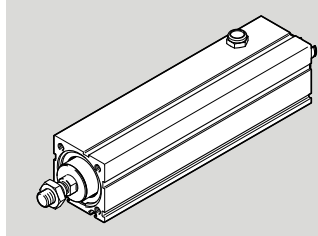


# EPCC-BS

## Electrical drive



# FESTO

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www.festo.com

Instructions | Operating

8084306  
 2018-06  
 [8084308]



Translation of the original instructions

### 1 Further applicable documents



All available documents for the product → [www.festo.com/pk](http://www.festo.com/pk).

### 2 Safety

#### 2.1 Safety instructions

- Observe labelling on the product.
- Prior to assembly, installation and maintenance work: Switch off power supply, ensure that it is off and secure it against being switched back on.
- Store the product in a cool, dry, UV-protected and corrosion-protected environment. Ensure that storage times are kept to a minimum.
- Observe tightening torques. Unless otherwise specified, the tolerance is  $\pm 20\%$ .

#### 2.2 Intended use

The electric drive with guide unit is intended for precise positioning of payloads in combination with a motor and controller. The product is intended for use in industrial environments. Measures for interference suppression may be required in residential areas.

#### 2.3 Training of qualified personnel

Installation, commissioning, maintenance and disassembly should only be conducted by qualified personnel. The personnel must be familiar with the installation of mechatronic control systems.

### 3 Service

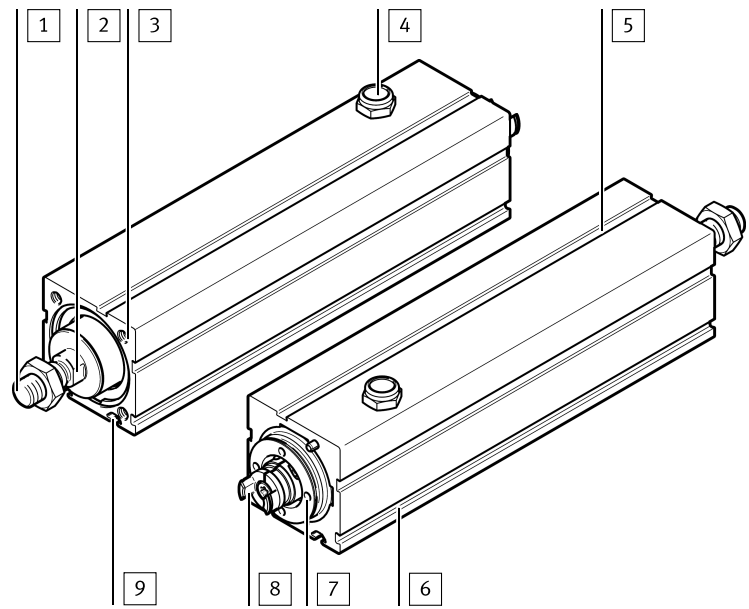
Contact your regional Festo contact person if you have technical questions → [www.festo.com](http://www.festo.com).

### 4 Product overview

#### 4.1 Function

A rotating ball screw drive converts the rotation of a motor into straight-line motion. As a result, the piston rod moves backwards and forwards. The piston rod is designed to prevent twisting. The position of the piston rod can optionally be sensed.

### 4.2 Product design



- |   |  |   |                                      |
|---|--|---|--------------------------------------|
| 1 | Piston rod (push rod)                  | 5 | Slot for sensor bracket (on 3 sides) |
| 2 | Spanner flat for counter holding       | 6 | Slot for profile mounting            |
| 3 | Thread for mounting (not with size 25) | 7 | Interface for motor mounting kit     |
| 4 | Venting hole with filter element       | 8 | Drive hub                            |
|   |  | 9 | Slot for mounting                    |

Fig. 1 Product design EPCC

### 5 Mounting

#### 5.1 Preparation

##### NOTICE!

#### High tensile load will strip the thread.

- Use additional profile mountings as well as the face mounting threads for high tensile loads.
- Do not modify any screws and threaded pins on the product.
- Install the product free from distortion and deflection. Evenness of the bearing surface  $\leq 0.2$  mm.
- Place the product in such a way that all operating elements can be reached.

