

Parallel kinematic system EXPT, tripod



# Parallel kinematic system EXPT, tripod

Key features

FESTO

## 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.

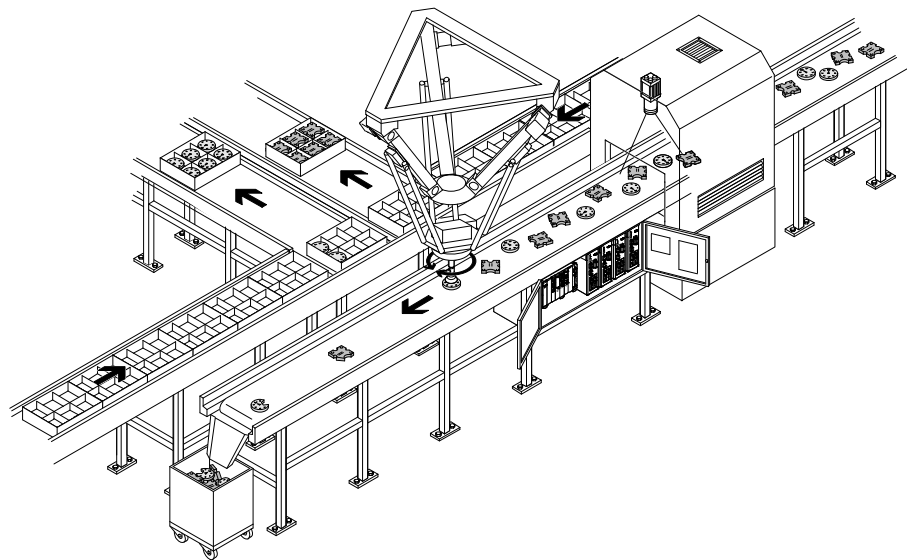
Typical applications include:

- Picking & placing small parts
- Bonding
- Labelling
- Palletising
- Sorting
- Grouping
- Repositioning and separating

## Comparison between parallel kinematic and Cartesian systems

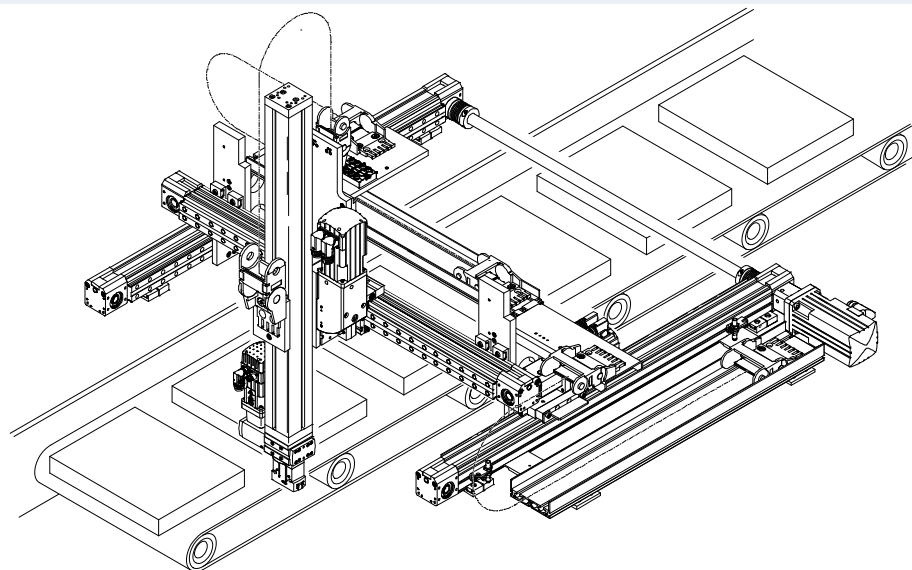
### Parallel kinematic system

- 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



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## The technology in detail

Parallel kinematic system

- 1 Mounting frame
- 2 Mounting bracket for toothed belt axis
- 3 Motor
- 4 Connection block
- 5 Rod pair
- 6 Interface housing
- 7 Angle kit → page 32
- 8 Protective conduit → page 32
- 9 Toothed belt axis
- 10 Tubing holder → page 32
- 11 Front unit for attaching a gripper, etc. → page 23



## Front unit

→ page 23

The front unit can optionally be ordered via the modular product system.

It includes a geared motor that enables rotary movement (fourth axis) and is available in two sizes.

The front unit can also be chosen with or without rotary throughfeed, for vacuum or excess pressure.

A range of grippers can be attached to it → page 33.

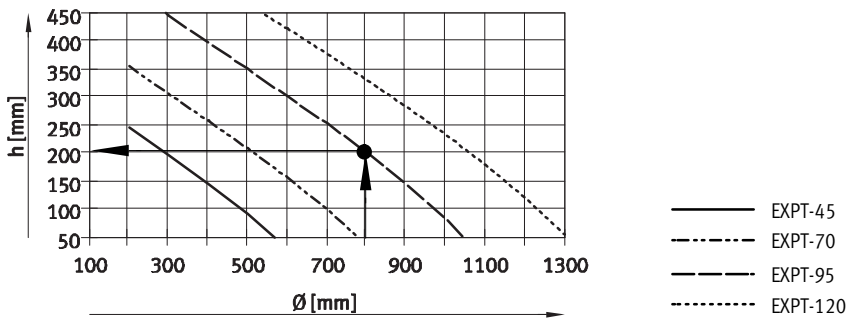
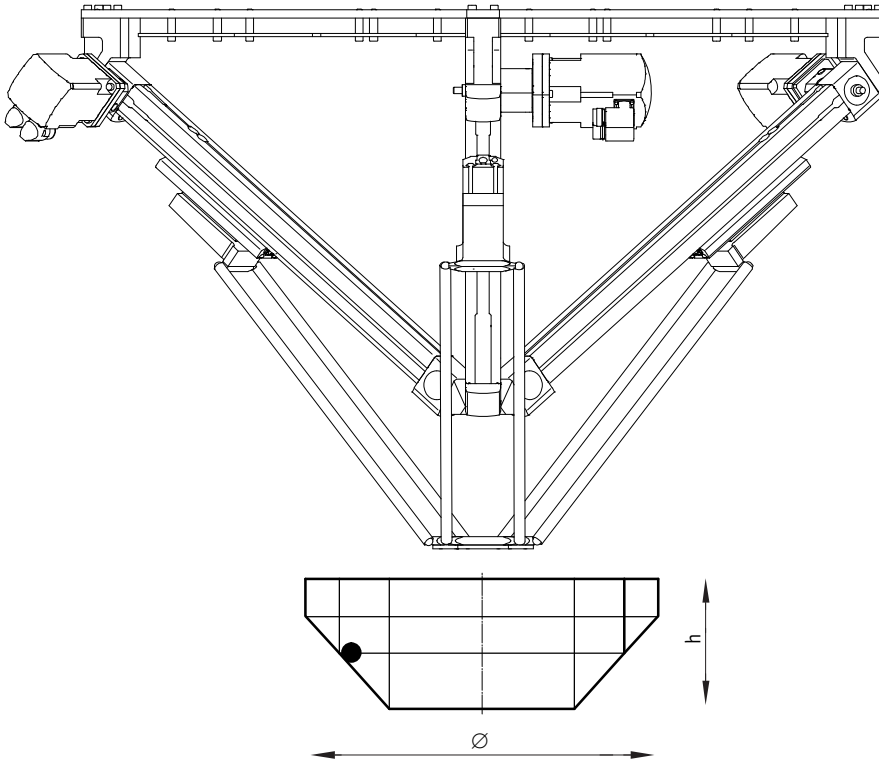


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## Available working space

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 more working space required, the smaller its diameter (→ graph).



# Parallel kinematic system EXPT, tripod

Key features

## Motor attachment variants

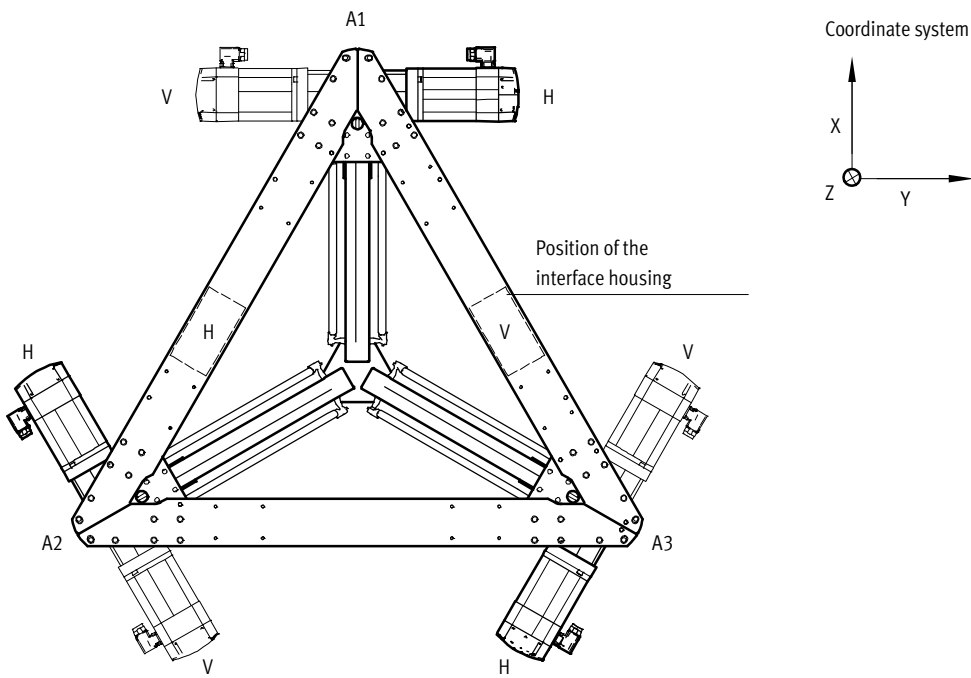
The attachment position of the motors can be individually configured via the modular product system (→ page 29).

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



# Parallel kinematic system EXPT, tripod

Key features

## Protection against particles for size 95 and 120

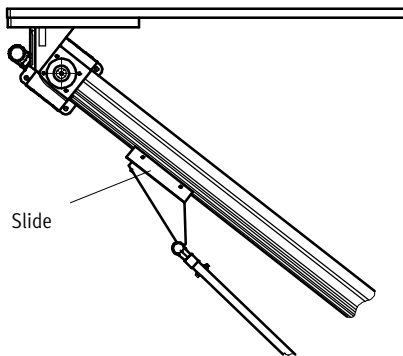
Installation type: Protected version (P8)

Abrasion on the toothed belt can lead to loose particles falling into the working space in the standard design.

