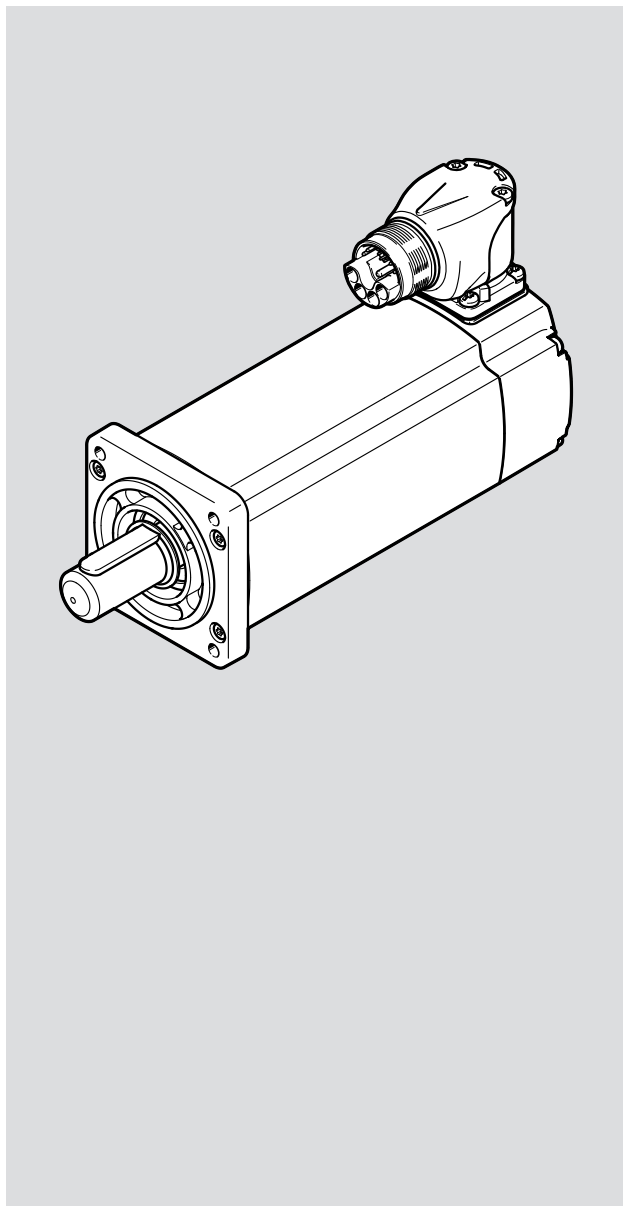


EMMT-AS-60/-80/-100-...-...MY

Servo motor



FESTO

Addendum document | Safety manual



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[8156108]

Original instructions

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1 About this document

1.1 Applicable documents



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

Document	Contents
Operating instruction EMMT-AS	Information on the safe use of the servo motor.

Tab. 1: Applicable documents for the product

1.2 Product version

This documentation describes the following product version:

- EMMT-AS-60/-80/-100-...-...MY safety absolute encoder, multi-turn with EnDat 2.2.

1.3 Specified standards

Version
EN ISO 13849-1:2023
EN 61508 Parts 1-7:2010
EN 61800-5-2:2017

Tab. 2: Standards specified in the document

2 Safety

2.1 Safety instructions

- Observe the identifications 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.
- The servo motor must not be opened.

2.2 Intended use

The servo motor with safety multi-turn absolute encoder must only be used as a safety-relevant component in drive systems in accordance with EN 61800 and may only be operated in combination with a suitable safety servo drive when the safety function is used.

Before commissioning, a risk assessment must be carried out for the mechanical application interfaces, e.g. for the motor flange and motor shaft.

2.3 Foreseeable misuse

- The use of a safety function with a servo motor without safety functionality, e.g. after a device replacement.
- The use of a safety function with evaluation of the multi-turn position is not permissible. The evaluation is reliable only in the single-turn range.
- The use of a safety function with damaged yellow stripes in the product labelling, e.g. servo motor was opened → 4.1 Product design.
- Overstressing of the motor shaft, e.g. due to transverse forces.

