Sensors/Vision systems
# Sensors/Vision systems

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## Sensors

### 1.4 Pressure and vacuum sensors

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- Intuitive user guidance via LCD display
- Easy teach-in
  ➞ Page 208

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- Light assembly
- Two-part, multi-coloured display
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**Pressure transmitters SPTW**
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- Voltage output
- Integrated or separate digital display
- Suitable for vacuum
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**Flow sensors SFAM**
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- Can be combined with MS6 series service units
- Simple checking of the current sensor settings in SHOW mode
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**Pressure switches SDE5**
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- Selectable output functions
- Teach-in function for programming
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**Pressure sensors SDE1**
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- Current or voltage output
- Numerical pressure display
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**Pressure transmitters SPTE**
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- Pressure measuring range 0 ... 10 bar
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**Flow sensors SFAB**
- Flow measuring range up to 1,000 l/min
- Display can be rotated 270°
- LCD display with 9 segments, bar chart and switching point-dependent colour changes
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**Flow sensors SFAM**
- Flow measuring range up to 5,000 l/min
- Can be combined with MS6 series service units
- Simple checking of the current sensor settings in SHOW mode
  ➞ Page 296
# Sensors

## 1.6 Inductive sensors

### Proximity sensors SIE, inductive
- For sensing metal objects
- Corrosion-resistant and welding field immune versions

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### Proximity sensors SIES-8M, inductive
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## 1.7 Opto-electronic sensors

### Sensors SOE, opto-electronic
- Light sensors and light barriers
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- Position sensor for semi-rotary actuators
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- For monitoring the position of semi-rotary actuators
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- With two mechanical switches
- For mechanical, electric proximity sensor

**Page 440**

### Limit switch attachments DAP2/QH-DR
- Square or round design
- Drive interface to Namur VDI/VDE 3845
- With pneumatic, electric or inductive sensing

**Page 450**
Proximity sensors for drive units
Proximity sensors for drive units

Key features

General

Festo proximity sensors are position sensors specially adapted and optimised for use with Festo cylinders. Given their special measuring methods, however, this does not prevent them from being used in many other applications for which magnetic fields are to be detected. As a system supplier, Festo offers specific tailored sensing solutions for a broad range of applications.

The proximity sensor range offers in-stock parts with fixed or variable configuration according to module types.

Proximity sensors detect the magnetic field of permanent magnets fitted on cylinder pistons and thus indirectly report the position of the piston rod. It is essential that they be coordinated to suit the magnets used, the relevant distance to the magnet, and the geometry and tolerance of the slot. As the leading supplier of pneumatic solutions, Festo can fulfil this requirement competently and reliably.

The proximity sensor is fixed mechanically at the desired switching position in the drive slot. As soon as the cylinder piston reaches this position, the switching signal status changes. This standardised binary switching signal is, for example, logically linked to programmable logic controllers (PLCs) and used to control the process sequence.

Switching characteristics of proximity sensors for cylinders

| Movement left → right: A to B = switching travel; A to D = hysteresis |
| Movement right → left: C to D = switching travel; C to B = hysteresis |

In general, hysteresis and switching travel are dependent on the magnetic field. Given the fact that cylinders come in different shapes and sizes, the distance to the magnet changes the influence on the hysteresis and the switching travel. Each new cylinder/sensor combination produces new values for both.

Repeatability: Repeated advancing to A or C and the identified deviation in the switching point. The repeatability of the switching point of proximity sensors SMT/SME when used in non-rotating drives is ±0.1 mm.

Proximity sensors for drive units > Sensors
Contacting proximity sensors SME → 29

Contacting proximity sensors use a reed switch as the switching element. The SME-6M series has an integrated protective circuit, which significantly increases the service life of the reed contacts. When connected to typical PLC loads, 100 million switching cycles can be achieved. A series without the protective circuit achieves 20 million switching cycles at PLC loads. Due to their robust structure, Festo proximity sensors with reed contacts are designed for currents up to 0.5 A, special variants up to 2 A. Switches for operating voltages up to 230 V and normally closed reeds complete the range.

Proximity sensors for drive units

Sensors for drive units must be operated via an isolation amplifier thanks to its Namur interface. It meets the high requirements of device category 1GD and 3GD. The sensor SMT-8F-I-…-EX meets the vice categories 1GD and 3GD.

The range also includes types for device categories 1GD and 3GD. The sensor SMT-8F-…-EX meets the high requirements of device category 1GD thanks to its Namur interface. It must be operated via an isolation amplifier. Proximity sensors SMT-8F-2S-…-EX for device category 3GD have a normal switch output and can be connected directly to fieldbus units or programmable logic controllers (PLC).

Proximity sensors for high and low temperatures

The S6 variants are approved for temperatures up to 120 °C. The SME-8-…-S6 can also be used for the low temperature range down to −40 °C.

Welding field immune proximity sensors SMTSO → 52

These electronic proximity sensors are designed for use in welding areas with alternating fields from 45 ... 65 Hz. The switching signal is effectively frozen as soon as the proximity sensor detects an alternating magnetic field. This prevents incorrect switching during welding operations.

Position transmitters SMAT → 148

The SMAT-8E is a sturdy magnetic measuring system with a 50 mm working range, regardless of the drive unit used. It provides a standardised analogue current and voltage signal via an M8x1 plug connection.

Position sensors SMH for grippers → 159

The position sensor SMH has been specially developed for use with Festo grippers. An analogue electrical signal is generated in the proximity sensor depending on the gripper position. The conversion to 3 digital output signals (corresponding to 3 gripper jaw positions) is effected via the signal converter SVE4 or the evaluation units SMH AE.

Corrosion-resistant proximity sensors CRSMT-8 → 36

The use of high quality materials for the housing and cables make the switch a reliable sensing solution for extreme environmental conditions. It was developed for use in the food industry, for acids (electroplating) and for contact with cooling lubricants.

Block-shaped proximity sensors SMTO/SMEO-8E → 52

Block-shaped proximity sensors SMTO/SMEO-8E are intended for mounting using mounting kits. In addition to the basic types, there are heat-resistant and welding field immune as well as pneumatic proximity sensors available.

Pneumatic proximity sensors SMPO → Internet: smpo-8e

The pneumatic proximity sensor SMPO consists of a 3/2-way valve, which is actuated when a magnetic field approaches. As a result of switching, a pneumatic output signal is set which can be processed directly as a pneumatic output signal.

Position sensors SMH-AE → 159

The position sensor SMH-AE has been specially developed for use with Festo grippers. An analogue electrical signal is generated in the proximity sensor depending on the gripper position. The conversion to 3 digital output signals (corresponding to 3 gripper jaw positions) is effected via the signal converter SVE4 or the evaluation units SMH AE.

Electronic proximity sensors SMT → 23

Electronic proximity sensors from Festo process the switching signal contactlessly, are polarity-safe, short circuit proof and overload proof. The SMT-8M series is characterised by its extreme reliability and boasts an MTBF value of 450 years during continuous operation 24 h / 365 days / 70 °C.

Connecting cables NEBU → 510

These have been developed for the secure connection of all devices using M5, M6 and M12 plugs. The range offers in-stock parts with fixed and variable configuration via modules.

Push-in T-connector NEDU → 566

Depending on the design, two M8 or M12 connection sockets connect to one M12 plug or two M8 connection sockets connect to one M8 plug. Using the T-connector saves on inputs to a controller, for example.

Proximity sensors for explosion protection areas → www.festo.com/en/ex

The S6 variants are approved for temperatures up to 120 °C. The SME-8-…-S6 can also be used for the low temperature range down to −40 °C.

Sensors / Vision systems – Subject to change – 2012/08
## Proximity sensors SMT/SME, for T-slot

**Product range overview**

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<th>Type of mounting</th>
<th>Measuring principle</th>
<th>Type</th>
<th>Operating voltage range</th>
<th>Switching output</th>
<th>Switching element function</th>
<th>Page/Internet</th>
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<td>For T-slot</td>
<td>Standard</td>
<td>Insertable in the slot from above, flush with the cylinder profile</td>
<td>Magneto-resistive</td>
<td>SMT-8M-A</td>
<td>5 ... 30 V DC</td>
<td>PNP</td>
<td>N/O contact</td>
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<tr>
<td></td>
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<td></td>
<td>NPN</td>
<td>N/O contact</td>
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<td>Non-contacting, 2-wire</td>
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<td>Insertable in the slot from above, flush with the cylinder profile</td>
<td>Magneto-resistive</td>
<td>SMT-8M</td>
<td>10 ... 30 V DC</td>
<td>PNP</td>
<td>N/O contact</td>
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<td>N/C contact</td>
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<td>N/O contact</td>
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<td></td>
<td>Non-contacting, 2-wire</td>
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<td>Magnetic reed</td>
<td>SME-8M</td>
<td>5 ... 30 V AC/DC</td>
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<td>N/O contact</td>
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<td>10 ... 30 V DC</td>
<td>PNP</td>
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<td>SME-8-8-SL</td>
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<td>Insertable in slot from above</td>
<td>Magnetic reed</td>
<td>SME-8-FM</td>
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<td>Contacting, bipolar</td>
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<td>Magneto-resistive</td>
<td>SMAO-8E</td>
<td>10 ... 30 V DC</td>
<td>PNP</td>
<td>N/O contact</td>
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<td>Corrosion-resistant</td>
<td>Insertable in the slot lengthwise, flush with the cylinder profile</td>
<td>Magneto-resistive</td>
<td>CRSMT-8</td>
<td>10 ... 30 V DC</td>
<td>PNP</td>
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<td>Welding field immune</td>
<td>Via accessories</td>
<td>Magneto-inductive</td>
<td>SMSKO-8E</td>
<td>10 ... 30 V DC</td>
<td>PNP</td>
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<td></td>
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<td>Heat-resistant up to 120 °C</td>
<td>Insertable in the slot lengthwise, flush with the cylinder profile</td>
<td>Magnetic reed</td>
<td>SME-8-...-S6</td>
<td>0 ... 30 V AC/DC</td>
<td>Contacting, bipolar</td>
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<td>Via accessories</td>
<td>Magnetic reed</td>
<td>SMEO-8E-...-S6</td>
<td>0 ... 30 V DC</td>
<td>Contacting</td>
</tr>
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### T-slot sensors can be used for drives with T-slot

**Exceptions**

- DFM-B: SMxO-8E cannot be used
- DHDS: SME-8M can only be used on ∅ 50
- DHPS: SME-8M can only be used on ∅ 20 ... 35
- HGDD-63-A: SMT-8M-A cannot be used
Sensors > Proximity sensor for drive units > For T-slot

Proximity sensors SMT/SME-8, for T-slot

Peripherals overview

New
SMT-8M-A

Sensors > Proximity sensor for drive units

1.1

www.festo.com/catalogue/...
### Proximity sensors SMT/SME-8, for T-slot

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### Mounting kits and accessories

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<td>dnc</td>
</tr>
<tr>
<td>22. Drives with tie or mounting rod</td>
<td>dng</td>
</tr>
</tbody>
</table>
## Proximity sensors SMT-8M-A, for T-slot

### Type codes

<table>
<thead>
<tr>
<th>Function</th>
<th>SMT-8M-A</th>
</tr>
</thead>
<tbody>
<tr>
<td>Series</td>
<td>A</td>
</tr>
<tr>
<td>Switching output</td>
<td>PS, PO</td>
</tr>
<tr>
<td>Rated operating voltage</td>
<td>24 V DC</td>
</tr>
<tr>
<td>Cable characteristics</td>
<td>E</td>
</tr>
<tr>
<td>Cable length [m]</td>
<td></td>
</tr>
<tr>
<td>Cable designation</td>
<td></td>
</tr>
<tr>
<td>Electrical connection</td>
<td></td>
</tr>
<tr>
<td>EU certification</td>
<td></td>
</tr>
</tbody>
</table>

### Description of codes:

- **SMT-8M**: Proximity sensor, magneto-resistive, for T-slot, insertable in the slot from above
- **A**: Short design
- **PS**: PNP, N/O contact, 3-wire
- **PO**: PNP, N/C contact, 3-wire
- **NS**: NPN, N/O contact, 3-wire
- **ZS**: N/O contact, 2-wire
- **PNS**: PNP, NPN switchable
- **PZO**: PNP N/C contact, N/O contact switchable
- **24V**: 24 V DC
- **E**: Energy chain + robot
- **N**: Without inscription label holder
- **OE**: Open end
- **M8**: Cable with plug M8x1, snap-on flange
- **M8D**: Cable with plug M8x1, rotatable thread
- **M12**: Cable with plug M12x1, rotatable thread
- **Ex2**: Ex II 3GD in accordance with EU Directive 94/9/EC
### Proximity sensors SMT-8M-A, for T-slot

#### Technical data – Magneto-resistive

**Function**
- Magneto-resistive measuring principle
- Insertable in the slot from above, does not protrude over the cylinder profile
- Cable clip and inscription labels included in the scope of delivery
- Variant EX2 for use in potentially explosive areas in zones 2 and 22

**General technical data**

<table>
<thead>
<tr>
<th>Design</th>
<th>For T-slot</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mounting position</td>
<td>Any</td>
</tr>
<tr>
<td>Based on standard</td>
<td>EN 60947-5-2</td>
</tr>
<tr>
<td>Certification</td>
<td>C-Tick</td>
</tr>
<tr>
<td>CE marking (see declaration of conformity)</td>
<td>To EU EMC Directive</td>
</tr>
<tr>
<td>Note on materials</td>
<td>Cable halogen-free, oil-resistant</td>
</tr>
<tr>
<td></td>
<td>RoHS-compliant, free of copper and PTFE</td>
</tr>
</tbody>
</table>

**Input signal/measuring element**

<table>
<thead>
<tr>
<th>Measured variable</th>
<th>Position</th>
</tr>
</thead>
<tbody>
<tr>
<td>Measuring principle</td>
<td>Magneto-resistive</td>
</tr>
<tr>
<td>Ambient temperature</td>
<td>[°C] –40 ... +85</td>
</tr>
</tbody>
</table>

**Switching output**

<table>
<thead>
<tr>
<th>Type</th>
<th>PS</th>
<th>NS</th>
<th>PO</th>
<th>ZS</th>
<th>PNS</th>
<th>PSO</th>
</tr>
</thead>
<tbody>
<tr>
<td>Switching output</td>
<td>PNP</td>
<td>NPN</td>
<td>PNP</td>
<td>Non-contacting, 2-wire</td>
<td>PNP, NPN switchable</td>
<td>PNP</td>
</tr>
<tr>
<td>Switching element function</td>
<td>N/O contact</td>
<td>N/O contact</td>
<td>N/C contact</td>
<td>N/O contact</td>
<td>N/O contact</td>
<td>N/C contact, N/O contact switchable</td>
</tr>
<tr>
<td>Repetition accuracy [mm]</td>
<td>±0.1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Switch-on time [ms]</td>
<td>≤ 1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Switch-off time [ms]</td>
<td>≤ 1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Max. output current [mA]</td>
<td>100 (1)</td>
<td>100 (2)</td>
<td>100 (4)</td>
<td>80 (1)</td>
<td>100</td>
<td>100</td>
</tr>
<tr>
<td>Max. output current in mounting kits [mA]</td>
<td>100</td>
<td>80 (1)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Max. switching capacity DC [W]</td>
<td>2.8</td>
<td>2.8</td>
<td>2.8</td>
<td>1.9</td>
<td>2.7</td>
<td>2.7</td>
</tr>
<tr>
<td>Max. switching capacity DC in mounting kits [W]</td>
<td>2.8 (2)</td>
<td>2.8 (2)</td>
<td>2.8 (4)</td>
<td>1.5 (2)</td>
<td>2.7</td>
<td>2.7</td>
</tr>
<tr>
<td>Max. switching frequency [Hz]</td>
<td>180</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Voltage drop [V]</td>
<td>0 ... 1.5</td>
<td>0 ... 1.5</td>
<td>0 ... 6</td>
<td>0 ... 2.5</td>
<td>0 ... 2.5</td>
<td></td>
</tr>
</tbody>
</table>

1) Variant ...-PS/NS/PO-...-Ex2: max. output current in mounting kits 80 mA, T_a 70 °C
   Variant ...-ZS-...-Ex2: max. output current in mounting kits 50 mA, T_a 70 °C
2) Variant ...-PS/NS/PO-...-Ex2: max. switching capacity 2.2 W
   Variant ...-ZS-...-Ex2: max. switching capacity 1.2 W

**Output, additional data**

<table>
<thead>
<tr>
<th>Protection against short circuit</th>
<th>Pulsed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Protection against overloading</td>
<td>Yes</td>
</tr>
</tbody>
</table>

---

2012/08 – Subject to change – Sensors / Vision systems  

FESTO
# Proximity sensors SMT-8M-A, for T-slot

## Technical data – Magneto-resistive

### Electronic components

<table>
<thead>
<tr>
<th>Type</th>
<th>PS, NS, PO, ZS</th>
<th>PNS, PSO</th>
<th>Ex2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating voltage range [V DC]</td>
<td>5 … 30</td>
<td>7 … 30</td>
<td>5 … 30</td>
</tr>
<tr>
<td>Rated operating voltage [V DC]</td>
<td>24</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reverse polarity protection</td>
<td>For all electrical connections</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Electromechanical components

<table>
<thead>
<tr>
<th>Electrical connection</th>
<th>M8</th>
<th>M8D</th>
<th>M12</th>
<th>OE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Electrical connection</td>
<td>Cable with plug, 3-pin</td>
<td>Cable, 3-wire</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>M8x1</td>
<td>M12x1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Connection direction</td>
<td>In-line</td>
<td>Rotatable thread</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cable test conditions</td>
<td>Energy chain: 5 million cycles, bending radius 28 mm</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Torsional strength: &gt; 300,000 cycles, ±270°/0.1 m</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Resistance to bending: according to Festo standard; test conditions on request</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cable length [m]</td>
<td>0.1 … 30</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cable characteristics</td>
<td>Energy chain + robot</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cable sheath materials</td>
<td>TPE-U(PU)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cable sheath colour</td>
<td>Grey</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Mechanical components

<table>
<thead>
<tr>
<th>Electrical connection</th>
<th>M8, M8D, M12</th>
<th>OE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type of mounting</td>
<td>Screw-clamped in slot, insertable from above</td>
<td></td>
</tr>
<tr>
<td>Max. tightening torque [Nm]</td>
<td>0.6</td>
<td></td>
</tr>
<tr>
<td>Housing</td>
<td>Black</td>
<td></td>
</tr>
<tr>
<td></td>
<td>PA reinforced</td>
<td></td>
</tr>
<tr>
<td></td>
<td>High-alloy stainless steel</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Nickel-plated brass</td>
<td></td>
</tr>
<tr>
<td></td>
<td>–</td>
<td></td>
</tr>
</tbody>
</table>
**Proximity sensors SMT-8M-A, for T-slot**

**Technical data – Magneto-resistive**

<table>
<thead>
<tr>
<th>Display/operation</th>
<th>PS, NS, PO, ZS</th>
<th>PNS</th>
<th>PSO</th>
</tr>
</thead>
<tbody>
<tr>
<td>Switching status display</td>
<td>Yellow LED</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Operating reserve display</td>
<td>Orange LED</td>
<td></td>
<td>–</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Immissions/ emissions</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Ambient temperature with flexible cable installation [°C]</td>
<td>–20 … +85</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Protection class</td>
<td>IP65, IP68, IP69K</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**ATEX**

<table>
<thead>
<tr>
<th>SMT-8M-A: …-</th>
<th>Ex2</th>
</tr>
</thead>
<tbody>
<tr>
<td>ATEX category for gas</td>
<td>II 3G</td>
</tr>
<tr>
<td>Explosion ignition protection type for gas</td>
<td>Ex nA IIC T4 X Gc</td>
</tr>
<tr>
<td>ATEX category for dust</td>
<td>II 3D</td>
</tr>
<tr>
<td>Explosion ignition protection type for dust</td>
<td>Ex tc IIC T1 20°C X Dc IP65</td>
</tr>
<tr>
<td>Explosion-proof temperature rating</td>
<td>-40 °C &lt;= Ta &lt;= +70 °C</td>
</tr>
<tr>
<td>Explosion protection</td>
<td>Zone 2 (ATEX)</td>
</tr>
<tr>
<td></td>
<td>Zone 22 (ATEX)</td>
</tr>
<tr>
<td>CE marking (see declaration of conformity)</td>
<td>To EU Explosion Protection Directive (ATEX)</td>
</tr>
</tbody>
</table>
Proximity sensors SMT-8M-A, for T-slot

Technical data – Magneto-resistive

Dimensions

SMT-8M-A-24V-E-...-... (PS, NS, PO, ZS)

Yellow LED for safe switching status.
Yellow and orange LED for unsafe switching status.

1. Yellow LED
2. Orange LED
3. Position of sensor element centre
4. Tightening torque of clamping component 0.6 Nm

SMT-8M-A-24V-E-...-... (PNS, PSO)

Switching status display for PNS:
Yellow LED for PS switching output.
White LED for NS switching output.

Switching status display for PSO:
Yellow LED for PS switching output.
White LED for PO switching output.

1. Yellow LED
2. White LED
3. Position of sensor element centre
4. Slot for screwdriver

<table>
<thead>
<tr>
<th>Type</th>
<th>B1</th>
<th>H1</th>
<th>L3</th>
<th>L4</th>
<th>ß</th>
</tr>
</thead>
<tbody>
<tr>
<td>SMT-8M-A-...-24V-E- (PS, NS, PO, ZS)</td>
<td>5</td>
<td>4.6</td>
<td>29.3</td>
<td>26.3</td>
<td>1.5</td>
</tr>
<tr>
<td>SMT-8M-A-...-24V-E- (PNS, PSO)</td>
<td></td>
<td></td>
<td>34.8</td>
<td>31.8</td>
<td></td>
</tr>
</tbody>
</table>
Proximity sensors SMT-8M-A, for T-slot

Technical data – Magneto-resistive

**Dimensions**

<table>
<thead>
<tr>
<th>Type</th>
<th>D1</th>
<th>D2</th>
<th>D3</th>
<th>L1</th>
<th>L2</th>
<th>L5</th>
<th>ß</th>
</tr>
</thead>
<tbody>
<tr>
<td>SMT-8M-A-…-OE</td>
<td></td>
<td></td>
<td></td>
<td>2.9</td>
<td>–</td>
<td>2,500; 7,500</td>
<td>50</td>
</tr>
<tr>
<td>SMT-8M-A-…-OE-Ex</td>
<td></td>
<td></td>
<td></td>
<td>–</td>
<td>–</td>
<td>5,000</td>
<td>50</td>
</tr>
<tr>
<td>SMT-8M-A-…-M8D</td>
<td>9.6</td>
<td>M8x1</td>
<td></td>
<td>300</td>
<td>41.1</td>
<td>32.7</td>
<td></td>
</tr>
<tr>
<td>SMT-8M-A-…-M8</td>
<td>8.5</td>
<td>M8x1</td>
<td></td>
<td>300</td>
<td>32.7</td>
<td>32.7</td>
<td></td>
</tr>
<tr>
<td>SMT-8M-A-…-M12</td>
<td>15</td>
<td>M12x1</td>
<td></td>
<td>300</td>
<td>55.5</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

New
SMT-8M-A

Sensors > Proximity sensors for drive units > For T-slot

Proximity sensors for drive units

Download CAD data: www.festo.com/en/engineering
## Proximity sensors SMT-8M-A, for T-slot

### Technical data – Magneto-resistive

#### Ordering data

<table>
<thead>
<tr>
<th>Switching output</th>
<th>Electrical connection</th>
<th>Cable with plug, rotatable thread</th>
<th>Cable length</th>
<th>Weight</th>
<th>Part No.</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>M8x1</td>
<td>M12x1</td>
<td>[m]</td>
<td>[g]</td>
<td></td>
</tr>
<tr>
<td>N/O contact</td>
<td></td>
<td>-</td>
<td>-</td>
<td>0.3</td>
<td>8.9</td>
<td>574334 SMT-8M-A-PS-24V-E-0,3-M8D</td>
</tr>
<tr>
<td>PNP</td>
<td>3-pin</td>
<td>-</td>
<td>-</td>
<td>0.3</td>
<td>8.9</td>
<td>574335 SMT-8M-A-PS-24V-E-2,5-OE</td>
</tr>
<tr>
<td>PNP</td>
<td>3-pin</td>
<td>-</td>
<td>-</td>
<td>3</td>
<td>57.1</td>
<td>574336 SMT-8M-A-PS-24V-E-5,0-0E</td>
</tr>
<tr>
<td>PNP</td>
<td>3-pin</td>
<td>-</td>
<td>-</td>
<td>0.3</td>
<td>15.9</td>
<td>574337 SMT-8M-A-PS-24V-E-0,3-M12</td>
</tr>
<tr>
<td>NPN</td>
<td>3-pin</td>
<td>-</td>
<td>-</td>
<td>0.3</td>
<td>15.9</td>
<td>574338 SMT-8M-A-NS-24V-E-2,5-OE</td>
</tr>
<tr>
<td>PNP</td>
<td>3-pin</td>
<td>-</td>
<td>-</td>
<td>0.3</td>
<td>8.9</td>
<td>574339 SMT-8M-A-NS-24V-E-0,3-M8D</td>
</tr>
<tr>
<td>PNP</td>
<td>3-pin</td>
<td>-</td>
<td>-</td>
<td>0.3</td>
<td>8.9</td>
<td>574341 SMT-8M-A-PS-24V-E-5,0-0E-Ex2</td>
</tr>
<tr>
<td>Non-contacting</td>
<td>2-wire</td>
<td>-</td>
<td>-</td>
<td>0.3</td>
<td>8.9</td>
<td>574342 SMT-8M-A-NS-24V-E-0,3-M8D-Ex2</td>
</tr>
</tbody>
</table>

#### Switchable

| PNP/NPN          | 3-pin                 | -                                 | -            | 0.3    | 9        | 574343 SMT-8M-A-PNS-24V-E-0,3-M8D |
| PNP PS/PO        | 3-pin                 | -                                 | -            | 0.3    | 9        | 574344 SMT-8M-A-PSO-24V-E-0,3-M8D |

#### N/C contact

| PNP              | 3-wire                | -                                 | -            | 7.5    | 85.1     | 574340 SMT-8M-A-PO-24V-E-7,5-0E |

Specified types ➔ [www.festo.com](http://www.festo.com)
## Proximity sensors SMT-8M-A, for T-slot

**Modular products – Magneto-resistive**

### Ordering table

<table>
<thead>
<tr>
<th>Size</th>
<th>8</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Conditions</th>
<th>Code</th>
<th>Enter code</th>
</tr>
</thead>
<tbody>
<tr>
<td>SMT-8M</td>
<td>SMT-8M</td>
<td></td>
</tr>
</tbody>
</table>

| Module No. | 574333 |

<table>
<thead>
<tr>
<th>Function</th>
<th>Proximity sensor for T-slot, electronic</th>
</tr>
</thead>
<tbody>
<tr>
<td>Series</td>
<td>Short design</td>
</tr>
<tr>
<td>Switching output</td>
<td>3-wire PNP N/O contact</td>
</tr>
<tr>
<td></td>
<td>3-wire NPN N/O contact</td>
</tr>
<tr>
<td></td>
<td>3-wire PNP N/C contact</td>
</tr>
<tr>
<td></td>
<td>2-wire PNP N/O contact</td>
</tr>
<tr>
<td></td>
<td>PNP/NPN switchable</td>
</tr>
<tr>
<td></td>
<td>PNP N/C contact, N/O contact switchable</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Rated operating voltage</th>
<th>[V DC]</th>
<th>24</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cable characteristics</td>
<td>Energy chain + robot</td>
<td>E</td>
</tr>
<tr>
<td>Cable length [m]</td>
<td>0.1 ... 30 (0.1 ... 5.0 in 0.1 increments, 5.0 ... 30 in 0.5 increments)</td>
<td></td>
</tr>
<tr>
<td>Cable designation</td>
<td>With inscription label holder</td>
<td></td>
</tr>
<tr>
<td>Connection technology</td>
<td>Open end</td>
<td></td>
</tr>
<tr>
<td>EU certification</td>
<td>II 3GD in accordance with EU Directive 94/9/EC</td>
<td></td>
</tr>
</tbody>
</table>

| Ex2 | Not with switching output PNS, PSO, minimum cable length 0.2 m |

### Transfer order code

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>574333</td>
<td>SMT-8M</td>
</tr>
<tr>
<td>A</td>
<td></td>
</tr>
<tr>
<td>24V</td>
<td></td>
</tr>
<tr>
<td>E</td>
<td></td>
</tr>
<tr>
<td>N</td>
<td></td>
</tr>
<tr>
<td>-</td>
<td></td>
</tr>
</tbody>
</table>

**SMT/SME-8M, for T-slot**

<table>
<thead>
<tr>
<th>Type codes</th>
<th>SMT/SME-8M</th>
</tr>
</thead>
</table>
| **Function** | SMT: Proximity sensor, magneto-resistive  
SME: Proximity sensor, magnetic reed |
| **Design** | 8M: For T-slot, insertable in slot from above |
| **Switching output, switching element function** | PS: PNP, N/O contact, 3-wire  
PO: PNP, N/C contact, 3-wire  
NS: NPN, N/O contact, 3-wire  
ZS: N/O contact, 2-wire  
DS: N/O contact, 3-wire  
DO: N/C contact, 3-wire |
| **Rated operating voltage** | 24V: 24 V DC |
| **Cable properties** | K: Standard + energy chain  
E: Energy chain + robot applications |
| **Cable length [m]** |  |
| **Electrical connection** | OE: Open end  
M8: Cable with plug M8x1, snap-on flange  
M8D: Cable with plug M8x1, rotatable thread  
M12: Cable with plug M12x1, rotatable thread |
| **EU certification** | EX2: II 3GD to EU Directive 94/9/EG |

**New**

SMT-8M-ZS-...-EX2

Sensors > Proximity sensor for drive units > For T-slot

Proximity sensors SMT/SME-8M, for T-slot
### General technical data

<table>
<thead>
<tr>
<th>Design</th>
<th>For T-slot</th>
</tr>
</thead>
<tbody>
<tr>
<td>Based on standard</td>
<td>EN 60947-5-2</td>
</tr>
<tr>
<td>Certification</td>
<td>UL us - Listed (OL)</td>
</tr>
<tr>
<td>CE mark (see declaration of conformity)</td>
<td>To EU EMC Directive</td>
</tr>
<tr>
<td>Note on materials</td>
<td>Free of copper and PTFE</td>
</tr>
<tr>
<td></td>
<td>RoHS-compliant</td>
</tr>
</tbody>
</table>

### Input signal/measuring element

<table>
<thead>
<tr>
<th>Measuring principle</th>
<th>Magneto-resistive</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ambient temperature</td>
<td>°C</td>
</tr>
<tr>
<td></td>
<td>–20 … +70</td>
</tr>
</tbody>
</table>

### Switching output

<table>
<thead>
<tr>
<th>Type</th>
<th>SMT-8M-PS</th>
<th>SMT-8M-NS</th>
<th>SMT-8M-PO</th>
<th>SMT-8M-ZS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Switching output</td>
<td>PNP</td>
<td>NPN</td>
<td>PNP</td>
<td>Contactless, 2-wire</td>
</tr>
<tr>
<td>Switching element function</td>
<td>N/O contact</td>
<td>N/C contact</td>
<td>N/O contact</td>
<td>N/O contact</td>
</tr>
<tr>
<td>Max. output current</td>
<td>[mA]</td>
<td>100</td>
<td>80</td>
<td>80</td>
</tr>
<tr>
<td>Max. switching capacity DC</td>
<td>[W]</td>
<td>3</td>
<td>2.4</td>
<td>2.4</td>
</tr>
<tr>
<td>Voltage drop(^1)</td>
<td>[V]</td>
<td>≤2</td>
<td>≤6</td>
<td>≤6</td>
</tr>
</tbody>
</table>

\(^1\) Applies to cable length 2.5 m. Max. 0.03 V voltage drop per metre of additional cable length

### Output, additional data

| Protection against short circuit | Pulsed |
| Protection against overloading  | Yes    |

### Electronic components

<table>
<thead>
<tr>
<th>Type</th>
<th>SMT-8M-PS</th>
<th>SMT-8M-NS</th>
<th>SMT-8M-PO</th>
<th>SMT-8M-ZS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating voltage range</td>
<td>[V DC]</td>
<td>10 … 30</td>
<td>8 … 30</td>
<td>8 … 30</td>
</tr>
<tr>
<td>Reverse polarity protection</td>
<td>For all electrical connections</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
## Electromechanical components

<table>
<thead>
<tr>
<th>Electrical connection</th>
<th>JE</th>
<th>M8D</th>
<th>M8</th>
<th>M12</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Electrical connection</strong></td>
<td>Cable, 3-wire</td>
<td>Cable with plug, 3-pin</td>
<td>M8x1</td>
<td>M8x1</td>
</tr>
<tr>
<td><strong>Connection direction</strong></td>
<td>in-line</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Cable test conditions</strong></td>
<td>Energy chain: 5 million cycles, bending radius 75 mm</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Resistance to bending: to Festo standard; test conditions on request</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Energy chain: 5 million cycles, bending radius 28 mm</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Torsional strength: ±270°/0.1 m</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Resistance to bending: to Festo standard; test conditions on request</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Cable length</strong></td>
<td>[m]</td>
<td>0.2 … 30</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Cable properties</strong></td>
<td>K</td>
<td>Standard + energy chain</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>E</td>
<td>Energy chain + robot applications</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Cable sheath material</strong></td>
<td>K</td>
<td>TPE-U(PU), oil resistant</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>E</td>
<td>TPE-U(PU), oil resistant, halogen free</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

## Mechanical components

<table>
<thead>
<tr>
<th>Electrical connection</th>
<th>JE</th>
<th>M...</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Type of mounting</strong></td>
<td>Screw-clamped in slot, insertable from above</td>
<td></td>
</tr>
<tr>
<td><strong>Housing</strong></td>
<td>PA</td>
<td></td>
</tr>
<tr>
<td></td>
<td>High-alloy stainless steel</td>
<td>High-alloy stainless steel</td>
</tr>
<tr>
<td></td>
<td>–</td>
<td>Nickel-plated brass</td>
</tr>
<tr>
<td></td>
<td>–</td>
<td>TPE-U(PU)</td>
</tr>
</tbody>
</table>

## Display/operation

<table>
<thead>
<tr>
<th></th>
<th>Switching status display</th>
<th>Yellow LED</th>
</tr>
</thead>
</table>

## Immissions/emissions

<table>
<thead>
<tr>
<th></th>
<th>Ambient temperature with flexible cable installation</th>
<th>[°C]</th>
<th>–5 ... +70</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Protection class</strong></td>
<td>IP65, IP68</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

## ATEX

<table>
<thead>
<tr>
<th></th>
<th>SMT-8M-ZS-...</th>
<th>EX2</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>ATEX category gas</strong></td>
<td>II 3G</td>
<td></td>
</tr>
<tr>
<td><strong>Ex-ignition protection type gas</strong></td>
<td>Ex nA II T4 X</td>
<td></td>
</tr>
<tr>
<td><strong>ATEX category dust</strong></td>
<td>II 3D</td>
<td></td>
</tr>
<tr>
<td><strong>Ex-ignition protection type dust</strong></td>
<td>Ex d IIA2 IP65 T120°C X</td>
<td></td>
</tr>
<tr>
<td><strong>ATEX ambient temperature</strong></td>
<td>–20 °C ≤ Ta ≤ +70 °C</td>
<td></td>
</tr>
<tr>
<td><strong>ATEX certification</strong></td>
<td>For zones 2 and 22</td>
<td></td>
</tr>
<tr>
<td><strong>CE mark (see declaration of conformity)</strong></td>
<td>To EU Explosion Protection Directive (ATEX)</td>
<td></td>
</tr>
</tbody>
</table>
# Proximity sensors SMT-8M, for T-slot

## Technical data – Magneto-resistive

### Pin allocation to EN 60947-5-2

**M8x1, 2-pin**

<table>
<thead>
<tr>
<th>Pin</th>
<th>Wire colour</th>
<th>Allocation</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Brown</td>
<td>+</td>
</tr>
<tr>
<td>4</td>
<td>Black</td>
<td>Output</td>
</tr>
</tbody>
</table>

**M12x1, 2-pin**

<table>
<thead>
<tr>
<th>Pin</th>
<th>Wire colour</th>
<th>Allocation</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Brown</td>
<td>+</td>
</tr>
<tr>
<td>4</td>
<td>Black</td>
<td>Output</td>
</tr>
</tbody>
</table>

**MM8x1, 3-pin**

<table>
<thead>
<tr>
<th>Pin</th>
<th>Wire colour</th>
<th>Allocation</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Brown</td>
<td>+</td>
</tr>
<tr>
<td>3</td>
<td>Blue</td>
<td>–</td>
</tr>
<tr>
<td>4</td>
<td>Black</td>
<td>Output</td>
</tr>
</tbody>
</table>

**M12x1, 3-pin**

<table>
<thead>
<tr>
<th>Pin</th>
<th>Wire colour</th>
<th>Allocation</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Brown</td>
<td>+</td>
</tr>
<tr>
<td>3</td>
<td>Blue</td>
<td>–</td>
</tr>
<tr>
<td>4</td>
<td>Black</td>
<td>Output</td>
</tr>
</tbody>
</table>

**M12x1, 3-pin**

<table>
<thead>
<tr>
<th>Pin</th>
<th>Wire colour</th>
<th>Allocation</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Brown</td>
<td>+</td>
</tr>
<tr>
<td>3</td>
<td>Blue</td>
<td>–</td>
</tr>
<tr>
<td>4</td>
<td>White</td>
<td>Output</td>
</tr>
</tbody>
</table>
## Proximity sensors SMT-8M, for T-slot

**Technical data – Magneto-resistive**

### Dimensions

**SMT-8M-...-OE – Cable**

| 1 | Yellow LED |
| 2 | Centre of the sensor element |
| 3 | Clamping component, tightening torque 0.6 Nm |
| 4 | Inscription label holder |
| 5 | Connecting cable |
| L1 | Cable length |

**SMT-8M-...-M8D – Cable with plug M8x1, rotatable thread**

| 1 | Yellow LED |
| 2 | Centre of the sensor element |
| 3 | Clamping component, tightening torque 0.6 Nm |
| 4 | Inscription label holder |
| 5 | Connecting cable |
| 6 | Plug to fit connecting cable NEBU-M8 |
| L1 | Cable length |

**SMT-8M-...-M8 – Cable with plug M8x1, snap-on flange**

| 1 | Yellow LED |
| 2 | Centre of the sensor element |
| 3 | Clamping component, tightening torque 0.6 Nm |
| 4 | Inscription label holder |
| 5 | Connecting cable |
| 6 | Plug to fit connecting cable NEBU-M8 |
| L1 | Cable length |

**SMT-8M-...-M12 – Cable with plug M12x1, rotatable thread**

| 1 | Yellow LED |
| 2 | Centre of the sensor element |
| 3 | Clamping component, tightening torque 0.6 Nm |
| 4 | Inscription label holder |
| 5 | Connecting cable |
| 6 | Plug to fit connecting cable NEBU-M12 |
| L1 | Cable length |

### Type

<table>
<thead>
<tr>
<th>Type</th>
<th>B1</th>
<th>D1</th>
<th>D2</th>
<th>D3</th>
<th>H1</th>
<th>L2</th>
<th>L3</th>
<th>L4</th>
<th>L5</th>
<th>ß</th>
</tr>
</thead>
<tbody>
<tr>
<td>SMT-8M-...-OE</td>
<td>5</td>
<td>2.9</td>
<td>–</td>
<td>–</td>
<td>4.6</td>
<td>50</td>
<td></td>
<td>34.8</td>
<td>31.8</td>
<td>23</td>
</tr>
<tr>
<td>SMT-8M-...-M8D</td>
<td></td>
<td></td>
<td>9.6</td>
<td>M8x1</td>
<td>41</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SMT-8M-...-M8</td>
<td></td>
<td></td>
<td>8.8</td>
<td>M8x1</td>
<td>35</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SMT-8M-...-M12</td>
<td></td>
<td></td>
<td>15</td>
<td>M12x1</td>
<td>55.5</td>
<td></td>
<td></td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>
## Proximity sensors SMT-8M, for T-slot
### Technical data – Magneto-resistive

**Ordering data**

<table>
<thead>
<tr>
<th>Switching output</th>
<th>Electrical connection</th>
<th>Cable</th>
<th>Cable with plug, rotatable thread</th>
<th>Part No.</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Cable</td>
<td>M8x1</td>
<td>M12x1</td>
<td></td>
</tr>
<tr>
<td>N/O contact</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PNP</td>
<td>3-wire</td>
<td>-</td>
<td>-</td>
<td>2.5</td>
<td>543866 SMT-8M-PS-24V-K-2,5-OE</td>
</tr>
<tr>
<td></td>
<td>3-pin</td>
<td>-</td>
<td>-</td>
<td>0.3</td>
<td>543867 SMT-8M-PS-24V-K-0,3-M8D</td>
</tr>
<tr>
<td></td>
<td>3-pin</td>
<td>-</td>
<td>-</td>
<td>0.3</td>
<td>543868 SMT-8M-PS-24V-K-0,3-M12</td>
</tr>
<tr>
<td>NPN</td>
<td>3-wire</td>
<td>-</td>
<td>-</td>
<td>2.5</td>
<td>543870 SMT-8M-NS-24V-K-2,5-OE</td>
</tr>
<tr>
<td></td>
<td>3-pin</td>
<td>-</td>
<td>-</td>
<td>0.3</td>
<td>543871 SMT-8M-NS-24V-K-0,3-M8D</td>
</tr>
<tr>
<td>Contactless, 2-wire</td>
<td>2-wire</td>
<td>-</td>
<td>-</td>
<td>5.0</td>
<td>543874 SMT-8M-ZS-24V-K-5,0-OE-EX2</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>N/C contact</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PNP</td>
<td>3-wire</td>
<td>-</td>
<td>-</td>
<td>7.5</td>
<td>543873 SMT-8M-PO-24V-K-7,5-OE</td>
</tr>
</tbody>
</table>

Specified types ➜ [www.festo.com](http://www.festo.com)
# Proximity sensors SMT-8M, for T-slot

## Modular products – Magneto-resistive

<table>
<thead>
<tr>
<th>Module No.</th>
<th>Function</th>
<th>Switching output</th>
<th>Rated operating voltage</th>
<th>Cable characteristics</th>
<th>Cable length</th>
<th>Connection technology</th>
<th>EU certification</th>
</tr>
</thead>
<tbody>
<tr>
<td>543893</td>
<td>SMT-8M</td>
<td>PS</td>
<td>24V</td>
<td>K</td>
<td>0.2 … 30</td>
<td>OE</td>
<td>EX2</td>
</tr>
<tr>
<td>543893</td>
<td>SMT-8M</td>
<td>NS</td>
<td>24V</td>
<td>E</td>
<td>3</td>
<td>M8D</td>
<td>EX2</td>
</tr>
</tbody>
</table>

### Ordering example

<table>
<thead>
<tr>
<th>Module No.</th>
<th>Function</th>
<th>Switching output</th>
<th>Rated operating voltage</th>
<th>Cable characteristics</th>
<th>Cable length</th>
<th>Connection technology</th>
<th>EU certification</th>
</tr>
</thead>
<tbody>
<tr>
<td>543893</td>
<td>SMT-8M</td>
<td>NS</td>
<td>24V</td>
<td>E</td>
<td>3</td>
<td>M8D</td>
<td>EX2</td>
</tr>
</tbody>
</table>

### Ordering table

<table>
<thead>
<tr>
<th>Size</th>
<th>Conditions</th>
<th>Code</th>
<th>Enter code</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>SMT-8M</td>
<td></td>
</tr>
</tbody>
</table>

### Module No.

<table>
<thead>
<tr>
<th>Function</th>
<th>3-wire PNP N/O contact</th>
<th>3-wire NPN N/O contact</th>
<th>3-wire PNP N/C contact</th>
<th>2-wire N/O contact</th>
</tr>
</thead>
<tbody>
<tr>
<td>Proximity sensor for T-slot, non-contacting</td>
<td>PS</td>
<td>NS</td>
<td>PO</td>
<td>ZS</td>
</tr>
</tbody>
</table>

### Rated operating voltage

<table>
<thead>
<tr>
<th>[V DC]</th>
<th>24V</th>
</tr>
</thead>
</table>

### Cable characteristics

<table>
<thead>
<tr>
<th>Standard + energy chain</th>
<th>Energy chain + robot</th>
</tr>
</thead>
</table>

### Cable length

<table>
<thead>
<tr>
<th>[m]</th>
<th>0.2 … 30</th>
<th>(0.2 … 5.0 m in 0.1 m increments, 5.0 … 30 m in 0.5 m increments)</th>
</tr>
</thead>
</table>

### Connection technology

<table>
<thead>
<tr>
<th>Open end</th>
<th>M8, rotatable thread</th>
<th>M8, snap-on flange</th>
<th>M12, rotatable thread</th>
</tr>
</thead>
</table>

### EU certification

| II 3GD in accordance with EU Directive 94/9/EC | EX2 |

---

**Transfer order code**

543893 SMT-8M 24V
## Proximity sensors SME-8M, for T-slot

### Technical data – Magnetic reed

<table>
<thead>
<tr>
<th>General technical data</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Design</strong></td>
<td>For T-slot</td>
</tr>
<tr>
<td><strong>Based on standard</strong></td>
<td>EN 60947-5-2</td>
</tr>
<tr>
<td><strong>Certification</strong></td>
<td>cULus listed (OL)</td>
</tr>
<tr>
<td></td>
<td>C-Tick</td>
</tr>
<tr>
<td><strong>CE mark (see declaration of conformity)</strong></td>
<td>To EU EMC Directive</td>
</tr>
<tr>
<td><strong>Note on materials</strong></td>
<td>Free of copper and PTFE</td>
</tr>
<tr>
<td></td>
<td>RoHS-compliant</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Input signal/measuring element</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Measuring principle</strong></td>
<td>Magnetic reed</td>
</tr>
<tr>
<td><strong>Ambient temperature [°C]</strong></td>
<td>-40 ... +70</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Switching output</th>
<th>SME-8M-DS</th>
<th>SME-8M-ZS</th>
<th>SME-8M-DO</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Switching output</strong></td>
<td>Contacting, bipolar</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Switching element function</strong></td>
<td>N/O contact</td>
<td>N/O contact</td>
<td>N/C contact</td>
</tr>
<tr>
<td><strong>Max. output current [mA]</strong></td>
<td>500</td>
<td>80</td>
<td></td>
</tr>
<tr>
<td><strong>Max. output current in mounting kits [mA]</strong></td>
<td>80</td>
<td>80</td>
<td></td>
</tr>
<tr>
<td><strong>Max. switching capacity DC [W]</strong></td>
<td>10</td>
<td>2.4</td>
<td></td>
</tr>
<tr>
<td><strong>Max. switching capacity in mounting kits [W]</strong></td>
<td>2.4</td>
<td>2.4</td>
<td></td>
</tr>
<tr>
<td><strong>Max. switching capacity AC [VA]</strong></td>
<td>10</td>
<td>2.4</td>
<td></td>
</tr>
<tr>
<td><strong>Max. switching capacity in mounting kits [VA]</strong></td>
<td>2.4</td>
<td>2.4</td>
<td></td>
</tr>
<tr>
<td><strong>Voltage drop [V]</strong></td>
<td>≤1.5</td>
<td>≤4.8</td>
<td>≤3.5</td>
</tr>
</tbody>
</table>

1) Applies to cable length 2.5 m. Max. 0.15 V voltage drop per metre of additional cable length

<table>
<thead>
<tr>
<th>Output, additional data</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Protection against short circuit</strong></td>
<td>No</td>
</tr>
<tr>
<td><strong>Protection against overloading</strong></td>
<td>No</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Electronic components</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Operating voltage range DC [V]</strong></td>
<td>5 ... 30</td>
</tr>
<tr>
<td><strong>Operating voltage range AC [V]</strong></td>
<td>5 ... 30</td>
</tr>
<tr>
<td><strong>Reverse polarity protection</strong></td>
<td>No</td>
</tr>
</tbody>
</table>
### Sensors > Proximity sensor for drive units > For T-slot

#### Proximity sensors SME-8M, for T-slot

**Technical data – Magnetic reed**

<table>
<thead>
<tr>
<th><strong>Electromechanical components</strong></th>
<th><strong>DS/DO</strong></th>
<th><strong>OE</strong></th>
<th><strong>M8D</strong></th>
<th><strong>M8</strong></th>
<th><strong>M12</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Switching element function</strong></td>
<td><strong>ZS</strong></td>
<td><strong>OE</strong></td>
<td><strong>M8D</strong></td>
<td><strong>M8</strong></td>
<td><strong>M12</strong></td>
</tr>
<tr>
<td><strong>Electrical connection</strong></td>
<td><strong>Cable, 3-wire</strong></td>
<td><strong>M8x1</strong></td>
<td><strong>M8x1</strong></td>
<td><strong>M12x1</strong></td>
<td><strong>M12</strong></td>
</tr>
<tr>
<td><strong>Electrical connection</strong></td>
<td><strong>Cable with plug, 2-pin</strong></td>
<td><strong>M8x1</strong></td>
<td><strong>M8x1</strong></td>
<td><strong>M12x1</strong></td>
<td><strong>M12x1</strong></td>
</tr>
<tr>
<td><strong>Connection direction</strong></td>
<td><strong>Snap-on flange</strong></td>
<td><strong>Rotatable thread</strong></td>
<td><strong>Rotatable thread</strong></td>
<td><strong>Snap-on flange</strong></td>
<td><strong>Rotatable thread</strong></td>
</tr>
<tr>
<td><strong>Cable test conditions</strong></td>
<td><strong>K</strong></td>
<td>Energy chain: 5 million cycles, bending radius 75 mm</td>
<td><strong>Resistance to bending: to Festo standard; test conditions on request</strong></td>
<td><strong>E</strong></td>
<td>Energy chain: 5 million cycles, bending radius 28 mm</td>
</tr>
<tr>
<td><strong>Cable length</strong></td>
<td><strong>[m]</strong></td>
<td><strong>0.2 – 10</strong></td>
<td><strong>Cable test conditions</strong></td>
<td><strong>[m]</strong></td>
<td><strong>0.2 – 10</strong></td>
</tr>
<tr>
<td><strong>Cable properties</strong></td>
<td><strong>K</strong></td>
<td>Standard + energy chain</td>
<td><strong>E</strong></td>
<td>Energy chain + robot applications</td>
<td></td>
</tr>
<tr>
<td><strong>Cable sheath material</strong></td>
<td><strong>K</strong></td>
<td>TPE-U(PU), oil resistant</td>
<td><strong>E</strong></td>
<td>TPE-U(PU), oil resistant, halogen free</td>
<td></td>
</tr>
</tbody>
</table>