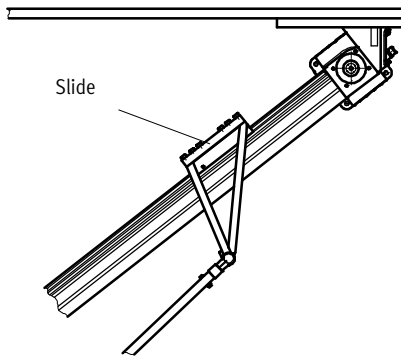
If the variant EXPT-...-P8 (→ page 29) is selected, the axes are turned during installation (slide on top). A cover kit EASC-E10 (→ page 32) can be additionally

ordered as a separate accessory and fitted; this prevents the particles from entering the working space. They slide downwards into the trough and collect in the cover (see below).

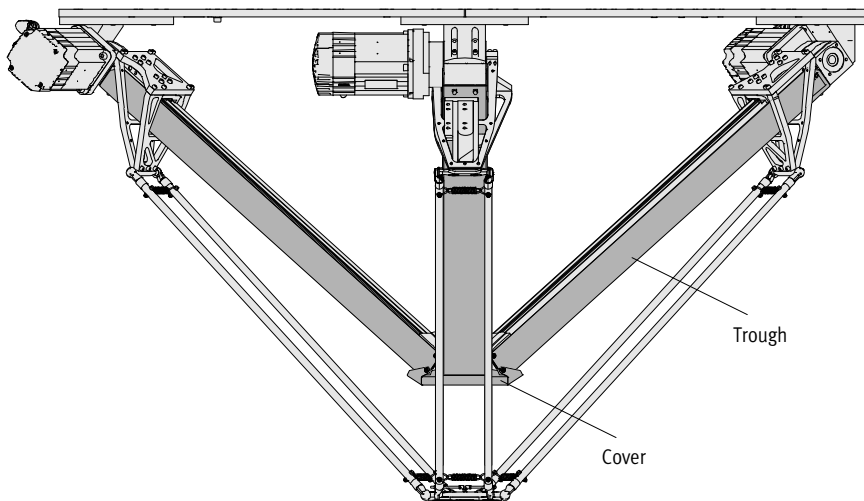
### Standard



### Protected version (P8)

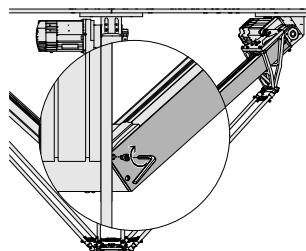
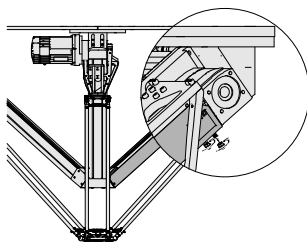


### Protected version (feature P8 in the modular product system) with cover kit EASC-E10 (ordered separately as an accessory)

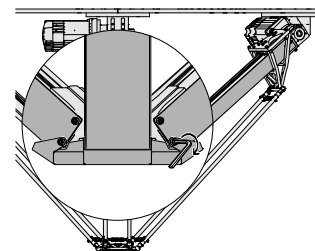


### Easy mounting of the cover kit EASC-E10

#### Mounting of the troughs



#### Mounting of the cover



# Parallel kinematic system EXPT, tripod

Type codes

EXPT - 70 - E1 - T2 - HHH - - 15K - S - DE

### Type

EXPT	Parallel kinematic system
------	---------------------------

### Working space [mm]

45	∅ 450, H100
70	∅ 700, H100
95	∅ 950, H100
120	∅ 1200, H100

### Drive

E1	DGE-25
E4	EGC-80

### Attachment components

T0	Without rotary drive
T1	Rotary drive, size 8
T2	Rotary drive, size 8 with pneumatic rotary throughfeed
T3	Rotary drive, size 11
T4	Rotary drive, size 11 with pneumatic rotary throughfeed

### 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

### Protection against particles

-	Standard
P8	Protected version

### Cable length

-	None
5K	5 m
10K	10 m
15K	15 m

### Presetting

-	Standard
S	With calibration

### Document language

DE	German
EN	English
ES	Spanish
FR	French
IT	Italian
RU	Russian
ZH	Chinese

# Parallel kinematic system EXPT, tripod

Peripherals overview

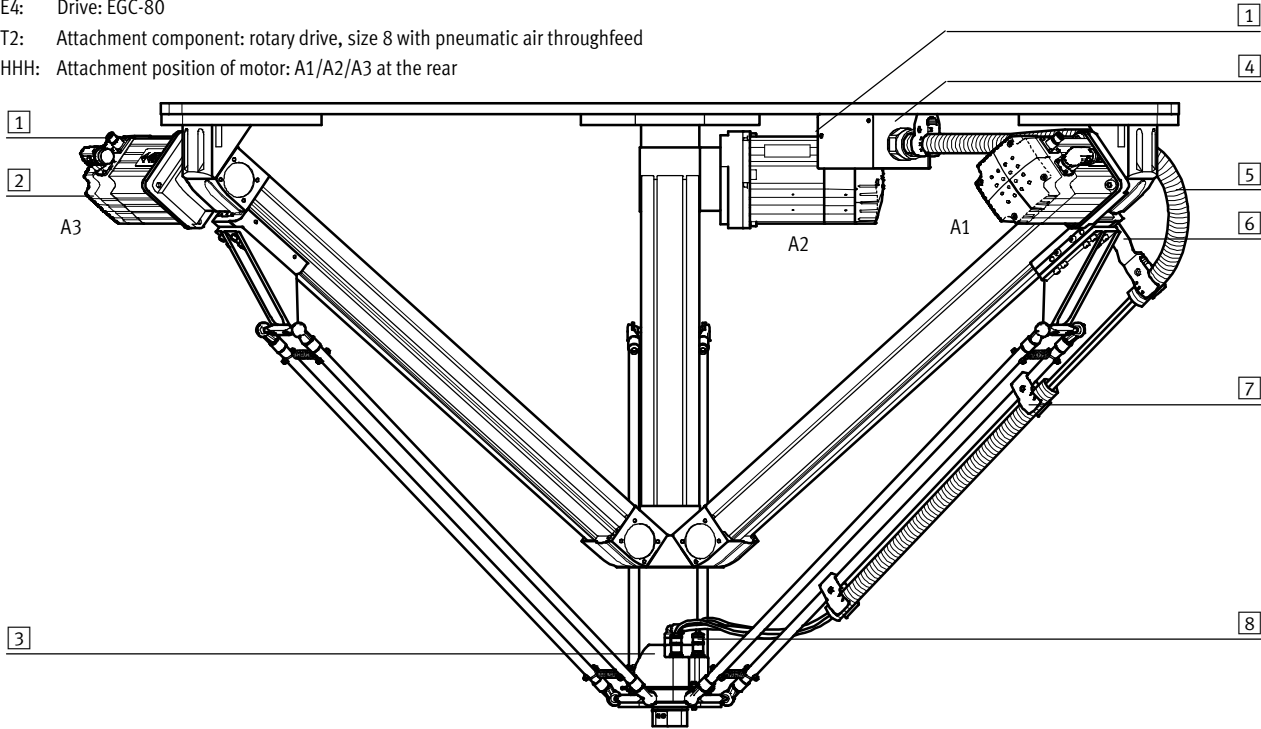
## Variant examples

Order code: EXPT-...-E4-T2-HHH-...

E4: Drive: EGC-80

T2: Attachment component: rotary drive, size 8 with pneumatic air throughfeed

HHH: Attachment position of motor: A1/A2/A3 at the rear



Order code: EXPT-...-E4-T0-HVV-P8-... with cover kit EASC-E10-...

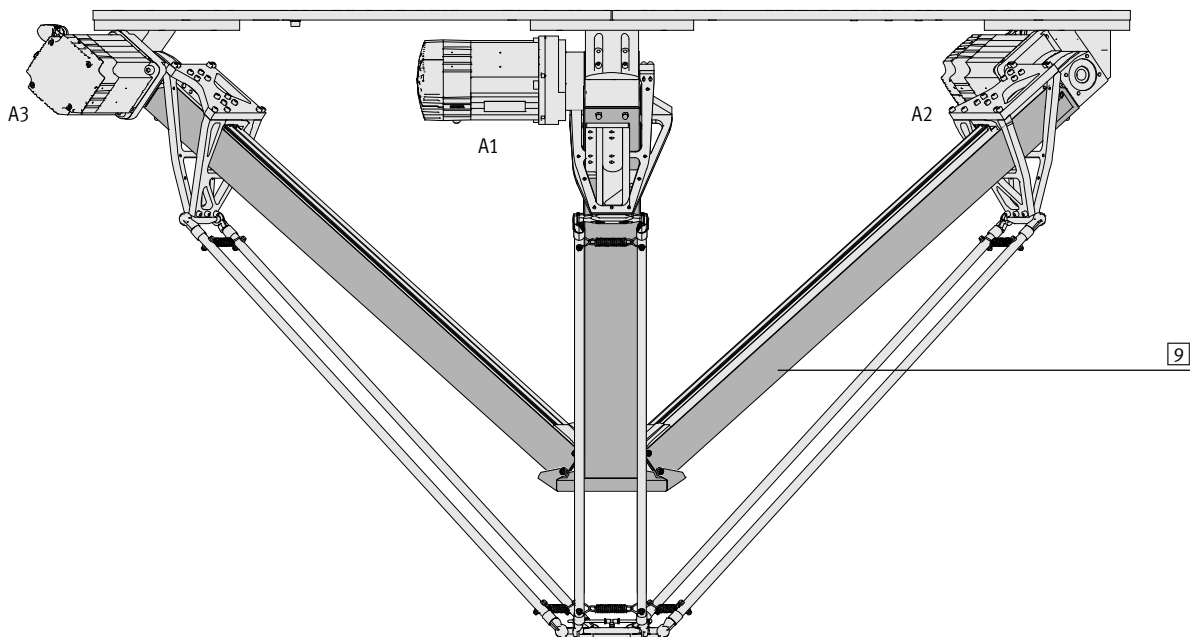
E4: Drive: EGC-80

T0: Attachment component: no rotary drive

HVV: Attachment position of motor: A1 at rear, A2/A3 at the front

P8: Protection against particles: protected version

Cover kit EASC-E10 must be ordered separately as an accessory.





