



- Position measuring range  
48 ... 52 mm
- Analogue output 0 ... 10 V and  
0 ... 20 mA
- Integrated out-of-range sensor
- Typical repetition  
accuracy 0.1 mm
- Direct mounting in T-slot

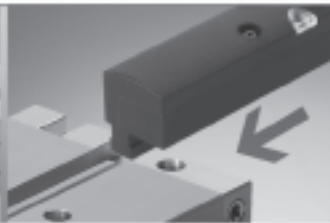


## Leading the way – the new SMAT

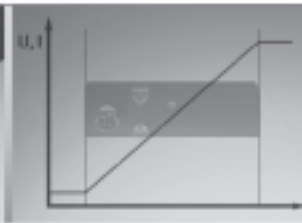
It continuously detects the position of the cylinder piston within a range of 50 mm. Its analogue output delivers an output signal in proportion to the piston position.



Wide range of use

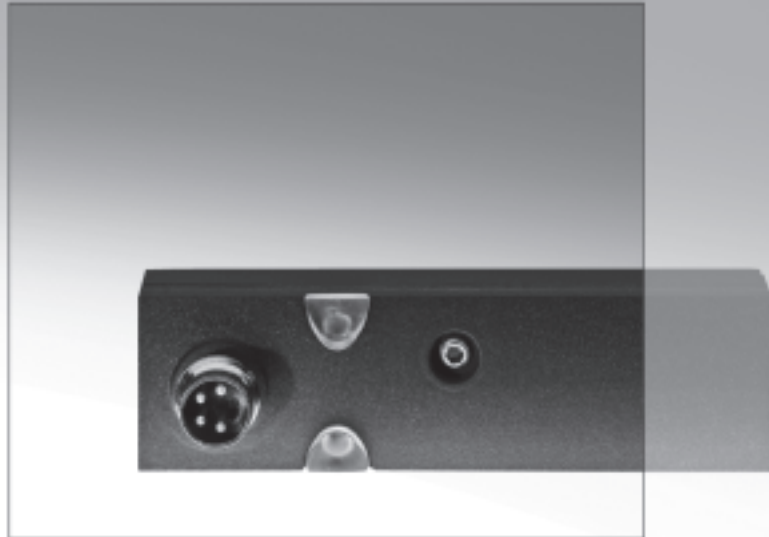


Easy installation



Position is known to 100%

- Sturdy: thanks to the contactless measuring principle with wear-free sensing
- Quicker to install: simply push into the slot and secure with Allen key
- Reliable: the measuring range is 48 ... 52 mm, independent of cylinder; reproducibility is 0.1 mm
- Flexible: the installation direction of the SMAT in the slot is freely selectable
- Multi-purpose: fits on virtually all Festo cylinders with T-slot
- Secure: operating- and out-of-range display via 2 LEDs on the device
- Standardised: 0 ... 10 V, 0 ... 20 mA analogue output
- Compact: direct mounting in T-slot does not require any additional accessories

**Advantages for designers**

- Minimal design costs, no need for accessories
- Suitable for use in confined spaces thanks to the compact design
- Freely selectable drive unit means greater flexibility
- The measuring system opens up a whole host of different applications

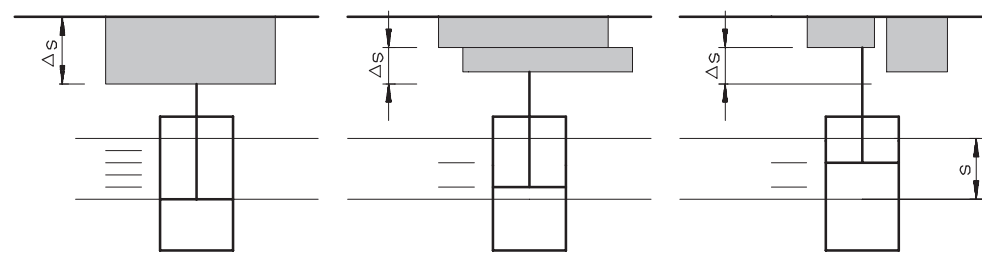
**Advantages for end users**

- Excellent reliability and precision thanks to the wear-free measuring system
- Minimum warehousing: only 1 type for a wide range of applications and drive units
- Less expensive than comparable potentiometer solutions


