# Parallel kinematic system EXPT, tripod

# Key features

## At a glance

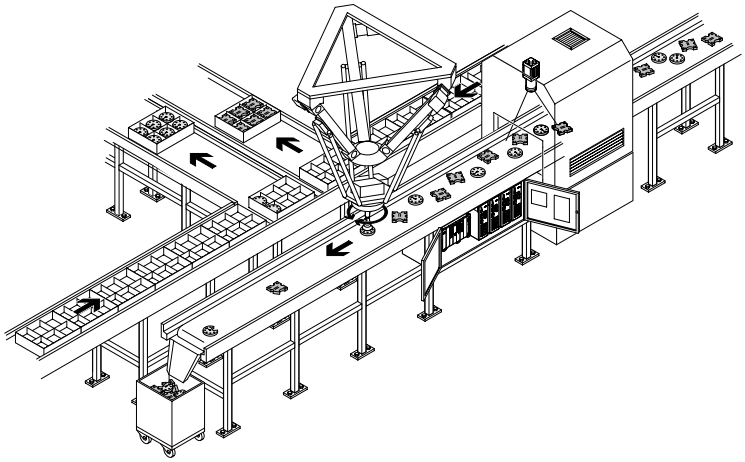
The high-speed handling unit with robot functionality for free movement in three dimensions provides precision in movement and positioning as well as a high dynamic response of up to 150 picks/min.
The highly rigid mechanical design and low moving mass make the parallel delta kinematic system with toothed belt axes up to three times as fast as comparable Cartesian systems.
Three double rods keep the front unit horizontal at all times. The axes and servo motors do not move with the unit.
The parallel kinematic system is suitable for handling loads of up to max. 5 kg.

Typical applications include:
- Pick&Place of small parts
- Gluing
- Labelling
- Palletising
- Sorting
- Grouping
- Repositioning and separating

## Comparison between parallel kinematic and Cartesian systems

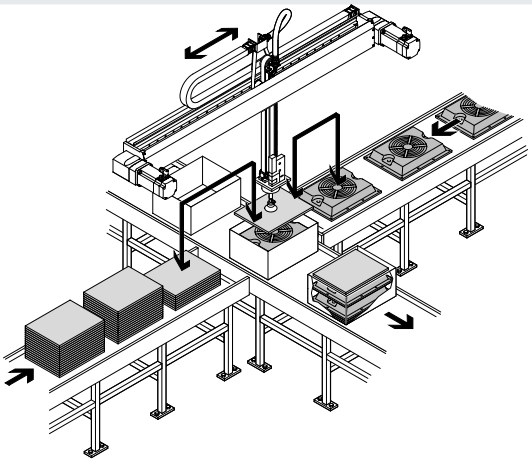
Parallel kinematic system

- Low moving mass – ideal for demanding requirements on dynamic response in three dimensions
- High path accuracy with a range of path profiles, even for highly dynamic operation
- Four sizes with a working space diameter of up to 1200 mm



Cartesian system

- Axes build on one another; the first axis carries all the subsequent axes
- High moving mass, therefore much lower dynamic response
- Rectangular, scalable working space
- Based on standard components
- Flexible designs



# Characteristics

**The technology in detail**

Parallel kinematic system

[1] Mounting frame
[2] Mounting bracket for toothed belt axis
[3] Motor
[4] Connection block
[5] Pair of rods
[6] Interface housing
[7] Angle kit ➔ Page 27
[8] Protective conduit ➔ Page 27
[9] Toothed belt axis
[10] Tubing holder ➔ Page 27
[11] Front unit for mounting a gripper, etc. ➔ Page 18

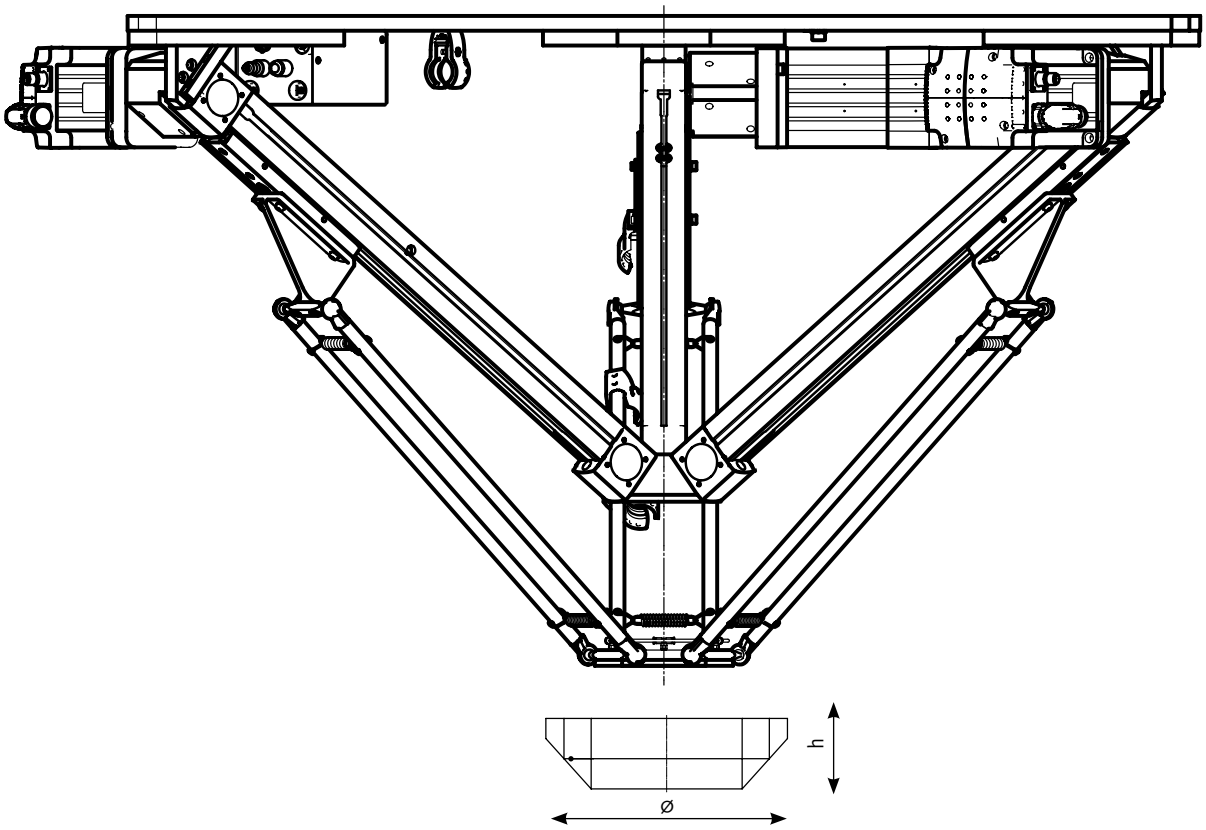

Front unit ➔ Page 18

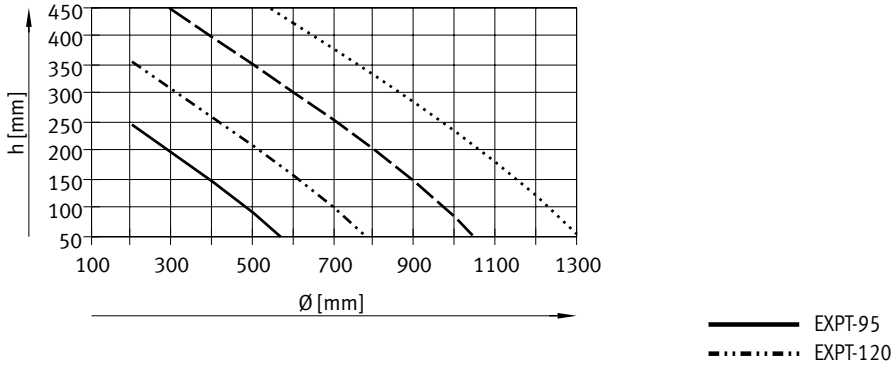
The front unit can optionally be ordered via the modular product system. It includes a gear motor that enables rotary movement (fourth axis) and is available in two sizes.
The front unit can also be chosen with or without rotary through-feed, for vacuum or excess pressure.
A range of grippers can be attached to it ➔ Page 28

# Characteristics

**Available working space**

There are four sizes available with different working space diameters.
In simplified terms, the possible working space can be described using the shape of a cylinder (➔ drawing).
The larger the working space required, the smaller its diameter (➔ graph).