# Parallel kinematic system EXPT, tripod

Peripherals overview

Attachments and accessories		
Type	Description	→ Page/Internet
1 Connecting cable 5K, 10K, 15K	All required connecting cables/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)	30
2 Servo motor 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 T0, T1, T2, ...	Choose from: <ul style="list-style-type: none"> <li>• Front unit without rotary drive (T0)</li> <li>• Front unit with rotary drive (T1 to T4)</li> </ul>	-
4 Interface housing	Serves as the interface between the parallel kinematic system and the control cabinet, to supply the front unit	-
5 Protective conduit MKG	Is pre-assembled for all variants (T0 to T4), on axis A1	31
6 Angle kit EAHM-E10	Is pre-assembled for all variants (T0 to T4), on axis A1. If required, further angle kits can be ordered as accessories	31
7 Tubing holder EAHM-E10-TH	Is pre-assembled for all variants (T0 to T4), on axis A1. If required, further tubing holders can be ordered as accessories	31
8 Front unit installation	The lines to supply the front unit are already installed between the front unit and the interface housing	-
9 Cover kit EADC-E10	Protects the working space against the ingress of particles. The kit must be fitted by the customer	31

# Parallel kinematic system EXPT, tripod

Technical data

Size  
45, 70, 95, 120

 www.festo.com



General technical data					
Size		45	70	95	120
Design		Parallel kinematic system			
Motor type		Servo motor			
Mounting position		Horizontal			
Working space					
Nominal diameter	[mm]	450	700	950	1200
Nominal height	[mm]	100	100	100	100
Max. acceleration <sup>1)</sup>	[m/s <sup>2</sup> ]	110			
Max. speed <sup>1)</sup>	[m/s]	7			
Max. pick rate <sup>1)2)</sup>	[picks/min]	150			
Repetition accuracy	[mm]	±0.1			
Positioning accuracy <sup>3)</sup>	[mm]	±0.5			
Track precision <sup>3)4)</sup>	[mm]	±0.5			
Nominal load <sup>5)</sup>					
With min. dynamic response	[kg]	5			
With max. dynamic response	[kg]	1			
Base weight	[kg]	45	47.5	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) Nominal load = tool load (accessories attached to the front unit) + payload

Max. process force in Z direction					
Size		45	70	95	120
With working space diameter	[mm]	0	0	0	0
Process force	[N]	1300	1000	1000	850
With working space diameter <sup>6)</sup>	[mm]	112.5	175	237.5	300
Process force	[N]	1000	750	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 <sup>7)</sup>	[%]	100
Corrosion resistance class CRC <sup>8)</sup>		2

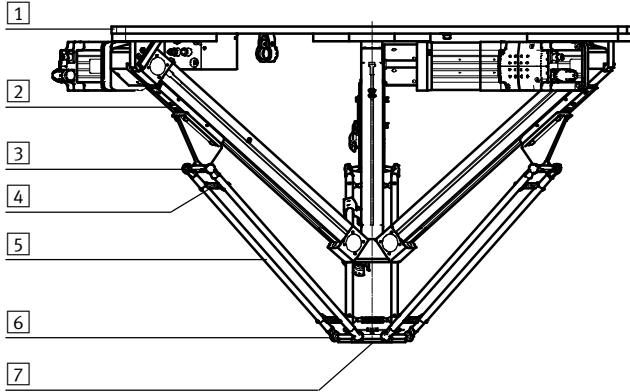
- 7) When used in combination with motor controller CMMP-AS-C5-3A.
- 8) Corrosion resistance class 2 according to Festo standard 940 070  
Components subject to moderate corrosion stress. Externally visible parts with primarily decorative surface requirements which are in direct contact with a normal industrial environment or media such as coolants or lubricating agents.

# Parallel kinematic system EXPT, tripod

Technical data

## Materials

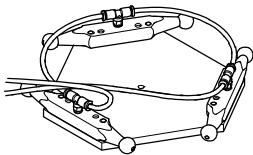
Sectional view



## 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

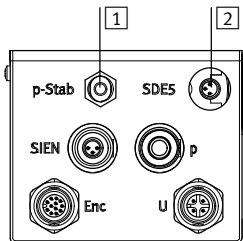


The rod loss detection feature detects detached rods and initiates an emergency stop.

It is realised via permanent compressed air monitoring (pressure switch integrated in the frame of the interface housing)

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.

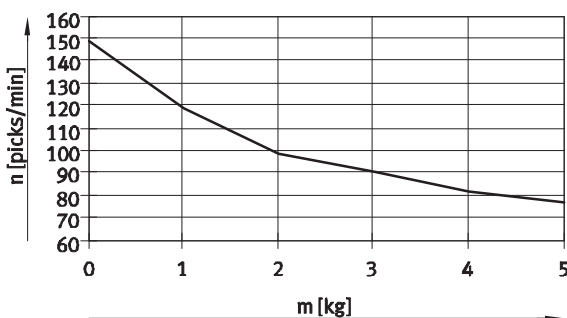
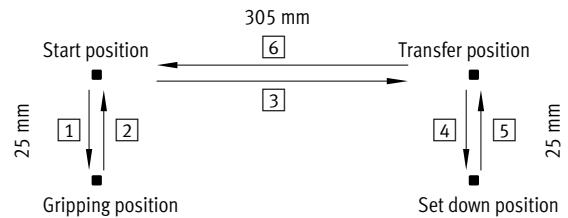
2 Pressure sensor for monitoring rod loss detection.  
Connecting cable → page 30

## Pick rate as a function of nominal 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 nominal 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



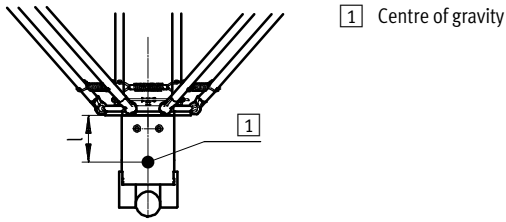
n= Cycles per minute  
m= Nominal load

# Parallel kinematic system EXPT, tripod

Technical data

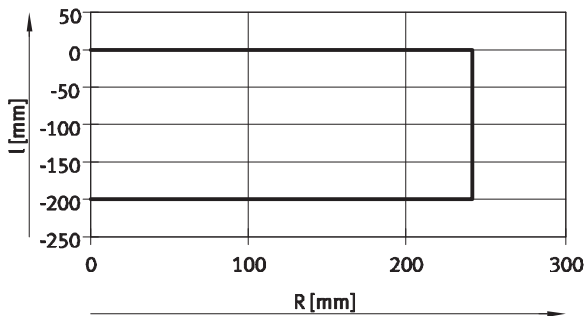
FESTO

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

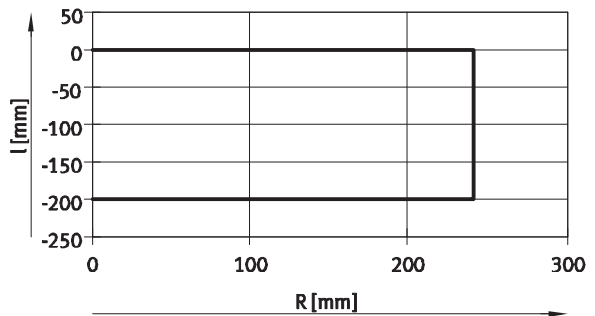


## EXPT-45

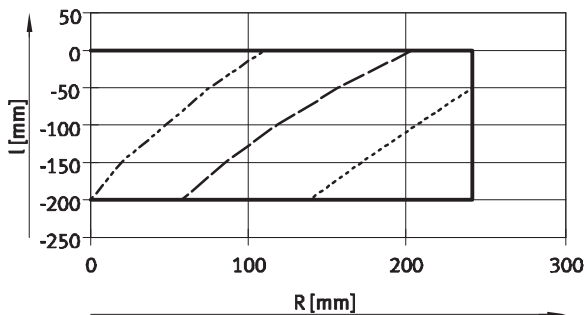
Nominal load of 0.1 kg



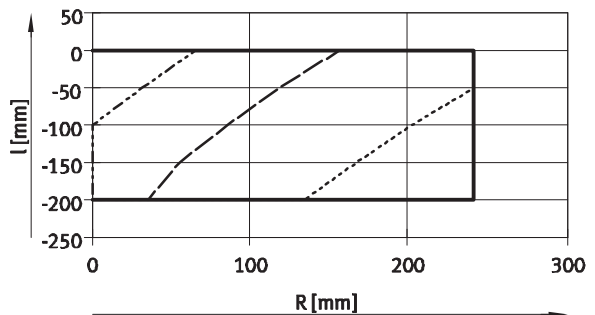
Nominal load of 0.5 kg



Nominal load of 1 kg



Nominal load of 1.5 kg



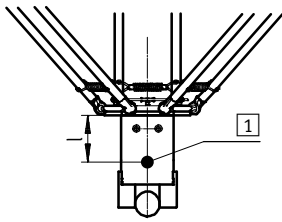
—  $a = 0 \dots 70 \text{ m/s}^2$   
 - - -  $a = 100 \text{ m/s}^2$   
 - - -  $a = 90 \text{ m/s}^2$   
 - - -  $a = 80 \text{ m/s}^2$

—  $a = 0 \dots 50 \text{ m/s}^2$   
 - - -  $a = 80 \text{ m/s}^2$   
 - - -  $a = 70 \text{ m/s}^2$   
 - - -  $a = 60 \text{ m/s}^2$

# Parallel kinematic system EXPT, tripod

Technical data

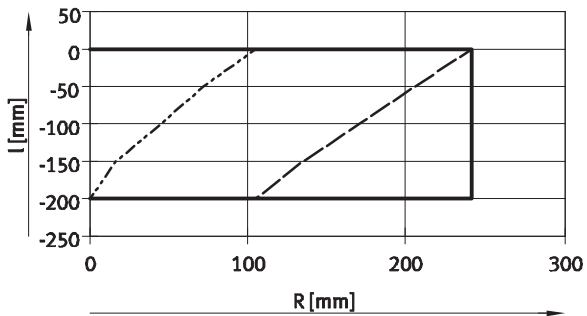
Max. acceleration  $a$  as a function of the position in the working space  $R$  and distance  $l$  from the centre of gravity of the nominal load  $m$  to the front unit



