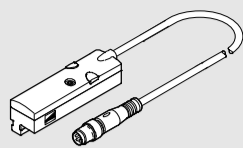


# SMAT-8E-...-M8D

## Position transmitter

**FESTO**



Instructions | Operating Translation of the original instructions

**UL LISTED**  
Industrial Control Equipment  
2MD1

2018-11c

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8103168 [8103170]

For all available product documentation  
→ [www.festo.com/pk](http://www.festo.com/pk)

### Warning

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

### Warning

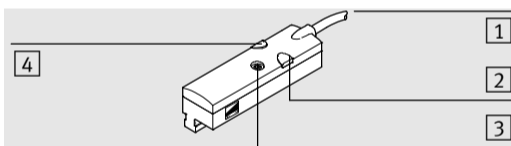
Use only power units which guarantee reliable electrical isolation of the operating voltage as per IEC/EN 60204-1. Observe also the general requirements for PELV power circuits as per IEC/EN 60204-1.

### Note

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

### Note

Long signal cables reduce the resistance to interference.  
• Recommendation: Use signal lines that are as short as possible.



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

Fig. 1

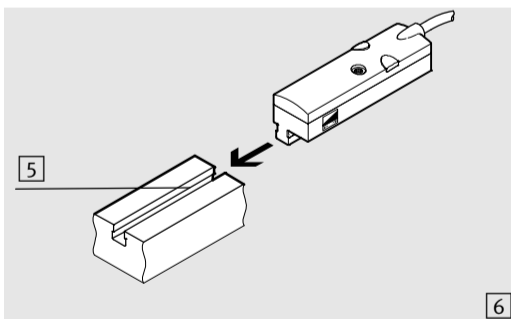


Fig. 2

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

### 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.

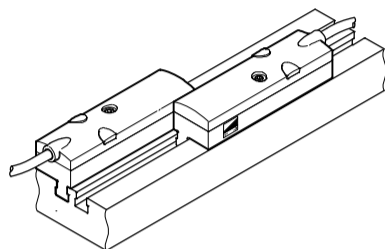
### 1 Method of operation and use

The position transmitter SMAT-8E-...-M8D 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](http://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 with the measuring range by using the SMAT-8E-...-M8D.

### 2 Conditions of use

#### 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.
- The device is intended for use in an industrial environment. In residential areas, measures for radio interference suppression may have to be taken.

### 3 Fitting

The position transmitter can be fitted in any position.

#### 3.1 Fitting mechanical components

##### Note

Observe the desired fitting direction. The SMAT-8E-...-M8D delivers a rising output signal when the piston moves toward the side of the electrical connection (→ characteristic curve in section 4.1).

Fasten the SMAT-8E-...-M8D as follows:

1. Move the position transmitter in the desired direction in the drive's t-slot [5].
2. Move the SMAT-8E-...-M8D into the desired measuring range.

##### Note

A low torque is sufficient for secure fastening.

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

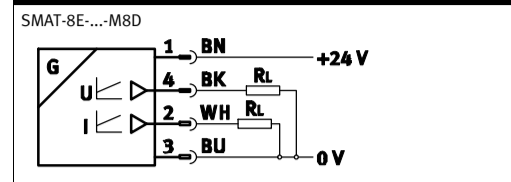
### 3.2 Permitted drives

#### Note

You can find a list of the permitted drives in the online catalogue at [www.festo.com](http://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-...-M8D as follows:

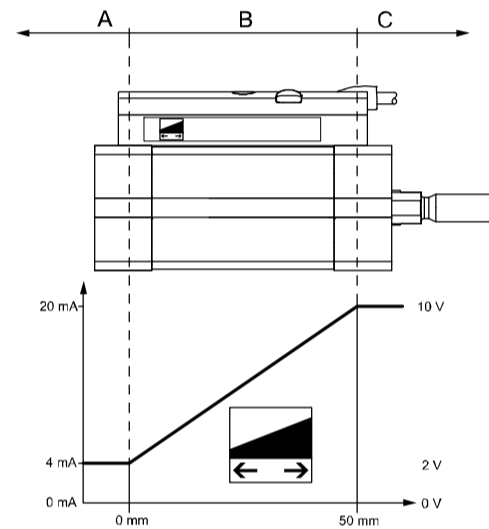
Pin	Assignment	Core colours	Plug 1)
1	+24 V DC power supply	brown (BN)	M8x1 4-pin 
2	Analogue output 4 ... 20 mA	white (WH)	
3	0 V	blue (BU)	
4	Analogue output 0 ... 10 V	black (BK)	

1) Tightening torque for the union nut at the plug: 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-...-M8D (→ section 4.2).
4. Check the adjustment (→ section 4.3).

#### 4.1 Signal behaviour of the analogue outputs



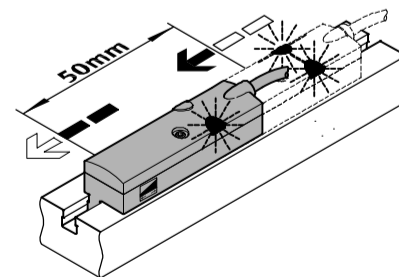
Analogue signals	Description	*)	
2 V	4 mA	Piston has left the measuring range in the negative direction	A
10 V	20 mA	Piston has left the measuring range in the positive direction	C
> 2 V ... < 10 V	> 4 mA ... < 20 mA	Piston within the measuring range at the appropriate position	B

\*) See characteristic curve above.

#### 4.2 Adjust SMAT-8E-...-M8D

Adjust the SMAT-8E-...-M8D as follows:

1. Loosen the hexagon socket set screw [3].
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-...-M8D 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-...-M8D.
4. Tighten the hexagon socket set screw [3] with max. 0.3 Nm.



#### 4.3 To check the adjustment

1. Start a test run.
2. Check that SMAT-8E-...-M8D 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-...-M8D
  - Clean the SMAT-8E-...-M8D 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 the dismantle the SMAT-8E-...-M8D.
2. Disconnect the relevant connections of the SMAT-8E-...-M8D.
3. Loosen the hexagon socket set screw [3].
4. Push the SMAT-8E-...-M8D out of the t-slot.

### 7 Eliminating faults

Fault	Possible cause	Remedy
Incorrect or unexpected signals at the analogue outputs	Impermissible drive	Use approved drives (see online catalogue at: <a href="http://www.festo.com">www.festo.com</a> )
	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-...-M8D not adjusted correctly	Readjust by tightening the set screw	Make sure that the SMAT-8E-...-M8D 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

Select the appropriate accessories from our catalogue. (→ [www.festo.com/catalogue/smat-8e](http://www.festo.com/catalogue/smat-8e))

### 9 Technical specifications

SMAT-8E-...-M8D	
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	yes
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 <sub>B</sub> = 15 V) max. 24 mA (U <sub>B</sub> = 24 V)
Readiness delay	max. 10 ms
Protection against incorrect polarity	for all electrical connections
Electrical connection	M8x1 plug, 4-pin, rotatable thread
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
Ambient temperature with flexible cable installation	-20 ... +50 °C
Storage temperature	-20 ... +80 °C
Product weight	21.4 g
Protection class	IP65 and IP68 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.