2.4 Training of qualified personnel

The product may be installed and commissioned only by a qualified electrical engineer who is familiar with:

- Installation and operation of electrical control systems
- Applicable regulations for operating safety-related systems

Work on safety engineering systems may only be carried out by qualified personnel trained in safety engineering.

3 Additional information

- Contact the regional Festo contact if you have technical problems → www.festo.com.
- Accessories → www.festo.com/catalogue.
- For additional information on the safety absolute encoder, EnDat 2.2 contact HEIDENHAIN.
 - EMMT-AS-60/80-...-...MY with encoder EQI 1131: Heidenhain product information ECI 1119/EQI 1131
 - EMMT-AS-100-...-...MY with encoder EQI 1331: Heidenhain product information ECI 1319/EQI 1331/EBI 1335
 - Specification of the E/E/PES safety requirements for the EnDat master and measures for the safe controller
 - Supplementary catalogue of measures for the jump monitoring (SIL3, PL e) system specification
 - EnDat 2.2 - Bidirectional interface for position encoders

4 Product overview

4.1 Product design

Servo motor with safety absolute encoder, EnDat 2.2 EMMT-AS-60/-80/-100-...-...MY

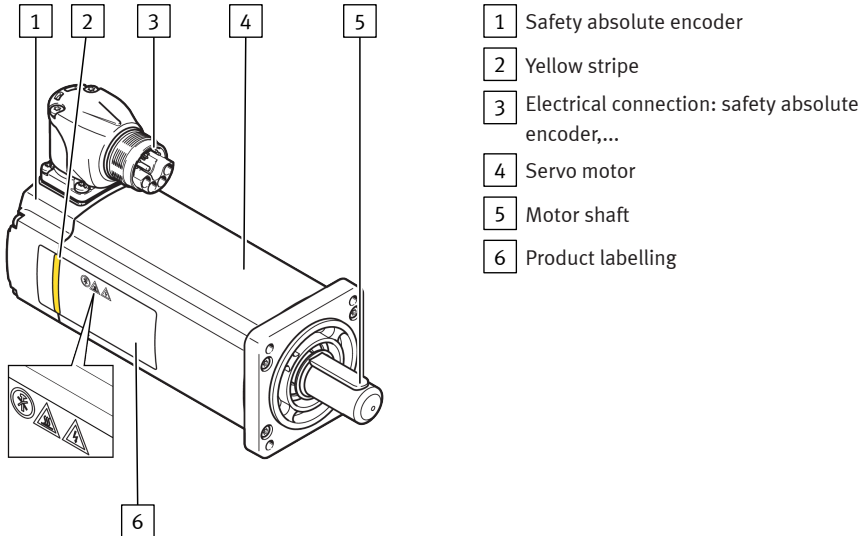


Fig. 1: Product design EMMT-AS-60-...-...MY
(example)

4.2 Function

The servo motor EMMT-AS-...-...MY includes an integrated safety multi-turn absolute encoder. The safety multi-turn absolute encoder only reliably determines and transmits the single-turn position data.

When using the safety function, the servo drive must fulfil the EnDat 2.2 protocol in accordance with the specification for E/E/PES safety requirements.

4.2.1 Safety function

The servo motor with integrated safety multi-turn absolute encoder EMMT-AS-...-...MY provides safe single-turn position data of the motor shaft for evaluation by a suitable servo drive.

5 Transport

Store and transport the product in its original packaging. Observe the weight, the dimensions and the ambient conditions.

6 Mounting

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.

Do not operate the motor if there is any external damage. Send to Festo for inspection.

Note the following for mounting:

- The motor shaft must be mounted clean, free of grease and free of damage.
- Observe the coupling clearances of the mounting kit to avoid increased axial force on the motor shaft.

7 Installation

WARNING

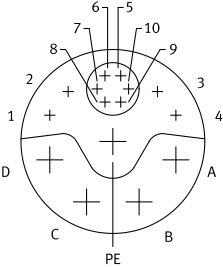
Risk of injury due to electric shock.

- 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.