#### Mechanical components

<table>
<thead>
<tr>
<th><strong>Electrical connection</strong></th>
<th><strong>OE</strong></th>
<th><strong>M</strong>…</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Type of mounting</strong></td>
<td><strong>Screw-clamped in slot, insertable from above</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Housing</strong></td>
<td><strong>PA</strong></td>
<td><strong>PA</strong></td>
</tr>
<tr>
<td></td>
<td>High-alloy stainless steel</td>
<td>High-alloy stainless steel</td>
</tr>
<tr>
<td></td>
<td>–</td>
<td>Nickel-plated brass</td>
</tr>
<tr>
<td></td>
<td>–</td>
<td>TPE-U(PU)</td>
</tr>
</tbody>
</table>

#### Display/operation

| **Switching status display** | **Yellow LED** |

#### Emissions/emissions

<table>
<thead>
<tr>
<th><strong>Ambient temperature with flexible cable installation</strong></th>
<th><strong>[°C]</strong></th>
<th><strong>–5 … +70</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Protection class</strong></td>
<td><strong>IP65, IP68</strong></td>
<td></td>
</tr>
</tbody>
</table>

#### Pin allocation to EN 60947-5-2

<table>
<thead>
<tr>
<th><strong>M8x1, 2-pin</strong></th>
<th><strong>N/O contact</strong></th>
<th><strong>Pin</strong></th>
<th><strong>Wire colour</strong></th>
<th><strong>Allocation</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>1</td>
<td>Brown</td>
<td>+</td>
</tr>
<tr>
<td></td>
<td></td>
<td>4</td>
<td>Black</td>
<td>Output</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>M12x1, 2-pin</strong></th>
<th><strong>N/O contact</strong></th>
<th><strong>Pin</strong></th>
<th><strong>Wire colour</strong></th>
<th><strong>Allocation</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>1</td>
<td>Brown</td>
<td>+</td>
</tr>
<tr>
<td></td>
<td></td>
<td>4</td>
<td>Black</td>
<td>Output</td>
</tr>
</tbody>
</table>

#### Pin allocation to EN 60947-5-2

<table>
<thead>
<tr>
<th><strong>M8x1, 3-pin</strong></th>
<th><strong>N/O contact and N/C contact</strong></th>
<th><strong>Pin</strong></th>
<th><strong>Wire colour</strong></th>
<th><strong>Allocation</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>1</td>
<td>Brown</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3</td>
<td>Blue</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td></td>
<td>4</td>
<td>Black</td>
<td>Output</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>M12x1, 3-pin</strong></th>
<th><strong>N/O contact</strong></th>
<th><strong>Pin</strong></th>
<th><strong>Wire colour</strong></th>
<th><strong>Allocation</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>1</td>
<td>Brown</td>
<td>+</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3</td>
<td>Blue</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td></td>
<td>4</td>
<td>Black</td>
<td>Output</td>
</tr>
</tbody>
</table>
Proximity sensors SME-8M, for T-slot

Technical data – Magnetic reed

Pin allocation to EN 60947-5-2

<table>
<thead>
<tr>
<th>Pin</th>
<th>Wire colour</th>
<th>Allocation</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Brown</td>
<td>+</td>
</tr>
<tr>
<td>3</td>
<td>Blue</td>
<td>–</td>
</tr>
<tr>
<td>2</td>
<td>White</td>
<td>Output</td>
</tr>
</tbody>
</table>

Dimensions

Download CAD data → www.festo.com/en/engineering

SME-8M-...-OE – Cable

SME-8M-...-M8D – Cable with plug M8x1, rotatable thread

SME-8M-...-M8 – Cable with plug M8x1, snap-on flange

<table>
<thead>
<tr>
<th>Type</th>
<th>B1</th>
<th>D1</th>
<th>D2</th>
<th>D3</th>
<th>H1</th>
<th>L2</th>
<th>L3</th>
<th>L4</th>
<th>L5</th>
<th>αC</th>
</tr>
</thead>
<tbody>
<tr>
<td>SME-8M-...-OE</td>
<td>5</td>
<td>2.9</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>4.6</td>
<td>50</td>
<td>34.8</td>
<td>31.8</td>
<td>23</td>
</tr>
<tr>
<td>SME-8M-...-M8D</td>
<td>9.6</td>
<td>M8x1</td>
<td>4.6</td>
<td>41</td>
<td>34.8</td>
<td>31.8</td>
<td>23</td>
<td>1.5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SME-8M-...-M8</td>
<td>8.8</td>
<td>M8x1</td>
<td>35</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Proximity sensors SME-8M, for T-slot

Technical data – Magnetic reed

### Dimensions

SME-8M-...-M12 – Cable with plug M12x1, rotatable thread

<table>
<thead>
<tr>
<th>Type</th>
<th>B1</th>
<th>D1</th>
<th>D2</th>
<th>D3</th>
<th>H1</th>
<th>L2</th>
<th>L3</th>
<th>L4</th>
<th>L5</th>
<th>Φ</th>
</tr>
</thead>
<tbody>
<tr>
<td>SME-8M-...-M12</td>
<td>5</td>
<td>2.9</td>
<td>15</td>
<td>M12x1</td>
<td>4.6</td>
<td>55.5</td>
<td>34.8</td>
<td>31.8</td>
<td>23</td>
<td>1.5</td>
</tr>
</tbody>
</table>

### Ordering data

<table>
<thead>
<tr>
<th>Switching output</th>
<th>Electrical connection</th>
<th>Cable length</th>
<th>Part No.</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>N/O contact</td>
<td>Cable</td>
<td>[m]</td>
<td></td>
<td>543862</td>
</tr>
<tr>
<td>Contacting, bipolar</td>
<td>3-wire</td>
<td>–</td>
<td>2.5</td>
<td>543862</td>
</tr>
<tr>
<td></td>
<td>–</td>
<td>5.0</td>
<td>543863</td>
<td>SME-8M-DS-24V-K-5,0-OE</td>
</tr>
<tr>
<td></td>
<td>–</td>
<td>7.5</td>
<td>543876</td>
<td>SME-8M-DS-24V-K-7,5-OE</td>
</tr>
<tr>
<td></td>
<td>3-pin</td>
<td>0.3</td>
<td>543861</td>
<td>SME-8M-DS-24V-K-0,3-M8D</td>
</tr>
<tr>
<td></td>
<td>2-wire</td>
<td>–</td>
<td>2.5</td>
<td>543872</td>
</tr>
<tr>
<td>N/C contact</td>
<td>3-wire</td>
<td>–</td>
<td>7.5</td>
<td>546799</td>
</tr>
</tbody>
</table>

**1. Yellow LED**
**2. Centre of the sensor element**
**3. Clamping component, tightening torque 0.6 Nm**
**4. Inscription label holder**
**5. Connecting cable**
**6. Plug to fit connecting cable NEBU-M12**
### Mandatory data

<table>
<thead>
<tr>
<th>Module No.</th>
<th>Function</th>
<th>Switching output</th>
<th>Rated operating voltage</th>
<th>Cable properties</th>
<th>Cable length</th>
<th>Connection technology</th>
</tr>
</thead>
<tbody>
<tr>
<td>543892</td>
<td>SME-8M</td>
<td>DS, ZS, DO</td>
<td>24V</td>
<td>K, E</td>
<td>0.2 … 10</td>
<td>OE, M8, M8, M12</td>
</tr>
</tbody>
</table>

**Ordering example**

<table>
<thead>
<tr>
<th>Module No.</th>
<th>Function</th>
<th>Switching output</th>
<th>Rated operating voltage</th>
<th>Cable properties</th>
<th>Cable length</th>
<th>Connection technology</th>
</tr>
</thead>
<tbody>
<tr>
<td>543892</td>
<td>SME-8M</td>
<td>ZS</td>
<td>24V</td>
<td>K</td>
<td>0.8</td>
<td>OE</td>
</tr>
</tbody>
</table>

### Ordering table

<table>
<thead>
<tr>
<th>Size</th>
<th>Conditions</th>
<th>Code</th>
<th>Enter code</th>
</tr>
</thead>
<tbody>
<tr>
<td>8</td>
<td></td>
<td>SME-8M</td>
<td></td>
</tr>
</tbody>
</table>

**Module No.** 543892

**Function** Proximity sensor for T-slot, contacting SME-8M

**Switching output**

- 3-wire N/O contact (DS)
- 2-wire N/O contact (ZS)
- 3-wire N/C contact (DO)

**Rated operating voltage** 24V (24V)

**Cable properties**

- Standard + energy chain (K)
- Energy chain + robot applications (E)

**Cable length** 0.2 … 10 m

- (0.2 … 5.0 m in 0.1 m steps, 5.0 … 10 m in 0.5 m steps)

**Connection technology**

- Open end (OE)
- M8, rotatable thread (MB0)
- M8, snap-on flange (M8)
- M12, rotatable thread (M12)

---

**Transfer order code**

<table>
<thead>
<tr>
<th>Module No.</th>
<th>Function</th>
<th>Switching output</th>
<th>Rated operating voltage</th>
<th>Connection technology</th>
</tr>
</thead>
<tbody>
<tr>
<td>543892</td>
<td>SME-8M</td>
<td>ZS</td>
<td>24V</td>
<td>OE</td>
</tr>
</tbody>
</table>
### Proximity sensors SMT/CMSMT/SME-8, for T-slot

#### SMT/SME-8

<table>
<thead>
<tr>
<th>Function</th>
<th>Design</th>
<th>Switching output, switching element function</th>
<th>Electrical connection, cable length</th>
<th>Rated operating voltage</th>
<th>Variant</th>
<th>Generation</th>
</tr>
</thead>
<tbody>
<tr>
<td>SMT</td>
<td>8</td>
<td>PNP, N/O contact, 3-wire</td>
<td>K Cable, 2.5 m or 7.5 m</td>
<td>24 V DC</td>
<td>S6</td>
<td>B series</td>
</tr>
<tr>
<td>SME</td>
<td></td>
<td>NPN, N/O contact, 3-wire</td>
<td>K2,5 Cable, 2.5 m</td>
<td>230 V AC</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>N/O contact, 2-wire</td>
<td>K5 Cable, 5.0 m</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>N/O contact, 2-wire</td>
<td>K-7,5 Cable, 7.5 m</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>N/O contact, 2-wire</td>
<td>KL Cable, 2.5 m</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Plug M8x1 with cable, 0.3 m</td>
<td>S</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Yellow LED</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>24 V DC</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>230 V AC</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### SMT/SME-8-SL

<table>
<thead>
<tr>
<th>Function</th>
<th>Design</th>
<th>Electrical connection</th>
<th>Switching output, switching element function</th>
<th>Rated operating voltage</th>
</tr>
</thead>
<tbody>
<tr>
<td>SMT</td>
<td>8</td>
<td>SL Plug</td>
<td>PNP, N/O contact, 3-wire</td>
<td>24 V DC</td>
</tr>
<tr>
<td>SME</td>
<td></td>
<td></td>
<td>NPN, N/O contact, 3-wire</td>
<td></td>
</tr>
</tbody>
</table>

**Type codes**

- **SMT**
  - Proximity sensor, magneto-resistive
- **SME**
  - Proximity sensor, magnetic reed

**Design**

- **8**
  - For T-slot, insertable in slot lengthwise
## Proximity sensors SMT/CRSMT/SME-8, for T-slot

### Type codes

<table>
<thead>
<tr>
<th>CRSMT-8</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Function</strong></td>
</tr>
<tr>
<td>CRSMT</td>
</tr>
<tr>
<td><strong>Design</strong></td>
</tr>
<tr>
<td>8</td>
</tr>
<tr>
<td><strong>Switching output, switching element function</strong></td>
</tr>
<tr>
<td>PS</td>
</tr>
<tr>
<td><strong>Electrical connection, cable length</strong></td>
</tr>
<tr>
<td>K2,5</td>
</tr>
<tr>
<td>K5</td>
</tr>
<tr>
<td><strong>Switching status display</strong></td>
</tr>
<tr>
<td>LED</td>
</tr>
<tr>
<td><strong>Rated operating voltage</strong></td>
</tr>
<tr>
<td>24</td>
</tr>
</tbody>
</table>
### General Technical Data

<table>
<thead>
<tr>
<th>Type</th>
<th>SMT-8</th>
<th>CRSMT</th>
<th>SMT-8-SL</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Switching output</strong></td>
<td>PNP</td>
<td>NPN</td>
<td>PNP</td>
</tr>
<tr>
<td><strong>Design</strong></td>
<td>For T-slot</td>
<td>For T-slot</td>
<td>For T-slot</td>
</tr>
<tr>
<td><strong>Conforms to</strong></td>
<td>–</td>
<td>EN 60947-5-2</td>
<td>–</td>
</tr>
<tr>
<td><strong>Based on standard</strong></td>
<td>EN 60947-5-2</td>
<td>–</td>
<td>EN 60947-5-2</td>
</tr>
<tr>
<td><strong>Certification</strong></td>
<td>C-Tick</td>
<td>C-Tick</td>
<td>C-Tick</td>
</tr>
<tr>
<td><strong>CE mark</strong></td>
<td>To EU EMC Directive</td>
<td>To EU EMC Directive</td>
<td>To EU EMC Directive</td>
</tr>
<tr>
<td><strong>Note on materials</strong></td>
<td>Free of copper and PTFE</td>
<td>Free of copper and PTFE</td>
<td>Free of copper and PTFE</td>
</tr>
<tr>
<td><strong>Input signal/measuring element</strong></td>
<td>SMT-8</td>
<td>CRSMT</td>
<td>SMT-8-SL</td>
</tr>
<tr>
<td><strong>Measuring principle</strong></td>
<td>Magneto-resistive</td>
<td>Magneto-resistive</td>
<td>Magneto-resistive</td>
</tr>
<tr>
<td><strong>Ambient temperature</strong></td>
<td>[°C]</td>
<td>–20 ... +60</td>
<td>–20 ... +60</td>
</tr>
</tbody>
</table>

### Switching Output

<table>
<thead>
<tr>
<th>Type</th>
<th>SMT-8</th>
<th>CRSMT</th>
<th>SMT-8-SL</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Switching output</strong></td>
<td>PNP</td>
<td>NPN</td>
<td>PNP</td>
</tr>
<tr>
<td><strong>Switching output</strong></td>
<td>PNP</td>
<td>NPN</td>
<td>PNP</td>
</tr>
<tr>
<td><strong>Switching element function</strong></td>
<td>N/O contact</td>
<td>N/O contact</td>
<td>N/O contact</td>
</tr>
<tr>
<td><strong>Reproducibility of switching value</strong></td>
<td>±0.1</td>
<td>±0.1</td>
<td>–</td>
</tr>
<tr>
<td><strong>Switch-on time</strong></td>
<td>±0.2</td>
<td>±0.2</td>
<td>±0.5</td>
</tr>
<tr>
<td><strong>Switch-off time</strong></td>
<td>±0.8</td>
<td>±0.5</td>
<td>±0.5</td>
</tr>
<tr>
<td><strong>Max. switching frequency</strong></td>
<td>1 000</td>
<td>–</td>
<td>140</td>
</tr>
<tr>
<td><strong>Max. output current</strong></td>
<td>100</td>
<td>100</td>
<td>100</td>
</tr>
<tr>
<td><strong>Max. switching capacity DC</strong></td>
<td>3</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td><strong>Voltage drop</strong></td>
<td>±1.8</td>
<td>±1.5</td>
<td>±1.8</td>
</tr>
<tr>
<td><strong>Residual current</strong></td>
<td>±100</td>
<td>±2</td>
<td>±100</td>
</tr>
</tbody>
</table>

### Output, Additional Data

<table>
<thead>
<tr>
<th>Type</th>
<th>SMT-8</th>
<th>CRSMT</th>
<th>SMT-8-SL</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Protection against short circuit</strong></td>
<td>Pulsed</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td><strong>Protection against overloading</strong></td>
<td>Yes</td>
<td>–</td>
<td>Yes</td>
</tr>
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</table>

### Electronic Components

<table>
<thead>
<tr>
<th>Type</th>
<th>SMT-8</th>
<th>CRSMT</th>
<th>SMT-8-SL</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Rated operating voltage</strong></td>
<td>[V DC]</td>
<td>–</td>
<td>24</td>
</tr>
<tr>
<td><strong>Operating voltage range</strong></td>
<td>[V DC]</td>
<td>10 ... 30</td>
<td>10 ... 30</td>
</tr>
<tr>
<td><strong>Reverse polarity protection</strong></td>
<td>For all electrical connections</td>
<td>–</td>
<td>–</td>
</tr>
</tbody>
</table>
### Electromechanical components

<table>
<thead>
<tr>
<th>Type</th>
<th>SMT-8</th>
<th>CRSMT</th>
<th>SMT-8-SL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Switching output</td>
<td>PNP</td>
<td>NPN</td>
<td>PNP</td>
</tr>
<tr>
<td>Electrical connection</td>
<td>Cable, 3-wire</td>
<td>Cable with plug M8x1, 3-pin</td>
<td>Cable, 3-wire</td>
</tr>
<tr>
<td>Connection direction</td>
<td>In-line</td>
<td>–</td>
<td>In-line</td>
</tr>
<tr>
<td>Cable length [m]</td>
<td>2.5</td>
<td>0.3</td>
<td>2.5</td>
</tr>
<tr>
<td>Cable sheath material</td>
<td>Polyurethane</td>
<td>–</td>
<td>–</td>
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</table>

### Mechanical components

<table>
<thead>
<tr>
<th>Type</th>
<th>SMT-8</th>
<th>CRSMT</th>
<th>SMT-8-SL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Switching output</td>
<td>PNP</td>
<td>NPN</td>
<td>PNP</td>
</tr>
<tr>
<td>Electrical connection</td>
<td>Cable, 3-wire</td>
<td>Cable with plug M8x1, 3-pin</td>
<td>Cable, 3-wire</td>
</tr>
<tr>
<td>Type of mounting</td>
<td>Clamped in T-slot</td>
<td>Insertable in slot lengthwise</td>
<td>Screw-clamped</td>
</tr>
<tr>
<td>Housing material</td>
<td>High-alloy stainless steel</td>
<td>Thermoplastic polyurethane elastomer</td>
<td>High-alloy stainless steel</td>
</tr>
<tr>
<td></td>
<td>Polyamide</td>
<td>–</td>
<td>Polyamide</td>
</tr>
<tr>
<td></td>
<td>Brass</td>
<td>–</td>
<td>Brass</td>
</tr>
<tr>
<td></td>
<td>Nickel-plated</td>
<td>–</td>
<td>Nickel-plated</td>
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</tbody>
</table>

### Display/operation

| Switching status display | Yellow LED |

### Immissions/ emissions

<table>
<thead>
<tr>
<th>Type</th>
<th>SMT-8</th>
<th>CRSMT</th>
<th>SMT-8-SL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ambient temperature with flexible cable installation [°C]</td>
<td>–5 ... +60</td>
<td>–5 ... +60</td>
<td>–</td>
</tr>
<tr>
<td>Protection class</td>
<td>IP65</td>
<td>IP65</td>
<td>IP65</td>
</tr>
<tr>
<td>Insulation voltage [V]</td>
<td>–</td>
<td>500</td>
<td>–</td>
</tr>
<tr>
<td>Degree of contamination</td>
<td>–</td>
<td>3</td>
<td>–</td>
</tr>
<tr>
<td>Corrosion resistance class CRC</td>
<td>2</td>
<td>4</td>
<td>3</td>
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</table>

### Pin allocation to EN 60947-5-2

<table>
<thead>
<tr>
<th>PS/NS</th>
<th>Plug, 3-pin</th>
</tr>
</thead>
<tbody>
<tr>
<td>M8x1</td>
<td>Pin</td>
</tr>
<tr>
<td>-----------</td>
<td>-----</td>
</tr>
<tr>
<td>1</td>
<td>Brown</td>
</tr>
<tr>
<td>3</td>
<td>Blue</td>
</tr>
<tr>
<td>4</td>
<td>Black</td>
</tr>
</tbody>
</table>
Proximity sensors SMT-8/CRSMT-8, for T-slot

Technical data – Magneto-resistive

### Dimensions

**SMT-8…S-K**

- B1
- B2
- H1
- L1

**SMT-8…S-S**

- B1
- B2
- D3
- L3
- L1
- L2

**CRSMT**

- B1
- B2
- H1
- L1

**SMT-8-SL**

- B1
- B2
- H1
- L3

### Table - Dimensions

<table>
<thead>
<tr>
<th>Type</th>
<th>B1</th>
<th>B2</th>
<th>D1</th>
<th>D2</th>
<th>D3</th>
<th>H1</th>
<th>H2</th>
<th>H3</th>
<th>H4</th>
<th>H5</th>
<th>L1</th>
<th>L2</th>
<th>L3</th>
<th>L4</th>
</tr>
</thead>
<tbody>
<tr>
<td>SMT-8…S-K</td>
<td>6.3</td>
<td>5</td>
<td>2.9</td>
<td>–</td>
<td>–</td>
<td>4.9</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>32.4</td>
<td>–</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>SMT-8…S-S</td>
<td>6.3</td>
<td>0.1</td>
<td>2.9</td>
<td>9.5</td>
<td>M8x1</td>
<td>4.9</td>
<td>0.1</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>310</td>
<td>41.1</td>
<td>32.4</td>
<td>–</td>
</tr>
<tr>
<td>CRSMT</td>
<td>6.3</td>
<td>5</td>
<td>2.9</td>
<td>–</td>
<td>–</td>
<td>4.9</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>32.4</td>
<td>–</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>SMT-8-SL</td>
<td>6.7</td>
<td>–</td>
<td>M8x1</td>
<td>–</td>
<td>–</td>
<td>17.1</td>
<td>13.1</td>
<td>10.2</td>
<td>3.1</td>
<td>37.6</td>
<td>66</td>
<td>48.4</td>
<td>36.6</td>
<td>26.9</td>
</tr>
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</table>

## Ordering data

<table>
<thead>
<tr>
<th>Switching output</th>
<th>Electrical connection</th>
<th>Cable length [m]</th>
<th>Part No.</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>N/O contact, basic version</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PNP</td>
<td>3-wire</td>
<td>2.5</td>
<td>175436</td>
<td>SMT-8-PS-K-LED-24-B</td>
</tr>
<tr>
<td></td>
<td>–</td>
<td>–</td>
<td>5.0</td>
<td>SMT-8-PS-K5-LED-24-B</td>
</tr>
<tr>
<td>NPN</td>
<td>3-wire</td>
<td>2.5</td>
<td>171180</td>
<td>SMT-8-NS-K-LED-24-B</td>
</tr>
<tr>
<td></td>
<td>–</td>
<td>–</td>
<td>0.3</td>
<td>SMT-8-NS-S-LED-24-B</td>
</tr>
<tr>
<td>PNP</td>
<td>–</td>
<td>3-pin</td>
<td>562019</td>
<td>SMT-8-SL-PS-LED-24-B</td>
</tr>
<tr>
<td>N/O contact, corrosion resistant</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PNP</td>
<td>3-wire</td>
<td>2.5</td>
<td>525563</td>
<td>CRSMT-8-PS-K-LED-24</td>
</tr>
<tr>
<td></td>
<td>–</td>
<td>–</td>
<td>5.0</td>
<td>CRSMT-8-PS-K5-LED-24</td>
</tr>
</tbody>
</table>

Proximity sensors SMT-8/CRSMT-8, for T-slot

Technical data – Magneto-resistive
**Sensors** > **Proximity sensors for drive units** > **For T-slot**

## Proximity sensors SME-8, for T-slot

**Technical data – Magnetic reed**

### Function
- Magnetic reed measuring principle
- Insertable in slot lengthwise

- e.g. N/O contact, with cable, 3-wire

- e.g. N/O contact, with plug, 3-pin

### General technical data

<table>
<thead>
<tr>
<th>Type</th>
<th>SME-8-K</th>
<th>SME-8-S</th>
<th>SME-8-ZS</th>
<th>SME-8-O</th>
<th>SME-8-SL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Design</td>
<td>For T-slot</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Conforms to</td>
<td>EN 60947-5-2</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Certification</td>
<td>C-Tick</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CE mark (see declaration of conformity)</td>
<td>To EU EMC Directive</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Note on materials</td>
<td>Free of copper and PTFE</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>RoHS-compliant</td>
<td></td>
<td></td>
<td></td>
<td>RoHS-compliant</td>
</tr>
</tbody>
</table>

**Note on materials:**
- Free of copper and PTFE
- RoHS-compliant

1) For information about the applicability of the component see the manufacturer’s EC declaration of conformity at: www.festo.com

### Input signal/measuring element

<table>
<thead>
<tr>
<th>Type</th>
<th>SME-8-K</th>
<th>SME-8-K5</th>
<th>SME-8-K-7,5</th>
<th>SME-8-S</th>
<th>SME-8-ZS</th>
<th>SME-8-O</th>
<th>SME-8-SL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Measuring principle</td>
<td>Magnetic reed</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ambient temperature [°C]</td>
<td>–40 ... +60</td>
<td>–40 ... +70</td>
<td>–40 ... +70</td>
<td>–40 ... +70</td>
<td>–40 ... +60</td>
<td>–40 ... +60</td>
<td>–40 ... +60</td>
</tr>
</tbody>
</table>

### Switching output

<table>
<thead>
<tr>
<th>Type</th>
<th>SME-8-K</th>
<th>SME-8-S</th>
<th>SME-8-ZS</th>
<th>SME-8-O</th>
<th>SME-8-SL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Switching output</td>
<td>Contacting, bipolar</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Switching element function</td>
<td>N/O contact</td>
<td>N/O contact</td>
<td>N/O contact</td>
<td>N/C contact</td>
<td>N/O contact</td>
</tr>
<tr>
<td>Reproducibility of switching value [mm]</td>
<td>±0.1</td>
<td>±0.1</td>
<td>±0.1</td>
<td>±0.1</td>
<td>±0.1</td>
</tr>
<tr>
<td>Switch-on time [ms]</td>
<td>≤ 0.5</td>
<td>≤ 0.5</td>
<td>≤ 0.5</td>
<td>≤ 2</td>
<td>≤ 0.6</td>
</tr>
<tr>
<td>Switch-off time [ms]</td>
<td>≤ 0.03</td>
<td>≤ 0.03</td>
<td>≤ 0.03</td>
<td>≤ 0.2</td>
<td>≤ 0.05</td>
</tr>
<tr>
<td>Max. switching frequency [Hz]</td>
<td>800</td>
<td>–</td>
<td>800</td>
<td>–</td>
<td>500</td>
</tr>
<tr>
<td>Max. output current [mA]</td>
<td>500</td>
<td>500</td>
<td>80</td>
<td>50</td>
<td>500</td>
</tr>
<tr>
<td>Max. switching capacity AC [VA]</td>
<td>10</td>
<td>10</td>
<td>–</td>
<td>1.5</td>
<td>10</td>
</tr>
<tr>
<td>Max. switching capacity DC [W]</td>
<td>10</td>
<td>10</td>
<td>2.16</td>
<td>1.5</td>
<td>10</td>
</tr>
<tr>
<td>Voltage drop [V]</td>
<td>0</td>
<td>–</td>
<td>≤ 3.5</td>
<td>≤ 2.5</td>
<td>0</td>
</tr>
</tbody>
</table>

### Output, additional data

<table>
<thead>
<tr>
<th>Type</th>
<th>SME-8-K</th>
<th>SME-8-S</th>
<th>SME-8-ZS</th>
<th>SME-8-O</th>
<th>SME-8-SL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Protection against short circuit</td>
<td>No</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Protection against overloading</td>
<td>No</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Electronic components

<table>
<thead>
<tr>
<th>Type</th>
<th>SME-8-K</th>
<th>SME-8-S</th>
<th>SME-8-ZS</th>
<th>SME-8-O</th>
<th>SME-8-SL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating voltage range [V AC]</td>
<td>12 ... 30</td>
<td>12 ... 30</td>
<td>–</td>
<td>12 ... 30</td>
<td>10 ... 30</td>
</tr>
<tr>
<td>Operating voltage range [V DC]</td>
<td>12 ... 30</td>
<td>12 ... 30</td>
<td>12 ... 27</td>
<td>12 ... 30</td>
<td>10 ... 30</td>
</tr>
<tr>
<td>Reverse polarity protection</td>
<td>No</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
# Proximity sensors SME-8, for T-slot

## Technical data – Magnetic reed

### Electromechanical components

<table>
<thead>
<tr>
<th>Type</th>
<th>SME-8-K</th>
<th>SME-8-K5</th>
<th>SME-8-K-7,5</th>
<th>SME-8-S</th>
<th>SME-8-ZS</th>
<th>SME-8-O</th>
<th>SME-8-SL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Electrical connection</td>
<td>Cable, 3-wire</td>
<td>Cable with plug M8x1, 3-pin</td>
<td>Cable, 2-wire</td>
<td>Cable, 3-wire</td>
<td>Plug M8x1, 3-pin</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Connection direction</td>
<td>In-line</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cable length [m]</td>
<td>2.5</td>
<td>3</td>
<td>7.5</td>
<td>0.3</td>
<td>2.5</td>
<td>7.5</td>
<td>–</td>
</tr>
<tr>
<td>Cable sheath material</td>
<td>Polyurethane</td>
<td>–</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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### Mechanical components

<table>
<thead>
<tr>
<th>Type</th>
<th>SME-8-K</th>
<th>SME-8-K5</th>
<th>SME-8-K-7,5</th>
<th>SME-8-S</th>
<th>SME-8-ZS</th>
<th>SME-8-O</th>
<th>SME-8-SL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type of mounting</td>
<td>Clamped in T-slot</td>
<td>Insertable in slot lengthwise</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Housing material</td>
<td>Epoxy resin</td>
<td>Polycarbonate</td>
<td>Polybutylene terephthalate</td>
<td>High-alloy stainless steel</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Display/operation

| Switching status display | Yellow LED |

### Immissions/emissions

<table>
<thead>
<tr>
<th>Type</th>
<th>SME-8-K</th>
<th>SME-8-K5</th>
<th>SME-8-K-7,5</th>
<th>SME-8-S</th>
<th>SME-8-ZS</th>
<th>SME-8-O</th>
<th>SME-8-SL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ambient temperature with flexible cable installation [°C]</td>
<td>–5 ... +60</td>
<td>–5 ... +70</td>
<td>–5 ... +70</td>
<td>–5 ... +70</td>
<td>–5 ... +60</td>
<td>–5 ... +60</td>
<td>–</td>
</tr>
<tr>
<td>Protection class</td>
<td>IP65</td>
<td>–</td>
<td>IP65</td>
<td>–</td>
<td>IP65</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Insulation voltage [V]</td>
<td>50</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Surge capacity [KV]</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Degree of contamination</td>
<td>3</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Pin allocation to EN 60947-5-2

<table>
<thead>
<tr>
<th>Plug, 3-pin</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pin</td>
</tr>
<tr>
<td>1</td>
</tr>
<tr>
<td>3</td>
</tr>
<tr>
<td>4</td>
</tr>
</tbody>
</table>
### Proximity sensors SME-8, for T-slot

**Technical data – Magnetic reed**

#### Dimensions

**N/O contact, cable**

<table>
<thead>
<tr>
<th>1</th>
<th>Connecting cable</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>Yellow LED</td>
</tr>
<tr>
<td>3</td>
<td>Clamping component</td>
</tr>
</tbody>
</table>

**N/C contact, cable**

<table>
<thead>
<tr>
<th>1</th>
<th>Connecting cable</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>Yellow LED</td>
</tr>
<tr>
<td>3</td>
<td>Clamping component</td>
</tr>
</tbody>
</table>

**Plug M8x1**

<table>
<thead>
<tr>
<th>1</th>
<th>Connecting cable</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>Plug to fit connecting cable</td>
</tr>
<tr>
<td>3</td>
<td>NEBU-M8</td>
</tr>
<tr>
<td>4</td>
<td>Yellow LED</td>
</tr>
</tbody>
</table>

#### Ordering data

<table>
<thead>
<tr>
<th>Switching output</th>
<th>Electrical connection</th>
<th>Cable length [m]</th>
<th>Part No.</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>N/O contact, basic version</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Contacting, bipolar</td>
<td>3-wire</td>
<td>–</td>
<td>–</td>
<td>2.5</td>
</tr>
<tr>
<td></td>
<td>–</td>
<td>3-pin</td>
<td>–</td>
<td>0.3</td>
</tr>
<tr>
<td>Contacting, bipolar</td>
<td>2-wire</td>
<td>–</td>
<td>–</td>
<td>2.5</td>
</tr>
<tr>
<td></td>
<td>–</td>
<td>3-pin</td>
<td>–</td>
<td>5.0</td>
</tr>
<tr>
<td></td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>7.5</td>
</tr>
<tr>
<td><strong>N/C contact</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Contacting, bipolar</td>
<td>3-wire</td>
<td>–</td>
<td>–</td>
<td>7.5</td>
</tr>
</tbody>
</table>
**Proximity sensors SME-8, for T-slot**

**Technical data – Magnetic reed**

- Magnetic reed measuring principle
- Insertable in slot lengthwise
- Heat-resistant design
- Variants with operating voltage range up to 230 V DC/AC

---

### General technical data

<table>
<thead>
<tr>
<th></th>
<th>SME-8-…-S6</th>
<th>SME-8-…-230</th>
</tr>
</thead>
<tbody>
<tr>
<td>Design</td>
<td>For T-slot</td>
<td></td>
</tr>
<tr>
<td>Conforms to</td>
<td>En 60947-5-2</td>
<td></td>
</tr>
<tr>
<td>CE mark (see declaration of conformity)</td>
<td>–</td>
<td>To EU EMC Directive¹²</td>
</tr>
<tr>
<td>–</td>
<td>–</td>
<td>To EU Low Voltage Directive</td>
</tr>
<tr>
<td>Note on materials</td>
<td>Free of copper and PTFE</td>
<td>RoHS-compliant</td>
</tr>
</tbody>
</table>

¹ For information about the applicability of the component see the manufacturer’s EC declaration of conformity at: www.festo.com  
² Support -> User documentation.
If the component is subject to restrictions on usage in residential, office or commercial environments or small businesses, further measures to reduce the emitted interference may be necessary.

---

### Input signal/measuring element

<table>
<thead>
<tr>
<th></th>
<th>SME-8-…-S6</th>
<th>SME-8-…-230</th>
</tr>
</thead>
<tbody>
<tr>
<td>Measuring principle</td>
<td>Magnetic reed</td>
<td></td>
</tr>
<tr>
<td>Ambient temperature [°C]</td>
<td>–40 ... +120</td>
<td>–30 ... +60</td>
</tr>
</tbody>
</table>

---

### Switching output

<table>
<thead>
<tr>
<th></th>
<th>SME-8-…-S6</th>
<th>SME-8-…-230</th>
</tr>
</thead>
<tbody>
<tr>
<td>Switching output</td>
<td>Contacting, bipolar</td>
<td>Contacting, bipolar, without LED function</td>
</tr>
<tr>
<td>Switching element function</td>
<td>N/O contact</td>
<td>N/O contact</td>
</tr>
<tr>
<td>Reproducibility of switching value [mm]</td>
<td>±0.1</td>
<td>±0.1</td>
</tr>
<tr>
<td>Switch-on time [ms]</td>
<td>≤ 0.5</td>
<td>2</td>
</tr>
<tr>
<td>Switch-off time [ms]</td>
<td>≤ 0.03</td>
<td>0.03</td>
</tr>
<tr>
<td>Max. switching frequency [Hz]</td>
<td>800</td>
<td>500</td>
</tr>
<tr>
<td>Max. output current [mA]</td>
<td>500</td>
<td>120</td>
</tr>
<tr>
<td>Max. switching capacity AC [VA]</td>
<td>10</td>
<td></td>
</tr>
<tr>
<td>Max. switching capacity DC [W]</td>
<td>10</td>
<td></td>
</tr>
<tr>
<td>Voltage drop [V]</td>
<td>≤ 0</td>
<td>≤ 3.9</td>
</tr>
<tr>
<td>Residual current [mA]</td>
<td>–</td>
<td>0</td>
</tr>
</tbody>
</table>

---

### Output, additional data

<table>
<thead>
<tr>
<th></th>
<th>SME-8-…-S6</th>
<th>SME-8-…-230</th>
</tr>
</thead>
<tbody>
<tr>
<td>Protection against short circuit</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>Protection against overloading</td>
<td>No</td>
<td>No</td>
</tr>
</tbody>
</table>

---

### Electronic components

<table>
<thead>
<tr>
<th></th>
<th>SME-8-…-S6</th>
<th>SME-8-…-230</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating voltage range [V AC]</td>
<td>0 ... 30</td>
<td>3 ... 230</td>
</tr>
<tr>
<td>Operating voltage range [V DC]</td>
<td>0 ... 30</td>
<td>3 ... 230</td>
</tr>
<tr>
<td>Reverse polarity protection</td>
<td>No</td>
<td>No</td>
</tr>
</tbody>
</table>
**Proximity sensors SME-8, for T-slot**

**Technical data – Magnetic reed**

### Electromechanical components

<table>
<thead>
<tr>
<th></th>
<th>SME-8-...-S6</th>
<th>SME-8-...-230</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Electrical connection</strong></td>
<td>Cable, 2-wire</td>
<td></td>
</tr>
<tr>
<td><strong>Connection direction</strong></td>
<td>In-line</td>
<td></td>
</tr>
<tr>
<td><strong>Cable length [m]</strong></td>
<td>2.5</td>
<td>2.5</td>
</tr>
<tr>
<td><strong>Cable sheath material</strong></td>
<td>Thermoplastic styrene elastomer</td>
<td>Polyurethane</td>
</tr>
</tbody>
</table>

### Mechanical components

<table>
<thead>
<tr>
<th></th>
<th>SME-8-...-S6</th>
<th>SME-8-...-230</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Type of mounting</strong></td>
<td>Clamped in T-slot</td>
<td>Insertable in slot lengthwise</td>
</tr>
<tr>
<td><strong>Housing material</strong></td>
<td>Epoxy resin</td>
<td>Epoxy resin, Polycarbonate, Polystyrene, Polyethylene terephthalate, High-alloy stainless steel</td>
</tr>
</tbody>
</table>

### Display/operation

<table>
<thead>
<tr>
<th></th>
<th>SME-8-...-S6</th>
<th>SME-8-...-230</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Switching status display</strong></td>
<td>–</td>
<td>Yellow LED</td>
</tr>
</tbody>
</table>

### Immissions/emissions

<table>
<thead>
<tr>
<th></th>
<th>SME-8-...-S6</th>
<th>SME-8-...-230</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Ambient temperature with flexible cable installation [°C]</strong></td>
<td>–5 ... +120</td>
<td>–5 ... +60</td>
</tr>
<tr>
<td><strong>Protection class</strong></td>
<td>–</td>
<td>IP67, IP67</td>
</tr>
<tr>
<td><strong>Insulation voltage [V]</strong></td>
<td>50</td>
<td>–</td>
</tr>
<tr>
<td><strong>Surge capacity [kV]</strong></td>
<td>0.8</td>
<td>4</td>
</tr>
<tr>
<td><strong>Degree of contamination</strong></td>
<td>3</td>
<td>3</td>
</tr>
</tbody>
</table>

### Dimensions

![Dimensions diagram](image-url)

### Ordering data

<table>
<thead>
<tr>
<th></th>
<th>Switching output</th>
<th>Electrical connection</th>
<th>Connection direction</th>
<th>Cable length [m]</th>
<th>Part No.</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>N/O contact, heat resistant</td>
<td>Contacting, bipolar</td>
<td>2-wire</td>
<td>In-line</td>
<td>2.5</td>
<td>161756</td>
<td>SME-8-K-24-S6</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>Contacting, bipolar</th>
<th>2-wire</th>
<th>In-line</th>
<th>2.5</th>
<th>152820</th>
<th>SME-8-K-LED-230</th>
</tr>
</thead>
</table>
## Proximity sensors SMT-8G, for T-slot

### Type codes

<table>
<thead>
<tr>
<th>Function</th>
<th>SMT</th>
<th>Proximity sensor, magneto-resistive</th>
</tr>
</thead>
<tbody>
<tr>
<td>Design</td>
<td>8G</td>
<td>For T-slot, insertable in slot lengthwise</td>
</tr>
<tr>
<td>Switching output, switching element function</td>
<td>PS</td>
<td>PNP, N/O contact, 3-wire</td>
</tr>
<tr>
<td>Rated operating voltage</td>
<td>24V</td>
<td>24 V DC</td>
</tr>
<tr>
<td>Cable properties</td>
<td>E</td>
<td>Energy chain + robot applications</td>
</tr>
<tr>
<td>Cable length [m], connection direction</td>
<td>2,5Q</td>
<td>Cable, 2.5 m, lateral(^1)</td>
</tr>
<tr>
<td></td>
<td>0,3Q</td>
<td>Cable with plug, 0.3 m, lateral(^1)</td>
</tr>
<tr>
<td>Electrical connection</td>
<td>OE</td>
<td>Open end</td>
</tr>
<tr>
<td></td>
<td>M8D</td>
<td>Cable with plug M8x1, rotatable thread</td>
</tr>
</tbody>
</table>

1) Only with electrical connection OE
2) Not with electrical connection OE
Sensors > Proximity sensors for drive units > For T-slot

**Proximity sensors SMT-8G, for T-slot**

**Technical data – Magneto-resistive**

**Function**
- Magneto-resistive measuring principle
- Insertable in slot lengthwise
- Design ideally matched to gripper sensing

**General technical data**

<table>
<thead>
<tr>
<th>Design</th>
<th>For T-slot</th>
</tr>
</thead>
<tbody>
<tr>
<td>Based on standard</td>
<td>EN 60947-5-2</td>
</tr>
<tr>
<td>Certification</td>
<td>cULus - Listed (OL)</td>
</tr>
<tr>
<td>CE mark</td>
<td>EU EMC Directive</td>
</tr>
<tr>
<td>Note on materials</td>
<td>Free of copper and PTFE</td>
</tr>
<tr>
<td></td>
<td>RoHS-compliant</td>
</tr>
</tbody>
</table>

**Input signal/measuring element**

<table>
<thead>
<tr>
<th>Measuring principle</th>
<th>Magneto-resistive</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ambient temperature</td>
<td>[°C] –20 … +70</td>
</tr>
</tbody>
</table>

**Switching output**

<table>
<thead>
<tr>
<th>Switching output</th>
<th>PNP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Switching element function</td>
<td>N/O contact</td>
</tr>
<tr>
<td>Max. output current</td>
<td>[mA] 80</td>
</tr>
<tr>
<td>Max. switching capacity DC</td>
<td>[W] 2.4</td>
</tr>
</tbody>
</table>

**Output, additional data**

<table>
<thead>
<tr>
<th>Protection against short circuit</th>
<th>Pulsed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Protection against overloading</td>
<td>Yes</td>
</tr>
</tbody>
</table>

**Electronic components**

<table>
<thead>
<tr>
<th>Operating voltage range [V DC]</th>
<th>10 ... 30</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reverse polarity protection</td>
<td>For all electrical connections</td>
</tr>
</tbody>
</table>

**Electromechanical components**

<table>
<thead>
<tr>
<th>Type</th>
<th>SMT-8G-…-OE</th>
<th>SMT-8G-…-M8D</th>
</tr>
</thead>
<tbody>
<tr>
<td>Electrical connection</td>
<td>Cable, 3-wire</td>
<td>Cable with plug M8x1, 3-pin, rotatable thread</td>
</tr>
<tr>
<td>Connection direction</td>
<td>Lateral</td>
<td></td>
</tr>
<tr>
<td>Cable test conditions</td>
<td>Energy chain: 5 million cycles, bending radius 28 mm</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Torsional strength: &gt; 300,000 cycles, ±270°/0.1 m</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Resistance to bending: to Festo standard; test conditions on request</td>
<td></td>
</tr>
<tr>
<td>Cable length [m]</td>
<td>2.5</td>
<td>0.3</td>
</tr>
<tr>
<td>Cable properties</td>
<td>Energy chain + robot applications</td>
<td></td>
</tr>
<tr>
<td>Cable sheath material</td>
<td>Thermoplastic polyurethane elastomer</td>
<td></td>
</tr>
</tbody>
</table>

**Mechanical components**

<table>
<thead>
<tr>
<th>Type of mounting</th>
<th>Clamped in T-slot</th>
</tr>
</thead>
<tbody>
<tr>
<td>Insertable in slot lengthwise</td>
<td></td>
</tr>
<tr>
<td>Housing material</td>
<td>Reinforced polyamide</td>
</tr>
</tbody>
</table>
Proximity sensors SMT-8G, for T-slot

Technical data – Magneto-resistive

<table>
<thead>
<tr>
<th>Display/operation</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Switching status display</td>
<td>Yellow LED</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Immissions/emissions</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Ambient temperature with flexible cable installation [°C]</td>
<td>–5 ... +70</td>
</tr>
<tr>
<td>Protection class</td>
<td>IP65</td>
</tr>
<tr>
<td></td>
<td>IP68</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Pin allocation to EN 60947-5-2</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>PS Plugs, 3-pin</td>
<td></td>
</tr>
<tr>
<td>M8x1</td>
<td></td>
</tr>
<tr>
<td>Pin</td>
<td>Wire colour</td>
</tr>
<tr>
<td>1</td>
<td>Brown</td>
</tr>
<tr>
<td>3</td>
<td>Blue</td>
</tr>
<tr>
<td>4</td>
<td>Black</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Dimensions</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Download CAD data</td>
<td><a href="http://www.festo.com/en/engineering">www.festo.com/en/engineering</a></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Ordering data</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Switching output</td>
<td>Electrical connection</td>
</tr>
<tr>
<td>N/O contact</td>
<td>3-wire</td>
</tr>
<tr>
<td></td>
<td>–</td>
</tr>
</tbody>
</table>
## Proximity sensors SME-8-FM, for T-slot

### Type codes

**SME-8-FM**

<table>
<thead>
<tr>
<th>Function</th>
<th>SME</th>
<th>Proximity sensor, magnetic reed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Design</td>
<td>8</td>
<td>For T-slot</td>
</tr>
<tr>
<td>Sensor design</td>
<td>FM</td>
<td>Screw-clamped in slot, insertable from above</td>
</tr>
<tr>
<td>Switching output</td>
<td>DS</td>
<td>3-wire N/O contact</td>
</tr>
<tr>
<td></td>
<td>ZS</td>
<td>2-wire N/O contact</td>
</tr>
<tr>
<td>Nominal operating voltage</td>
<td>24V</td>
<td>24 V AC/DC</td>
</tr>
<tr>
<td>Cable properties</td>
<td>K</td>
<td>Standard</td>
</tr>
<tr>
<td>Cable length [m]</td>
<td>1,0</td>
<td>1</td>
</tr>
<tr>
<td>Electrical connection</td>
<td>OE</td>
<td>Open end</td>
</tr>
</tbody>
</table>
## Proximity sensors SME-8-FM, for T-slot

### Technical data – Magnetic reed

<table>
<thead>
<tr>
<th>Function</th>
<th>Magnetic reed measuring principle</th>
<th>Insertable in slot from above</th>
</tr>
</thead>
<tbody>
<tr>
<td>N/O contact, with cable, 3-wire</td>
<td></td>
<td></td>
</tr>
<tr>
<td>N/O contact, with cable, 2-wire</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### General technical data

<table>
<thead>
<tr>
<th>Design</th>
<th>For T-slot</th>
</tr>
</thead>
<tbody>
<tr>
<td>Based on standard</td>
<td>EN 60947-5-2</td>
</tr>
<tr>
<td>Certification</td>
<td>C-Tick</td>
</tr>
<tr>
<td>CE mark (see declaration of conformity)</td>
<td>EU EMC Directive</td>
</tr>
<tr>
<td>Note on materials</td>
<td>Free of copper and PTFE</td>
</tr>
<tr>
<td></td>
<td>RoHS-compliant</td>
</tr>
</tbody>
</table>

### Input signal/measuring element

<table>
<thead>
<tr>
<th>Measuring principle</th>
<th>Magnetic reed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ambient temperature [°C]</td>
<td>–10 ... +60</td>
</tr>
</tbody>
</table>

### Switching output

<table>
<thead>
<tr>
<th>Type</th>
<th>SME-8-FM-DS</th>
<th>SME-8-FM-ZS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Switching output</td>
<td>Contacting, bipolar</td>
<td>Contacting, bipolar</td>
</tr>
<tr>
<td>Switching element function</td>
<td>N/O contact</td>
<td>N/O contact</td>
</tr>
<tr>
<td>Max. output current [mA]</td>
<td>100</td>
<td></td>
</tr>
<tr>
<td>Max. switching capacity AC</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Max. switching capacity DC</td>
<td>3</td>
<td></td>
</tr>
</tbody>
</table>

