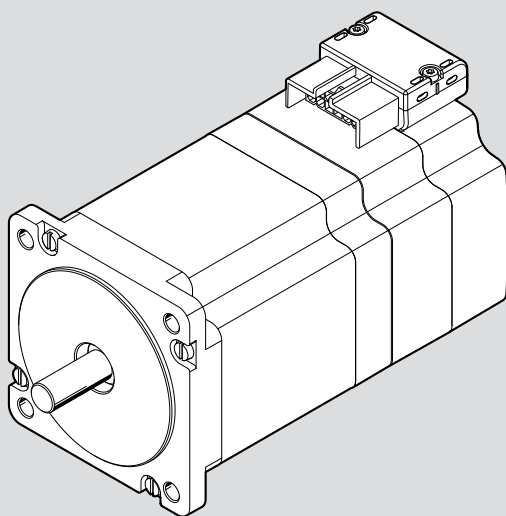


EMMB-ST

Stepper motor

FESTO

Operating instruction



8231912

8231912
2025-03a
[8231914]

Original instructions

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1 Applicable documents



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

2 Product labelling

Additional information → www.festo.com/catalogue.

Designation	Description
Motor EMMB-ST	
U _N [V]	Nominal operating voltage DC
I _N [A]	Nominal current
M ₀ [Nm]	Holding torque
n _{max} [rpm]	Maximum rotational speed
Class 130 (B)	Temperature class B (130 °C)
Holding brake EMMB-ST-...-B	
U _B [V]	Operating voltage DC
Operating conditions and environmental conditions	
IPxx	Degree of protection
→ www.festo.com/sp approval	
CE	CE mark for the European Union. ¹⁾²⁾
cUL US	UL certification mark for the USA and Canada.
RCM	RCM certification mark for Australia and New Zealand.
UKCA	UKCA certification mark for Great Britain

1) Declaration of conformity: all data in accordance with IEC 60034.

2) EMC Directive: the product is intended for use in industrial areas. Measures for interference suppression may be required in residential areas. The product may generate high frequency interference, which may require interference suppression measures in residential areas. Compliance with the EMC Directive is the responsibility of the user. The maximum cable length is limited to 25 m.

Tab. 1: Identifiers on the product labelling

3 Safety

3.1 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.

3.2 Intended use

The motor serves as a drive for a mechanical application and is to be used as a component in drive systems in accordance with EN 61800. Only operate in conjunction with a suitable servo drive.

3.3 Foreseeable misuse

The holding brake must not be used for braking the motor.

3.4 Training of qualified personnel

Work on the product may only be carried out by qualified personnel who can evaluate the work and detect dangers.
The qualified personnel must be familiar with the assembly and installation of electric drive systems.

3.5 Range of application and certification

In combination with the UL inspection mark on the product, the information in this section must also be observed in order to comply with the certification conditions of Underwriters Laboratories Inc. (UL) for USA and Canada.

UL certification information	
Product category code	PRHZ2 (USA) or PRHZ8 (Canada)
File number	E342973
Considered standards	UL 1004-1/-6, C22.2 No.100
UL mark	

Tab. 2: UL/CSA certification information

4 Additional information

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

5 Product overview

5.1 Product design

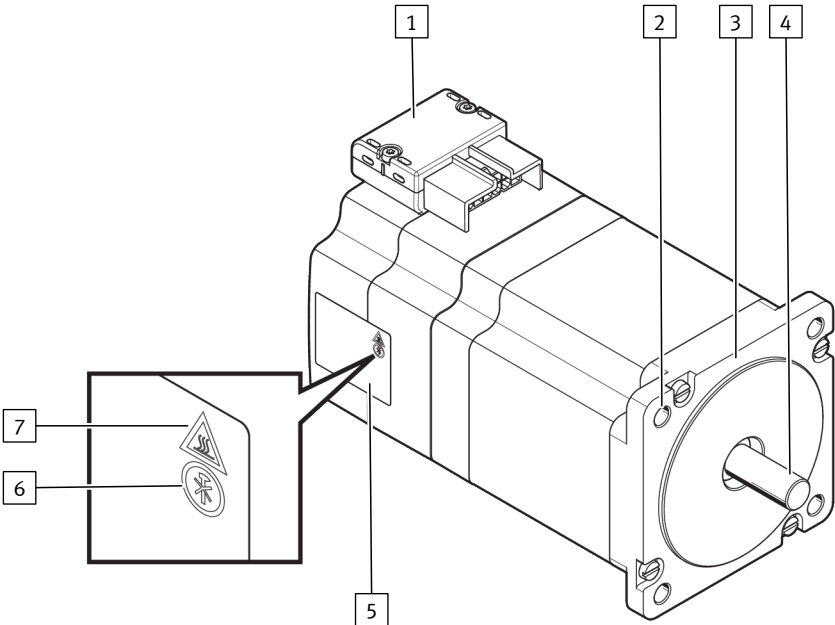


Fig. 1: Product design EMMB-ST, example EMMB-ST-87

- | | |
|--|---|
| <div>1</div> Electrical connection: motor, holding brake, absolute encoder | <div>5</div> Product labelling |
| <div>2</div> Through-hole for mounting | <div>6</div> Note: mechanical impacts not permitted |
| <div>3</div> Motor flange | <div>7</div> Warning: hot surface |
| <div>4</div> Motor shaft | |

