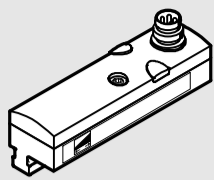


SMAT-8E-...

Position transmitter

FESTO



Instructions | Operating Translation of the original instructions

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UL LISTED
Industrial Control Equipment
2MD1



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For all available product documentation
→ www.festo.com/pk

Warning

Use only in connection with permitted drives from Festo (see www.festo.com).
Not suitable for use as a safety component! Electric voltage! Before working on the electric components:
• Switch off voltage.

Warning

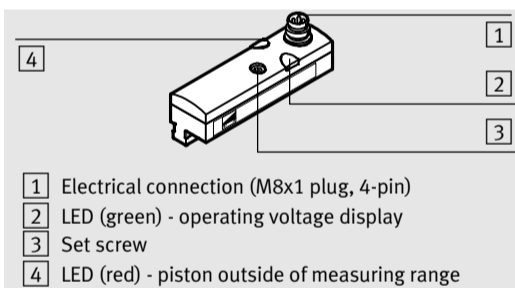
Use only power units which guarantee reliable electrical isolation of the operating voltage as per IEC/DIN EN 60204-1. Observe also the general requirements for PELV power circuits as per IEC/DIN EN 60204-1.

Please note

Only trained personnel with suitable qualification are allowed to fit and commission in accordance with the operating instructions.

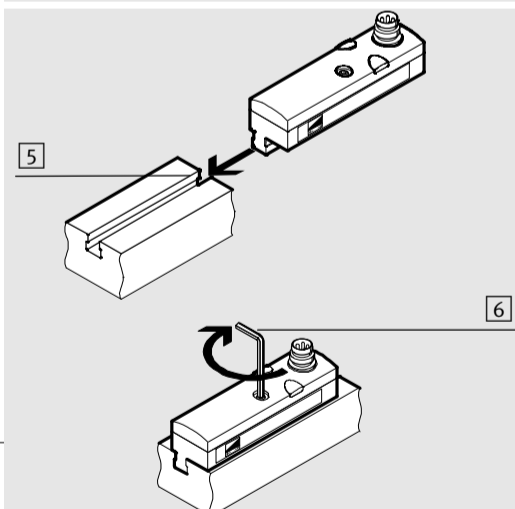
Please note

Long signal cables reduce the immunity to interference.
• Recommendation: Connect the SMAT-8E-... using as short a signal cable as possible.



- 1 Electrical connection (M8x1 plug, 4-pin)
- 2 LED (green) - operating voltage display
- 3 Set screw
- 4 LED (red) - piston outside of measuring range

Fig. 1



- 5 T-slot (profile slot 8)
- 6 Hexagon socket wrench

Fig. 2

UL information

Only in connection with the UL mark on the product: To comply with the approval requirements of Underwriters Laboratories (UL) for USA and Canada, please observe the following information from UL:

- Only for use in Class 2 Circuits.
- Field installed conductors for the position transmitter shall be segregated from field and factory installed conductors and uninsulated live parts of other circuits operating at over 150 V to ground so that a minimum permanent 2 inch (50.8 mm) separation is maintained, unless the field wiring conductors have been provided with recognized insulating material which has an equal or higher voltage rating than the other circuit involved."

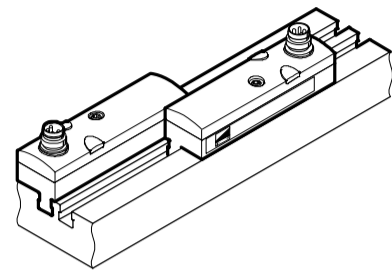
1 Method of operation and use

The position transmitter SMAT-8E-... has been designed for continuous recording of the piston position of drives which can be queried magnetically. Festo drives with a T-slot (profile slot 8) are permitted. You can find a list of the permitted drives in the online catalogue at www.festo.com.

The piston position is recorded without contact (magnetically). The measurement results are made available via 2 analogue outputs and as a current and voltage signal. An output signal proportional to the displacement is delivered within the measuring range.

The red LED [4] indicates when the piston is located outside the measuring range (integrated OOR detection - out of range).

For many drives with a two row t-slot, the asymmetrical design allows multiple position transmitters to be arranged in a row without gaps.



Thanks to the output signal proportional to the displacement, the following fields of use are possible, for example:

- Object detection (location, position, good/bad part, sorting)
- Process monitoring (measuring, quality, wear)
- Object registering (seizing, pressing in, clamping).
- Cycle time optimisation.
- Use instead of a simply proximity switch. If it is not possible to use a fine adjustment of sensors for space reasons, any switching position can be defined within the measuring range by using the SMAT-8E-...