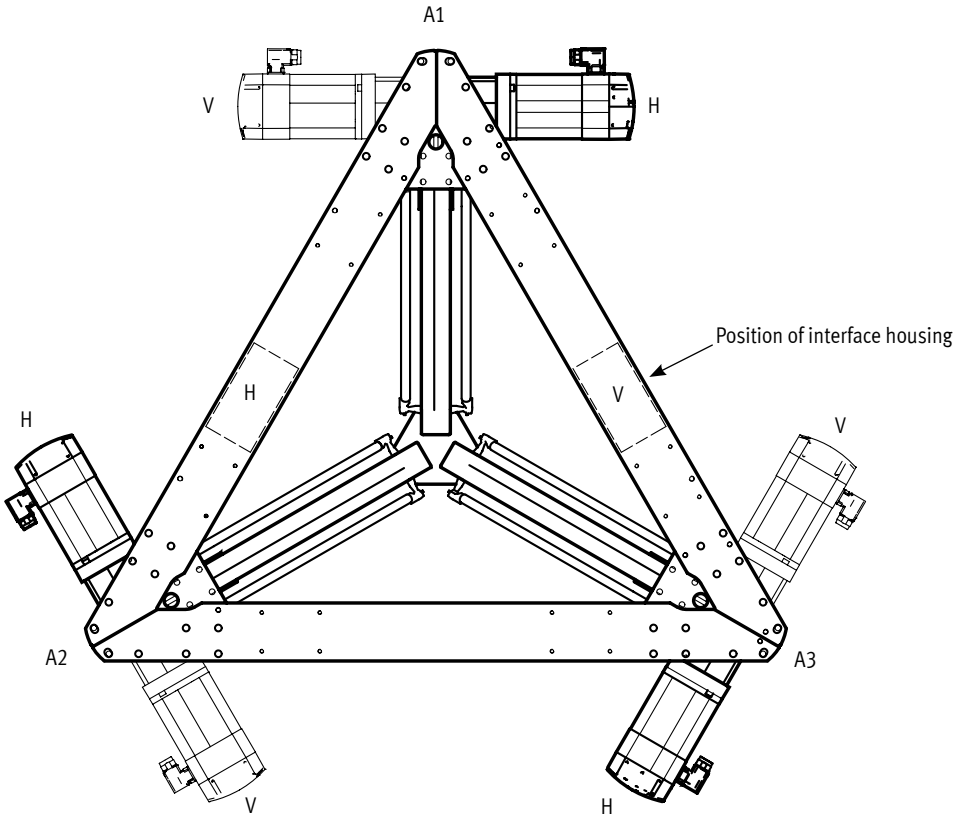



# Characteristics

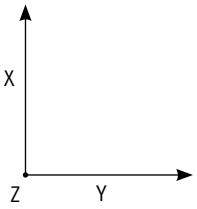
**Motor attachment variants**

The attachment position of the motors can be individually configured via the modular product system (→ Page 24).
The standard motor attachment position corresponds to code HHH (cf. illustration below). This means: A1/A2/A3 rear.
If a motor is to be attached on the front, a 'V' must be specified in the order code for the respective axis.
The position of the interface housing depends on the position of the motor (V or H) on axis A1.

| Code | Description |
|---|---|
| HHH | A1/A2/A3 rear |
| HHV | A3 front; A1/A2 rear |
| HVH | A2 front; A1/A3 rear |
| HVV | A2/A3 front; A1 rear |
| VHH | A1 front; A2/A3 rear |
| VHV | A1/A3 front; A2 rear |
| VVH | A1/A2 front; A3 rear |
| VVV | A1/A2/A3 front |




Coordinate system

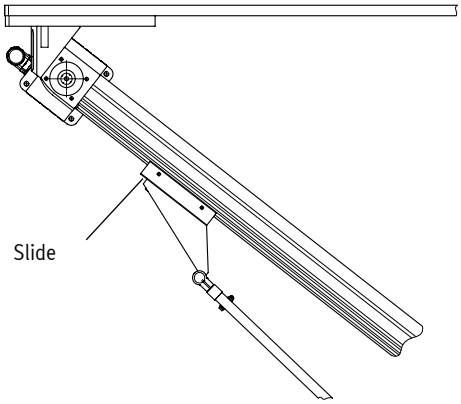


# Characteristics

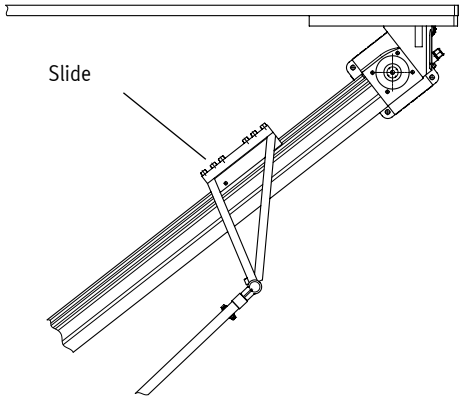
**Protection against particles for size 95 and 120**
Installation type: protected version (P8)

Abrasion on the toothed belt can lead to loose particles falling into the working space in the basic design.
If the variant EXPT-...-P8 (➔ page 24) is selected, the axes are turned during installation (slide on top). A cover kit EASC-E10 (➔ page 27) can be additionally ordered as a separate accessory and fitted; this prevents particles from entering the working space. They slide downwards into the troughs and collect in the cover (see below).

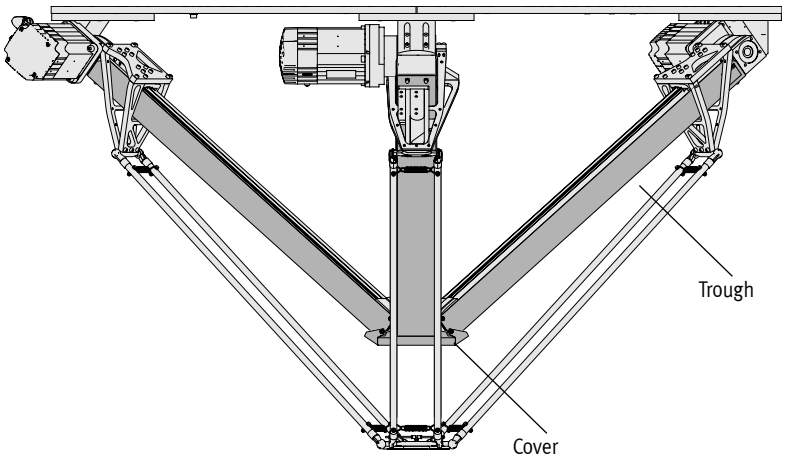
Standard




Protected version (P8)

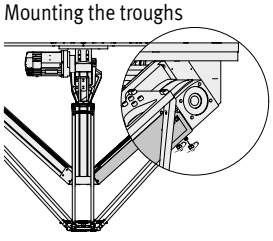


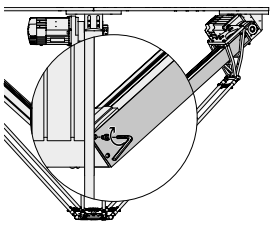

Protected version (characteristic P8 in the modular product system) with cover kit EASC-E10 (ordered separately as an accessory)



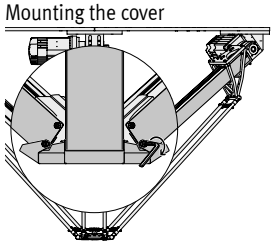

Easy mounting of the covering kit EASC-E10

Mounting the troughs





Mounting the cover



# Type codes

| 001 | Series | |
|---|---|---|
| **EXPT** | Parallel kinematic system | |

| 002 | Working space | |
|---|---|---|
| **95** | 950 mm | |
| **120** | 1200 mm | |

| 003 | Drive | |
|---|---|---|
| **E1** | DGE-25 | |
| **E4** | EGC-80 | |

| 004 | Attachment components | |
|---|---|---|
| **T0** | None | |
| **T1** | Rotary drive, size 8 | |
| **T2** | Rotary drive, size 8 with pn. rotary feed-through | |
| **T3** | Rotary drive, size 11 | |
| **T4** | Rotary drive, size 11 with pn. rotary feed-through | |

| 005 | Motor attachment position | |
|---|---|---|
| **HHH** | A1/A2/A3 rear | |
| **HHV** | A3 front, A1/A2 rear | |
| **HVH** | A2 front, A1/A3 rear | |
| **HVV** | A2/A3 front, A1 rear | |
| **VHH** | A1 front, A2/A3 rear | |
| **VHV** | A1/A3 front, A2 rear | |
| **VVH** | A1/A2 front, A3 rear | |
| **VVV** | A1/A2/A3 front | |

| 006 | Protection against particles | |
|---|---|---|
| | Standard | |
| **P8** | Protected version | |

| 007 | Cable length | |
|---|---|---|
| | None | |
| **5K** | 5 m | |
| **10K** | 10 m | |
| **15K** | 15 m | |

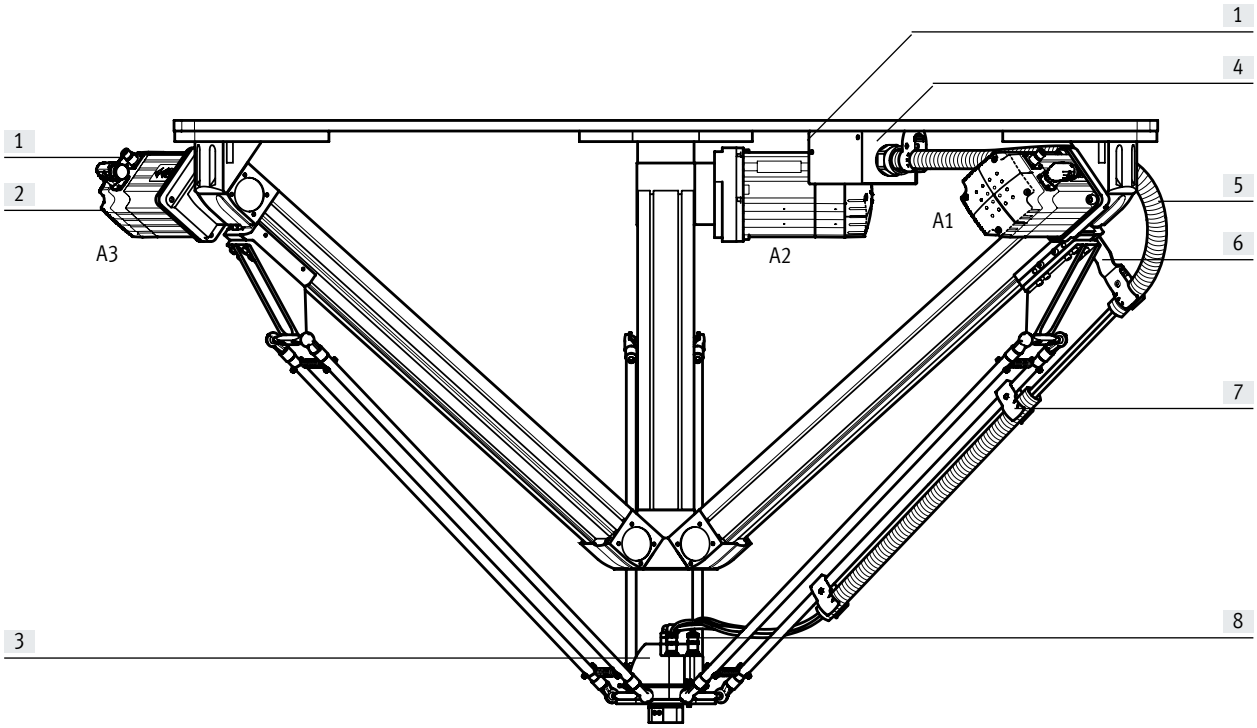
| 008 | Presetting | |
|---|---|---|
| | Standard | |
| **S** | With calibration | |

| 009 | Document language | |
|---|---|---|
| **DE** | German | |
| **EN** | English | |
| **ES** | Spanish | |
| **FR** | French | |
| **IT** | Italian | |
| **RU** | Russian | |
| **ZH** | Chinese | |

