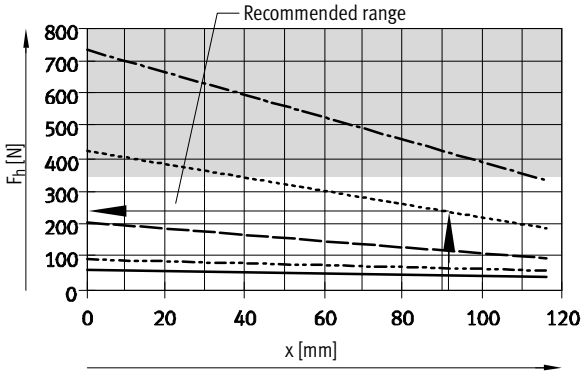
Given:
Distance a = 60 mm
Distance b = 70 mm
To be found:
The gripping force at 40 mm/s with a HGPLE-25-40, used as an external gripper

Approach:
Calculating the lever arm x

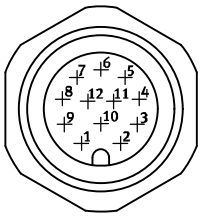
$x = \sqrt{60^2 + 70^2}$

x = 92 mm

The graph (➔ page 6) gives a value for the gripping force $F_h$ of approx. 245 N.




## Pin allocation of plug connector



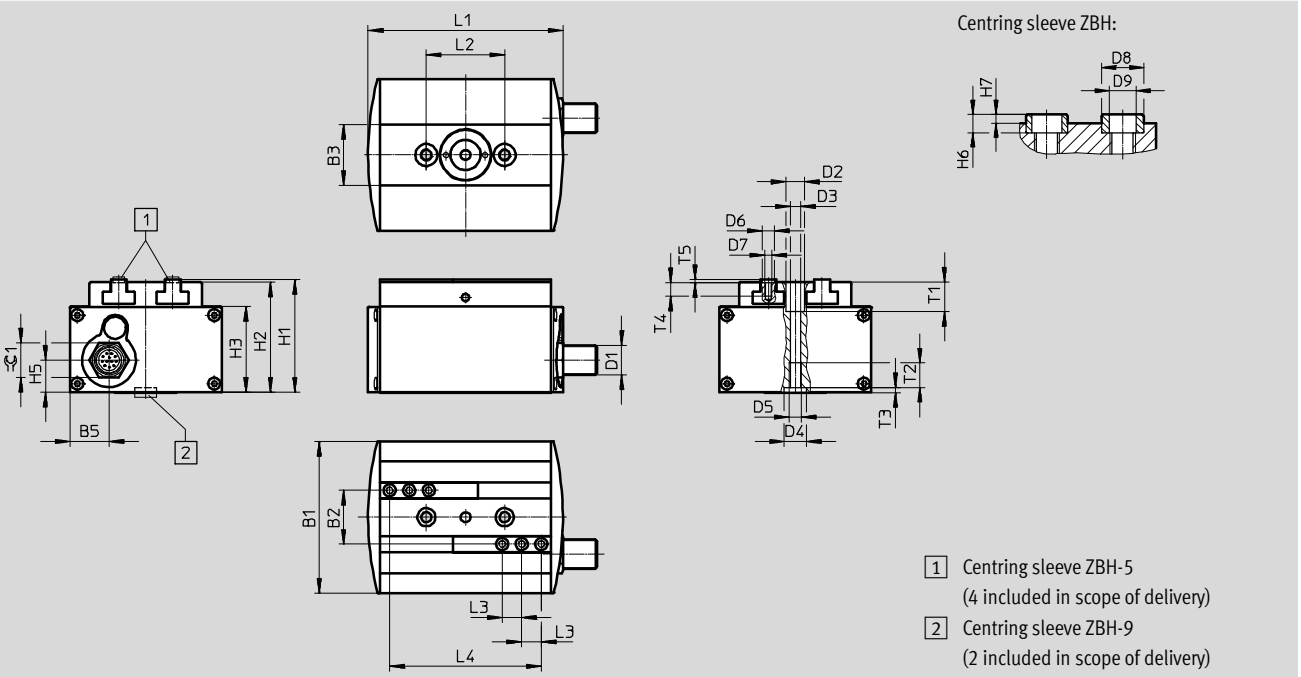

| M12 plug connector | | |
|---|---|---|
| Pin | Port | Function |
| 1 | Motor + | Motor conductor |
| 2 | Motor – | Motor conductor |
| 3 | A | Encoder signal RS 485 |
| 4 | A/ | Encoder signal RS 485 |
| 5 | B | Encoder signal RS 485 |
| 6 | B/ | Encoder signal RS 485 |
| 7 | I | Encoder signal RS 485 |
| 8 | I/ | Encoder signal RS 485 |
| 9 | +5 V DC | Signal supply |
| 10 | 0V | Signal ground |
| 11 | – | Preassigned |
| 12 | – | Preassigned |