5.2 Function

The product is a stepper motor with 2-phase hybrid technology. The direction of rotation and step angle are specified by the connected servo drive in the form of a sinusoidal current injection. The encoder is used to detect the step angle position. The de-energised holding brake enables the motor shaft to be held at a standstill.



"Servo-Light" operation (closed loop control) is available in combination with the servo drive CMMT-ST-MP.

6 Mounting

6.1 Safety

⚠ WARNING

Risk of injury due to unexpected movement of components.

- Bring moving parts of the connected mechanical system into a secure position (e.g. move into the lower end position).



The max. permissible axial and radial forces on the motor shaft must not be exceeded during transport, assembly or operation → www.festo.com/catalogue.

6.2 Mounting motor

1. Degrease and dry the motor shaft.
2. Mount motor on the drive mechanism.

Instruction manual for drive unit, gear unit and mounting kit

→ www.festo.com/sp.

7 Installation

⚠ WARNING

Risk of injury due to electric shock.

- Switch off power supply prior to assembly and installation work; ensure that it is off and secure it against being switched back on. Cancelling the enable signal is not sufficient.

7.1 Connecting cable

Rotating plug

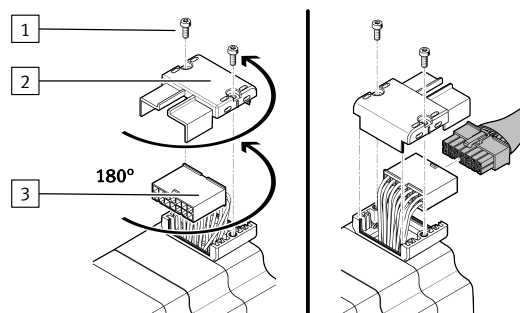


Fig. 2: Rotating plug

1. Unscrew the screws [1].
2. Remove the cover [2] and the base [3] and turn them 180°.
3. Position the cover and the base. Do not pinch stranded conductors.

Connecting cable

4. Tighten the screws to 0.5 Nm ± 10%.

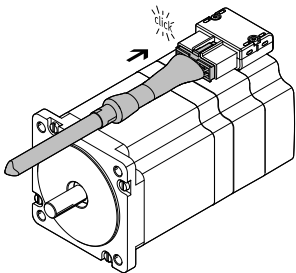


Fig. 3: Connecting motor cable, example standard alignment

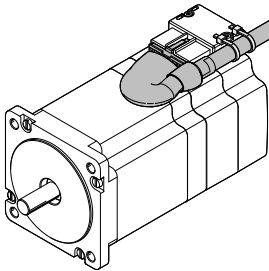


Fig. 4: Strain relief on motor cable

Requirements:

- Accessories selected ➔ www.festo.com/catalogue.
- Approved cable length and cross section noted ➔ www.festo.com/catalogue.
- Shielded cables used.

1. Insert the cable into the plug until the retaining clip audibly clicks into place.
2. Connect the cable to the servo drive.
3. Fasten the cable with strain relief, e.g. with cable clips on the connection cap.

Avoid tension, pressure or vibrations on the motor plug.

Instruction manual for servo drive and cable ➔ www.festo.com/sp.

Plug, 14-pin, pins	Pin	Function	Description
	1	A	String A
	2	A/	String A/
	3	BR+	Holding brake control: – 24 V DC (21.6 ... 25.44 V DC): open (released) – 0 V DC: closed (tripped)
	4	BR–	Holding brake: reference potential 0 V
	5	FE	Housing for supporting the cable shielding
	6	–	Not connected
	7	SLO+	Encoder SLO+
	8	SLO–	Encoder SLO–
	9	MA+	Encoder MA+
	10	MA–	Encoder MA–
	11	VCC	Encoder supply voltage 3.6 ... 14 V DC
	12	GND	Encoder earth 0 V
	13	B	String B
	14	B/	String B/

Tab. 3: Plug for motor, holding brake and absolute encoder

8 Commissioning

⚠ WARNING

Risk of injury due to unexpected movement of components.

- When releasing the holding brake, secure the driven mechanical system to prevent unintended movement.
- Deenergise the motor before releasing the holding brake manually.
- Before setting the enable signal, protect the traversing range of the driven mechanical system from access.