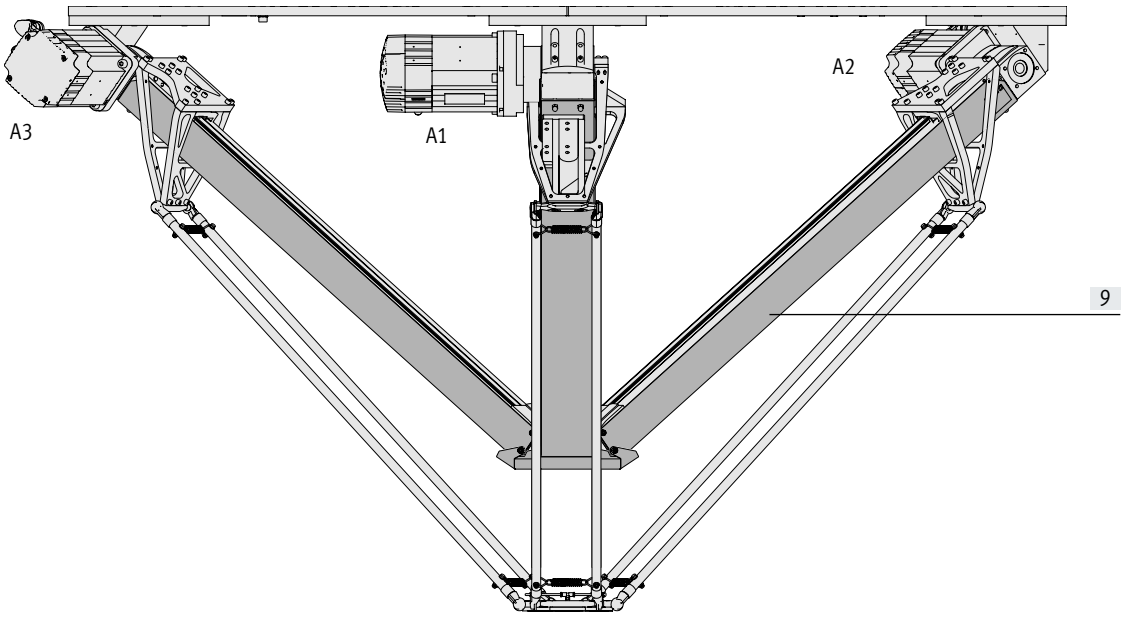
# Peripherals overview

**Variant examples**

Order code: EXPT-...-E4-T2-HHH-...
E4: Drive: EGC-80
T2: Attachment component: rotary drive, size 8 with pneumatic air supply through-feed
HHH: Motor attachment position: A1/A2/A3 rear




Order code: EXPT-...-E4-T0-HVV-P8-... with cover kit EASC-E10-...
E4: Drive: EGC-80
T0: Attachment component: no rotary drive
HVV: Motor attachment position: A1 rear, A2/A3 front
P8: Protection against particles: protected version
Cover kit EASC-E10 must be ordered separately as an accessory.



# Peripherals overview

**Attachments and accessories**

| | Type | Description | → Page/Internet |
|---|---|---|---|
| [1] | Connecting cable<br>5K, 10K, 15K | All required connecting cables/compressed air tubing are included loose as part of the delivery. The required cable length can be selected in the modular product system (none, 5 m, 10 m or 15 m) | 26 |
| [2] | Servo motor<br>HHH, HHV, ... | The attachment position of the motors can be defined via the modular product system (HHH ... VVV). Homing is not required thanks to a multi-turn rotary encoder | – |
| [3] | Front unit<br>T0, T1, T2, ... | Choose from:<br>• Front unit without rotary drive (T0)<br>• Front unit with rotary drive (T1 to T4) | – |
| [4] | Interface housing | Serves as the interface between the parallel kinematic system and the control cabinet to supply the front unit | – |
| [5] | Protective conduit<br>MKG | Is pre-assembled for all variants (T0 to T4), on axis A1 | 27 |
| [6] | Angle kit<br>EAHM-E10 | Is pre-assembled for all variants (T0 to T4), on axis A1.<br>If required, further angle kits can be ordered as accessories | 27 |
| [7] | Tubing holder<br>EAHM-E10-TH | Is pre-assembled for all variants (T0 to T4), on axis A1.<br>If required, further tubing holders can be ordered as accessories | 27 |
| [8] | Front unit installation | The cables that supply the front unit are already installed between the front unit and the interface housing | – |
| [9] | Cover kit<br>EADC-E10 | Protects the working space against contamination by particles.<br>The kit must be fitted by the customer | 27 |

# Data sheet

Size
95, 120

www.festo.com

| General technical data | | | |
|---|---|---|---|
| Size | | 95 | 120 |
| Design | | Parallel kinematic system | |
| Motor type | | Servo motor | |
| Mounting position | | Horizontal | |
| Working space | | | |
| Nominal diameter | [mm] | 950 | 1200 |
| Nominal height | [mm] | 100 | 100 |
| Max. acceleration[1] | [m/s²] | 110 | |
| Max. speed[1] | [m/s] | 7 | |
| Max. pick rate[1][2] | [picks/min] | 150 | |
| Repetition accuracy | [mm] | ±0.1 | |
| Positioning accuracy[3] | [mm] | ±0.5 | |
| Track precision[3][4] | [mm] | ±0.5 | |
| Rated load[5] | | | |
| With min. dynamic response | [kg] | 5 | |
| With max. dynamic response | [kg] | 1 | |
| Base weight | [kg] | 61.5 | 66 |

1) When used in combination with motor controller CMMP-AS-C5-3A.
2) In the 12" cycle.
3) Only with calibrated system (order code S).
4) At a speed of ≤0.3 m/s.
5) Rated load = tool load (accessories attached to the front unit) + payload

| Max. process force in Z direction | | | |
|---|---|---|---|
| Size | | 95 | 120 |
| With working space diameter | [mm] | 0 | 0 |
| Process force | [N] | 1000 | 850 |
| | | | |
| With working space diameter[6] | [mm] | 237.5 | 300 |
| Process force | [N] | 750 | 750 |

6) The specified values correspond to 25% of the nominal diameter.

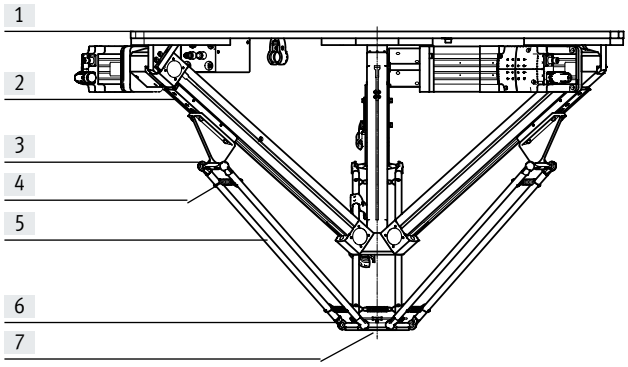
| Operating and environmental conditions | | |
|---|---|---|
| Ambient temperature | [°C] | 0 ... +40 |
| Storage temperature | [°C] | −10 ... +60 |
| Operating pressure for rod loss detection | [bar] | 2 ... 8 |
| Duty cycle[7] | [%] | 100 |
| Corrosion resistance CRC[8] | | 2 |

7) When used in combination with motor controller CMMP-AS-C5-3A.
8) Corrosion resistance class CRC 2 to Festo standard FN 940070
Moderate corrosion stress. Indoor applications in which condensation can occur. External visible parts with primarily decorative surface requirements which are in direct contact with a normal industrial environment.

# Data sheet

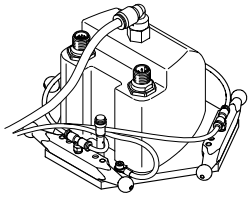
## Materials

Sectional view




| Parallel kinematic system | | |
|---|---|---|
| [1] | Mounting frame | Wrought aluminium alloy |
| [2] | Toothed belt axis DGE/EGC | → Internet: dge, egc |
| [3] | Ball stud | Wrought aluminium alloy |
| [4] | Tension spring | High-alloy stainless steel |
| [5] | Pair of rods | Plastic, carbon-fibre reinforced |
| [6] | Ball cup | Polyamide |
| | Ball | Ceramic |
| [7] | Front unit | Wrought aluminium alloy |
| – | Note on materials | Contains paint-wetting impairment substances |
| | | Free of copper and PTFE |

## Rod loss detection

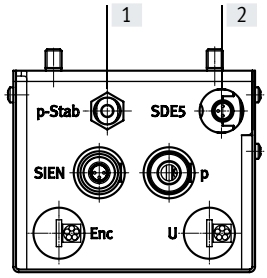


The rod loss detection feature detects detached rods and initiates an emergency stop.