# Position transmitters SMAT-8E, for T-slot

Key features

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| Design   | Typical applications  |
|--|---|
| <p>The SMAT-8E is a sturdy magnetic measuring system in the 50 mm range. It provides a standardised analogue current and voltage signal via an M8x1 plug connection, regardless of the drive unit used. The transmitter can thus be connected directly to the analogue input of a programmable logic controller. The piston position of the pneumatic cylinder can be recorded by means of contactless sensing and the travel distance can be measured between any set switching points with typical reproducibility of 0.1 mm.</p>  | <p><b>Object detection</b><br/>Press-fitting, clamping, position sensing, quality sorting of parts, workpiece replacement.</p> <p><b>Process monitoring</b><br/>Quality inspection, wear monitoring, thickness measuring.</p> |

s Position measuring range

 Note

Sensors that detect magnetic fields, such as proximity sensors SMT/SME/SMPO, position sensors SMH and position transmitters SMAT, must not be secured onto the drive using mountings made from ferritic materials, as this can lead to malfunction.

# Position transmitters SMAT-8E, for T-slot

Selection aid

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| Drive  | Piston Ø             | Suitability | Drive                          | Piston Ø                 | Suitability |
|--|----------------------|-------------|--------------------------------|--------------------------|-------------|
| Standards-based cylinders                      |                      |             | Drives with linear guide       |                          |             |
| Standard cylinders DSNU, ESNU                  |                      | o           | Mini slides SLS, SLF, SLT      |                          | –           |
| Standard cylinders DSN, ESN                    |                      | o           | Twin cylinders SPZ             | Ø 10, 25                 | o           |
| Standard cylinders DNCB                        |                      | ++          |                                | Ø 16                     | ++          |
| Standard cylinders DNC                         |                      | ++          |                                | Ø 32                     | –           |
| Standard cylinders DNG                         |                      | –           | Slide units SLZ                |                          | –           |
| Standard cylinders CDN-...-R with sensor strip |                      | –           | Guided cylinders DFP           | Ø 10 ... 16              | –           |
| Standard cylinders DNU                         |                      | –           |                                | Ø 25 ... 80              | o           |
| Standard cylinders ADN                         |                      | ++          | Mini guided drives DFC         |                          | –           |
| Cylinders with piston rod                      |                      |             | Guided drives DFM              | Ø 12, 25, 50             | ++          |
| Compact cylinders ADVU, AEVU                   |                      | ++          |                                | Ø 16, 20, 32, 40, 63, 80 | +           |
| Short-stroke cylinders ADVC, AEVC              | Ø 6 ... 25           | –           |                                | Ø 100                    | –           |
|  | Ø 32 ... 100         | ++          | Guided drives DFM-B            | Ø 12, 16, 25, 32         | –           |
| Flat cylinders EZH-10/40-40-A-B                |                      | +           |                                | Ø 20, 63                 | +           |
| Flat cylinders DZF                             | Ø 12, 25, 32, 40, 63 | +           |                                | Ø 40, 50                 | ++          |
|  | Ø 18, 50             | ++          | Linear drive units SLE         |                          | –           |
| Flat cylinders DZH                             | Ø 16 ... 25          | +           | Twin cylinders DPZC            |                          | –           |
|  | Ø 32 ... 63          | –           | Twin cylinders DPZ             |                          | ++          |
| Round cylinders DSNU, ESNU                     |                      | o           | Handling units                 |                          |             |
| Round cylinders DSW, ESW                       |                      | o           | Linear modules HMP             |                          | –           |
| Round cylinders DSEU, ESEU                     |                      | o           | Linear modules HMPL            |                          | –           |
| Multimount cylinders DMM, EMM                  |                      | +           | Handling modules HSP           |                          | –           |
| Round cylinders CRDG                           |                      | o           | Feed separators HPV            |                          | –           |
| Round cylinders CRDSW                          |                      | o           | Three-point grippers HGD       |                          | –           |
| Standard cylinders CRHD                        |                      | o           | Parallel grippers HGP          |                          | –           |
| Standard cylinders CRDSNU                      |                      | o           | Parallel grippers HGPP         |                          | –           |
| Standard cylinders CRDNG                       |                      | –           | Parallel grippers HGPT         |                          | –           |
| Standard cylinders CRDNGS                      |                      | –           | Angle grippers HGW             |                          | –           |
| Rodless cylinders                              |                      |             | Radial grippers HGR            |                          | –           |
| Linear drives DGC                              |                      | –           | Cushioning components          |                          |             |
| Linear drives DGP, DGPL                        |                      | –           | Stop elements YSRWJ            |                          | –           |
| Linear drives SLG                              |                      | –           | Electrical positioning systems |                          |             |
| Linear drives DGO                              |                      | –           | Toothed belt axes DGE-ZR       |                          | –           |
| Linear drives SLM                              | Ø 12, 40             | ++          | Spindle axes DGE-SP            |                          | –           |
|  | Ø 16 ... 32          | o           | System components              |                          |             |
| Semi-rotary drives                             |                      |             | Heavy-duty guides HD           |                          | –           |
| Swivel modules DSM                             | Ø 6 ... 10           | –           | Process valve actuators        |                          |             |
| Semi-rotary drives DRQ                         |                      | –           | Copac linear actuators DLP-A   |                          | –           |
| Semi-rotary drives DRQD                        | Ø 6, 8, 12, 40, 50   | –           |                                |                          |             |
|  | Ø 16 ... 32          | ++          |                                |                          |             |
| Function-oriented drives                       |                      |             |                                |                          |             |
| Stopper cylinders STA, STAF                    |                      | –           |                                |                          |             |
| Linear/swivel clamps CLR                       |                      | o           |                                |                          |             |
| Swivel/linear units DSL                        |                      | –           |                                |                          |             |