Feature	Type designation (order code)
Position transmitter	SMAT-...
Design	-8E-...
Measuring range	-S50-... (50mm)
Outputs	-IU-... Current and voltage output: – Analogue output (I) 4 ... 20 mA – Analogue output (U) 0 ... 10V
Electrical connection	-M8 M8 plug, 4-pin

2 Conditions of use

Please note

Malfunctions will occur if the device is not used correctly. Make sure that the following specifications are always observed:

- Compare the maximum values specified in these operating instructions with those of your actual application (e.g. voltage, forces, torques, temperatures, masses, speeds).
- Take into account the ambient conditions at your location.
- Please comply with national and local safety laws and regulations.
- Remove all transport packing such as protective wax, foils (polyamide), caps (polyethylene), cardboard boxes (except for the sealing elements of the pneumatic connections).
- The packing is intended for recycling (except for: oiled paper which must be disposed of).
- Use the product in its original state. Unauthorized modification is not permitted.
- Use the position transmitter only for drives approved for this by Festo.
- Avoid ferritic objects in the vicinity of the position transmitter (e.g. fastening elements for drives). This can negatively influence the magnetic field and thus the sensor's behaviour.

3 Fitting

The position transmitter can be fitted in any position.

3.1 Fitting mechanical components

Please note

Observe the desired fitting direction. The SMAT-8E-... delivers a rising output signal when the piston moves toward the side of the electrical connection (see also characteristic curve in section 4.1).

Fasten the SMAT-8E-... as follows:

1. Move the position transmitter in the desired direction in the drive's t-slot [5].
2. Move the SMAT-8E-... into the desired measuring range.

Please note

A low torque is sufficient for secure fastening.

3. Tighten the M3*12 hexagon socket set screw with 0.3 Nm (see fig. 2) - width across flats 1.5 mm [6].

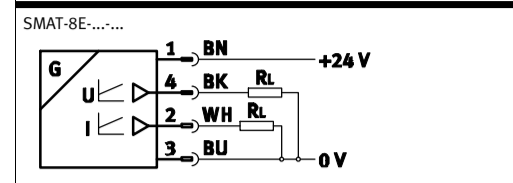
3.2 Permitted drives

Please note

You can find a list of the permitted drives in the online catalogue at www.festo.com. Please ask your technical advisor if you have questions about this.

3.3 Fitting electric components

Circuit diagram



- Connect the SMAT-8E-... as follows:

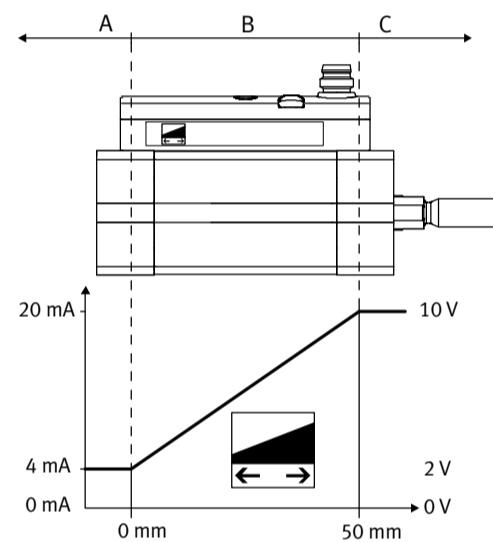
Pin	Assignment	Cable colours 1)	Plug ²⁾
1	+24 V DC power supply	brown (BN)	M8x1 4-pin
2	Analogue output 4 ... 20 mA	white (WH)	
3	0 V	blue (BU)	
4	Analogue output 0 ... 10 V	black (BK)	

1) Using the connector socket with cable as specified in the chapter "Accessories"
2) Tightening torque max. 0.3 Nm

4 Commissioning

1. Switch on the operating voltage. The green LED will then light up (operating voltage display).
2. If the piston is outside the measuring range, the red LED will also light up (out-of-range display).
3. Adjust the SMAT-8E-... (see section 4.2).
4. Check the adjustment (see section 4.3).