This is realised using permanent compressed air monitoring (pressure switch integrated in the interface housing on the frame)

This is done by pressurising the ball cup connections of the front unit with compressed air at 2 bar (rel.).

Connections on the interface housing:



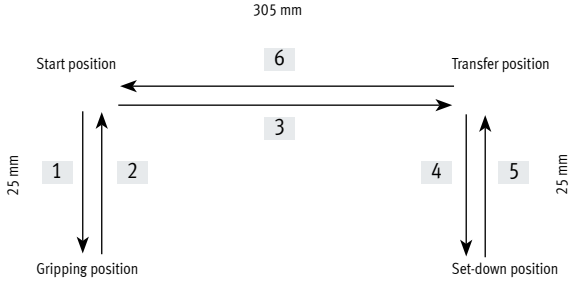

[1] Compressed air supply for rod loss detection.
The compressed air is adjusted to 2 bar in the interface housing.

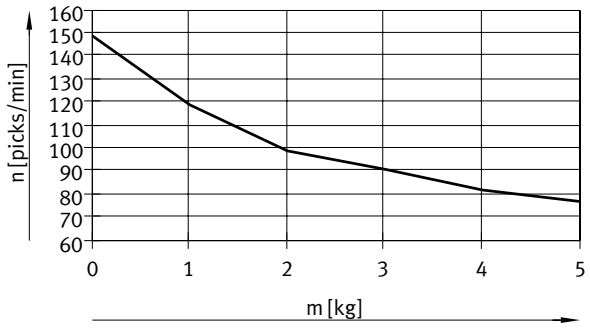
[2] Pressure sensor for monitoring rod loss detection.
Connecting cable
→ Page 26

## Pick rate as a function of rated load

The characteristic values for dynamic response are determined in so-called 12" cycles. The graph below shows the maximum number of possible cycles as a function of rated load. It is based on an accuracy of ±0.5 mm.

One 12" cycle means:
[1] To the gripping position
[2] To the start position
[3] To the transfer position
[4] To the set-down position
[5] To the transfer position
[6] To the start position

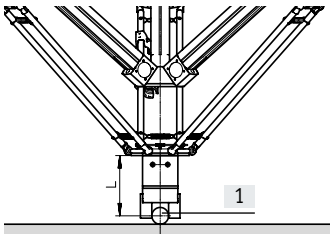



n = cycles per minute
M = rated load

# Data sheet

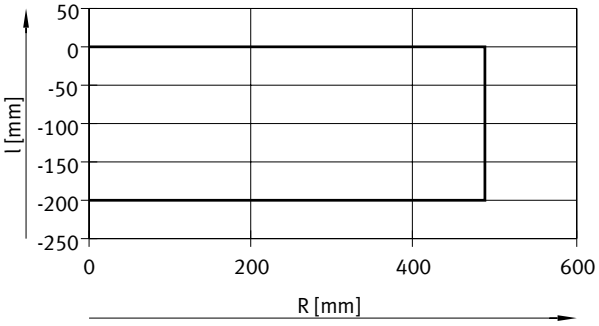
**Max. acceleration a as a function of the position in the working space R and distance l, from the centre of gravity of the rated load m to the front unit**




[1] Centre of gravity

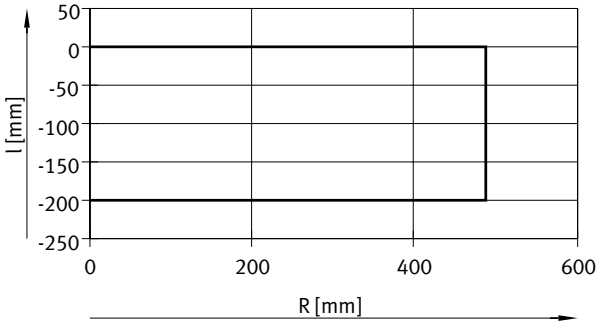
**EXPT-95**

Rated load of 0.1 kg



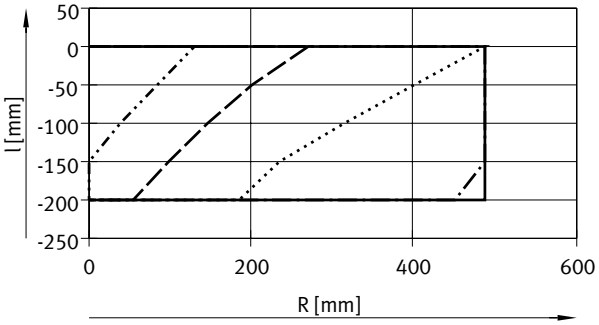

a = 0 ... 100 m/s²

Rated load of 0.5 kg



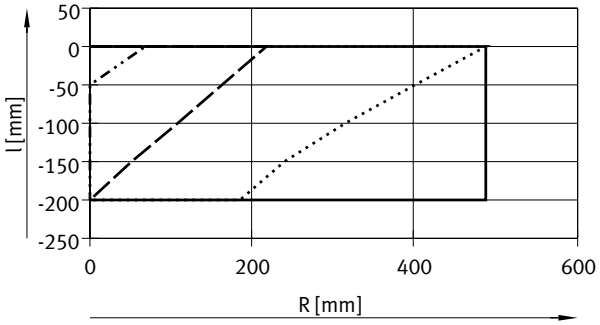

a = 0 ... 100 m/s²

Rated load of 1 kg




a = 0 ... 60 m/s²
a = 100 m/s²
a = 90 m/s²
a = 80 m/s²
a = 70 m/s²

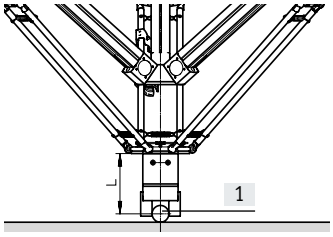
Rated load of 1.5 kg




a = 0 ... 50 m/s²
a = 80 m/s²
a = 70 m/s²
a = 60 m/s²

# Data sheet

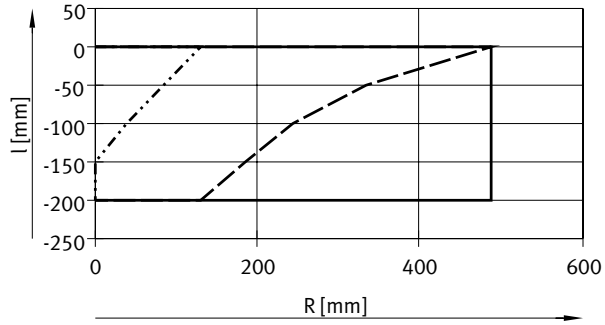
**Max. acceleration a as a function of the position in the working space R and distance l, from the centre of gravity of the rated load m to the front unit**




[1] Centre of gravity

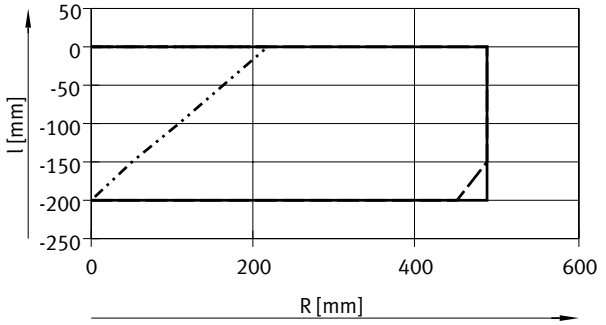
**EXPT-95**

Rated load of 2 kg



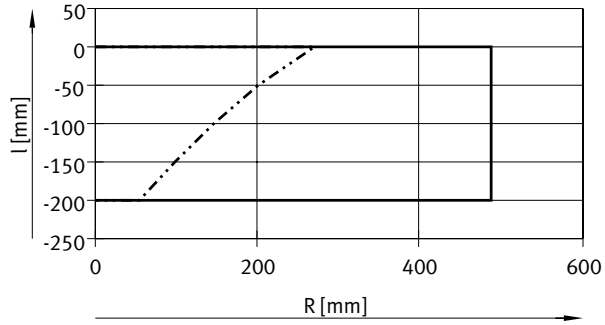

a = 0 ... 40 m/s²
a = 60 m/s²
a = 50 m/s²

Rated load of 3 kg



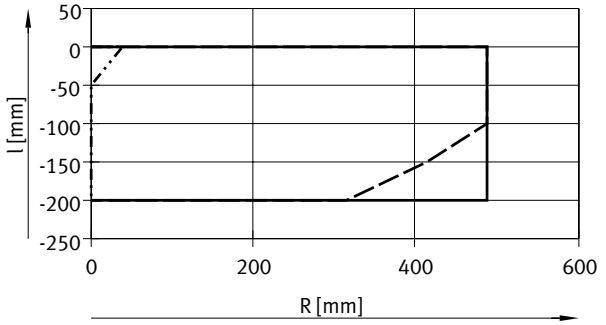

a = 0 ... 20 m/s²
a = 40 m/s²
a = 30 m/s²

Rated load of 4 kg




a = 0 ... 20 m/s²
a = 30 m/s²

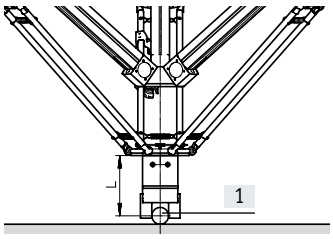
Rated load of 5 kg




a = 0 ... 10 m/s²
a = 30 m/s²
a = 20 m/s²

# Data sheet

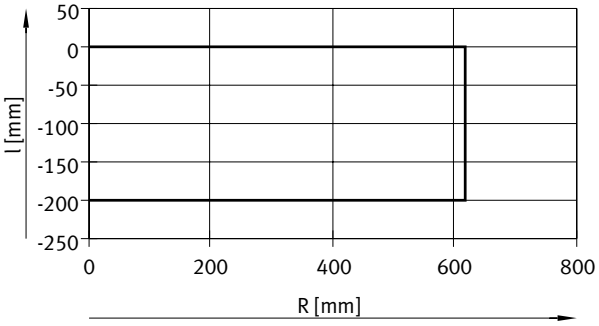
**Max. acceleration a as a function of the position in the working space R and distance l, from the centre of gravity of the rated load m to the front unit**