### Output, additional data

| Protection against short circuit | No                  |
| Protection against overloading  | No                  |

### Electronic components

| Operating voltage range [V AC]| 10 ... 30 |
| Operating voltage range [V DC]| 10 ... 30 |

### Electromechanical components

<table>
<thead>
<tr>
<th>Type</th>
<th>SME-8-FM-DS</th>
<th>SME-8-FM-ZS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Electrical connection</td>
<td>Cable, 3-wire</td>
<td>Cable, 2-wire</td>
</tr>
<tr>
<td>Connection direction</td>
<td>In-line</td>
<td></td>
</tr>
<tr>
<td>Cable test conditions</td>
<td>Test conditions on request</td>
<td></td>
</tr>
<tr>
<td>Cable length [m]</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Cable properties</td>
<td>Standard</td>
<td></td>
</tr>
<tr>
<td>Cable sheath material</td>
<td>Polyvinyl chloride</td>
<td></td>
</tr>
</tbody>
</table>

### Mechanical components

<table>
<thead>
<tr>
<th>Type</th>
<th>SME-8-FM-DS</th>
<th>SME-8-FM-ZS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type of mounting</td>
<td>Screw-clamped</td>
<td>Insertable in slot from above</td>
</tr>
<tr>
<td>Housing material</td>
<td>Polyamide</td>
<td></td>
</tr>
</tbody>
</table>
## Display/Operation

<table>
<thead>
<tr>
<th>Feature</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Switching status display</td>
<td>Yellow LED</td>
</tr>
</tbody>
</table>

## Immissions/Emissions

<table>
<thead>
<tr>
<th>Feature</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ambient temperature with flexible cable installation</td>
<td>-5 ... +60 °C</td>
</tr>
<tr>
<td>Protection class</td>
<td>IP67</td>
</tr>
</tbody>
</table>

## Dimensions

<table>
<thead>
<tr>
<th>Feature</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>B1</td>
<td>5.1</td>
</tr>
<tr>
<td>B2</td>
<td>5.8</td>
</tr>
<tr>
<td>D1</td>
<td>2.9</td>
</tr>
<tr>
<td>H1</td>
<td>6</td>
</tr>
<tr>
<td>L1</td>
<td>27.4</td>
</tr>
<tr>
<td>L2</td>
<td>1 000</td>
</tr>
</tbody>
</table>

## Ordering Data

<table>
<thead>
<tr>
<th>Switching Output</th>
<th>Electrical Connection</th>
<th>Cable Length (m)</th>
<th>Part No.</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>Contacting, bipolar</td>
<td>3-wire</td>
<td>1</td>
<td>562515</td>
<td>SME-8-FM-DS-24V-K-1,0-OE</td>
</tr>
<tr>
<td></td>
<td>2-wire</td>
<td>1</td>
<td>562516</td>
<td>SME-8-FM-ZS-24V-K-1,0-OE</td>
</tr>
</tbody>
</table>

### Proximity sensors SMTO/SMTSO/SMEO-8E, for T-slot

#### Type codes

<table>
<thead>
<tr>
<th>SMTO/SMTSO/SMEO-8E</th>
<th>SMTO</th>
<th>8E</th>
<th>PS</th>
<th>M12</th>
<th>LED</th>
<th>24</th>
</tr>
</thead>
</table>

#### Function

<table>
<thead>
<tr>
<th>Type code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>SMTO</td>
<td>Proximity sensor, magneto-resistive</td>
</tr>
<tr>
<td>SMTSO</td>
<td>Proximity sensor, magneto-inductive, welding field immune</td>
</tr>
<tr>
<td>SMEO</td>
<td>Proximity sensor, magnetic reed</td>
</tr>
</tbody>
</table>

#### Design

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>8E</td>
<td>For T-slot, mounting via accessories</td>
</tr>
</tbody>
</table>

#### Switching output, switching element function

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>PS</td>
<td>PNP, N/O contact, 3-wire</td>
</tr>
<tr>
<td>NS</td>
<td>NPN, N/O contact, 3-wire</td>
</tr>
</tbody>
</table>

#### Electrical connection, cable length

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>K</td>
<td>Cable, 2.5 m or 7.5 m</td>
</tr>
<tr>
<td>S</td>
<td>Plug M8x1</td>
</tr>
<tr>
<td>M12</td>
<td>Plug M12x1</td>
</tr>
</tbody>
</table>

#### Switching status display

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>LED</td>
<td>Yellow LED</td>
</tr>
</tbody>
</table>

#### Rated operating voltage

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>24</td>
<td>24 V DC</td>
</tr>
<tr>
<td>230</td>
<td>230 V AC</td>
</tr>
</tbody>
</table>

#### Variant

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>S6</td>
<td>Heat resistant</td>
</tr>
</tbody>
</table>
## Proximity sensors SMTO-8E/SMTSO-8E, for T-slot

**Technical data – Magneto-resistive**

### Function
- Magneto-resistive measuring principle
- Welding field immune designs

### General technical data

<table>
<thead>
<tr>
<th></th>
<th>SMTO-8E</th>
<th>SMTSO-8E, welding field immune</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Type</strong></td>
<td>SMTO-8E</td>
<td>SMTSO-8E, welding field immune</td>
</tr>
<tr>
<td><strong>Design</strong></td>
<td>For T-slot</td>
<td></td>
</tr>
<tr>
<td><strong>Certification</strong></td>
<td>C-Tick</td>
<td>To EU EMC Directive¹</td>
</tr>
<tr>
<td><strong>CE mark</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Note on materials</strong></td>
<td>Free of copper and PTFE</td>
<td>RoHS-compliant</td>
</tr>
</tbody>
</table>

¹ For information about the applicability of the component see the manufacturer’s EC declaration of conformity at: www.festo.com

### Input signal/measuring element

<table>
<thead>
<tr>
<th></th>
<th>SMTO-8E</th>
<th>SMTSO-8E, welding field immune</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Measuring principle</strong></td>
<td>Magneto-resistive</td>
<td>Magneto-inductive</td>
</tr>
<tr>
<td><strong>Ambient temperature [°C]</strong></td>
<td>–20 ... +60</td>
<td>–25 ... +70</td>
</tr>
</tbody>
</table>

### Switching output

<table>
<thead>
<tr>
<th></th>
<th>SMTO-8E</th>
<th>SMTSO-8E, welding field immune</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Switching output</strong></td>
<td>PNP</td>
<td>PNP</td>
</tr>
<tr>
<td><strong>PNP</strong></td>
<td>NPN</td>
<td>NPN</td>
</tr>
<tr>
<td><strong>Switching element function</strong></td>
<td>N/O contact</td>
<td></td>
</tr>
<tr>
<td><strong>Reproducibility of switching value [mm]</strong></td>
<td>±0.1</td>
<td>±0.1</td>
</tr>
<tr>
<td><strong>Switch-on time [ms]</strong></td>
<td>0 ... 0.5</td>
<td>0 ... 38</td>
</tr>
<tr>
<td><strong>Switch-off time [ms]</strong></td>
<td>10 ... 25</td>
<td>0 ... 20</td>
</tr>
<tr>
<td><strong>Max. output current [mA]</strong></td>
<td>100</td>
<td>200</td>
</tr>
<tr>
<td><strong>Max. switching capacity DC [W]</strong></td>
<td>3</td>
<td>6</td>
</tr>
<tr>
<td><strong>Voltage drop [V]</strong></td>
<td>0 ... 1.8</td>
<td>0 ... 1.8</td>
</tr>
<tr>
<td><strong>Residual current [μmA]</strong></td>
<td>0.01</td>
<td></td>
</tr>
</tbody>
</table>

### Output, additional data

<table>
<thead>
<tr>
<th></th>
<th>SMTO-8E</th>
<th>SMTSO-8E, welding field immune</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Switching output</strong></td>
<td>PNP</td>
<td>PNP</td>
</tr>
<tr>
<td><strong>PNP</strong></td>
<td>NPN</td>
<td>NPN</td>
</tr>
<tr>
<td><strong>Protection against short circuit</strong></td>
<td>Pulsed</td>
<td>Yes</td>
</tr>
<tr>
<td><strong>Protection against overloading</strong></td>
<td>Yes</td>
<td>Pulsed</td>
</tr>
</tbody>
</table>

### Electronic components

<table>
<thead>
<tr>
<th></th>
<th>SMTO-8E</th>
<th>SMTSO-8E, welding field immune</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Operating voltage range DC [V]</strong></td>
<td>10 ... 30</td>
<td></td>
</tr>
<tr>
<td><strong>Reverse polarity protection</strong></td>
<td>For all electrical connections</td>
<td></td>
</tr>
</tbody>
</table>
## Proximity sensors SMTO-8E/SMTSO-8E, for T-slot

### Technical data – Magneto-resistive

#### Electromechanical components

<table>
<thead>
<tr>
<th>Type</th>
<th>SMTO-8E-…-S</th>
<th>SMTO-8E-…-M12</th>
<th>SMTSO-8E-…-M12, welding field immune</th>
</tr>
</thead>
<tbody>
<tr>
<td>Electrical connection</td>
<td>Plug M8x1, 3-pin</td>
<td>Plug M12x1, 3-pin</td>
<td>Plug M12x1, 3-pin</td>
</tr>
<tr>
<td>Connection direction</td>
<td>Lateral</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Max. tightening torque for plug [Nm]</td>
<td>0.3</td>
<td>0.5</td>
<td>0.5</td>
</tr>
</tbody>
</table>

#### Mechanical components

<table>
<thead>
<tr>
<th>Type</th>
<th>SMTO-8E-…-S</th>
<th>SMTO-8E-…-M12</th>
<th>SMTSO-8E-…-M12, welding field immune</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type of mounting</td>
<td>Clamped in T-slot</td>
<td>Insertable in slot from above</td>
<td>Via accessories</td>
</tr>
<tr>
<td>Tightening torque [Nm]</td>
<td>1</td>
<td>0.5</td>
<td>0.5</td>
</tr>
<tr>
<td>Housing materials</td>
<td>TPE-U(PU)</td>
<td>TPE-U(PU)</td>
<td>TPE-U(PU)</td>
</tr>
<tr>
<td></td>
<td>Nickel-plated brass</td>
<td>High-alloy stainless steel</td>
<td>High-alloy stainless steel</td>
</tr>
<tr>
<td></td>
<td>–</td>
<td>Wrought aluminium alloy</td>
<td>Wrought aluminium alloy</td>
</tr>
<tr>
<td></td>
<td></td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### Display/operation

| Switching status display | Yellow LED |

#### Immissions/emissions

<table>
<thead>
<tr>
<th>Type</th>
<th>SMTO-8E-…-S</th>
<th>SMTO-8E-…-M12</th>
<th>SMTSO-8E-…-M12, welding field immune</th>
</tr>
</thead>
<tbody>
<tr>
<td>Protection class</td>
<td>IP65</td>
<td>IP67</td>
<td></td>
</tr>
<tr>
<td>Resistance to interference from magnetic fields</td>
<td>–</td>
<td>–</td>
<td>Alternating magnetic field 45 … 65 Hz</td>
</tr>
</tbody>
</table>

#### Pin allocation to EN 60947-5-2

**M8x1, 3-pin**

<table>
<thead>
<tr>
<th>N/O contact</th>
<th>Pin</th>
<th>Wire colour</th>
<th>Allocation</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1</td>
<td>Brown</td>
<td>+</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>Blue</td>
<td>–</td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>Black</td>
<td>Output</td>
</tr>
</tbody>
</table>

**M12x1, 3-pin**

<table>
<thead>
<tr>
<th>N/O contact</th>
<th>Pin</th>
<th>Wire colour</th>
<th>Allocation</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1</td>
<td>Brown</td>
<td>+</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>Blue</td>
<td>–</td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>Black</td>
<td>Output</td>
</tr>
</tbody>
</table>
Proximity sensors SMTO-8E/SMTSO-8E, for T-slot

Technical data – Magneto-resistive

Dimensions

SMTO-8E...S-LED-24 – Plug M8x1

SMTO-8E...M12-LED-24 – Plug M12x1

Download CAD data ➔ www.festo.com/en/engineering
Proximity sensors SMTO-8E/SMTSO-8E, for T-slot

Technical data – Magneto-resistive

**Dimensions**

SMTSO-8E-...-M12-LED-24 – Plug M12x1

**Ordering data**

<table>
<thead>
<tr>
<th>Switching output</th>
<th>Electrical connection</th>
<th>Part No.</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Plug M8x1</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Plug M12x1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>N/O contact, basic version</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PNP</td>
<td>3-pin</td>
<td>171178</td>
<td>SMTD-8E-PS-S-LED-24</td>
</tr>
<tr>
<td>NPN</td>
<td>3-pin</td>
<td>171179</td>
<td>SMTD-8E-PS-M12-LED-24</td>
</tr>
<tr>
<td></td>
<td>–</td>
<td>171166</td>
<td>SMTD-8E-NS-S-LED-24</td>
</tr>
<tr>
<td></td>
<td>–</td>
<td>171176</td>
<td>SMTD-8E-NS-M12-LED-24</td>
</tr>
<tr>
<td>N/O contact, welding field immune</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PNP</td>
<td>–</td>
<td>191986</td>
<td>SMTSO-8E-PS-M12-LED-24</td>
</tr>
<tr>
<td>NPN</td>
<td>–</td>
<td>175825</td>
<td>SMTSO-8E-NS-M12-LED-24</td>
</tr>
</tbody>
</table>

1. Yellow LED
2. Mounting kit SMB-8E (not included in the scope of delivery)
3. Fitting space for connecting cable NEBU-M12G5
Sensors > Proximity sensors for drive units > For T-slot

Proximity sensors SMEO-8E, for T-slot

Technical data – Magnetic reed

Function

- Magnetic reed measuring principle
- Heat-resistant variant

E.g. N/O contact, 3-wire, with plug

E.g. N/O contact, 2-wire, with cable

General technical data

<table>
<thead>
<tr>
<th>Design</th>
<th>For T-slot</th>
<th>For T-slot</th>
<th>For T-slot</th>
</tr>
</thead>
<tbody>
<tr>
<td>Conforms to</td>
<td>EN 60947-5-2</td>
<td>–</td>
<td>EN 60947-5-2</td>
</tr>
<tr>
<td>Certification</td>
<td>C-Tick</td>
<td>–</td>
<td>C-Tick</td>
</tr>
<tr>
<td>CE mark (see declaration of conformity)</td>
<td>To EU EMC Directive</td>
<td>–</td>
<td>To EU EMC Directive</td>
</tr>
<tr>
<td>Note on materials</td>
<td>Free of copper and PTFE</td>
<td>Free of copper and PTFE</td>
<td>Free of copper and PTFE</td>
</tr>
</tbody>
</table>

Note on materials

Free of copper and PTFE

If the component is subject to restrictions on usage in residential, office or commercial environments or small businesses, further measures to reduce the emitted interference may be necessary.

1) For information about the applicability of the component see the manufacturer's EC declaration of conformity at: www.festo.com

Input signal/measuring element

<table>
<thead>
<tr>
<th>Measuring principle</th>
<th>SMEO-8E-…-24</th>
<th>SMEO-8E-…-24-S6, heat-resistant</th>
<th>SMEO-8E-…-230</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ambient temperature</td>
<td>–40 … +60</td>
<td>–40 … +120</td>
<td>–20 … +60</td>
</tr>
</tbody>
</table>

Switching output

<table>
<thead>
<tr>
<th>Switching output</th>
<th>SMEO-8E-…-24</th>
<th>SMEO-8E-…-24-S6, heat-resistant</th>
<th>SMEO-8E-…-230</th>
</tr>
</thead>
<tbody>
<tr>
<td>Switching element function</td>
<td>Contacting, bipolar</td>
<td>Contacting</td>
<td>Contacting, bipolar</td>
</tr>
<tr>
<td>Reproducibility of switching value</td>
<td>±0.1</td>
<td>±0.1</td>
<td>±0.1</td>
</tr>
<tr>
<td>Switch-on time</td>
<td>0 … 0.5</td>
<td>0 … 0.5</td>
<td>0 … 2</td>
</tr>
<tr>
<td>Switch-off time</td>
<td>0.03</td>
<td>0.03</td>
<td>0.03</td>
</tr>
<tr>
<td>Max. switching frequency</td>
<td>800</td>
<td>500</td>
<td>500</td>
</tr>
<tr>
<td>Max. output current</td>
<td>500</td>
<td>500</td>
<td>120</td>
</tr>
<tr>
<td>Max. switching capacity DC</td>
<td>10</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td>Max. switching capacity AC</td>
<td>10</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td>Voltage drop</td>
<td>–</td>
<td>0.5</td>
<td>3.9</td>
</tr>
</tbody>
</table>

Output, additional data

- Protection against short circuit: No
- Protection against overloading: No

Electronic components

<table>
<thead>
<tr>
<th>Operating voltage range DC</th>
<th>SMEO-8E-…-24</th>
<th>SMEO-8E-…-24-S6, heat-resistant</th>
<th>SMEO-8E-…-230</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating voltage range AC</td>
<td>12 … 30</td>
<td>0 … 30</td>
<td>3 … 250</td>
</tr>
<tr>
<td>Reverse polarity protection</td>
<td>No</td>
<td>For all electrical connections</td>
<td>No</td>
</tr>
</tbody>
</table>
### Proximity sensors SMEO-8E, for T-slot

#### Technical data – Magnetic reed

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
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</tr>
</thead>
<tbody>
<tr>
<td>Electrical connection</td>
<td>Plug M8x1, 3-pin</td>
<td>Plug M12x1, 3-pin</td>
<td>Cable, 2-wire</td>
<td>Plug M12x1, 3-pin</td>
</tr>
<tr>
<td>Connection direction</td>
<td>Lateral</td>
<td>Lateral</td>
<td>Lateral</td>
<td>Lateral</td>
</tr>
<tr>
<td>Pin contact materials</td>
<td>Nickel-plated brass</td>
<td>Brass</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>Cable length [m]</td>
<td>–</td>
<td>–</td>
<td>2.5</td>
<td>–</td>
</tr>
<tr>
<td>Cable sheath materials</td>
<td>–</td>
<td>–</td>
<td>TPE-S</td>
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</table>

#### Mechanical components

<table>
<thead>
<tr>
<th></th>
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<tbody>
<tr>
<td>Type of mounting</td>
<td>Via accessories</td>
<td>Via accessories</td>
<td>Via accessories</td>
<td>Via accessories</td>
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<tr>
<td>Tightening torque [Nm]</td>
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<td>0.5</td>
<td>0.5</td>
<td>0.5</td>
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<tr>
<td>Housing materials</td>
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<td>TPE-U(PU)</td>
<td>TPE-U(PU)</td>
<td>TPE-U(PU)</td>
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<tr>
<td></td>
<td>High-alloy stainless steel</td>
<td>High-alloy stainless steel</td>
<td>–</td>
<td>High-alloy stainless steel</td>
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<tr>
<td></td>
<td>Wrought aluminium alloy</td>
<td>Wrought aluminium alloy</td>
<td>–</td>
<td>Wrought aluminium alloy</td>
</tr>
<tr>
<td></td>
<td>Nickel-plated brass</td>
<td>–</td>
<td>–</td>
<td>–</td>
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</table>

#### Display/operation

<table>
<thead>
<tr>
<th></th>
<th></th>
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<tbody>
<tr>
<td>Switching status display</td>
<td>Yellow LED</td>
<td>–</td>
<td>Yellow LED</td>
<td>Yellow LED</td>
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</table>

#### Immissions/emissions

<table>
<thead>
<tr>
<th></th>
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<th></th>
<th></th>
<th></th>
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</thead>
<tbody>
<tr>
<td>Protection class</td>
<td>IP65</td>
<td>IP65</td>
<td>IP65</td>
<td>IP65</td>
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<tr>
<td>Protection class</td>
<td>IP65</td>
<td>IP67</td>
<td>IP67</td>
<td>IP67</td>
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<tr>
<td>Insulation voltage [V]</td>
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<td>–</td>
<td>50</td>
<td>–</td>
</tr>
<tr>
<td>Surge capacity [kV]</td>
<td>0.8</td>
<td>–</td>
<td>–</td>
<td>4</td>
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<tr>
<td>Degree of contamination</td>
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<td>3</td>
<td>3</td>
<td>3</td>
</tr>
</tbody>
</table>

#### Pin allocation to EN 60947-5-2

**M8x1, 3-pin**

<table>
<thead>
<tr>
<th>N/O contact</th>
<th>Pin</th>
<th>Wire colour</th>
<th>Allocation</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1</td>
<td>Brown</td>
<td>+</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>Blue</td>
<td>–</td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>Black</td>
<td>Output</td>
</tr>
</tbody>
</table>

**M12x1, 3-pin, 24 V**

<table>
<thead>
<tr>
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<th>Pin</th>
<th>Wire colour</th>
<th>Allocation</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1</td>
<td>Brown</td>
<td>+</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>Blue</td>
<td>–</td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>Black</td>
<td>Output</td>
</tr>
</tbody>
</table>

**M12x1, 3-pin, 230 V**

<table>
<thead>
<tr>
<th>N/O contact</th>
<th>Pin</th>
<th>Wire colour</th>
<th>Allocation</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>3</td>
<td>Blue</td>
<td>– / –</td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>Black</td>
<td>– / +</td>
</tr>
</tbody>
</table>
Proximity sensors SMEO-8E, for T-slot

Technical data – Magnetic reed

Dimensions

Download CAD data ➔ www.festo.com/en/engineering

SMEO-8E-S-LED-24 – Plug M8x1

1. Plug to fit connecting cable NEBU-M8
2. Yellow LED
3. Mounting screw
4. Theoretical switching point
5. Mounting kit SMB-8E (not included in the scope of delivery)
6. Fitting space for connecting cable NEBU-M8W3
7. Fitting space for connecting cable NEBU-M8G3

SMEO-8E-M12-LED-24 – Plug M12x1

1. Plug to fit connecting cable NEBU-M12
2. Yellow LED
3. Mounting screw
4. Theoretical switching point
5. Mounting kit SMB-8E (not included in the scope of delivery)
6. Fitting space for connecting cable NEBU-M12W5
7. Fitting space for connecting cable NEBU-M12G5

SMEO-8E-K24-S6 – Cable, heat-resistant up to 120 °C

1. Connecting cable
2. Mounting kit SMB-8E (not included in the scope of delivery)
3. Mounting screw
## Proximity sensors SMEO-8E, for T-slot

### Technical data – Magnetic reed

#### Ordering data

<table>
<thead>
<tr>
<th>Part No.</th>
<th>Type</th>
<th>Switching output</th>
<th>Electrical connection</th>
<th>Cable length (m)</th>
<th>Product weight (g)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>N/O contact, basic version</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Contacting, bipolar</td>
<td>3-pin</td>
<td>10</td>
<td>171163 SMEO-8E-S-LED-24</td>
</tr>
<tr>
<td></td>
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<td></td>
<td>-</td>
<td>-</td>
<td>171164 SMEO-8E-M12-LED-24</td>
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<tr>
<td></td>
<td></td>
<td>N/O contact, heat-resistant</td>
<td>2-wire</td>
<td>2.5</td>
<td>171158 SMEO-8E-K-24-S6</td>
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<td>Contacting, bipolar</td>
<td>3-pin</td>
<td>9</td>
<td>171160 SMEO-8E-M12-LED-230</td>
</tr>
</tbody>
</table>
Sensors > Proximity sensor for drive units > For T-slot

Proximity sensors SMT/SME-8, for T-slot

Accessories

Mounting kit SMBR-8-8/100-S6

Materials:
Rail: Anodised wrought aluminium alloy
Clamping strap, screws: High-alloy stainless steel
Free of copper and PTFE
RoHS-compliant

Dimensions and ordering data

| Part No. | Type       | For piston | B1 | B2 | B3 | H1 |
|----------|------------|------------|----|----|----|----|---|
| 538937   | SMBR-8-8/100-S6 | 8...100    | 8  | 12.3| 7  | 17.5|   |

1) Corrosion resistance class 4 according to Festo standard 940.070

Components subject to particularly high corrosion stress. Parts used with aggressive media, e.g. in the food or chemical industry. These applications should be supported with special tests with the media if required.

Mounting kit SMBR

Material:
Polyacetal
RoHS-compliant

Dimensions and ordering data

| Part No. | Type       | B1 | B2 | B3 | H1 |
|----------|------------|----|----|----|----|---|
| 175091   | SMBR-8-8   | 8  | 12.3| 7  | 17.5|   |
| 175092   | SMBR-8-10  | 10 | 13.7| 7  | 19.9|   |
| 175093   | SMBR-8-12  | 12 | 14.3| 7  | 21.9|   |
| 175094   | SMBR-8-16  | 16 | 16.9| 8  | 25.7|   |
| 175095   | SMBR-8-20  | 20 | 20.8| 9  | 30.4|   |
| 175096   | SMBR-8-25  | 25 | 22.7| 9  | 35.6|   |
| 175097   | SMBR-8-32  | 32 | 24.6| 9  | 42.7|   |
| 175098   | SMBR-8-40  | 40 | 26.3| 9  | 50.7|   |
| 175099   | SMBR-8-50  | 50 | 28.6| 9  | 61.5|   |
| 175100   | SMBR-8-63  | 63 | 32  | 9  | 74.5|   |
Proximity sensors SMT/SME-8, for T-slot

Accessories

Mounting kit CRSMB

Design: For round cylinders
Mounting method: Affixed with adhesive tape (supplied)

Protection class: IP65, IP68, IP69K
Ambient temperature: −40...+90 °C
Materials:
   Housing: Polyurethane
   Rail: Hard anodised aluminium
   Free of copper and PTFE

Ordering data

<table>
<thead>
<tr>
<th>Part No.</th>
<th>Type</th>
<th>CRC(1)</th>
<th>Part No.</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>525565</td>
<td>CRSMB-8-32/100</td>
<td>4</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

1) Corrosion resistance class 4 according to Festo standard 940 070
Components subject to very high corrosion stress. Parts used with aggressive media, e.g. in the food or chemical industry. These applications should be supported with special tests with the media if required.

Mounting kit SMB-B-FENG

Material:
   Wrought aluminium alloy
   Free of copper and PTFE

Dimensions and ordering data

<table>
<thead>
<tr>
<th>Part No.</th>
<th>Type</th>
<th>B1</th>
<th>B2</th>
<th>D1</th>
<th>L1</th>
<th>Tightening torque [Nm]</th>
<th>Part No.</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>32/40</td>
<td>SMB-FENG-32/40</td>
<td>35.1</td>
<td>8.7</td>
<td>M3</td>
<td>15.5</td>
<td>0.2</td>
<td>175705</td>
<td>SMB-B-FENG-32/40</td>
</tr>
<tr>
<td>50/63</td>
<td>SMB-FENG-50/63</td>
<td>47</td>
<td>12.3</td>
<td>M4</td>
<td>20</td>
<td>0.5</td>
<td>175706</td>
<td>SMB-B-FENG-50/63</td>
</tr>
<tr>
<td>80/100</td>
<td>SMB-FENG-80/100</td>
<td>64.3</td>
<td>15.7</td>
<td>M5</td>
<td>24.3</td>
<td>0.7</td>
<td>175707</td>
<td>SMB-B-FENG-80/100</td>
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</tbody>
</table>

Mounting kit SMB-8E

Material:
   Polyacetal

Ordering data

<table>
<thead>
<tr>
<th>Part No.</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>178230</td>
<td>SMB-8E</td>
</tr>
</tbody>
</table>

1) Suitable for T-slot
2) Locking screw
Proximity sensors SMT/SME-8, for T-slot

Mounting SMBZ-8-...

Materials:
- Rail: Anodised wrought aluminium alloy
- Screws: High-alloy stainless steel
- Free of copper and PTFE
- RoHS-compliant

Positioning component SMM

Insertable in slot lengthwise

Ambient temperature: –40 … +120 °C

Materials:
- Housing: Anodised wrought aluminium alloy
- Screws: High-alloy stainless steel
- Note on materials: RoHS-compliant

———

1) Corrosion resistance class 4 according to Festo standard 940 070
   Components subject to particularly high corrosion stress. Parts used with aggressive media, e.g. in the food or chemical industry. These applications should be supported with special tests with the media if required.

2) Packaging unit
## Proximity sensors SMT/SME-8, for T-slot

### Accessories

#### Ordering data – Connecting cables

<table>
<thead>
<tr>
<th>Socket M8x1, 3-pin</th>
<th>Number of wires</th>
<th>Cable length [m]</th>
<th>Part No.</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>For SMT/SME-8... and SMTO/SMTSO/SMEO-8E</td>
<td>3</td>
<td>2.5</td>
<td>541333</td>
<td>NEBU-M8G3-K-2.5-LE3</td>
</tr>
<tr>
<td>For SMT/SME-8... and SMTO/SMTSO/SMEO-8E</td>
<td>5</td>
<td>2.5</td>
<td>541334</td>
<td>NEBU-M8G3-K-5-LE3</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Socket M12x1, 5-pin</th>
<th>Number of wires</th>
<th>Cable length [m]</th>
<th>Part No.</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>For SMT/SME-8M and SMTO/SMTSO/SMEO-8E</td>
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<td>2.5</td>
<td>541363</td>
<td>NEBU-M12G5-K-2.5-LE3</td>
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<tr>
<td>For SMT/SME-8M and SMTO/SMTSO/SMEO-8E</td>
<td>5</td>
<td>2.5</td>
<td>541364</td>
<td>NEBU-M12G5-K-5-LE3</td>
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</tbody>
</table>

#### Ordering data – Inscription labels, safety clips

<table>
<thead>
<tr>
<th>Size</th>
<th>Part No.</th>
<th>Type</th>
<th>PU</th>
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</thead>
<tbody>
<tr>
<td>23x4 mm</td>
<td>541598</td>
<td>ASLR-L-423</td>
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<tr>
<td>M8</td>
<td>548067</td>
<td>NEAU-M8-GD</td>
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<tr>
<td>M12</td>
<td>548068</td>
<td>NEAU-M12-GD</td>
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1) Packaging unit per frame

#### Ordering data – Mounting attachments

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<tbody>
<tr>
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<td>534254</td>
<td>SMBK-8</td>
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</table>

#### Ordering data – Sensor tester

<table>
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<tr>
<th>Part No.</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>158481</td>
<td>SM-TEST-1</td>
</tr>
</tbody>
</table>
Mounting kits SAMH-S
Mounting kits SAMH-S
Key features and type codes

Function
Tamper-proof mounting of proximity sensors of the type SMx-8M or SMT-8M-A. These mounting kits fulfill the applicable requirements of EN ISO 13849-2 for mechanical systems: tamper-proof, captive components, positive-locking. The mounted cover prevents access to the clamping screws of the terminal block and proximity sensor. This prevents the proximity sensor being disassembled or moved. The cover cannot be removed without destroying it. This enables any attempt to tamper with the proximity sensor to be identified.

Mounting
- Screw terminal block firmly in place
- Fit cover on the sensor cable
- Push the cover forward as far as the proximity sensor and engage

Possible application
The mounting kit has been tested with the proximity sensors SMT-8M-A, SME-8M and SMT-8M (apart from SME-8M-DO) within the framework of qualification of the drives listed in the following table. The drive extends the overall length of the proximity sensor. To guarantee its reliable operation, the specified minimum strokes must be taken into consideration with the drives. Compatibility with drives not listed here must be examined where necessary.

<table>
<thead>
<tr>
<th>Drive</th>
<th>Diameter in mm</th>
<th>Minimum stroke in mm</th>
<th>Restrictions</th>
</tr>
</thead>
<tbody>
<tr>
<td>ADN/AEN</td>
<td>12</td>
<td>16</td>
<td>–</td>
</tr>
<tr>
<td>ADN/AEN</td>
<td>16</td>
<td>17</td>
<td>–</td>
</tr>
<tr>
<td>ADN/AEN</td>
<td>20</td>
<td>27</td>
<td>–</td>
</tr>
<tr>
<td>ADN/AEN</td>
<td>25</td>
<td>15</td>
<td>–</td>
</tr>
<tr>
<td>ADN/AEN</td>
<td>32</td>
<td>12</td>
<td>–</td>
</tr>
<tr>
<td>ADN/AEN</td>
<td>40</td>
<td>12</td>
<td>–</td>
</tr>
<tr>
<td>ADN/AEN</td>
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<td>12</td>
<td>–</td>
</tr>
<tr>
<td>ADN/AEN</td>
<td>63</td>
<td>10</td>
<td>–</td>
</tr>
<tr>
<td>ADN/AEN</td>
<td>80</td>
<td>7</td>
<td>–</td>
</tr>
<tr>
<td>ADN/AEN</td>
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<td>1</td>
<td>–</td>
</tr>
<tr>
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<td>–</td>
</tr>
<tr>
<td>DNC</td>
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<td>12</td>
<td>–</td>
</tr>
<tr>
<td>DNC</td>
<td>40</td>
<td>10</td>
<td>–</td>
</tr>
<tr>
<td>DNC</td>
<td>50</td>
<td>11</td>
<td>–</td>
</tr>
<tr>
<td>DNC</td>
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<td>10</td>
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<tr>
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<td>3</td>
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<tr>
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<td>DNCE</td>
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<td>23</td>
<td>SMx-8M¹</td>
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<td>SMx-8M¹</td>
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<td>DGC-GF</td>
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<tr>
<td>DGC-GF</td>
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<td>–</td>
</tr>
<tr>
<td>DGC-KF</td>
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<td>0</td>
<td>–</td>
</tr>
<tr>
<td>DGC-KF</td>
<td>63</td>
<td>0</td>
<td>–</td>
</tr>
<tr>
<td>DGC-GF</td>
<td>63</td>
<td>0</td>
<td>–</td>
</tr>
</tbody>
</table>

¹) SME-8M, SMT-8M, SMT-8M-A-PNS/PSO: Sensing of the end position at the bearing cap not possible.
## Mounting kits SAMH-S

### Key features and type codes

<table>
<thead>
<tr>
<th>Drive</th>
<th>Diameter in mm</th>
<th>Minimum stroke in mm</th>
<th>Restrictions</th>
</tr>
</thead>
<tbody>
<tr>
<td>STA- … -P-A-R</td>
<td>20</td>
<td>15</td>
<td>-</td>
</tr>
<tr>
<td>STA- … -P-A-R</td>
<td>32</td>
<td>11</td>
<td>-</td>
</tr>
<tr>
<td>STA- … -P-A-R</td>
<td>50</td>
<td>11</td>
<td>-</td>
</tr>
<tr>
<td>DSBC/DNCB</td>
<td>32</td>
<td>15</td>
<td>-</td>
</tr>
<tr>
<td>DSBC/DNCB</td>
<td>40</td>
<td>14</td>
<td>-</td>
</tr>
<tr>
<td>DSBC/DNCB</td>
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<td>-</td>
</tr>
<tr>
<td>DSBC/DNCB</td>
<td>63</td>
<td>14</td>
<td>-</td>
</tr>
<tr>
<td>DSBC/DNCB</td>
<td>80</td>
<td>13</td>
<td>-</td>
</tr>
<tr>
<td>DSBC/DNCB</td>
<td>100</td>
<td>13</td>
<td>-</td>
</tr>
<tr>
<td>STAF</td>
<td>32</td>
<td>17</td>
<td>-</td>
</tr>
<tr>
<td>STAF</td>
<td>50</td>
<td>17</td>
<td>-</td>
</tr>
<tr>
<td>STAF</td>
<td>80</td>
<td>14</td>
<td>-</td>
</tr>
<tr>
<td>DFST</td>
<td>50</td>
<td>15</td>
<td>-</td>
</tr>
<tr>
<td>DFST</td>
<td>63</td>
<td>7</td>
<td>-</td>
</tr>
<tr>
<td>DFST</td>
<td>80</td>
<td>0</td>
<td>-</td>
</tr>
<tr>
<td>DFSP</td>
<td>16</td>
<td>14</td>
<td>-</td>
</tr>
<tr>
<td>DFSP</td>
<td>20</td>
<td>16</td>
<td>-</td>
</tr>
<tr>
<td>DFSP</td>
<td>32</td>
<td>12</td>
<td>-</td>
</tr>
<tr>
<td>DFSP</td>
<td>40</td>
<td>12</td>
<td>-</td>
</tr>
<tr>
<td>DFSP</td>
<td>50</td>
<td>12</td>
<td>-</td>
</tr>
</tbody>
</table>

### Type codes

<table>
<thead>
<tr>
<th>Function</th>
<th>Type code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>SAMH-S-N8</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Length</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>L</td>
<td>Long for SME-8M-DS/ZS, SMT-8M-PS/NS/ZS/PO, SMT-8M-A-PNS/PO</td>
</tr>
<tr>
<td>S</td>
<td>Short for SMT-8M-A-PS/NS/ZS/PO</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Variant</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>MK</td>
<td>Mounting kit</td>
</tr>
<tr>
<td>SC</td>
<td>Slot cover</td>
</tr>
</tbody>
</table>
Mounting kits SAMH-S

### Technical data – Mounting kit

<table>
<thead>
<tr>
<th>Type</th>
<th>SAMH-S-N8-S-MK</th>
<th>SAMH-S-N8-L-MK</th>
</tr>
</thead>
<tbody>
<tr>
<td>Design</td>
<td>For T-slot</td>
<td></td>
</tr>
<tr>
<td>Type of mounting</td>
<td>Engaging</td>
<td>Insertable in the slot from above, secured with screw</td>
</tr>
<tr>
<td>Max. tightening torque</td>
<td>[Nm] 0.6</td>
<td></td>
</tr>
<tr>
<td>Product weight [g]</td>
<td>1.88</td>
<td>1.91</td>
</tr>
<tr>
<td>Information on materials</td>
<td>High-alloy steel</td>
<td></td>
</tr>
<tr>
<td>Note on materials</td>
<td>Free of copper and PTFE</td>
<td>RoHS-compliant</td>
</tr>
</tbody>
</table>

### Operating and environmental conditions

<table>
<thead>
<tr>
<th>Ambient temperature [°C]</th>
<th>–40 ... 85 °C</th>
</tr>
</thead>
<tbody>
<tr>
<td>Corrosion resistance class CRC</td>
<td>3</td>
</tr>
</tbody>
</table>

1) Corrosion resistance class 3 according to Festo standard 940 070
Components subject to high corrosion stress. External visible parts in direct contact with industrial atmospheres or media such as solvents and cleaning agents, with a predominantly functional requirement for the surface.

### Technical data – Cover

<table>
<thead>
<tr>
<th>Type</th>
<th>SAMH-S-N8-S-SC</th>
<th>SAMH-S-N8-L-SC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Design</td>
<td>For T-slot</td>
<td></td>
</tr>
<tr>
<td>Type of mounting</td>
<td>Engaging</td>
<td>Insertable in the slot from above</td>
</tr>
<tr>
<td>Product weight [g]</td>
<td>0.36</td>
<td>0.39</td>
</tr>
<tr>
<td>Information on materials</td>
<td>PA</td>
<td></td>
</tr>
<tr>
<td>Note on materials</td>
<td>Free of copper and PTFE</td>
<td>RoHS-compliant</td>
</tr>
</tbody>
</table>

### Operating and environmental conditions

<table>
<thead>
<tr>
<th>Ambient temperature [°C]</th>
<th>–40 ... 85 °C</th>
</tr>
</thead>
<tbody>
<tr>
<td>Corrosion resistance class CRC</td>
<td>3</td>
</tr>
</tbody>
</table>

1) Corrosion resistance class 3 according to Festo standard 940 070
Components subject to high corrosion stress. External visible parts in direct contact with industrial atmospheres or media such as solvents and cleaning agents, with a predominantly functional requirement for the surface.
Mounting kits SAMH-S

Technical data

Dimensions

<table>
<thead>
<tr>
<th>Type</th>
<th>B1</th>
<th>H1</th>
<th>H2</th>
<th>H3</th>
<th>L1</th>
<th>L2</th>
<th>L3</th>
<th>L4</th>
</tr>
</thead>
<tbody>
<tr>
<td>SAMH-S-N8-S-MK</td>
<td>5.05</td>
<td>6.2</td>
<td>12.1</td>
<td>4.8</td>
<td>42</td>
<td>42</td>
<td>26.5</td>
<td>11.4</td>
</tr>
<tr>
<td>SAMH-S-N8-L-MK</td>
<td>14</td>
<td>48.4</td>
<td>47</td>
<td>32</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Ordering data

<table>
<thead>
<tr>
<th>Description</th>
<th>Part No.</th>
<th>Type</th>
<th>Qty</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mounting kit, terminal block with cover</td>
<td></td>
<td>SAMH-S-N8-S-MK</td>
<td>1</td>
</tr>
<tr>
<td>Short (for SME-8M-DS/ZS, SMT-8M-PS/NS/ZS/PO)</td>
<td>575815</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Long (for SME-8M-DS/ZS, SMT-8M-PS/NS/ZS/PO, SMT-8M-A-PNS/PSO)</td>
<td>575816</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Cover</td>
<td></td>
<td>SAMH-S-N8-S-SC</td>
<td>10</td>
</tr>
<tr>
<td>Short</td>
<td>575817</td>
<td>10</td>
<td></td>
</tr>
<tr>
<td>Long</td>
<td>575818</td>
<td>10</td>
<td></td>
</tr>
</tbody>
</table>

1) Packaging unit
Proximity sensors SMT/SME-10, for C-slot
### Proximity sensors SMT/SME-10, for C-slot

**Product range overview**

<table>
<thead>
<tr>
<th>Design</th>
<th>Type of mounting</th>
<th>Measuring principle</th>
<th>Type</th>
<th>Operating voltage range</th>
<th>Switching output</th>
<th>Switching element function</th>
<th>Page/Internet</th>
</tr>
</thead>
<tbody>
<tr>
<td>For C-slot</td>
<td>Standard</td>
<td>Magneto-resistive</td>
<td>SMT-10M</td>
<td>10 ... 30 V DC</td>
<td>PNP/NPN</td>
<td>N/O contact</td>
<td>75</td>
</tr>
<tr>
<td></td>
<td>Insertable in slot from above, flush with cylinder profile</td>
<td>Magnetic reed</td>
<td>SME-10M</td>
<td>5 ... 30 V AC/DC</td>
<td>Contacting, bipolar</td>
<td>N/O contact</td>
<td>80</td>
</tr>
<tr>
<td></td>
<td>Insertable in slot length-wise</td>
<td>Magneto-resistive</td>
<td>SMT-10G</td>
<td>10 ... 30 V DC</td>
<td>PNP</td>
<td>N/O contact</td>
<td>89</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Magnetic reed</td>
<td>SME-10</td>
<td>12 ... 27 V AC/DC</td>
<td>Contacting</td>
<td>N/O contact</td>
<td>86</td>
</tr>
</tbody>
</table>

**C-slot sensors can be used for drives with C-slot**

**Exceptions**

- **ADVC ∅ 100**: SMT-10M and SME-10M cannot be used (ADVC is equipped with T-slot and C-slot)
- **DSM/DSM-B-6/8/10**: SME-10M cannot be used
- **DSM/DSM-B-10/16**: SMT-10M cannot be used
Proximity sensors SMT/SME-10, for C-slot

Overview of peripherals

Proximity sensors

1. SMT/SME-10M-…-OE, with cable 75
2. SME-10, with cable 86
3. SMT-10G-…-OE, with cable 90
4. SMT/SME-10M-…-M…, with cable and plug 75
5. SME-10, with cable and plug 86
6. SMT-10G-…-M…, with cable and plug 90

Connecting cables

7. Connecting cable NEBU-M…G… 93
8. Connecting cable NEBU-M…W… 93

Mounting kits

9. Mounting kit SMBK-10 92
10. Mounting kit SMBR-10-… 92
11. Mounting kit WSM-…-SME-10 93

Mounting attachments and accessories

Page/online

13. Accessories
   a. Sensor tester SM-TEST-1 579
   b. Positioning component SMM-10 93
   c. Clip SMBK-10 93
   d. Incription label ASLR 93
   e. Safety clip NEAU 93

14. Drives
   a. Drives with C-slot dsm
   b. Drives with T-slot drives
   c. Round cylinder dsm
   d. Semi-rotary drive DSM dsm
### Proximity sensors SMT/SME-10M, for C-slot

<table>
<thead>
<tr>
<th>Function</th>
<th>SMT</th>
<th>Proximity sensor, magneto-resistive</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>SME</td>
<td>Proximity sensor, magnetic reed</td>
</tr>
</tbody>
</table>

| Design   | 10M | For C-slot, insertable in slot from above |

| Switching output, switching element function | PS | PNP, N/O contact, 3-wire |
|                                                | NS | NPN, N/O contact, 3-wire |
|                                                | ZS | N/O contact, 2-wire     |
|                                                | DS | N/O contact, 3-wire     |

| Rated operating voltage | 24V | 24 V DC |

| Cable attribute | L   | Energy chain + robot applications |
|                 | Q   |                                   |

| Cable length [m] | L   | In-line                           |
|                 | Q   | Lateral                           |

| Cable designation | –   | With inscription label holder    |
|                  | N   | Without inscription label holder |

| Connection technology | OE  | Open end                         |
|                      | M8  | Cable with plug M8x1, snap-on flange |
|                      | M8D | Cable with plug M8x1, rotatable thread |
|                      | M12 | Cable with plug M12x1, rotatable thread |
### General technical data

<table>
<thead>
<tr>
<th>Design</th>
<th>For C-slot</th>
</tr>
</thead>
<tbody>
<tr>
<td>Conforms to</td>
<td>EN 60947-5-2</td>
</tr>
<tr>
<td>Certification</td>
<td>C-Tick</td>
</tr>
<tr>
<td>CE mark (see declaration of conformity)</td>
<td>To EU EMC Directive 1)</td>
</tr>
</tbody>
</table>

Note on materials:
- Cable resistant to oil
- Cable free of halogen
- Free of copper and PTFE
- RoHS-compliant

1) For information about the applicability of the component see the manufacturer’s EC declaration of conformity at: www.festo.com

### Input signal/measuring element

<table>
<thead>
<tr>
<th>Measured variable</th>
<th>Position</th>
</tr>
</thead>
<tbody>
<tr>
<td>Measuring principle</td>
<td>Magneto-resistive</td>
</tr>
<tr>
<td>Ambient temperature</td>
<td>[°C] -20 ... +70</td>
</tr>
</tbody>
</table>

### Switching output

<table>
<thead>
<tr>
<th>Type SMT-10M</th>
<th>PS</th>
<th>NS</th>
<th>ZS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Switching output</td>
<td>PNP</td>
<td>NPN</td>
<td>Non-contacting, 2-wire</td>
</tr>
<tr>
<td>Switching element function</td>
<td>N/O contact</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Repetition accuracy of switching output in ± mm</td>
<td>0.1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Switch-on time</td>
<td>[ms] 0 ... 1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Switch-off time</td>
<td>[ms] 0 ... 1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Max. switching frequency</td>
<td>[Hz] 150</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Max. output current</td>
<td>[mA] 100</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Max. output current in mounting kits</td>
<td>[mA] 50</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Max. switching capacity DC</td>
<td>[W] 3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Max. switching capacity DC in mounting kits</td>
<td>[W] 1.5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Voltage drop</td>
<td>[V] 0 ... 1.7</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Output, additional data

| Protection against short circuit | Pulsed |
| Protection against overloading | Yes |

### Electronic components

| Rated operating voltage | [V DC] 24 |
| Operating voltage range | [V DC] 10 ... 30 |
| Reverse polarity protection | For all electrical connections |
## Proximity sensors SMT-10M, for C-slot

### Technical data – Magneto-resistive

#### Electromechanical components

<table>
<thead>
<tr>
<th>Type</th>
<th>PS/NS</th>
<th>ZS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Electrical connection</td>
<td>OE</td>
<td>M8D</td>
</tr>
<tr>
<td>Cable, 3-wire</td>
<td>M8x1</td>
<td>M8x1</td>
</tr>
<tr>
<td>Electrode connection</td>
<td>OE</td>
<td>M8D</td>
</tr>
<tr>
<td>2-wire</td>
<td>M8x1</td>
<td>M8x1</td>
</tr>
</tbody>
</table>

#### Electrical connection

- **Cable test conditions**
  - Energy chain: 5 million cycles, bending radius 28 mm
  - Torsional strength: > 300,000 cycles, ±270°/0.1 m
  - Resistance to bending: to Festo standard; test conditions on request

- **Cable length** [m] 0.2 … 30

- **Cable attribute**
  - Energy chain + robot applications

- **Cable sheath materials**
  - TPE-U(PU)

#### Mechanical components

<table>
<thead>
<tr>
<th>Type of mounting</th>
<th>Screw-clamped in slot, insertable from above</th>
</tr>
</thead>
<tbody>
<tr>
<td>Max. tightening torque [Nm]</td>
<td>0.4</td>
</tr>
<tr>
<td>Mounting position</td>
<td>Any</td>
</tr>
<tr>
<td>Housing</td>
<td>PA reinforced High-alloy stainless steel</td>
</tr>
</tbody>
</table>

#### Display/operation

- **Switching status display**
  - Yellow LED

#### Immissions/emissions

- **Ambient temperature with flexible cable installation** [°C] -20 ... +70
- **Protection class**
  - IP65
  - IP68

### Pin allocation to EN 60947-5-2

#### M8x1, 2-pin

<table>
<thead>
<tr>
<th>Pin</th>
<th>Wire colour</th>
<th>Allocation</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Brown</td>
<td>+</td>
</tr>
<tr>
<td>4</td>
<td>Black</td>
<td>Output</td>
</tr>
</tbody>
</table>