1 Centre of gravity

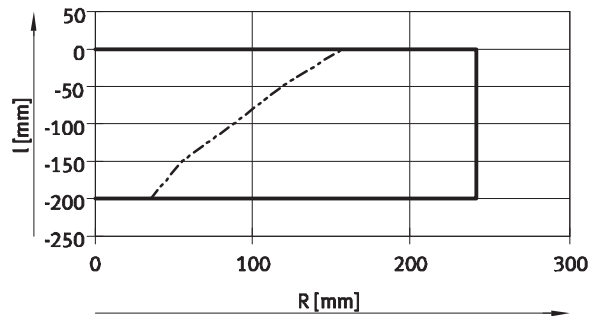
## EXPT-45

Nominal load of 2 kg



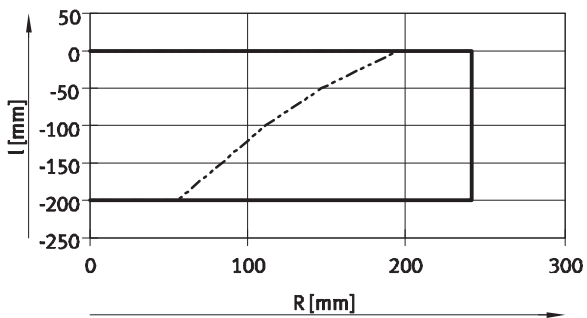
—  $a = 0 \dots 40 \text{ m/s}^2$   
 - - -  $a = 60 \text{ m/s}^2$   
 - · -  $a = 50 \text{ m/s}^2$

Nominal load of 3 kg



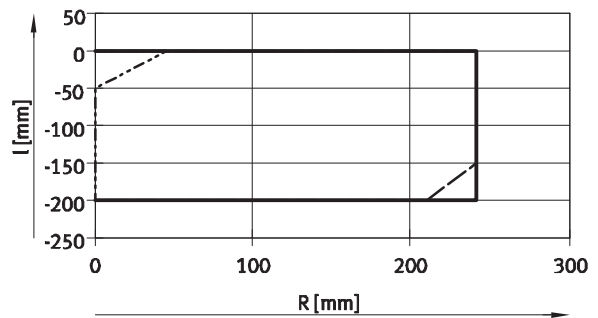
—  $a = 0 \dots 30 \text{ m/s}^2$   
 - - -  $a = 40 \text{ m/s}^2$

Nominal load of 4 kg



—  $a = 0 \dots 20 \text{ m/s}^2$   
 - - -  $a = 30 \text{ m/s}^2$

Nominal load of 5 kg



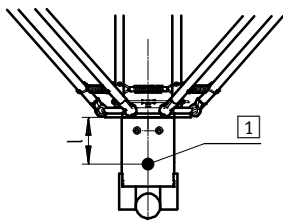
—  $a = 0 \dots 10 \text{ m/s}^2$   
 - - -  $a = 30 \text{ m/s}^2$   
 - · -  $a = 20 \text{ m/s}^2$

# Parallel kinematic system EXPT, tripod

Technical data



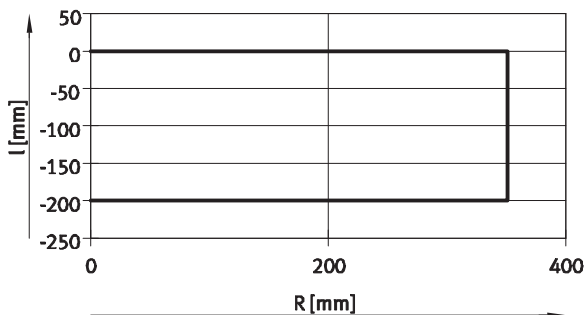
Max. acceleration  $a$  as a function of the position in the working space  $R$  and distance  $l$  from the centre of gravity of the nominal load  $m$  to the front unit



1 Centre of gravity

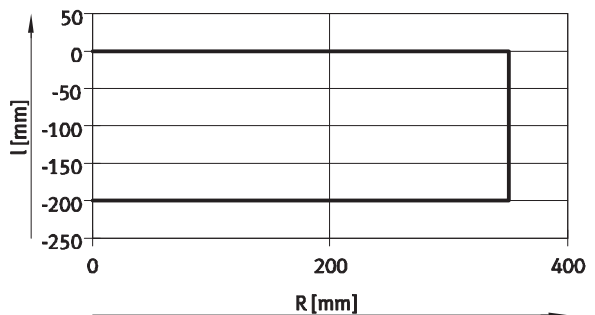
## EXPT-70

Nominal load of 0.1 kg



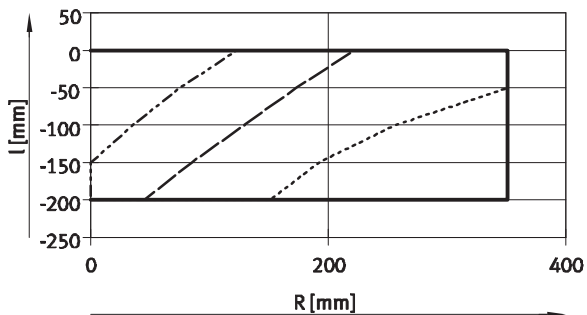
—  $a = 0 \dots 100 \text{ m/s}^2$

Nominal load of 0.5 kg



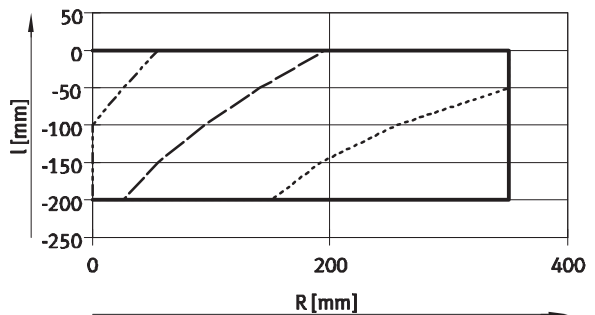
—  $a = 0 \dots 100 \text{ m/s}^2$

Nominal load of 1 kg



—  $a = 0 \dots 70 \text{ m/s}^2$   
 - - -  $a = 100 \text{ m/s}^2$   
 —  $a = 90 \text{ m/s}^2$   
 - - -  $a = 80 \text{ m/s}^2$

Nominal load of 1.5 kg

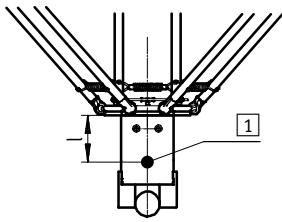


—  $a = 0 \dots 50 \text{ m/s}^2$   
 - - -  $a = 80 \text{ m/s}^2$   
 —  $a = 70 \text{ m/s}^2$   
 - - -  $a = 60 \text{ m/s}^2$

# Parallel kinematic system EXPT, tripod

Technical data

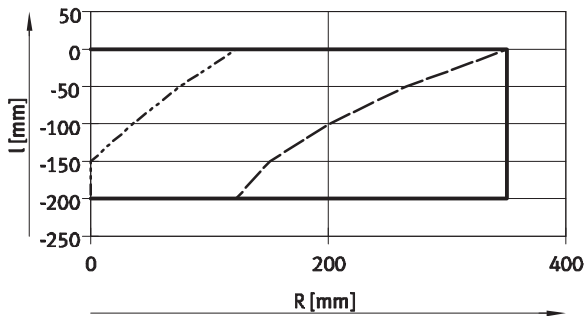
Max. acceleration  $a$  as a function of the position in the working space  $R$  and distance  $l$  from the centre of gravity of the nominal load  $m$  to the front unit



1 Centre of gravity

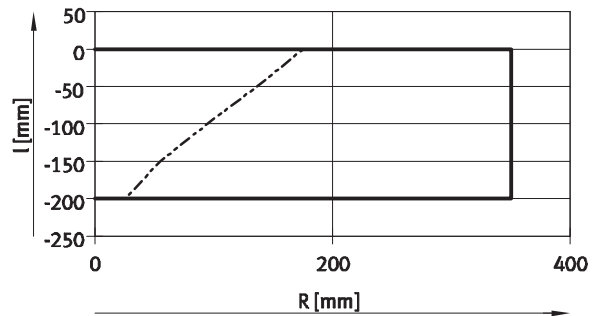
## EXPT-70

Nominal load of 2 kg



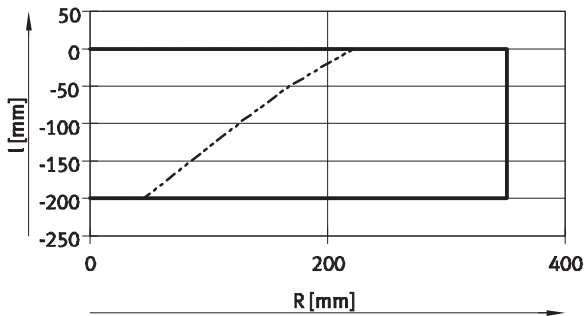
—  $a = 0 \dots 40 \text{ m/s}^2$   
 - - -  $a = 60 \text{ m/s}^2$   
 - · -  $a = 50 \text{ m/s}^2$

Nominal load of 3 kg



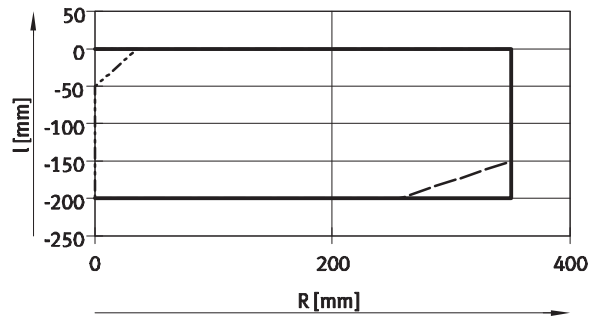
—  $a = 0 \dots 30 \text{ m/s}^2$   
 - - -  $a = 40 \text{ m/s}^2$

Nominal load of 4 kg



—  $a = 0 \dots 20 \text{ m/s}^2$   
 - - -  $a = 30 \text{ m/s}^2$

Nominal load of 5 kg



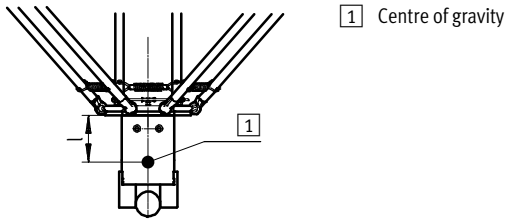
—  $a = 0 \dots 10 \text{ m/s}^2$   
 - - -  $a = 30 \text{ m/s}^2$   
 - · -  $a = 20 \text{ m/s}^2$

# Parallel kinematic system EXPT, tripod

Technical data

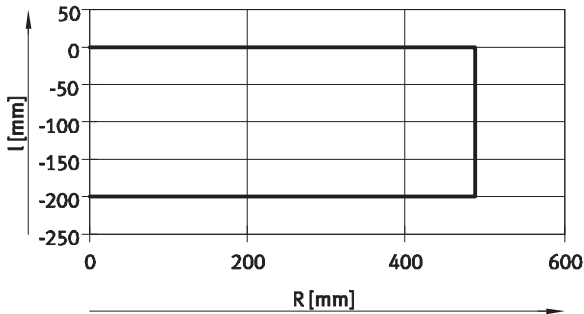


Max. acceleration  $a$  as a function of the position in the working space  $R$  and distance  $l$  from the centre of gravity of the nominal load  $m$  to the front unit