[1] Centre of gravity

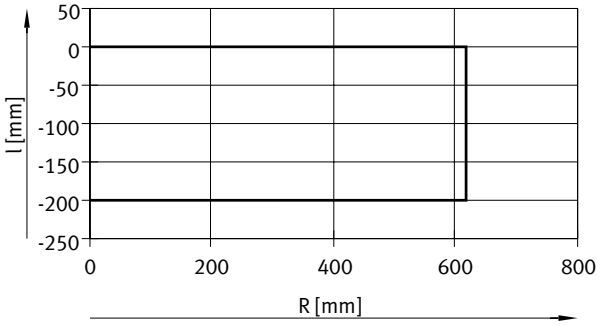
**EXPT-120**

Rated load of 0.1 kg



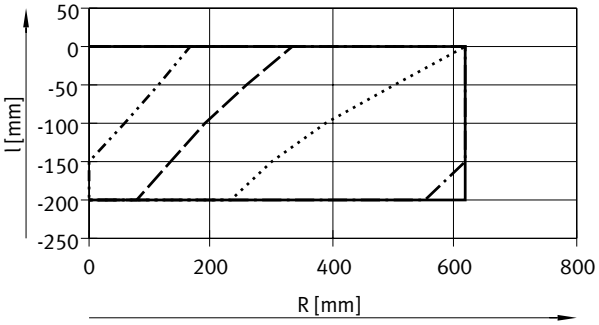

a = 0 ... 100 m/s²

Rated load of 0.5 kg



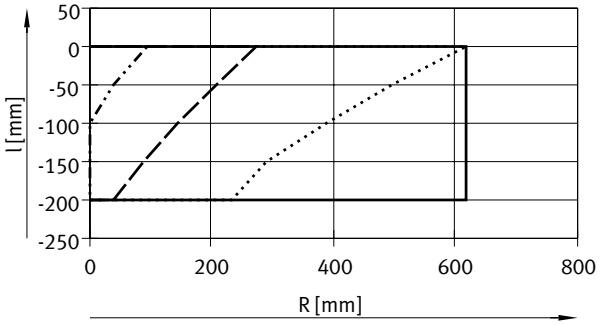

a = 0 ... 100 m/s²

Rated load of 1 kg




a = 0 ... 60 m/s²
a = 100 m/s²
a = 90 m/s²
a = 80 m/s²
a = 70 m/s²

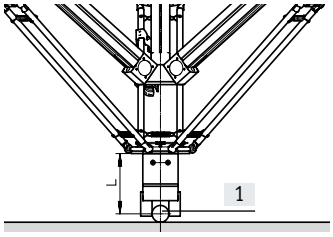
Rated load of 1.5 kg




a = 0 ... 50 m/s²
a = 80 m/s²
a = 70 m/s²
a = 60 m/s²

# Data sheet

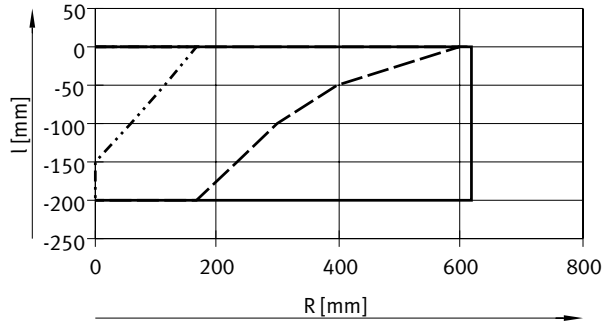
**Max. acceleration a as a function of the position in the working space R and distance l, from the centre of gravity of the rated load m to the front unit**




[1] Centre of gravity

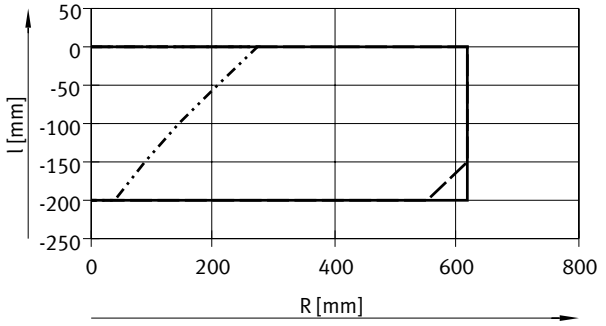
**EXPT-120**

Rated load of 2 kg



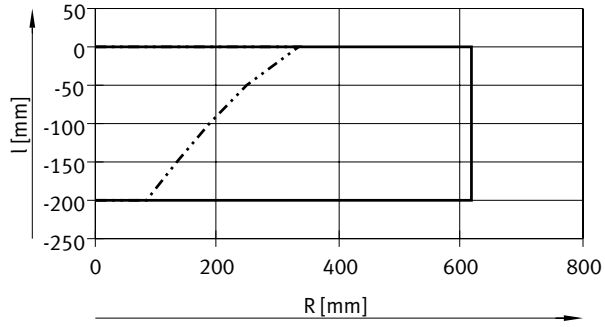

a = 0 ... 40 m/s²
a = 60 m/s²
a = 50 m/s²

Rated load of 3 kg



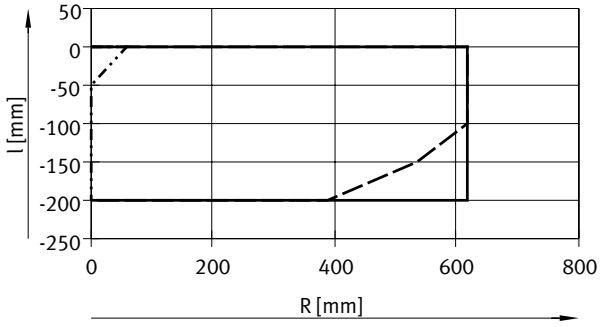

a = 0 ... 20 m/s²
a = 40 m/s²
a = 30 m/s²

Rated load of 4 kg




a = 0 ... 20 m/s²
a = 30 m/s²

Rated load of 5 kg




a = 0 ... 10 m/s²
a = 30 m/s²
a = 20 m/s²

# Data sheet

## Requirements for the base frame

The positioning and path accuracy depends to a large extent on the design of the base frame.
The following influences must therefore be taken into consideration:
- Rigidity of the base frame
- Mass of the base frame
- Mass of the parallel kinematic system
- Start-up frequency caused by dynamic operation of the parallel kinematic system
  - Cycles per minute
  - Dynamic settings for acceleration and jerk

Maximum forces occur if two axes accelerate in the opposite direction to the third and result in horizontal movement of the rated load.
The base frame must be designed so that the maximum forces that can occur as a result of the parallel kinematic system can be absorbed with the necessary degree of certainty.

The guide value for the first natural frequency is specified to be at least 16 Hz for the complete system.

With a maximum dynamic response of the axes, the following forces are exerted on the corner brackets of the mounting frame and therefore on the mounting in the base frame.

| Size | | 95 | 120 |
|---|---|---|---|
| Vertical force | [N] | ±325 | ±475 |
| Horizontal force | [N] | ±200 | ±215 |

## Mounting options on the base frame

The parallel kinematic system must always be mounted in the area of the corner brackets of the mounting frame. Ensure that the corner bracket area has a torsionally rigid, flat bearing surface.

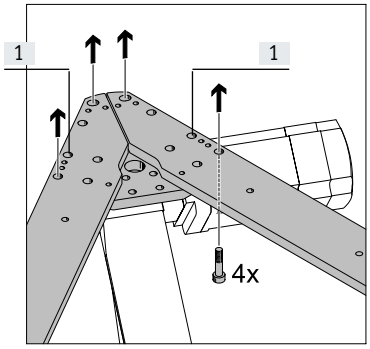
The bearing surface must meet the following minimum requirements in order to achieve the positioning accuracy:
- Flatness = 0.05 mm
- Parallelism = 0.5 mm

Since the distance between the slots is 40 mm in the 80x80 profile, the drilled holes in the corner brackets have been positioned so that the profile can be mounted in various positions.

Since the homing settings of the corresponding axis are lost when the motor is dismounted, it is recommended to use mounting holes that do not require the motor to be removed.
The drilled holes [1] are not accessible, depending on the attachment position of the motor.

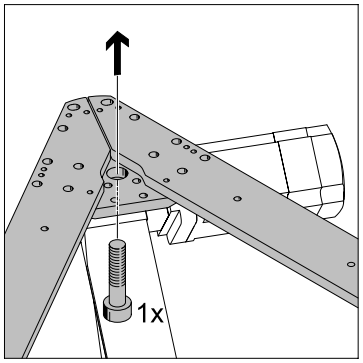
### Direct mounting via screws
### Screws M8x...

Via at least 4 screws (M8) per corner bracket directly on the base frame. These 4 screws should be placed as far apart as possible to ensure a torsionally rigid connection.




### Screws M20x...

Via 1 screw (M20) per corner bracket directly on the base frame. There is a central drilled hole on each bracket for this purpose.



