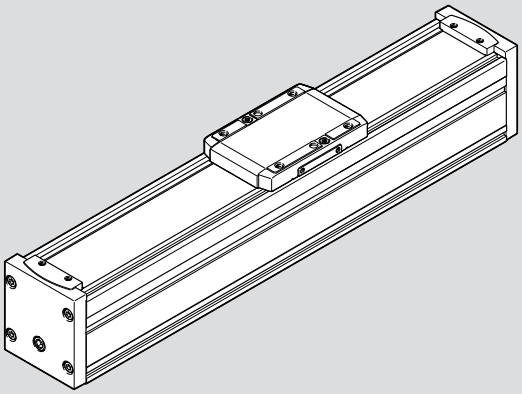
ELFC
Guide axis



FESTO

Operating instruction

8178727

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2023-05c
[8178729]

Translation of the original instructions

Table of contents

1 Applicable documents

All available documents for the product ➔ www.festo.com/sp.

2 Safety

2.1 Safety instructions

- Observe the identifications on the product.
- Only use the product if it is in perfect technical condition.
- Before working on the product: Switch off the power supply, ensure that it is off and secure it against being switched on again.
- Store the product in a cool, dry environment protected from UV and corrosion. Keep storage times short.
- Store the product in ambient conditions without oils, greases and grease-dissolving vapours.

2.2 Intended use

The axis positions payloads in connection with a drive axis in multi-axis systems.
The axis is approved for slide operation.

Fig. 1: Slide operation

2.3 Training of qualified personnel

Work on the product may only be carried out by qualified personnel who can evaluate the work and detect dangers.

3 Additional information

- Contact the regional Festo contact if you have technical problems ➔ www.festo.com.
- Accessories and spare parts ➔ www.festo.com/catalogue.

4 Product overview

4.1 Product design

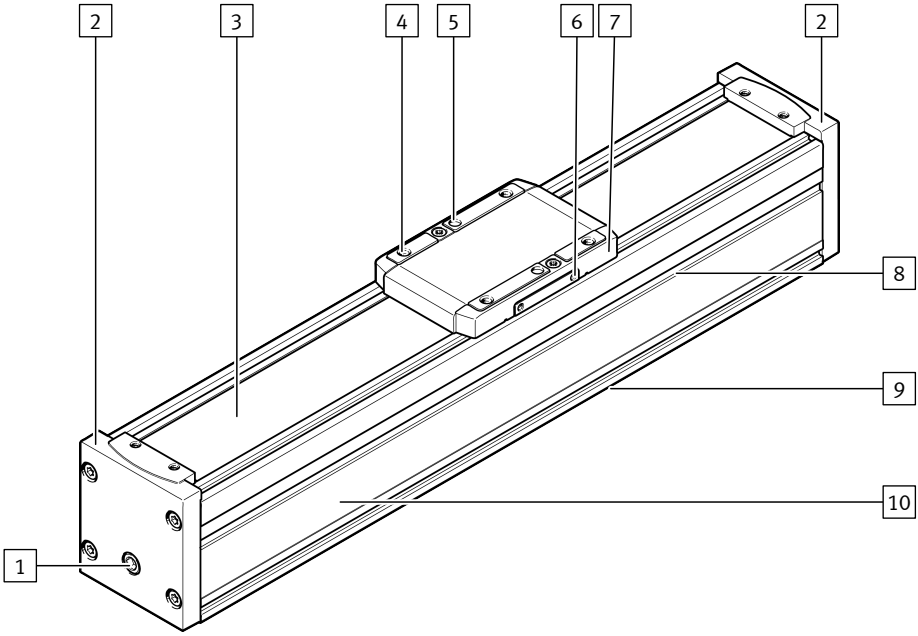


Fig. 2: Product design ELFC

1	Sealing air connection	6	Threaded hole for switch lug
2	End cap	7	Slide
3	Cover strip	8	Slot for sensors and sensor brackets
4	Threaded hole for payload	9	Slot for profile mountings
5	Centring hole for payload	10	Profile

4.2 Function

The slide of the axis follows the movement of the parallel mounted drive axis via the mechanical coupling. The linear movement of the slide is precisely guided by the guide. Sensors enable the monitoring of end positions, reference position and intermediate position.
The slide of the axis follows the movement of the parallel mounted drive axis via the mechanical coupling. The linear motion of the slide is precisely guided by the guide. The integrated cover strip prevents abraded particles from access to the immediate vicinity of the drive. Sensors monitor end positions, reference position and intermediate position.