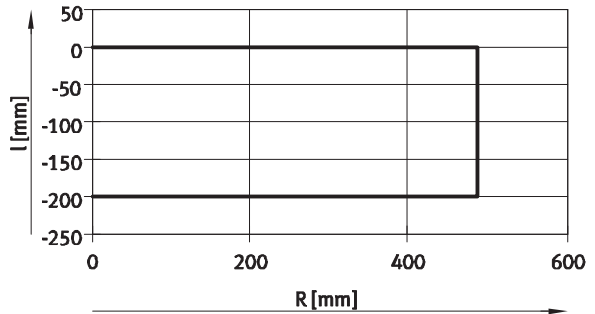
## EXPT-95

Nominal load of 0.1 kg



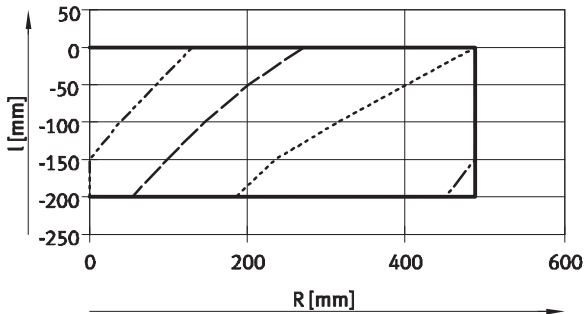
—  $a = 0 \dots 100 \text{ m/s}^2$

Nominal load of 0.5 kg



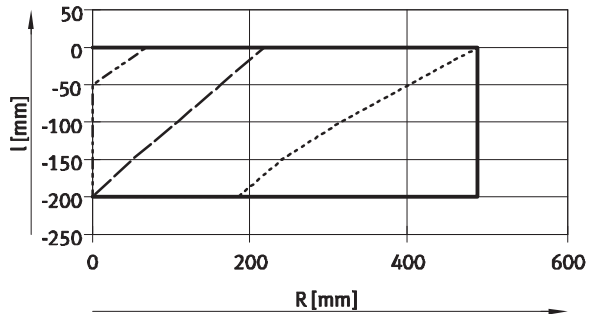
—  $a = 0 \dots 100 \text{ m/s}^2$

Nominal load of 1 kg



—  $a = 0 \dots 60 \text{ m/s}^2$   
 - - -  $a = 100 \text{ m/s}^2$   
 - · -  $a = 90 \text{ m/s}^2$   
 · · ·  $a = 80 \text{ m/s}^2$   
 - · -  $a = 70 \text{ m/s}^2$

Nominal load of 1.5 kg



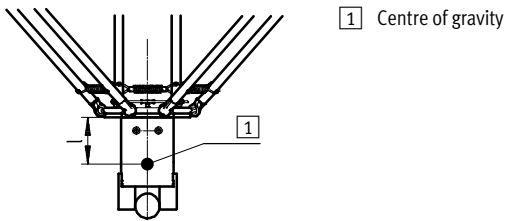
—  $a = 0 \dots 50 \text{ m/s}^2$   
 - - -  $a = 80 \text{ m/s}^2$   
 - · -  $a = 70 \text{ m/s}^2$   
 · · ·  $a = 60 \text{ m/s}^2$



# Parallel kinematic system EXPT, tripod

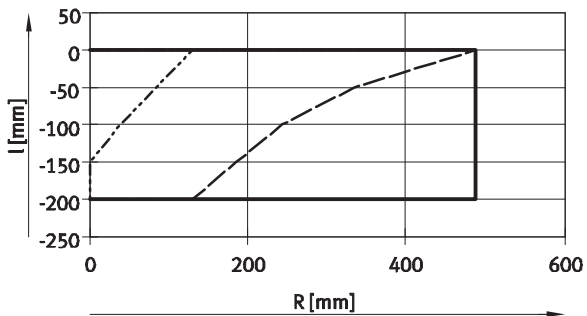
Technical data

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



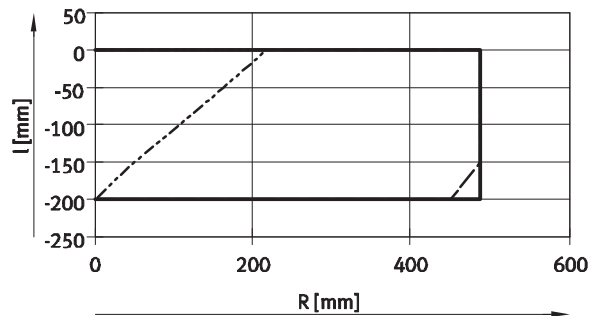
## EXPT-95

Nominal load of 2 kg



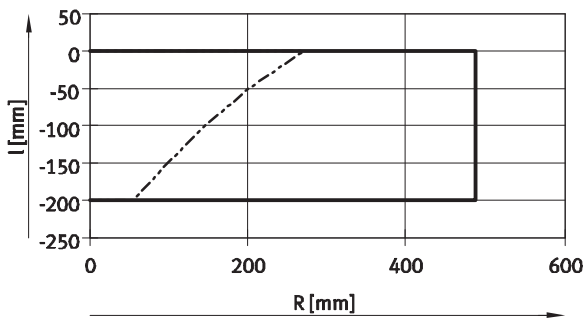
—  $a = 0 \dots 40 \text{ m/s}^2$   
 - - -  $a = 60 \text{ m/s}^2$   
 - · -  $a = 50 \text{ m/s}^2$

Nominal load of 3 kg



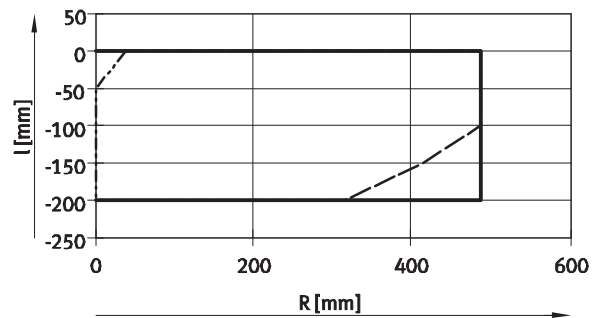
—  $a = 0 \dots 20 \text{ m/s}^2$   
 - - -  $a = 40 \text{ m/s}^2$   
 - · -  $a = 30 \text{ m/s}^2$

Nominal load of 4 kg



—  $a = 0 \dots 20 \text{ m/s}^2$   
 - - -  $a = 30 \text{ m/s}^2$

Nominal load of 5 kg



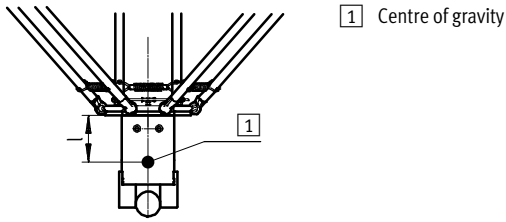
—  $a = 0 \dots 10 \text{ m/s}^2$   
 - - -  $a = 30 \text{ m/s}^2$   
 - · -  $a = 20 \text{ m/s}^2$

# Parallel kinematic system EXPT, tripod

Technical data

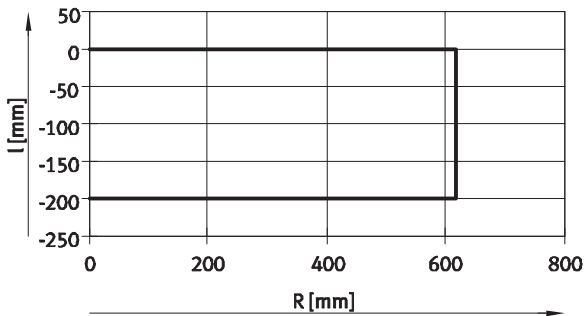
FESTO

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



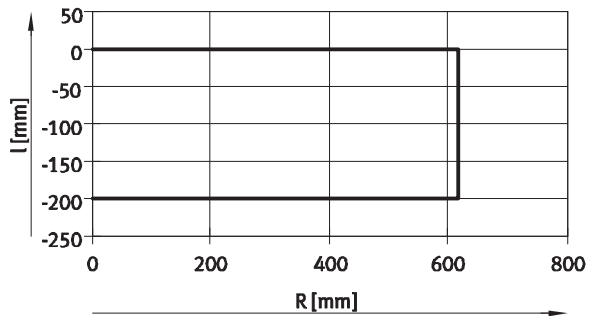
## EXPT-120

Nominal load of 0.1 kg



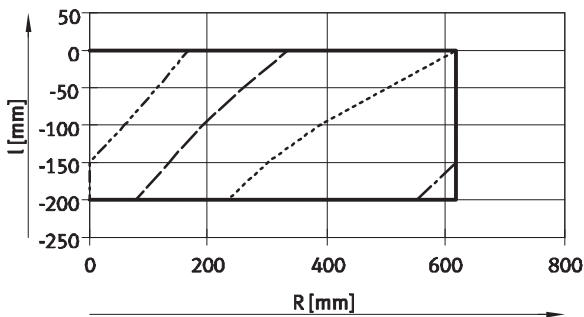
—  $a = 0 \dots 100 \text{ m/s}^2$

Nominal load of 0.5 kg



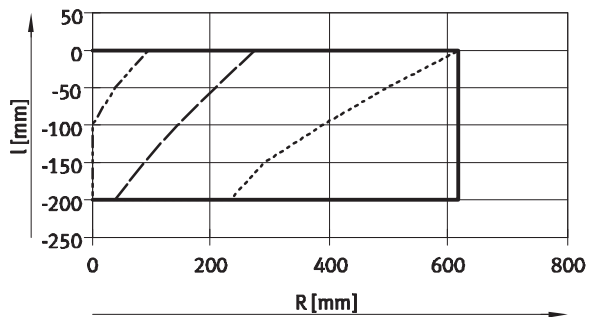
—  $a = 0 \dots 100 \text{ m/s}^2$

Nominal load of 1 kg



—  $a = 0 \dots 60 \text{ m/s}^2$   
 - - -  $a = 100 \text{ m/s}^2$   
 —  $a = 90 \text{ m/s}^2$   
 - - -  $a = 80 \text{ m/s}^2$   
 - · -  $a = 70 \text{ m/s}^2$

