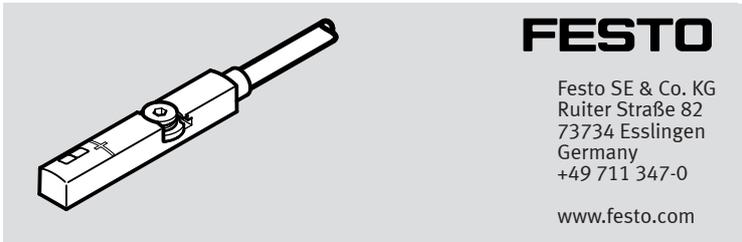


SMAT-8M

Position transmitter



Festo SE & Co. KG
 Ruiter Straße 82
 73734 Esslingen
 Germany
 +49 711 347-0
 www.festo.com

Operating instruction

8203946
 2023-12h
 [8203948]



8203946

Translation of the original instructions

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1 Applicable documents

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

2 Safety

2.1 General safety instructions

– Only use the product if it is in perfect technical condition.

2.2 Intended use

This product is intended for proximity sensing of the piston position of Festo drives that can be detected magnetically. The device is intended for use in an industrial environment. It is suitable for use with Festo drives with T-slot (profile slot 8) and round cylinders and tie-rod cylinders with mounting kits → www.festo.com/catalogue.

2.3 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 have skills and experience in dealing with electrical (open-loop) control technology.

2.4 UL/CSA 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/CSA certification information

Product category code	NRKH, NRKH7
File number	E232949
Considered standards	UL 60947-1 UL 60947-5-2 CAN/CSA C22.2 No. 60947-1 CAN/CSA C22.2 No. 60947-5-2
UL mark	
UL control number	Industrial Control Equipment 2MD1

Tab. 1: UL/CSA certification information

Only for connection to a NEC/CEC Class 2 supply.

Locally installed conductors for the position transmitter must be separated from the on-site and factory-installed conductors and uninsulated live parts of other circuits that operate with more than 150 V to earth. A permanent minimum distance of 50.8 mm (2 inches) must be observed. If the locally installed conductors have been provided with approved insulating material that has an identical or higher rated operating voltage than the other circuit involved, the minimum distance need not be observed.

3 Additional information

- Contact the regional Festo contact if you have technical problems → www.festo.com.
- Accessories and spare parts → www.festo.com/catalogue.

4 Product overview

4.1 Configuration

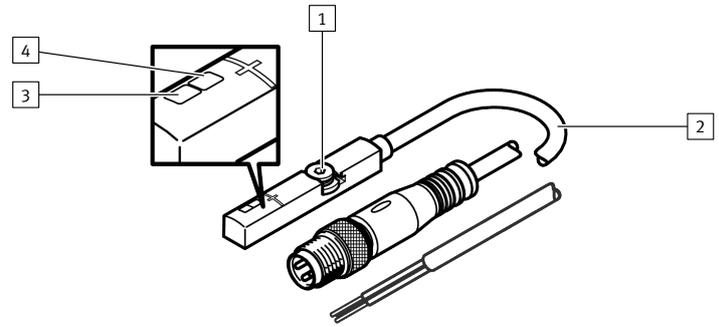


Fig. 1: Design of SMAT-8M

- 1 Retaining screw
- 2 Connecting cable, depending on the version with a rotatable M8 plug or cable with open end
- 3 Red LED: piston not in sensing range
- 4 Green LED: piston in sensing range

4.2 Function

The position transmitter SMAT-8M is an electronic position transmitter with a 3D Hall sensor arrangement, integrated signal processing, analogue voltage output and optical operating status display. The magnetic field of the piston magnet is detected, the magnetic field components are evaluated internally and output within the sensing range as an analogue displacement-proportional signal at the output. The sensing range varies depending on the cylinder.

5 Assembly

Any mounting position can be used.

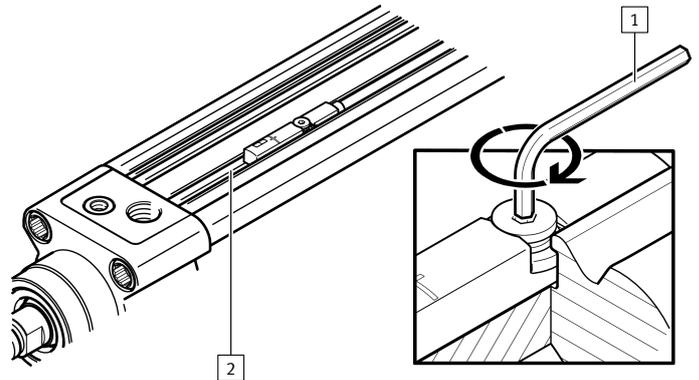


Fig. 2: Mounting

- 1 Internal hex key, spanner size 1.5 mm
- 2 T-slot

1. Place the position transmitter in the T-slot of the drive.
2. Tighten the retaining screw.
 - Maximum tightening torque: 0.3 Nm

6 Installation, electrical

WARNING

Risk of injury due to electric shock.

- Use exclusively PELV circuits in accordance with IEC 60204-1/EN 60204-1 for the electrical power supply (Protective Extra-Low Voltage, PELV).
- Observe the general requirements of IEC 60204-1/EN 60204-1 for PELV circuits.
- Use exclusively voltage sources that guarantee reliable electrical isolation from mains power in accordance with IEC 60204-1/EN 60204-1.