5 Transport

⚠ WARNING

Risk of injury due to falling product

If the product is lifted incorrectly, it may fall and cut, crush or separate body parts.

- Lift the product only with suitable load-bearing equipment.

– Store and transport the product in its original packaging. Observe the weight, the dimensions and the ambient conditions.
– Take the centre of gravity of the product into consideration.
– Store and transport the product in a horizontal position.
– Comply with the maximum permitted support clearances when attaching transportation aids ➔ 10.2 Characteristic curves of support distances. Compliance with the support clearances prevents the axis from excessive bending.

6 Assembly

6.1 Safety

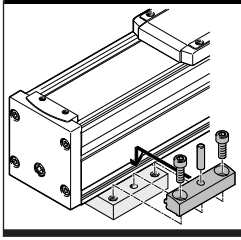
⚠ WARNING

Risk of Injury due to Unexpected Movement of Components

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

- Bring moving parts of the product into a safe end position or secure them against falling.

6.2 Mounting axis

Profile mounting EAHF-L2


Tab. 1: Overview of mounting component

Requirements:
– Adequate clearance for payload to avoid collisions with motor, mounting components and sensor components.
– Sufficient space for maintenance work.

- Flatness of the mounting surface of 0.05% of the stroke length or maximum 0.5 mm over the stroke length of the bearing surface.
- Required support points lie within the specified support clearances ➔ 10.2 Characteristic curves of support distances. Compliance with the support clearances prevents the axis from excessive bending.

1. Place the mounting components on the support points.
2. Tighten the screws. Observe the maximum tightening torque and maximum screw-in depth.

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When used in multi-axis systems: align to the first axis and install without tension.

ELFC-...	-32	-45	-60	-80
Profile mounting EAHF-L2				
Thread	Instruction manual ➔ www.festo.com/sp.			

6.3 Mounting the payload

⚠ WARNING

Unexpected movement of components.

Injury due to impacts or crushing.

- Before working on the product, switch off the control and secure it to prevent it from being switched back on accidentally.

⚠ WARNING

Risk of Injury due to Unexpected Movement of Components

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

- Bring moving parts of the product into a safe end position or secure them against falling.

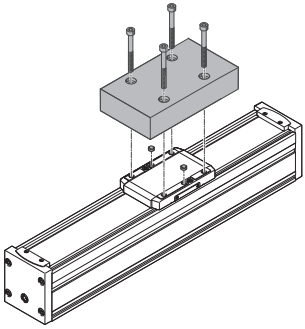


Fig. 3: Mounting payload, example "top mounting"

Requirements:
- Adequate clearance for payload to avoid collisions with motor, mounting components and sensor components.
- Sufficient space for maintenance work.
- A payload mounting surface flatness of 0.01 mm above the slide surface.
- Minimise the guide load. Short lever arms from the guide centre to the force application points and centres of gravity of the payload.

1. Place centring components in the centring holes.
2. Position the payload at the intended location.
3. Tighten the screws. Observe the maximum tightening torque and maximum screw-in depth.

ELFC-...		**-32**	**-45**	**-60**	**-80**
Direct fastening					
Thread		M3	M4	M5	M6
Max. tightening torque	[Nm]	1.2	2.9	5.9	9.9
Max. screw-in depth t_{max}	[mm]	5.3	7.8	10.8	14.7
Centring pins	[mm]	∅ 2 H7	∅ 4 H7	–	–
Centring sleeve	[mm]	–	–	∅ 5 H7	∅ 7 H7