# Parallel grippers HGPLE, sturdy with long stroke, electric

Technical data

**Dimensions** Download CAD data ➔ **www.festo.com**

HGPLE-14




| Type | B1 ±0.05 | B2 ±0.01 | B3 ±1 | B5 | D1 | D2 ∅ H13 | D3 ∅ | D4 ∅ H8 | D5 | D6 ∅ H8 | D7 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| HGPLE-14-30 | 62 | 22 | 25 | 16 | M12x1 | 7.4 | 4.2 | 9 | M5 | 5 | M3 |
| HGPLE-14-60 | | | | | | | | | | | |

| Type | D8[4] ∅ h7 | D9[4] ∅ | H1 ±0.1 | H2 | H3 | H5 | H6[4] −0.2 | H7[4] −0.3 | L1 ±0.3 | L2[1] | L3[1] |
|---|---|---|---|---|---|---|---|---|---|---|---|
| HGPLE-14-30 | 5/7 | 3.2/6.4 | 46.2 | 45.2 | 35.2 | 13.1 | 2.4/4 | 1.1/1.9 | 79.6 | 32 | 8 |
| HGPLE-14-60 | | | | | | | | | 139.6 | | |

| Type | L4 | | T1 | T2 | T3 | T4 | T5 | ⫧ |
|---|---|---|---|---|---|---|---|---|
| | max.[2] | min.[3] | +0.2 | min. | +0.1 | min. | +0.1 | |
| HGPLE-14-30 | 62 | 2 | 12 | 10 | 2.1 | 5.5 | 1.3 | 14 |
| HGPLE-14-60 | 122 | 2 | | | | | | |

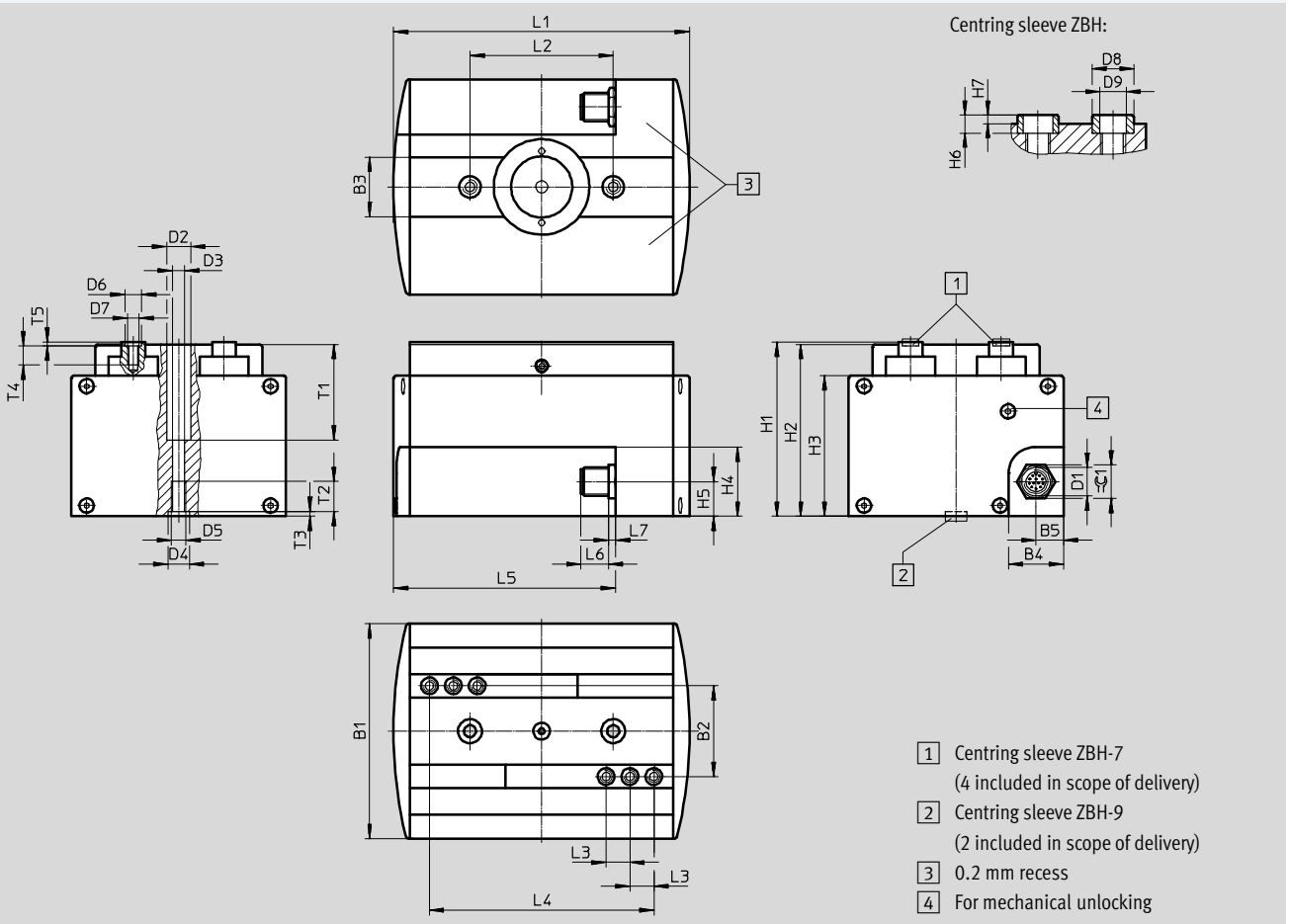
1) Tolerance for centring hole ±0.02 mm
Tolerance for thread ±0.1 mm
2) Gripper open
3) Gripper closed
4) On the gripper jaw/on the gripper