Please note the following during installation:

- Only use motor cables from the listed accessories.
- The wiring between the servo motor and the servo drive must be installed so as to eliminate the possibility of short circuit between any two conductors of the connecting cable → EN 61800-5-2, Table D.8.
- Install flexible cables for strain relief at a maximum distance of 30 cm from the motor plug.
- Maintain cable distance from sources of interference:
 - To motors and relays > 100 mm.
 - To inverters and transformers > 200 mm.
- Observe permissible cable length and conductor cross section → www.festo.com/catalogue.
- A PELV system must be used for the power supply.

Servo motor connection with safety absolute encoder, EnDat 2.2

Plug, M23, 15-pin, pins	Pin	Function	Description
	Servo motor EMMT-AS-...		
	A ... PE	...	Additional information → Operating instructions for servo motor EMMT-AS
	Holding brake EMMT-AS-....-B		
	1 ... 4	...	Additional information → Operating instructions for servo motor EMMT-AS
	Safety absolute encoder, multi-turn, EnDat 2.2 EMMT-AS-....-MY		
	5	Us	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. 3: Servo motor plug with safety absolute encoder, EnDat 2.2 EMMT-AS-60/-80/-100-....-MY

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.

 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.

 The structure must be verified before commissioning by checking each assembly step.

 If a defect is present, do not operate the motor. Send to Festo for inspection.

Note the following during commissioning:

- Do not exceed the maximum permissible rotational speed n_{Max} specified on the rating plate when parameterising the maximum motor speed.
- The maximum acceleration torque in the application must be selected as a function of the total inertia and the permissible maximum acceleration of the absolute encoder.
- High voltage loss in the motor cable can result in undershoot of the permissible operating voltage directly at the absolute encoder.



The drive system must only be commissioned after the confirmation of conformity in accordance with EN 61800.

Commission the servo motor in conjunction with the servo drive → 1.1 Applicable documents.

Validating safety functions

The safety functions must be re-validated during initial start-up or after a device replacement with a servo motor of the same type.

9 Operation

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.



Safety functions with the requirement "safe position, e.g. SLP":

After a power failure, carry out a new homing run.

Check the function and holding torque of the holding brake at regular intervals.

- If the holding torque is reduced, set the holding brake briefly at low rotational 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 Replacement



If there is visible wear or a defect, the motor must be replaced with an motor of the same type

→ www.festo.com/catalogue.

Checking radial shaft seal

The shaft seal on servo motors with radial shaft seal EMMT-AS-...-R must be checked regularly and replaced after 5000 operating hours.

10.2 Cleaning

Requirement:

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

11 Malfunctions

Fault clearance



Servo motor with safety absolute encoder

- Do not open the servo motor. Opening the servo motor will invalidate the safety engineering information.
- Have repairs carried out only by Festo repair service.

Malfunction	Cause	Remedy
No or faulty transmission of encoder signals.	Wiring fault or contact fault.	– Check and correct wiring and contacts.
	Encoder cable too long.	– Check and correct cable length.
	Encoder fault.	– Contact local Festo Service. – Replace servo motor.

Tab. 4: Fault clearance

12 Technical data



Use the motor only in conformity with the permissible technical data.

EMMT-AS	-60/-80/-100-...-...MY
Certificates, declaration of conformity	➔ www.festo.com/sp
Safety function	Secure acquisition and transmission of single-turn position data
Safety Integrity Level SIL in accordance with 61508,	SIL 2 SIL 3, only with additional software function in the servo drive.
Performance level PL in accordance with EN ISO 13849	Category 3, Performance Level d Category 3, Performance Level e, only with additional software function in the servo drive.
Probability of a dangerous failure (PFHd) [1/h]	SIL 2 or Category 3, Performance Level d: $\leq 15 \times 10^{-9}$ SIL 3 or Category 3, Performance Level e: $\leq 2 \times 10^{-9}$
Service life (TM)	20 years

Tab. 5: Safety data

EMMT-AS	-60/-80/-100-...-...MY
MM-YYYY:XX	MM-YYYY: 6-digit production date (MM: 2-digit month, YYYY: 4-digit year)
	XX: 2-digit factory code

Tab. 6: Safety engineering identifiers on the product labelling

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