6.4 Mounting sensor

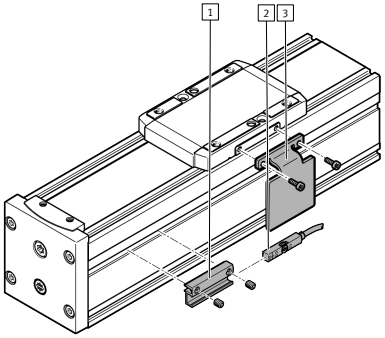


Fig. 4: Mounting switch lug, sensor and sensor bracket

1 Sensor bracket

2 Sensor

3 Switch lug

Requirements:

- Protect the sensor from external magnetic or ferritic influences with min. 10 mm distance from slot nuts.
- Use a hardware limit switch with N/C contact function to guarantee protection in the event of a sensor failure.
- Use an inductive or magnetoresistive sensor.
- Only query the integrated magnets in the slide with a magnetoresistive sensor.

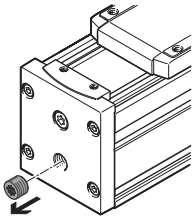
1. Only mount the switch lug on the inductive sensor.
2. If necessary, mount the sensor bracket.
3. Mount the sensor.

6.5 Connecting sealing air

The use of sealing air at approx. ± 0.02 MPa (± 0.2 bar, ± 2.9 psi) reduces or prevents the following forms of contamination:

- The application of negative pressure minimises the release of abraded particles into the environment.
- The application of overpressure reduces the penetration of dirt into the drive train.

1. Remove the sealing air plug screw from the threaded hole.



2. Mount the fitting and connect the hose.

7 Commissioning

⚠ 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.

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Identical axes can generate different running noises depending on the parameterisation, mode of operation, type of mounting, installation environment and components.

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For use with reduced particle emission

- Clean the product ➔ 8.3 Cleaning axis.

Requirements:

– The mounting of the drive system has been checked.
– The protective cover of the cover strip is removed.
– There are no foreign objects in the movement space of the drive system.
– Axis is not mechanically overloaded and dynamic setpoint deviation is not exceeded as a result of force peaks, torque peaks or overshoot effects, e.g. overrunning the end position.

- Commission the drive system, e.g. start check run and homing.

8 Maintenance

8.1 Safety

⚠ WARNING

Unexpected movement of components

Injury due to impact or crushing.

- Before working on the product: secure the slide to prevent unintentional movement.

⚠ WARNING

Risk of Injury due to Unexpected Movement of Components

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

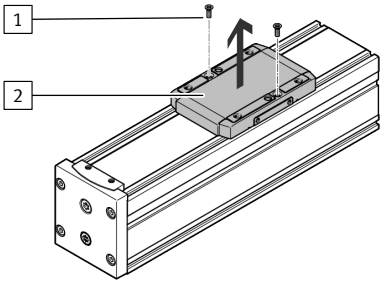
- Bring moving parts of the product into a safe end position or secure them against falling.

8.2 Retensioning cover strip

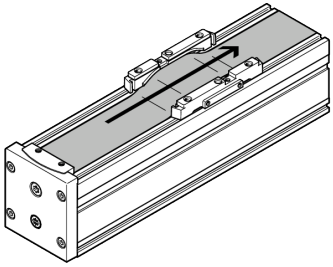
1. Check the cover strip for wave formation every 2000 km.
2. Retension the cover strip as follows if waves are detected.
3. Replace the belt reversals and the cover strip if retension is no longer possible.

Retensioning cover strip for magnetic reversal

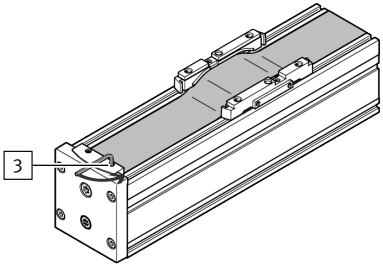
1. Remove the screws [1].
   Remove the covering [2].