# Parallel grippers HGPLE, sturdy with long stroke, electric

Technical data

**Dimensions** Download CAD data ➔ **www.festo.com**

HGPLE-25




1 Centring sleeve ZBH-7
(4 included in scope of delivery)
2 Centring sleeve ZBH-9
(2 included in scope of delivery)
3 0.2 mm recess
4 For mechanical unlocking

| Type | B1 ±0.05 | B2 ±0.01 | B3 ±1 | B4 | B5 | D1 | D2 ∅ H13 | D3 ∅ +0.1 | D4 ∅ H8 | D5 | D6 ∅ H8 | D7 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| HGPLE-25-40 | 90 | 38 | 25 | 23 | 11.5 | M12x1 | 10 | 5.1 | 9 | M6 | 7 | M5 |
| HGPLE-25-80 | | | | | | | | | | | | |

| Type | D8[4] ∅ h7 | D9[4] ∅ | H1 ±0.1 | H2 | H3 | H4 | H5 | H6[4] −0.2 | H7[4] −0.3 | L1 ±0.3 | L2[1] | L3[1] |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| HGPLE-25-40 | 7/9 | 5.3/6.4 | 73 | 72 | 59 | 29 | 14.5 | 3/4 | 1.4/1.9 | 124 | 60 | 10 |
| HGPLE-25-80 | | | | | | | | | | 204 | | |

| Type | L4 | | L5 | L6 | L7 | T1 | T2 | T3 | T4 | T5 | ⫧ |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | max.[2] | min.[3] | | | | +0.2 | min. | +0.1 | min. | +0.1 | |
| HGPLE-25-40 | 94 | 14 | 93 | 11.5 | 3 | 40 | 12.5 | 2.1 | 8 | 1.6 | 14 |
| HGPLE-25-80 | 174 | 14 | 133 | | | | | | | | |

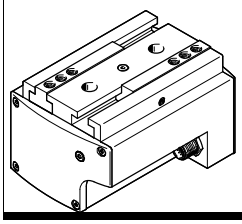
1) Tolerance for centring hole ±0.02 mm
Tolerance for thread ±0.1 mm
2) Gripper open
3) Gripper closed
4) On the gripper jaw/on the gripper

