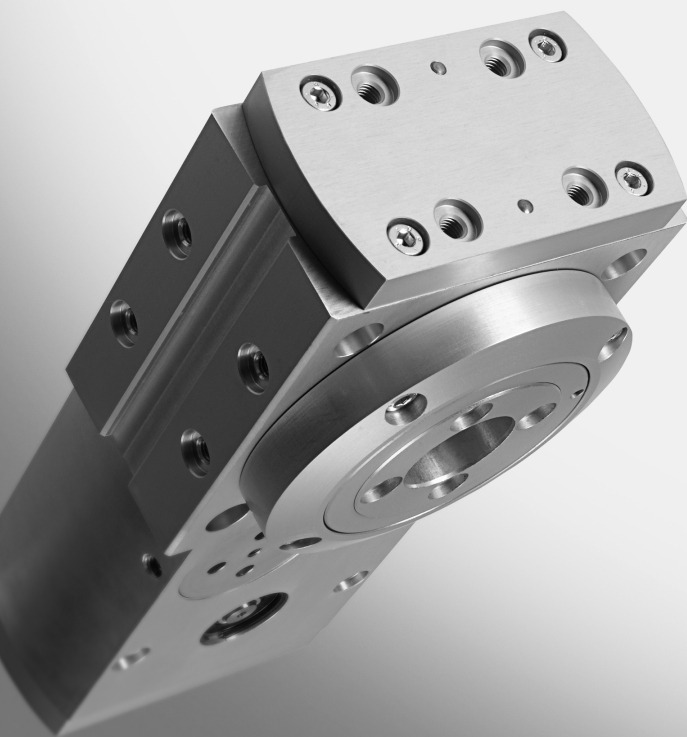


Rotary module

ERMB



FESTO

(en) Operating
instructions

8103858
2018-12a
[8103860]

Translation of the original instructions

Identification of hazards and instructions on how to prevent them:



Danger

Immediate dangers which can lead to death or serious injuries



Warning

Hazards that can cause death or serious injuries



Caution

Hazards that can cause minor injuries

Other symbols:



Note

Material damage or loss of function



Recommendations, tips, references to other documentation



Essential or useful accessories



Information on environmentally sound usage

Text designations:

- Activities that may be carried out in any order
- 1. Activities that should be carried out in the order stated
- General lists
- ➔ Result of an action/References to more detailed information

Rotary module ERMB

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For all available product documentation → www.festo.com/pk

1 Operating parts and connections

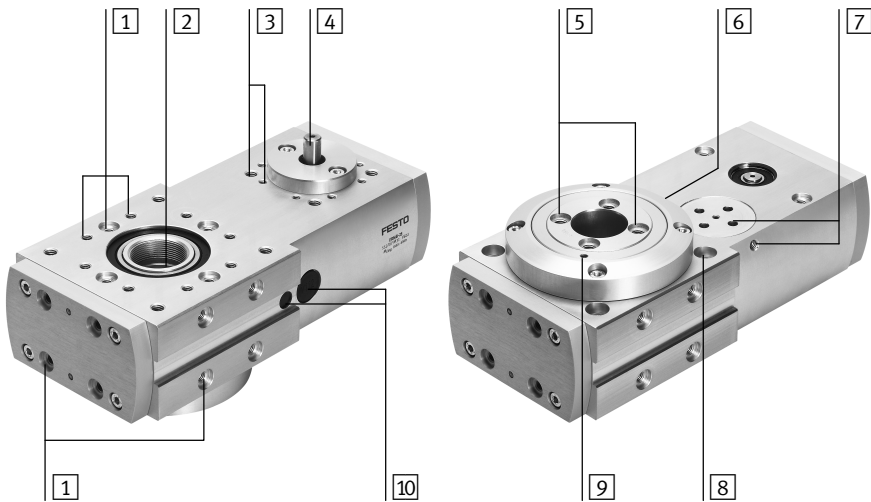


Fig. 1

- | | |
|---|--|
| <p>1 Centring holes and threaded holes for fastening (on 6 sides)</p> | <p>6 Threaded hole for proximity switch (covered)</p> |
| <p>2 Drive shaft (hollow shaft) with thread for accessories, rear side</p> | <p>7 Toothed belt tension pulley with locking screw for service personnel</p> |
| <p>3 Threaded holes for kits for connecting the motor</p> | <p>8 Through hole for fastening</p> |
| <p>4 Drive shaft</p> | <p>9 Marking hole on connector ring for switching cam lying behind</p> |
| <p>5 Drive shaft with centring holes and threaded holes for work load, front</p> | <p>10 Holes for service personnel</p> |

2 Function and application

A toothed belt transfers the rotary movement of a motor to a hollow shaft.