##### CAUTION!

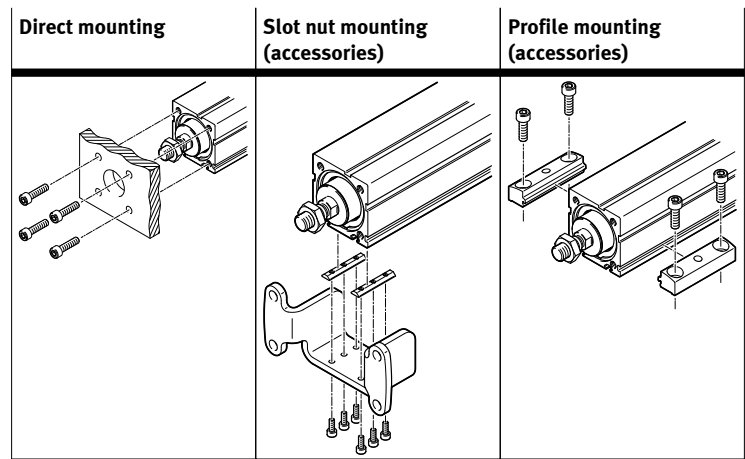
#### For vertical or slanted mounting position: when power is off, moving parts can travel or fall uncontrolled into the lower end position.

Injury due to impacts or crushing.

- Bring moving parts of the product into a safe end position or secure them against falling.
- Check if additional external safety measures such as pawls or moveable bolts are required.

#### 5.2 Mounting

1. Secure product. Mounting accessories → [www.festo.com/catalogue](http://www.festo.com/catalogue).
2. Tighten the retaining screws evenly.



Tab. 1 Types of mounting

Size	25	32	45	60
Direct mounting				
Female thread face	–	M4	M5	M6
Tightening torque [Nm]	–	≤ 3	≤ 4	≤ 5

Tab. 2 Screw diameter and tightening torques for the mounting

### 5.3 Attachment

When attaching the payload do not transfer torque to the piston rod. The spanner flat is used for counter holding → 4.2 Product design.

1. Place the centre of gravity of the payload centrically to the piston rod.
2. Mount the payload on the piston rod.

The piston rod is lowered depending on the payload. Deflection of the piston rod → 11.2 Technical data, characteristic curves.

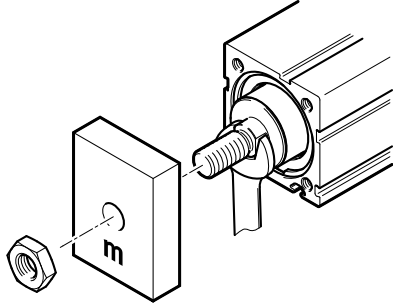


Fig. 2 Mounting the payload

Size	25	32	45	60
Piston rod				
Male thread	M6	M8	M10x1.25	M12x1.25
Spanner flat	7	9	10	13

Tab. 3 Thread and spanner flat for mounting the payload

### 5.4 Mounting accessories

To protect the end positions against uncontrolled overtravel:

- Check whether proximity sensors are necessary (hardware limit switches).
- If proximity sensors are used as limit switches:
- Preferably use proximity sensors with normally closed function. This protects against excess travel beyond the end position, if the proximity sensor cable is broken.

If proximity sensors are used as reference switches:

- Use proximity sensors that correspond to the input of the controller being used.

Mounting the proximity sensors:

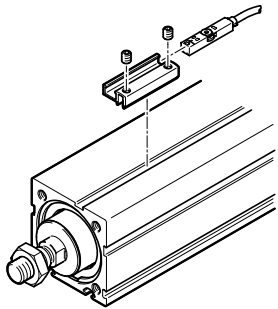


Fig. 3 mounting kit and sensor bracket

1. Use a mounting kit for mounting the proximity sensors → [www.festo.com/catalogue](http://www.festo.com/catalogue).
2. Avoid external influence caused by magnetic or ferrite parts in the vicinity of the proximity sensors (minimum spacing 20 mm from ferrite parts).
3. Test switching function.

### Prevention of contamination

- Connect sealing air. To do so, remove the filter element [4] from the housing and connect compressed air (max. 0.2 bar).