# Parallel grippers HGPLE, sturdy with long stroke, electric

Technical data

FESTO

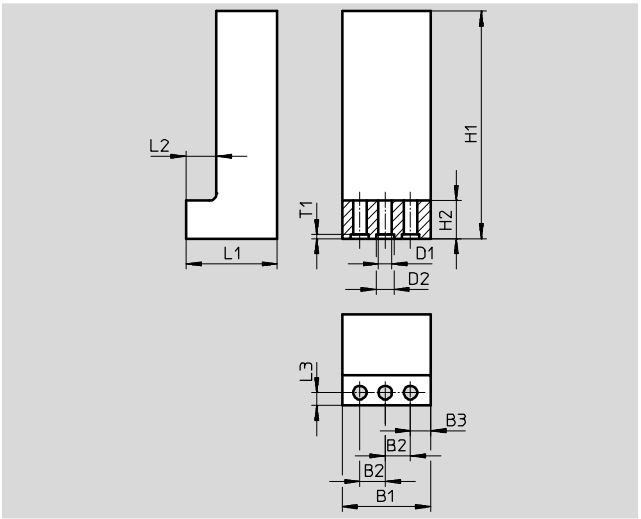
## Ordering data

| | Part No. | Type |
|---|---|---|
|  | **2342434** | **HGPLE-14-30-3,1-DC-VCSC-G96** |
| | **2342435** | **HGPLE-14-60-3,1-DC-VCSC-G96** |
| | **555563** | **HGPLE-25-40-2,8-DC-VCSC-G85** |
| | **2342436** | **HGPLE-25-80-2,8-DC-VCSC-G85** |

## Accessories

**Gripper jaw blank BUB-HGPL**
(2 included in delivery)

Materials:
Wrought aluminium alloy
Free of copper and PTFE
RoHS-compliant




## Dimensions and ordering data

| For size | B1<br>+0.1 | B2<br>+0.02 | B3 | D1<br>∅<br>+0.1 | D2<br>∅<br>H8 | H1<br>+0.1 | H2 |
|---|---|---|---|---|---|---|---|
| 14 | 25 | 8 | 4 | 3.2 | 5 | 80 | 11 |
| 25 | 35 | 10 | 8 | 5.3 | 7 | 120 | 15 |

| For size | L1<br>+0.1 | L2<br>+0.1 | L3<br>+0.1 | T1<br>+0.1 | Weight per blank<br>[g] | Part No. | Type |
|---|---|---|---|---|---|---|---|
| 14 | 20.5 | 8 | 3.3 | 1.3 | 75 | **537316** | **BUB-HGPL-14** |
| 25 | 36 | 12 | 5 | 1.6 | 295 | **537317** | **BUB-HGPL-25** |

## Ordering data – Centring sleeve

| | For size | Part No. | Type | PU[1)] |
|---|---|---|---|---|
| For the gripper jaws | | | Technical data ➔ Internet: zbh | |
|  | 14 | **189652** | **ZBH-5** | 10 |
| | 25 | **186717** | **ZBH-7** | |
| | | | | |
| For the gripper | | | Technical data ➔ Internet: zbh | |
|  | 14, 25 | **150927** | **ZBH-9** | 10 |

1) Packaging unit

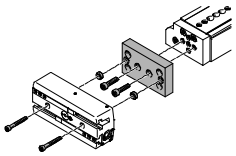
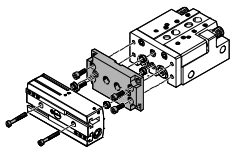
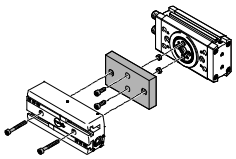
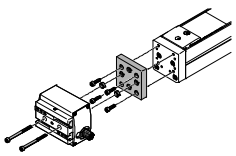
**Adapter kit**
**DHAA, HAPG**

Materials:
Wrought aluminium alloy
Free of copper and PTFE
RoHS-compliant

Note
The kit includes the individual mounting interface as well as the necessary mounting material.