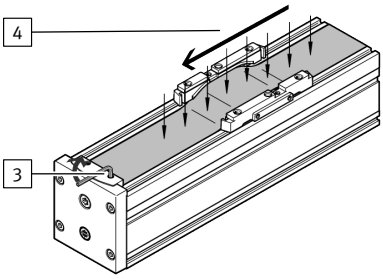
2. Check the cover strip for wave formation.
   - Retension the cover strip if wave formation is detected ➔ Step 3.
   - If there is no wave formation, mount the removed carriage components ➔ Step 7.



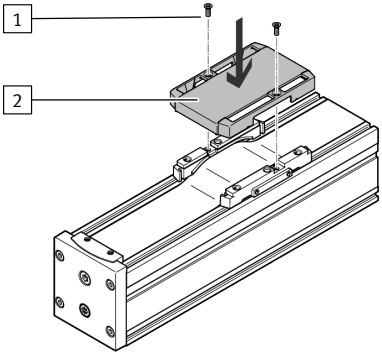
3. Unscrew clamping screws on one side [3].



4. Slowly press the cover strip [4] flat onto the guide surfaces in the direction of the loosened clamping screws.
   Tighten the clamping screws [3] to 2 Nm while maintaining the tension of the cover strip.



5. Place the covering [2] on the moment compensator. The cover strip must not contact the cover.
   Tighten the screws [1] to 0.2 Nm for size 32 and to 0.5 Nm for sizes 45, 60 and 80.



8.3 Cleaning axis

– Clean the product with a clean, soft cloth and non-abrasive cleaning agents.

For use with reduced particle emission:

– Remove abrasion and contamination from the product on the following schedule:
  – Prior to initial commissioning.
  – Regularly during operation.

8.4 Lubricating axis

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The axis is lubricated for life.
Additional lubrication of the axis is not necessary.

9 Fault clearance

⚠ WARNING

Unexpected movement of components

Injury due to impact or crushing.

- Before working on the product: secure the slide to prevent unintentional movement.

⚠ 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.

⚠ WARNING

Risk of Injury due to Unexpected Movement of Components

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

- Bring moving parts of the product into a safe end position or secure them against falling.

Malfunction	Cause	Remedy
Loud running noises, vibrations or rough running of the axis.	Torsional stresses	– Install axis without tension. Make sure that the contact surface is flat ➔ 6.2 Mounting axis. – Change the layout of the attachment component, e.g. payload. – Align axes parallel to each another.
	Resonance oscillation of the axis.	– Change travel speed.
	Wear on bearing or guide.	– Contact local Festo Service. – Replace axis.
Vibrations on the slide.	Operation at the resonant frequency of the axis.	– Change travel speed. – Change the acceleration. – Increase axis stiffness, e.g. shorter support distances. – Change the payload geometry.

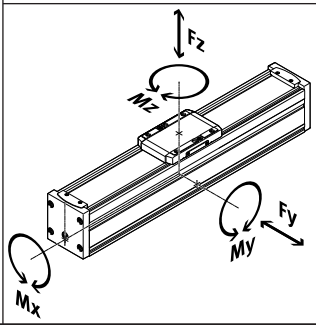
Malfunction	Cause	Remedy
Long oscillations of the profile.	Resonant frequency of profile and payload too low.	– Increase axis stiffness, e.g. shorter support distances. – Change the payload geometry.
Slide does not move.	Loads are too high.	– Reduce forces and torques. Consider dynamics.
	Screws too long for mounting payload.	– Observe the screw-in depth ➔ 6.3 Mounting the payload.
Overruns the end position.	Sensor does not switch.	– Check sensor, installation and parameterisation.
Wave formation on the cover strip or aluminium abrasion on the axis.	Wear on belt reversals.	– Retension cover strip ➔ 8.2 Retensioning cover strip. – Replace belt reversal and cover strip.