4.1 Signal behaviour of the analogue outputs



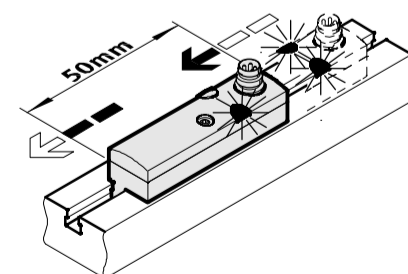
Analogue signals	Description	*)	
2 V ... < 10 V	4 mA ... < 20 mA	Piston has left the measuring range in the negative direction	A
> 2 V ... > 10 V	> 4 mA ... > 20 mA	Piston has left the measuring range in the positive direction	C
		Piston within the measuring range at the appropriate position	B

*) See characteristic curve above.

4.2 Adjust SMAT-8E-...

Adjust the SMAT-8E-... as follows:

1. Loosen the hexagon socket set screw [3] on the SMAT-8E-...
2. Position the drive's piston at the outer limit of the desired measuring range (e.g. at the desired end position).
3. Slowly move the SMAT-8E-... towards the desired measuring range until the red LED [4] goes out. The piston is now located in the measuring range of the SMAT-8E-...
4. Tighten the hexagon socket set screw [3] on the SMAT-8E-... with max. 0.3 Nm.



4.3 To check the adjustment

1. Start a test run.
2. Check that SMAT-8E-... covers the desired positioning ranges and delivers the desired signals.
3. Correct the adjustment if necessary.

5 Care and maintenance

- Switch off the operating voltage in order to clean the SMAT-8E-...
 - Clean the SMAT-8E-... as needed.
- Permitted cleaning agents are:
- soap suds (max. + 60°)
 - petroleum ether
 - all non-abrasive cleaning agents.

6 Dismantling

1. Switch off the operating voltage in order to dismantle the SMAT-8E-...
2. Disconnect the relevant connections of the SMAT-8E-...
3. Loosen the hexagon socket set screw [3] on the SMAT-8E-...
4. Push the SMAT-8E- out of the t-slot.

7 Eliminating faults

Fault	Possible cause	Remedy
Incorrect or unexpected signals at the analogue outputs	Impermissible drive	Use only approved drives (see online catalogue at: www.festo.com)
	Operating voltage below the permitted range	Observe the tolerances
	Short circuit/overload at relevant output	Eliminate short circuit/overload
	Wire fracture	Replace cable
	Ferritic objects in the vicinity of the position transmitter (e.g. fastening elements for drives).	Avoid ferritic objects in the vicinity
	SMAT-8E-... not adjusted correctly	Readjust SMAT-8E-...
	Readjust by tightening the set screw	Make sure that the SMAT-8E does not slip while tightening the set screw
	Noisy or slow signal due to incorrect filter setting in the PLC/IPC	Correct the filter setting in the PLC/IPC

8 Accessories

Designation	Type
Connecting cable M8x1 4-pin	SIM-M8-4.-D-...

9 Technical specifications

SMAT-8E-...	
Measured variable	Position
Measuring principle	magnetic
Path measuring range	48 ... 52 mm
Sampling period	typ. 2,85 ms
Path resolution	0,064 mm
Max. positioning speed	3 m/s
Linearity fault	typ. ± 0,25 mm, max. ± 0,60 mm
Current output sensitivity	typ. 0,305 mA/mm
Tolerance range of the sensitivity	0,296 ... 0,314 mA/mm
Voltage output sensitivity	typ. 0,152 V/mm
Tolerance range of the sensitivity	0,149 ... 0,155 V/mm
Repetition accuracy ¹⁾	0,128 mm
Analogue output	4 ... 20 mA, 0 ... 10 V
Max. load resistance of current output	500 Ω
Min. load resistance of voltage output	2 kΩ
Permitted capacitive load maximum DC	100 nF
Resistance to overload	exists
Resistance to short circuit	Wegmessbereich
Recovery time	140 ms as per DIN 60947-5-7
Operating voltage range DC	15 ... 30 V
Residual ripple	10% of the DC voltage (DIN 41755) within the operating voltage range
Idling current	max. 32 mA (U _B = 15 V) max. 24 mA (U _B = 24 V)
Readiness delay	max. 10 ms
Protection against incorrect polarity	for all electrical connections
Electrical connection	M8x1 plug, 4-pin
Material information for plug-in contacts	Gold-plated brass
Material information for threaded sleeve	Nickel-plated brass
Material information for housing	PA, reinforced and PC
Ambient temperature	-20 ... +50 °C
Storage temperature	-20 ... +80 °C
Product weight	15 g
Protection class	IP65 and IP67 as per DIN EN 60 529
Protection class	III as per DIN VDE 0106-1

1) We recommend the use of a piston rod protected against incorrect rotation or protection by mechanical structure.