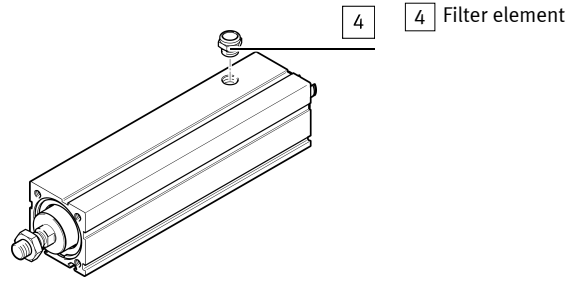


Fig. 4 Sealing air connection

Size	25	32	45	60
Threaded hole	M5	M5	G1/8	G1/4
Screw-in depth [mm]	≤ 4	≤ 6	≤ 7	≤ 9
Tightening torque [Nm]	1.4	1.4	5	8

Tab. 4 Thread for sealing air connection

## 6 Commissioning

### 6.1 Preparation

- The product is fully assembled and installed.
- The motor controller is parameterised and ready for operation.
- The positioning range is protected against access (e.g. with a protective grille) and free from foreign objects.
- Incorrect specification values for the braking ramp result in overload of the product and may destroy it or drastically reduce the service life. Check the settings for all braking ramps in the motor controller or the higher-order control system (deceleration values and jerk). Taking the travel speed, moveable load and mounting position into account, set the delay values (brake delay and delay times) in such a way that the maximum drive torque and the maximum feed force of the product are not exceeded. Use the Festo Positioning-Drives sizing software → [www.festo.com](http://www.festo.com).
- Block-shaped acceleration profiles (without jerk limitation) cause high peaks in the drive force that can lead to an overloading of the drive. Due to overshooting effects, positions outside of the permissible range may also occur. A jerk-limited acceleration specification reduces vibrations in the entire system and has a positive effect on stress in the mechanical system. Check which closed-loop controller settings can be adapted (e.g. jerk limitation, smoothing the acceleration profile).

### 6.2 Processing

#### ⚠ WARNING!

#### Risk of injury due to unexpected movement of components.

- Protect the positioning range from unwanted intervention.
- Keep foreign objects out of the positioning range.
- Perform commissioning with low dynamic response.

1. Start control travel with low dynamic response (speed, acceleration) to check the direction of rotation.  
The direction of rotation of the motors depends on the wiring.
2. Carry out homing. The reference run may be made directly against the end position if the maximum impact energy is not exceeded.

#### Formula for maximum impact energy

$$\text{maximum impact energy} = 0,5 \times \text{velocity}^2 \times \left[ \text{weight} + \frac{\text{inertia}}{\text{mass moment of inertia per kg payload}} \right]$$

Tab. 5

Impact energy:

- EPCC-BS-25: max. 0.0012 J
- EPCC-BS-32: max. 0.0036 J
- EPCC-BS-45: max. 0.0120 J
- EPCC-BS-60: max. 0.0240 J

Inertia per kg payload → 11 Technical data.

3. Start a test run with low dynamic response.  
Check that the EPCC meets the following requirements:
  - The piston rod can move through the complete intended positioning cycle.
  - The piston rod stops as soon as it reaches a limit switch.

If the proximity sensors fail to respond: → 9 Fault clearance and → operating instructions for the proximity sensors.

## 7 Operation

1. Comply with operating conditions.
2. Comply with maintenance conditions → 8 Maintenance.
3. Only close the holding brake when the motor is switched off.

In cantilever mode, the service life can be increased if vibrations of the piston rod are reduced. Remedial measures:

1. Use smoothing.
2. In vertical operation, the load should preferably be mounted centrally to the piston rod.
3. Minimise lateral accelerations of the entire electric drive

## 8 Maintenance

### 8.1 Safety

#### ⚠ WARNING!

**Danger of crushing due to unexpectedly fast-moving loads and unintentional movements.**

- Switch off power to the product.
- Safeguard the power supply from being switched on again unintentionally.

### 8.2 Cleaning

- Clean the outside of the product with a soft cloth as required. Before cleaning, the product must be cooled down to room temperature. Cleaning agents include all non-abrasive media.

### 8.3 Lubrication

- If the piston rod no longer has a coating of grease, lubricate it with ELKALUB VP 922 lubricating grease (ChemieTechnik, Vöhringen).

## 9 Fault clearance

Error description	Cause	Remedy
Running noises or vibrations are occurring.	Warping in the product	<ul style="list-style-type: none"> <li>– Install product without tension. Evenness of the bearing surface: ≤ 0.2 mm.</li> <li>– Grease piston rod → 8.3 Lubrication.</li> <li>– Change the travel speed.</li> </ul>
	Incorrect controller parameters set.	Change controller parameters (in controlled operation).
	Resonance is occurring.	Change travel speed or mass of load.
Piston rod does not move.	Loads too high.	<ul style="list-style-type: none"> <li>– Reduce load mass.</li> <li>– Reduce travel speed.</li> </ul>
	Pre-tension of toothed belt too high with parallel kit.	Reduce pre-tension of the toothed belt → assembly instructions for the parallel kit.
	Ambient temperature is too low (increased breakaway torque at first start-up due to increasing viscosity of the lubricants in the spindle system).	<ul style="list-style-type: none"> <li>– Reduce load mass.</li> <li>– Reduce travel speed.</li> <li>– Adjust ambient temperature.</li> </ul>

