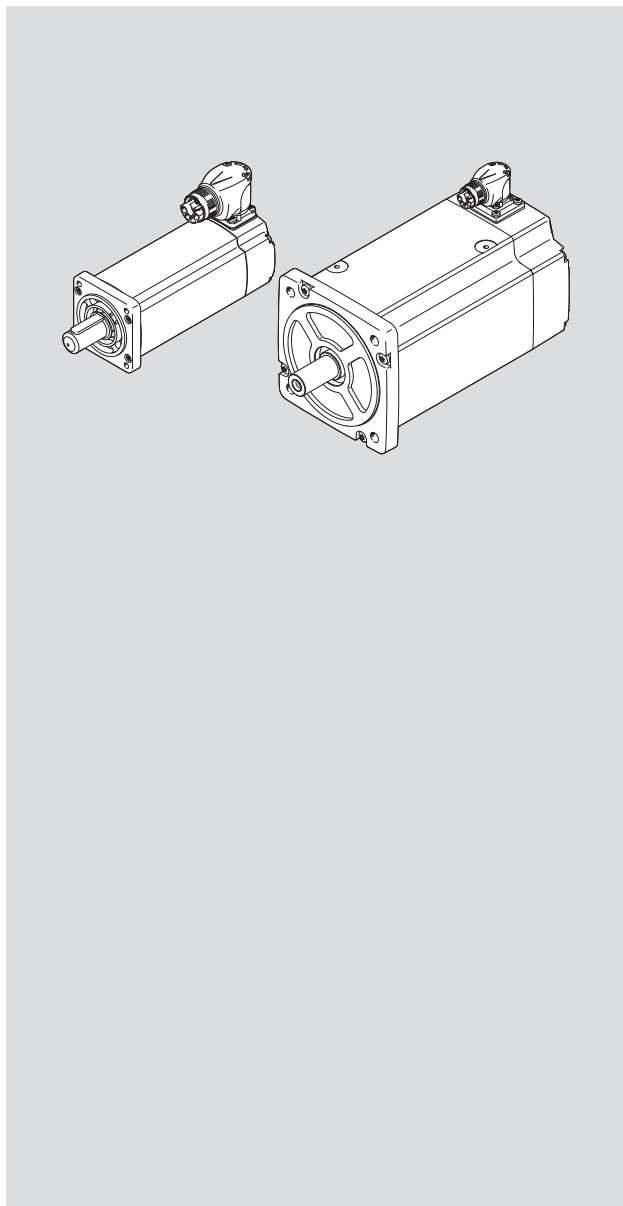


EMMT-AS

Servo motor



FESTO

Operating instruc-
tion



8201371

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[8201373]

Translation of the original instructions

EnDat is a registered trademark of its respective trademark holder in certain countries.

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1 Applicable documents



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

Documentation concept consists of several documents

Documentation for the product, which consists of several documents.

Document	Content
Addendum document Safety Manual Safety absolute encoder EMMT-AS-...-MY	Detailed description of safety sub-functions: multi-turn, EnDat 2.2

Tab. 1: Applicable documents

2 Product labelling

Additional information → www.festo.com/catalogue.

Designation		Description
Motor EMMT-AS-...		
U _{ZK}	[V]	Nominal operating voltage DC
I _{Nph}	[A]	Nominal current
I _{max}	[A]	Peak current
I ₀	[A]	Continuous stall current
P _N	[kW]	Nominal power
k _e	[mVmin]	Voltage constant
M _N	[Nm]	Nominal torque
M ₀	[Nm]	Stall torque
n _N	[rpm]	Nominal rotational speed
n _{max}	[rpm]	Maximum mechanically permissible rotational speed
n _{0max}	[rpm]	Maximum idling speed
Class 155 (F)		Temperature class F (155°C)

Designation	Description
Holding brake EMMT-AS-...-B	
U _B [V]	Operating voltage DC
Operating and environmental conditions	
IPxx	Degree of protection ¹⁾
→ www.festo.com/sp/approval	
	CE mark for the European Union. ²⁾³⁾
	UL certification mark for the USA and Canada.
	RCM certification mark for Australia and New Zealand.
	UKCA certification mark for Great Britain

1) A radial shaft seal must be provided on the motor for vertical use under the influence of dripping water.