**Permissible drive/gripper combinations with adapter kit**

Download CAD data ➔ **www.festo.com**

| Combination | Drive | Gripper | Mounting option | | Adapter kit | | |
|---|---|---|---|---|---|---|---|
| | Size | Size |  |  | CRC[1] | Part No. | Type |
| DGSL/HGPLE | DGSL | HGPLE | | | DHAA/HAPG | | |
|  | 16 | 14 | ■ | ■ | 2 | **2519367** | **DHAA-G-G6-16-B17-14** |
| | 20, 25 | 14 | ■ | ■ | | **2515219** | **DHAA-G-G6-20-B17-14** |
| | 25 | 25 | ■ | ■ | | **539274** | **HAPG-90** |
| SLT/HGPLE | SLT | HGPLE | | | DHAA | | |
|  | 16 | 14 | ■ | – | 2 | **2531838** | **DHAA-G-G3-16-B17-14** |
| | 20 | 14 | ■ | – | | **2516304** | **DHAA-G-G3-20-B17-14** |
| | 25 | 14 | ■ | – | | **2516252** | **DHAA-G-G3-25-B17-14** |
| | 25 | 25 | ■ | – | | **8033603** | **DHAA-G-G3-25-B17-25** |
| DRRD/HGPLE | DRRD | HGPLE | | | DHAA | | |
|  | 16 | 14 | ■ | ■ | 2 | **8034057** | **DHAA-G-Q11-16-B17-14** |
| | 20 | 14 | ■ | ■ | | **8034058** | **DHAA-G-Q11-20-B17-14** |
| | 25 | 14 | ■ | ■ | | **3122168** | **DHAA-G-Q11-25-B17-14** |
| | 25 | 25 | ■ | ■ | | **8033607** | **DHAA-G-Q11-25-B17-25** |
| | 32 | 25 | ■ | ■ | | **8033608** | **DHAA-G-Q11-32-B17-25** |
| | 35 | 25 | ■ | ■ | | **8033609** | **DHAA-G-Q11-35-B17-25** |
| DGEA/HGPLE | DGEA | HGPLE | | | DHAA | | |
|  | 25 | 14 | ■ | ■ | 2 | **2786045** | **DHAA-G-E2-25-B17-14** |
| | 40 | 14 | ■ | ■ | | **2806354** | **DHAA-G-E2-40-B17-14** |

1) Corrosion resistance class CRC 2 to Festo standard FN 940070
Moderate corrosion stress. Indoor applications in which condensation may occur. External visible parts with primarily decorative requirements for the surface and which are in direct contact with the ambient atmosphere typical for industrial applications.

**Adapter kit**
**DHAA, HAPG**

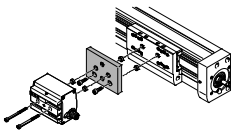
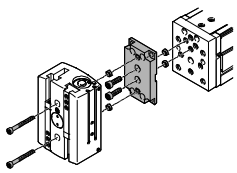
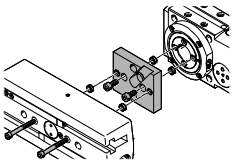
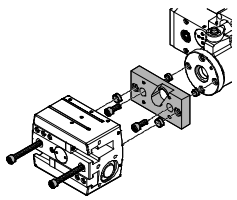
Material:
Wrought aluminium alloy
Free of copper and PTFE
RoHS-compliant

- Note

The kit includes the individual mounting interface as well as the necessary mounting material.

**Permissible drive/gripper combinations with adapter kit**

Download CAD data ➔ **www.festo.com**

| Combination | Drive | Gripper | | | Adapter kit | | |
|---|---|---|---|---|---|---|---|
| | Size | Size | Mounting option | | CRC[1] | Part No. | Type |
| | | |  |  | | | |
| EGC/HGPLE | EGC | HGPLE | | | DHAA | | |
|  | 70 | 14 | ■ | ■ | 2 | **2808960** | **DHAA-G-E7-70-B17-14** |
| | 80 | 14 | ■ | ■ | | **2810619** | **DHAA-G-E7-80-B17-14** |
| | 120 | 25 | ■ | ■ | | **8033604** | **DHAA-G-E7-120-B17-25** |
| | 185 | 25 | ■ | ■ | | **8033605** | **DHAA-G-E7-185-B17-25** |
| EGSL/HGPLE | EGSL | HGPLE | | | DHAA | | |
|  | 45, 55 | 14 | ■ | ■ | 2 | **2519367** | **DHAA-G-G6-16-B17-14** |
| | 75 | 14 | ■ | ■ | | **2515219** | **DHAA-G-G6-20-B17-14** |
| ERMB/HGPLE | ERMB | HGPLE | | | DHAA | | |
|  | 20 | 14 | ■ | ■ | 2 | **2807590** | **DHAA-G-R1-20-B17-14** |
| | 25 | 14 | ■ | ■ | | **2812698** | **DHAA-G-R1-25-B17-14** |
| | 32 | 25 | ■ | ■ | | **8033606** | **DHAA-G-R1-32-B17-25** |
| EHMB/HGPLE | EHMB | HGPLE | | | HAPG | | |
|  | 20 | 25 | ■ | ■ | 2 | **537311** | **HAPG-SD2-29** |

1) Corrosion resistance class CRC 2 to Festo standard FN 940070
Moderate corrosion stress. Indoor applications in which condensation may occur. External visible parts with primarily decorative requirements for the surface and which are in direct contact with the ambient atmosphere typical for industrial applications.