#### M8x1, 3-pin

<table>
<thead>
<tr>
<th>Pin</th>
<th>Wire colour</th>
<th>Allocation</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Brown</td>
<td>+</td>
</tr>
<tr>
<td>3</td>
<td>Blue</td>
<td>–</td>
</tr>
<tr>
<td>4</td>
<td>Black</td>
<td>Output</td>
</tr>
</tbody>
</table>

#### M12x1, 2-pin

<table>
<thead>
<tr>
<th>Pin</th>
<th>Wire colour</th>
<th>Allocation</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Brown</td>
<td>+</td>
</tr>
<tr>
<td>4</td>
<td>Black</td>
<td>Output</td>
</tr>
</tbody>
</table>

#### M12x1, 3-pin

<table>
<thead>
<tr>
<th>Pin</th>
<th>Wire colour</th>
<th>Allocation</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Brown</td>
<td>+</td>
</tr>
<tr>
<td>3</td>
<td>Blue</td>
<td>–</td>
</tr>
<tr>
<td>4</td>
<td>Black</td>
<td>Output</td>
</tr>
</tbody>
</table>
Proximity sensors SMT-10M, for C-slot

Technical data – Magneto-resistive

Dimensions

<table>
<thead>
<tr>
<th>Type</th>
<th>B1</th>
<th>D1</th>
<th>D2</th>
<th>D3</th>
<th>H1</th>
<th>L2</th>
<th>L3</th>
<th>L4</th>
<th>L5</th>
<th>L6</th>
<th>L7</th>
<th>θC</th>
</tr>
</thead>
<tbody>
<tr>
<td>SMT-10M – OE</td>
<td>2.9</td>
<td>2.15</td>
<td>–</td>
<td>–</td>
<td>4.6</td>
<td>22.9</td>
<td>20.9</td>
<td>23</td>
<td>50</td>
<td>–</td>
<td>1.5</td>
<td></td>
</tr>
<tr>
<td>SMT-10M – M8D</td>
<td>M8x1</td>
<td>8.5</td>
<td>32.7</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SMT-10M – M8</td>
<td>M8x1</td>
<td>9.6</td>
<td>41.1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SMT-10M – M12</td>
<td>M12x1</td>
<td>15</td>
<td>55.5</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

1. Yellow LED
2. SMT-10M
3. Inscription label holder
4. Connecting cable
5. Cable with open end
6. Plug M8x1, snap-on flange
7. Plug M8x1, rotatable thread
8. Plug M12x1

Download CAD data ➔ www.festo.com/en/engineering
Proximity sensors SMT-10M, for C-slot

Technical data – Magneto-resistive

Dimensions

SMT-10M-…-Q, lateral connection

<table>
<thead>
<tr>
<th>Type</th>
<th>B1</th>
<th>D1</th>
<th>D2</th>
<th>D3</th>
<th>H1</th>
<th>L2</th>
<th>L3</th>
<th>L4</th>
<th>L5</th>
<th>L6</th>
<th>L7</th>
</tr>
</thead>
<tbody>
<tr>
<td>SMT-10M-…-OE</td>
<td>2.9</td>
<td>2.15</td>
<td>–</td>
<td>–</td>
<td>20.9</td>
<td>6</td>
<td>4.6</td>
<td>23</td>
<td>50</td>
<td>–</td>
<td>1.5</td>
</tr>
<tr>
<td>SMT-10M-…-M8D</td>
<td>2.9</td>
<td>2.15</td>
<td>M8x1</td>
<td>8.5</td>
<td>–</td>
<td>32.7</td>
<td>6</td>
<td>4.6</td>
<td>23</td>
<td>50</td>
<td>–</td>
</tr>
<tr>
<td>SMT-10M-…-M8</td>
<td>2.9</td>
<td>2.15</td>
<td>M8x1</td>
<td>9.6</td>
<td>–</td>
<td>41.1</td>
<td>6</td>
<td>4.6</td>
<td>23</td>
<td>50</td>
<td>–</td>
</tr>
<tr>
<td>SMT-10M-…-M12</td>
<td>2.9</td>
<td>2.15</td>
<td>M12x1</td>
<td>15</td>
<td>–</td>
<td>55.5</td>
<td>6</td>
<td>4.6</td>
<td>23</td>
<td>50</td>
<td>–</td>
</tr>
</tbody>
</table>

Ordering data

<table>
<thead>
<tr>
<th>Switching output</th>
<th>Electrical connection</th>
<th>Cable length [m]</th>
<th>Weight [g]</th>
<th>Part No.</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>N/O contact</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PNP</td>
<td>3-wire</td>
<td>2.5</td>
<td>16.8</td>
<td>551373</td>
<td>SMT-10M-PS-24V-E-2,5-L-OE</td>
</tr>
<tr>
<td></td>
<td>–</td>
<td>–</td>
<td>6.7</td>
<td>551374</td>
<td>SMT-10M-PS-24V-E-2,5-Q-OE</td>
</tr>
<tr>
<td></td>
<td>M8x1, 3-pin</td>
<td>0.3</td>
<td>6.7</td>
<td>551375</td>
<td>SMT-10M-PS-24V-E-0,3-L-M8D</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>551376</td>
<td>SMT-10M-PS-24V-E-0,3-Q-M8D</td>
</tr>
<tr>
<td>NPN</td>
<td>3-wire</td>
<td>2.5</td>
<td>16.8</td>
<td>551377</td>
<td>SMT-10M-NS-24V-E-2,5-L-OE</td>
</tr>
<tr>
<td></td>
<td>–</td>
<td>–</td>
<td>6.7</td>
<td>551378</td>
<td>SMT-10M-NS-24V-E-2,5-Q-OE</td>
</tr>
<tr>
<td></td>
<td>M8x1, 3-pin</td>
<td>0.3</td>
<td>6.7</td>
<td>551379</td>
<td>SMT-10M-NS-24V-E-0,3-L-M8D</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>551380</td>
<td>SMT-10M-NS-24V-E-0,3-Q-M8D</td>
</tr>
<tr>
<td>Non-contacting, 2-wire</td>
<td>–</td>
<td>–</td>
<td>14.6</td>
<td>551382</td>
<td>SMT-10M-ZS-24V-E-2,5-L-OE</td>
</tr>
<tr>
<td></td>
<td>2-wire</td>
<td>2.5</td>
<td>14.6</td>
<td>551383</td>
<td>SMT-10M-ZS-24V-E-2,5-Q-OE</td>
</tr>
</tbody>
</table>
## Proximity sensors SMT-10M, for C-slot

**Modular product system – Magneto-resistive**

### Mandatory data

<table>
<thead>
<tr>
<th>Module No.</th>
<th>Function</th>
<th>Switching output</th>
<th>Rated operating voltage</th>
<th>Cable attribute</th>
<th>Cable length in m</th>
<th>Cable outlet</th>
<th>Cable designation</th>
<th>Connection technology</th>
</tr>
</thead>
<tbody>
<tr>
<td>551372</td>
<td>SMT-10M</td>
<td>PS, NS, ZS</td>
<td>24V</td>
<td>E</td>
<td>0.2 ... 30</td>
<td>L</td>
<td>Q</td>
<td>N</td>
</tr>
</tbody>
</table>

**Ordering example**

<table>
<thead>
<tr>
<th>Module No.</th>
<th>Function</th>
<th>Switching output</th>
<th>Rated operating voltage</th>
<th>Cable attribute</th>
<th>Cable length in m</th>
<th>Cable outlet</th>
<th>Cable designation</th>
<th>Connection technology</th>
</tr>
</thead>
<tbody>
<tr>
<td>551372</td>
<td>SMT-10M</td>
<td>NS</td>
<td>24V</td>
<td>E</td>
<td>3</td>
<td>L</td>
<td>N</td>
<td>M8D</td>
</tr>
</tbody>
</table>

### Ordering table

<table>
<thead>
<tr>
<th>Size</th>
<th>Module No.</th>
<th>10</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Function</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Proximity sensor for C-slot, non-contacting</td>
<td>SMT-10M</td>
</tr>
<tr>
<td></td>
<td>Switching output</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3-wire PNP N/O contact</td>
<td>PS</td>
</tr>
<tr>
<td></td>
<td>3-wire NPN N/O contact</td>
<td>NS</td>
</tr>
<tr>
<td></td>
<td>2-wire N/O contact</td>
<td>ZS</td>
</tr>
<tr>
<td></td>
<td>Rated operating voltage</td>
<td>24</td>
</tr>
<tr>
<td></td>
<td>[V DC]</td>
<td>24V</td>
</tr>
<tr>
<td></td>
<td>Cable attribute</td>
<td>Energy chain + robot applications</td>
</tr>
<tr>
<td></td>
<td>Cable length</td>
<td>0.2 ... 30</td>
</tr>
<tr>
<td></td>
<td>[m]</td>
<td>(0.2 ... 5.0 m in 0.1 m increments, 5.0 ... 30 m in 0.5 m increments)</td>
</tr>
<tr>
<td></td>
<td>Cable outlet</td>
<td>In-line</td>
</tr>
<tr>
<td></td>
<td>Lateral</td>
<td>Q</td>
</tr>
<tr>
<td></td>
<td>Cable designation</td>
<td>With inscription label holder</td>
</tr>
<tr>
<td></td>
<td>Without inscription label holder</td>
<td>N</td>
</tr>
<tr>
<td></td>
<td>Connection technology</td>
<td>Open end</td>
</tr>
<tr>
<td></td>
<td>M8, rotatable thread</td>
<td>M8D</td>
</tr>
<tr>
<td></td>
<td>M8, snap-on flange</td>
<td>M8</td>
</tr>
<tr>
<td></td>
<td>M12, rotatable thread</td>
<td>M12</td>
</tr>
</tbody>
</table>

### Transfer order code

<table>
<thead>
<tr>
<th>Module No.</th>
<th>Function</th>
<th>Switching output</th>
<th>Rated operating voltage</th>
<th>Cable attribute</th>
<th>Cable length in m</th>
<th>Cable outlet</th>
<th>Cable designation</th>
<th>Connection technology</th>
</tr>
</thead>
<tbody>
<tr>
<td>551372</td>
<td>SMT-10M</td>
<td>NS</td>
<td>24V</td>
<td>E</td>
<td>3</td>
<td>L</td>
<td>N</td>
<td>M8D</td>
</tr>
</tbody>
</table>
Proximity sensors SME-10M, for C-slot

Function

- Magnetic reed measuring principle
- Insertable in slot from above, does not protrude over the cylinder profile
- Cable clip and holder for inscription labels included in the scope of delivery

General technical data

<table>
<thead>
<tr>
<th>Design</th>
<th>For C-slot</th>
</tr>
</thead>
<tbody>
<tr>
<td>Conforms to</td>
<td>EN 60947-5-2</td>
</tr>
<tr>
<td>Certification</td>
<td>C-Tick</td>
</tr>
<tr>
<td>CE mark (see declaration of conformity)</td>
<td>To EU EMC Directive 1)</td>
</tr>
</tbody>
</table>

Note on materials

- Cable resistant to oil
- Cable free of halogen
- Free of copper and PTFE
- RoHS-compliant

1) For information about the applicability of the component see the manufacturer’s EC declaration of conformity at: www.festo.com

Input signal/measuring element

<table>
<thead>
<tr>
<th>Measured variable</th>
<th>Position</th>
</tr>
</thead>
<tbody>
<tr>
<td>Measuring principle</td>
<td>Magnetic reed</td>
</tr>
<tr>
<td>Ambient temperature [°C]</td>
<td>-40 ... +70</td>
</tr>
</tbody>
</table>

Switching output

<table>
<thead>
<tr>
<th>Type SME-10M</th>
<th>DS</th>
<th>ZS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Switching output</td>
<td>Contacting, bipolar</td>
<td></td>
</tr>
<tr>
<td>Switching element function</td>
<td>N/O contact</td>
<td></td>
</tr>
<tr>
<td>Repetition accuracy of switching output in ± mm</td>
<td>0.1</td>
<td></td>
</tr>
<tr>
<td>Switch-on time [ms]</td>
<td>0 ... 1.2</td>
<td></td>
</tr>
<tr>
<td>Switch-off time [ms]</td>
<td>0 ... 1</td>
<td></td>
</tr>
<tr>
<td>Max. switching frequency [Hz]</td>
<td>50</td>
<td></td>
</tr>
<tr>
<td>Max. output current [mA]</td>
<td>300</td>
<td></td>
</tr>
<tr>
<td>Max. output current in mounting kits [mA]</td>
<td>50</td>
<td></td>
</tr>
<tr>
<td>Max. switching capacity AC [VA]</td>
<td>9</td>
<td></td>
</tr>
<tr>
<td>Max. switching capacity AC in mounting kits [VA]</td>
<td>1.5</td>
<td></td>
</tr>
<tr>
<td>Max. switching capacity DC [W]</td>
<td>9</td>
<td></td>
</tr>
<tr>
<td>Max. switching capacity DC in mounting kits [W]</td>
<td>1.5</td>
<td></td>
</tr>
<tr>
<td>Voltage drop [V]</td>
<td>0 ... 0.5</td>
<td>0 ... 4.5</td>
</tr>
</tbody>
</table>

Output, additional data

| Protection against short circuit | No |
| Protection against overloading | No |
**Proximity sensors SME-10M, for C-slot**

**Technical data – Magnetic reed**

**Electronic components**

<table>
<thead>
<tr>
<th>Feature</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rated operating voltage [V DC]</td>
<td>24</td>
</tr>
<tr>
<td>Operating voltage range AC [V]</td>
<td>5 ... 30</td>
</tr>
<tr>
<td>Operating voltage range DC [V]</td>
<td>5 ... 30</td>
</tr>
<tr>
<td>Reverse polarity protection</td>
<td>No</td>
</tr>
</tbody>
</table>

**Electromechanical components**

<table>
<thead>
<tr>
<th>Type</th>
<th>DS</th>
<th>M8D</th>
<th>M8</th>
<th>M12</th>
<th>OE</th>
<th>M8D</th>
<th>M8</th>
<th>M12</th>
</tr>
</thead>
<tbody>
<tr>
<td>Electrical connection</td>
<td>Cable, 3-wire</td>
<td>Cable with plug, 3-pin</td>
<td>Cable, 2-wire</td>
<td>Cable with plug, 2-pin</td>
<td>Cable, 2-wire</td>
<td>Cable with plug, 3-pin</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rotatable thread</td>
<td>M8x1</td>
<td>M8x1</td>
<td>M12x1</td>
<td>M8x1</td>
<td>M8x1</td>
<td>M12x1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Snap-on flange</td>
<td>Rotatable thread</td>
<td>Rotatable thread</td>
<td>Rotatable thread</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Connection direction</td>
<td>In-line</td>
<td>Lateral</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cable test conditions</td>
<td>Energy chain: 5 million cycles, bending radius 28 mm</td>
<td>Torsional strength: &gt; 300,000 cycles, ±270°/0.1 m</td>
<td>Resistance to bending: to Festo standard; test conditions on request</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cable length [m]</td>
<td>0.2 ... 10</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cable attribute</td>
<td>Energy chain + robot applications</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cable sheath materials</td>
<td>TPE-U(PU)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Mechanical components**

<table>
<thead>
<tr>
<th>Feature</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type of mounting</td>
<td>Screw-clamped in slot, insertable from above</td>
</tr>
<tr>
<td>Max. tightening torque</td>
<td>0.4</td>
</tr>
<tr>
<td>Mounting position</td>
<td>Any</td>
</tr>
<tr>
<td>Housing</td>
<td>PA reinforced</td>
</tr>
<tr>
<td></td>
<td>High-alloy stainless steel</td>
</tr>
</tbody>
</table>

**Display/operation**

<table>
<thead>
<tr>
<th>Feature</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Switching status display</td>
<td>Yellow LED</td>
</tr>
</tbody>
</table>

**Immissions/emissions**

<table>
<thead>
<tr>
<th>Feature</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ambient temperature with flexible cable installation [°C]</td>
<td>–20 ... +70</td>
</tr>
<tr>
<td>Protection class</td>
<td>IP65</td>
</tr>
<tr>
<td></td>
<td>IP68</td>
</tr>
</tbody>
</table>

**Pin allocation to EN 60947-5-2**

**M8x1, 2-pin**

<table>
<thead>
<tr>
<th>N/O contact</th>
<th>Pin</th>
<th>Wire colour</th>
<th>Allocation</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1</td>
<td>Brown</td>
<td>+</td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>Black</td>
<td>Output</td>
</tr>
</tbody>
</table>

**M8x1, 3-pin**

<table>
<thead>
<tr>
<th>N/O contact</th>
<th>Pin</th>
<th>Wire colour</th>
<th>Allocation</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1</td>
<td>Brown</td>
<td>+</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>Blue</td>
<td>–</td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>Black</td>
<td>Output</td>
</tr>
</tbody>
</table>

**Pin allocation to EN 60947-5-2**

**M12x1, 2-pin**

<table>
<thead>
<tr>
<th>N/O contact</th>
<th>Pin</th>
<th>Wire colour</th>
<th>Allocation</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1</td>
<td>Brown</td>
<td>+</td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>Black</td>
<td>Output</td>
</tr>
</tbody>
</table>

**M12x1, 3-pin**

<table>
<thead>
<tr>
<th>N/O contact</th>
<th>Pin</th>
<th>Wire colour</th>
<th>Allocation</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1</td>
<td>Brown</td>
<td>+</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>Blue</td>
<td>–</td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>Black</td>
<td>Output</td>
</tr>
</tbody>
</table>
### Proximity sensors SME-10M, for C-slot

**Dimensions**
SME-10M-...-L, in-line connection

<table>
<thead>
<tr>
<th>Type</th>
<th>B1</th>
<th>D1</th>
<th>D2</th>
<th>D3</th>
<th>H1</th>
<th>L2</th>
<th>L3</th>
<th>L4</th>
<th>L5</th>
<th>L6</th>
<th>L7</th>
<th>θ</th>
</tr>
</thead>
<tbody>
<tr>
<td>SME-10M-...-OE</td>
<td>3</td>
<td>2.15</td>
<td></td>
<td></td>
<td>4.6</td>
<td></td>
<td>50</td>
<td>26.6</td>
<td>24.6</td>
<td>23</td>
<td>50</td>
<td>7</td>
</tr>
<tr>
<td>SME-10M-...-M8D</td>
<td></td>
<td></td>
<td>M8x1</td>
<td>8.5</td>
<td></td>
<td></td>
<td>32.7</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1.5</td>
</tr>
<tr>
<td>SME-10M-...-M8</td>
<td></td>
<td></td>
<td>M8x1</td>
<td>9.6</td>
<td></td>
<td></td>
<td>41.1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SME-10M-...-M12</td>
<td></td>
<td></td>
<td>M12x1</td>
<td>15</td>
<td></td>
<td></td>
<td>55.5</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- Yellow LED
- SME-10M
- Inscription label holder
- Connecting cable
- Cable with open end
- Plug M8x1, snap-on flange
- Plug M8x1, rotatable thread
- Plug M12x1
- L1 Cable length
Proximity sensors SME-10M, for C-slot

Technical data – Magnetic reed

Dimensions

![Diagram of SME-10M-...-Q, lateral connection]

<table>
<thead>
<tr>
<th>Type</th>
<th>B1</th>
<th>D1</th>
<th>D2</th>
<th>D3</th>
<th>H1</th>
<th>L2</th>
<th>L3</th>
<th>L4</th>
<th>L5</th>
<th>L6</th>
<th>L7</th>
<th>Φ</th>
</tr>
</thead>
<tbody>
<tr>
<td>SME-10M-...-OE</td>
<td>3</td>
<td>2.15</td>
<td>-</td>
<td>-</td>
<td>24.6</td>
<td>50</td>
<td>6</td>
<td>4.6</td>
<td>23</td>
<td>50</td>
<td>7</td>
<td>1.5</td>
</tr>
<tr>
<td>SME-10M-...-M8D</td>
<td></td>
<td></td>
<td>M8x1</td>
<td>8.5</td>
<td>32.7</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SME-10M-...-M8</td>
<td></td>
<td></td>
<td>M8x1</td>
<td>9.6</td>
<td>41.1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SME-10M-...-M12</td>
<td></td>
<td></td>
<td>M12x1</td>
<td>15</td>
<td>55.5</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Ordering data

<table>
<thead>
<tr>
<th>Switching output</th>
<th>Electrical connection</th>
<th>Cable length [m]</th>
<th>Weight [g]</th>
<th>Part No.</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>N/O contact</td>
<td>Cable with plug, rotatable thread</td>
<td>-</td>
<td>2.5</td>
<td>16.8</td>
<td>551365 SME-10M-DS-24V-E-2.5-L-OE</td>
</tr>
<tr>
<td></td>
<td>Cable with plug, rotatable thread</td>
<td>M8x1, 3-pin</td>
<td>0.3</td>
<td>6.7</td>
<td>551366 SME-10M-DS-24V-E-2.5-Q-OE</td>
</tr>
<tr>
<td></td>
<td>Cable with plug, rotatable thread</td>
<td>2-wire</td>
<td>2.5</td>
<td>14.6</td>
<td>551367 SME-10M-DS-24V-E-2.5-L-M8D</td>
</tr>
<tr>
<td></td>
<td>Cable with plug, rotatable thread</td>
<td>2-wire</td>
<td>2.5</td>
<td>14.6</td>
<td>551368 SME-10M-DS-24V-E-2.5-Q-M8D</td>
</tr>
<tr>
<td></td>
<td>Cable with plug, rotatable thread</td>
<td>2-wire</td>
<td>2.5</td>
<td>14.6</td>
<td>551369 SME-10M-ZS-24V-E-2.5-L-OE</td>
</tr>
<tr>
<td></td>
<td>Cable with plug, rotatable thread</td>
<td>2-wire</td>
<td>2.5</td>
<td>14.6</td>
<td>551370 SME-10M-ZS-24V-E-2.5-Q-OE</td>
</tr>
<tr>
<td></td>
<td>Cable with plug, rotatable thread</td>
<td>2-wire</td>
<td>2.5</td>
<td>14.6</td>
<td>551370 SME-10M-ZS-24V-E-2.5-Q-OE</td>
</tr>
</tbody>
</table>
## Proximity sensors SME-10M, for C-slot

**Mandatory data**

<table>
<thead>
<tr>
<th>Module No.</th>
<th>Function</th>
<th>Switching output</th>
<th>Rated operating voltage</th>
<th>Cable attribute</th>
<th>Cable length in m</th>
<th>Cable outlet</th>
<th>Cable designation</th>
<th>Connection technology</th>
</tr>
</thead>
<tbody>
<tr>
<td>551364</td>
<td>SME-10M</td>
<td>DS</td>
<td>24V</td>
<td>E</td>
<td>0.2 ... 10</td>
<td>L</td>
<td>Q</td>
<td>OE</td>
</tr>
</tbody>
</table>

**Ordering example**

<table>
<thead>
<tr>
<th>Module No.</th>
<th>Function</th>
<th>Switching output</th>
<th>Rated operating voltage</th>
<th>Cable attribute</th>
<th>Cable length in m</th>
<th>Cable outlet</th>
<th>Cable designation</th>
<th>Connection technology</th>
</tr>
</thead>
<tbody>
<tr>
<td>551364</td>
<td>SME-10M</td>
<td>DS</td>
<td>24V</td>
<td>E</td>
<td>3</td>
<td>L</td>
<td>N</td>
<td>M8D</td>
</tr>
</tbody>
</table>

### Ordering table

<table>
<thead>
<tr>
<th>Size</th>
<th>Conditions</th>
<th>Code</th>
<th>Enter code</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td></td>
<td>SME-10M</td>
<td></td>
</tr>
</tbody>
</table>

**Function**
- Proximity sensor for C-slot, contacting

**Switching output**
- 3-wire N/O contact (DS)
- 2-wire N/O contact (ZS)

**Rated operating voltage**
- 24V

**Cable attribute**
- Energy chain + robot applications (E)

**Cable length**
- 0.2 ... 10 m
- (0.2 ... 5.0 m in 0.1 m increments, 5.0 ... 10 m in 0.5 m increments)

**Cable outlet**
- In-line (L)
- Lateral (Q)

**Cable designation**
- With inscription label holder (N)
- Without inscription label holder

**Connection technology**
- Open end (OE)
- M8, rotatable thread (M8D)
- M8, snap-on flange (M8)
- M12, rotatable thread (M12)

**Transfer order code**

<table>
<thead>
<tr>
<th>Module No.</th>
<th>Function</th>
<th>Switching output</th>
<th>Rated operating voltage</th>
<th>Cable attribute</th>
<th>Cable length in m</th>
<th>Cable outlet</th>
<th>Cable designation</th>
<th>Connection technology</th>
</tr>
</thead>
<tbody>
<tr>
<td>551364</td>
<td>SME-10M</td>
<td>DS</td>
<td>24V</td>
<td>E</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### Proximity sensors SME-10, for C-slot

<table>
<thead>
<tr>
<th>Type codes</th>
<th>Function</th>
<th>Design</th>
<th>Electrical connection, cable length, connection direction</th>
<th>Switching status display</th>
<th>Rated operating voltage</th>
</tr>
</thead>
<tbody>
<tr>
<td>SME-10</td>
<td>SME</td>
<td>10</td>
<td>KL: Cable, 2.5 m, in-line</td>
<td>LED: Yellow LED</td>
<td>24 V DC</td>
</tr>
</tbody>
</table>

- **Function**: Proximity sensor, magnetic reed
- **Design**: For C-slot, insertable in slot lengthwise
- **Electrical connection, cable length, connection direction**:
  - KL: Cable, 2.5 m, in-line
  - KQ: Cable, 2.5 m, lateral
  - SL: Plug M8x1 with cable, 0.3 m, in-line
  - SQ: Plug M8x1 with cable, 0.3 m, lateral
- **Switching status display**: LED: Yellow LED
- **Rated operating voltage**: 24 V DC
### Proximity sensors SME-10, for C-slot

**Technical data – Magnetic reed**

#### Function
- NO contact, 3-wire, with cable
- N/O contact, 3-wire, with plug
- Magneto-resistive measuring principle
- Insertable in the slot lengthwise

#### General technical data

<table>
<thead>
<tr>
<th>Design</th>
<th>For C-slot</th>
</tr>
</thead>
<tbody>
<tr>
<td>Based on standard</td>
<td>EN 60947-5-2</td>
</tr>
<tr>
<td>CE mark (see declaration of conformity)</td>
<td>To EU EMC Directive</td>
</tr>
<tr>
<td>Note on materials</td>
<td>Free of copper and PTFE</td>
</tr>
</tbody>
</table>

#### Input signal/measuring element

<table>
<thead>
<tr>
<th>Measuring principle</th>
<th>Magnetic reed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ambient temperature [°C]</td>
<td>–20 … +70</td>
</tr>
</tbody>
</table>

#### Switching output

<table>
<thead>
<tr>
<th>Switching output</th>
<th>Contacting, bipolar</th>
</tr>
</thead>
<tbody>
<tr>
<td>Switching element function</td>
<td>N/O contact</td>
</tr>
<tr>
<td>Reproducibility of switching value [mm]</td>
<td>±0.1</td>
</tr>
<tr>
<td>Switch-on time [ms]</td>
<td>±0.6</td>
</tr>
<tr>
<td>Switch-off time [ms]</td>
<td>±0.05</td>
</tr>
<tr>
<td>Max. output current [mA]</td>
<td>100</td>
</tr>
<tr>
<td>Max. switching frequency [Hz]</td>
<td>500</td>
</tr>
<tr>
<td>Max. switching capacity DC [W]</td>
<td>1</td>
</tr>
<tr>
<td>Voltage drop [V]</td>
<td>0</td>
</tr>
</tbody>
</table>

#### Output, additional data

| Protection against short circuit | No |
| Protection against overloading | No |

#### Electronic components

| Operating voltage range DC [V] | 12 ... 27 |
| Operating voltage range AC [V] | 12 ... 27 |
| Reverse polarity protection | No |

#### Electromechanical components

<table>
<thead>
<tr>
<th>Type</th>
<th>SME-10-...-K-...-...</th>
<th>SME-10-...-S-...-...</th>
</tr>
</thead>
<tbody>
<tr>
<td>Electrical connection</td>
<td>Cable, 3-wire</td>
<td>Cable with plug M8x1, 3-pin</td>
</tr>
<tr>
<td>Connection direction</td>
<td>In-line, lateral</td>
<td>In-line, lateral</td>
</tr>
<tr>
<td>Cable length [m]</td>
<td>2.5</td>
<td>0.3</td>
</tr>
<tr>
<td>Information on cable sheath materials</td>
<td>PUR</td>
<td></td>
</tr>
</tbody>
</table>
### Mechanical components

<table>
<thead>
<tr>
<th>Type</th>
<th>SME-10-...-K...-...</th>
<th>SME-10-...-S...-...</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type of mounting</td>
<td>Clamped in C-slot, insertable in the slot lengthwise</td>
<td></td>
</tr>
<tr>
<td>Tightening torque</td>
<td>[Nm] 0.18</td>
<td></td>
</tr>
<tr>
<td>Information on housing materials</td>
<td>PPS, high-alloy stainless steel</td>
<td>PPS, TPE-U(PU), high-alloy stainless steel, nickel-plated brass</td>
</tr>
</tbody>
</table>

### Display/operation

| Switching status display | Yellow LED |

### Immissions/emissions

| Ambient temperature with flexible cable installation | °C -5…+70 |
| Protection class | IP65 IP67 |
| Insulation voltage | [V] 50 |
| Surge capacity | [kV] 0.8 |
| Degree of contamination | 3 |

### Pin allocation to EN 60947-5-2

<table>
<thead>
<tr>
<th>Plug, 3-pin</th>
<th>M8x1</th>
<th>Pin</th>
<th>Wire colour</th>
<th>Allocation</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 2 3 4</td>
<td>1</td>
<td>Brown</td>
<td>+</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>Blue</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>Black</td>
<td>Output</td>
<td></td>
</tr>
</tbody>
</table>

---

Proximity sensors SME-10, for C-slot

Technical data – Magnetic reed
Proximity sensors SME-10, for C-slot

Technical data – Magnetic reed

Dimensions

Cable, in-line connection

Cable, lateral connection

Download CAD data ➔ www.festo.com/en/engineering

Plug M8x1, in-line connection

Plug M8x1, lateral connection

Ordering data

Switching output

Electrical connection

Cable

Cable with plug, M8x1

Cable length [m]

Part No.

Type

In-line connection

N/O contact

Contacting

3-wire

- 2.5 173210 SME-10-KL-LED-24

bipolar

- 3-pin 0.3 173212 SME-10-SL-LED-24

Lateral connection

N/O contact

Contacting

3-wire

- 2.5 173211 SME-10-KQ-LED-24

bipolar

- 3-pin 0.3 173213 SME-10-SQ-LED-24

www.festo.com/catalogue/...
**Proximity sensors SMT-10G, for C-slot**

### Type codes

<table>
<thead>
<tr>
<th>Type codes</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>SMT-10G</td>
<td>Proximity sensor, magneto-resistive</td>
</tr>
<tr>
<td>10G</td>
<td>For C-slot, insertable in slot lengthwise</td>
</tr>
<tr>
<td>PS</td>
<td>PNP, N/O contact, 3-wire</td>
</tr>
<tr>
<td>24V</td>
<td>Rated operating voltage 24 V DC</td>
</tr>
<tr>
<td>E</td>
<td>Energy chain + robot applications</td>
</tr>
<tr>
<td>2.5Q</td>
<td>Cable, 2.5 m, lateral</td>
</tr>
<tr>
<td>0.3Q</td>
<td>Cable with plug, 0.3 m, lateral</td>
</tr>
<tr>
<td>OE</td>
<td>Open end</td>
</tr>
<tr>
<td>M8D</td>
<td>Cable with plug M8x1, rotatable thread</td>
</tr>
</tbody>
</table>

1) Only with electrical connection OE
2) Not with electrical connection OE
Proximity sensors SMT-10G, for C-slot

Technical data – Magneto-resistive

Function
• Magneto-resistive measuring principle
• Insertable in slot lengthwise
• Design ideally matched to gripper sensing

PNP, N/O contact, with cable, 3-wire

PNP, N/O contact, with plug

General technical data

<table>
<thead>
<tr>
<th>Design</th>
<th>For C-slot</th>
</tr>
</thead>
<tbody>
<tr>
<td>Based on standard</td>
<td>EN 60947-5-2</td>
</tr>
<tr>
<td>Certification</td>
<td>c UL us - Listed (OL)</td>
</tr>
<tr>
<td>CE mark (see declaration of conformity)</td>
<td>To EU EMC Directive</td>
</tr>
<tr>
<td>Note on materials</td>
<td>Free of copper and PTFE</td>
</tr>
<tr>
<td></td>
<td>RoHS-compliant</td>
</tr>
</tbody>
</table>

Input signal/measuring element

<table>
<thead>
<tr>
<th>Measuring principle</th>
<th>Magneto-resistive</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ambient temperature [°C]</td>
<td>–20 ... +70</td>
</tr>
</tbody>
</table>

Switching output

<table>
<thead>
<tr>
<th>Switching output</th>
<th>PNP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Switching element function</td>
<td>N/O contact</td>
</tr>
<tr>
<td>Max. output current [mA]</td>
<td>80</td>
</tr>
<tr>
<td>Max. switching capacity DC [W]</td>
<td>2.4</td>
</tr>
</tbody>
</table>

Output, additional data

| Protection against short circuit | Pulsed |
| Protection against overloading | Yes |

Electronic components

| Operating voltage range [V DC] | 10 … 30 |
| Reverse polarity protection | For all electrical connections |

Electromechanical components

<table>
<thead>
<tr>
<th>Type</th>
<th>SMT-10G-…-OE</th>
<th>SMT-10G-…-M8D</th>
</tr>
</thead>
<tbody>
<tr>
<td>Electrical connection</td>
<td>Cable, 3-wire</td>
<td>Cable with plug M6x1, 3-pin, rotatable thread</td>
</tr>
<tr>
<td>Connection direction</td>
<td>Lateral</td>
<td></td>
</tr>
<tr>
<td>Cable test conditions</td>
<td>Energy chain: 5 million cycles, bending radius 28 mm</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Torsional strength: &gt; 300,000 cycles, ±270°/0.1 m</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Resistance to bending: to Festo standard; test conditions on request</td>
<td></td>
</tr>
<tr>
<td>Cable length [m]</td>
<td>2.5</td>
<td>0.3</td>
</tr>
<tr>
<td>Cable properties</td>
<td>Energy chain + robot applications</td>
<td></td>
</tr>
<tr>
<td>Cable sheath material</td>
<td>Thermoplastic polyurethane elastomer</td>
<td></td>
</tr>
</tbody>
</table>

Mechanical components

| Type of mounting | Clamped in C-slot |
| Insertable in slot lengthwise |
| Housing material | Reinforced polyamide |
## Display/operation

| Switching status display | Yellow LED |

## Immissions/emissions

| Ambient temperature with flexible cable installation | °C | –5 ... +70 |
| Protection class | IP65 | IP68 |

## Pin allocation to EN 60947-5-2

### PS

#### Plug, 3-pin

<table>
<thead>
<tr>
<th>M8x1</th>
<th>Pin</th>
<th>Wire colour</th>
<th>Allocation</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td></td>
<td>Brown</td>
<td>+</td>
</tr>
<tr>
<td>3</td>
<td>Blue</td>
<td></td>
<td>–</td>
</tr>
<tr>
<td>4</td>
<td>Black</td>
<td></td>
<td>Output</td>
</tr>
</tbody>
</table>

## Dimensions

![Dimensions diagram](https://www.festo.com/en/engineering)

<table>
<thead>
<tr>
<th>D1</th>
<th>D2</th>
<th>D3</th>
<th>B1</th>
<th>B2</th>
<th>B3</th>
<th>B4</th>
<th>H1</th>
<th>H2</th>
<th>L1</th>
<th>L2</th>
<th>L3</th>
<th>L4</th>
<th>L5</th>
<th>L6</th>
<th>L7</th>
<th>L8</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.9</td>
<td></td>
<td></td>
<td>5.4</td>
<td>5</td>
<td>3.75</td>
<td>3</td>
<td>10</td>
<td>5</td>
<td>2500</td>
<td>300</td>
<td>30</td>
<td>14.4</td>
<td>23</td>
<td>50</td>
<td>2.75</td>
<td>1.5</td>
</tr>
<tr>
<td></td>
<td>M8x0.5</td>
<td>6</td>
<td></td>
<td>5</td>
<td>3.75</td>
<td>3</td>
<td>10</td>
<td>5</td>
<td>2500</td>
<td>300</td>
<td>30</td>
<td>14.4</td>
<td>23</td>
<td>50</td>
<td>2.75</td>
<td>1.5</td>
</tr>
</tbody>
</table>

## Ordering data

<table>
<thead>
<tr>
<th>Switching output</th>
<th>Electrical connection</th>
<th>Cable length</th>
<th>Part No.</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>N/O contact</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PNP</td>
<td>3-wire</td>
<td>2.5</td>
<td>547862</td>
<td>SMT-10G-PS-24V-E-2,5Q-OE</td>
</tr>
<tr>
<td></td>
<td>3-pin</td>
<td>0.3</td>
<td>547863</td>
<td>SMT-10G-PS-24V-E-0,3Q-M8D</td>
</tr>
</tbody>
</table>
Proximity sensors SMT/SME-10, for C-slot

Mounting SMBN-10
for mounting proximity sensors SME/SMT-10 on drives with T-slot

Materials:
Rail: Anodised wrought aluminium alloy
Screws: High-alloy stainless steel
Note on materials:
Free of copper and PTFE
RoHS-compliant

Ordering data
For piston Ø 125 – 320
<table>
<thead>
<tr>
<th>Part No.</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>537809</td>
<td>SMBN-10</td>
</tr>
</tbody>
</table>

Mounting kit SMBR

Material:
Polyacetal
RoHS-compliant

Dimensions and ordering data
For piston Ø

<table>
<thead>
<tr>
<th>B1</th>
<th>B2</th>
<th>B3 ±0.1</th>
<th>B4 ±0.1</th>
<th>H1</th>
<th>Part No.</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>6</td>
<td>15.6</td>
<td>9.4</td>
<td>7</td>
<td>19</td>
<td>13.5</td>
<td>173226</td>
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<tr>
<td>8</td>
<td>18.9</td>
<td>12.3</td>
<td>7</td>
<td>19</td>
<td>17.5</td>
<td>175101</td>
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<tr>
<td>10</td>
<td>20.4</td>
<td>13.7</td>
<td>7</td>
<td>19</td>
<td>19.9</td>
<td>173227</td>
</tr>
<tr>
<td>12</td>
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<td>14.3</td>
<td>7</td>
<td>19</td>
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<td>16</td>
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<td>17</td>
<td>7</td>
<td>19</td>
<td>25.7</td>
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</tr>
<tr>
<td>20</td>
<td>33.2</td>
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<td>9</td>
<td>19</td>
<td>30.4</td>
<td>175103</td>
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<td>25</td>
<td>36.5</td>
<td>22.6</td>
<td>9</td>
<td>19</td>
<td>35.6</td>
<td>175104</td>
</tr>
<tr>
<td>32</td>
<td>41.7</td>
<td>24.5</td>
<td>9</td>
<td>19</td>
<td>42.7</td>
<td>175105</td>
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<tr>
<td>40</td>
<td>47</td>
<td>26.3</td>
<td>9</td>
<td>19</td>
<td>50.7</td>
<td>175106</td>
</tr>
<tr>
<td>50</td>
<td>56.4</td>
<td>28.6</td>
<td>9</td>
<td>19</td>
<td>61.5</td>
<td>175107</td>
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<td>63</td>
<td>69.6</td>
<td>32</td>
<td>9</td>
<td>19</td>
<td>74.5</td>
<td>175108</td>
</tr>
</tbody>
</table>
Proximity sensors SMT/SME-10, for C-slot

Positioning component SMM
Insertable in slot lengthwise

Ambient temperature: –40 … +120 °C

Materials:
Housing: Anodised wrought aluminium alloy
Screws: High-alloy stainless steel
Note on materials:
RoHS-compliant

<table>
<thead>
<tr>
<th>Dimensions and ordering data</th>
<th>B1</th>
<th>D1</th>
<th>H1</th>
<th>H2</th>
<th>L1</th>
<th>Ø21</th>
<th>CRC(1)</th>
<th>Part No.</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>3.75</td>
<td>3.0</td>
<td>12.23</td>
<td>7.6</td>
<td>4.0</td>
<td>1.5</td>
<td>3</td>
<td>547942</td>
<td>SMM-10</td>
</tr>
</tbody>
</table>

1) Corrosion resistance class 4 according to Festo standard 940 070
Components subject to particularly high corrosion stress. Parts used with aggressive media, e.g. in the food or chemical industry. These applications should be supported with special tests with the media if required.

2) Packaging unit

Ordering data – Connecting cables

<table>
<thead>
<tr>
<th>Type</th>
<th>Number of wires</th>
<th>Cable length [m]</th>
<th>Part No.</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>Socket M8x1, 3-pin</td>
<td>3</td>
<td>2.5</td>
<td>541333</td>
<td>NEBU-M8G3-K-2.5-LE3</td>
</tr>
<tr>
<td>For SMT/SME-10...</td>
<td>5</td>
<td>2.5</td>
<td>541334</td>
<td>NEBU-M8G3-K-5-LE3</td>
</tr>
<tr>
<td>For SME/SME-10...</td>
<td>3</td>
<td>2.5</td>
<td>541338</td>
<td>NEBU-M8W3-K-2.5-LE3</td>
</tr>
<tr>
<td></td>
<td>5</td>
<td>2.5</td>
<td>541341</td>
<td>NEBU-M8W3-K-5-LE3</td>
</tr>
</tbody>
</table>

Ordering data – Mounting attachments

<table>
<thead>
<tr>
<th>For ø</th>
<th>Part No.</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>6</td>
<td>173205</td>
<td>WSM-6-SME-10</td>
</tr>
<tr>
<td>8</td>
<td>173206</td>
<td>WSM-8-SME-10</td>
</tr>
<tr>
<td>10</td>
<td>173207</td>
<td>WSM-10-SME-10</td>
</tr>
<tr>
<td></td>
<td>534255</td>
<td>SMBK-10</td>
</tr>
</tbody>
</table>

Ordering data – Sensor tester

<table>
<thead>
<tr>
<th>Part No.</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>158481</td>
<td>SM-TEST-1</td>
</tr>
</tbody>
</table>

Ordering data – Inscription labels, safety clips

<table>
<thead>
<tr>
<th>Size</th>
<th>Part No.</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>23x4 mm</td>
<td>541598</td>
<td>ASLR-L-423</td>
</tr>
<tr>
<td>M8</td>
<td>548067</td>
<td>NEAU-M8-GD</td>
</tr>
<tr>
<td>M12</td>
<td>548068</td>
<td>NEAU-M12-GD</td>
</tr>
</tbody>
</table>

1) Packaging unit per frame
Proximity sensors SMT/SME

Application examples

**General application examples**

- Proximity sensors are used for sensing the piston position of pneumatic drives. The signal is logically linked to the controller and used for process control.
- End-position sensing for piston position detection and consequent feedback of process events.

**Cable attributes**

The connecting cables of the proximity sensors can be configured using the modular system. You can select qualities that are suited to standard, drag chain or robot applications.

<table>
<thead>
<tr>
<th>Standard application</th>
<th>Drag chain application</th>
</tr>
</thead>
<tbody>
<tr>
<td>Standard applications are characterised by fixed cable installation or small to medium mechanical loads.</td>
<td>Above a bending radius of 75 mm, the Festo standard qualities are also suitable for drag chains.</td>
</tr>
<tr>
<td>High mechanical loads occur in the case of drag chain applications, particularly when the drag chain has small radii.</td>
<td></td>
</tr>
</tbody>
</table>
Robot application

Robot applications are characterised by high mechanical loads, which are primarily caused by torsion.

Special application

Areas at risk of explosion → www.festo.com

Extreme temperature ranges

- The range also includes sensors for device categories 1GD and 3GD.
- The sensor meets the high requirements of device category 1GD thanks to its Namur interface. The sensor must be operated with an isolation amplifier to analyse the signal. The isolation amplifier analyses the proximity sensor signal and provides the conventional binary output signal.
- Proximity sensors for device category 3GD have a normal switch output and can be connected directly to the fieldbus unit or PLC.
- Proximity sensors with the identifier “S6” in the type code are for increased temperature range and for use up to 120 °C. Some of these sensors are also suitable for a temperature range down to –40 °C.
### Special proximity sensors

<table>
<thead>
<tr>
<th>Sensors &gt; Proximity sensor for drive units</th>
<th>Proximity sensors SMT/SME</th>
</tr>
</thead>
<tbody>
<tr>
<td>Application examples</td>
<td></td>
</tr>
</tbody>
</table>

**CRSMT-8 – Corrosion-resistant**

- The sensor is suitable for the food industry and ideal for use in the food sector.
- The sensor is acid-resistant and can be used in electroplating, for example.
- The sensor demonstrates very good resistance to lubricant coolants.
- The sensor has the highest corrosion resistance class (Festo CRC4).