Nominal load of 1.5 kg

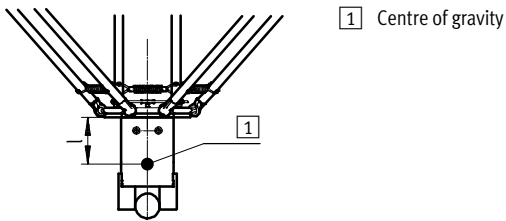


—  $a = 0 \dots 50 \text{ m/s}^2$   
 - - -  $a = 80 \text{ m/s}^2$   
 —  $a = 70 \text{ m/s}^2$   
 - - -  $a = 60 \text{ m/s}^2$

# Parallel kinematic system EXPT, tripod

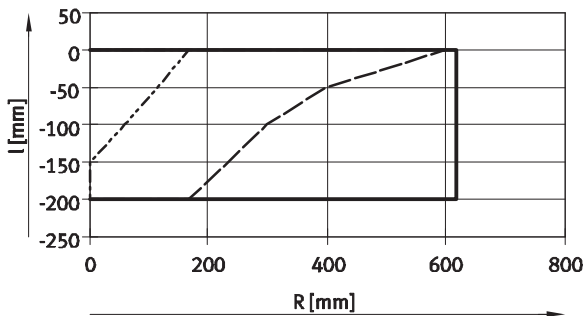
Technical data

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



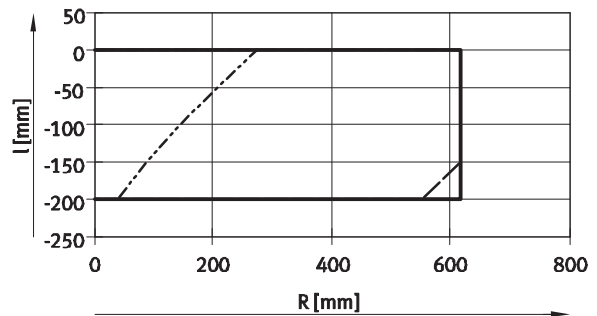
## EXPT-120

Nominal load of 2 kg



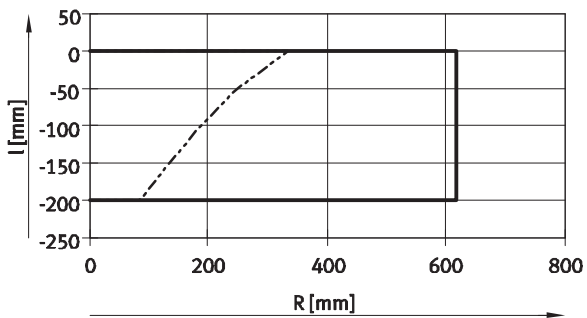
—  $a = 0 \dots 40 \text{ m/s}^2$   
 - - -  $a = 60 \text{ m/s}^2$   
 - · -  $a = 50 \text{ m/s}^2$

Nominal load of 3 kg



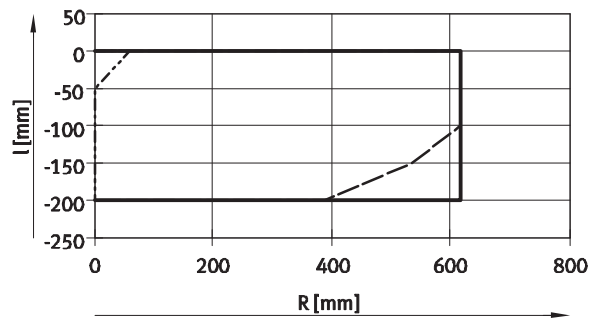
—  $a = 0 \dots 20 \text{ m/s}^2$   
 - - -  $a = 40 \text{ m/s}^2$   
 - · -  $a = 30 \text{ m/s}^2$

Nominal load of 4 kg



—  $a = 0 \dots 20 \text{ m/s}^2$   
 - - -  $a = 30 \text{ m/s}^2$

Nominal load of 5 kg



—  $a = 0 \dots 10 \text{ m/s}^2$   
 - - -  $a = 30 \text{ m/s}^2$   
 - · -  $a = 20 \text{ m/s}^2$

# Parallel kinematic system EXPT, tripod

Technical data

## Requirements for the frame

The positioning and path accuracy depends to a large extent on the frame design.

The following influences must therefore be taken into consideration:

- Frame rigidity
- Mass of frame
- Mass of 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 nominal load.

The 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.

At maximum dynamic response for the axes, the following forces act on the corner bracket and therefore on the mounting in the frame.

Size		45	70	95	120
Vertical force	[N]	±250	±290	±325	±475
Horizontal force	[N]	±145	±150	±200	±215

## Mounting options on the frame

The parallel kinematic system must always be mounted in the area of the corner bracket 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 slots is 40 mm in the 80x80 profile, the holes in the corner brackets have been positioned so that the profile can be mounted in various positions.

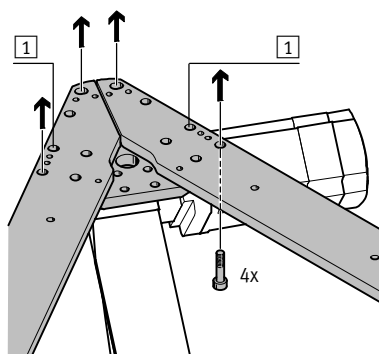
Since the homing settings of the axis are lost when the motor is dismantled, it is recommended to use mounting holes that do not require the motor to be removed. The holes **1** are not accessible, depending on the attachment position of the motor.

### Direct mounting via screws

#### Screws M8x...

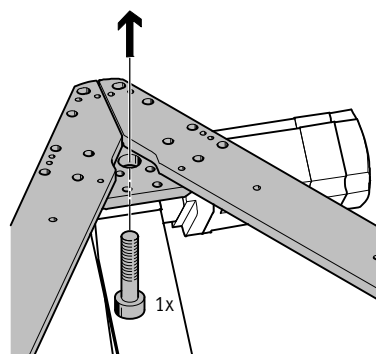
Via at least 4 screws (M8) per corner bracket directly on the frame. These 4 screws should be placed as far apart

as possible to ensure a torsionally rigid connection.



#### Screws M20x...

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



# Parallel kinematic system EXPT, tripod

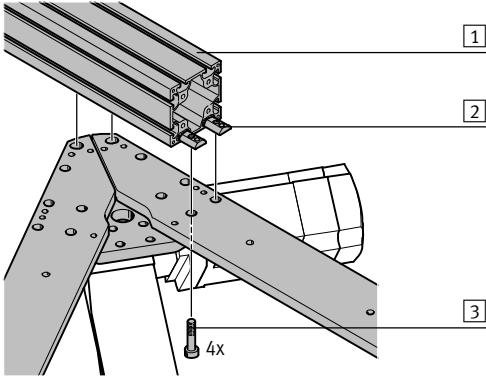
Technical data

## Mounting options on the frame

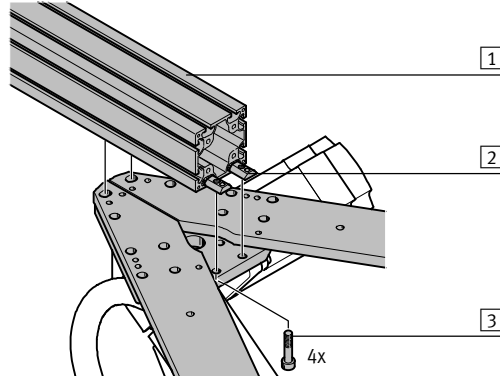
Mounting via slot nuts – parallel to the mounting frame

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

### Example 1



### Example 2



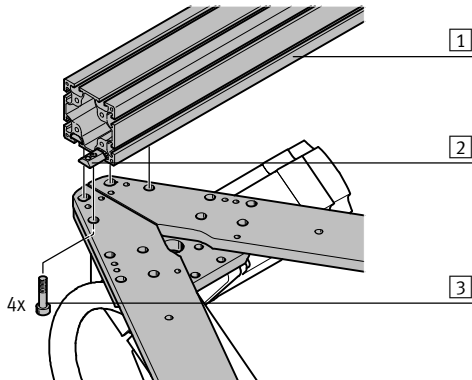
Mounting via slot nuts – at right angles to the mounting frame

- 1 Profile (e.g. HMBS-80/80)
- 2 Slot nut (e.g. NST-HMV-8-2-M8)
- 3 Screws (e.g. M8x35)
- 4 Angle bracket

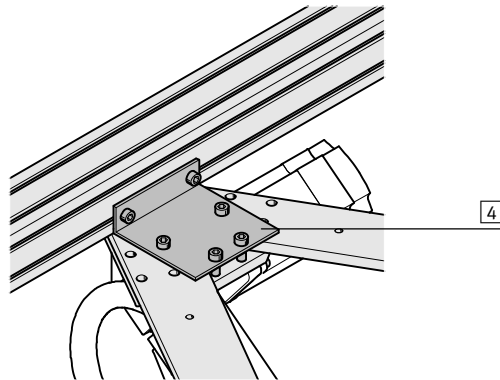
The additional angle brackets in the following examples are required in order to increase the torsional rigidity and the bearing surface.

### Example 1

Profile mounting

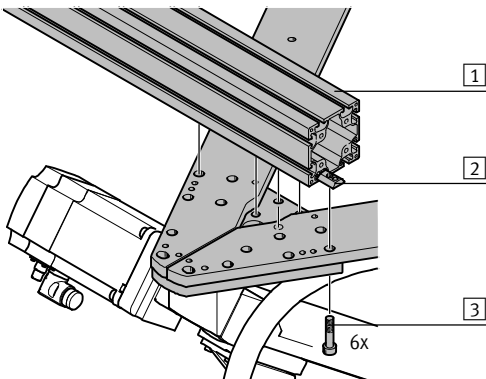


Angle bracket mounting

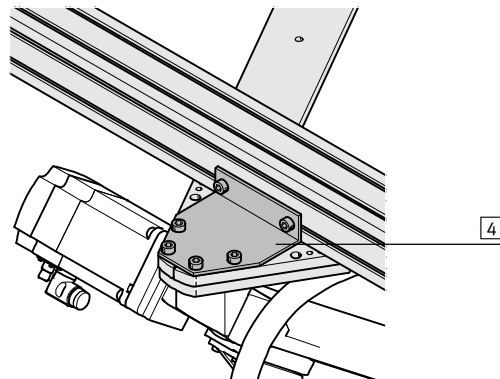


### Example 2

Profile mounting



Angle bracket mounting



# Parallel kinematic system EXPT, tripod

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Technical data

## Technical data – Front unit

EXPT-...-T...