The shafts have ball bearings. The reference position of the hollow shaft can be scanned with the aid of an inductive proximity switch in the threaded hole [6].

The rotary module type ERM is intended for turning work loads (e. g. with grippers). The ERM is not permitted for application conditions in which vegetable and water-soluble greases or oils can penetrate into the axis. Vegetable greases or oils can reduce the capacity of the toothed belt.



Note

The ERM is not fitted with a brake. When the input torque is not applied, the rotary module can be moved freely. Generally self-locking of the complete system can be achieved with motors with integrated holding brake or with high self-braking torque.

- Use the motors specified in the Festo (→ catalogue. www.festo.com/catalogue).
You will then be operating two devices which are especially matched to each other.

When using other motors:

- Observe the maximum values for torques and speeds → chapter “12 Technical specifications.”
- Note the interface geometries (e.g. for the drive shafts) → catalogue specifications under www.festo.com/catalogue

3 Transport and storage

- Take into account the weight of the rotary module. Depending on the design the ERM can weigh up to 3.3 kg.
- Ensure storage conditions as follows:
 - Storage times should be kept to a minimum
 - cool, dry, shaded, corrosion-protected storage locations

4 Conditions of use



Warning

Uncontrolled moving masses can cause injury to people or damage to property (danger of fingers being squashed).

- Apply power to the drive motor, at first limited to low speeds and torques.

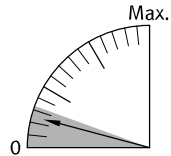


Fig. 2



Note

The positioning times and permitted mass moments of inertia on the drive depend to a large extent on the flange-mounted motor.

- Use the design tool “Positioning Drives” from Festo for ascertaining the optimum combination of the products (➔ www.festo.com).

Make sure that the following specifications are observed:

- Compare the maximum values specified in these operating instructions with those of your actual application (e. g. forces, torques, temperatures, masses, speeds).

The product can only be operated in compliance with the relevant safety regulations if the maximum loading limits are observed.

- Take into consideration the ambient conditions at the location of use. Corrosive environments reduce the service life of the product (e.g. ozone).
- Please comply with national and local safety laws and regulations.
- Remove transport packaging such as foils (polyethylene) and cardboard. The packing is intended for recycling (except for: oiled paper = other waste).
- Use the product in its original state. Unauthorised modification is not permitted.
- Take the tolerance of the tightening torques into consideration. Without special specification the tolerance is $\pm 20\%$.



5 Fitting

Fitting mechanical components

- Do not modify the settings of screws and threaded pins if there is no request to do this in these operating instructions.
- Fit the motor onto the rotary module in accordance with the assembly instructions for the kit recommended in the catalogue.

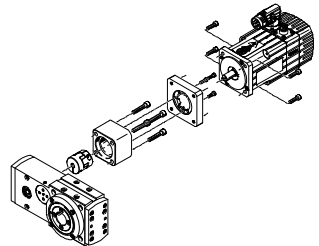


Fig. 3

Fitting the product:



Note

External stops can cause the toothed belt to tear due to excessive forces.

- Use only the motor controller for braking the ERMB.

- Position the ERMB so that all the operating parts are accessible.
- Fasten the ERMB with 4 screws and 2 centring sleeves (diagonal) or with the aid of kits to the threaded holes **1** or **8**.

Fastening is possible on all six side surfaces.

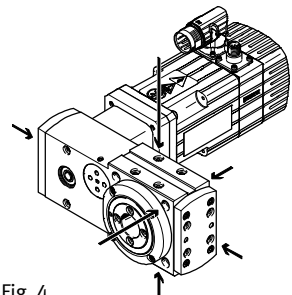


Fig. 4

- Tighten the fastening screws evenly.
Observe the max. screw-in depth D on the base surface (➔ Fig. 5).

ERMB-...		20	25	32
Tightening torque	M4 [Nm]	2.9	–	–
	M5	5.9	5.9	5.9
	M6	–	9.9	9.9
Max. screw-in depth D	[mm]	10		
Centring sleeves	[mm]	Dia. 9x4		

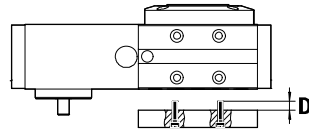


Fig. 5

Eccentric loads fitted in a vertical or sloping position:



Warning

Uncontrolled moving masses can cause injury to people or damage to property (danger of fingers being squashed). If there is a power failure or if the toothed belt breaks inside the ERMB, the work load will slide down.