- Good resistance to media such as:
  - Acids, for example phosphoric acid
  - Alkalines, for example caustic soda lye
  - Disinfectants, for example sodium hypochlorite
  - Polar solvents, for example esters, ketones, alcohols
  - Brake fluids
  - Lubricant coolants
  - Water (60°C/hydrolysis)

- Limited resistance to media such as:
  - Aliphatic hydrocarbons, for example fats and oils

- No resistance to media such as:
  - Fuels
  - Aromatic hydrocarbons

**SMTSO-8E – Welding field immune**

- The SMTSO-8E series provides welding field immune proximity sensors.
- This electronic proximity sensor is designed for use in welding areas with alternating fields from 45 … 65 Hz. The switching signal is “frozen” as soon as the proximity sensor detects an alternating magnetic field. This prevents incorrect switching during welding operations.
Proximity sensors, round design
Proximity sensors, round design

Product range overview

<table>
<thead>
<tr>
<th>Measuring principle</th>
<th>Version</th>
<th>Type</th>
<th>Assembly</th>
<th>Switching element function</th>
<th>Switch output</th>
<th>Electrical connection</th>
</tr>
</thead>
<tbody>
<tr>
<td>Magneto-inductive</td>
<td>SMTO-4U</td>
<td>Via accessories</td>
<td>N/O contact</td>
<td>N/C contact</td>
<td>PNP</td>
<td>3-wire</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>NPN</td>
<td>3-wire</td>
</tr>
<tr>
<td>Magnetic reed</td>
<td>SMEO-4U</td>
<td>Via accessories</td>
<td>N/O contact</td>
<td>N/C contact</td>
<td>Contacting</td>
<td>3-wire</td>
</tr>
<tr>
<td>Operating voltage range 10 ... 30 V DC</td>
<td>CRSMEO-4</td>
<td>Corrosion resistant</td>
<td>Via accessories</td>
<td>Contacting</td>
<td>3-wire</td>
<td>–</td>
</tr>
<tr>
<td>Operating voltage range 12 ... 250 V AC/DC</td>
<td>SMEO-4U</td>
<td>Via accessories</td>
<td>N/O contact</td>
<td>N/C contact</td>
<td>Contacting</td>
<td>2-wire</td>
</tr>
</tbody>
</table>
# Proximity sensors, round design

## Product range overview

<table>
<thead>
<tr>
<th>Type</th>
<th>Connection direction</th>
<th>Switching status display</th>
<th>Free of copper and PTFE</th>
<th>Page/online</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>In-line</td>
<td>Lateral</td>
<td>via LED</td>
<td></td>
</tr>
<tr>
<td><strong>Operating voltage range 10 … 30 V DC</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SMT0-4U</td>
<td>■</td>
<td>–</td>
<td>■</td>
<td>■</td>
</tr>
<tr>
<td></td>
<td>■</td>
<td>–</td>
<td>■</td>
<td>–</td>
</tr>
<tr>
<td><strong>Operating voltage range 12 … 30 V AC/DC</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SMED-4U</td>
<td>■</td>
<td>–</td>
<td>■</td>
<td>■</td>
</tr>
<tr>
<td></td>
<td>■</td>
<td>–</td>
<td>■</td>
<td>–</td>
</tr>
<tr>
<td><strong>CRSMED-4</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Corrosion resistant</td>
<td>■</td>
<td>–</td>
<td>■</td>
<td>–</td>
</tr>
<tr>
<td><strong>Operating voltage range 12 … 250 V AC/DC</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SMED-4U</td>
<td>■</td>
<td>–</td>
<td>■</td>
<td>–</td>
</tr>
</tbody>
</table>
# Proximity sensors, round design

## Peripheral overview

### Mounting attachments and accessories

<table>
<thead>
<tr>
<th>Proximity sensors</th>
<th>Brief description</th>
<th>Page/online</th>
</tr>
</thead>
<tbody>
<tr>
<td>SMTO-4U-K</td>
<td>Magneto-inductive, with cable</td>
<td>102</td>
</tr>
<tr>
<td>SMEO-4U-K</td>
<td>Magnetic reed, with cable</td>
<td>105</td>
</tr>
<tr>
<td>SMTO-4U-S</td>
<td>Magneto-inductive, with plug M8x1</td>
<td>102</td>
</tr>
<tr>
<td>SMEO-4U-S</td>
<td>Magnetic reed, with plug M8x1</td>
<td>105</td>
</tr>
<tr>
<td>CRSMEO-4</td>
<td>Magnetic reed, corrosion resistant, with cable</td>
<td>108</td>
</tr>
</tbody>
</table>

#### Accessories

<table>
<thead>
<tr>
<th>Mounting kit</th>
<th>Description</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>NEBU-M83GD-…</td>
<td>Straight socket, M8x1, 3-pin</td>
<td>nebu</td>
</tr>
<tr>
<td>NEBU-M83WD-…</td>
<td>Angled socket, M8x1, 3-pin</td>
<td></td>
</tr>
<tr>
<td>SMBR-…</td>
<td>For round cylinders</td>
<td>110</td>
</tr>
<tr>
<td>CRSMBR-…</td>
<td>Corrosion resistant, for round cylinders</td>
<td>110</td>
</tr>
<tr>
<td>CRSMB-…</td>
<td>Corrosion resistant</td>
<td>111</td>
</tr>
<tr>
<td>SM-TEST-1</td>
<td>Sensor tester</td>
<td>579</td>
</tr>
</tbody>
</table>

#### Drives

<table>
<thead>
<tr>
<th>Drive Type</th>
<th>Diameter</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Round cylinders</td>
<td>Ø 8 ... 25 mm</td>
<td>round cylinders</td>
</tr>
<tr>
<td>Round cylinders</td>
<td>Ø 12 ... 63 mm</td>
<td>crdg</td>
</tr>
<tr>
<td>Standard cylinders</td>
<td>Ø 32 ... 125 mm</td>
<td></td>
</tr>
</tbody>
</table>

---

1.1 Sensors > Proximity sensor for drive units > Round design > Proximity sensors, round design

---

FESTO

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www.festo.com/catalogue/...
## Proximity sensors, round design

### Type codes

<table>
<thead>
<tr>
<th>Function</th>
<th>SMTO</th>
<th>4U</th>
<th>PS</th>
<th>K</th>
<th>LED</th>
<th>24</th>
</tr>
</thead>
<tbody>
<tr>
<td>SMTO</td>
<td>Proximity sensor, magneto-inductive</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SMEO</td>
<td>Proximity sensor, magnetic reed</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CRSMEO</td>
<td>Proximity sensor, magnetic reed, corrosion resistant</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Design</th>
<th>4U</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>4U</td>
<td>Round design, U-shaped housing</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Round design, straight housing</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Switch output, switching element function</th>
<th>PS</th>
<th>NS</th>
</tr>
</thead>
<tbody>
<tr>
<td>PS</td>
<td>PNP, N/O contact, 3-wire</td>
<td></td>
</tr>
<tr>
<td>NS</td>
<td>NPN, N/O contact, 3-wire</td>
<td></td>
</tr>
<tr>
<td></td>
<td>N/O contact, 2- or 3-wire</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Electrical connection, cable length</th>
<th>K</th>
<th>K5</th>
<th>S</th>
</tr>
</thead>
<tbody>
<tr>
<td>K</td>
<td>Cable, 2.5 m</td>
<td></td>
<td></td>
</tr>
<tr>
<td>K5</td>
<td>Cable, 5 m</td>
<td></td>
<td></td>
</tr>
<tr>
<td>S</td>
<td>Plug M8x1</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Switching status display</th>
<th>LED</th>
</tr>
</thead>
<tbody>
<tr>
<td>LED</td>
<td>Yellow LED</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Rated operating voltage</th>
<th>24</th>
<th>230</th>
</tr>
</thead>
<tbody>
<tr>
<td>24</td>
<td>24 V DC</td>
<td></td>
</tr>
<tr>
<td>230</td>
<td>230 V AC</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Generation</th>
<th>B</th>
</tr>
</thead>
<tbody>
<tr>
<td>B</td>
<td>B series</td>
</tr>
</tbody>
</table>
## Proximity sensors SMTO-4U, round design, magneto-inductive

### Technical data

**Function**
- e.g. PNP, N/O contact, with plug
- e.g. NPN, N/O contact, with plug

### General technical data

<table>
<thead>
<tr>
<th>Design</th>
<th>Round</th>
</tr>
</thead>
<tbody>
<tr>
<td>Certification</td>
<td>C-Tick</td>
</tr>
<tr>
<td>CE marking (see declaration of conformity)</td>
<td>To EU EMC Directive</td>
</tr>
<tr>
<td>Note on materials</td>
<td>Free of copper and PTFE</td>
</tr>
</tbody>
</table>

### Input signal/measuring element

<table>
<thead>
<tr>
<th>Measuring principle</th>
<th>Magneto-inductive</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ambient temperature [°C]</td>
<td>–25 ... +70</td>
</tr>
</tbody>
</table>

### Switching output

<table>
<thead>
<tr>
<th>Type</th>
<th>SMTO-4U-...-K</th>
<th>SMTO-4U-...-S</th>
</tr>
</thead>
<tbody>
<tr>
<td>Switching output</td>
<td>NPN</td>
<td>NPN</td>
</tr>
<tr>
<td>PNP</td>
<td>PNP</td>
<td></td>
</tr>
<tr>
<td>Switching element function</td>
<td>N/O contact</td>
<td>N/O contact</td>
</tr>
<tr>
<td>Reproducibility of switching point[1] [mm]</td>
<td>±0.1</td>
<td>±0.1</td>
</tr>
<tr>
<td>Switch-on time [ms]</td>
<td>0 ... 5</td>
<td>0 ... 5</td>
</tr>
<tr>
<td>Switch-off time [ms]</td>
<td>0 ... 5</td>
<td>0 ... 5</td>
</tr>
<tr>
<td>Max. output current [mA]</td>
<td>200</td>
<td>200</td>
</tr>
<tr>
<td>Max. contact rating DC [N]</td>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td>Voltage drop [V]</td>
<td>2</td>
<td>0 ... 2</td>
</tr>
<tr>
<td>Residual current [mA]</td>
<td>0 ... 0.01</td>
<td>0 ... 0.01</td>
</tr>
</tbody>
</table>

[1] Only applicable to drives secured against rotation.

### Output, additional data

<table>
<thead>
<tr>
<th>Protection against short circuit</th>
<th>Pulsed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Protection against overloading</td>
<td>Yes</td>
</tr>
</tbody>
</table>

### Electronic components

<table>
<thead>
<tr>
<th>Operating voltage range DC [V]</th>
<th>10 ... 30</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reverse polarity protection</td>
<td>For all electrical connections</td>
</tr>
</tbody>
</table>
Proximity sensors SMTO-4U, round design, magneto-inductive

Technical data

### Electromechanical components

<table>
<thead>
<tr>
<th>Type</th>
<th>SMTO-4U-…-K</th>
<th>SMTO-4U-…-S</th>
</tr>
</thead>
<tbody>
<tr>
<td>Electrical connection</td>
<td>Cable, 3-wire</td>
<td>Plug M8x1, 3-pin</td>
</tr>
<tr>
<td>Connection direction</td>
<td>In-line</td>
<td>-</td>
</tr>
<tr>
<td>Max. tightening torque, plug [Nm]</td>
<td>-</td>
<td>0.3</td>
</tr>
<tr>
<td>Cable length [m]</td>
<td>2.5</td>
<td>-</td>
</tr>
<tr>
<td>Cable characteristics</td>
<td>Standard</td>
<td>-</td>
</tr>
<tr>
<td>Cable sheath materials</td>
<td>PVC</td>
<td>-</td>
</tr>
</tbody>
</table>

### Mechanical components

<table>
<thead>
<tr>
<th>Type</th>
<th>SMTO-4U-…-K</th>
<th>SMTO-4U-…-S</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type of mounting</td>
<td>Via accessories</td>
<td>-</td>
</tr>
<tr>
<td>Max. tightening torque [Nm]</td>
<td>0.8</td>
<td>0.8</td>
</tr>
<tr>
<td>Product weight [g]</td>
<td>70</td>
<td>6</td>
</tr>
<tr>
<td>Housing materials</td>
<td>PET</td>
<td>PET</td>
</tr>
<tr>
<td></td>
<td>PA</td>
<td>PUR</td>
</tr>
</tbody>
</table>

### Display/operation

<table>
<thead>
<tr>
<th></th>
<th>SMTO-4U-…-K</th>
<th>SMTO-4U-…-S</th>
</tr>
</thead>
<tbody>
<tr>
<td>Switching status display</td>
<td>Yellow LED</td>
<td>-</td>
</tr>
</tbody>
</table>

### Immissions/emissions

<table>
<thead>
<tr>
<th>Type</th>
<th>SMTO-4U-…-K</th>
<th>SMTO-4U-…-S</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ambient temperature with flexible cable installation [°C]</td>
<td>−5 … +70</td>
<td>-</td>
</tr>
<tr>
<td>Protection class</td>
<td>IP67</td>
<td>-</td>
</tr>
<tr>
<td>Corrosion resistance class CRC¹</td>
<td>2</td>
<td>-</td>
</tr>
</tbody>
</table>

¹) Corrosion resistance class 2 according to Festo standard 940 070
   Components subject to moderate corrosion stress. 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.

### Dimensions

**Cable**

[Diagram of cable]

1. Connecting cable
2. Yellow LED

**Plug M8x1**

[Diagram of plug]

1. Yellow LED
2. Plug to fit connecting cable NEBU-M8
3. Installation space for angled socket

[Download CAD data → www.festo.com/en/engineering]
## Proximity sensors SMTO-4U, round design, magneto-inductive

### Technical data

#### Ordering data

<table>
<thead>
<tr>
<th>Switching output</th>
<th>Electrical connection</th>
<th>Cable length [m]</th>
<th>Part No.</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>3-wire</td>
<td>2.5</td>
<td>152836</td>
<td>SMTO-4U-PS-K-LED-24</td>
</tr>
<tr>
<td></td>
<td>3-pin</td>
<td></td>
<td>152742</td>
<td>SMTO-4U-PS-S-LED-24</td>
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<tr>
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<td>152837</td>
<td>SMTO-4U-NS-K-LED-24</td>
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<tr>
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<td>3-pin</td>
<td></td>
<td>152743</td>
<td>SMTO-4U-NS-S-LED-24</td>
</tr>
</tbody>
</table>
**Proximity sensors SME-4U, round design, magnetic reed**

**Technical data**

### Function
- Magnetic reed measuring principle

**Input signal/measuring element**
- Measuring principle: Magnetic reed
- Ambient temperature: \([-20 \ldots +60] ^\circ C\)

<table>
<thead>
<tr>
<th>Switching output</th>
<th>SME-4U-..-24</th>
<th>SME-4U-..-230</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type</td>
<td>Contacting, bipolar</td>
<td>Contacting, bipolar</td>
</tr>
<tr>
<td>Switching element function</td>
<td>N/O contact</td>
<td>N/O contact</td>
</tr>
<tr>
<td>Reproducibility of switching point</td>
<td>±0.1</td>
<td>±0.1</td>
</tr>
<tr>
<td>Switch-on time</td>
<td>0 ... 0.5 ms</td>
<td>0 ... 2 ms</td>
</tr>
<tr>
<td>Switch-off time</td>
<td>0.03 ms</td>
<td>0.05 ms</td>
</tr>
<tr>
<td>Max. switching frequency</td>
<td>500 Hz</td>
<td>500 Hz</td>
</tr>
<tr>
<td>Max. output current DC</td>
<td>500 mA</td>
<td>500 mA</td>
</tr>
<tr>
<td>Max. output current AC</td>
<td>120 mA</td>
<td>250 mA</td>
</tr>
<tr>
<td>Max. contact rating DC</td>
<td>10 W</td>
<td>10 W</td>
</tr>
<tr>
<td>Max. contact rating AC</td>
<td>10 VA</td>
<td>10 VA</td>
</tr>
<tr>
<td>Voltage drop</td>
<td>0 ... 4.5 V</td>
<td></td>
</tr>
</tbody>
</table>

1) Only applicable to drives secured against rotation.

### General technical data

<table>
<thead>
<tr>
<th>Type</th>
<th>SME-4U-..-24</th>
<th>SME-4U-..-230</th>
</tr>
</thead>
<tbody>
<tr>
<td>Design</td>
<td>Round</td>
<td>Round</td>
</tr>
<tr>
<td>Conforms to</td>
<td>-</td>
<td>EN 60947-5-2</td>
</tr>
<tr>
<td>Certification</td>
<td>C-Tick</td>
<td>C-Tick</td>
</tr>
<tr>
<td>CE marking</td>
<td>To EU EMC Directive (see declaration of conformity)</td>
<td>To EU EMC Directive (see declaration of conformity)</td>
</tr>
<tr>
<td>Note on materials</td>
<td>Free of copper and PTFE</td>
<td>Free of copper and PTFE</td>
</tr>
</tbody>
</table>

1) For information about the applicability of the component see the manufacturer’s EC declaration of conformity at: [www.festo.com](http://www.festo.com) – Support – User documentation.

If the component is subject to restrictions on usage in residential, office or commercial environments or small businesses, further measures to reduce the emitted interference may be necessary.

### Electronic components

<table>
<thead>
<tr>
<th>Type</th>
<th>SME-4U-..-24</th>
<th>SME-4U-..-230</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating voltage range DC</td>
<td>12 ... 27 V</td>
<td>12 ... 250 V</td>
</tr>
<tr>
<td>Operating voltage range AC</td>
<td>-</td>
<td>12 ... 250 V</td>
</tr>
<tr>
<td>Reverse polarity protection</td>
<td>No</td>
<td>No</td>
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</tbody>
</table>
**Proximity sensors SMEO-4U, round design, magnetic reed**

### Technical data

#### Electromechanical components

<table>
<thead>
<tr>
<th>Type</th>
<th>SMEO-4U-K-…-24</th>
<th>SMEO-4U-S-…-24</th>
<th>SMEO-4U-…-230</th>
</tr>
</thead>
<tbody>
<tr>
<td>Electrical connection</td>
<td>Cable, 3-wire</td>
<td>Plug M8x1, 3-pin</td>
<td>Cable, 2-wire</td>
</tr>
<tr>
<td>Connection direction</td>
<td>–</td>
<td>–</td>
<td>In-line</td>
</tr>
<tr>
<td>Cable length [m]</td>
<td>2.5</td>
<td>–</td>
<td>2.5</td>
</tr>
<tr>
<td></td>
<td>5</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>Cable sheath materials</td>
<td>PVC</td>
<td>–</td>
<td>PVC</td>
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</tbody>
</table>

#### Mechanical components

<table>
<thead>
<tr>
<th>Type</th>
<th>SMEO-4U-…-24</th>
<th>SMEO-4U-…-230</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type of mounting</td>
<td>Via accessories</td>
<td>–</td>
</tr>
<tr>
<td>Tightening torque  [Nm]</td>
<td>–</td>
<td>0.8</td>
</tr>
<tr>
<td>Housing materials</td>
<td>PET</td>
<td>PET</td>
</tr>
<tr>
<td></td>
<td>–</td>
<td>TPE-O</td>
</tr>
</tbody>
</table>

#### Display/operation

- **Switching status display**: Yellow LED

#### Immissions/emissions

<table>
<thead>
<tr>
<th>Type</th>
<th>SMEO-4U-K-…-24</th>
<th>SMEO-4U-S-…-24</th>
<th>SMEO-4U-…-230</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ambient temperature with flexible cable installation [°C]</td>
<td>-5 _ 60</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>Protection class</td>
<td>IP67</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>Surge capacity [kV]</td>
<td>–</td>
<td>4</td>
<td>–</td>
</tr>
<tr>
<td>Degree of contamination</td>
<td>–</td>
<td>3</td>
<td>–</td>
</tr>
</tbody>
</table>

#### Pin allocation to EN 60947-5-2

M8x1, 3-pin

<table>
<thead>
<tr>
<th>Pin</th>
<th>Wire colour</th>
<th>Allocation</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Brown</td>
<td>+</td>
</tr>
<tr>
<td>3</td>
<td>Blue</td>
<td>–</td>
</tr>
<tr>
<td>4</td>
<td>Black</td>
<td>Output</td>
</tr>
</tbody>
</table>

#### Dimensions


- SMEO-4U-K – Cable
- SMEO-4U-S – Plug M8x1

1. Connecting cable
2. Yellow LED
3. Plug to fit connecting cable NEBU-M8
4. Installation space for angled socket
## Sensors > Proximity sensor for drive units > Round design

### Proximity sensors SMEO-4U, round design, magnetic reed

#### Technical data

<table>
<thead>
<tr>
<th>Electrical connection</th>
<th>Cable length [m]</th>
<th>Switching status display</th>
<th>Product weight [g]</th>
<th>Part No.</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>N/O contact</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Operating voltage range 12 ... 27 V DC</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3-wire</td>
<td>–</td>
<td>■</td>
<td>70</td>
<td>36198</td>
<td>SMEO-4U-K-LED-24</td>
</tr>
<tr>
<td></td>
<td>2.5</td>
<td>■</td>
<td>130</td>
<td>175401</td>
<td>SMEO-4U-KS-LED-24</td>
</tr>
<tr>
<td></td>
<td>–</td>
<td>■</td>
<td>6</td>
<td>151526</td>
<td>SMEO-4U-S-LED-24-B</td>
</tr>
<tr>
<td>2-wire</td>
<td>–</td>
<td>■</td>
<td>70</td>
<td>150011</td>
<td>SMEO-4U-K-LED-230</td>
</tr>
</tbody>
</table>

Operating voltage range 12 ... 250 V AC/DC

<table>
<thead>
<tr>
<th>Electrical connection</th>
<th>Cable length [m]</th>
<th>Switching status display</th>
<th>Product weight [g]</th>
<th>Part No.</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2.5</td>
<td>■</td>
<td>70</td>
<td>150011</td>
<td>SMEO-4U-K-LED-230</td>
</tr>
</tbody>
</table>
Proximity sensors CRSMEO-4, round design, magnetic reed

Technical data

### Function
- e.g. N/O contact, 3-wire, with cable
- Corrosion-resistant
- Magnetic reed measuring principle

### General technical data

<table>
<thead>
<tr>
<th>Design</th>
<th>Round</th>
</tr>
</thead>
<tbody>
<tr>
<td>Certification</td>
<td>C-Tick</td>
</tr>
<tr>
<td>CE marking (see declaration of conformity)</td>
<td>To EU EMC Directive1)</td>
</tr>
<tr>
<td>Note on materials</td>
<td>Free of copper and PTFE</td>
</tr>
</tbody>
</table>

1) For information about the applicability of the component see the manufacturer’s EC declaration of conformity at: www.festo.com

### Input signal/measuring element

<table>
<thead>
<tr>
<th>Measuring principle</th>
<th>Magnetic reed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ambient temperature</td>
<td>[°C] -20 … +60</td>
</tr>
</tbody>
</table>

### Switching output

<table>
<thead>
<tr>
<th>Switching output</th>
<th>Contacting, bipolar</th>
</tr>
</thead>
<tbody>
<tr>
<td>Switching element function</td>
<td>N/O contact</td>
</tr>
<tr>
<td>Reproducibility of switching point [mm]</td>
<td>±0.1</td>
</tr>
<tr>
<td>Switch-on time [ms]</td>
<td>0 … 0.5</td>
</tr>
<tr>
<td>Switch-off time [ms]</td>
<td>0.03</td>
</tr>
<tr>
<td>Max. output current [mA]</td>
<td>500</td>
</tr>
<tr>
<td>Max. contact rating DC [W]</td>
<td>10</td>
</tr>
</tbody>
</table>

### Output, additional data

| Protection against short circuit | No |

### Electronic components

| Operating voltage range DC [V] | 12 … 30 |
| Reverse polarity protection   | No |

### Electromechanical components

| Electrical connection | Cable, 3-wire |
| Cable length [m]     | 2.5 |
| Cable sheath materials | TPE-O |

### Mechanical components

| Type of mounting      | Via accessories |
| Product weight [g]    | 70 |
| Housing               | PP |

### Display/operation

| Switching status display | Yellow LED |
Proximity sensors CRSMEO-4, round design, magnetic reed

Technical data

<table>
<thead>
<tr>
<th>Immissions/ emissions</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Ambient temperature with flexible cable installation</td>
<td>°C</td>
<td>-5 … +60</td>
</tr>
<tr>
<td>Protection class</td>
<td></td>
<td>IP67</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Dimensions</th>
<th></th>
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</thead>
<tbody>
<tr>
<td>Download CAD data</td>
<td><a href="http://www.festo.com/en/engineering">www.festo.com/en/engineering</a></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Ordering data</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Electrical connection</td>
<td>Cable length [m]</td>
<td>Part No.</td>
</tr>
<tr>
<td>N/O contact</td>
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<td>161775</td>
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</table>
Proximity sensors, round design

**Mounting kit SMBR**

Material:
Polyacetate

<table>
<thead>
<tr>
<th>Part No.</th>
<th>Type</th>
<th>B1</th>
<th>B2</th>
<th>B3</th>
<th>H1</th>
<th>H2</th>
<th>H3</th>
<th>Tightening torque</th>
<th>Part No.</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>19272</td>
<td>SMBR-8</td>
<td>21</td>
<td>14</td>
<td>23.5</td>
<td>16.5</td>
<td>9</td>
<td>0.5 Nm</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>19273</td>
<td>SMBR-10</td>
<td>22</td>
<td>0.5</td>
<td>14</td>
<td>26</td>
<td>18.5</td>
<td>10</td>
<td>0.5 Nm</td>
<td></td>
<td></td>
</tr>
<tr>
<td>19274</td>
<td>SMBR-12</td>
<td>22</td>
<td>4</td>
<td>11</td>
<td>28.5</td>
<td>20</td>
<td>10.2</td>
<td>0.5 Nm</td>
<td></td>
<td></td>
</tr>
<tr>
<td>19275</td>
<td>SMBR-16</td>
<td>22.5</td>
<td>4</td>
<td>11.5</td>
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<td>12.4</td>
<td>0.5 Nm</td>
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<td></td>
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<tr>
<td>19276</td>
<td>SMBR-20</td>
<td>26.5</td>
<td>5.5</td>
<td>13.5</td>
<td>35.5</td>
<td>22.5</td>
<td>14</td>
<td>0.5 Nm</td>
<td></td>
<td></td>
</tr>
<tr>
<td>19277</td>
<td>SMBR-25</td>
<td>31.5</td>
<td>7.5</td>
<td>16</td>
<td>40.5</td>
<td>25</td>
<td>16</td>
<td>0.5 Nm</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Mounting kit CRSMBR**

Material:
Polypropylene

<table>
<thead>
<tr>
<th>Part No.</th>
<th>Type</th>
<th>B1</th>
<th>B2</th>
<th>B3</th>
<th>H1</th>
<th>H2</th>
<th>H3</th>
<th>Tightening torque</th>
<th>Part No.</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>164581</td>
<td>CRSMBR-12</td>
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<td>4.1</td>
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<td>20</td>
<td>10.2</td>
<td>12.4</td>
<td>0.5 Nm</td>
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<tr>
<td>164582</td>
<td>CRSMBR-16</td>
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<td>4</td>
<td>33.2</td>
<td>22.5</td>
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<td>12.4</td>
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<td>5.6</td>
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<td>12.4</td>
<td>0.5 Nm</td>
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<td>164584</td>
<td>CRSMBR-25</td>
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<td>7.4</td>
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<td>25</td>
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<td>12.4</td>
<td>0.5 Nm</td>
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<tr>
<td>163888</td>
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<td>7.9</td>
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<td>19.7</td>
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<tr>
<td>163889</td>
<td>CRSMBR-40</td>
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<td>8.1</td>
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<td>23.8</td>
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<td>163890</td>
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<td>0.5 Nm</td>
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<tr>
<td>163891</td>
<td>CRSMBR-63</td>
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<td>8.2</td>
<td>80.8</td>
<td>45.9</td>
<td>36.2</td>
<td>12.4</td>
<td>0.5 Nm</td>
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<td></td>
</tr>
</tbody>
</table>
Proximity sensors, round design

Mounting kit CRSMB

Material:
High-alloy stainless steel

### Dimensions and ordering data

<table>
<thead>
<tr>
<th>For piston Ø</th>
<th>B1</th>
<th>H1</th>
<th>Part No.</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>32</td>
<td>29</td>
<td>17.6</td>
<td>161763</td>
<td>CRSMB-32</td>
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<tr>
<td>40</td>
<td>29</td>
<td>15.1</td>
<td>161764</td>
<td>CRSMB-40</td>
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<tr>
<td>50</td>
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<td>17.4</td>
<td>161765</td>
<td>CRSMB-50</td>
</tr>
<tr>
<td>63</td>
<td>31.1</td>
<td>18.1</td>
<td>161766</td>
<td>CRSMB-63</td>
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<td>80</td>
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<td>24.2</td>
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<td>CRSMB-80</td>
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<td>100</td>
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<td>CRSMB-100</td>
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<td>125</td>
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<td>31.1</td>
<td>185365</td>
<td>CRSMB-125</td>
</tr>
</tbody>
</table>

Sensors > Proximity sensor for drive units > Round design > Sensors

Sensors > Proximity sensor for drive units

1.1
Proximity sensors, block design
## Proximity sensors, block design

**Product range overview**

### Measuring principle

<table>
<thead>
<tr>
<th>Measuring principle</th>
<th>Version</th>
<th>Type</th>
<th>Mounting</th>
<th>Switching element function</th>
<th>Switching output</th>
<th>Electrical connection</th>
</tr>
</thead>
<tbody>
<tr>
<td>Magneto-resistive</td>
<td>Operating voltage range 10 ... 30 V DC</td>
<td>SMTO-1</td>
<td>Via accessories</td>
<td>N/O contact</td>
<td>N/C contact</td>
<td>PNP</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Welding field immune</td>
<td>SMTO-1</td>
<td>Via accessories</td>
<td>N/O contact</td>
<td>N/C contact</td>
<td>PNP</td>
</tr>
<tr>
<td>Magnetic reed</td>
<td>Operating voltage range 0 ... 30 V DC</td>
<td>SMDO-1</td>
<td>Via accessories</td>
<td>N/O contact</td>
<td>N/C contact</td>
<td>Contacting</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Operating voltage range 0 ... 250 V AC, 0 ... 200 V DC</td>
<td>SMDO-1</td>
<td>Via accessories</td>
<td>N/O contact</td>
<td>N/C contact</td>
<td>Contacting</td>
<td>2-wire</td>
</tr>
<tr>
<td></td>
<td>SMDO-1-B</td>
<td>Via accessories</td>
<td>N/O contact</td>
<td>N/C contact</td>
<td>Contacting</td>
<td>2-wire</td>
</tr>
<tr>
<td></td>
<td>SMDO-1-S6-C</td>
<td>Heat-resistant up to 120 °C</td>
<td>N/O contact</td>
<td>N/C contact</td>
<td>Contacting</td>
<td>2-wire</td>
</tr>
<tr>
<td>Magnetic</td>
<td>Pneumatic proximity sensor, operating pressure 2 ... 6 bar</td>
<td>SMPO-1</td>
<td>Via accessories</td>
<td>N/O contact</td>
<td>N/C contact</td>
<td>–</td>
</tr>
<tr>
<td>Magneto-inductive</td>
<td>Operating voltage range 10 ... 30 V DC</td>
<td>SMT-C1</td>
<td>Clamped</td>
<td>N/O contact</td>
<td>N/C contact</td>
<td>PNP</td>
</tr>
</tbody>
</table>

1) The proximity sensor has 2 wires internally. One pin of the M8 plug is unused.
2) 3/2-way valve, normally closed

---

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[www.festo.com/catalogue/]
### Proximity sensors, block design

#### Product range overview

<table>
<thead>
<tr>
<th>Type</th>
<th>Connection direction</th>
<th>Replacement without re-adjustment</th>
<th>Switching status display via LED</th>
<th>Free of copper and PTFE</th>
<th>Page/online</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>In-line</td>
<td>Lateral</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Operating voltage range 10 ... 30 V DC</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SMTO-1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SMTSO-1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Operating voltage range 0 ... 30 V DC</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SMEO-1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Operating voltage range 0 ... 250 V DC, 0 ... 200 V DC</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SMEO-1-B</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SMEO-1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SMEO-1-S6-C</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Pneumatic proximity sensor, operating pressure 2 ... 6 bar</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SMPO-1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Operating voltage range 10 ... 30 V DC</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SMT-C1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

1) Not in combination with mounting kit SMB-1 or SMBS-...
2) Switching status is indicated via a pneumatic pin
Proximity sensors, block design
Overview of peripherals
### Proximity sensors, block design

#### Overview of peripherals

<table>
<thead>
<tr>
<th>Proximity sensors</th>
<th>Brief description</th>
<th>Page/online</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.1 SMT-C1-…</td>
<td>Magneto-inductive, with cable and clamping component</td>
<td>128</td>
</tr>
<tr>
<td>1.2 SMT-C1-…</td>
<td>Magneto-inductive, with cable and plug M12x1 and clamping component</td>
<td>128</td>
</tr>
<tr>
<td>1.3 SMT-C1-…</td>
<td>Magneto-inductive, with cable and plug M12x1 and clamping component</td>
<td>128</td>
</tr>
<tr>
<td>1.4 SMTS-1-…</td>
<td>Magneto-resistive, with cable</td>
<td>119</td>
</tr>
<tr>
<td>1.5 SME-1-…</td>
<td>Magnetic reed, with cable</td>
<td>123</td>
</tr>
<tr>
<td>1.6 SMTSO-1-…</td>
<td>Magneto-resistive, with plug M12x1</td>
<td>121</td>
</tr>
<tr>
<td>1.7 SMPO-1-…</td>
<td>Pneumatic</td>
<td>126</td>
</tr>
</tbody>
</table>

#### Accessories

<table>
<thead>
<tr>
<th>Accessories</th>
<th>Brief description</th>
<th>Page/online</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.8 Connecting cable NEBU-M8G3-…</td>
<td>Straight socket, M8x1, 3-pin</td>
<td>133</td>
</tr>
<tr>
<td>1.9 Connecting cable NEBU-M8W3-…</td>
<td>Angled socket, M8x1, 3-pin</td>
<td>133</td>
</tr>
<tr>
<td>1.10 Connecting cable NEBU-M12G5-…</td>
<td>Straight socket, M12x1, 3-pin</td>
<td>133</td>
</tr>
<tr>
<td>1.11 Connecting cable NEBU-M12W5-…</td>
<td>Angled socket, M12x1, 3-pin</td>
<td>133</td>
</tr>
<tr>
<td>1.12 Mounting kit SMB-1</td>
<td></td>
<td>131</td>
</tr>
<tr>
<td>1.13 Mounting kit SMBU-1-B</td>
<td>For standard cylinders DNU</td>
<td>131</td>
</tr>
<tr>
<td>1.14 Mounting kits SMB-2-B, SMB-3-B</td>
<td>For standard cylinders DNG</td>
<td>131</td>
</tr>
<tr>
<td>1.15 Mounting kit SMBT-1</td>
<td>For standard cylinders DNG</td>
<td>132</td>
</tr>
<tr>
<td>1.16 Mounting kit SMB55-…</td>
<td>For round cylinders</td>
<td>132</td>
</tr>
<tr>
<td>1.17 Mounting kit SMBU-1-H-32</td>
<td>For standard cylinders DNU</td>
<td>132</td>
</tr>
<tr>
<td>1.18 Sensor tester SM-TEST-1</td>
<td></td>
<td>579</td>
</tr>
</tbody>
</table>

#### Drives

<table>
<thead>
<tr>
<th>Drives</th>
<th>Brief description</th>
<th>Page/online</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.19 Standard cylinder DSBF-C or CDN-…-R with sensor rail</td>
<td>∅ 32 … 100 mm</td>
<td>dsbf</td>
</tr>
<tr>
<td>1.20 Standard cylinder DNG</td>
<td>∅ 32 … 320 mm</td>
<td>dng</td>
</tr>
<tr>
<td>1.21 Flat cylinder DEH</td>
<td>∅ 32 … 63 mm</td>
<td>dzh</td>
</tr>
<tr>
<td>1.22 Semi-rotary drive DRQ</td>
<td>∅ 40 … 100 mm</td>
<td>drq</td>
</tr>
<tr>
<td>1.23 Standard cylinder DNU</td>
<td>∅ 32 … 125 mm</td>
<td>dnu</td>
</tr>
<tr>
<td>1.24 Round cylinder</td>
<td>∅ 8 … 100 mm</td>
<td>round cylinder</td>
</tr>
</tbody>
</table>
## Proximity sensors, block design

### Proximity sensor for cylinders with tie or mounting rod

<table>
<thead>
<tr>
<th>Description</th>
<th>Code</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Proximity sensor, block design, magneto-resistive</td>
<td>SMT0-1</td>
<td></td>
</tr>
<tr>
<td>Proximity sensor, block design, magneto-resistive, welding field immune</td>
<td>SMTSO-1</td>
<td></td>
</tr>
<tr>
<td>Proximity sensor, block design, magnetic reed</td>
<td>SMEO-1</td>
<td></td>
</tr>
<tr>
<td>Proximity sensor, block design, magnetic</td>
<td>SMPO-1</td>
<td></td>
</tr>
</tbody>
</table>

### Function
- **Function**: SMTO-1, SMTO-1, SMEO-1, SMPO-1
- **Type codes**: PS, K, LED, 24, C

### Switching output, switching element function
- **PS**: PNP, N/O contact, 3-wire
- **NS**: NPN, N/O contact, 3-wire

### Electrical connection, cable length
- **K**: Cable, 2.5 m
- **S**: Plug M8x1

### Switching status display
- **LED**: Yellow LED

### Rated operating voltage
- **24**: 24 V DC
- **230**: 230 V AC

### Generation
- **B**: B series
- **C**: C series

### Proximity sensor for standard cylinders DSBF-C or CDN-C with sensor strip

<table>
<thead>
<tr>
<th>Description</th>
<th>Code</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Proximity sensor, block design, magneto-inductive</td>
<td>SMT-C1</td>
<td></td>
</tr>
</tbody>
</table>

### Function
- **Function**: SMT-C1

### Switching element function, switching output
- **PS**: N/O contact, 3-wire, PNP

### Rated operating voltage
- **24**: 24 V DC

### Version
- **K**: Cable

### Cable length
- **0,3**: 0.3 m
- **5,0**: 5.0 m
- **10,0**: 10.0 m

### Electrical connection
- **OE**: Open end
- **M8D**: Cable with plug M8x1, rotatable thread
- **M12**: Cable with plug M12x1
## Proximity sensors SMTO-1, block design, magneto-resistive

### Technical data

#### Function
- e.g. PNP, N/O contact, with cable
- Magneto-resistive measuring principle

#### Design

<table>
<thead>
<tr>
<th>Constructional design</th>
<th>Block design</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type of mounting</td>
<td>Via accessories</td>
</tr>
<tr>
<td>Connection direction</td>
<td>In-line</td>
</tr>
<tr>
<td>Reproducibility of switching point</td>
<td>±0.1</td>
</tr>
<tr>
<td>Switching status display</td>
<td>Yellow LED</td>
</tr>
</tbody>
</table>

1) Only applicable to drives secured against rotation.

#### Technical data – N/O contact

<table>
<thead>
<tr>
<th>Switch output</th>
<th>PNP</th>
<th>NPN</th>
</tr>
</thead>
<tbody>
<tr>
<td>Electrical connection</td>
<td>Cable, 3-wire</td>
<td>Plug M8x1, 3-pin</td>
</tr>
<tr>
<td>Cable length [m]</td>
<td>2.5</td>
<td>-</td>
</tr>
<tr>
<td>Operating voltage range [V DC]</td>
<td>10 … 30</td>
<td></td>
</tr>
<tr>
<td>Max. switching current [mA]</td>
<td>200</td>
<td></td>
</tr>
<tr>
<td>Max. switching capacity [W]</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>Voltage drop [V]</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Residual current [mA]</td>
<td>≤0.01</td>
<td></td>
</tr>
<tr>
<td>Switch-on time [ms]</td>
<td>≤1</td>
<td></td>
</tr>
<tr>
<td>Switch-off time [ms]</td>
<td>≤1</td>
<td></td>
</tr>
</tbody>
</table>

Protection against short circuit: Yes
Protection against polarity reversal: For all electrical connections
Protection class: IP67

#### Operating and environmental conditions

<table>
<thead>
<tr>
<th>Electrical connection</th>
<th>Cable</th>
<th>Plug</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cable installation</td>
<td>Fixed</td>
<td>Flexible</td>
</tr>
<tr>
<td>Ambient temperature [°C]</td>
<td>–25 … +70</td>
<td>–5 … +70</td>
</tr>
<tr>
<td>Corrosion resistance class CRC</td>
<td>4</td>
<td>2</td>
</tr>
<tr>
<td>CE symbol (declaration of conformity)</td>
<td>In accordance with EU EMC directive</td>
<td></td>
</tr>
<tr>
<td>Certification</td>
<td>C-Tick</td>
<td></td>
</tr>
</tbody>
</table>

1) 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.
   Corrosion resistance class 4 according to Festo standard 940 070
   Components requiring higher corrosion resistance. Parts used with aggressive media, e.g. food or chemical industry. These applications should be supported with special tests with the media if required.

2) For information about the applicability of the component see the manufacturer’s EC declaration of conformity at www.festo.com ➤ Support ➤ User documentation.

#### Materials

<table>
<thead>
<tr>
<th>Housing</th>
<th>Die-cast zinc, polyester</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cable sheath</td>
<td>Polyvinyl chloride</td>
</tr>
<tr>
<td>Note on materials</td>
<td>Free of copper and PTFE</td>
</tr>
</tbody>
</table>

---

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www.festo.com/catalogue/...
**Proximity sensors SMTO-1, block design, magneto-resistive**

### Technical data

#### Product weights [g]

<table>
<thead>
<tr>
<th>Electrical connection</th>
<th>Cable</th>
<th>Plug</th>
</tr>
</thead>
<tbody>
<tr>
<td>N/O contact</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PNP</td>
<td>85</td>
<td>20</td>
</tr>
<tr>
<td>NPN</td>
<td>85</td>
<td>20</td>
</tr>
</tbody>
</table>

#### Dimensions

**Download CAD data** → www.festo.com/en/engineering

![Diagram of dimensions](image)

**Plug type M8x1**

![Diagram of plug type M8x1](image)

#### Ordering data

<table>
<thead>
<tr>
<th>Switch output</th>
<th>Electrical connection</th>
<th>Cable length [m]</th>
<th>Part No.</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>N/O contact</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PNP</td>
<td>3-wire</td>
<td>2.5</td>
<td>151683</td>
<td>SMTO-1-PS-K-LED-24-C</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>151685</td>
<td>SMTO-1-PS-S-LED-24-C</td>
</tr>
<tr>
<td>NPN</td>
<td>3-wire</td>
<td>2.5</td>
<td>151684</td>
<td>SMTO-1-NS-K-LED-24-C</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>151686</td>
<td>SMTO-1-NS-S-LED-24-C</td>
</tr>
</tbody>
</table>
Proximity sensors SMTSO-1, block design, magneto-resistive

Technical data

Function
PNP, N/O contact, with plug

- Welding field immune
- Magneto-resistive measuring principle

Design

Constructional design | Block design
Type of mounting | Via accessories
Connection direction | In-line
Reproducibility of switching point | ±0.1 [mm]
Switching status display | Yellow LED
Ready status display | Green LED

1) Only applicable to drives secured against rotation

Technical data – PNP, N/O contact

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Electrical connection</td>
<td>Plug M12 x 1, 3-pin</td>
</tr>
<tr>
<td>Operating voltage range</td>
<td>[V DC] 10 … 30</td>
</tr>
<tr>
<td>Max. switching current</td>
<td>[mA] 200</td>
</tr>
<tr>
<td>Max. switching capacity</td>
<td>[W] 6</td>
</tr>
<tr>
<td>Voltage drop</td>
<td>[V] 3</td>
</tr>
<tr>
<td>Residual current</td>
<td>[mA] 0.01</td>
</tr>
<tr>
<td>Switch-on time</td>
<td>[ms] ≤ 35</td>
</tr>
<tr>
<td>Switch-off time</td>
<td>[ms] ≤ 20</td>
</tr>
<tr>
<td>Resistance to interference from magnetic fields</td>
<td>Alternating magnetic field 50 … 60 Hz</td>
</tr>
<tr>
<td>Protection against short circuit</td>
<td>Yes</td>
</tr>
<tr>
<td>Protection against polarity reversal</td>
<td>For all electrical connections</td>
</tr>
<tr>
<td>Protection class</td>
<td>IP65/IP67</td>
</tr>
</tbody>
</table>

Operating and environmental conditions

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ambient temperature</td>
<td>[°C] –25 … +70</td>
</tr>
<tr>
<td>Corrosion resistance class CRC</td>
<td>1</td>
</tr>
<tr>
<td>CE symbol (declaration of conformity)</td>
<td>In accordance with EU EMC directive 2)</td>
</tr>
<tr>
<td>Certification</td>
<td>C-Tick</td>
</tr>
</tbody>
</table>

1) Corrosion resistance class 1 according to Festo standard 940 070

Components requiring low corrosion resistance. Transport and storage protection. Parts that do not have primarily decorative surface requirements, e.g. in internal areas that are not visible or behind covers.

2) For information about the applicability of the component see the manufacturer’s EC declaration of conformity at www.festo.com

Materials

<table>
<thead>
<tr>
<th>Material</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Housing</td>
<td>Die-cast zinc</td>
</tr>
</tbody>
</table>

Product weights [g]

<table>
<thead>
<tr>
<th>Contact</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>N/O</td>
<td>70</td>
</tr>
<tr>
<td>PNP</td>
<td>70</td>
</tr>
</tbody>
</table>

Support
User documentation.

If the component is subject to restrictions on usage in residential, office or commercial environments or small businesses, further measures to reduce the emitted interference may be necessary.
Proximity sensors SMTSO-1, block design, magneto-resistive

### Technical data

#### Dimensions
Plug type M12x1

![Diagram of M12x1 plug type with measurements]

- 1 Green LED
- 2 Yellow LED
- 3 Mounting kit
- 4 Installation space for socket

#### Ordering data

<table>
<thead>
<tr>
<th>Switch output</th>
<th>Electrical connection</th>
<th>Part No.</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>N/O contact</td>
<td>Plug M12x1, 3-pin</td>
<td>30441</td>
<td>SMTSO-1-PS-S-LED-24</td>
</tr>
</tbody>
</table>

Proximity sensors SMEO-1, block design, magnetic reed

Technical data

<table>
<thead>
<tr>
<th>Function</th>
<th>Magnetic reed measuring principle</th>
</tr>
</thead>
<tbody>
<tr>
<td>e.g. N/O contact, 3-wire, with cable</td>
<td></td>
</tr>
<tr>
<td>e.g. N/O contact, 3-wire, with plug</td>
<td></td>
</tr>
</tbody>
</table>

Technical data

<table>
<thead>
<tr>
<th>Electrical connection</th>
<th>3-wire</th>
<th>2-wire</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type</td>
<td>SMEO-1-…-24</td>
<td>SMEO-1-LED-230, SMEO-1-B, SMEO-1-S6, heat-resistant</td>
</tr>
<tr>
<td>Design</td>
<td>Block design</td>
<td>Block design</td>
</tr>
<tr>
<td>Conforms to</td>
<td>–</td>
<td>EN 60947-5-2</td>
</tr>
<tr>
<td>Certification</td>
<td>C-Tick</td>
<td>C-Tick</td>
</tr>
<tr>
<td>CE mark (see declaration of conformity)</td>
<td>–</td>
<td>To EU EMC Directive¹</td>
</tr>
<tr>
<td>Note on materials</td>
<td>Free of copper and PTFE</td>
<td>Free of copper and PTFE</td>
</tr>
</tbody>
</table>

¹ For information about the applicability of the component see the manufacturer’s EC declaration of conformity at: www.festo.com

Input signal/measuring element

<table>
<thead>
<tr>
<th>Type</th>
<th>SMEO-1</th>
<th>SMEO-1-S6, heat-resistant</th>
</tr>
</thead>
<tbody>
<tr>
<td>Measuring principle</td>
<td>Magnetic reed</td>
<td>Magnetic reed</td>
</tr>
<tr>
<td>Ambient temperature [°C]</td>
<td>–20 ... +70</td>
<td>–50 ... +120</td>
</tr>
</tbody>
</table>

Switching output

<table>
<thead>
<tr>
<th>Electrical connection</th>
<th>3-wire</th>
<th>2-wire</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type</td>
<td>SMEO-1-…-24</td>
<td>SMEO-1-LED-230, SMEO-1-B, SMEO-1-S6, heat-resistant</td>
</tr>
<tr>
<td>Switching output</td>
<td>Contacting, bipolar</td>
<td>Contacting, bipolar</td>
</tr>
<tr>
<td></td>
<td>–</td>
<td>Without LED function</td>
</tr>
<tr>
<td>Reproducibility of switching point¹ [mm]</td>
<td>±0.1</td>
<td>±0.1</td>
</tr>
<tr>
<td>Switch-on time [ms]</td>
<td>±0.5</td>
<td>±0.5</td>
</tr>
<tr>
<td>Switch-off time [ms]</td>
<td>±0.03</td>
<td>±0.03</td>
</tr>
<tr>
<td>Max. switching frequency [Hz]</td>
<td>–</td>
<td>500</td>
</tr>
<tr>
<td>Max. output current [mA]</td>
<td>1,000</td>
<td>500</td>
</tr>
<tr>
<td>Max. output current DC [mA]</td>
<td>–</td>
<td>1,000</td>
</tr>
<tr>
<td>Max. output current AC [mA]</td>
<td>–</td>
<td>1,000</td>
</tr>
<tr>
<td>Max. switching capacity DC [W]</td>
<td>27</td>
<td>40</td>
</tr>
<tr>
<td>Max. switching capacity AC [VA]</td>
<td>–</td>
<td>40</td>
</tr>
<tr>
<td>Voltage drop [V]</td>
<td>–</td>
<td>0 ... 4.5</td>
</tr>
<tr>
<td>Residual current [mA]</td>
<td>–</td>
<td>0</td>
</tr>
</tbody>
</table>

¹ Only applicable to drives secured against rotation.

Output, additional data

| Protection against short circuit | No |
| Protection against overloading  | No |

123
## Proximity sensors SMOE-1, block design, magnetic reed

### Technical data

#### Electronic components

<table>
<thead>
<tr>
<th>Electrical connection</th>
<th>3-wire</th>
<th>2-wire</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Type</strong></td>
<td>SMOE-1-...-LED-24</td>
<td>SMOE-1-5-24-B</td>
</tr>
<tr>
<td><strong>Operating voltage range DC [V]</strong></td>
<td>12 ... 27</td>
<td>0 ... 30</td>
</tr>
<tr>
<td><strong>Operating voltage range AC [V]</strong></td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td><strong>Reverse polarity protection</strong></td>
<td>No</td>
<td>No</td>
</tr>
</tbody>
</table>

#### Electromechanical components

<table>
<thead>
<tr>
<th>Electrical connection</th>
<th>3-wire</th>
<th>2-wire</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Type</strong></td>
<td>SMOE-1-LED-24</td>
<td>SMOE-1-5...-B</td>
</tr>
<tr>
<td><strong>Electrical connection</strong></td>
<td>Cable, 3-wire</td>
<td>Plug M8x1, 3-pin</td>
</tr>
<tr>
<td><strong>Connection direction</strong></td>
<td>In-line</td>
<td>–</td>
</tr>
<tr>
<td><strong>Cable length [m]</strong></td>
<td>2.5</td>
<td>–</td>
</tr>
<tr>
<td><strong>Cable sheath materials</strong></td>
<td>PVC</td>
<td>–</td>
</tr>
</tbody>
</table>

#### Mechanical components

<table>
<thead>
<tr>
<th>Electrical connection</th>
<th>3-wire</th>
<th>2-wire</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Type of mounting</strong></td>
<td>Via accessories</td>
<td>–</td>
</tr>
<tr>
<td><strong>Tightening torque [Nm]</strong></td>
<td>–</td>
<td>2.9</td>
</tr>
<tr>
<td><strong>Product weight [g]</strong></td>
<td>–</td>
<td>Die-cast zinc</td>
</tr>
<tr>
<td><strong>Housing materials</strong></td>
<td>Die-cast zinc</td>
<td>Epoxy resin</td>
</tr>
<tr>
<td></td>
<td>–</td>
<td>TPE-O</td>
</tr>
<tr>
<td></td>
<td>–</td>
<td>Steel</td>
</tr>
<tr>
<td></td>
<td>–</td>
<td>PET</td>
</tr>
<tr>
<td></td>
<td>–</td>
<td>PC</td>
</tr>
</tbody>
</table>

#### Display/operation

<table>
<thead>
<tr>
<th>Electrical connection</th>
<th>3-wire</th>
<th>2-wire</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Type</strong></td>
<td>SMOE-1-...-LED-24</td>
<td>SMOE-1-5-24-B</td>
</tr>
<tr>
<td><strong>Switching status display</strong></td>
<td>Yellow LED</td>
<td>–</td>
</tr>
</tbody>
</table>

#### Immissions/emissions

<table>
<thead>
<tr>
<th>Electrical connection</th>
<th>3-wire</th>
<th>2-wire</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Ambient temperature with flexible cable installation [°C]</strong></td>
<td>–5 ... +70</td>
<td>–</td>
</tr>
<tr>
<td><strong>Protection class</strong></td>
<td>IP67</td>
<td>IP67</td>
</tr>
<tr>
<td><strong>Surge capacity [kV]</strong></td>
<td>–</td>
<td>4</td>
</tr>
<tr>
<td><strong>Degree of contamination</strong></td>
<td>–</td>
<td>3</td>
</tr>
</tbody>
</table>

#### Pin allocation to EN 60947-5-2

<table>
<thead>
<tr>
<th>Pin</th>
<th>Wire colour</th>
<th>Allocation</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Brown</td>
<td>+</td>
</tr>
<tr>
<td>3</td>
<td>Blue</td>
<td>–</td>
</tr>
<tr>
<td>4</td>
<td>Black</td>
<td>Output</td>
</tr>
</tbody>
</table>
Proximity sensors SMEO-1, block design, magnetic reed

Technical data

Dimensions

<table>
<thead>
<tr>
<th>SMEO-1 – Cable</th>
<th>SMEO-1-S – Plug M8x1</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image1" alt="Diagram of SMEO-1 Cable" /></td>
<td><img src="image2" alt="Diagram of SMEO-1-S Plug M8x1" /></td>
</tr>
</tbody>
</table>

Ordering data

<table>
<thead>
<tr>
<th>Electrical connection</th>
<th>Cable length [m]</th>
<th>Switching status display</th>
<th>Product weight [g]</th>
<th>Part No.</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>N/O contact</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Operating voltage range 12 … 27 V DC</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3-wire</td>
<td>2.5</td>
<td>■</td>
<td>85</td>
<td>30459</td>
<td>SMEO-1-LED-24-B</td>
</tr>
<tr>
<td>5.0</td>
<td>130</td>
<td>□</td>
<td></td>
<td>151672</td>
<td>SMEO-1-LED-24-K5-B</td>
</tr>
<tr>
<td>3-pin</td>
<td>20</td>
<td>□</td>
<td></td>
<td>150848</td>
<td>SMEO-1-S-LED-24-B</td>
</tr>
<tr>
<td>Operating voltage range 0 … 30 V DC</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3-pin</td>
<td>–</td>
<td>–</td>
<td>20</td>
<td>150847</td>
<td>SMEO-1-S-24-B</td>
</tr>
<tr>
<td>Operating voltage range 0 … 250 V AC, 0 … 200 V DC</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2-wire</td>
<td>2.5</td>
<td>■</td>
<td>100</td>
<td>151671</td>
<td>SMEO-1-LED-230-B</td>
</tr>
<tr>
<td>5.0</td>
<td>130</td>
<td>■</td>
<td></td>
<td>160998</td>
<td>SMEO-1-LED-230-K5-B</td>
</tr>
<tr>
<td>2.5</td>
<td>–</td>
<td>■</td>
<td>100</td>
<td>30457</td>
<td>SMEO-1-5-B</td>
</tr>
<tr>
<td>Heat-resistant up to 120 °C</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2-wire</td>
<td>2.5</td>
<td>–</td>
<td>100</td>
<td>151673</td>
<td>SMEO-1-56-C</td>
</tr>
</tbody>
</table>

1) The proximity sensor has 2 wires internally. One pin of the M8 plug is unused.
## Proximity sensors SMPO-1, block design, pneumatic

### Technical data

<table>
<thead>
<tr>
<th><strong>Design</strong></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Constructional design</td>
<td>Block design</td>
</tr>
<tr>
<td>Type of mounting</td>
<td>Via accessories</td>
</tr>
<tr>
<td>Connection direction</td>
<td>In-line</td>
</tr>
<tr>
<td>Reproducibility of switching point [mm]</td>
<td>±0.1</td>
</tr>
<tr>
<td>Switching status display</td>
<td>Optical</td>
</tr>
</tbody>
</table>

1) Only applicable to drives secured against rotation.