High voltage loss in the motor cable can result in the permissible operating voltage of the holding brake being undershot.

- Observe permissible cable length and conductor cross section
➔ www.festo.com/sp.



Before operating the motor with a servo drive, the electrical safety and EMC must be tested for this device combination in accordance with the EMC Directive. In particular, the drive system may only be commissioned if conformity in accordance with EN 61800 has been confirmed.

1. Commission the motor in combination with a suitable servo drive.
Instructions for servo drive ➔ www.festo.com/sp.
2. Check function and holding torque of the holding brake.
Briefly close the holding brake at low rotational speed, e.g. 3 s at 100 rpm, to bed-in the brake system.

9 Operation

⚠ WARNING

Risk of injury due to unexpected movement of components.

Body parts in the movement range of the piston rod can be crushed or severed.

- Protect the positioning range from unwanted intervention.
- Keep foreign objects out of the positioning range.

⚠ WARNING

Danger of burns from hot housing surfaces.

Metallic housing parts can reach high temperatures during operation. Contact with metal housing parts can cause burn injuries.

- Do not touch metallic housing parts.
- After the power supply is switched off, let the device cool down to room temperature.



Axial and radial forces on the motor shaft.

Excessive axial and radial forces on the motor shaft can damage the motor.

- Comply with maximum permissible shaft loads
➔ www.festo.com/catalogue.

- Check the function and holding torque of the holding brake at regular intervals.
If the holding torque is reduced, close the holding brake briefly at low speed, e.g. 3 s at 100 rpm.

10 Maintenance

⚠ WARNING

Risk of injury due to electric shock.

- Switch off power supply prior to assembly and installation work; ensure that it is off and secure it against being switched back on.
Cancelling the enable signal is not sufficient.

⚠ WARNING

Risk of injury due to unexpected movement of components.

- Bring moving parts of the connected mechanical system into a secure position (e.g. for vertical installation, move the slide into the lower end position).
- Only then should you disconnect the motor from the mechanical system.

⚠ WARNING

Danger of burns from hot housing surfaces.

Metallic housing parts can reach high temperatures during operation.
Contact with metal housing parts can cause burn injuries.

- Do not touch metallic housing parts.
- After the power supply is switched off, let the device cool down to room temperature.

10.1 Cleaning

Requirement:

- The product has cooled to $\leq 40\text{ °C}$.
- Clean the product with a clean, soft cloth and non-abrasive cleaning agents.

11 Malfunctions

⚠ WARNING

Risk of injury due to electric shock.

- Switch off power supply prior to assembly and installation work; ensure that it is off and secure it against being switched back on.
Cancelling the enable signal is not sufficient.

⚠ WARNING

Risk of injury due to unexpected movement of components.

- Bring moving parts of the connected mechanical system into a secure position (e.g. for vertical installation, move the slide into the lower end position).
- Only then should you disconnect the motor from the mechanical system.

⚠ WARNING**Danger of burns from hot housing surfaces.**

Metallic housing parts can reach high temperatures during operation.

Contact with metal housing parts can cause burn injuries.

- Do not touch metallic housing parts.
- After the power supply is switched off, let the device cool down to room temperature.

11.1 Fault clearance**Motor and absolute encoder**

- Motor must not be opened. Exception: the plug cover may be removed for cable installation.
- Repairs must only be carried out by the Festo repair service.

Malfunction	Cause	Remedy
Loud rotation noises of the motor shaft.	Coupling distance too short.	– Observe the permissible coupling spacings → assembly instructions of the motor mounting kit.
Motor shaft does not turn.	Excessive load.	– Reduce load.
	Servo drive has not yet been enabled.	– Check signals.
	Holding brake closed.	– Release holding brake.
	Min. operating voltage for opening the holding brake is not reached.	– Comply with permissible cable length and cable cross section. – Contact local Festo Service.
Torque of the motor shaft is not transmitted to the drive system.	Coupling slips.	– Check the mounting of the shaft-hub connection → assembly instructions of the motor mounting kit.
Motor shaft vibrates.	Current controller settings.	– Optimise controller data, e.g. speed, acceleration, ...
Motor shaft rotates in the wrong direction.	Wiring fault.	– Check and correct wiring.
Holding torque of the holding brake is not reached.	Poor condition of the brake disc.	– Briefly close the holding brake several times at low speed, e.g. 3 s at 100 rpm.
Holding torque of the holding brake not effective.	Holding brake fault, e.g. excessive axial force on the motor shaft.	– Replace motor. – Observe max. permissible axial force, e.g. mount the coupling free of tension.
Encoder signals not transmitted.	Wiring fault.	– Check and correct wiring.
	Encoder fault, e.g. excessive axial force on the motor shaft.	– Replace motor. – Observe max. permissible axial force, e.g. mount the coupling free of tension.

Tab. 4: Fault clearance

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