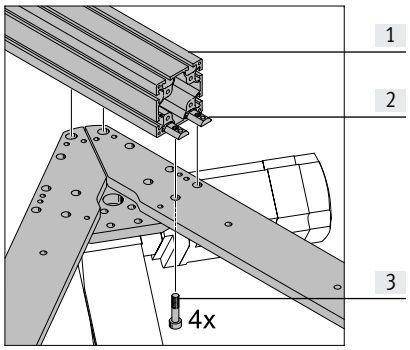
# Data sheet

**Mounting options on the base frame**

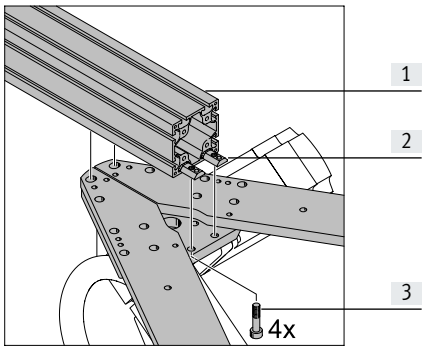
Mounting via slot nuts – parallel to the mounting frame

[1] Profile
(e.g. HMBS-8 0/80)
[2] Slot nut
(e.g. NST-HMV-8-2-M8)
[3] Screws
(e.g. M8x35)

Example 1




Example 2



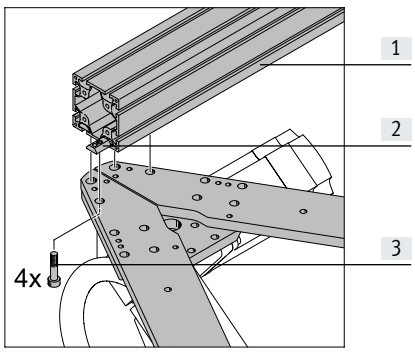

Mounting via slot nuts – at right angles to the mounting frame

[1] Profile
(e.g. HMBS-8 0/80)
[2] Slot nut
(e.g. NST-HMV-8-2-M8)
[3] Screws
(e.g. M8x35)
[4] Bracket

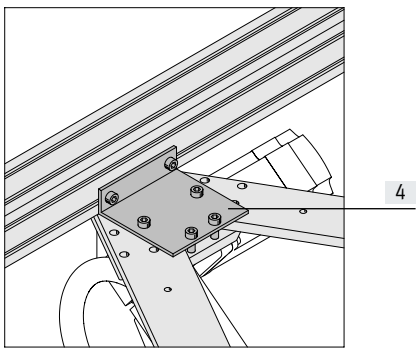
The additional brackets in the following examples are required in order to increase the torsional rigidity and the bearing surface.

Example 1

Mounting the profile

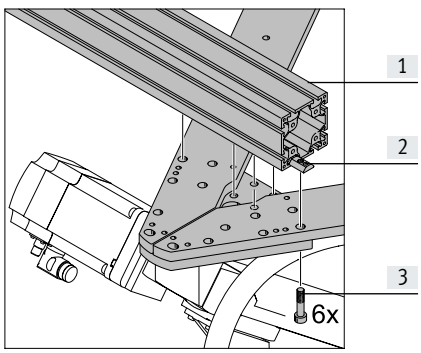



Mounting the bracket

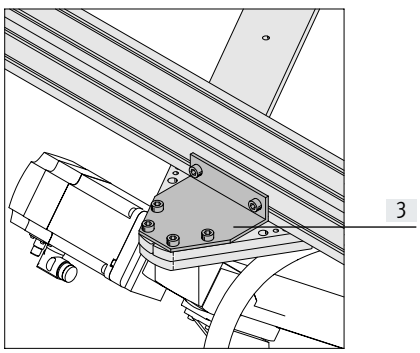



Example 2

Mounting the profile




Mounting the bracket



# Data sheet

**Technical data – Front unit**
EXPT-...-T...

| **Mechanical data** | | | | | |
|---|---|---|---|---|---|
| Type | | EXPT-...- | | | |
| | | T1 | T2 | T3 | T4 |
| Design | | Electromechanical rotary module | | | |
| | | – | With rotary through-feed | – | With rotary through-feed |
| Motor type | | Servo motor | | | |
| Size | | 8 | 8 | 11 | 11 |
| Rotation angle | | Infinite | | | |
| Pneumatic connection | | – | G1/8 | – | G1/8 |
| Nominal width | [mm] | – | 4 | – | 4 |
| Standard nominal flow rate | [l/min] | – | 350 | – | 350 |
| Gear ratio | | 30:1 | | | |
| Repetition accuracy | [°] | ±0.01 | | | |
| Max. output speed | [rpm] | 200 | | | |
| Nominal torque | [Nm] | 0.75 | 0.75 | 1.8 | 1.8 |
| Peak torque | [Nm] | 1.8 | 1.8 | 4.5 | 4.5 |
| Max. axial force | [N] | 200 | 200 | 300 | 300 |
| Max. pull-out torque, static | [Nm] | 15 | 15 | 40 | 40 |
| Perm. mass moment of inertia of load | [kgm$^2$] | 0.0026 | 0.0026 | 0.006 | 0.006 |
| Mounting position | | Any | | | |
| Load mass for EXPT | [g] | 640 | 690 | 850 | 900 |

| **Electrical data** | | | | | |
|---|---|---|---|---|---|
| Type | | EXPT-...- | | | |
| | | T1 | T2 | T3 | T4 |
| Nominal voltage | [V AC] | 230 | | | |
| Nominal current | [A] | 0.31 | 0.31 | 0.74 | 0.74 |
| Peak current | [A] | 0.61 | 0.61 | 1.5 | 1.5 |
| Nominal power | [W] | 9.2 | 9.2 | 22.1 | 22.1 |
| Duty cycle | [%] | 100 | | | |
| Measuring system[1)] | | Encoder | | | |

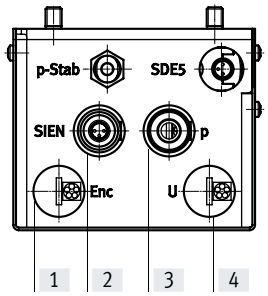
1) Homing required

| **Operating and environmental conditions** | | | | | |
|---|---|---|---|---|---|
| Type | | EXPT-...- | | | |
| | | T1 | T2 | T3 | T4 |
| Operating pressure | [bar] | – | –0.9 ... +10 | – | –0.9 ... +10 |
| Ambient temperature | [°C] | 0 ... 40 | | | |
| Degree of protection | | IP40 | | | |
| Note on materials | | RoHS-compliant | | | |
| Corrosion resistance CRC[1)] | | 2 | | | |

1) Corrosion resistance class CRC 2 to Festo standard FN 940070
Moderate corrosion stress. Indoor applications in which condensation can occur. External visible parts with primarily decorative surface requirements which are in direct contact with a normal industrial environment.

# Data sheet

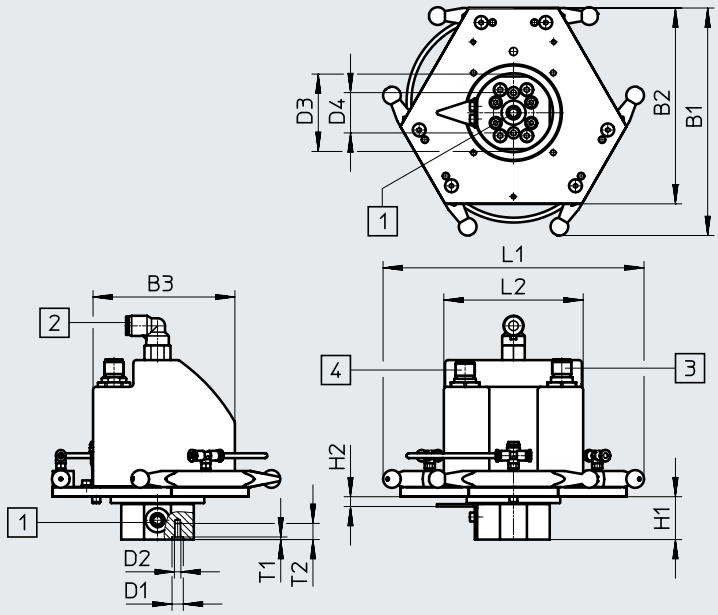
Connections on the interface housing:




Connection for:
[1] Encoder cable ➔ Page 26
[2] Rotary motion sensing ➔ Page 26
[3] Supply port for pneumatic rotary through-feed
[4] Motor cable ➔ Page 26