<table>
<thead>
<tr>
<th><strong>Technical data</strong></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Switching element function</td>
<td>3/2-way valve, normally closed</td>
</tr>
<tr>
<td>Operating medium</td>
<td>Filtered, un lubricated compressed air</td>
</tr>
<tr>
<td>Operating pressure [bar]</td>
<td>2 ... 6</td>
</tr>
<tr>
<td>Switch-on time [ms]</td>
<td>12</td>
</tr>
<tr>
<td>Switch-off time [ms]</td>
<td>30</td>
</tr>
<tr>
<td>Pneumatic connection</td>
<td>Barbed connector for tubing, nominal diameter 3 mm</td>
</tr>
<tr>
<td>Protection class</td>
<td>IP65</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Operating and environmental conditions</strong></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Ambient temperature [°C]</td>
<td>–15 ... +60</td>
</tr>
<tr>
<td>Corrosion resistance class CRC</td>
<td>1</td>
</tr>
</tbody>
</table>

1) Corrosion resistance class 1 according to Festo standard 940 070

Components requiring low corrosion resistance. Transport and storage protection. Parts that do not have primarily decorative surface requirements, e.g. in internal areas that are not visible or behind covers.

<table>
<thead>
<tr>
<th><strong>Materials</strong></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Housing</td>
<td>Polyamide</td>
</tr>
<tr>
<td>Barbed connector</td>
<td>Brass</td>
</tr>
<tr>
<td>Note on materials</td>
<td>Free of copper and PTFE</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Product weights [g]</strong></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>PNP</td>
<td>14</td>
</tr>
</tbody>
</table>
Proximity sensors SMPO-1, block design, pneumatic

Technical data

Dimensions

Ordering data

<table>
<thead>
<tr>
<th>Pneumatic connection</th>
<th>Part No.</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>3/2-way valve, normally closed</td>
<td>31008</td>
<td>SMPO-1-H-B</td>
</tr>
<tr>
<td>Barbed connector for 3 mm I.D. tubing</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
## Proximity sensors SMT-C1, block design, magneto-inductive

### Technical data

- **Function**
  - PNP, N/O contact, with cable
  - PNP, N/O contact, with plug

- **Magneto-inductive measuring principle**

- **For standard cylinders DSBF-C or CDN-…-R with sensor strip**

#### Technical data

<table>
<thead>
<tr>
<th>Design</th>
<th>Block design</th>
</tr>
</thead>
<tbody>
<tr>
<td>Based on standard</td>
<td>EN 60947-5-2</td>
</tr>
<tr>
<td>Certification</td>
<td>C-Tick</td>
</tr>
<tr>
<td>Suitability for use in the food industry</td>
<td>As per manufacturer’s declaration</td>
</tr>
<tr>
<td>CE mark (see declaration of conformity)</td>
<td>EU EMC Directive 1)</td>
</tr>
<tr>
<td>Note on materials</td>
<td>Cable free of halogen</td>
</tr>
<tr>
<td></td>
<td>Free of copper and PTFE</td>
</tr>
</tbody>
</table>

1) For information about the applicability of the component see the manufacturer's EC declaration of conformity at: [www.festo.com](http://www.festo.com)

- **Input signal/measuring element**
  - Measuring principle: Magneto-inductive
  - Ambient temperature: [°C] –20 … +70

- **Switching output**
  - Switching output: PNP
  - Switching element function: N/O contact
  - Switch-on time: [ms] 0 … 0.5
  - Switch-off time: [ms] 0 … 0.5
  - Max. output current: [mA] 200
  - Max. switching capacity DC: [W] 6
  - Voltage drop: [V] 0 … 1.8

- **Output, additional data**
  - Protection against short circuit: Pulsed
  - Protection against overloading: Yes
## Technical data

### Proximity sensors SMT-C1, block design, magneto-inductive

#### Electronic components

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating voltage range DC</td>
<td>10 ... 30 V</td>
</tr>
<tr>
<td>Residual ripple</td>
<td>10 %</td>
</tr>
<tr>
<td>Reverse polarity protection</td>
<td>For all electrical connections</td>
</tr>
</tbody>
</table>

#### Electromechanical components

<table>
<thead>
<tr>
<th>Type</th>
<th>SMT-C1-...-OE</th>
<th>SMT-C1-...-M8D</th>
<th>SMT-C1-...-M12</th>
</tr>
</thead>
<tbody>
<tr>
<td>Electrical connection</td>
<td>Cable, 3-wire</td>
<td>Cable with plug M8x1, 3-pin, rotatable thread</td>
<td>Cable with plug M12x1, 3-pin</td>
</tr>
<tr>
<td>Connection direction</td>
<td>In-line</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cable length [m]</td>
<td>0.3</td>
<td>0.3</td>
<td>0.3</td>
</tr>
<tr>
<td>Wire ends</td>
<td>Wire end sleeve</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### Mechanical components

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type of mounting</td>
<td>Clamped</td>
</tr>
<tr>
<td>Tightening torque [Nm]</td>
<td>1.2</td>
</tr>
<tr>
<td>Mounting position</td>
<td>Any</td>
</tr>
<tr>
<td>Housing materials</td>
<td>High-alloy stainless steel, Wrought aluminium alloy, Nickel-plated brass, PP, TPE-O, TPE-U(PU), PP</td>
</tr>
</tbody>
</table>

#### Display/operation

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Switching status display</td>
<td>Yellow LED</td>
</tr>
</tbody>
</table>

#### Immissions/emissions

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ambient temperature with flexible cable installation [°C]</td>
<td>-20 ... +70</td>
</tr>
<tr>
<td>Protection class</td>
<td>To IEC 60529, IP65, IP68</td>
</tr>
</tbody>
</table>
Proximity sensors SMT-C1, block design, magneto-inductive

Technical data

Pin allocation to EN 60947-5-2

<table>
<thead>
<tr>
<th>Pin</th>
<th>Wire colour</th>
<th>Allocation</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Brown</td>
<td>+</td>
</tr>
<tr>
<td>3</td>
<td>Blue</td>
<td>–</td>
</tr>
<tr>
<td>4</td>
<td>Black</td>
<td>Output</td>
</tr>
</tbody>
</table>

M8x1, 3-pin

<table>
<thead>
<tr>
<th>Pin</th>
<th>Wire colour</th>
<th>Allocation</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Brown</td>
<td>+</td>
</tr>
<tr>
<td>3</td>
<td>Blue</td>
<td>–</td>
</tr>
<tr>
<td>4</td>
<td>Black</td>
<td>Output</td>
</tr>
</tbody>
</table>

M12x1, 3-pin

<table>
<thead>
<tr>
<th>Pin</th>
<th>Wire colour</th>
<th>Allocation</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Brown</td>
<td>+</td>
</tr>
<tr>
<td>3</td>
<td>Blue</td>
<td>–</td>
</tr>
<tr>
<td>4</td>
<td>Black</td>
<td>Output</td>
</tr>
</tbody>
</table>

Dimensions

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Ordering data

<table>
<thead>
<tr>
<th>Switching</th>
<th>Electrical connection</th>
<th>Cable length</th>
<th>Weight</th>
<th>Part No.</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>N/O contact</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PNP</td>
<td>3-wire</td>
<td>M8x1, rotatable thread</td>
<td>5</td>
<td>65.9</td>
<td>571339 SMT-C1-PS-24V-K-5,0-OE</td>
</tr>
<tr>
<td></td>
<td>3-pin</td>
<td>M12x1</td>
<td>10</td>
<td>114.5</td>
<td>571340 SMT-C1-PS-24V-K-10,0-OE</td>
</tr>
<tr>
<td></td>
<td>3-pin</td>
<td>M12x1</td>
<td>0.3</td>
<td>24.4</td>
<td>571342 SMT-C1-PS-24V-K-0,3-M12D</td>
</tr>
<tr>
<td></td>
<td></td>
<td>M12x1</td>
<td>0.3</td>
<td>32.6</td>
<td>571341 SMT-C1-PS-24V-K-0,3-M12</td>
</tr>
</tbody>
</table>
Mounting kit SMB-1

Material:
Die-cast zinc

Dimensions and ordering data

<table>
<thead>
<tr>
<th>For piston</th>
<th>B1</th>
<th>B2</th>
<th>L1</th>
<th>L2</th>
<th>Part No.</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>32 ... 100</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>11886</td>
<td>SMB-1</td>
</tr>
</tbody>
</table>

Mounting kit SMB-2-B/SMB-3-B

Material:
Die-cast aluminium

Dimensions and ordering data

<table>
<thead>
<tr>
<th>For piston</th>
<th>B1</th>
<th>B2</th>
<th>L1</th>
<th>L2</th>
<th>Part No.</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>32 ... 50</td>
<td>18</td>
<td>11</td>
<td>23</td>
<td>11.6</td>
<td>36162</td>
<td>SMB-2-B</td>
</tr>
<tr>
<td>63 ... 100</td>
<td>26.8</td>
<td>13.7</td>
<td>26</td>
<td>10.8</td>
<td>36163</td>
<td>SMB-3-B</td>
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</tbody>
</table>

Mounting kit SMBU

Material:
Die-cast aluminium

Dimensions and ordering data

<table>
<thead>
<tr>
<th>For piston</th>
<th>B1</th>
<th>B2</th>
<th>L1</th>
<th>Part No.</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>32 ... 50</td>
<td>19</td>
<td>8.5</td>
<td>30</td>
<td>36173</td>
<td>SMBU-1-B</td>
</tr>
<tr>
<td>63 ... 100</td>
<td>31</td>
<td>13.5</td>
<td>34</td>
<td>36174</td>
<td>SMBU-2-B</td>
</tr>
<tr>
<td>125</td>
<td>31</td>
<td>13.5</td>
<td>37</td>
<td>125828</td>
<td>SMBU-3-B</td>
</tr>
</tbody>
</table>

1) Free of copper and PTFE
### Mounting kit SMBU-1-H-32

**Material:**
Aluminium

**Dimensions and ordering data**

<table>
<thead>
<tr>
<th>For piston Ø</th>
<th>Part No.</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>32</td>
<td>150216</td>
<td>SMBU-1-H-32</td>
</tr>
</tbody>
</table>

### Mounting kit SMBS

**Material:**
Brass, plastic

**Dimensions and ordering data**

<table>
<thead>
<tr>
<th>For piston Ø</th>
<th>Part No.</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>8…25</td>
<td>151225</td>
<td>SMBS-1</td>
</tr>
<tr>
<td>32…100</td>
<td>151226</td>
<td>SMBS-2</td>
</tr>
</tbody>
</table>

### Mounting kit SMBT-1

**Material:**
Die-cast zinc

**Dimensions and ordering data**

<table>
<thead>
<tr>
<th>For piston Ø</th>
<th>Part No.</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>32…200</td>
<td>150002</td>
<td>SMBT-1</td>
</tr>
</tbody>
</table>
### Sensors > Proximity sensor for drive units > Block design

#### Proximity sensors, block design

**Accessories**

<table>
<thead>
<tr>
<th>Socket M8x1, 3-pin</th>
<th>Number of wires</th>
<th>Cable length [m]</th>
<th>Part No.</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>For SMT-C1 and SMTO/SMEO-1</td>
<td>3</td>
<td>2.5</td>
<td>541333</td>
<td>NEBU-M8G3-K-2.5-LE3</td>
</tr>
<tr>
<td>For SMT-C1 and SMTO/SMEO-1</td>
<td>3</td>
<td>5</td>
<td>541334</td>
<td>NEBU-M8G3-K-5-LE3</td>
</tr>
<tr>
<td>Socket M12x1, 5-pin</td>
<td>3</td>
<td>2.5</td>
<td>541363</td>
<td>NEBU-M12G5-K-2.5-LE3</td>
</tr>
<tr>
<td>For SMT-C1 and SMTO-6, SMTSO-1</td>
<td>3</td>
<td>5</td>
<td>541364</td>
<td>NEBU-M12G5-K-5-LE3</td>
</tr>
<tr>
<td>For SMT-C1 and SMTO-6, SMTSO-1</td>
<td>3</td>
<td>2.5</td>
<td>541367</td>
<td>NEBU-M12W5-K-2.5-LE3</td>
</tr>
<tr>
<td>For SMT-C1 and SMTO-6, SMTSO-1</td>
<td>3</td>
<td>5</td>
<td>541370</td>
<td>NEBU-M12W5-K-5-LE3</td>
</tr>
</tbody>
</table>

**Ordering data – Connecting cables**

**Technical data ➔ Internet: nebu**

[Internet: nebu](http://www.festo.com/catalogue/...)

---

1.1
1.1
Position transmitters SMAT-8E, for T-slot
Sensors > Position sensors >

Position transmitters SMAT-8E, for T-slot

Key features

Design

The SMAT-8E is a sturdy magnetic measuring system with a 50 mm range. It provides a standardised analogue current and voltage signal via an M8x1 plug connection, regardless of the drive used. The transmitter can thus be connected directly to the analogue input of a programmable logic controller. The piston position of the pneumatic cylinder is detected by contactless sensing and the travel distance can be measured between any set switching points with typical repeatability of 0.1 mm.

Analogue output as a function of piston position

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

Note

Sensors that detect magnetic fields, such as the position transmitter 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**

<table>
<thead>
<tr>
<th>Drive</th>
<th>Piston</th>
<th>Suitability</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Standards-based cylinders</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Standard cylinders DSNU, ESNU</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Standard cylinders DSAN, ESN</td>
<td>–</td>
<td></td>
</tr>
<tr>
<td>Standard cylinders DNCB</td>
<td>++</td>
<td></td>
</tr>
<tr>
<td>Standard cylinders DNC</td>
<td>++</td>
<td></td>
</tr>
<tr>
<td>Standard cylinders DNG</td>
<td>–</td>
<td></td>
</tr>
<tr>
<td>Standard cylinders CDN – R with sensor strip</td>
<td>–</td>
<td></td>
</tr>
<tr>
<td>Standard cylinders DNU</td>
<td>–</td>
<td></td>
</tr>
<tr>
<td>Standard cylinders ADN</td>
<td>++</td>
<td></td>
</tr>
<tr>
<td><strong>Cylinders with piston rod</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Compact cylinders ADVU, ABVU</td>
<td>++</td>
<td></td>
</tr>
<tr>
<td>Short-stroke cylinders ADVc, ASEc</td>
<td>☺ 6–25</td>
<td>–</td>
</tr>
<tr>
<td></td>
<td>☺ 32–100</td>
<td>++</td>
</tr>
<tr>
<td>Flat cylinders EZH-10/40-40-A-B</td>
<td>+</td>
<td></td>
</tr>
<tr>
<td>Flat cylinders DZF</td>
<td>☺ 12, 25, 32, 40, 63</td>
<td>+</td>
</tr>
<tr>
<td></td>
<td>☺ 18, 50</td>
<td>++</td>
</tr>
<tr>
<td>Flat cylinders DZH</td>
<td>☺ 16–25</td>
<td>+</td>
</tr>
<tr>
<td></td>
<td>☺ 32–63</td>
<td>–</td>
</tr>
<tr>
<td>Round cylinders DSNU, ESNU</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Round cylinders DSEU, ESEU</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Multimount cylinders DMM, EMM</td>
<td>+</td>
<td></td>
</tr>
<tr>
<td>Round cylinders CRDG</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Standard cylinders CRHID</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Standard cylinders CRDSNU</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Standard cylinders CRDNSG</td>
<td>–</td>
<td></td>
</tr>
<tr>
<td><strong>Rodless cylinders</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Linear drives DGC</td>
<td>–</td>
<td></td>
</tr>
<tr>
<td>Linear drives DGP, DGPL</td>
<td>–</td>
<td></td>
</tr>
<tr>
<td>Linear drives SLG</td>
<td>–</td>
<td></td>
</tr>
<tr>
<td>Linear drives DG0</td>
<td>–</td>
<td></td>
</tr>
<tr>
<td>Linear drives SLM</td>
<td>☺ 12, 40</td>
<td>++</td>
</tr>
<tr>
<td></td>
<td>☺ 16–32</td>
<td>0</td>
</tr>
<tr>
<td><strong>Semi-rotary drives</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Semi-rotary drives DSM</td>
<td>☺ 6–10</td>
<td>–</td>
</tr>
<tr>
<td>Semi-rotary drives DRQ</td>
<td>–</td>
<td></td>
</tr>
<tr>
<td>Semi-rotary drives DRQD</td>
<td>☺ 6, 8, 12, 40, 50</td>
<td>–</td>
</tr>
<tr>
<td></td>
<td>☺ 16–32</td>
<td>++</td>
</tr>
<tr>
<td><strong>Function-oriented drives</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stopper cylinders STA, STAF</td>
<td>–</td>
<td></td>
</tr>
<tr>
<td>Linear/Swivel clamps CLR</td>
<td>–</td>
<td></td>
</tr>
<tr>
<td>Swivel/linear units DSL</td>
<td>–</td>
<td></td>
</tr>
</tbody>
</table>

++ Unrestricted use
+
Sensor function guaranteed without restriction; installation direction and clamping are drive-specific
○ On request
– Not suitable

---

### Drives

<table>
<thead>
<tr>
<th>Drive</th>
<th>Piston</th>
<th>Suitability</th>
</tr>
</thead>
<tbody>
<tr>
<td>Drives with linear guide</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mini slides SLC, SLE, SLI</td>
<td>–</td>
<td></td>
</tr>
<tr>
<td>Twin-piston cylinders SPZ</td>
<td>☺ 10, 25</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>☺ 16</td>
<td>++</td>
</tr>
<tr>
<td></td>
<td>☺ 32</td>
<td>–</td>
</tr>
<tr>
<td>Guided drives DFP</td>
<td>☺ 10–16</td>
<td>–</td>
</tr>
<tr>
<td></td>
<td>☺ 25–80</td>
<td>0</td>
</tr>
<tr>
<td>Mini guided cylinders DFC</td>
<td>–</td>
<td></td>
</tr>
<tr>
<td>Guided drives DYM</td>
<td>☺ 12, 25, 30</td>
<td>++</td>
</tr>
<tr>
<td></td>
<td>☺ 16, 20, 32, 40, 63, 80</td>
<td>+</td>
</tr>
<tr>
<td></td>
<td>☺ 100</td>
<td>–</td>
</tr>
<tr>
<td>Guided drives DYM-B</td>
<td>☺ 12, 16, 25, 32</td>
<td>++</td>
</tr>
<tr>
<td></td>
<td>☺ 20</td>
<td>+</td>
</tr>
<tr>
<td></td>
<td>☺ 40, 50</td>
<td>++</td>
</tr>
<tr>
<td></td>
<td>☺ 63</td>
<td>–</td>
</tr>
<tr>
<td><strong>Linear units SLE</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Twin-piston cylinders DPZ</strong></td>
<td></td>
<td>++</td>
</tr>
<tr>
<td>Handling units</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Linear modules HMS</td>
<td>–</td>
<td></td>
</tr>
<tr>
<td>Linear modules HMLP</td>
<td>–</td>
<td></td>
</tr>
<tr>
<td>Handling modules HSP</td>
<td>–</td>
<td></td>
</tr>
<tr>
<td>Feed separators HPV</td>
<td>–</td>
<td></td>
</tr>
<tr>
<td>Three-point grippers HDG</td>
<td>–</td>
<td></td>
</tr>
<tr>
<td>Parallel grippers HG</td>
<td>–</td>
<td></td>
</tr>
<tr>
<td>Parallel grippers HGPP</td>
<td>–</td>
<td></td>
</tr>
<tr>
<td>Parallel grippers HGPT</td>
<td>–</td>
<td></td>
</tr>
<tr>
<td>Angle grippers HGW</td>
<td>–</td>
<td></td>
</tr>
<tr>
<td>Radial grippers HGRR</td>
<td>–</td>
<td></td>
</tr>
<tr>
<td>Cushioning components</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stop elements YSRWJ</td>
<td>–</td>
<td></td>
</tr>
<tr>
<td>Electrical positioning systems</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Toothed belt axes DGE-ZR</td>
<td>–</td>
<td></td>
</tr>
<tr>
<td>Spindle axes DGE-SP</td>
<td>–</td>
<td></td>
</tr>
<tr>
<td>System components</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Heavy-duty guides HD</td>
<td>–</td>
<td></td>
</tr>
<tr>
<td>Valve actuators</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Copac linear actuators DLP-A</td>
<td>–</td>
<td></td>
</tr>
</tbody>
</table>
Position transmitters SMAT-8E, for T-slot

Peripheral overview

### Accessories

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Connecting cable NEBU-M8</td>
</tr>
<tr>
<td>2</td>
<td>Standard cylinder DNCB, Standard cylinder DNC, Standard cylinder ADN, Compact cylinder ADVU, AEVU, Short-stroke cylinder ADV, AEVC, Flat cylinder EZH</td>
</tr>
</tbody>
</table>

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>Flat cylinder DZF, Flat cylinder DZH, Multimount cylinder DMM, EMM, Linear drive SLM, Semi-rotary drive DRQD, Twin-piston cylinder SP2, Guided drive DFM, DFM-B</td>
</tr>
</tbody>
</table>

1.2-V- New SMAT-8E-...-M8D
**Position transmitters SMAT-8E, for T-slot**

**Type codes**

| Type     | SMAT - Position transmitter, magnetic
| Design   | 8E - For T-slot, insertable in slot lengthwise
| Position measuring range | S50 - 48 ... 52 mm
| Analogue output | IU - 0...10 V, 0...20 mA
| Cable attribute | E - Energy chain + robot applications
| Cable length | 0,3 - 0.3 m
| Electrical connection | M8 - Plug M8, 4-pin, fixed
|            | M8D - Plug M8, 4-pin, rotatable thread

New SMAT-8E-...-M8D
## Function

### Normal operation

![Diagram of sensor](image.png)

### Technical data

#### General technical data

<table>
<thead>
<tr>
<th>Type</th>
<th>SMAT-8E-...-M8</th>
<th>SMAT-8E-...-E-0,3-M8D</th>
</tr>
</thead>
<tbody>
<tr>
<td>Design</td>
<td>For T-slot</td>
<td></td>
</tr>
<tr>
<td>Certification</td>
<td>cULus listed (OL)</td>
<td>–</td>
</tr>
<tr>
<td>CE mark (see declaration of conformity)</td>
<td>To EU EMC Directive</td>
<td></td>
</tr>
<tr>
<td>Note on materials</td>
<td>Free of copper and PTFE</td>
<td>Cable free of halogen</td>
</tr>
<tr>
<td></td>
<td>–</td>
<td>Cable resistant to oil</td>
</tr>
</tbody>
</table>

#### Input signal/measuring element

<table>
<thead>
<tr>
<th>Measuring principle</th>
<th>Magnetic</th>
</tr>
</thead>
<tbody>
<tr>
<td>Position measuring range [mm]</td>
<td>48 ... 52</td>
</tr>
<tr>
<td>Ambient temperature1) [°C]</td>
<td>–20 ... +50</td>
</tr>
</tbody>
</table>

1) Extended ambient temperature range on request.

#### Signal processing

<table>
<thead>
<tr>
<th>Typ. sampling interval [ms]</th>
<th>2.85</th>
</tr>
</thead>
<tbody>
<tr>
<td>Max. travel speed [m/s]</td>
<td>3</td>
</tr>
</tbody>
</table>

#### Output, general

<table>
<thead>
<tr>
<th>Displacement resolution [mm]</th>
<th>0.064</th>
</tr>
</thead>
</table>

#### Analogue output

<table>
<thead>
<tr>
<th>Analogue output [V]</th>
<th>0 ... 10</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sensitivity [V/mm]</td>
<td>0.152</td>
</tr>
<tr>
<td></td>
<td>[mA/mm] 0.305</td>
</tr>
<tr>
<td>Typ. linearity error [mm]</td>
<td>0.25</td>
</tr>
<tr>
<td>Repetition accuracy of analogue value2) [mm]</td>
<td>±0.064</td>
</tr>
<tr>
<td>Min. load resistance of voltage output [kΩ]</td>
<td>2</td>
</tr>
<tr>
<td>Max. load resistance of current output [Ω]</td>
<td>500</td>
</tr>
</tbody>
</table>

2) Use of a non-rotating piston rod or a mechanical structure to protect against rotation is recommended.
## Technical data

### Output, additional data

| Protection against short circuit | Yes |
| Protection against overloading  | Yes |

### Electronic components

| Operating voltage range [V DC] | 15 ... 30 |
| Idling current [mA]            | 32     |
| Reverse polarity protection    | For all electrical connections |

### Electromechanical components

<table>
<thead>
<tr>
<th>Type</th>
<th>SMAT-8E-...-M8</th>
<th>SMAT-8E-...-E-0,3-M8D</th>
</tr>
</thead>
<tbody>
<tr>
<td>Electrical connection</td>
<td>Plug M8x1, 4-pin</td>
<td></td>
</tr>
<tr>
<td>Connection direction</td>
<td>Lateral</td>
<td>In-line</td>
</tr>
<tr>
<td>Cable attribute</td>
<td>--</td>
<td>Energy chain + robot applications</td>
</tr>
</tbody>
</table>

### Mechanical components

<table>
<thead>
<tr>
<th>Type</th>
<th>SMAT-8E-...-M8</th>
<th>SMAT-8E-...-E-0,3-M8D</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mounting position</td>
<td>Any</td>
<td></td>
</tr>
<tr>
<td>Product weight [g]</td>
<td>15</td>
<td>21.4</td>
</tr>
<tr>
<td>Housing materials</td>
<td>PA-reinforced, PC</td>
<td></td>
</tr>
<tr>
<td>Cable sheath materials</td>
<td>--</td>
<td>TPE-U(PU)</td>
</tr>
</tbody>
</table>

### Display/operation

| Ready status display      | Green LED      |
| Status display            | Red LED = outside measuring range |

### Immissions/emissions

<table>
<thead>
<tr>
<th>Type</th>
<th>SMAT-8E-...-M8</th>
<th>SMAT-8E-...-E-0,3-M8D</th>
</tr>
</thead>
<tbody>
<tr>
<td>Protection class</td>
<td>IP65, IP67</td>
<td>IP65, IP68</td>
</tr>
<tr>
<td>Corrosion resistance class CRC</td>
<td>3) 2</td>
<td></td>
</tr>
</tbody>
</table>

3) Corrosion resistance class 2 according to Festo standard 940 070  
Components subject to moderate corrosion stress. 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.

### Pin allocation

**Normal operation**

```
1 Operating voltage
2 Analogue output 0 ... 20 mA
3 0 V
4 Analogue output 0 ... 10 V
```

**Wire colours**

- BN = brown
- BK = black
- BU = blue
- WH = white
New
SMAT-8E-...-M8D

Position transmitters SMAT-8E, for T-slot

Technical data

Dimensions

<table>
<thead>
<tr>
<th>Type</th>
<th>B1</th>
<th>B2</th>
<th>B3</th>
<th>B4</th>
<th>D1</th>
<th>H1</th>
<th>H2</th>
<th>H3</th>
<th>H4</th>
<th>L1</th>
<th>L2</th>
<th>L3</th>
<th>L4</th>
</tr>
</thead>
<tbody>
<tr>
<td>SMAT-8E-...-M8</td>
<td>16.8</td>
<td>6.3</td>
<td>5</td>
<td>5.5</td>
<td>M8x1</td>
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Ordering data

<table>
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<tr>
<th>Electrical connection</th>
<th>Cable length [m]</th>
<th>Part No.</th>
<th>Type</th>
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<tr>
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<td>SMAT-8E-550-IU-M8</td>
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<tr>
<td>Plug M8x1, 4-pin, rotatable thread</td>
<td>0.3</td>
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</table>
Position transmitters SMAT-8E, for T-slot

### Accessories

#### New SMAT-8E-...-M8D

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<tr>
<th>Ordering data – Connecting cables NEBU-M8</th>
<th>Technical data</th>
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<td>Electrical connection, right</td>
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<td><img src="image9.jpg" alt="Diagram" /></td>
<td><img src="image10.jpg" alt="Diagram" /></td>
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</tbody>
</table>
Application examples

Many typical applications can be found in the areas of object detection and process monitoring:

- Joining procedures
- Clamping
- Position sensing
- Detection of good/reject parts
- Positioning
- Workpiece placement
- Quality inspection
- Wear monitoring
- Thickness measuring

**Hot air riveting**

- After the rivet has been heated using hot air, the rivet head is formed by compressing it with the die.

**Ultrasonic welding**

- The joining of sections of material using ultrasonics must be defined. The position transmitter is used for contactless and wear-free detection of the feed motion of the sonotrode.

**Pressing**

- Feed or press-in depth is monitored using the position transmitter.

**Clamping**

- The position and movement of the clamping jaws is fed back via the position transmitter for process monitoring/quality inspection.
### Detection of good/reject parts

- The length or thickness of components is detected using the position transmitter and sorted into good and reject parts according to the result.

### Cutting

- The cutting depth of the blade is monitored and the blade is retracted when the required depth is reached.

### Position monitoring

- The desired belt tension is preset using the piston position of the cylinder. The position transmitter is used to monitor an area for the preset piston position. Ageing and stretching of the belt can be detected at an early stage by means of the resulting change in the piston position.

### Automatic screwdriver application

- The feed motion of the power screwdriver and, consequently, the screw-in depth is detected using the position transmitter and the screwdriver is switched off or reversed depending on the depth.
Position transmitters SMAT-8E, for T-slot
Application examples

Grinding
- The feed motion of the grinding disc is monitored using the position transmitter.

Punching
- The feed motion of the punching device is monitored using the position transmitter.
Position transmitters SMAT-8M, for T-slot
Position transmitters SMAT-8M, for T-slot

Key features

Design

General

The SMAT-8M is a position transmitter for the contactless sensing of the piston position of drives that can be detected magnetically. It supplies a displacement-proportional analogue output signal in the position measuring range. It is connected directly to the analogue PLC inputs without any accessories. With its extremely compact design, the SMAT-8M is the ideal solution for grippers, short-stroke cylinders and all applications in which installation space is restricted.

Position measuring range

The SMAT-8M supplies a displacement-proportional analogue output signal of 0 ... 10 V in the position measuring range of up to 40 mm (depending on the drive used). In other words, the output voltage increases when the piston moves in the direction of the piston rod. When the piston retracts, the output voltage drops.

The installation direction of the SMAT-8M is irrelevant in this case. To achieve the best possible function on the drive in question, the position measuring range must be initialised on the drive during installation.

As a visual aid, the green LED lights up within the position measuring range (B) and the red LED lights up outside of the measuring range (A)/(C) in normal operation.

Repetition accuracy

The repetition accuracy is ±0.025 mm on grippers and ±0.1 mm on standard drives.

With standard drives, the repetition accuracy in the centre of the measuring range is lower than at the edge. It is ±0.06 mm at a distance of ±5 mm from the centre, for example. For critical applications, it is recommended that the SMAT-8M be mounted so as to have the relevant measuring points close to 5.5 V.

Repetition accuracy as a function of position measuring range S

Note

It can be used with Festo cylinders with T-slot (profile slot 8) as well as round cylinders and tie-rod cylinders with mounting kits. A selection aid with suitable drives can be found on the following pages.
## Position transmitters SMAT-8M, for T-slot

### Selection aid

#### Drive/gripper

<table>
<thead>
<tr>
<th>Standards-based cylinders</th>
<th>Usability on drive</th>
<th>Position measuring range approx.</th>
<th>With initialisation</th>
<th>Without initialisation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Standard cylinder DSNU/ESNU-8</td>
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<tr>
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<td>Standard cylinder DSNU/ESNU-16</td>
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<td>19</td>
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<tr>
<td>Standard cylinder DSNU/ESNU-20</td>
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</tr>
<tr>
<td>Standard cylinder DSNU/ESNU-25</td>
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<tr>
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#### Cylinders with piston rod

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<tr>
<th>Drive/gripper</th>
<th>Usability on drive</th>
<th>Position measuring range approx.</th>
<th>With initialisation</th>
<th>Without initialisation</th>
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<tbody>
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<td>Flat cylinder DZF-12</td>
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#### Rodless cylinders

<table>
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<th>Function-oriented drives</th>
<th>Usability on drive</th>
<th>Position measuring range approx.</th>
<th>With initialisation</th>
<th>Without initialisation</th>
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</thead>
<tbody>
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<td>Linear drive DGC-18</td>
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<td>+ Stroke</td>
<td>Stroke</td>
<td>position measuring range</td>
</tr>
<tr>
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<td>+ Stroke</td>
<td>Stroke</td>
<td>position measuring range</td>
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<tr>
<td>Linear drive DGC-32</td>
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<td>+ Stroke</td>
<td>Stroke</td>
<td>position measuring range</td>
</tr>
<tr>
<td>Linear drive DGC-40</td>
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<td>+ Stroke</td>
<td>Stroke</td>
<td>position measuring range</td>
</tr>
<tr>
<td>Linear/swivel clamp CLR-12</td>
<td>+ Stroke</td>
<td>+ Stroke</td>
<td>Stroke</td>
<td>position measuring range</td>
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<tr>
<td>Linear/swivel clamp CLR-16</td>
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<td>+ Stroke</td>
<td>Stroke</td>
<td>position measuring range</td>
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<tr>
<td>Linear/swivel clamp CLR-20</td>
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<td>+ Stroke</td>
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<td>position measuring range</td>
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<tr>
<td>Linear/swivel clamp CLR-25</td>
<td>+ Stroke</td>
<td>+ Stroke</td>
<td>Stroke</td>
<td>position measuring range</td>
</tr>
<tr>
<td>Linear/swivel clamp CLR-32</td>
<td>+ Stroke</td>
<td>+ Stroke</td>
<td>Stroke</td>
<td>position measuring range</td>
</tr>
<tr>
<td>Linear/swivel clamp CLR-40</td>
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<td>+ Stroke</td>
<td>Stroke</td>
<td>position measuring range</td>
</tr>
<tr>
<td>Linear/swivel clamp CLR-50</td>
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<tr>
<td>Linear/swivel clamp CLR-63</td>
<td>+ Stroke</td>
<td>+ Stroke</td>
<td>Stroke</td>
<td>position measuring range</td>
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</tbody>
</table>
## Sensors > Position sensors

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

#### Selection aid

**Drives with linear guides**

<table>
<thead>
<tr>
<th>Drive/gripper</th>
<th>Usability on drive</th>
<th>Position measuring range approx.</th>
<th>With initialisation</th>
<th>Without initialisation</th>
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<td>Linear unit SLE-10</td>
<td>+</td>
<td></td>
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<td>22</td>
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<tr>
<td>Linear unit SLE-16</td>
<td>+</td>
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<tr>
<td>Linear unit SLE-20</td>
<td>+</td>
<td></td>
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<tr>
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<td>Linear unit SLE-32</td>
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<tr>
<td>Linear unit SLE-40</td>
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<tr>
<td>Linear unit SLE-50</td>
<td>+</td>
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<td>31</td>
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</table>

**Handling units**

<table>
<thead>
<tr>
<th>Drive/gripper</th>
<th>Usability on drive</th>
<th>Position measuring range approx.</th>
<th>With initialisation</th>
<th>Without initialisation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Linear module HMPL-12</td>
<td>+</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Linear module HMPL-16</td>
<td>+</td>
<td></td>
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<tr>
<td>Linear module HMPL-20</td>
<td>+</td>
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<tr>
<td>Three-point gripper DHDS-32</td>
<td>+</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Three-point gripper DHDS-50</td>
<td>+</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Parallel gripper DHPS-10</td>
<td>+</td>
<td></td>
<td></td>
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<tr>
<td>Parallel gripper DHPS-16</td>
<td>+</td>
<td></td>
<td></td>
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<tr>
<td>Parallel gripper DHPS-35</td>
<td>+</td>
<td></td>
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<tr>
<td>Parallel gripper HGPL-63</td>
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<tr>
<td>Parallel gripper HGPT-40-B</td>
<td>+</td>
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<td></td>
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<tr>
<td>Parallel gripper HGPT-50-B</td>
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<td>Parallel gripper HGPT-67-B</td>
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<td>Parallel gripper HGPT-80-B</td>
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<tr>
<td>Angle gripper DHWS-16</td>
<td>+</td>
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<td>Angle gripper DHWS-25</td>
<td>+</td>
<td></td>
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<tr>
<td>Angle gripper DHWS-32</td>
<td>+</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Angle gripper DHWS-40</td>
<td>+</td>
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<tr>
<td>Radial gripper DHRS-16</td>
<td>+</td>
<td></td>
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<td></td>
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<tr>
<td>Radial gripper DHRS-25</td>
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<td>Radial gripper DHRS-32</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Radial gripper DHRS-40</td>
<td>+</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Radial gripper HGRT-40-A-G2</td>
<td>+</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Radial gripper HGRT-50-A-G2</td>
<td>o</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

1. Different from technical data. Usability on request.
2. Position measuring range without initialisation (as supplied from the factory).

+ Unrestricted use
o On request
Position transmitters SMAT-8M, for T-slot

Peripherals overview

<table>
<thead>
<tr>
<th>Accessories</th>
<th>Page/online</th>
</tr>
</thead>
<tbody>
<tr>
<td>Connecting cable NEBU-M8G4</td>
<td>156</td>
</tr>
<tr>
<td>Connecting cable NEBU-M8W4</td>
<td>156</td>
</tr>
<tr>
<td>Inscription label ASLR</td>
<td>156</td>
</tr>
<tr>
<td>Mounting kit SMBR-8-8/100-S6, heat-resistant</td>
<td>156</td>
</tr>
<tr>
<td>Mounting kit SMBR</td>
<td>156</td>
</tr>
<tr>
<td>Mounting SMBZ-8</td>
<td>156</td>
</tr>
<tr>
<td>Connecting cable NEBU-M8G4</td>
<td>156</td>
</tr>
<tr>
<td>Three-point gripper DHDS</td>
<td>dhds</td>
</tr>
<tr>
<td>Three-point gripper HGDD</td>
<td>hgdd</td>
</tr>
<tr>
<td>Parallel gripper DHPS</td>
<td>dhpS</td>
</tr>
<tr>
<td>Parallel gripper HGPD</td>
<td>hpGd</td>
</tr>
<tr>
<td>Parallel gripper HGPT</td>
<td>hgpt</td>
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<td>Angle gripper DHWS</td>
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<td>Radial gripper DHRS</td>
<td>dhrs</td>
</tr>
<tr>
<td>Radial gripper HGRT</td>
<td>hgrt</td>
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</table>

<table>
<thead>
<tr>
<th>Accessories</th>
<th>Page/online</th>
</tr>
</thead>
<tbody>
<tr>
<td>Standard cylinder DNBC</td>
<td>dncb</td>
</tr>
<tr>
<td>Standard cylinder DNC</td>
<td>dnc</td>
</tr>
<tr>
<td>Compact cylinder ADN</td>
<td>adn</td>
</tr>
<tr>
<td>Short-stroke cylinder ADVC/AEVU</td>
<td>advc</td>
</tr>
<tr>
<td>Compact cylinder ADVU/AEVU</td>
<td>advu</td>
</tr>
<tr>
<td>Flat cylinder DZF</td>
<td>dzf</td>
</tr>
<tr>
<td>Linear drive DGC</td>
<td>dgc</td>
</tr>
<tr>
<td>Linear/swivel clamp CLR</td>
<td>clr</td>
</tr>
<tr>
<td>Guided drive DFM</td>
<td>dfm</td>
</tr>
<tr>
<td>Linear module HMPL</td>
<td>hmpl</td>
</tr>
<tr>
<td>Standard cylinder/round cylinder DSNU</td>
<td>dsnu</td>
</tr>
<tr>
<td>Linear unit SLE</td>
<td>sie</td>
</tr>
<tr>
<td>Standard cylinder DNG</td>
<td>dng</td>
</tr>
<tr>
<td>Signal converter SVE4</td>
<td>sve4</td>
</tr>
</tbody>
</table>
## Position transmitters SMAT-8M, for T-slot

### Type codes

<table>
<thead>
<tr>
<th>Type</th>
<th>SMAT</th>
<th>Position transmitter, magnetic</th>
</tr>
</thead>
<tbody>
<tr>
<td>Design</td>
<td>8</td>
<td>For T-slot</td>
</tr>
<tr>
<td>Sensor design</td>
<td>M</td>
<td>Insertable in slot, centre clamping</td>
</tr>
<tr>
<td>Switching input/output</td>
<td>U</td>
<td>0 ... 10 V</td>
</tr>
<tr>
<td>Cable characteristics</td>
<td>E</td>
<td>Suitable for energy chains/robot applications</td>
</tr>
<tr>
<td>Cable length</td>
<td>0.3</td>
<td>0.3 m</td>
</tr>
<tr>
<td>Electrical connection</td>
<td>M8D</td>
<td>M8 plug, 4-pin, rotatable thread</td>
</tr>
</tbody>
</table>

---

Sensors > Position sensors > Position transmitters SMAT-8M, for T-slot

Type codes

<table>
<thead>
<tr>
<th>Type</th>
<th>SMAT</th>
<th>8</th>
<th>M</th>
<th>U</th>
<th>E</th>
<th>0.3</th>
<th>M8D</th>
</tr>
</thead>
<tbody>
<tr>
<td>Design</td>
<td>Position transmitter, magnetic</td>
<td>For T-slot</td>
<td>Insertable in slot, centre clamping</td>
<td>Switching input/output</td>
<td>0 ... 10 V</td>
<td>Cable characteristics</td>
<td>Suitable for energy chains/robot applications</td>
</tr>
</tbody>
</table>
# Position transmitters SMAT-8M, for T-slot

## Technical data

### Function

**Normal operation**

![Diagram](image)

### General technical data

<table>
<thead>
<tr>
<th>Design</th>
<th>For T-slot</th>
</tr>
</thead>
<tbody>
<tr>
<td>Certification</td>
<td>c UL us - Listed (OL)</td>
</tr>
<tr>
<td></td>
<td>C-tick</td>
</tr>
<tr>
<td>CE marking (see declaration of conformity)</td>
<td>To EU EMC Directive <a href="#">1</a></td>
</tr>
<tr>
<td>Note on materials</td>
<td>RoHS-compliant</td>
</tr>
<tr>
<td></td>
<td>Cable, halogen-free</td>
</tr>
<tr>
<td></td>
<td>Cable, oil resistant</td>
</tr>
</tbody>
</table>

1) For information about the applicability of the component see the manufacturer’s EC declaration of conformity at: www.festo.com  ➤  Support  ➤  User documentation. If the component is subject to restrictions on usage in residential, office or commercial environments or small businesses, further measures to reduce the emitted interference may be necessary.

### Input signal/measuring element

<table>
<thead>
<tr>
<th>Measuring principle</th>
<th>Magnetic</th>
</tr>
</thead>
<tbody>
<tr>
<td>Position measuring range [mm]</td>
<td>≤ 40 [2]</td>
</tr>
</tbody>
</table>

2) Depending on drive/gripper used.

### Signal processing

| Max. speed of travel [m/s] | 3 |

### Output, general

| Displacement resolution [mm] | ≤ 0.05 [2] |
| Repetition accuracy [mm] | ≤0.1 on cylinders [3]
|                         | ≤0.025 on grippers [3] |

2) Depending on drive/gripper used.

3) Use of a non-rotating piston rod or a mechanical structure to protect against rotation is recommended.

### Analogue output

| Typical linearity error [mm] | ≤1 on cylinders [2]
|                            | ≤0.2 on grippers [2] |

2) Depending on drive/gripper used.

### Electrical outputs

| Analogue output [V] | 0 ... 10 |
| Protection against short circuit | Yes |
| Protection against overloading | Yes |
| Output signal | Analogue |
### Technical data

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

**Electronics**
- **Operating voltage range** [V DC]: 15 ... 30
- **Typical scanning interval** [ms]: 2.8
- **Protection against polarity reversal**: For all electrical connections

**Electromechanics**
- **Electrical connection**: Cable with plug, M8x1, knurled ring, 4-pin
- **Ambient temperature with flexible cable installation** [°C]: –5 ... +70
- **Cable length** [m]: 0.3
- **Cable characteristics**: Energy chain + robots
- **Cable test conditions**: Energy chain: 50,000 cycles, bending radius 30 mm
  - Torsional strength: >300,000 cycles, ±270°/0.1 m
  - Resistance to bending: to Festo standard; test conditions on request
- **Information on materials for cable sheath**: TPE-U(PU)

**Mechanical components**
- **Type of mounting**: Secured with screw, insertable in the slot from above
- **Product weight** [g]: 10
- **Information on housing materials**: Reinforced PA6

**Display/operation**
- **Status display**: LED red, green

**Immissions/emissions**
- **Ambient temperature** [°C]: –25 ... +75
- **Protection class**: IP65, IP68
- **Corrosion resistance class**: CRC\textsuperscript{4)} 2

\textsuperscript{4)} Corrosion resistance class 2 as per Festo standard 940 070
- Components subject to moderate corrosion stress. 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.

