

EMMB-AS
Servo motor

FESTO
Festo SE & Co. KG
Ruiter Straße 82
73734 Esslingen
Deutschland
+49 711 347-0
www.festo.com
Operating instructions
8163182
2021-08b
[8163184]

Translation of the original instructions
© 2021 all rights reserved to Festo SE & Co. KG

1 About this document
1.1 Applicable Documents

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

Table with 2 columns: EMMB-AS-...-K-...S/M/B, Product version. Rows include K (with featherkey), S (Absolute encoder, single-turn), M (Absolute encoder, multi-turn), and B (with holding brake).

Tab. 1: Product version

2 Safety

2.1 Safety instructions

- Observe labelling on the product.
- Before working on the product, switch off the power supply 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.
- Observe tightening torques. Unless otherwise specified, the tolerance is ± 20 %.
- Store the product in ambient conditions without oils, greases and grease-dis-solving vapours.

2.2 Intended use

The motor is intended to be used as a component in drive systems in accordance with EN 61800 and may only be operated in combination with a suitable servo drive.

2.3 Foreseeable misuse

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

2.4 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.

2.5 Area of application and approval

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.

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

Tab. 2: UL/CSA certification information

3 Additional Information

- Accessories -> www.festo.com/catalogue.

4 Product overview

4.1 Function

The product is a permanently excited, electrodynamic, brushless servo motor. The integrated absolute encoder serves to record the angular position and derives the angular velocity signals and other status variables. These signals are evaluated by a higher-order servo drive. The de-energised holding brake enables the motor shaft to be held at a standstill.

4.2 Product design

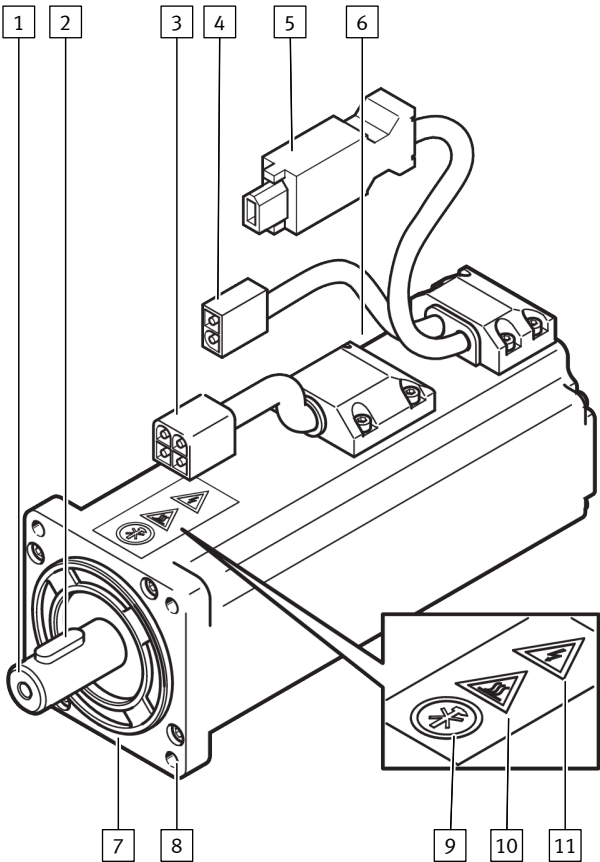


Fig. 1: Product design EMMB-AS (example EMMB-AS-60-04-K-S30MB)

- 1 Motor shaft
- 2 Featherkey
- 3 Electrical connection: motor
- 4 Electrical connection: holding brake
- 5 Electrical connection: absolute encoder
- 6 Product labelling
- 7 Motor flange
- 8 Through-hole for mounting
- 9 Note: mechanical impacts not permitted
- 10 Warning: hot surface
- 11 Warning: dangerous electrical voltage

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.
- Store and transport the product in a horizontal position.

6 Assembly

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).

i
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.

6.1 Unpacking product

- 1. Open packaging.
- 2. Remove all transport materials, e.g. foils, caps, cardboard boxes.
- 3. Remove the product from the packaging and place it on the mounting surface.
- 4. Dispose of packaging and transport materials.

6.2 Mounting motor

- Requirement
- Select accessories → [www.festo.com/catalogue](http://www.festo.com/catalogue).
  - 1. Degrease and dry the motor shaft.
  - 2. Mount motor on the driven mechanical system.
- Instruction manual for drive unit, gear unit and mounting kit
- [www.festo.com/sp](http://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.

 **WARNING**

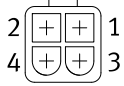
**Risk of injury due to electric shock.**

High voltage potential can injure people when the motor plug is disconnected.

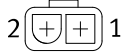
- Use appropriate measures to ensure that the motor plug cannot be disconnected.

7.1 Connect lines

- Requirement
- Select accessories → [www.festo.com/catalogue](http://www.festo.com/catalogue).
  - Observe permissible cable length and conductor cross section  
→ [www.festo.com/catalogue](http://www.festo.com/catalogue).
  - Use screened cables.
1. Plug the cables into the appropriate plugs.
  2. Connect the cables to the servo drive.
- Instructions for servo drive and cables → [www.festo.com/sp](http://www.festo.com/sp).