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 interference, 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. 2: 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. 3: 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

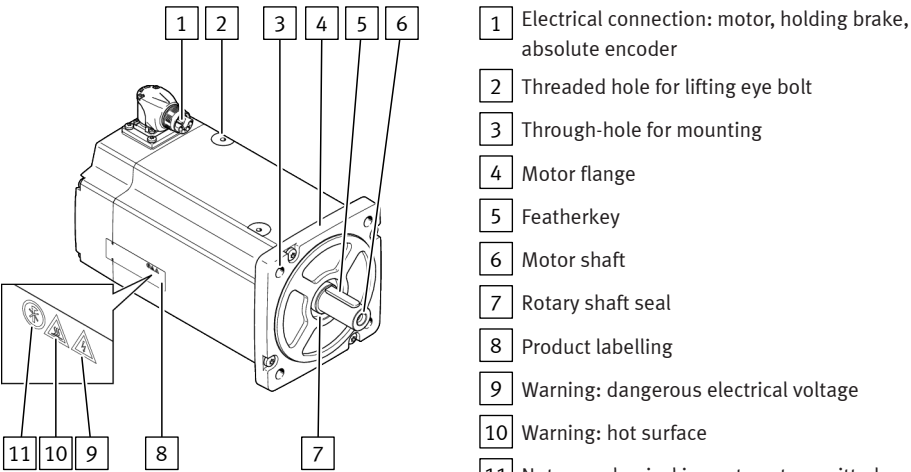


Fig. 1: Product design EMMT-AS, example EMMT-AS-150-...

5.2 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.

6 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.

7 Assembly

7.1 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).

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.
- Product weight ≥ 25 kg: use only lifting eye bolts as lifting aids.
- Do not use the electrical connection and the motor shaft as a lifting aid.



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.

7.2 Mounting motor

1. Degrease and dry the motor shaft.
2. For product weight ≥ 25 kg: mount two lifting eye bolts as lifting aid.
3. Mount motor on the driven mechanical system.

Instruction manual for drive unit, gear unit and mounting kit → www.festo.com/sp.

8 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.

WARNING

Risk of injury from electric shock.

Inadequate earthing of the product may result in dangerous leakage current when touching the motor housing, which can cause serious injuries.

- The motor must also be integrated into the equipotential bonding on the machine bed.

8.1 Connecting cable and earthing

Motor earthing

Electrical continuity to the motor flange must be ensured.

Motor connection

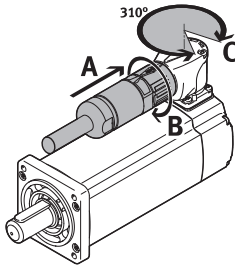


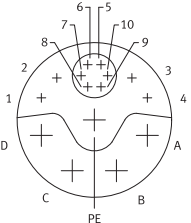
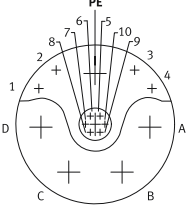
Fig. 2: Connect and align motor cable

Requirements:

- Select accessories → www.festo.com/catalogue.
- Observe permissible cable length and conductor cross section → www.festo.com/catalogue.
- Use screened cables.

1. Connect cable (A) to the plug and tighten the screw-type lock (B).
2. Align plug (C) (can be swivelled 310°).
3. Connect the cable to the servo drive.

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

Plug, M23/M40, 15-pin, pins	Pin	Function	Description
Servo motor EMMT-AS...			
M23 	A	U	Motor phase U
	B	V	Motor phase V
	C	W	Motor phase W
	D	–	not connected
	PE	PE	Protective earthing
Holding brake EMMT-AS-...-...B			
M40 	1	BR–	Reference potential 0 V
	2	–	not connected
	3	–	not connected
	4	BR+	Holding brake control: – 24 V DC (21.6 ... 25.44 V DC): open (released) – 0 V DC: closed (tripped)
	EnDat 2.2 absolute encoder, single-turn/multi-turn EMMT-AS-...-...S/M		
	5	U _S	Supply voltage 3.6...14 V DC
	6	GND	Earth 0 V
	7	DATA	Data cable, bidirectional, RS485-compliant, differential
	8	#DATA	
	9	CLOCK	Clock line, input, RS485-compliant, differential
	10	#CLOCK	

Tab. 4: Plug for motor, holding brake and absolute encoder

9 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.



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

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.

10 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.

11 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.

11.1 Replace the rotary shaft seal

For variants with rotary shaft seal EMMT-AS-....-R-....:

- Rotary shaft seal EASS must be replaced after 5,000 operating hours at the latest → Instructions for rotary shaft seal, → www.festo.com/sp.

11.2 Cleaning

Requirement:

- The product has cooled to ≤ 40 °C.
- Clean the product with a clean, soft cloth and non-abrasive cleaning agents.

12 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.

12.1 Fault clearance



Servo motor and absolute encoder

- Motor must not be opened.
- Repairs may 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.	Insufficient condition of the brake disc.	– Briefly close the holding brake several times at low speed, e.g. 3 s at 100 rpm.

Malfunction	Cause	Remedy
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. 5: Fault clearance

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