- Make sure that the ERMB is driven only by motors with an integrated spring-loaded holding brake.
- Check whether external safety measures against damage due to toothed-belt fracture are necessary (e. g. toothed latches or moving bolts).

In this way you can prevent the work load from sliding down.

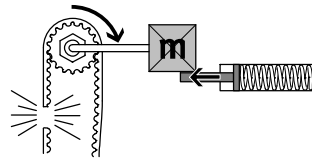


Fig. 6

Fitting the work load

- Place the centre of gravity of the work load if possible centrally to the drive shaft.
- Fasten the work load to the drive shaft with at least 2 screws and 2 centring sleeves (diagonal) or with the aid of kits.

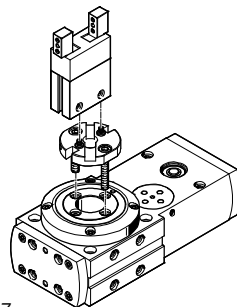
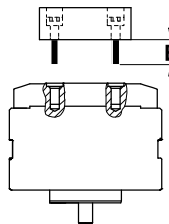


Fig. 7

ERMB-...	20	25	32
Screw	M4	M6	M6
Tightening torque [Nm]	2.9	9.9	9.9
Max. screw-in depth E [mm]	9.6	12	12
Centring sleeves [mm]	dia. 7x3	dia. 9x4	dia. 9x4

Fig. 8



Fitting electric components

Fitting an inductive proximity switch as reference switch:

1. Turn the drive shaft until the marking hole (A) reaches the threaded hole [6].
2. Push the clamping element (C) into the recess intended for this.
3. Screw the proximity switch (D):
 - at first into the hole [6] until it touches the switching cam (B).
 - then unscrew it approx. 0.6 of a turn ($\cong 0.6$ mm).
4. Screw the threaded pin ($\cong 2.5$) into the clamping unit (C). The tightening torque is 0.8 Nm.

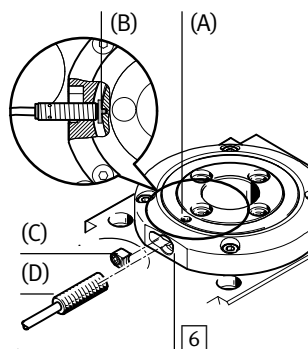


Fig. 9

- Check whether additional proximity switches are necessary. The scanning kit can be used for this purpose in accordance with the section on Accessories (→ catalogue specifications, www.festo.com/catalogue).

Turning the switching ring (E)

- Screw the switching ring with a pin into the hole (A) as far as is desired (90° latching). The drive shaft [2] must be used here as a counter hold.

Turning the holding ring (F)

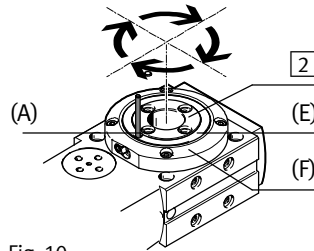


Fig. 10



Note

If the holding ring is loosened, the drive shaft may be drawn out of the ERMB due to excessive axial forces.

- Avoid axial forces when the holding ring is loose.

- Unscrew:
 - The 4 fastening screws out of the holding ring (F).
 - Screw the holding ring into the desired position (note permitted swivel angle).
 - Screw the 4 fastening screws into the holding ring again.
 The permitted swivel angle and tightening torques are as follows:

ERMB-...		20	25	32
Permitted swivel angle	[°]	180	90/180/270	90/180/270
Tightening torque	[Nm]	2.9	2.9	5.9

Fig. 11

Fitting electric components



Note

If used in safety-relevant applications additional measures are necessary. In Europe, for example, the EU machine guideline standards must be observed. Without additional measures in accordance with legally specified minimum requirements, the product is not suitable as a safety relevant component in control systems.

6 Commissioning



Warning

Uncontrolled moving masses can cause injury to people or damage to property (danger of fingers being squashed).

- Make sure that:
 - nobody can place his/her hand in the path of the moving parts (e. g. by means of a protective screen),
 - there are no objects in the positioning range.

It should not be possible to touch the ERMB until the mass has come to a complete stand.

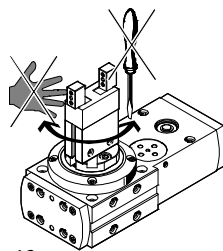


Fig. 12



Note

Excessive drive torques will damage the ERMB.

- Observe the maximum permitted drive torque of the ERMB. If necessary, the motor current must be limited.