#### Pin allocation

**Normal operation**
- 1 BN = brown
- 2 BK = black
- 3 BU = blue
- 4 WH = white

**Initialisation**
- 1 Operating voltage
- 2 Analogue output 0 V
- 3 0 V
- 4 Analogue output 0 ... 10 V

**Plug**
- 1

**Wire colours**
- BN = brown
- BK = black
- BU = blue
- WH = white
Position transmitters SMAT-8M, for T-slot

Technical data

### Dimensions

<table>
<thead>
<tr>
<th>1</th>
<th>Light emitting diode (LED)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>Centre of the sensor element</td>
</tr>
<tr>
<td>3</td>
<td>Clamping component</td>
</tr>
<tr>
<td>4</td>
<td>Inscription label holder</td>
</tr>
<tr>
<td>5</td>
<td>Connecting cable</td>
</tr>
<tr>
<td>6</td>
<td>M8 plug, 4-pin, knurled ring</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>B1</th>
<th>D1</th>
<th>D2</th>
<th>D3</th>
<th>H1</th>
<th>L1</th>
<th>L2</th>
<th>L3</th>
<th>L4</th>
<th>L5</th>
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</thead>
<tbody>
<tr>
<td>5</td>
<td>M8x1</td>
<td>9.6</td>
<td>2.9</td>
<td>4.6</td>
<td>300</td>
<td>34.8</td>
<td>31.8</td>
<td>41.1</td>
<td>23</td>
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</table>

### Ordering data

<table>
<thead>
<tr>
<th>Size</th>
<th>Analogue output [V]</th>
<th>Electrical connection</th>
<th>Cable length [m]</th>
<th>Part No.</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0...10</td>
<td>M8 plug, 4-pin, rotatable thread</td>
<td>0.3</td>
<td>553744</td>
<td>SMAT-8M-U-E-0.3-M8D</td>
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</tbody>
</table>
## Sensors > Position sensors > Position transmitters SMAT-8M, for T-slot

### Accessories

<table>
<thead>
<tr>
<th>Ordering data – Mounting attachments</th>
<th>Part No.</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>For piston diameter</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mounting kit SMBR-8/8/100-S6, heat-resistant</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8 ... 100</td>
<td>538937</td>
<td>SMBR-8/8/100-S6</td>
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<tr>
<td>Mounting kit SMBR</td>
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<tr>
<td>8</td>
<td>175091</td>
<td>SMBR-8-8</td>
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<td>175092</td>
<td>SMBR-8-10</td>
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<td>175093</td>
<td>SMBR-8-12</td>
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<td>175094</td>
<td>SMBR-8-16</td>
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<td>175095</td>
<td>SMBR-8-20</td>
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<tr>
<td>25</td>
<td>175096</td>
<td>SMBR-8-25</td>
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<td>175097</td>
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<tr>
<td>50</td>
<td>175099</td>
<td>SMBR-8-50</td>
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<tr>
<td>63</td>
<td>175100</td>
<td>SMBR-8-63</td>
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<tr>
<td>Mounting SMBZ</td>
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<tr>
<td>32 ... 100</td>
<td>537806</td>
<td>SMBZ-8-32/100</td>
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<tr>
<td>125 ... 320</td>
<td>537808</td>
<td>SMBZ-8-125/320</td>
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<table>
<thead>
<tr>
<th>Ordering data – Connecting cable NEBU-M8</th>
<th>Technical data &gt; Internet: nebu</th>
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</thead>
<tbody>
<tr>
<td>Electrical connection, left</td>
<td>Electrical connection, right</td>
</tr>
<tr>
<td>Straight socket, M8x1, 4-pin</td>
<td>Cable, open end, 4-wire</td>
</tr>
<tr>
<td>Straight socket, M8x1, 4-pin</td>
<td>Straight socket, M8x1, 4-pin</td>
</tr>
<tr>
<td>Angled socket, M8x1, 4-pin</td>
<td>Cable, open end, 4-wire</td>
</tr>
<tr>
<td></td>
<td></td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Ordering data – Inscription label ASLR</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Size</td>
<td>Part No.</td>
<td>Type</td>
</tr>
<tr>
<td>23x4 mm</td>
<td>541598</td>
<td>ASLR-L-423</td>
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</table>

1) Packaging unit in quantity per frame
Application examples

- The analogue output signal from the SMAT-8M can be freely processed by the PLC.
- Any desired switching points can be selected and logically linked to process monitoring.
- The user can program switching functions such as the hysteresis comparator or the window comparator as required for the application.
Position sensors SMH-S1, for grippers

Product overview

- Position sensors, adapted to Festo grippers
- Freely selectable switching points
- 3 gripper positions can be detected using an evaluation unit

**Product overview**

<table>
<thead>
<tr>
<th>Design</th>
<th>Type of mounting</th>
<th>Measuring principle</th>
<th>Operating voltage range</th>
<th>Analogue output</th>
<th>Switch output</th>
<th>Switching element function</th>
<th>➔ Page/online</th>
</tr>
</thead>
<tbody>
<tr>
<td>Position sensor SMH-S1</td>
<td>For gripper</td>
<td>Screwed to gripper</td>
<td>Magnetic Hall</td>
<td>24 V DC</td>
<td>–</td>
<td>–</td>
<td>160</td>
</tr>
<tr>
<td>Evaluation unit SMH-AE1</td>
<td>For position sensor SMH-S1</td>
<td>With mounting hole</td>
<td>–</td>
<td>24 V DC</td>
<td>–</td>
<td>3x PNP, 3x NPN</td>
<td>N/O contact</td>
</tr>
<tr>
<td>Signal converter SVE4</td>
<td>For position sensor SMH-S1</td>
<td>With mounting hole</td>
<td>–</td>
<td>10 ... 30 V DC</td>
<td>–</td>
<td>2x PNP, 2x NPN</td>
<td>Switchable</td>
</tr>
</tbody>
</table>

**Key features**

The position sensor SMH-S1 has been specially developed for use with Festo grippers. An analogue electrical signal is generated in the proximity sensor depending on the gripper position. The conversion to 3 digital output signals (corresponding to 3 gripper jaw positions) takes place via the signal converters SVE4 or the evaluation units SMH-AE.

- **Note**
  Sensors that detect magnetic fields, such as position sensors SMH, must not be secured onto the drive using mountings made from ferritic materials, as this can lead to malfunction.

In order to ensure the correct functioning of the position sensor the outlet cables and the compressed air tubing must be mounted in the same direction.

Detailed product information ➔ www.festo.com/catalogue/smh
Position sensors SMH, for grippers

Type codes, technical data – Position sensors

<table>
<thead>
<tr>
<th>SMH-S1</th>
<th>HGP06</th>
</tr>
</thead>
</table>

### Type

<table>
<thead>
<tr>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>SMH-S1</td>
<td>Position sensor for gripper</td>
</tr>
</tbody>
</table>

### Associated grippers

<table>
<thead>
<tr>
<th>Gripper</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>HGD16</td>
<td>Three-point gripper DHDS-16-A</td>
</tr>
<tr>
<td>HGP06</td>
<td>Parallel gripper DHPS-06-A</td>
</tr>
<tr>
<td>HGR10</td>
<td>Radial gripper DHRS-10-A</td>
</tr>
<tr>
<td>HGW10</td>
<td>Angle gripper DHWS-10-A</td>
</tr>
<tr>
<td>HGPP-10/12</td>
<td>Parallel gripper HGPP-10 and HGPP-12</td>
</tr>
<tr>
<td>HGPP-16</td>
<td>Parallel gripper HGPP-16</td>
</tr>
<tr>
<td>HGPP20/25</td>
<td>Parallel gripper HGPP-20 and HGPP-25</td>
</tr>
<tr>
<td>HGPP-32</td>
<td>Parallel gripper HGPP-32</td>
</tr>
</tbody>
</table>

### Technical data

<table>
<thead>
<tr>
<th>Design</th>
<th>Associated grippers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constructional design</td>
<td>Adapted for grippers</td>
</tr>
<tr>
<td>Type of mounting</td>
<td>Screwed to gripper</td>
</tr>
</tbody>
</table>

### Electrical data

<table>
<thead>
<tr>
<th>Electrical connection</th>
<th>Cable with plug M8x1, 4-pin</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cable length [m]</td>
<td>0.5</td>
</tr>
<tr>
<td>Protection against short circuit</td>
<td>No</td>
</tr>
<tr>
<td>Protection against polarity reversal</td>
<td>No</td>
</tr>
<tr>
<td>Protection class</td>
<td>IP65</td>
</tr>
</tbody>
</table>

### Operating and environmental conditions

<table>
<thead>
<tr>
<th>Ambient temperature [°C]</th>
<th>5...60</th>
</tr>
</thead>
<tbody>
<tr>
<td>CE mark (see declaration of conformity)</td>
<td>In accordance with EU EMC directive</td>
</tr>
</tbody>
</table>

### Materials

<table>
<thead>
<tr>
<th>Housing</th>
<th>Polyamide</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cable sheath</td>
<td>Polyurethane</td>
</tr>
</tbody>
</table>

### Ordering data

<table>
<thead>
<tr>
<th>Associated grippers</th>
<th>Part No.</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>DHDS-16-A</td>
<td>175 713</td>
<td>SMH-S1-HGD16</td>
</tr>
<tr>
<td>DHPS-06-A</td>
<td>175 710</td>
<td>SMH-S1-HGP06</td>
</tr>
<tr>
<td>DHRS-10-A</td>
<td>175 712</td>
<td>SMH-S1-HGR10</td>
</tr>
<tr>
<td>DHWS-10-A</td>
<td>175 711</td>
<td>SMH-S1-HGW10</td>
</tr>
<tr>
<td>HGPP-10, HGPP-12</td>
<td>189 040</td>
<td>SMH-S1-HGPP-10/12</td>
</tr>
<tr>
<td>HGPP-16</td>
<td>189 041</td>
<td>SMH-S1-HGPP-16</td>
</tr>
<tr>
<td>HGPP-20, HGPP-25</td>
<td>189 042</td>
<td>SMH-S1-HGPP-20/25</td>
</tr>
<tr>
<td>HGPP-32</td>
<td>526 895</td>
<td>SMH-S1-HGPP-32</td>
</tr>
</tbody>
</table>

**Note**

For position sensors SMH-S1-HG...:
Adapted signal converters SVE4-HS
Internet: sve4-hs
### Sensors > Position sensors > Position sensors SMH, for grippers

#### Type codes, technical data – Evaluation unit

<table>
<thead>
<tr>
<th>Type</th>
<th>Switch output</th>
<th>Electrical connection</th>
</tr>
</thead>
<tbody>
<tr>
<td>SMH-AE1</td>
<td>SMH-AE1</td>
<td>SMH-AE1</td>
</tr>
</tbody>
</table>

#### Switch output

- **PS3**: N/O contact, PNP, 3 switch outputs
- **NS3**: N/O contact, NPN, 3 switch outputs

#### Electrical connection

- **M12**: Plug M12x1, 5-pin

### Technical data

#### Design
- **Type of mounting**: Via through-hole
- **Switching status display**: Yellow LED
- **Ready status display**: Green LED

#### Electrical data

- **Switch output**: PNP, NPN
- **Electrical connection**:
  - **Input**: 4-pin
  - **Output**: Plug M12x1, 5-pin
- **Operating voltage range**
  - **[V DC]**: 24
- **Protection class**: IP53

#### Operating and environmental conditions

- **Ambient temperature**
  - **[°C]**: 5...60
- **CE mark (see declaration of conformity)**: In accordance with EU EMC directive
- **Certification**: C-Tick

#### Materials

- **Housing**: Wrought aluminium alloy

### Ordering data

<table>
<thead>
<tr>
<th>Switch output</th>
<th>Part No.</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>PNP</td>
<td>175 708</td>
<td>SMH-AE1-PS3-M12</td>
</tr>
<tr>
<td>NPN</td>
<td>175 709</td>
<td>SMH-AE1-NS3-M12</td>
</tr>
</tbody>
</table>

---

**Note**

For position sensors SMH-S1-HG...:
Adapted signal converters SVE4-HS
Internet: sve4-HS
Position sensors SMH, for grippers

Position sensors
1. SMH-S1-HGD16
2. SMH-S1-HGPP
3. SMH-S1-HGPP6
4. SMH-S1-HGR10
5. SMH-S1-HGW10

Associated grippers
6. Three-point gripper DHDS-16-A
7. Parallel gripper HGPP
8. Parallel gripper DHPS-06-A
9. Radial gripper DHRS-10-A
10. Angle gripper DHWS-10-A

Accessories
11. Connecting cable NEBU-M8G4-K-2.5-M8G4
12. Evaluation unit SMH-AE1
13. Connecting cable NEBU-M12G5-K-...-LE5
14. Signal converter SVE4

Ordering data – Connecting cables

<table>
<thead>
<tr>
<th>Number of wires</th>
<th>Cable length [m]</th>
<th>Part No.</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>2.5</td>
<td>554 035</td>
<td>NEBU-M8G4-K-2.5-M8G4</td>
</tr>
<tr>
<td>5</td>
<td>2.5</td>
<td>541 330</td>
<td>NEBU-M12G5-K-2.5-LE5</td>
</tr>
<tr>
<td>5</td>
<td>5</td>
<td>541 331</td>
<td>NEBU-M12G5-K-5-LE5</td>
</tr>
</tbody>
</table>

Technical data → Internet: nebu
Signal converters SVE4
## Signal converters SVE4

### Product range overview

<table>
<thead>
<tr>
<th>Type</th>
<th>Signal range</th>
<th>Switching output</th>
<th>Switching function</th>
<th>Electrical connection Input</th>
<th>Output</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>SVE4-US</td>
<td>0 ... 10 V</td>
<td>2x PNP</td>
<td>Freely programmable</td>
<td>Socket M8x1, 4-pin, to EN 60947-5-2</td>
<td>Plug M8x1, 4-pin, to EN 60947-5-2</td>
<td>166</td>
</tr>
<tr>
<td>SVE4-IS</td>
<td>0 ... 20 mA</td>
<td>2x NPN</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SVE4-HS</td>
<td>Adapted for position sensors SMH-S1-HG</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Overview of peripherals

<table>
<thead>
<tr>
<th>Mounting attachments and accessories</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Connecting cable for signal input NEBU</td>
<td>169</td>
</tr>
<tr>
<td>2. Adapter plate SXE3-W</td>
<td>169</td>
</tr>
<tr>
<td>3. Mounting rail to DIN EN 60715 NRH-35-2000</td>
<td>169</td>
</tr>
<tr>
<td>4. Connecting cable for switching output NEBU</td>
<td>169</td>
</tr>
<tr>
<td>5. Inscription label holder SXE3 (included in the scope of delivery)</td>
<td>–</td>
</tr>
</tbody>
</table>
## Sensors > Signal converters >

### Signal converters SVE4

**Type codes**

<table>
<thead>
<tr>
<th>Type</th>
<th>SVE4</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Signal converter</td>
</tr>
</tbody>
</table>

**Signal range**

<table>
<thead>
<tr>
<th>Signal</th>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>US</td>
<td>0 ... ±10 V</td>
<td></td>
</tr>
<tr>
<td>IS</td>
<td>0 ... 20 mA</td>
<td></td>
</tr>
<tr>
<td>HS</td>
<td>Adapted for position sensors SMH-S1-HG</td>
<td></td>
</tr>
</tbody>
</table>

**Display and operation**

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>R</td>
<td>Switching status display via LED, teach-in buttons</td>
</tr>
</tbody>
</table>

**Mounting**

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>H</td>
<td>H-rail mounting</td>
</tr>
</tbody>
</table>

**Electrical connection (signal input)**

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>M8</td>
<td>Socket M8x1, 4-pin</td>
</tr>
</tbody>
</table>

**Switching output**

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>2P</td>
<td>2x PNP</td>
</tr>
<tr>
<td>2N</td>
<td>2x NPN</td>
</tr>
</tbody>
</table>

**Electrical connection (switching output)**

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>M8</td>
<td>Plug M8x1, 4-pin</td>
</tr>
</tbody>
</table>
## Signal converters SVE4

### Technical data

#### Function
- Switching function freely programmable
- Choice of switching functions (NO/NC)
- Switching points can be taught in
- Mounting via H-rail or adapter plate

#### General technical data

<table>
<thead>
<tr>
<th>Certification</th>
<th>cULus listed (UL)</th>
</tr>
</thead>
<tbody>
<tr>
<td>UL temperature rating [°C]</td>
<td>–20 ... 60</td>
</tr>
<tr>
<td>CE mark</td>
<td>To EU EMC Directive</td>
</tr>
<tr>
<td>(see declaration of conformity)</td>
<td></td>
</tr>
<tr>
<td>Note on materials</td>
<td>Free of copper and PTFE</td>
</tr>
</tbody>
</table>

1) For information about the applicability of the component see the manufacturer’s EC declaration of conformity at: www.festo.com

#### Input signal/measuring element

<table>
<thead>
<tr>
<th>Type</th>
<th>SVE4-US</th>
<th>SVE4-IS</th>
<th>SVE4-HS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Signal range</td>
<td>0 ... 10 ± 0.3 V</td>
<td>0 ... 20 ± 0.6 mA</td>
<td>Adapted for position sensors SMH-S1-HG</td>
</tr>
<tr>
<td>Ambient temperature [°C]</td>
<td>–20 ... +70</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### Switching output

<table>
<thead>
<tr>
<th>Switching output</th>
<th>2x PNP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Switching function</td>
<td>Freely programmable</td>
</tr>
<tr>
<td>Switching element function</td>
<td>Switchable</td>
</tr>
</tbody>
</table>

#### Output, additional data

| Protection against short circuit | Pulsed |
| Protection against overloading   | Yes    |

#### Electronic components

<table>
<thead>
<tr>
<th>Type</th>
<th>SVE4-US</th>
<th>SVE4-IS</th>
<th>SVE4-HS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating voltage range [V DC]</td>
<td>10 ... 30</td>
<td></td>
<td>For operating voltage and switching outputs</td>
</tr>
<tr>
<td>Reverse polarity protection</td>
<td>For all electrical connections</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### Electromechanical components

| Electrical connection, input | Socket M8x1, 4-pin, to EN 60947-5-2 |
| Electrical connection, output | Plug M8x1, 4-pin, to EN 60947-5-2 |

#### Mechanical components

| Product weight [g] | 19 |
| Information on housing materials | ABS |
Sensors > Signal converters > Signal converters SVE4

Technical data

**Display/operation**

<table>
<thead>
<tr>
<th>Setting options</th>
<th>Teach-in</th>
</tr>
</thead>
</table>

**Immissions/emissions**

<table>
<thead>
<tr>
<th>Protection class</th>
<th>IP65</th>
</tr>
</thead>
<tbody>
<tr>
<td>Corrosion resistance class CRC</td>
<td>2</td>
</tr>
</tbody>
</table>

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

Components subject to moderate corrosion stress. 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.

**Signal range 0 ... 10 V**

<table>
<thead>
<tr>
<th>Switching output 2x PNP</th>
<th>Switching output 2x NPN</th>
<th>Pin allocation for input</th>
<th>Pin allocation for output</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 = +24 V (for transmitter)</td>
<td>2 = n.c.</td>
<td>3 = 0 V (for transmitter)</td>
<td>4 = Input 0 ... 10 V</td>
</tr>
<tr>
<td>1 = +24 V</td>
<td>2 = Out B</td>
<td>3 = 0 V</td>
<td>4 = Out A</td>
</tr>
</tbody>
</table>

**Signal range 0 ... 20 mA**

<table>
<thead>
<tr>
<th>Switching output 2x PNP</th>
<th>Switching output 2x NPN</th>
<th>Pin allocation for input</th>
<th>Pin allocation for output</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 = +24 V (for transmitter)</td>
<td>2 = Input 0 ... 20 mA</td>
<td>3 = 0 V (for transmitter)</td>
<td>4 = n.c.</td>
</tr>
<tr>
<td>1 = +24 V</td>
<td>2 = Out B</td>
<td>3 = 0 V</td>
<td>4 = Out A</td>
</tr>
</tbody>
</table>

**Signal range adapted for position sensors SMH-S1-HG**

<table>
<thead>
<tr>
<th>Switching output 2x PNP</th>
<th>Switching output 2x NPN</th>
<th>Pin allocation for input</th>
<th>Pin allocation for output</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adapted for position sensors SMH-S1-HG</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 = +24 V</td>
<td>2 = Out B</td>
<td>3 = 0 V</td>
<td>4 = Out A</td>
</tr>
</tbody>
</table>

1) Core colours indicated apply when using plug sockets with cable NEBU-M8 or SIM-M8

**Dimensions**

### Ordering data

<table>
<thead>
<tr>
<th>Version</th>
<th>Signal range</th>
<th>Part No.</th>
<th>Type</th>
<th>Part No.</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 ... 10 ± 0.3 V</td>
<td>544217</td>
<td>SVE4-US-R-HMB-2P-M8</td>
<td>544220</td>
<td>SVE4-US-R-HMB-2N-M8</td>
<td></td>
</tr>
<tr>
<td>0 ... 20 ± 0.6 mA</td>
<td>544218</td>
<td>SVE4-IS-R-HMB-2P-M8</td>
<td>544221</td>
<td>SVE4-IS-R-HMB-2N-M8</td>
<td></td>
</tr>
<tr>
<td>Adapted for position sensors</td>
<td>SMH-S1-HG</td>
<td>544216</td>
<td>SVE4-HS-R-HMB-2P-M8</td>
<td>544219</td>
<td>SVE4-HS-R-HMB-2N-M8</td>
</tr>
</tbody>
</table>
### Ordering data – Connecting cables for signal input

<table>
<thead>
<tr>
<th>Number of wires</th>
<th>Cable length [m]</th>
<th>Part No.</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>M8x1, straight plug&lt;br&gt;1)</td>
<td>4</td>
<td>2.5</td>
<td>554033</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>554034</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>554035</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>554036</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>554037</td>
</tr>
<tr>
<td>M8x1, straight socket&lt;br&gt;2)</td>
<td>4</td>
<td>2.5</td>
<td>541342</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>5</td>
</tr>
<tr>
<td>M8x1, angled socket&lt;br&gt;3)</td>
<td>4</td>
<td>2.5</td>
<td>541344</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>5</td>
</tr>
</tbody>
</table>

[^1]: For connecting signal converter SVE4-US to pressure transmitter SPTW ... VD-M12.
[^2]: For connecting signal converter SVE4-IS to pressure transmitter SPTW ... A-M12.
[^3]: For connecting to position transmitter SMAF-00M.
[^4]: For connecting to proximity sensor SIEA.

### Ordering data – Connecting cables for switching output

<table>
<thead>
<tr>
<th>Number of wires</th>
<th>Cable length [m]</th>
<th>Part No.</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>M8x1, straight socket&lt;br&gt;4)</td>
<td>4</td>
<td>2.5</td>
<td>541342</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>5</td>
</tr>
<tr>
<td>M8x1, angled socket&lt;br&gt;5)</td>
<td>4</td>
<td>2.5</td>
<td>541344</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>5</td>
</tr>
</tbody>
</table>

---

**Note**

User-friendly configurator for easy selection of connecting cables NEBU

[www.festo.com/catalogue](http://www.festo.com/catalogue)
Signal converters SVE4
Application examples

Pump control with SVE4 and pressure transmitter SDET

- A pump control system can easily be realised on a storage tank in combination with the pressure transmitter SDET, which measures the pressure of the liquid column.

The filling levels 1 (= pump on) and 2 (= pump off) are simply taught at the touch of a button.

Detection of parts with SVE4 and position sensor SMH-S1

- A part detection system can easily be realised in combination with the position sensor SMH-S1, which senses the position of the jaws on a gripper. The three statuses “Gripper open”, “Part gripped” and “Part not gripped” can be taught at the touch of a button, using just two outputs.

Quality inspection with SVE4 and position transmitter SMAT-8E

- A quality inspection system can easily be realised in combination with the position transmitter SMAT-8E, which senses the position of a feed cylinder in a rivet sorting machine, where the rivet is pressed against a stop. The upper and lower deviation can simply be taught at the touch of a button. Parts that do not lie within the tolerance range are rejected.
Pressure and vacuum sensors
Pressure and vacuum sensors

Key features

Basic principles of pressure measurement

Sensors used for pressure measurement are equipped with an internal pressure-sensitive element. They convert changes in pressure to an electrical signal or initiate switching operations when a threshold value is exceeded. The type of pressure to be measured must be noted. A distinction is made between the following types of pressure:

- **Absolute pressure**: Pressure in comparison with absolute vacuum as a zero value \( (p_{\text{abs}} = 0) \). It can be measured directly using the pressure balance, for example.
- **Differential pressure**: Pressure representing the difference between 2 absolute pressures.
- **Excess pressure (relative pressure)**: Pressure that refers to the prevailing atmospheric pressure and uses it as a zero value. Sensors that detect this are known as relative pressure sensors.

Representation of pressure ranges

<table>
<thead>
<tr>
<th>Absolute pressure</th>
<th>Differential pressure</th>
<th>100% vacuum</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pressure in comparison with absolute vacuum as a zero value ( (p_{\text{abs}} = 0) ).</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pressure representing the difference between 2 absolute pressures.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Atmospheric air pressure</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Partial vacuum</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Partial pressure 1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Partial pressure 2</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Operating principles of pressure sensors

**Mechanical operating principle**

The pressure acting on the inside of a curved Bourdon tube causes the Bourdon tube to arch or contract. This deformation is converted into a needle deflection using precision mechanical components.

**Electronic operating principle**

The pressure acts on a highly flexible diaphragm, whose deflection is measured. Various physical principles can be used to detect this deflection, e.g. inductive, capacitive, piezoresistive, ceramic, monolithic (composed of very small, inseparable electronic components) and ohmic in the form of strain gauge.

Electronic operating principles of pressure sensors

**Pressure sensor with Hall element**

A small permanent magnet, which is connected to the diaphragm, causes a change in the Hall voltage when there is a deflection of the diaphragm.

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hall generator</td>
<td>Permanent magnet</td>
</tr>
<tr>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>Sensor housing</td>
<td>Diaphragm</td>
</tr>
</tbody>
</table>

**Piezoresistive pressure sensor**

The measuring element in the piezoresistive pressure sensor is a clamped plate, into which resistances were introduced through diffusion or ion implantation, with these resistances in turn being "cut out" by gradual etching from silicon. They change their electrical resistance under load.

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aluminium contact</td>
<td>Passivation</td>
<td>Piezoresistor</td>
<td>Epitaxy layer</td>
<td>Silicon substrate</td>
<td>Glass support</td>
<td>Sensor housing</td>
<td>Metallic connecting layer</td>
<td>Connecting layer</td>
</tr>
</tbody>
</table>
Pressure and vacuum sensors

Key features

Capacitive pressure sensor

In the capacitive variant, the diaphragm is designed as a capacitor plate. The capacity change in the ceramic diaphragm occurs as a result of deflection relative to a parallel counter-electrode. The sensor element must not be covered by fluid when it enters the system. The following technologies are used in the case of capacitive ceramic pressure sensors with signal processing:

- Thick-film technology for the signal processing hybrid
- Microjoining technology for the ceramics
- ASIC for signal processing

Pressure sensor with strain gauge

Pressure sensors with a strain gauge can now be produced efficiently thanks to modern technologies. If you have a clamped circular diaphragm (measurement diaphragm, usually made from stainless steel) as a deformation element, you can use a film strain gauge with a rosette pattern. These sensor elements are small (diameter of 7 mm, for example) and have a measurement grid with 4 segments arranged in a circle. These are interconnected to form a Wheatstone bridge. Sizing of the deformation element is based on a tensile stress of 100 μm/m = 1% of the nominal load.

Monolithic pressure sensor

Silicon pressure sensors are used for pressure ranges from 0 ... 16 bar. Pressure sensors using thin-film and thick-film technology are suitable for the entire pressure range. They can also be made self-learning by combining them with electronic components.

Temperature-sensitive resistors can be integrated in the structure, which makes it possible to use the sensor to detect the temperature of the medium and compensate for temperature errors.

Internal circuit of a pressure sensor

The strain gauges are combined to form a pressure measuring bridge. A basic temperature compensating circuit is connected (R1, R2).

In the PE converter, a pneumatic pressure signal switches an electrical signal generator, which is usually designed as a changeover switch. The pressure actuating force can be increased using a suitably large diaphragm surface. A device that lets you adjust the switching pressure is called a pressure switch.

Conclusion

Pressure sensors are equipped with different setting options. Low-cost devices have a fixed switching point, which cannot be changed. Statically adjustable devices allow the switching points to be defined individually. In the case of dynamic adjustment, you can adapt the switching points to the current conditions within the process or teach them in during the static teach-in procedure.
Sensors > Pressure and vacuum sensors

Pressure and vacuum switches PEV/VPEV, PE converters PE/PEN/VPE
## Pressure and vacuum switches PEV/VPEV, PE converters PE/PEN/VPE

### Product range overview

<table>
<thead>
<tr>
<th>Function</th>
<th>Design</th>
<th>Type</th>
<th>Operating pressure [bar]</th>
<th>Pneumatic connection</th>
<th>Electrical connection</th>
<th>Max. switching output voltage [V DC]</th>
<th>[V AC]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mechanical pressure switches</td>
<td>Mounting via screws</td>
<td>PEV</td>
<td>1...12</td>
<td>G3/4</td>
<td>Plug, type A</td>
<td>125</td>
<td>250</td>
</tr>
<tr>
<td></td>
<td></td>
<td>PEV</td>
<td>1...12</td>
<td>G3/4</td>
<td>Plug, type A</td>
<td>125</td>
<td>250</td>
</tr>
<tr>
<td></td>
<td></td>
<td>PEV</td>
<td>1...12</td>
<td>G3/4</td>
<td>Plug, type A</td>
<td>125</td>
<td>250</td>
</tr>
<tr>
<td></td>
<td></td>
<td>PEV</td>
<td>1...12</td>
<td>G3/4</td>
<td>Plug M12x1, 4-pin</td>
<td>48</td>
<td>48</td>
</tr>
<tr>
<td>H-rail mounting</td>
<td>PEV-W</td>
<td></td>
<td>0...8</td>
<td>M5</td>
<td>Plug M8x1, 4-pin</td>
<td>30</td>
<td>–</td>
</tr>
<tr>
<td></td>
<td>PEV-W</td>
<td></td>
<td>0...8</td>
<td>M5</td>
<td>Screw terminal, 4-pin</td>
<td>30</td>
<td>–</td>
</tr>
<tr>
<td>Mounting via screw-in thread</td>
<td></td>
<td>PEV-SW27</td>
<td>1...10</td>
<td>G3/4</td>
<td>For plug socket PEV-1/4-A-WD</td>
<td>250</td>
<td>250</td>
</tr>
<tr>
<td></td>
<td></td>
<td>PEV-SW27</td>
<td>1...10</td>
<td>G3/4</td>
<td>For plug socket PEV-1/4-WD-LED-…</td>
<td>250</td>
<td>250</td>
</tr>
<tr>
<td>Mechanical vacuum switches</td>
<td>Mounting via screws</td>
<td>VPEV</td>
<td>–1...+1.6</td>
<td>G3/4</td>
<td>Plug, type A</td>
<td>125</td>
<td>250</td>
</tr>
<tr>
<td></td>
<td></td>
<td>VPEV</td>
<td>–1...+1.6</td>
<td>G3/4</td>
<td>Plug M12x1, 4-pin</td>
<td>48</td>
<td>48</td>
</tr>
<tr>
<td>H-rail mounting</td>
<td>VPEV-W</td>
<td></td>
<td>–1...0</td>
<td>M5</td>
<td>Plug M8x1, 4-pin</td>
<td>30</td>
<td>–</td>
</tr>
<tr>
<td></td>
<td>VPEV-W</td>
<td></td>
<td>–1...0</td>
<td>M5</td>
<td>Screw terminal, 4-pin</td>
<td>30</td>
<td>–</td>
</tr>
<tr>
<td>PE converter</td>
<td>On mounting frame 2N</td>
<td>PEN-M5</td>
<td>–1...8</td>
<td>M5</td>
<td>Cable, 3-wire</td>
<td>10...30</td>
<td>–</td>
</tr>
<tr>
<td></td>
<td></td>
<td>PE-1/4-2N</td>
<td>0...8</td>
<td>G3/4</td>
<td>Screw terminal, 3 wires</td>
<td>12...250</td>
<td>12...250</td>
</tr>
<tr>
<td></td>
<td></td>
<td>VPE-1/4-2N</td>
<td>-0.95...0</td>
<td>G3/4</td>
<td>Screw terminal, 3 wires</td>
<td>12...250</td>
<td>12...250</td>
</tr>
</tbody>
</table>

1) Plug socket included in scope of delivery
### Sensors > Pressure and vacuum sensors

**Pressure and vacuum switches PEV/VPEV, with through-holes**

**Peripherals overview**

#### PEV

#### VPEV

<table>
<thead>
<tr>
<th>Mounting attachments and accessories</th>
<th>➤ Page/online</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Angled plug socket with switching status display PEV</td>
<td>191</td>
</tr>
<tr>
<td>Plug socket without switching status display MSSD</td>
<td>195</td>
</tr>
<tr>
<td>2. Connecting cable NEBU-M12</td>
<td>195</td>
</tr>
<tr>
<td>3. Mounting plate APL</td>
<td>193</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Mounting attachments and accessories</th>
<th>➤ Page/online</th>
</tr>
</thead>
<tbody>
<tr>
<td>4. Mounting frame NRRQ</td>
<td>194</td>
</tr>
<tr>
<td>5. Push-in fitting QS</td>
<td>qs</td>
</tr>
<tr>
<td>6. Quick connector CK-1/4, LCK-1/4</td>
<td>ck</td>
</tr>
<tr>
<td>7. Blanking screw VPEV-1/4 (included in scope of delivery of VPEV)</td>
<td>–</td>
</tr>
</tbody>
</table>

**Note**

The vacuum switch VPEV is used as a pressure switch by repositioning the blanking screw supplied from the pressure supply port to the vacuum port.
### Pressure and vacuum switches PEV/VPEV, with through-holes

#### Type codes

<table>
<thead>
<tr>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>PEV</td>
<td>Pressure switch</td>
</tr>
<tr>
<td>VPEV</td>
<td>Vacuum switch</td>
</tr>
</tbody>
</table>

#### Pneumatic connection

<table>
<thead>
<tr>
<th>Size</th>
<th>Connection</th>
</tr>
</thead>
<tbody>
<tr>
<td>⅛</td>
<td>G⅛</td>
</tr>
<tr>
<td>⅛</td>
<td>G⅛</td>
</tr>
</tbody>
</table>

#### Generation

<table>
<thead>
<tr>
<th>Generation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>B</td>
<td>B series</td>
</tr>
</tbody>
</table>

#### Electrical connection

- Plug, type A, rectangular design, to EN 175301-803
- Plug M12x1, 4-pin, round design, to EN 60947-5-2

#### Setting options

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>SC</td>
<td>Scale for pressure adjustment</td>
</tr>
</tbody>
</table>

#### Plug socket

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>--</td>
<td>Included in the scope of delivery</td>
</tr>
<tr>
<td>OD</td>
<td>Not included in the scope of delivery</td>
</tr>
</tbody>
</table>
## Function

**PEV/VPEV**

![Pressure and vacuum switches PEV/VPEV, with through-holes](#)

<table>
<thead>
<tr>
<th>General technical data</th>
<th>PEV-1/4-B(OD)</th>
<th>PEV-1/4-SC-OD</th>
<th>PEV-1/4-B-M12</th>
<th>VPEV-1/4</th>
<th>VPEV-1/4-M12</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Type</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>General</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Conforms to standard</td>
<td>EN 60947-5-1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Approval</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>cULus recognized (OL)</td>
</tr>
<tr>
<td>CCC</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CE marking (see declaration of conformity)</td>
<td>To EU Low Voltage Directive</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Note on materials</td>
<td>RoHS-compliant</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Input signal/measuring element</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Measured variable</td>
<td>Relative pressure</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Method of measurement</td>
<td>Pneumatic/electric pressure transducer</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>–</td>
<td>With setting scale</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td></td>
</tr>
<tr>
<td>Pressure measuring range [bar]</td>
<td>–</td>
<td>–</td>
<td>–1 ... +1.6</td>
<td>–</td>
<td></td>
</tr>
<tr>
<td>Operating pressure [bar]</td>
<td>1 ... 12</td>
<td>–</td>
<td>–1 ... +1.6</td>
<td>–</td>
<td></td>
</tr>
<tr>
<td>Temperature of medium [°C]</td>
<td>–20 ... +80</td>
<td>–20 ... +80</td>
<td>–20 ... +80</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>Ambient temperature [°C]</td>
<td>–20 ... +80</td>
<td>–20 ... +80</td>
<td>–20 ... +80</td>
<td>–</td>
<td>–</td>
</tr>
</tbody>
</table>
## Electrical data

<table>
<thead>
<tr>
<th>Type</th>
<th>PEV-1/4-B(-OD)</th>
<th>PEV-1/4-SC-OD</th>
<th>PEV-1/4-B-M12</th>
<th>VPEV-16</th>
<th>VPEV-16-M12</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Switching output</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Switching element function</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Changeover switch</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Max. switching frequency</strong> [Hz]</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td><strong>Max. switching output voltage</strong> [V AC]</td>
<td>250</td>
<td>48</td>
<td>250</td>
<td>48</td>
<td>48</td>
</tr>
<tr>
<td>[V DC]</td>
<td>125</td>
<td>48</td>
<td>125</td>
<td>48</td>
<td>48</td>
</tr>
<tr>
<td><strong>Max. output current</strong> [mA]</td>
<td>5,000</td>
<td>4,000</td>
<td>5,000</td>
<td>4,000</td>
<td>4,000</td>
</tr>
<tr>
<td>Minimum load current</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>[mA]</td>
<td>1 (at 24 V)</td>
<td>10 (at 10 V)</td>
<td>100 (at 5 V)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Electronic components

- **Utilisation category for inductive load**: AC-14, DC-13
- **Utilisation category for ohmic load**: AC-12, DC-12

### Electromechanical components

#### Electrical connection

- Plug, type A, rectangular design, to EN 175301-803
- Plug M12x1, 4-pin, round design, to EN 60947-5-2
- Plug, type A, rectangular design, to EN 175301-803
- Plug M12x1, 4-pin, round design, to EN 60947-5-2

### Pin allocation

<table>
<thead>
<tr>
<th>Plug, type A</th>
<th>Pin</th>
<th>Meaning</th>
<th>Plug M12x1, 4-pin</th>
<th>Pin</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1</td>
<td>Operating voltage</td>
<td>2</td>
<td>1</td>
<td>Operating voltage</td>
</tr>
<tr>
<td>2</td>
<td>N/C contact</td>
<td></td>
<td>3</td>
<td>N/O contact</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>N/O contact</td>
<td></td>
<td>4</td>
<td>Earthing</td>
<td></td>
</tr>
</tbody>
</table>

### Mechanical components

- **Type**: PEV-1/4-B(-OD), PEV-1/4-SC-OD, PEV-1/4-B-M12, VPEV-16, VPEV-16-M12
- **Type of mounting**: Via through-hole
- **Mounting position**: Any
- **Pneumatic connection**: G 1/4, G 1/8
- **Product weight [g]**: 220, 170, 220, 240, 220
- **Housing material information**: Wrought aluminium alloy
- **Switch contact material information**: Silver

### Display/operation

#### Switching output

- **Switching status display**: Yellow LED (only PEV-1/4-B)\(^1\)
- **Threshold value setting range [bar]**: 1 ... 12
- **Threshold value setting range after conversion [bar]**: \(-0.95 \ldots -0.2\)

<table>
<thead>
<tr>
<th>Type</th>
<th>PEV-1/4-B(-OD)</th>
<th>PEV-1/4-SC-OD</th>
<th>PEV-1/4-B-M12</th>
<th>VPEV-16</th>
<th>VPEV-16-M12</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Switching output</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Threshold value setting range [bar]</strong></td>
<td>1 ... 12</td>
<td>-</td>
<td>(-0.95 \ldots -0.2)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Threshold value setting range after conversion [bar]</strong></td>
<td>-</td>
<td>0.16 ... 1.6</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

1) LED is integrated in the supplied plug socket.

### Immissions/ emissions

- **Storage temperature [°C]**: \(-20 \ldots +80\)
- **Protection**: IP65
- **Corrosion resistance class CRC\(^1\)**: 2

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

Components subject to moderate corrosion stress. 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.
Pressure and vacuum switches PEV/VPEV, with through-holes

Technical data

Dimensions – Pressure switches

<table>
<thead>
<tr>
<th></th>
<th>PEV-¼-B</th>
<th>PEV-¼-B-OD</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Switching point adjusting screw</td>
<td>PEV-¼-B: Push-in connector M16x1.5 to EN 175301-803-A, choice of cable outlet by turning socket inset 4x90°</td>
</tr>
<tr>
<td>2</td>
<td>Hex nut for adjustment of hysteresis (under protective cover)</td>
<td>PEV-¼-B-OD: Push-In connector suitable for plug socket M16x1.5 to EN 175301-803-A</td>
</tr>
<tr>
<td>3</td>
<td>Protective cover</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Type</th>
<th>B1 ±0.2</th>
<th>B2 ±0.1</th>
<th>D1</th>
<th>D2  ¯0.2</th>
<th>D3</th>
<th>H1 ±0.6</th>
<th>H2</th>
<th>H3 ±0.5</th>
<th>L1</th>
<th>L2 ±0.2</th>
<th>ß ≤1</th>
</tr>
</thead>
<tbody>
<tr>
<td>PEV-¼-B</td>
<td>30</td>
<td>20</td>
<td>G¼</td>
<td>5.2</td>
<td>min. 5</td>
<td>77.3</td>
<td>56</td>
<td>18.5</td>
<td>78</td>
<td>1</td>
<td>11</td>
</tr>
<tr>
<td>PEV-¼-B-OD</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Dimensions – Pressure switch

<table>
<thead>
<tr>
<th></th>
<th>PEV-¼-SC-OD</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Switching point adjusting screw</td>
</tr>
<tr>
<td>2</td>
<td>Hex nut for adjustment of hysteresis (under protective cover)</td>
</tr>
<tr>
<td>3</td>
<td>Protective cover</td>
</tr>
<tr>
<td>4</td>
<td>Push-In connector suitable for plug socket M16x1.5 to EN 175301-803-A</td>
</tr>
<tr>
<td>5</td>
<td>Scale for reading off the set switching pressure</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Type</th>
<th>B1 ±0.2</th>
<th>B2 ±0.1</th>
<th>D1</th>
<th>D2  ¯0.2</th>
<th>D3</th>
<th>H1 ±0.6</th>
<th>H2</th>
<th>H3 ±0.5</th>
<th>L1</th>
<th>L2 ±0.2</th>
<th>ß ≤1</th>
</tr>
</thead>
<tbody>
<tr>
<td>PEV-¼-SC-OD</td>
<td>30</td>
<td>20</td>
<td>G¼</td>
<td>5.2</td>
<td>min. 5</td>
<td>77.3</td>
<td>40</td>
<td>18.5</td>
<td>56</td>
<td>1</td>
<td>11</td>
</tr>
</tbody>
</table>
Pressure and vacuum switches PEV/VPEV, with through-holes

Dimensions – Pressure switch

<table>
<thead>
<tr>
<th>Type</th>
<th>B1 ±0.2</th>
<th>B2 ±0.1</th>
<th>B3</th>
<th>D1</th>
<th>D2 ±0.2</th>
<th>D3</th>
<th>H1 ±0.6</th>
<th>H2 ±0.5</th>
<th>H3 ±0.2</th>
<th>L1</th>
<th>L2 ±0.2</th>
<th>±σ1</th>
</tr>
</thead>
<tbody>
<tr>
<td>PEV-1/4-B-M12</td>
<td>30</td>
<td>20</td>
<td>12.5</td>
<td>G3/4</td>
<td>5.2</td>
<td>min. 5</td>
<td>77.3</td>
<td>40</td>
<td>18.5</td>
<td>55.4</td>
<td>1</td>
<td>11</td>
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</tbody>
</table>

Dimensions – Vacuum switch

<table>
<thead>
<tr>
<th>Type</th>
<th>B1 ±0.2</th>
<th>B2 ±0.1</th>
<th>B3</th>
<th>D1</th>
<th>D2 ±0.2</th>
<th>D3</th>
<th>H1 ±0.1</th>
<th>H2</th>
<th>H3</th>
<th>H4</th>
<th>H5</th>
<th>H6</th>
<th>L1</th>
<th>L2 ±0.2</th>
<th>L3</th>
<th>±σ1</th>
</tr>
</thead>
<tbody>
<tr>
<td>VPEV-1/₆</td>
<td>30</td>
<td>20</td>
<td>–</td>
<td>G3/₄</td>
<td>5.2</td>
<td>–</td>
<td>98</td>
<td>48</td>
<td>32</td>
<td>5.5</td>
<td>91</td>
<td>–</td>
<td>18.5</td>
<td>78</td>
<td>1</td>
<td>–</td>
</tr>
<tr>
<td>VPEV-1/₆-M12</td>
<td></td>
<td></td>
<td>12.5</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
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<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
</tbody>
</table>

1. Switching point adjusting screw
2. Hex nut for adjustment of hysteresis (under protective cover)
3. Protective cover
4. Connection arrangement for plug connectors to EN 60947-5-2
5. Vacuum port
6. Push-in connector M16x1.5 to EN 175301-803-A, choice of cable outlet by turning socket inset 4x90°
## Technical data

### Pressure and vacuum switches PEV/VPEV, with through-holes

#### Ordering data

<table>
<thead>
<tr>
<th>Pressure switch</th>
<th>Pneumatic connection</th>
<th>Electrical connection</th>
<th>Part No.</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>G¼</td>
<td>Plug, type A, rectangular design, to EN 175301-803</td>
<td>10773</td>
<td>PEV-¼-B</td>
</tr>
<tr>
<td></td>
<td>G¼</td>
<td>Plug socket included in scope of delivery</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>G¼</td>
<td>Plug, type A, rectangular design, to EN 175301-803</td>
<td>175250</td>
<td>PEV-¼-B-DD</td>
</tr>
<tr>
<td></td>
<td>G¼</td>
<td>Plug, type A, rectangular design, to EN 175301-803</td>
<td>161760</td>
<td>PEV-¼-SC-00</td>
</tr>
<tr>
<td></td>
<td>G¼</td>
<td>Plug M12x1, 4-pin, round design, to EN 60947-5-2</td>
<td>192488</td>
<td>PEV-¼-B-M12</td>
</tr>
<tr>
<td>Vacuum switch</td>
<td>G½</td>
<td>Plug, type A, rectangular design, to EN 175301-803</td>
<td>150261</td>
<td>VPEV-½</td>
</tr>
<tr>
<td></td>
<td>G½</td>
<td>Plug socket included in scope of delivery</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>G½</td>
<td>Plug M12x1, 4-pin, round design, to EN 60947-5-2</td>
<td>192489</td>
<td>VPEV-½-M12</td>
</tr>
</tbody>
</table>
### Pressure and vacuum switches PEV-W/VPEV-W, H-rail mounting

#### Peripherals overview

<table>
<thead>
<tr>
<th>Mounting attachments and accessories</th>
<th>Page/online</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Connecting cable NEBU-M8</td>
<td>195</td>
</tr>
<tr>
<td>2 Push-in fitting QSM-M5</td>
<td>qsm</td>
</tr>
<tr>
<td>3 Mounting latch PENV</td>
<td>195</td>
</tr>
<tr>
<td>4 Mounting rail NRH, to EN 60715</td>
<td>195</td>
</tr>
<tr>
<td>5 Mounting rail NRC, to EN 50035</td>
<td>195</td>
</tr>
</tbody>
</table>

#### Type codes

<table>
<thead>
<tr>
<th>Type</th>
<th>PEV-W</th>
<th>KL</th>
<th>LED</th>
<th>GH</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type</td>
<td>Pressure switch</td>
<td>Vacuum switch</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Electrical connection</td>
<td>Plug M8x1, 4-pin</td>
<td>Screw terminal, 4-pin</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Switching status display</td>
<td>LED</td>
<td>Yellow LED</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Type of mounting</td>
<td>GH</td>
<td>Via H-rail or through-hole</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### Function

- **Pressure and vacuum switches PEV-W/VPEV-W, H-rail mounting**

### General technical data

<table>
<thead>
<tr>
<th>Type</th>
<th>PEV-W</th>
<th>VPEV-W</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>General</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Approval</td>
<td>C-Tick</td>
<td></td>
</tr>
<tr>
<td>CE marking (see declaration of conformity)</td>
<td>To EU EMC Directive</td>
<td></td>
</tr>
<tr>
<td>Note on materials</td>
<td>Contains PWIS (paint-wetting impairment substances)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Input signal/measuring element</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Measured variable</td>
<td>Relative pressure</td>
<td></td>
</tr>
<tr>
<td>Method of measurement</td>
<td>Pneumatic/electric pressure transducer</td>
<td></td>
</tr>
<tr>
<td>Pressure measuring range [bar]</td>
<td>2 ... 8</td>
<td>-0.8 ... -0.2</td>
</tr>
<tr>
<td>Operating pressure [bar]</td>
<td>0 ... 8</td>
<td>-1 ... 0</td>
</tr>
<tr>
<td>Operating medium</td>
<td>Compressed air to ISO 8573-1:2010</td>
<td></td>
</tr>
<tr>
<td>Note about the operating/pilot medium</td>
<td>Lubricated operation possible (required during subsequent operation)</td>
<td></td>
</tr>
<tr>
<td>Temperature of medium [°C]</td>
<td>0 ... +60</td>
<td></td>
</tr>
<tr>
<td>Ambient temperature [°C]</td>
<td>0 ... +60</td>
<td></td>
</tr>
</tbody>
</table>

1) For information about the applicability of the component see the manufacturer’s CE declaration of conformity at: www.festo.com

### Electrical data

<table>
<thead>
<tr>
<th>Type</th>
<th>PEV-W-S</th>
<th>PEV-W-KL</th>
<th>VPEV-W-S</th>
<th>VPEV-W-KL</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Switching output</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Switching element function</td>
<td>Changeover switch</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Max. switching frequency [Hz]</td>
<td>3</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Max. output current [mA]</td>
<td>2,500</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Operating voltage range [V DC]</td>
<td>10 ... 30</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Electromechanical components

- Electrical connection
  - Plug M8x1, 4-pin
  - Screw terminal, 4-pin

### Pin allocation

<table>
<thead>
<tr>
<th>Pin allocation</th>
<th>Pin</th>
<th>Meaning</th>
<th></th>
<th>Pin</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plug M8x1, 4-pin</td>
<td>1</td>
<td>+ (–)</td>
<td>Screw terminal, 4-pin</td>
<td>1</td>
<td>+ (–)</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>N/C contact</td>
<td></td>
<td>2</td>
<td>N/C contact</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>– (+)</td>
<td></td>
<td>3</td>
<td>– (+)</td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>N/O contact</td>
<td></td>
<td>4</td>
<td>N/O contact</td>
</tr>
</tbody>
</table>
Pressure and vacuum switches PEV-W/VPEV-W, H-rail mounting

Technical data

### Mechanical components

<table>
<thead>
<tr>
<th>Type of mounting</th>
<th>Via through-hole</th>
</tr>
</thead>
<tbody>
<tr>
<td>Via H-rail</td>
<td></td>
</tr>
<tr>
<td>Mounting position</td>
<td>Any</td>
</tr>
<tr>
<td>Pneumatic connection</td>
<td>M5</td>
</tr>
<tr>
<td>Product weight</td>
<td>56 g</td>
</tr>
<tr>
<td>Housing material information</td>
<td>PA, PEI, POM</td>
</tr>
</tbody>
</table>

### Display/operation

<table>
<thead>
<tr>
<th>Type</th>
<th>PEV-W</th>
<th>VPEV-W</th>
</tr>
</thead>
<tbody>
<tr>
<td>Switching output</td>
<td>Yellow LED</td>
<td>Yellow LED</td>
</tr>
<tr>
<td>Threshold value setting range</td>
<td>[bar] 1.5 ... 8</td>
<td>[bar] –0.8 ... –0.2</td>
</tr>
<tr>
<td>Hysteresis setting range</td>
<td>[bar] 0.5 ... 2</td>
<td>[bar] 0.08 ... 0.2</td>
</tr>
</tbody>
</table>

### Immissions/emissions

<table>
<thead>
<tr>
<th>Type</th>
<th>PEV-W-S</th>
<th>PEV-W-KL</th>
<th>VPEV-W-S</th>
<th>VPEV-W-KL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Storage temperature</td>
<td>°C</td>
<td>–20 ... +80</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Protection</td>
<td>IP65</td>
<td>IP20</td>
<td>IP65</td>
<td>IP20</td>
</tr>
<tr>
<td>Corrosion resistance class</td>
<td>CRC1) 2</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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

Components subject to moderate corrosion stress. 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.