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

Front unit



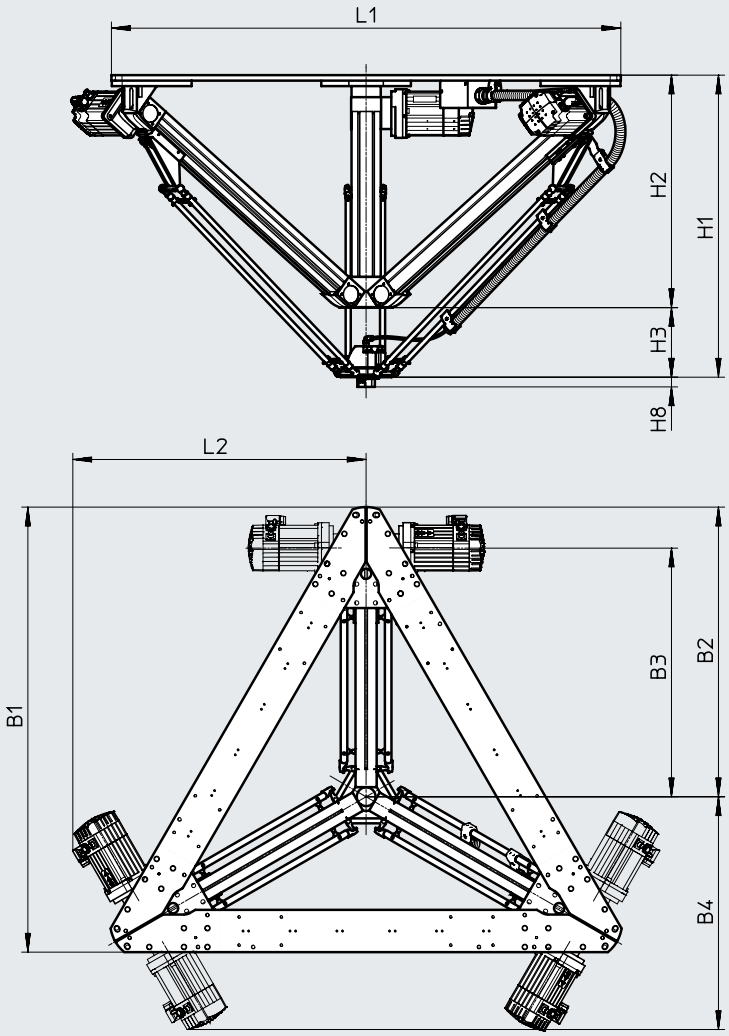

[1] Supply port outlet
[2] Supply port for rotary through-feed
[3] Connection for motor cable
[4] Connection for encoder cable

| Type | B1 | B2 | B3 | D1 ø H7 | D2 | D3 ø | D4 ø | H1 | H2 +1 | L1 | L2 | T1 | T2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| EXPT-... | 141 | 122 | 88 | 7 | M4 | 48 | 25 | 27 | 6 | 162 | 86 | 1.6 | 10 |

# Data sheet

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

Parallel kinematic system

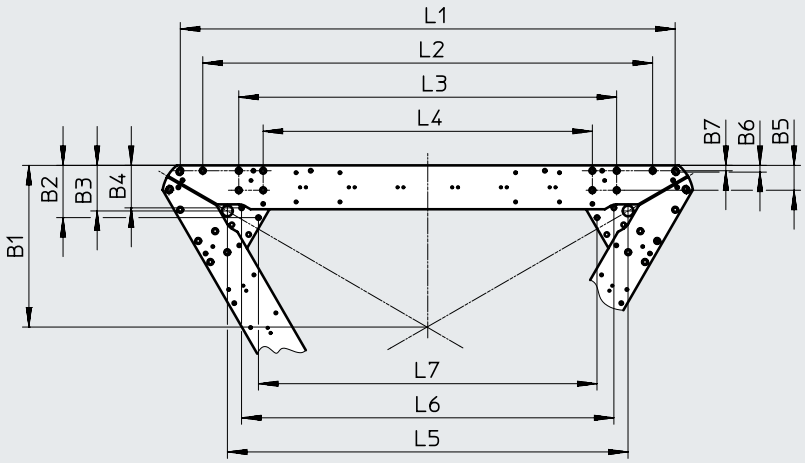



| Type | B1 | B2 | B3 | B4 | H1 | H2 | H3 | L1 | L2 |
|---|---|---|---|---|---|---|---|---|---|
| EXPT-95 | 1213 | 794 | 705 | 626 | 827 | 636 | 191 | 1394 | 803 |
| EXPT-120 | 1355 | 888 | 800 | 672 | 944 | 710 | 234 | 1558 | 885 |

# Data sheet

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

Mounting holes on the mounting frame



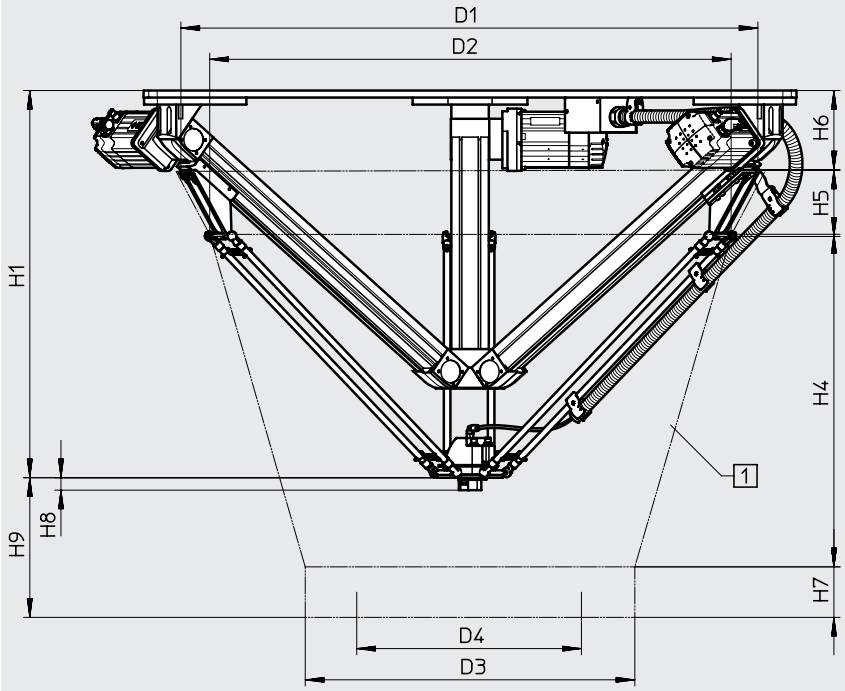

| Type | B1 | B2 | B3 | B4 | B5 | B6 | B7 |
|---|---|---|---|---|---|---|---|
| EXPT-95 | 419.3 | 107.2 | 93.5 | 87.2 | 51 | 12.3 | 11 |
| EXPT-120 | 466.6 | 107.2 | 93.5 | 87.2 | 51 | 12.3 | 11 |

| Type | L1 | L2 | L3 | L4 | L5 | L6 | L7 |
|---|---|---|---|---|---|---|---|
| EXPT-95 | 1323.7 | 1229.7 | 1082.1 | 982.1 | 1128.7 | 1070.6 | 1001.3 |
| EXPT-120 | 1487.5 | 1393.5 | 1245.9 | 1145.9 | 1292.5 | 1234.4 | 1165.1 |

# Data sheet

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

Interference contour within the nominal operating area




[1] Interference contour
D3 Diameter of interference contour
D4 Diameter of nominal operating area
H7 Height of nominal operating area
H9 Distance from bottom edge of gripper plate to base of nominal operating area

The distance specification for the working space refers to the bottom edge of the gripper plate. With the variants T1 to T4, the working space is extended downwards by the dimension H8. The same applies to attached gripper systems, where the reference point is always shifted by the height of the gripper system. Additional dimensions for laying the motor cables and tubing are not taken into account in the interference contour.

| Type | D1 ±5 | D2 ±5 | D3 ±5 | D4 | H1 | H4 | H5 |
|---|---|---|---|---|---|---|---|
| EXPT-95 | 1400 | 1260 | 1120 | 950 | 827 | 760 | 141 |
| EXPT-120 | 1590 | 1440 | 1370 | 1200 | 944 | 907 | 141 |

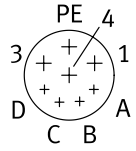
| Type | H6 | H7 | H8 | | | H9 |
|---|---|---|---|---|---|---|
| | | | EXPT-...-T0 | EXPT-...-T1/T2 | EXPT-...-T3/T4 | |
| EXPT-95 | 170 | 100 | 0 | 27 | 28.5 | 357 |
| EXPT-120 | 170 | 100 | 0 | 27 | 28.5 | 397 |

# Data sheet

**Pin allocations**

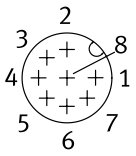
Axis motor

Motor




| PIN | Function |
|---|---|
| 1 | Phase U |
| PE | PE (protective earthing) |
| 3 | Phase W |
| 4 | Phase V |
| A | Temperature sensor $M_T$+ |
| B | Temperature sensor $M_T$– |
| C | Holding brake BR+ |
| D | Holding brake BR– |

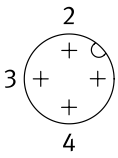
Encoder




| PIN | Function |
|---|---|
| 1 | –SENS |
| 2 | +SENS |
| 3 | DATA |
| 4 | DATA/ |
| 5 | 0 V |
| 6 | CLOCK/ |
| 7 | CLOCK |
| 8 | UP |

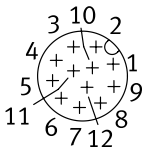
Motor for the front unit

Motor




| PIN | Function |
|---|---|
| 1 | U |
| 2 | V |
| 3 | W |
| 4 | PE |

Encoder




| PIN | Function |
|---|---|
| 1 | A |
| 2 | A\ |
| 3 | B |
| 4 | B\ |
| 5 | Z |
| 6 | Z\ |
| 7 | U |
| 8 | V |
| 9 | W |
| 10 | GND |
| 11 | 5V |
| 12 | Screening |

# Ordering data – Modular product system

**Ordering table**

| Size | | 95 | 120 | Conditions | Code | | Enter code |
|---|---|---|---|---|---|---|---|
| Module no. | | **569799** | **569800** | | | | |
| Product type | | EXPT series T | | | **EXPT** | | EXPT |
| Working space | [mm] | 950 | – | | **-95** | | |
| | [mm] | | 1200 | | **-120** | | |
| Drive | | EGC-80 | | | **-E4** | | -E4 |
| Attachment components | | EXPT series T | | | **-T0** | | |
| | | Rotary drive, size 8 | | | **-T1** | | |
| | | Rotary drive, size 8 with pneum. air supply through-feed | | | **-T2** | | |
| | | Rotary drive, size 11 | | | **-T3** | | |
| | | Rotary drive, size 11 with pneum. air supply through-feed | | | **-T4** | | |
| Motor attachment position | | A1/A2/A3 rear | | | **-HHH** | | |
| | | A3 front, A1/A2 rear | | | **-HHV** | | |
| | | A2 front, A1/A3 rear | | | **-HVH** | | |
| | | A2/A3 front, A1 rear | | | **-HVV** | | |
| | | A1 front, A2/A3 rear | | | **-VHH** | | |
| | | A1/A3 front, A2 rear | | | **-VHV** | | |
| | | A1/A2 front, A3 rear | | | **-VVH** | | |
| | | A1/A2/A3 front | | | **-VVV** | | |
| Protection against particles | | Standard | | | | | |
| | | Protected version | | | **-P8** | | |

Allocation table

| Parallel kinematic system EXPT | Motor controller CMMP (→ Page 26) |
|---|---|
| EXPT-...-T0-... | 3x CMMP-AS-C5-3A |
| EXPT-...-T0-... | 3x CMMP-AS-C5-3A |
| EXPT-...-T1 to T4-... | 3x CMMP-AS-C5-3A, 1x CMMP-AS-C2-3A |
| EXPT-...-T1 to T4-... | 3x CMMP-AS-C5-3A, 1x CMMP-AS-C2-3A |

**Note**

Motor controllers must be ordered separately as accessories → page 26.