Tab. 6

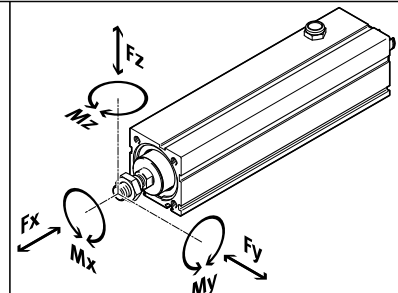
## 10 Disposal

#### ♻ ENVIRONMENT!

Send the packaging and product for environmentally sound recycling in accordance with the current regulations → [www.festo.com/sp](http://www.festo.com/sp).

## 11 Technical data

### 11.1 Technical data, mechanical

Size	25		32	
	[mm]		[mm]	
Spindle pitch	2	6	3	8
Design	Electric drive with ball screw drive			
Guide	Sliding guide			
Max. torsion angle of piston rod [°]	± 1			
Mounting position	Any			
Max. radial force on drive shaft [N]	30		75	
Max. feed force $F_x$ [N]	75		150	
Max. driving torque [Nm]	0.05	0.1	0.15	0.3
No-load driving torque [Nm]	0.02	0.055	0.065	0.095
Inertia per kg payload [kg cm <sup>2</sup> / kg]	0.0010	0.0091	0.0023	0.0162
Max. speed [m/s]	0.133 <sup>1)</sup>	0.4 <sup>1)</sup>	0.188	0.5
Max. acceleration [m/s <sup>2</sup> ]	5	15	5	15
Max. rotational speed [rpm]	4000		3750	
Reversing backlash [mm]	< 0.1			
Repetition accuracy [mm]	± 0.02			
Feed constant (spindle pitch) [mm/re-v]	2	6	3	8
Ambient temperature [°C]	0 ... +60			
Storage temperature [°C]	-20 ... +60			
Relative humidity [%]	0 ... 95 (non-condensing)			
Degree of protection	IP40			
Max. permitted forces and torques on the piston rod				
				
$F_{x,max}$ [N]	75		150	
$F_{y,max} = F_{z,max}$ [N]	→ 11.2 Technical data, characteristic curves			
$M_{x,max}$ [Nm]	0		0	
$M_{y,max} = M_{z,max}$ [Nm]	0.6		1.5	
Formula for combined loads:				
$f_v = \frac{ F_{y,dyn} }{F_{y,max}} + \frac{ F_{z,dyn} }{F_{z,max}} + \frac{ M_{x,dyn} }{M_{x,max}} + \frac{ M_{y,dyn} }{M_{y,max}} + \frac{ M_{z,dyn} }{M_{z,max}} \leq 1$				
Information on materials				
Cylinder barrel	Anodised aluminium			
Piston rod	High-alloy stainless steel			
Spindle	Steel			
Note on materials	Contains paint-wetting impairment substances <sup>2)</sup>			
Weight [kg]	0.16 ... 0.39		0.29 ... 0.71	

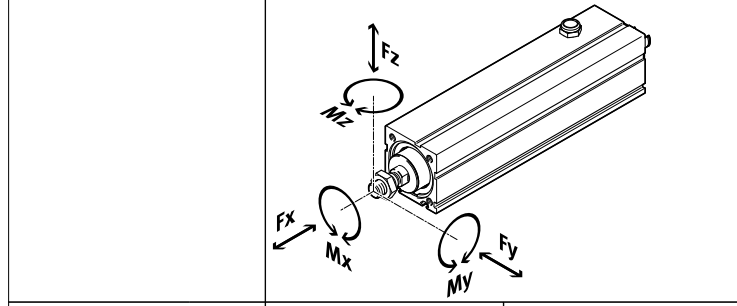
1) from 130 mm stroke reduced velocity → catalogue information