++ Unlimited use  
+ Sensor function guaranteed without restriction; installation direction and clamping are drive-specific  
o Upon request  
– Unsuitable

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o Upon request  
– Unsuitable

Drive accessories  
Cylinder sensors

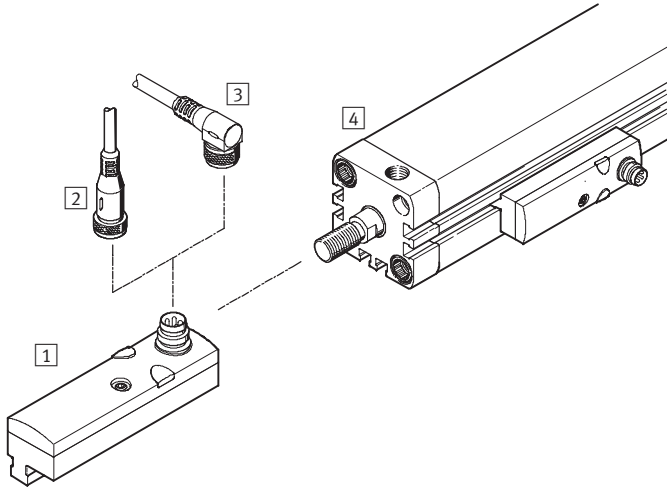
10.2

# Position transmitters SMAT-8E, for T-slot

Peripherals overview and type codes

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## Peripherals overview



|                   | Brief description          | → Page  |
|-------------------|----------------------------|---|
| Proximity sensors |                            |   |
| 1                 | SMAT-8E                    | Magnetic, with plug M8x1                            |
|                   |                            | 1 / 10.2-123  |
| Accessories       |                            |   |
| 2                 | Connecting cable NEBU-M8G4 | Straight socket, M8x1, 4-pin                        |
| 3                 | Connecting cable NEBU-M8W4 | Angled socket, M8x1, 4-pin                          |
|                   |                            | 1 / 10.2-125  |
| Drives            |                            |   |
| 4                 | Drives with T-slot         | Drives combinable with SMAT-8E → Table 1 / 10.2-121 |
|                   |                            | –   |

## Type codes

|                                 |                                 |      |   |    |   |     |   |    |   |    |
|---------------------------------|---------------------------------|------|---|----|---|-----|---|----|---|----|
|                                 |                                 | SMAT | – | 8E | – | S50 | – | IU | – | M8 |
| <b>Type</b>                     |                                 |      |   |    |   |     |   |    |   |    |
| SMAT                            | Position transmitter, magnetic  |      |   |    |   |     |   |    |   |    |
| <b>Design</b>                   |                                 |      |   |    |   |     |   |    |   |    |
| 8E                              | For T-slot, insertable from end |      |   |    |   |     |   |    |   |    |
| <b>Position measuring range</b> |                                 |      |   |    |   |     |   |    |   |    |
| S50                             | 50 mm                           |      |   |    |   |     |   |    |   |    |
| <b>Analogue output</b>          |                                 |      |   |    |   |     |   |    |   |    |
| IU                              | 0 ... 10 V, 0 ... 20 mA         |      |   |    |   |     |   |    |   |    |
| <b>Electrical connection</b>    |                                 |      |   |    |   |     |   |    |   |    |
| M8                              | Plug M8x1                       |      |   |    |   |     |   |    |   |    |