Open-loop control system on request.

## Ordering data – Modular product system

**Ordering table**

| Size | 95 | 120 | Conditions | Code | | Enter code |
|---|---|---|---|---|---|---|
| Cable length | None | | | | | |
| | 5 m | | [1] | **-5K** | | |
| | 10 m | | [1] | **-10K** | | |
| | 15 m | | | **-15K** | | |
| Presetting | Standard | | | | | |
| | With calibration | | | **-S** | | |
| Document language | German | | | **-DE** | | |
| | English | | | **-EN** | | |
| | Spanish | | | **-ES** | | |
| | French | | | **-FR** | | |
| | Italian | | | **-IT** | | |
| | Russian | | | **-RU** | | |
| | Chinese | | | **-ZH** | | |

[1] The motor and encoder cables for the rotary drive (attachment components) are always 15 m long, regardless of the specification in the modular product system.

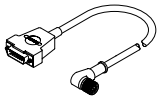
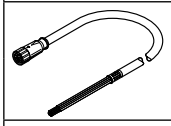
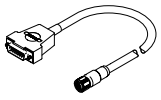
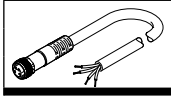
**Note**

To order a parallel kinematic system, please get in touch with your local Festo contact.
The parallel kinematic system may only be commissioned by a specially trained technician (robotics specialist).

The following knowledge is required:
- Specialist knowledge of robotics and CODESYS
- Knowledge of handling motor controllers CMMP
- Knowledge of handling parallel kinematic systems

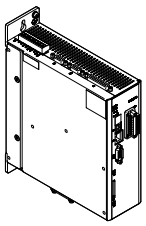
# Accessories

**Ordering data**

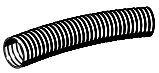
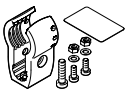
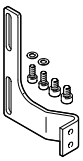
| | Cable length [m] | Part no. | Type |
|---|---|---|---|
| **Connection from the motor for the axis to the motor controller** | | | |
|  | **Motor cable NEBM** | | |
| | 5 | **550310** | **NEBM-M23G8-E-5-Q9N-LE8** |
| | 10 | **550311** | **NEBM-M23G8-E-10-Q9N-LE8** |
| | 15 | **550312** | **NEBM-M23G8-E-15-Q9N-LE8** |
| | X length[1] | **550313** | **NEBM-M23G8-E-...-Q9N-LE8** |
|  | **Encoder cable NEBM** | | |
| | 5 | **550318** | **NEBM-M12W8-E-5-N-S1G15** |
| | 10 | **550319** | **NEBM-M12W8-E-10-N-S1G15** |
| | 15 | **550320** | **NEBM-M12W8-E-15-N-S1G15** |
| | X length[1] | **550321** | **NEBM-M12W8-E-...-N-S1G15** |
| **Connection from the interface housing to the motor controller** | | | |
|  | **Motor cable NEBM** | | |
| | 15 | **571907** | **NEBM-M12G4-RS-15-N-LE4** |
|  | **Encoder cable NEBM** | | |
| | 15 | **571915** | **NEBM-M12G12-RS-15-N-S1G15** |
| **Connecting cable NEBU for rod loss detection or reference sensor of the rotary drive** | | | |
|  | 5 | **541334** | **NEBU-M8G3-K-5-LE3** |
| | 10 | **541332** | **NEBU-M8G3-K-10-LE3** |
| | 15 | **575986** | **NEBU-M8G3-K-15-LE3** |

1) Max. 25 m

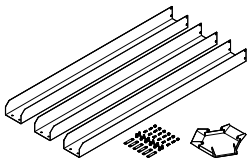
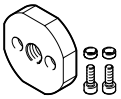
**Ordering data – Motor controller**

| | For size | Output voltage [V AC] | Nominal output current [A] | Nominal power [VA] | Part no. | Type |
|---|---|---|---|---|---|---|
|  | **For parallel kinematic system** | | | | | |
| | 45 ... 120 | 3x 0 ... 270 | 5 | 1000 | **1622902** | **CMMP-AS-C5-3A-M0** |
| | **For attachment component** | | | | | |
| | 45 ... 120 | 3x 0 ... 270 | 2.5 | 500 | **1622901** | **CMMP-AS-C2-3A-M0** |

# Accessories

| Ordering data | For size | Description | Part no. | Type |
|---|---|---|---|---|
| **Protective conduit MKG** | | | | |
|  | 95, 120 | 2 m are required per axis | **3156318** | **MKG-23-PG-29-B** |
| **Tubing holder EAHM** | | | | |
|  | 95, 120 | For mounting the protective conduit | **3506553** | **EAHM-E10-TH-W29** |
| **Angle kit EAHM** | | | | |
|  | 95, 120 | For mounting the tubing holder on the connection block | **2075203** | **EAHM-E10-AK** |
| | | | **2075842** | **EAHM-E10-AK-P8**[1] |

1) In combination with the variant EXPT-...-P8

| Ordering data | For size | Description | Part no. | Type |
|---|---|---|---|---|
| **Cover kit EASC-E10** | | | | |
|  | 95 | • Protects the working space against contamination by particles<br>• Can only be fitted in conjunction with the variant EXPT-...-P8 | **3790894** | **EASC-E10-95** |
| | 120 | | **3790896** | **EASC-E10-120** |
| **Adapter kit EAHA** | | | | |
|  | 95, 120 | For suction gripper ESG- (holder size 2) | **1574224** | **EAHA-R2-M12P** |
| | | For suction gripper ESG- (holder size 3 and 4) | **1574227** | **EAHA-R2-M14P** |

# Accessories

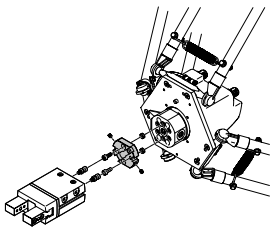
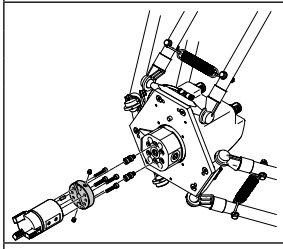
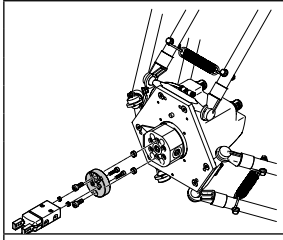
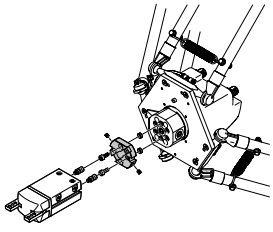
**Adapter kit**
**DHAA, HAPG**

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.

**Gripper combinations with adapter kit**

Download CAD data → www.festo.com

| Gripper | Size | Adapter kit Part no. | Type |
|---|---|---|---|
| **Parallel gripper** | | | |
|  | **DHPS, standard** | | |
| | 6 | **187566** | **HAPG-SD2-12** |
| | 10 | **184477** | **HAPG-SD2-1** |
| | 16 | **184478** | **HAPG-SD2-2** |
| | **HGPT-B, sturdy** | | |
| | 16 | **564958** | **DHAA-G-Q5-12-B8-16** |
| | 20 | **564955** | **DHAA-G-Q5-16-B8-20** |
| | 25 | **537181** | **HAPG-SD2-25** |
| | **HGPL, sturdy with long stroke** | | |
| | 14-40, 14-60, 14-80 | **537310** | **HAPG-SD2-31** |
| | **HGPD, leak-proof** | | |
| | 16 | **564958** | **DHAA-G-Q5-12-B8-16** |
| | 20 | **564955** | **DHAA-G-Q5-16-B8-20** |
| | 25 | **537181** | **HAPG-SD2-25** |
| **Three-point gripper** | | | |
|  | **DHDS, standard** | | |
| | 16 | **187567** | **HAPG-SD2-13** |
| | **HGDT, sturdy** | | |
| | 25 | **542439** | **HAPG-SD2-32** |
| **Radial gripper** | | | |
|  | **DHRS, standard** | | |
| | 10 | **187566** | **HAPG-SD2-12** |
| | 16 | **184477** | **HAPG-SD2-1** |
| | 25 | **184478** | **HAPG-SD2-2** |
| | **HGRT, sturdy** | | |
| | 16 | **1273999** | **DHAA-G-Q5-16-B11-16** |
| **Angle gripper** | | | |
|  | **DHWS, standard** | | |
| | 10 | **187566** | **HAPG-SD2-12** |
| | 16 | **184477** | **HAPG-SD2-1** |
| | 25 | **184478** | **HAPG-SD2-2** |