Tab. 2: Fault clearance

10 Technical data

10.1 Technical data, mechanical

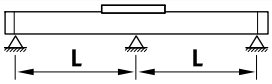
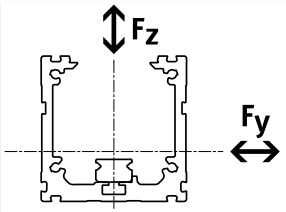
ELFC-...		-32	-45	-60	-80
Design		Mechanical axis			
Guide		Recirculating ball bearing guide			
Mounting position		Any			
Max. displacement force	[N]	2	4.5	6.75	15
Max. speed	[m/s]	1.5			
Max. acceleration	[m/s²]	15			
Ambient temperature	[°C]	0 ... +50			
Storage temperature	[°C]	–20 ... +60			
Degree of protection		IP40			
Max. permissible forces and torques on the slide					
Fy	[N]	150	300	600	900
Fz	[N]	300	600	1800	2700
Mx	[Nm]	1.3	5.5	29.1	59.8
My	[Nm]	1.1	4.7	31.8	56.2

ELFC-...		-32	-45	-60	-80
Mz	[Nm]	1.1	4.7	31.8	56.2
Calculating the load comparison factor					
fv		$fv = \frac{\lvert Fy,dyn\rvert}{Fy,max} + \frac{\lvert Fz,dyn\rvert}{Fz,max} + \frac{\lvert Mx,dyn\rvert}{Mx,max} + \frac{\lvert My,dyn\rvert}{My,max} + \frac{\lvert Mz,dyn\rvert}{Mz,max} \leq 1$			
					

Tab. 3: Technical data, mechanical

10.2 Characteristic curves of support distances

The maximum permissible support distance L without profile mounting MUE as a function of force Fy/Fz with a maximum deflection of 0.5 mm.

Support distance	Force load
	

Tab. 4: Overview of support distance and force load

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Additional support spacing is not required for support points for the ELFC-KF-32.

ELFC-KF-45

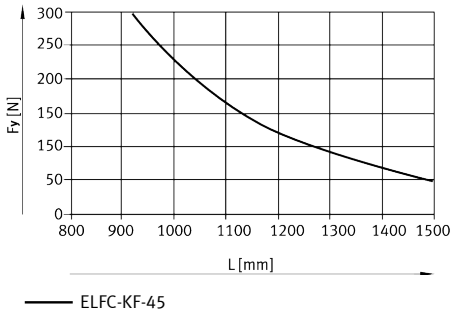

Fig. 5: ELFC-KF-45, support distance L as a function of force Fy

ELFC-KF-60/80

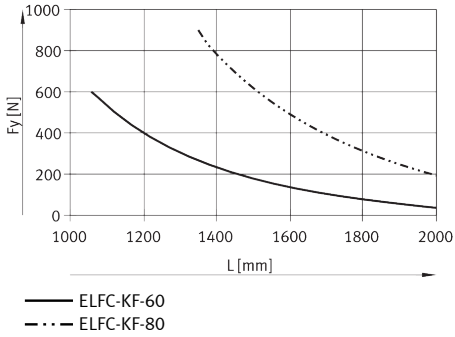

Fig. 6: ELFC-KF-60/-80, support distance L as a function of force Fy

ELFC-KF-45

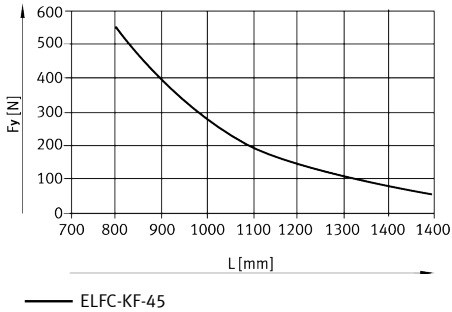

Fig. 7: ELFC-KF-45, support distance L as a function of force Fz

ELFC-KF-60/80

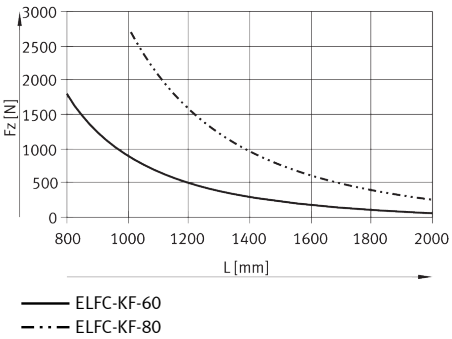

Fig. 8: ELFC-KF-60/-80, support distance L as a function of force Fz

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