1. Switch off the operating voltage.
2. Connect the connecting cable to the higher-level controller.

SMAT-8M-UE-0.3-M8D	SMAT-8M-UE-2.5-OE
M8x1, 4-pin, max. tightening torque: 0.3 Nm 	

Tab. 2: Circuit diagram and pin allocation

7 Commissioning

The position transmitter SMAT-8M can be commissioned immediately without additional initialisation.

NOTICE

Influence of the measured values by external magnetic fields.

External magnetic fields influence the measured values of the position transmitter.

- Keep magnetic fields and magnetic materials away from the immediate vicinity of the position transmitter.
- Move the position transmitter when determining the sensing range without a tool or with a non-magnetic tool.
- Commission the position transmitter in the final application environment.

- Switch on operating voltage.
 - ↳ LED on (depending on piston position → Tab. 3 LED display in operation). Device is ready for operation.

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The repetition accuracy is better at the centre of the sensing range than at the edge.

- Position the position transmitter for critical applications in such a way that the relevant measuring points are close to 5.5 V.

8 Operating status and signal behaviour

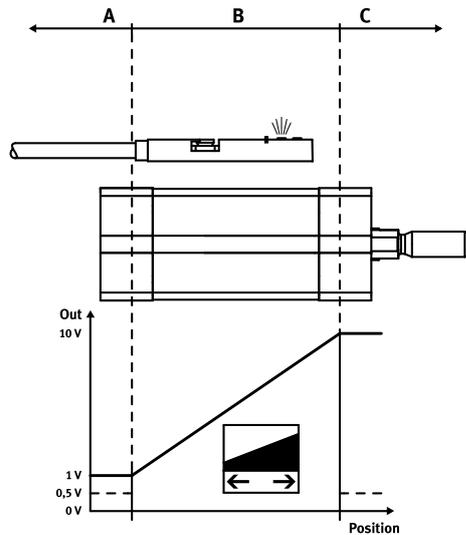


Fig. 3: Signal characteristics SMAT-8M

LED Green	LED Red	Meaning	Description
		LED Green on, LED Red off.	Analogue signal >1 V ... <10 V: The piston is located within the sensing range (range B → Fig. 3).
		LED Green off, LED Red on.	Analogue signal 0.5 V: The piston is outside the sensing range after switching on the operating voltage (range A or C → Fig. 3). The piston position is unknown. Analogue signal 1 V: the piston has left the sensing range in the direction of the connecting cable (range A → Fig. 3). Analogue signal 10 V: The piston has left the sensing range in the direction of the LEDs (range C → Fig. 3).

Tab. 3: LED display in operation

9 Fault clearance

9.1 Diagnostics via LED

LED Green	LED Red	Meaning	Possible cause	Remedy
		Both LEDs off.	Fault in power supply. Fault in connecting cable. Fault in sensor.	Connect power supply. Replace connecting cable. Replace device.
		LEDs flashing alternately.	Internal error.	Contact Festo regional service.

Tab. 4: Diagnostics via LED

9.2 General malfunctions

Fault description	Cause	Remedy
Incorrect or unexpected signals at the analogue output	Unsuitable drive	Use only suitable drives.
	SMAT-8M defective	Replace device.

Fault description	Cause	Remedy
Incorrect or unexpected signals at the analogue output	No operating voltage or unreliable operating voltage	Switch on operating voltage. Maintain operating voltage range.
	Short circuit or overload at output	Correct short circuit or overload.
	Fault in connecting cable	Replace connecting cable.
	Magnetic object close to the position transmitter	Keep magnetic objects away from the near vicinity.

Tab. 5

10 Disassembly

1. Switch off operating voltage.
2. Disconnect all connections from the position transmitter.
3. Unscrew retaining screw.
4. Remove the position transmitter from the T-slot.

11 Technical data

SMAT-8M

General		
Certificates, declaration of conformity		→ www.festo.com/sp
Input signal/measuring element		
Measured variable		Position
Measurement principle		magnetic
Sensing range ¹⁾	[mm]	≤ 52
Signal processing		
Max. travel speed	[m/s]	3
Typical sampling interval	[ms]	2
Output, general		
Path resolution ²⁾	[mm]	≤ 0.2
Analogue output		
Analogue output	[V]	0 ... 10
Sensitivity ¹⁾	[mm / V]	Measuring range/9 V
Typical linearity error ¹⁾	[mm]	±1
Repetition accuracy	[mm]	0.2
Repetition accuracy on quarter turn actuator DRRD	[°]	1
Capacitive load maximum DC	[nF]	100
Min. load resistance of voltage output ³⁾	[kΩ]	20
Electronics		
Operating voltage DC	[V]	15 ... 30
Ready-state delay	[ms]	≤ 200
Typical signal running time ⁴⁾	[ms]	≤ 8
Immission/emission		
Ambient temperature	[°C]	-40 ... +80
Ambient temperature with flexible cable installation	[°C]	-20 ... +70
Recovery time	[ms]	≤ 12.5 ms in accordance with DIN EN 60947-5-7
Degree of protection (in accordance with EN 60529)		IP65/IP68 (condition IP68: test duration 24 h)
Protection class (in accordance with DIN VDE 0106-1)		III

1) Depending on the drive: see selection table in the catalogue

2) Resolution of travel = sensing range/921 (e.g. 0.027 mm with 25 mm sensing range)

3) Recommendation: connect resistor to the analogue output, typ. 20 kΩ

4) The signal running time is longer than the sampling interval due to dynamic filtering. Min. signal running time = sampling interval 2 ms; max. signal running time 8 ms (4x filtering)

Tab. 6: Technical data