Mechanical data				
Type	EXPT-...-			
	T1	T2	T3	T4
Design	Electromechanical rotary module			
	-	With rotary throughfeed	-	With rotary throughfeed
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 <sup>2</sup> ]	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
Rated output [W]	9.2	9.2	22.1	22.1
Duty cycle [%]	100			
Measuring system <sup>1)</sup>	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 class CRC <sup>1)</sup>	2			

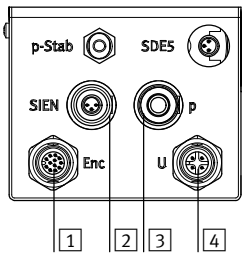
1) Corrosion resistance class 2 according to Festo standard 940070

Components subject to moderate corrosion stress. Externally visible parts with primarily decorative surface requirements which are in direct contact with a normal industrial environment or media such as coolants or lubricating agents.

# Parallel kinematic system EXPT, tripod

Technical data

Connections on the interface housing:



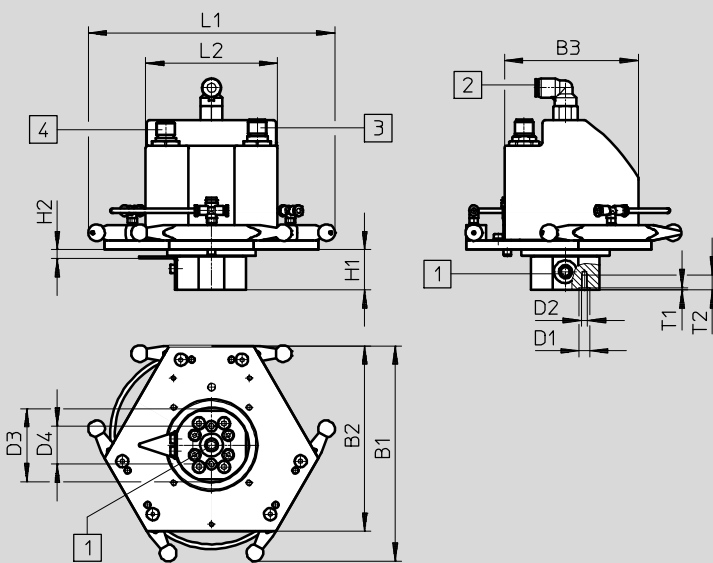
Connection for:

- 1 Encoder cable → page 30
- 2 Sensor for rotary motion → page 30
- 3 Supply port for pneumatic rotary through-feed
- 4 Motor cable → page 30

## Dimensions

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

Front unit



- 1 Supply port outlet
- 2 Supply port rotary throughfeed
- 3 Connection for motor cable
- 4 Connection for encoder cable

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

# Parallel kinematic system EXPT, tripod

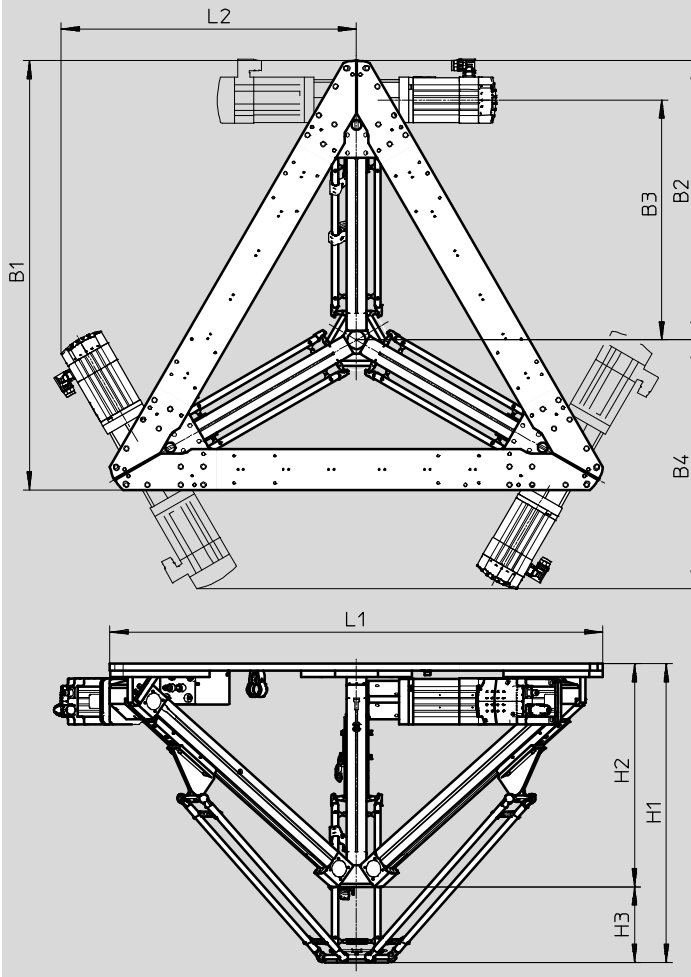
Technical data

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## Dimensions

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

Parallel kinematic system



Type	B1	B2	B3	B4	H1	H2	H3	L1	L2
EXPT-45	947	617	530	549	659	493	166	1088	652
EXPT-70	1077	703	622	590	727	561	166	1238	727
EXPT-95	1213	794	705	626	827	636	191	1394	803
EXPT-120	1355	888	800	672	944	710	234	1558	885



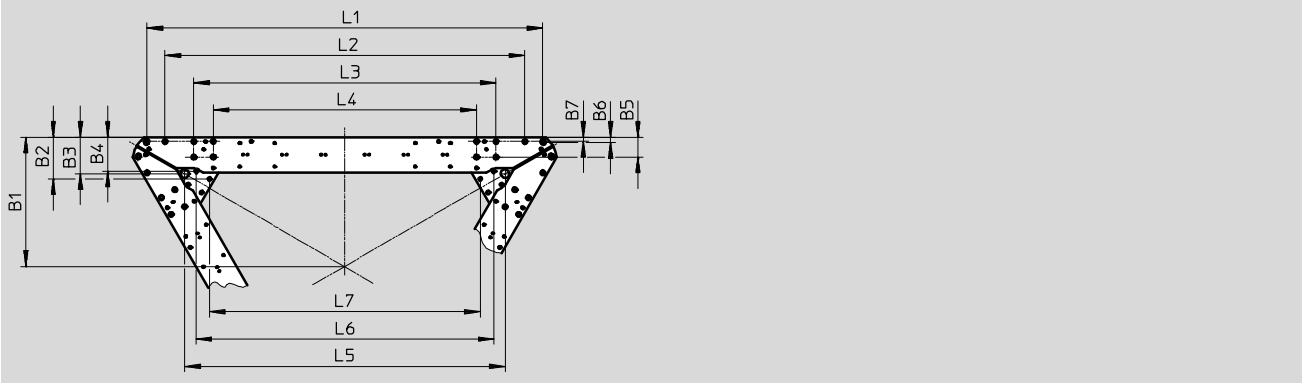
# Parallel kinematic system EXPT, tripod

Technical data

## Dimensions

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

Mounting holes on the mounting frame



Type	B1	B2	B3	B4	B5	B6	B7
EXPT-45	330.8	107.2	93.5	87.2	51	12.3	11
EXPT-70	374.1	107.2	93.5	87.2	51	12.3	11
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-45	1017	923	775.4	675.4	822	794	694.6
EXPT-70	1167.1	1073.1	925.5	825.5	972.1	914	844.7
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

# Parallel kinematic system EXPT, tripod

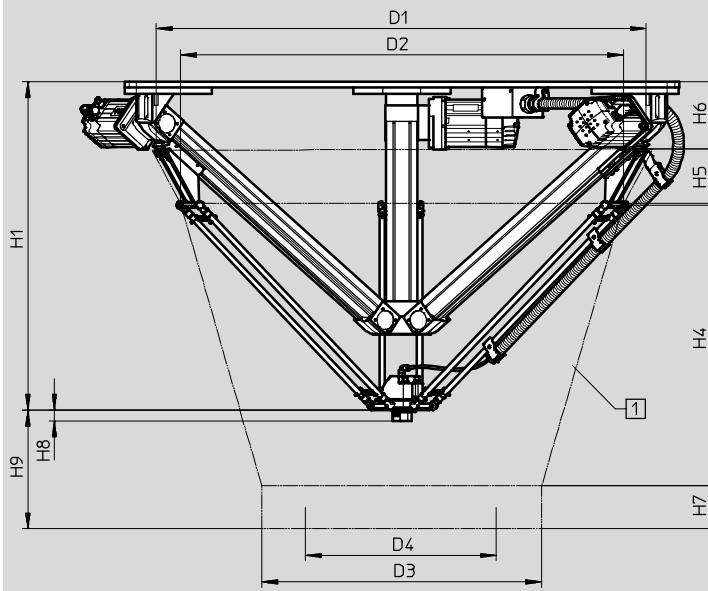
Technical data



## Dimensions

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

- - Note

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-45	950	860	620	450	659	500	117
EXPT-70	1120	1035	870	700	727	614	117
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-45	180	100	0	27	28.5	234
EXPT-70	180	100	0	27	28.5	286
EXPT-95	170	100	0	27	28.5	357
EXPT-120	170	100	0	27	28.5	397

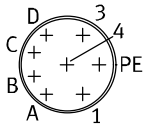
# Parallel kinematic system EXPT, tripod

Technical data

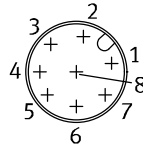
## Pin allocations

### Axis motor

Motor



Encoder

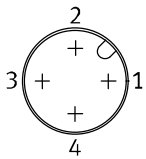


PIN	Function
1	Phase U
PE	PE (protective earth)
3	Phase W
4	Phase V
A	Temperature sensor $M_T+$
B	Temperature sensor $M_T-$
C	Holding brake BR+
D	Holding brake BR-

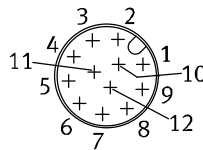
PIN	Function
1	-SENS
2	+SENS
3	DATA
4	DATA/
5	0 V
6	CLOCK/
7	CLOCK
8	up

### Front unit motor

Motor



Encoder



PIN	Function
1	U
2	V
3	W
4	PE


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

# Parallel kinematic system EXPT, tripod

Ordering data – Modular products

Ordering table								
Size	45	70	95	120	Condi- tions	Code	Entry code	
<b>M</b> Module No.	<b>569797</b>	<b>569798</b>	<b>569799</b>	<b>569800</b>				
Product type	EXPT series T						EXPT	
Working space	[mm] 450	-				-45		
	[mm] -	700	-			-70		
	[mm] -	950		-		-95		
	[mm] -	1200				-120		
Drive	DGE-25		-			-E1		
	-		EGC-80			-E4		
Attachment components	Without rotary drive						-T0	
	Rotary drive, size 8						-T1	
	Rotary drive, size 8 with pneum. air throughfeed						-T2	
	Rotary drive, size 11						-T3	
	Rotary drive, size 11 with pneum. air throughfeed						-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	
<b>O</b> Protection against particles	Standard							
	-			Protected version		-P8		

Allocation table	
Parallel kinematic system EXPT	Motor controllers CMMP-AS (→ page 30)
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  
 The motor controller must be ordered separately as an accessory → page 30.  
 Control system on request.