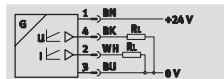
# Position transmitters SMAT-8E, for T-slot

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Technical data

Function

Position transmitter



- Position measuring range  
48 ... 52 mm
- Analogue output 0 ... 10 V and  
0 ... 20 mA
- Integrated out-of-range sensor
- Magnetic measuring principle
- Insertable in the T-slot from the end



| Design                |  |
|-----------------------|--|
| Constructional design | For T-slot                                 |
| Type of mounting      | Clamped, insertable in the slot lengthwise |
| Connection direction  | In-line                                    |
| Ready status display  | Green LED                                  |
| Status display        | Red LED = outside measuring range          |

| Technical data                         |                                |           |
|--|--------------------------------|-----------|
| Analogue output                        | [V]                            | 0 ... 10  |
|  | [mA]                           | 0 ... 20  |
| Sensitivity                            | [V/mm]                         | 0.152     |
|  | [mA/mm]                        | 0.305     |
| Typical scanning interval              | [ms]                           | 2.85      |
| Displacement resolution                | [mm]                           | 0.064     |
| Electrical connection                  | Plug M8x1, 4-pin               |           |
| Operating voltage range                | [V DC]                         | 15 ... 30 |
| Min. load resistance of voltage output | [Ω]                            | 2,000     |
| Max. load resistance of current output | [Ω]                            | 500       |
| Idle current                           | [mA]                           | 32        |
| Protection against short circuit       | Yes                            |           |
| Protection against overloading         | Yes                            |           |
| Protection against polarity reversal   | For all electrical connections |           |
| Measuring principle                    | Magnetic                       |           |
| Position measuring range               | [mm]                           | 48 ... 52 |
| Reproducibility, analogue value        | [mm]                           | ±0.064    |
| Max. speed of travel                   | [m/s]                          | 3         |
| Protection class                       | IP65/IP67                      |           |
| Product weight                         | [g]                            | 15        |

| Materials         |                                       |
|-------------------|---------------------------------------|
| Housing           | Reinforced polyamide<br>Polycarbonate |
| Note on materials | Free of copper and PTFE               |

| Operating and environmental conditions       |                                     |                           |
|--|-------------------------------------|---------------------------|
| Ambient temperature                          | [°C]                                | -20 ... +50 <sup>1)</sup> |
| Corrosion resistance class CRC <sup>2)</sup> | 2                                   |                           |
| CE symbol (declaration of conformity)        | In accordance with EU EMC directive |                           |
| Certification                                | c UL us - Listed (OL)               |                           |
|  | C-Tick                              |                           |

1) Extended ambient temperature range on request

2) Corrosion resistance class 2 according to Festo standard 940 070

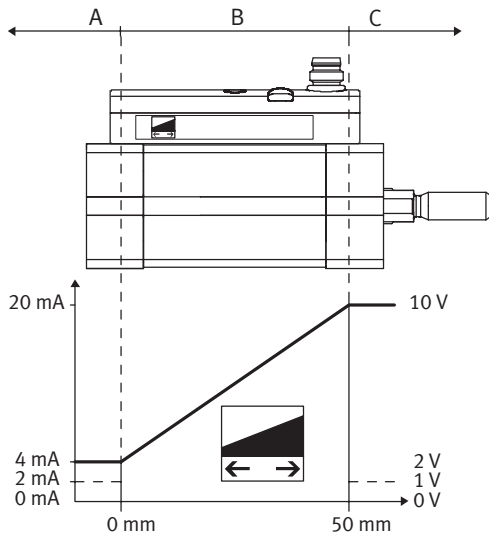
Components requiring moderate corrosion resistance. Externally visible parts with primarily decorative surface requirements which are in direct contact with a normal industrial environment or media such as coolants or lubricating agents.