Note

With excessive rotary movements (e.g. endless rotation) the energy supply to the plug-in components may be interrupted.

Firmly held loads may then fall down (e.g. if the tubing of a pneumatic gripper is loosened).

- Check whether mechanical or electric safety measures are necessary.

1. Check travel	2. Reference run (homing)	3. Test run
Determining the direction of movement of the motor	Adjusting the real situation with the image in the controller	Checking the complete behaviour

Fig. 13: Definitions

Commissioning – carrying out

1. Start check travel limited to low dynamics.
In spite of equal control, motors of the same type sometimes turn in the opposite direction due to the circuitry.
2. Start reference travel limited to low dynamics up to the reference switch in accordance with the operating instructions for your motor drive system.
3. Start test travel limited to low dynamics.
4. Check whether the ERMB fulfils the following requirements:
 - The rotary module must be able to move through the complete intended positioning cycle.
 - The rotary module stops as expected.

7 Operation



Warning

Uncontrolled moving masses can cause injury to people or damage to property (danger of fingers being squashed).

- Make sure that:
 - nobody can place his/her hand in the path of the moving parts (e. g. by means of a protective screen),
 - there are no objects in the positioning range.

It should not be possible to touch the ERMB until the mass has come to a complete stand.

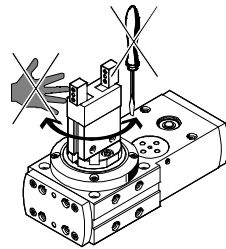


Fig. 14

If the motor turns in the wrong direction:



Note

The reference position will be lost if the motor is dismantled.

- Start reference travel in accordance with the chapter “Commissioning” in order to determine the new reference position.

8 Care and maintenance



Warning

Uncontrolled moving masses can cause injury to people or damage to property (danger of fingers being squashed). Controller signals can cause unintentional movements of the ERMB.

- Switch off the controller for all maintenance work on the ERMB and protect it from being switched on again unintentionally.
- If necessary, clean the ERMB with a soft cloth.
Cleaning agents: all non-abrasive media.

Optimizing the service life of the toothed belt with swivel angles less than 360°:

1. Carry out the following steps after every 2 million load changes:
 - Turn the switching ring (E) 90° (→ chapter 5 “Fitting electric components”)
 - Dismantling the work load.
 - Also turn the work load 90° in the same direction.
 - Mount the work load again.

A different part of the toothed belt then comes into the loading zone of the toothed gear.
2. Repeat the commissioning.

9 Repairs

Recommendation:

- Return the product to our repair service for overhaul.
The necessary accurate adjustments and tests will then be taken into account.

10 Accessories



Note

- Please select the appropriate accessories from our catalogue www.festo.com/catalogue

11 Eliminating faults

Fault	Possible cause	Remedy
Squeaking noises or vibrations	Incorrect controller settings	Modify the controller parameters
Rotary module does not move	Loadings too high	Reduce load mass
		Reduce positioning speed
		Send ERMB to Festo for repairs
	Fastening screws too long	Observe maximum screw-in depth (→ chapter 5 “Fitting mechanical components”)
	Motor is blocked	Eliminate cause
Drive shaft can be turned freely	Toothed belt fracture	Send ERMB to Festo for repairs
	Coupling to motor loosened	Check fitting Tighten clamping screw