- M** Mandatory data
- O** Options

**Transfer order code**


**EXPT**  -  -  -  -  -

# Parallel kinematic system EXPT, tripod

Ordering data – Modular products

Ordering table							
Size	45	70	95	120	Condi- tions	Code	Entry code
[O] Cable length	None						
	5 m				[1]	-5K	
	10 m				[1]	-10K	
	15 m					-15K	
	Presetting						
	Standard						
	With calibration					-S	
[M] 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

- [M] Mandatory data
- [O] Options

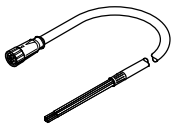
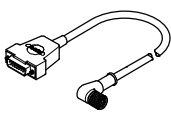
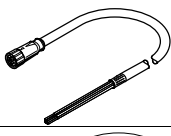
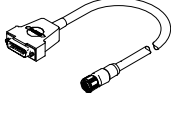
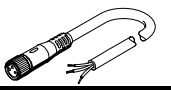
Transfer order code

-  -  -

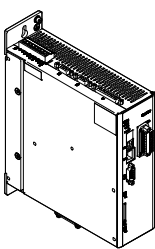
# Parallel kinematic system EXPT, tripod

Accessories

FESTO

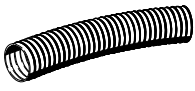
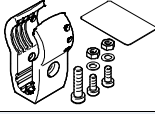

Ordering data			
	Cable length [m]	Part No.	Type
<b>Connection from axis motor to the motor controller</b>			
	Motor cable NEBM		
	5	550310	NEBM-M23G8-E-5-Q9N-LE8
	10	550311	NEBM-M23G8-E-10-Q9N-LE8
	15	550312	NEBM-M23G8-E-15-Q9N-LE8
	X length <sup>1)</sup>	550313	NEBM-M23G8-E-...-Q9N-LE8
	Encoder cable 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 <sup>1)</sup>	550321	NEBM-M12W8-E-...-N-S1G15
<b>Connection from interface housing to the motor controller</b>			
	Motor cable NEBM		
	15	571907	NEBM-M12G4-RS-15-N-LE4
	Encoder cable NEBM		
	15	571915	NEBM-M12G12-RS-15-N-S1G15
<b>Connecting cable NEBU for rod loss detection or reference sensor of the rotary drive</b>			
	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

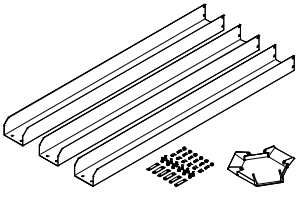
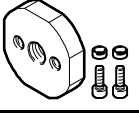
Ordering data – Motor controller						
	For size	Output voltage	Nominal output current	Nominal power	Part No.	Type
		[V AC]	[A]	[VA]		
	For parallel kinematic system					
	45 ... 120	3x 0 ... 270	5	1000	1622902	CMMP-AS-C5-3A-M0
	For attachment component					
	45 ... 120	3x 0 ... 270	2.5	500	1622901	CMMP-AS-C2-3A-M0

# Parallel kinematic system EXPT, tripod

Accessories

Ordering data				
	For size	Description	Part No.	Type
Protective conduit MKG				
	45 ... 120	2 m are required per axis	<b>3156318</b>	<b>MKG-23-PG-29-B</b>
Tubing holder EAHM				
	45 ... 120	For attaching the protective conduit	<b>3506553</b>	<b>EAHM-E10-TH-W29</b>
Angle kit EAHM				
	45 ... 120	For attaching the tubing holder to the connection block	<b>2075203</b>	<b>EAHM-E10-AK</b>
			<b>2075842</b>	<b>EAHM-E10-AK-P8<sup>1)</sup></b>

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

Ordering data				
	For size	Description	Part No.	Type
Cover kit EASC-E10				
	95	<ul style="list-style-type: none"> <li>Protects the working space against the ingress of particles</li> <li>Can only be fitted in conjunction with the variant EXPT-...-P8</li> </ul>	<b>3790894</b>	<b>EASC-E10-95</b>
	120		<b>3790896</b>	<b>EASC-E10-120</b>
Adapter kit EAHA				
	45 ... 120	For suction gripper ESG- (retainer size 2)	<b>1574224</b>	<b>EAHA-R2-M12P</b>
		For suction gripper ESG- (retainer size 3 and 4)	<b>1574227</b>	<b>EAHA-R2-M14P</b>


# Parallel kinematic system EXPT, tripod

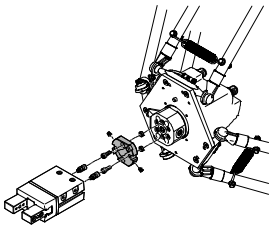
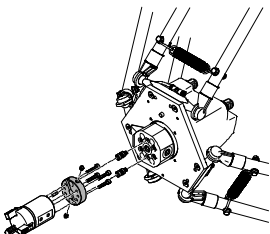
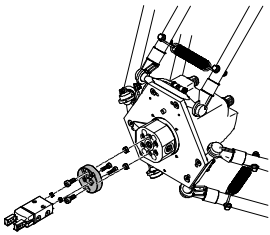
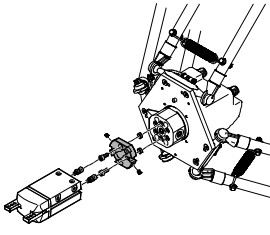
Accessories



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

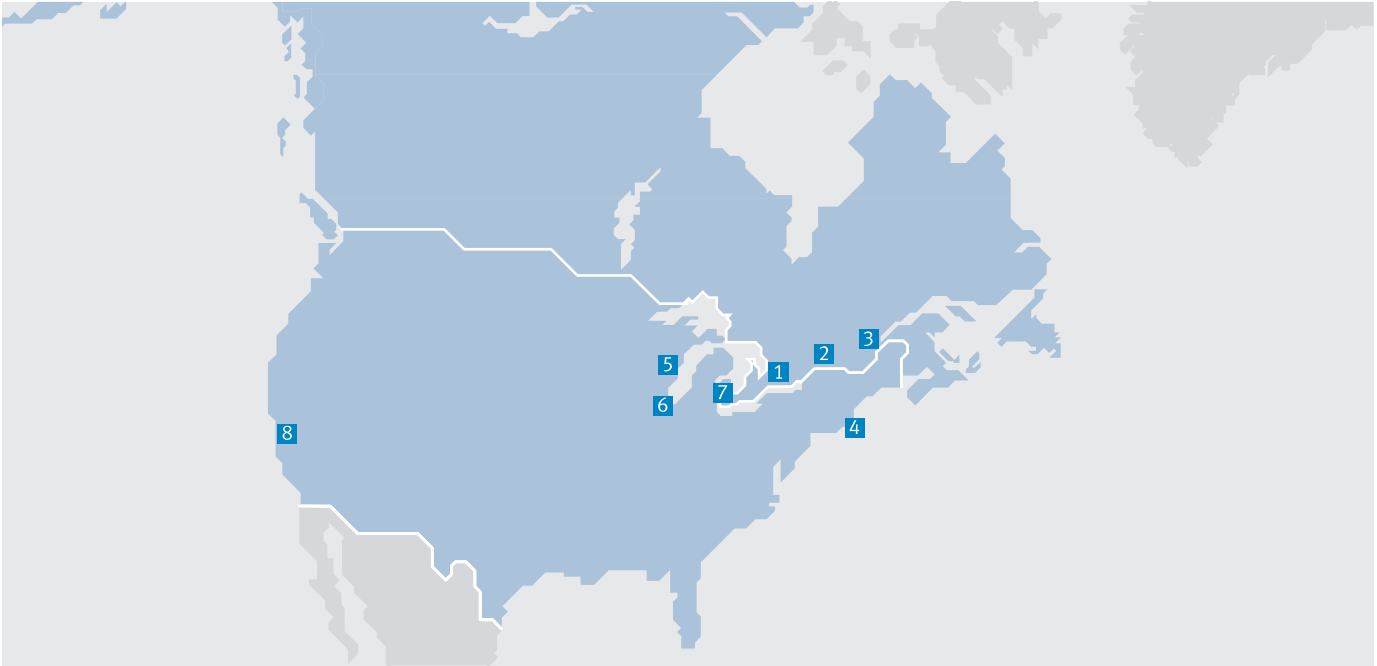
Materials:  
Wrought aluminium alloy  
Free of copper and PTFE  
RoHS compliant

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

Gripper combinations with adapter kit		Download CAD data → <a href="http://www.festo.com">www.festo.com</a>	
Gripper	Size	Adapter kit	
		Part No.	Type
<b>Parallel gripper</b>			
	DHPS, standard		
	6	187566	HAPG-SD2-12
	10	184477	HAPG-SD2-1
	16	184478	HAPG-SD2-2
	HGPT-B, heavy-duty		
	16	564958	DHAA-G-Q5-12-B8-16
	20	564955	DHAA-G-Q5-16-B8-20
	25	537181	HAPG-SD2-25
	HGPL, heavy-duty with long stroke		
	14-40, 14-60, 14-80	537310	HAPG-SD2-31
	HGPD, sealed		
	16	564958	DHAA-G-Q5-12-B8-16
	20	564955	DHAA-G-Q5-16-B8-20
25	537181	HAPG-SD2-25	
<b>Three-point gripper</b>			
	DHDS, standard		
	16	187567	HAPG-SD2-13
	HGDT, heavy-duty		
25	542439	HAPG-SD2-32	
<b>Radial gripper</b>			
	DHRS, standard		
	10	187566	HAPG-SD2-12
	16	184477	HAPG-SD2-1
	25	184478	HAPG-SD2-2
	HGRT, heavy-duty		
16	1273999	DHAA-G-Q5-16-B11-16	
<b>Angle gripper</b>			
	DHWS, standard		
	10	187566	HAPG-SD2-12
	16	184477	HAPG-SD2-1
	25	184478	HAPG-SD2-2



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Subject to change

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