2) PWIS = paint-wetting impairment substances

Tab. 7 Technical data, mechanical for size 25 and 32

Size	45		60	
	Spindle pitch [mm]			
Spindle pitch [mm]	3	10	5	12
Design	Electric drive with ball screw drive			
Guide	Sliding guide			
Max. torsion angle of piston rod [°]	± 1			
Mounting position	Any			
Max. radial force on drive shaft [N]	180		230	
Max. feed force $F_x$ [N]	450		1000	
Max. driving torque [Nm]	0.4	0.9	1.2	2.4
No-load driving torque [Nm]	0.08	0.16	0.235	0.325
Inertia per kg payload [kg cm <sup>2</sup> / kg]	0.0028	0.0253	0.0063	0.0365
Max. speed [m/s]	0.18	0.6	0.25	0.6
Max. acceleration [m/s <sup>2</sup> ]	5	15	5	15
Max. rotational speed [rpm]	3600		3000	
Reversing backlash [mm]	< 0.1			
Repetition accuracy [mm]	± 0.02			
Feed constant (spindle pitch) [mm/rev]	3	10	5	12
Ambient temperature [°C]	0 ... +60			
Storage temperature [°C]	-20 ... +60			
Relative humidity [%]	0 ... 95 (non-condensing)			
Degree of protection	IP40			

Max. permitted forces and torques on the piston rod



$F_{x,max}$ [N]	450	1000
$F_{y,max} = F_{z,max}$ [N]	→ 11.2 Technical data, characteristic curves	
$M_{x,max}$ [Nm]	0	0
$M_{y,max} = M_{z,max}$ [Nm]	2.9	6.4

Formula for combined loads:

$$f_v = \frac{|F_{y,dyn}|}{F_{y,max}} + \frac{|F_{z,dyn}|}{F_{z,max}} + \frac{|M_{x,dyn}|}{M_{x,max}} + \frac{|M_{y,dyn}|}{M_{y,max}} + \frac{|M_{z,dyn}|}{M_{z,max}} \leq 1$$

Information on materials	
Cylinder barrel	Anodised aluminium
Piston rod	High-alloy stainless steel
Spindle	Steel
Note on materials	Contains paint-wetting impairment substances <sup>1)</sup>
Weight [kg]	0.66 ... 1.79
	1.29 ... 4.56

1) PWIS = paint-wetting impairment substances

Tab. 8 Technical data, mechanical for size 45 and 60

11.2 Technical data, characteristic curves

Maximum permissible transverse loads  $F_{y,max}$  and  $F_{z,max}$  on the piston rod depending on cantilever A.

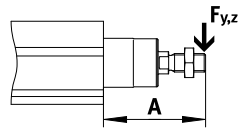
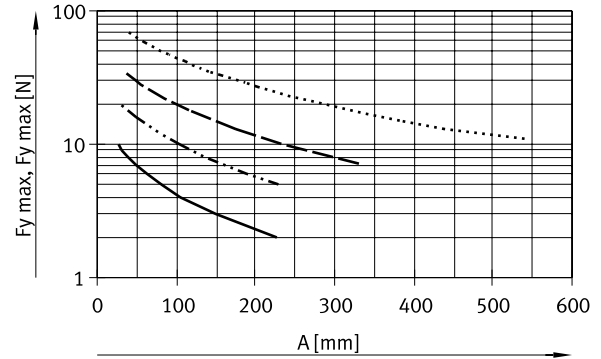


Fig. 5

EPCC



— EPCC-25  
 ..... EPCC-32  
 ---- EPCC-45  
 - · - · EPCC-60

Fig. 6

Piston rod deflection f depending on cantilever A and transverse load F.

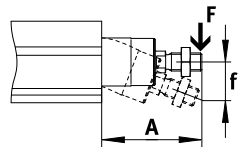
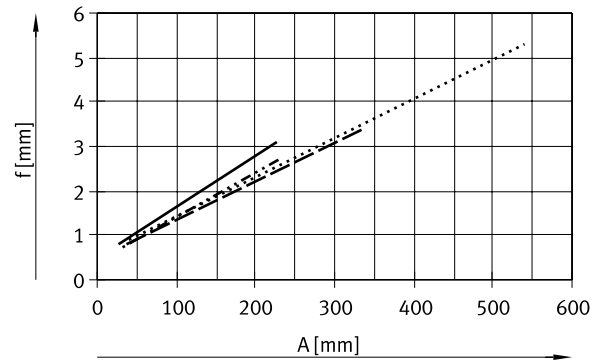


Fig. 7

EPCC



— EPCC-25 (F= 1.5 N)  
 ..... EPCC-32 (F= 3.5 N)  
 ---- EPCC-45 (F= 4 N)  
 - · - · EPCC-60 (F= 8 N)

Fig. 8