Fig. 15

12 Technical specifications

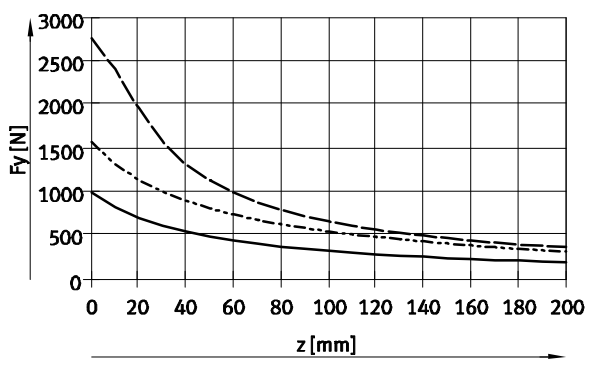
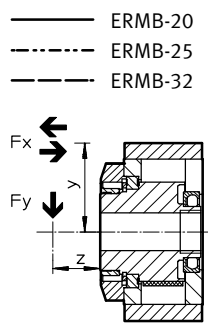
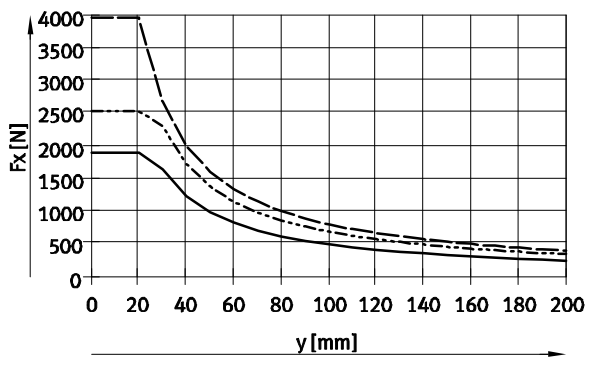
ERMB-...	20	25	32
Constructional design	Electromechanical drive unit with toothed belt		
Drive shaft diameter [mm]	6	8	12
Hollow shaft diameter [mm]	20	24	28
Rotation angle	endless		
Repetition accuracy: – with EMMS-AS [°] – with EMMS-ST – with MTR-DCI	±0.03 ±0.08 ±0.05		
Transmission ratio	4.5:1	4:1	3:1
Assembly position	as desired		
Max. drive torque [Nm]	0.7	2.2	8.5
Max. drive torque ¹⁾ [Nm]	3.15	8.8	25.5
Idle drive torque ²⁾ [Nm]	< 0.07	< 0.18	< 0.5
Max. input speed [1/min]	1350	1200	900
Max. drive take-off speed [1/min]	300		
Max. mass moment of inertia of the work load ³⁾ [kgcm ²]	< 200	< 1200	< 3700
Toothed belt spacing [mm]	2	3	5
Ambient temperature [°C]	–10 ... +60		
Protection class	IP20		
1) Drive take-off torque minus friction depends on speed 2) at maximum speed 3) Motor-dependent; measured with MTR-DCI-...-G14			

ERMB-...	20	25	32
– Vibration – Shock	tested as per DIN/IEC 68/EN 60068 part 2-6; 0.15 mm path at 10 ... 58 Hz; 2 g acceleration at 58 ... 150 Hz tested as per DIN/IEC 68/EN 60068 part 2-27; ±15 g at 11 ms duration; 5 shocks in each direction		
Materials:	Drive shaft, cover, housing profile: Drive shaft: Toothed belt:	anodised aluminium high-alloy steel, stainless polychloroprene with glass fibre	
Weight (approx.) [kg]	0.85	1.46	3.25
1) Drive take-off torque minus friction depends on speed 2) at maximum speed 3) Motor-dependent; measured with MTR-DCI-...-G14			

Fig. 16

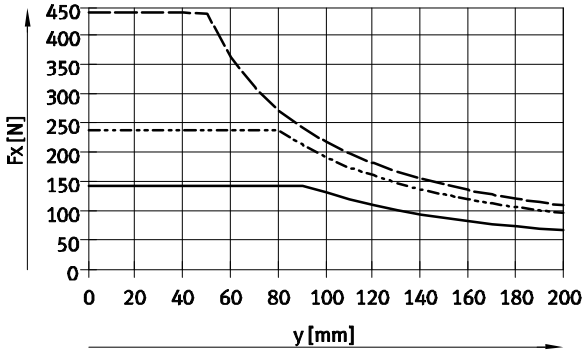
Characteristic curves

1 Max. static power Fx and Fy as a function of the distance y and z

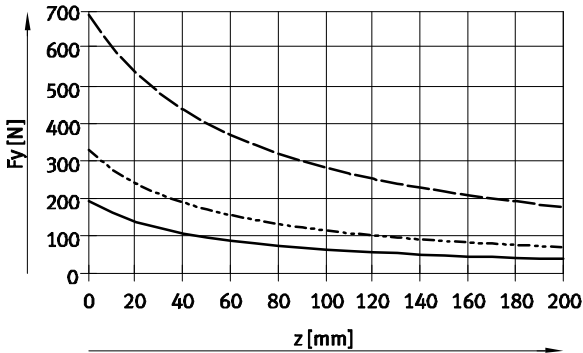
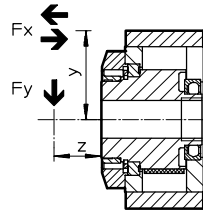


$$\frac{|F_x|}{F_{x_{max}}} + \frac{|F_y|}{F_{y_{max}}} \leq 1$$

2 Max. dynamic power F_x and F_y as a function of the distance y and z



- ERMB-20
- - - ERMB-25
- · - ERMB-32



$$\frac{|F_x|}{F_{x_{max}}} + \frac{|F_y|}{F_{y_{max}}} \leq 1$$

ERMB

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