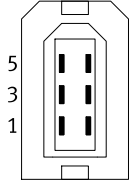
| Plug, 4-pin, pins                                                                | Pin | Function | Description         |
|----------------------------------------------------------------------------------|-----|----------|---------------------|
|  | 1   | U        | Motor phase U       |
|                                                                                  | 2   | V        | Motor phase V       |
|                                                                                  | 3   | W        | Motor phase W       |
|                                                                                  | 4   | PE       | Protective earthing |

Tab. 3: Plug for motor

| Plug, 2-pin, pins                                                                  | Pin | Function | Description                                                                        |
|------------------------------------------------------------------------------------|-----|----------|------------------------------------------------------------------------------------|
|  | 1   | BR+      | Holding brake control:<br>- 24 V DC: open (vented)<br>- 0 V DC: closed (retracted) |
|                                                                                    | 2   | BR-      | Reference potential 0 V                                                            |

Tab. 4: Plug for holding brake

 The adapter NEFM-REG6-K-0.5-B-R3G8 must be used with the servo motor with multi-turn absolute encoder EMMB-AS-...-S30M → [www.festo.com/sp](http://www.festo.com/sp).

| Plug, 6-pin                                                                        | Pin | Function | Description                                |
|------------------------------------------------------------------------------------|-----|----------|--------------------------------------------|
|  | 1   | Vcc      | Supply voltage 4.75 ... 5.25 V DC          |
|                                                                                    | 2   | GND      | Earth 0 V                                  |
|                                                                                    | 3   | -        | Single-turn (S): not connected             |
|                                                                                    | 4   | BAT+     | Multi-turn (M): supply voltage for battery |
|                                                                                    | 5   | -        | Single-turn (S): not connected             |
|                                                                                    | 6   | BAT-     | Multi-turn (M): battery earth              |
|                                                                                    |     | SD+      | Data line                                  |
|                                                                                    |     | SD-      |                                            |

Tab. 5: Plug for absolute encoder, single-turn/multi-turn, Nikon A format

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/catalogue](http://www.festo.com/catalogue).

8.1 Performing commissioning

 Commissioning of the drive system may only be carried out with the confirmation of conformity in accordance with EN 61800.

1. Commission the motor in combination with a suitable servo drive.  
Instructions for servo drive → [www.festo.com/sp](http://www.festo.com/sp).
2. Check function and holding torque of the holding brake.  
For the grinding-in process of the brake system, briefly close the holding brake at low speed, e.g. 3 s at 100 rpm.

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](http://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**

Before cleaning, the product must be cooled down to below 40°C.  
Clean the outside of the product with a soft cloth as required. Cleaning agents include all non-abrasive media.

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

i

Servo motor and absolute encoder

- Motor must not be opened.
- Repairs may only be carried out by the Festo repair service.

| Malfunction                                                       | Possible cause                                                       | Remedy                                                                                                                                                                                |
|-------------------------------------------------------------------|----------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Loud rotation noises of the motor shaft.                          | Coupling distance too short.                                         | Observe permissible coupling distances<br>➔ Instruction manual for motor mounting kit,<br>➔ <a href="http://www.festo.com/sp">www.festo.com/sp</a> .                                  |
| 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 ➔ <a href="http://www.festo.com/catalogue">www.festo.com/catalogue</a> .<br>– 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<br>➔ Instruction manual for the motor mounting kit, ➔ <a href="http://www.festo.com/sp">www.festo.com/sp</a> .                         |
| Motor shaft vibrates.                                             | Current controller settings.                                         | Optimise controller data, e.g. velocity, acceleration, ...                                                                                                                            |
| Motor shaft rotates in the wrong direction.                       | Wiring fault.                                                        | Check and correct wiring.                                                                                                                                                             |
| Holding torque of the holding brake is not reached.               | Insufficient conditioning 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 ➔ <a href="http://www.festo.com/catalogue">www.festo.com/catalogue</a> .<br>– Observe max. permissible axial force, e.g. mount the coupling so it is 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 ➔ <a href="http://www.festo.com/catalogue">www.festo.com/catalogue</a> .<br>– Observe max. permissible axial force, e.g. mount the coupling so it is free of tension. |

Tab. 6: Overview of fault clearance

12 Disassembly

1. Disconnect electrical installations.
2. Remove motor.
3. Observe transport information ➔ 5 Transport.

13 Technical data

Additional information ➔ [www.festo.com/catalogue](http://www.festo.com/catalogue).

| Identifier                                                                        | Description                                             |
|-----------------------------------------------------------------------------------|---------------------------------------------------------|
| Motor EMMB-AS -...                                                                |                                                         |
| U <sub>DC</sub>                                                                   | [V] Nominal operating voltage DC                        |
| I <sub>N</sub>                                                                    | [A] Nominal current                                     |
| I <sub>max</sub>                                                                  | [A] Peak current                                        |
| I <sub>o</sub>                                                                    | [A] Continuous stall current                            |
| k <sub>e</sub>                                                                    | [mVmin] Voltage constant                                |
| M <sub>N</sub>                                                                    | [Nm] Nominal torque                                     |
| n <sub>N</sub>                                                                    | [rpm] Nominal rotary speed                              |
| n <sub>max</sub>                                                                  | [rpm] Maximum mechanically permissible rotational speed |
| Class F                                                                           | Temperature class F (155°C)                             |
| Operating and environmental conditions                                            |                                                         |
| IPxx                                                                              | Degree of protection <sup>1)</sup>                      |
| Approval ➔ <a href="http://www.festo.com/sp">www.festo.com/sp</a>                 |                                                         |
|  | CE mark for the European Union. <sup>2)3)</sup>         |
|  | UL certification mark for the USA and Canada.           |
|  | RCM certification mark for Australia and New Zealand.   |

1) For vertical use under the influence of dripping water, a rotary shaft seal must be provided on the motor.  
2) Declaration of conformity: all data in accordance with IEC 60034.  
3) EMC Directive: the product is intended for use in industrial environments. Measures for interference suppression may be required in residential areas. The product may generate high frequency malfunctions, which may require interference suppression measures in residential areas. Additional measures are required to comply with the EMC Directive for cables > 30 m. Compliance with the EMC Directive is the responsibility of the user.

Tab. 7: Designations on the product labelling