# Position transmitters SMAT-8E, for T-slot

Technical data

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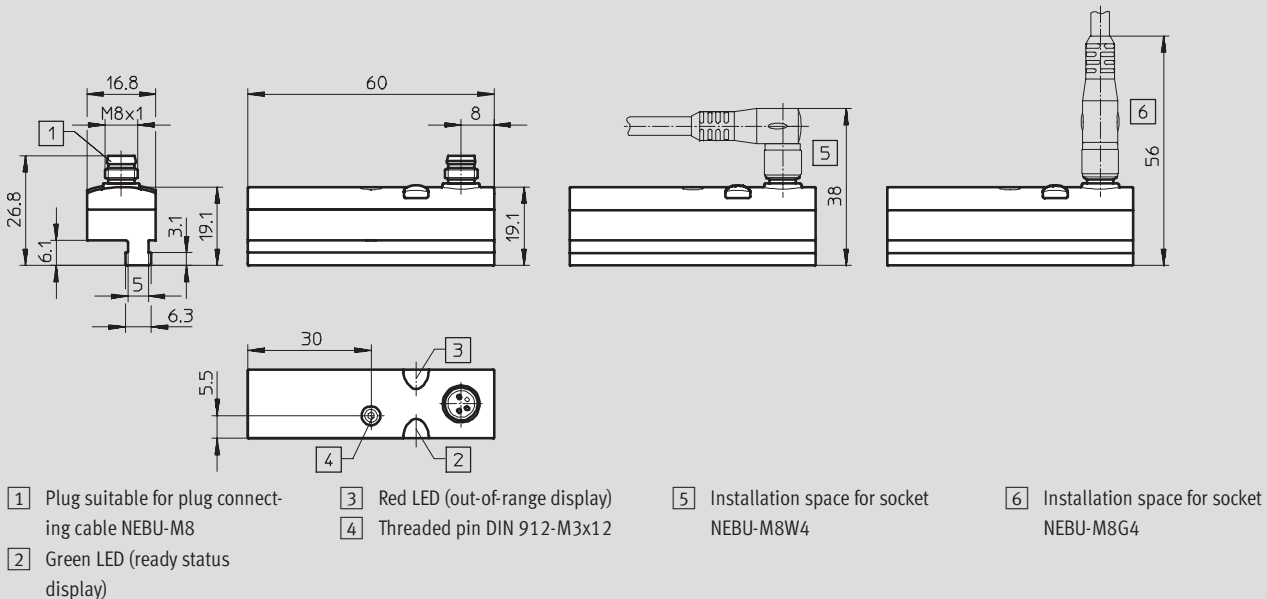
## Analogue output as a function of the piston position



| Analogue output |          | Description  | Range |
|-----------------|----------|--|-------|
| [V]             | [mA]     |  |       |
| 0               | 0        | No valid signal, e.g. no operating voltage                               | –     |
| 1               | 2        | Piston outside of measuring range after operating voltage is switched on | A, C  |
| 2               | 4        | Piston has left the measuring range in the negative direction            | A     |
| 10              | 20       | Piston has left the measuring range in the positive direction            | C     |
| 2 ... 10        | 4 ... 20 | Piston within the measuring range at the relevant position               | B     |

## Dimensions

Download CAD data → [www.festo.com/en/engineering](http://www.festo.com/en/engineering)



## Ordering data

|  | Analogue output           | Electrical connection | Part No. | Type              |
|--|---------------------------|-----------------------|----------|-------------------|
|  | 0 ... 10 V<br>0 ... 20 mA | Plug M8x1, 4-pin      | 540 191  | SMAT-8E-S50-IU-M8 |



# Position transmitters SMAT-8E, for T-slot

Accessories



Connecting cable M8x1

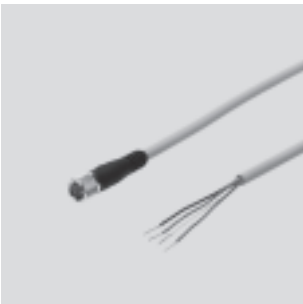
NEBU-M8G4

NEBU-M8W4

Material:

Housing: Polyurethane

Cable sheath: Polyurethane



| Ordering data   |     |                                  |                     |          |                     |
|-----------------|-----|----------------------------------|---------------------|----------|---------------------|
| Switch output   |     | Switching status display via LED | Cable length<br>[m] | Part No. | Type                |
| PNP             | NPN |                                  |                     |          |                     |
| Straight socket |     |                                  |                     |          |                     |
| ■               | ■   | –                                | 2.5                 | 541 342  | NEBU-M8G4-K-2.5-LE4 |
| ■               | ■   | –                                | 5                   | 541 343  | NEBU-M8G4-K-5-LE4   |
| Angled socket   |     |                                  |                     |          |                     |
| ■               | ■   | –                                | 2.5                 | 541 344  | NEBU-M8W4-K-2.5-LE4 |
| ■               | ■   | –                                | 5                   | 541 345  | NEBU-M8W4-K-5-LE4   |