### Dimensions


<table>
<thead>
<tr>
<th>PEV-W-S/VPEV-W-S</th>
<th>PEV-W-KL/VPEV-W-KL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Slot for inscription label</td>
<td>1</td>
</tr>
<tr>
<td>Foot mounting (included in scope of delivery)</td>
<td>2</td>
</tr>
<tr>
<td>Clamping foot for G/H rail</td>
<td>3</td>
</tr>
<tr>
<td>Switching status display, yellow</td>
<td>4</td>
</tr>
<tr>
<td>Switching point adjusting screw</td>
<td>5</td>
</tr>
<tr>
<td>Manual override</td>
<td>6</td>
</tr>
<tr>
<td>Integral plug, fits plug sockets to NEBU</td>
<td>7</td>
</tr>
<tr>
<td>Cable terminals</td>
<td>8</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Type</th>
<th>B1</th>
<th>B2</th>
<th>B3</th>
<th>D1</th>
<th>D2</th>
<th>D3</th>
<th>H1</th>
<th>H2</th>
<th>H3</th>
<th>H4</th>
<th>H5</th>
<th>H6</th>
<th>L1</th>
<th>L2</th>
<th>L3</th>
<th>L4</th>
<th>L5</th>
<th>L6</th>
<th>L7</th>
</tr>
</thead>
<tbody>
<tr>
<td>PEV-W-S/VPEV-W-S</td>
<td>18</td>
<td>8.8</td>
<td>3</td>
<td>M5</td>
<td>3.2</td>
<td>1.4</td>
<td>73.4</td>
<td>72</td>
<td>66</td>
<td>60</td>
<td>54</td>
<td>2.6</td>
<td>7.4</td>
<td>–</td>
<td>42</td>
<td>34.7</td>
<td>18.4</td>
<td>12</td>
<td>15.8</td>
</tr>
<tr>
<td>PEV-W-KL/VPEV-W-KL</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>
## Pressure and vacuum switches PEV-W/VPEV-W, H-rail mounting

### Technical data

<table>
<thead>
<tr>
<th>Pressure switch</th>
<th>Pneumatic connection</th>
<th>Electrical connection</th>
<th>Part No.</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>M5</td>
<td>Plug M8x1, 4-pin</td>
<td>152616 PEV-W-S-LED-GH</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Screw terminal, 4-pin</td>
<td>152618 PEV-W-KL-LED-GH</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Vacuum switch</th>
<th>Pneumatic connection</th>
<th>Electrical connection</th>
<th>Part No.</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>M5</td>
<td>Plug M8x1, 4-pin</td>
<td>152617 VPEV-W-S-LED-GH</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Screw terminal, 4-pin</td>
<td>152619 VPEV-W-KL-LED-GH</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Pressure switches PEV-SW27, screw-in

Peripherals overview

<table>
<thead>
<tr>
<th>Accessories</th>
<th>Page/online</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Angled socket</td>
<td></td>
</tr>
<tr>
<td>PEV-¼-A-WD</td>
<td></td>
</tr>
<tr>
<td>2. Angled socket</td>
<td></td>
</tr>
<tr>
<td>PEV-¼-WD-LED-…</td>
<td></td>
</tr>
</tbody>
</table>

Type codes

<table>
<thead>
<tr>
<th>Type</th>
<th>PEV</th>
<th>¼</th>
<th>A</th>
<th>SW27</th>
<th>—</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pneumatic connection</td>
<td>¼</td>
<td>G½</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Generation</td>
<td>A</td>
<td>A series</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Width across flats</td>
<td>SW27</td>
<td>27 mm</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Electrical connection</td>
<td>—</td>
<td>For angled plug socket PEV-¼-A-WD</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>B-OD</td>
<td>For angled plug socket PEV-¼-WD-LED-…</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
## General technical data

### General

- **CE marking (see declaration of conformity)**: To EU Low Voltage Directive

### Input signal/measuring element

- **Measured variable**: Relative pressure
- **Method of measurement**: Pneumatic/electric pressure transducer
- **Pressure measuring range [bar]**: 1 … 10
- **Operating pressure [bar]**: 1 … 10
- **Operating medium**: Compressed air to ISO 8573-1:2010
- **Note about the operating/pilot medium**: Lubricated operation possible (required during subsequent operation)
- **Temperature of medium [°C]**: –20 … +80
- **Ambient temperature [°C]**: –20 … +100

## Electrical data

### Switching output

- **Switching element function**: Changeover switch
- **Max. switching frequency [Hz]**: 3
- **Max. switching output voltage [V AC]**: 250
- **[V DC]**: 250
- **Max. output current [mA]**: 4,000
- **Operating voltage range [V DC]**: 12 … 250

### Electromechanical components

- **Electrical connection**: Plug, 4-pin

### Pin allocation

<table>
<thead>
<tr>
<th>Pin allocation</th>
<th>Pin</th>
<th>Meaning</th>
<th>PEV-1/4-A-SW27-B-OD</th>
<th>Pin</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>PEV-1/4-A-SW27</td>
<td>1</td>
<td>Switchable voltage</td>
<td></td>
<td>1</td>
<td>Switchable voltage</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>N/C contact</td>
<td></td>
<td>2</td>
<td>N/C contact</td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>N/O contact</td>
<td></td>
<td>4</td>
<td>N/O contact</td>
</tr>
</tbody>
</table>

### Mechanical components

- **Type of mounting**: Screw-in
- **Mounting position**: Any
- **Pneumatic connection**: G5/4
- **Product weight [g]**: 90
- **Housing material information**: Galvanised steel
Pressure switches PEV-SW27, screw-in

**Technical data**

### Display/operation

<table>
<thead>
<tr>
<th>Switching output</th>
<th>Threshold value setting range [bar]</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1 ... 10</td>
</tr>
</tbody>
</table>

### Immissions/emissions

<table>
<thead>
<tr>
<th>Protection</th>
</tr>
</thead>
<tbody>
<tr>
<td>IP65</td>
</tr>
</tbody>
</table>

### Dimensions

- **PEV-¼-A-SW27**
- **PEV-¼-A-SW27-B-OD**

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

- **Max. tightening torque 50 Nm**
- **Integral plug connector to DIN 46244**

<table>
<thead>
<tr>
<th>Type</th>
<th>B1</th>
<th>D1</th>
<th>D2</th>
<th>D3</th>
<th>H1</th>
<th>H2</th>
<th>H3</th>
<th>H4</th>
<th>C1</th>
</tr>
</thead>
<tbody>
<tr>
<td>PEV-¼-A-SW27</td>
<td>–</td>
<td>G14</td>
<td>30</td>
<td>26</td>
<td>58</td>
<td>8</td>
<td>2</td>
<td>1.3</td>
<td>27</td>
</tr>
<tr>
<td>PEV-¼-A-SW27-B-OD</td>
<td>30</td>
<td></td>
<td>34</td>
<td>–</td>
<td>74</td>
<td>–</td>
<td>–</td>
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</table>

### Ordering data

<table>
<thead>
<tr>
<th>Pressure switch</th>
<th>Pneumatic connection</th>
<th>Electrical connection</th>
<th>Part No.</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>G14</td>
<td>For angled plug socket PEV-¼-A-WD</td>
<td>159259</td>
<td>PEV-¼-A-SW27</td>
</tr>
<tr>
<td></td>
<td>G14</td>
<td>For angled plug socket PEV-¼-WD-LED ...</td>
<td>175252</td>
<td>PEV-¼-A-SW27-B-OD</td>
</tr>
</tbody>
</table>
Pressure and vacuum switches PEV/VPEV

Accessories

Angled socket PEV-¼-WD-LED-

for pressure switch PEV-¼-B-OD,
PEV-¼-SC-OD and
PEV-¼-A-SW27-B-OD

• With integrated LED for switching
  status indication

General technical data

<table>
<thead>
<tr>
<th>Type</th>
<th>PEV-¼-WD-LED-24</th>
<th>PEV-¼-WD-LED-230</th>
</tr>
</thead>
<tbody>
<tr>
<td>CE marking (see declaration of conformity)</td>
<td>To EU EMC Directive</td>
<td>To EU Low Voltage Directive</td>
</tr>
<tr>
<td>Note on materials</td>
<td>RoHS-compliant</td>
<td></td>
</tr>
</tbody>
</table>

Electronic components

<table>
<thead>
<tr>
<th>Type</th>
<th>PEV-¼-WD-LED-24</th>
<th>PEV-¼-WD-LED-230</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating voltage range [V AC]</td>
<td>–</td>
<td>0 ... 230</td>
</tr>
<tr>
<td>[V DC]</td>
<td>15 ... 30</td>
<td>0 ... 180</td>
</tr>
</tbody>
</table>

Electromechanical components

| Electrical connection | Angled socket, 4-pin |
| Acceptable current load [A] | 8 |

Mechanical components

| Type of mounting | Via through-hole |
| Housing material information | PA |

Display/operation

| Ready status display | Green LED |
| Switching status display | Yellow LED |

Immissions/emissions

| Ambient temperature [°C] | –40 ... +90 |
| Protection | IP65 |

Dimensions

Download CAD data ➔ www.festo.com/en/engineering

Dimensions and ordering data

<table>
<thead>
<tr>
<th>Type</th>
<th>B1</th>
<th>B2</th>
<th>D1</th>
<th>D2</th>
<th>D3</th>
<th>H1</th>
<th>H2</th>
<th>L1</th>
<th>L2</th>
<th>L3</th>
<th>Weight [g]</th>
<th>Part No.</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>PEV-¼-24</td>
<td>30</td>
<td>27.5</td>
<td>M3</td>
<td>22.5</td>
<td>Pgt1</td>
<td>53</td>
<td>43</td>
<td>34.2</td>
<td>5.5</td>
<td>1.5</td>
<td>34</td>
<td>164274</td>
<td>PEV-¼-WD-LED-24</td>
</tr>
<tr>
<td>PEV-¼-230</td>
<td>34</td>
<td>27.5</td>
<td>M3</td>
<td>22.5</td>
<td>Pgt1</td>
<td>53</td>
<td>43</td>
<td>34.2</td>
<td>5.5</td>
<td>1.5</td>
<td>34</td>
<td>164275</td>
<td>PEV-¼-WD-LED-230</td>
</tr>
</tbody>
</table>

[1] Inserts can be rotated 90°
Pressure and vacuum switches PEV/VPEV

Accessories

Angled plug socket PEV-¼-A-WD
for pressure switch PEV-¼-A-SW27

<table>
<thead>
<tr>
<th>General technical data</th>
</tr>
</thead>
<tbody>
<tr>
<td>Note on materials</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Electromechanical components</th>
</tr>
</thead>
<tbody>
<tr>
<td>Electrical connection</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Mechanical components</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type of mounting</td>
</tr>
<tr>
<td>Housing material information</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Immissions/ emissions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ambient temperature</td>
</tr>
<tr>
<td>Protection</td>
</tr>
</tbody>
</table>

**Dimensions**

<table>
<thead>
<tr>
<th>Dimensions and ordering data</th>
</tr>
</thead>
<tbody>
<tr>
<td>D1</td>
</tr>
<tr>
<td>-----</td>
</tr>
<tr>
<td>34</td>
</tr>
</tbody>
</table>

Download CAD data ➤ www.festo.com/en/engineering
Mounting plate APL
for pressure switch PEV and vacuum switch VPEV

Dimensions and ordering data

<table>
<thead>
<tr>
<th></th>
<th>B1</th>
<th>B2</th>
<th>B3</th>
<th>D1</th>
<th>D2</th>
<th>H1</th>
<th>H2</th>
<th>H3</th>
<th>H4</th>
<th>H5</th>
<th>L1</th>
</tr>
</thead>
<tbody>
<tr>
<td>For PEV</td>
<td>27</td>
<td>16</td>
<td>4.4</td>
<td>4.4</td>
<td>M4</td>
<td>87.3</td>
<td>10</td>
<td>7.7</td>
<td>5</td>
<td>2</td>
<td>88.5</td>
</tr>
<tr>
<td>For VPEV</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>L2</th>
<th>L3</th>
<th>L4</th>
<th>L5</th>
<th>L6</th>
<th>L7</th>
<th>L8</th>
<th>Weight</th>
<th>Part No.</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>For PEV</td>
<td>80.8</td>
<td>74</td>
<td>82</td>
<td>75</td>
<td>24</td>
<td>-</td>
<td>2.3</td>
<td>18</td>
<td>9349</td>
<td>APL-2N-PEV</td>
</tr>
<tr>
<td>For VPEV</td>
<td>81</td>
<td>81</td>
<td>75</td>
<td>24</td>
<td>-</td>
<td>22</td>
<td>2.3</td>
<td>18</td>
<td>150218</td>
<td>APL-2N-VPEV</td>
</tr>
</tbody>
</table>
Pressure and vacuum switches PEV/VPEV

Accessories

Mounting frame NRRQ

Scope of delivery:
2 x Connecting piece NRV-2N
2 x Profile rail NRQ-8-480
4 x Mounting bracket NRW-12/3
4 x Bolt NRB-12/60
4 x Socket head screw
  DIN 84-M6X18-4.8
4 x Socket head screw
  DIN 84-M6X12-4.8
4 x Mounting bracket NRW-9/1,5-B
4 x Socket head screw
  DIN 84-M4X10-4.8

Mounting frame NRW

Dimensions – Mounting frame NRRQ

Dimensions and ordering data

<table>
<thead>
<tr>
<th>Part No.</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>9365</td>
<td>NRRQ-2N</td>
</tr>
<tr>
<td>11571</td>
<td>NRW-9/1,5-B</td>
</tr>
</tbody>
</table>
### Pressure and vacuum switches PEV/VPEV

#### Accessories

**Ordering data – Plug socket MSSD**

<table>
<thead>
<tr>
<th>Electrical connection</th>
<th>Cable connector</th>
<th>Part No.</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>Angled socket, 3-pin, type A</td>
<td>Pg9</td>
<td>171157</td>
<td>MSSD-C-4P</td>
</tr>
</tbody>
</table>

**Ordering data – Connecting cable NEBU-M8**

<table>
<thead>
<tr>
<th>Electrical connection</th>
<th>Number of wires</th>
<th>Cable length [m]</th>
<th>Part No.</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>M8x1, straight socket</td>
<td>4</td>
<td>2.5</td>
<td>541342</td>
<td>NEBU-M8G4-K-2.5-LE4</td>
</tr>
<tr>
<td></td>
<td>5</td>
<td>541343</td>
<td>NEBU-M8G4-K-5-LE4</td>
<td></td>
</tr>
<tr>
<td>M8x1, angled socket</td>
<td>4</td>
<td>2.5</td>
<td>541344</td>
<td>NEBU-M8W4-K-2.5-LE4</td>
</tr>
<tr>
<td></td>
<td>5</td>
<td>541345</td>
<td>NEBU-M8W4-K-5-LE4</td>
<td></td>
</tr>
</tbody>
</table>

**Ordering data – Connecting cable NEBU-M12**

<table>
<thead>
<tr>
<th>Electrical connection</th>
<th>Number of wires</th>
<th>Cable length [m]</th>
<th>Part No.</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>M12x1, straight socket</td>
<td>4</td>
<td>2.5</td>
<td>550326</td>
<td>NEBU-M12G5-K-2.5-LE4</td>
</tr>
<tr>
<td></td>
<td>5</td>
<td>541328</td>
<td>NEBU-M12G5-K-5-LE4</td>
<td></td>
</tr>
<tr>
<td>M12x1, angled socket</td>
<td>4</td>
<td>2.5</td>
<td>550325</td>
<td>NEBU-M12W5-K-2.5-LE4</td>
</tr>
<tr>
<td></td>
<td>5</td>
<td>541329</td>
<td>NEBU-M12W5-K-5-LE4</td>
<td></td>
</tr>
</tbody>
</table>

**Ordering data – Mounting rail NRC**

<table>
<thead>
<tr>
<th>Description</th>
<th>Length</th>
<th>Part No.</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>G-rail to EN 50035</td>
<td>2 m</td>
<td>6756</td>
<td>NRC-32-2000</td>
</tr>
</tbody>
</table>

**Ordering data – Mounting rail NRH**

<table>
<thead>
<tr>
<th>Description</th>
<th>Length</th>
<th>Part No.</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>H-rail to EN 60715</td>
<td>2 m</td>
<td>35430</td>
<td>NRH-35-2000</td>
</tr>
</tbody>
</table>

**Ordering data – Mounting latch PENV**

<table>
<thead>
<tr>
<th>Description</th>
<th>Part No.</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>For mounting on mounting rail</td>
<td>164597</td>
<td>PENV-BGH</td>
</tr>
</tbody>
</table>
## PE converter PE/PEN/VPE

### Type codes

<table>
<thead>
<tr>
<th>Type</th>
<th>PE</th>
<th>½</th>
<th>2N</th>
<th>SW</th>
</tr>
</thead>
</table>

### Technical data

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Design</td>
<td>Pneumatic connection</td>
<td>G½</td>
<td>M5</td>
<td>G½</td>
<td></td>
</tr>
<tr>
<td>Electrical data</td>
<td>Operating voltage range (V DC)</td>
<td>12 ... 250</td>
<td>12 ... 30</td>
<td>12 ... 250</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Operating voltage range (V AC)</td>
<td>12 ... 250</td>
<td>–</td>
<td>12 ... 250</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Switch output</td>
<td>–</td>
<td>PNP</td>
<td>–</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Switching element function</td>
<td>Changeover switch</td>
<td>N/O contact</td>
<td>Changeover switch</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Max. output current (mA)</td>
<td>4,000</td>
<td>350</td>
<td>4,000</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Minimum load current (mA)</td>
<td>100</td>
<td>–</td>
<td>100</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Protection against short circuit</td>
<td>No</td>
<td>Yes</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Protection against polarity reversal</td>
<td>No</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Protection class</td>
<td>IP00, IP20 with protective cap</td>
<td>IP67</td>
<td>IP67</td>
<td>IP00, IP20 with protective cap</td>
</tr>
<tr>
<td></td>
<td>Operating and environmental conditions</td>
<td>Operating medium</td>
<td>Compressed air in accordance with ISO 8573-1:2010 [7:4:4]</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Note on operating/pilot medium</td>
<td>Operation with lubricated medium possible (in which case lubricated operation will always be required)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Operating pressure (bar)</td>
<td>0 ... 8</td>
<td>–1 ... +8</td>
<td>–0.95 ... 0</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Ambient temperature (°C)</td>
<td>0 ... 60</td>
<td>–20 ... +60</td>
<td>0 ... 60</td>
<td></td>
</tr>
<tr>
<td></td>
<td>CE mark (see declaration of conformity)</td>
<td>In accordance with EU Low Voltage Directive</td>
<td>In accordance with EU EMC directive</td>
<td>In accordance with EU Low Voltage Directive</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Certification</td>
<td>CCC</td>
<td>C-Tick</td>
<td>CCC</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Materials</td>
<td>Housing</td>
<td>Die-cast aluminium, polyamide</td>
<td>Die-cast zinc</td>
<td>Die-cast aluminium, polyamide</td>
</tr>
</tbody>
</table>

1) For information about the applicability of the component see the manufacturer’s EC declaration of conformity at: www.festo.com |

### Ordering data

<table>
<thead>
<tr>
<th>Operating pressure (bar)</th>
<th>Electrical connection</th>
<th>Part No.</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 ... 8</td>
<td>Screw terminal</td>
<td>7860</td>
<td>PE-1/8-2N</td>
</tr>
<tr>
<td></td>
<td>3 wires</td>
<td>7862</td>
<td>PE-1/8-2N-SW</td>
</tr>
<tr>
<td>–1 ... +8</td>
<td>Cable, 3-wire</td>
<td>8625</td>
<td>PEN-M5</td>
</tr>
<tr>
<td>–0.95 ... 0</td>
<td>Screw terminal</td>
<td>12594</td>
<td>VPE-1/8-2N</td>
</tr>
<tr>
<td></td>
<td>3 wires</td>
<td>12595</td>
<td>VPE-1/8-2N-SW</td>
</tr>
</tbody>
</table>
Pressure sensors SDE5

Key features and Peripherals overview

At a glance

SDE5-…-M8
Plug version, plug M8x1, 3-pin

SDE5-…-K
Cable version, 2.5 m long,

Linkable wall bracket with clip-in facility for sensors (included in the scope of delivery)

Product description

The pressure sensor SDE5 is a cost-effective alternative for simple and quick pressure monitoring. The “intelligent fitting” delivers instant information about the current pressure and is an equally effective device for object detection via back pressure as it is for pressure, regulation and vacuum detection.

Main applications

The pressure sensor SDE5 can be used wherever simple sensing of the current pressure is required:

- Compressed air monitoring
- Regulator monitoring
- Suction confirmation in vacuum technology
- Object detection via back pressure

Features

- Selectable output functions
- Teach-in function for programming
- Minimal assembly times thanks to QS fittings and linkable wall bracket
- Quick switching-point adjustment at the touch of a button
- Switching status indicated by an LED visible from all sides
- Relative pressure or differential pressure measurement
- Five pressure measuring ranges: 0 – –1, –1…1, 0..2, 0..6, 0..10 bar
- Analogue output: 0..10 V
- Electrical outputs: 1 switching output PNP or NPN

Peripherals overview

<table>
<thead>
<tr>
<th>Mounting attachments and accessories</th>
<th>Page/online</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Pressure sensor SDE5-…-M8, plug version</td>
<td>200</td>
</tr>
<tr>
<td>2. Pressure sensor SDE5-…-K, cable version</td>
<td>200</td>
</tr>
<tr>
<td>3. Wall bracket (included in scope of delivery)</td>
<td>–</td>
</tr>
<tr>
<td>4. Connecting cable NEBU-M8W3 with angled plug socket</td>
<td>205</td>
</tr>
<tr>
<td>5. Connecting cable NEBU-M8G3 with straight plug socket</td>
<td>205</td>
</tr>
</tbody>
</table>
### Type codes

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>SDE5</td>
<td>Pressure sensor</td>
</tr>
</tbody>
</table>

### Pressure measuring range

<table>
<thead>
<tr>
<th>Code</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>V1</td>
<td>0...−1 bar</td>
</tr>
<tr>
<td>D2</td>
<td>0...+2 bar</td>
</tr>
<tr>
<td>D10</td>
<td>0...+10 bar</td>
</tr>
</tbody>
</table>

### Pressure input

- Relative pressure
- Differential pressure

### Output function

- Freely programmable
- Selectable
- Threshold value with fixed hysteresis, 1 teach-in pressure
  - N/O contact
  - N/C contact
- Threshold value with fixed hysteresis, 2 teach-in pressures
  - N/O contact
- Threshold value with variable hysteresis, 2 teach-in pressures
  - N/O contact
- Window comparator with fixed hysteresis, 2 teach-in pressures
  - N/O contact
- N/C contact
- Analogue output (no binary switching function)
  - 0...10 V

### Pneumatic connection

- Push-in connector at both ends
  - For tubing Ø 4 mm
  - For tubing Ø 6 mm
- Push-in connector at one end
  - For tubing Ø 4 mm
  - For tubing Ø 6 mm
  - For tubing Ø 3/16" |

### Electrical output

- 1 switching output PNP
- 1 switching output NPN
- 1 analogue output 0...10 V

### Electrical connection

- Cable, 2.5 m long, 3-wire
- Plug, M8x1, 3-pin

Additional variants can be ordered using the modular system ➔ 204
## Pressure sensors SDE5

### Function

**Switching output PNP**

![Switching output PNP diagram]

**Switching output NPN**

![Switching output NPN diagram]

### General technical data

<table>
<thead>
<tr>
<th>Type SDE5</th>
<th>V1</th>
<th>Q2</th>
<th>-D2</th>
<th>-D6</th>
<th>D10</th>
</tr>
</thead>
</table>

#### General information

- **Certification**
  - CE mark (see declaration of conformity)
  - cULus recognized (OL)
  - To EU EMC Directive
- **Note on materials**
  - RoHS-compliant
- **Input signal/measuring element**
  - Measured variable: Relative pressure, Differential pressure
- **Method of measurement**
  - Piezoresistive pressure sensor
- **Pressure measuring range**
  - [bar]: 0...–1, –1...+1, 0...+2, 0...+6, 0...+10
- **Operating medium**
  - Compressed air in accordance with ISO 8573-1:2010 [7:4:4]
- **Note on operating/pilot medium**
  - Operation with lubricated medium possible (in which case lubricated operation will always be required)
- **Temperature of medium**
  - [°C]: 0...+50
- **Ambient temperature**
  - [°C]: 0...+50

#### Electrical data

- **Voltage**
  - [V]: 0...10
- **Accuracy**
  - Analogue output ±FS:[%]: 3 (ambient temperature 20...+25 °C), 4 (ambient temperature 0...+50 °C)
  - Linearity error ±FS:[%]: 0.3

---

1) % FS = % of the measuring range final value (full-scale)
### Electrical data

<table>
<thead>
<tr>
<th>Output, additional data</th>
<th>Yes</th>
</tr>
</thead>
</table>

#### Electronics

- **Operating voltage range DC [V]**: 15 ... 30
- **Protection against polarity reversal**: For all electrical connections

#### Electromechanics

- **Electrical connection**: Plug M8x1, 3-pin, round design, to EN 60947-5-2
  - Cable 2.5 m, 3-wire, to EN 60947-5-2

### Pin allocation

<table>
<thead>
<tr>
<th>Plug, M8x1, 3-pin</th>
<th>Pin</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1</td>
<td>Operating voltage +24 V DC</td>
</tr>
<tr>
<td></td>
<td>2/4</td>
<td>Switching output or analogue output</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>0 V</td>
</tr>
</tbody>
</table>

### Mechanics

- **Type of mounting**: Via accessories
- **Mounting position**: Any
- **Pneumatic connection**: QS-4, QS-6, QS-¼", QS-½"
- **Product weight [g]**: 19 (plug version), 47 (cable version)
- **Product weight of wall bracket [g]**: 5.5
- **Material of housing**: PA, POM

### Display/operation

- **Switching output**
  - **Switching status display**: Yellow LED
  - **Threshold value setting range [%]**: 0 ... 100

- **Analogue output**
  - **Ready status display**: Green LED

### Immissions/emissions

- **Storage temperature [°C]**: −20 ... +80
- **Protection class**: IP640
- **Electrical protection class**: III
- **Corrosion resistance class CRC[1]**: 2

---

1) Corrosion resistance class 2 according to Festo standard 940 070
Components subject to moderate corrosion stress. 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.
### Dimensions

<table>
<thead>
<tr>
<th>Type</th>
<th>B1</th>
<th>B2</th>
<th>B3</th>
<th>D1</th>
<th>D2</th>
<th>H1</th>
<th>H2</th>
<th>L1</th>
<th>L2</th>
<th>L3</th>
<th>L4</th>
<th>L5</th>
<th>L6</th>
<th>L7</th>
</tr>
</thead>
<tbody>
<tr>
<td>SDE5-…-M8, plug version</td>
<td>16</td>
<td>23</td>
<td>21.4</td>
<td>-</td>
<td>4.5</td>
<td>24.5</td>
<td>40.3</td>
<td>38.5</td>
<td>-</td>
<td>45.5</td>
<td>56</td>
<td>73.5</td>
<td>-</td>
<td>38.5</td>
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<tr>
<td>SDE5-…-K, cable version</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>2.9</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>41.5</td>
<td>-</td>
<td>-</td>
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</tr>
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</table>

### Ordering data – Measured variable differential pressure

<table>
<thead>
<tr>
<th>Pressure measuring range [bar]</th>
<th>Switching element function</th>
<th>Electrical output</th>
<th>Electrical connection</th>
<th>Pneumatic connection</th>
<th>Part No.</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 ... +10</td>
<td>Freely programmable (switching/teach-in function, N/O contact, N/C contact)</td>
<td>Switchable</td>
<td>Switching output PNP</td>
<td>Plug, M8x1, 3-pin</td>
<td>QS-6</td>
<td>SDE5-D10Z-FP-Q6-P-M8</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>At one end</td>
<td>At both ends</td>
<td>S67460</td>
<td></td>
</tr>
<tr>
<td>0 ... +10</td>
<td>Threshold value with fixed hysteresis, 1 teach-in pressure</td>
<td>N/O contact</td>
<td>Switching output PNP</td>
<td>Plug, M8x1, 3-pin</td>
<td>QS-6</td>
<td>S67462 SDE5-D10Z-O-Q6-P-M8</td>
</tr>
</tbody>
</table>

Download CAD data ➔ www.festo.com/en/engineering
## Sensors > Pressure and vacuum sensors
### Pressure sensors SDE5
#### Technical data

<table>
<thead>
<tr>
<th>Pressure measuring range [bar]</th>
<th>Switching element function</th>
<th>Electrical output</th>
<th>Electrical connection</th>
<th>Pneumatic connection</th>
<th>Part No.</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Switching output</td>
<td>Plug, M8x1, 3-pin</td>
<td>At one end</td>
<td>QS-6</td>
<td>SDE5-V1-FP-Q6-P-M8</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Switching output</td>
<td>Plug, M8x1, 3-pin</td>
<td>At both ends</td>
<td>QS-6</td>
<td>SDE5-D10-FP-Q6-P-M8</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Switching output</td>
<td>Plug, M8x1, 3-pin</td>
<td>–</td>
<td>QS-6</td>
<td>SDE5-D10-C-Q6-P-M8</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Switching output</td>
<td>Cable, 3-wire</td>
<td>–</td>
<td>QS-6</td>
<td>SDE5-D10-C-Q6-P-M8</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Switching output</td>
<td>Plug, M8x1, 3-pin</td>
<td>–</td>
<td>QS-6</td>
<td>SDE5-D10-C-Q6-P-M8</td>
</tr>
</tbody>
</table>

#### Freely programmable (switching/teach-in function, N/O contact, N/C contact)

<table>
<thead>
<tr>
<th>Pressure measuring range [bar]</th>
<th>Switching element function</th>
<th>Electrical output</th>
<th>Electrical connection</th>
<th>Part No.</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>0...–1</td>
<td>Switchable</td>
<td>Switching output</td>
<td>Plug, M8x1, 3-pin</td>
<td>QS-4</td>
<td>SDE5-V1-O-Q4E-P-M8</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Switching output</td>
<td>Plug, M8x1, 3-pin</td>
<td>QS-6</td>
<td>SDE5-D10-O-Q6E-P-M8</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Switching output</td>
<td>Cable, 3-wire</td>
<td>QS-6</td>
<td>SDE5-D10-O-Q6E-P-M8</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Switching output</td>
<td>Plug, M8x1, 3-pin</td>
<td>QS-6</td>
<td>SDE5-D10-O-Q6P-M8</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Switching output</td>
<td>Cable, 3-wire</td>
<td>QS-6</td>
<td>SDE5-D10-O-Q6P-M8</td>
</tr>
</tbody>
</table>

#### Threshold value with fixed hysteresis, 1 teach-in pressure

<table>
<thead>
<tr>
<th>Pressure measuring range [bar]</th>
<th>Switching element function</th>
<th>Electrical output</th>
<th>Electrical connection</th>
<th>Part No.</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>0...–1</td>
<td>N/O contact</td>
<td>Switching output</td>
<td>Plug, M8x1, 3-pin</td>
<td>QS-4</td>
<td>SDE5-V1-O-Q4E-P-M8</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Switching output</td>
<td>Plug, M8x1, 3-pin</td>
<td>QS-6</td>
<td>SDE5-D10-O-Q6E-P-M8</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Switching output</td>
<td>Cable, 3-wire</td>
<td>QS-6</td>
<td>SDE5-D10-O-Q6E-P-M8</td>
</tr>
<tr>
<td>0...+2</td>
<td>N/O contact</td>
<td>Switching output</td>
<td>Cable, 3-wire</td>
<td>QS-6</td>
<td>SDE5-D10-O-Q6E-P-M8</td>
</tr>
<tr>
<td>0...+10</td>
<td>N/O contact</td>
<td>Switching output</td>
<td>Plug, M8x1, 3-pin</td>
<td>QS-6</td>
<td>SDE5-D10-O-Q6P-M8</td>
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<tr>
<td></td>
<td></td>
<td>Switching output</td>
<td>Cable, 3-wire</td>
<td>QS-6</td>
<td>SDE5-D10-O-Q6P-M8</td>
</tr>
</tbody>
</table>

#### Window comparator with fixed hysteresis, 2 teach-in pressures

<table>
<thead>
<tr>
<th>Pressure measuring range [bar]</th>
<th>Switching element function</th>
<th>Electrical output</th>
<th>Electrical connection</th>
<th>Part No.</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N/O contact</td>
<td>Switching output</td>
<td>Plug, M8x1, 3-pin</td>
<td>QS-6</td>
<td>SDE5-D10-O-Q6E-P-M8</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Switching output</td>
<td>Plug, M8x1, 3-pin</td>
<td>QS-6</td>
<td>SDE5-D10-O-Q6P-M8</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Switching output</td>
<td>Cable, 3-wire</td>
<td>QS-6</td>
<td>SDE5-D10-O-Q6P-M8</td>
</tr>
</tbody>
</table>

#### Analogue output (no binary switching function)

<table>
<thead>
<tr>
<th>Pressure measuring range [bar]</th>
<th>Electrical output</th>
<th>Electrical connection</th>
<th>Part No.</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>0...–1</td>
<td>Analogue output</td>
<td>Plug, M8x1, 3-pin</td>
<td>QS-6</td>
<td>SDE5-V1-NF-Q6E-V-M8</td>
</tr>
<tr>
<td></td>
<td>0...–10 V</td>
<td>Cable, 3-wire</td>
<td>QS-6</td>
<td>SDE5-V1-NF-Q6E-V-M8</td>
</tr>
<tr>
<td>0...+10</td>
<td>Analogue output</td>
<td>Plug, M8x1, 3-pin</td>
<td>QS-6</td>
<td>SDE5-D10-NF-Q6E-V-M8</td>
</tr>
<tr>
<td></td>
<td>0...–10 V</td>
<td>Cable, 3-wire</td>
<td>QS-6</td>
<td>SDE5-D10-NF-Q6E-V-M8</td>
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</tbody>
</table>
### Ordering table

<table>
<thead>
<tr>
<th>Size</th>
<th>Module No.</th>
<th>Function</th>
<th>Conditions</th>
<th>Code</th>
<th>Enter code</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>529027</td>
<td>Pressure sensor</td>
<td>SDE5</td>
<td>SDE5</td>
<td>529027</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Pressure measuring range [bar]</td>
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</tr>
<tr>
<td></td>
<td></td>
<td>0 ... –1</td>
<td>-V1</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>–1 ... 1</td>
<td>-B2</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>0 ... 2</td>
<td>-D2</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>0 ... 6</td>
<td>-D6</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>0 ... 10</td>
<td>-D10</td>
<td></td>
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<td>Pressure input</td>
<td>Relative pressure</td>
<td></td>
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<tr>
<td></td>
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<td>Differential pressure</td>
<td></td>
<td></td>
<td>Z</td>
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<td></td>
<td></td>
<td>Output function</td>
<td>Freely programmable (switching/teach-in function, N/O contact, N/C contact)</td>
<td>+P</td>
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<tr>
<td></td>
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<td>Threshold value with fixed hysteresis, 1 teach-in point, N/O contact</td>
<td>-O</td>
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<tr>
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<td></td>
<td>Threshold value with fixed hysteresis, 1 teach-in point, N/C contact</td>
<td>-C</td>
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<tr>
<td></td>
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<td>Threshold value with fixed hysteresis, 2 teach-in points, N/O contact</td>
<td>-O1</td>
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<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Threshold value with fixed hysteresis, 2 teach-in points, N/C contact</td>
<td>-C1</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Threshold value with variable hysteresis, N/O contact</td>
<td>-O2</td>
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<td>Threshold value with variable hysteresis, N/C contact</td>
<td>-C2</td>
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<td></td>
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<tr>
<td></td>
<td></td>
<td>Window comparator with fixed hysteresis, N/O contact</td>
<td>-O3</td>
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<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Window comparator with fixed hysteresis, N/C contact</td>
<td>-C3</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>No binary switching function (analog output)</td>
<td>NF</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>Pneumatic connection</td>
<td>Push-in connector 4 mm, at both ends</td>
<td>-Q4</td>
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<td></td>
<td></td>
<td></td>
<td>Push-in connector 6 mm, at both ends</td>
<td>-Q6</td>
<td></td>
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<tr>
<td></td>
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<td></td>
<td>Push-in connector ⅓&quot;, at both ends</td>
<td>-T14</td>
<td></td>
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<td></td>
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<td></td>
<td>Push-in connector ⅓&quot;, at both ends</td>
<td>-T532</td>
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<td></td>
<td></td>
<td>Push-in connector 4 mm, at one end</td>
<td>-Q4E</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>Push-in connector 6 mm, at one end</td>
<td>-Q6E</td>
<td></td>
</tr>
<tr>
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<td></td>
<td></td>
<td>Push-in connector ⅓&quot;, at one end</td>
<td>-T14E</td>
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<td>Push-in connector ⅓&quot;, at one end</td>
<td>-T532E</td>
<td></td>
</tr>
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<td></td>
<td></td>
<td>Electrical output</td>
<td>1 switching output PNP</td>
<td>+P</td>
<td></td>
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<tr>
<td></td>
<td></td>
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<td>1 switching output NPN</td>
<td>+N</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>1 analogue output 0 ... 10 V</td>
<td>+V</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Electrical connection</td>
<td>Cable, 2.5 m</td>
<td>+K</td>
<td></td>
</tr>
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<td></td>
<td></td>
<td></td>
<td>Plug M8, 3-pin</td>
<td>+M8</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Electrical accessories</td>
<td>Connecting cable, straight socket, 2.5 m</td>
<td>+G</td>
<td></td>
</tr>
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<td></td>
<td></td>
<td></td>
<td>Connecting cable, angled socket, 2.5 m</td>
<td>+W</td>
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<td></td>
<td></td>
<td></td>
<td>Connecting cable, straight socket, 5 m</td>
<td>+G5</td>
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</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Connecting cable, angled socket, 5 m</td>
<td>+W5</td>
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<tr>
<td></td>
<td></td>
<td>X teach-in point permanently set in bar</td>
<td>–0.85 ... 1017</td>
<td>-X</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>X teach-in point negative</td>
<td>Negative range</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Y teach-in point permanently set in bar</td>
<td>–0.85 ... 1017</td>
<td>-Y</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Y teach-in point negative</td>
<td>Negative range</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Notes

1. Permitted value range. The value for the permanently set teach-in point must always be within the chosen pressure measuring range V1, B2, D2, D6, D10.

2. Note on V1: Enter the teach-in pressure without a sign.

3. Note on B2: Enter the teach-in pressure for vacuum without a sign, but with a suffix "V", see V1 or B2.

### Transfer order code

<table>
<thead>
<tr>
<th>529027</th>
<th>SDE5</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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<td></td>
</tr>
</tbody>
</table>

---

**Sensors > Pressure and vacuum sensors >**

**Sensors**

**1.4**

**Pressure sensors SDE5**

Ordering data – Modular products

---

**www.festo.com/catalogue/**...
### Ordering data – Connecting cable NEBU-M8

<table>
<thead>
<tr>
<th>Electrical connection</th>
<th>Number of wires</th>
<th>Cable length [m]</th>
<th>Order code</th>
<th>Part No.</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>M8x1, straight plug socket</td>
<td>3</td>
<td>2.5</td>
<td>G</td>
<td>541333</td>
<td>NEBU-M8G3-K-2.5-LE3</td>
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<tr>
<td></td>
<td>3</td>
<td>5</td>
<td>G5</td>
<td>541334</td>
<td>NEBU-M8G3-K-5-LE3</td>
</tr>
<tr>
<td>M8x1, angled plug socket</td>
<td>3</td>
<td>2.5</td>
<td>W</td>
<td>541338</td>
<td>NEBU-M8W3-K-2.5-LE3</td>
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<tr>
<td></td>
<td>3</td>
<td>5</td>
<td>W5</td>
<td>541341</td>
<td>NEBU-M8W3-K-5-LE3</td>
</tr>
</tbody>
</table>

1) When ordering using the modular system ➔ 204

Technical data ➔ Internet: nebu
Pressure switches SDE5

Application examples

**Vacuum monitoring**

- Pressure sensor SDE5 in combination with a vacuum generator VN for vacuum monitoring in the handling of bottles
- Pressure sensor SDE5 as suction monitoring in the handling of small parts, such as computer chips

**Pressure monitoring**

- Pressure sensor SDE5 as pressure monitor for the pressing in of punched parts
- Pressure sensor SDE5 as "inline variant" for pressure range monitoring on a compressed air screw driver
Pressure sensors SDE3, with display
Pressure sensors SDE3, with display

At a glance

SDE3-…-M…
plug version,
plug M8x1 and M12x1

Fast H-rail, wall or surface mounting

High-contrast, two-colour LCD display

Pressure display:
– Alphanumeric
– Bar chart

SDE3-…-FQ…
cable with plug

Fast front panel mounting

Greater ease of use
– Easy teach-in
– Intuitive user guidance via LCD display

Product description

The pressure sensor SDE3 is a slim, space-optimised pressure sensor. It can be used wherever information about the current pressure is required and the focus is on space-saving mounting combined with ease of use.

Main applications

- Compressed air monitoring
- Regulator monitoring
- Suction confirmation in vacuum technology
- Leak tests
- Object detection via back pressure
- Differential pressure measurement

Key features

- Fastest possible H-rail and front panel mounting in a small space
- Minimal assembly times thanks to QS connections
- Intuitive user guidance via LCD display
- Alphanumeric and bar chart pressure display for dynamic processes
- Individual alphanumeric code lock for protection from manipulation
- Easy teach-in
- Relative pressure, differential pressure or two independent pressure inputs
- Five pressure measuring ranges: 0…-1, -1…+1, 0…2, 0…6, 0…10 bar
- High-contrast, two-colour LCD display
- Electrical outputs: 2 switching outputs PNP or NPN

Product range overview

<table>
<thead>
<tr>
<th>Measured variable</th>
<th>Pressure measuring range [bar]</th>
<th>Switching function</th>
<th>Pneumatic connection</th>
<th>Electrical connection</th>
<th>Type of mounting</th>
<th>Electrical output</th>
</tr>
</thead>
<tbody>
<tr>
<td>1x relative pressure, 2x relative pressure, 1x differential pressure</td>
<td>0 … -1, -1 … +1, 0 … 2, 0 … 6, 0 … 10</td>
<td>Freely programmable</td>
<td>Push-in connector for tubing O.D. ( \varnothing 4 ) mm for tubing O.D. ( \varnothing 5/32&quot; )</td>
<td>Plug M8x1, Plug M12x1, Cable</td>
<td>Via H-rail, wall bracket, surface bracket, front panel mounting or through-hole</td>
<td>2x PNP –</td>
</tr>
<tr>
<td>1x relative pressure and 1x differential pressure</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>2x NPN –</td>
<td></td>
</tr>
</tbody>
</table>
### Pressure sensors SDE3, with display

#### Peripherals overview

<table>
<thead>
<tr>
<th>Accessory Description</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pressure sensor SDE3-...-K</td>
<td>211</td>
</tr>
<tr>
<td>Pressure sensor SDE3-...-M8/-M12</td>
<td>211</td>
</tr>
<tr>
<td>Pressure sensor SDE3-...-F...</td>
<td>211</td>
</tr>
<tr>
<td>Connecting cable NEBU, straight socket</td>
<td>217</td>
</tr>
<tr>
<td>Connecting cable NEBU, angled socket</td>
<td>217</td>
</tr>
<tr>
<td>Adapter plate SXE3-W</td>
<td>217</td>
</tr>
<tr>
<td>(included in the scope of delivery with SDE3-...-W...)</td>
<td></td>
</tr>
<tr>
<td>Mounting rail to EN 60715</td>
<td>nrh</td>
</tr>
<tr>
<td>Clamping plate</td>
<td>-</td>
</tr>
<tr>
<td>(included in the scope of delivery with SDE3-...-F...)</td>
<td></td>
</tr>
</tbody>
</table>
## Pressure sensors SDE3, with display

### Type codes

<table>
<thead>
<tr>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>SDE3</td>
<td>Piezoresistive pressure sensor with display</td>
</tr>
</tbody>
</table>

### Pressure measuring range [bar]

<table>
<thead>
<tr>
<th>Code</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>V1</td>
<td>0 — 1</td>
</tr>
<tr>
<td>B2</td>
<td>-1 — +1</td>
</tr>
<tr>
<td>D2</td>
<td>0 — 2</td>
</tr>
<tr>
<td>D6</td>
<td>0 — 6</td>
</tr>
<tr>
<td>D10</td>
<td>0 — 10</td>
</tr>
</tbody>
</table>

### Pressure input

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>S</td>
<td>1x relative pressure</td>
</tr>
<tr>
<td>D</td>
<td>2x relative pressure</td>
</tr>
<tr>
<td>M</td>
<td>1x relative pressure, 1x differential pressure</td>
</tr>
<tr>
<td>Z</td>
<td>1x differential pressure</td>
</tr>
</tbody>
</table>

### Display

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>B</td>
<td>Values in bar</td>
</tr>
<tr>
<td>H</td>
<td>Values in inches of mercury</td>
</tr>
</tbody>
</table>

### Mounting/pneumatic connection

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>HQ4</td>
<td>Via H-rail, 4 mm push-in connector</td>
</tr>
<tr>
<td>WQ4</td>
<td>Wall mounting, 4 mm push-in connector</td>
</tr>
<tr>
<td>FQ4</td>
<td>Front panel mounting, 4 mm push-in connector</td>
</tr>
</tbody>
</table>

### Electrical output

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>2P</td>
<td>2 switching outputs PNP</td>
</tr>
<tr>
<td>2N</td>
<td>2 switching outputs NPN</td>
</tr>
</tbody>
</table>

### Electrical connection

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>M8</td>
<td>Plug M8x1</td>
</tr>
<tr>
<td>M12</td>
<td>Plug M12x1</td>
</tr>
</tbody>
</table>

### Additional variants can be ordered using the modular system ➔ 216

- Display
- Mounting/pneumatic connection
- Electrical connection
- EU Certification
- Electrical accessories
## Pressure sensors SDE3, with display

### Technical data

#### Function

- **Voltage**: 15 ... 30 V DC
- **Pressure**: –1 ... +10 bar
- **Temperature range**: 0 ... 50 °C

#### General technical data

<table>
<thead>
<tr>
<th>Specification</th>
<th>V1</th>
<th>B2</th>
<th>D2</th>
<th>D6</th>
<th>D10</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>General</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Certification</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>cULus recognized (OL)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>C-Tick</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>CE marking (see declaration of conformity)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>To EU EMC Directive</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>To EU Explosion Protection Directive (ATEX)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Note on materials</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Free of copper and PTFE</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>RoHS-compliant</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Input signal/measuring element</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Measured variable</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Relative pressure</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2x relative pressure</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1x relative pressure, 1x differential pressure</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Differential pressure</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Method of measurement</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Piezoresistive pressure sensor with display</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Operating medium</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Compressed air in accordance with ISO 8573-1:2010 [7:4:4]</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Note on operating/pilot medium</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Operation with lubricated medium possible (in which case lubricated operation will always be required)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Pressure measuring range</strong></td>
<td>bar</td>
<td>0 ... –1</td>
<td>–1 ... +1</td>
<td>0 ... 2</td>
<td>0 ... 6</td>
</tr>
<tr>
<td><strong>Temperature of medium</strong></td>
<td>°C</td>
<td>0 ... 50</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Ambient temperature</strong></td>
<td>°C</td>
<td>0 ... 50</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

1) For information about the applicability of the component see the manufacturer’s EC declaration of conformity at: www.festo.com

#### Electrical data

<table>
<thead>
<tr>
<th>Specification</th>
<th>-2P</th>
<th>-2N</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Output, general</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Accuracy FS [%]</td>
<td></td>
<td>2</td>
</tr>
<tr>
<td><strong>Switching output</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Switching output 2x PNP</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Switching output 2x NPN</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Switching function</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Freely programmable</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Switching element function</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Switchable</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Reproducibility of switching value [%]</strong></td>
<td></td>
<td>0.3</td>
</tr>
<tr>
<td>Max. output current [mA]</td>
<td></td>
<td>100</td>
</tr>
<tr>
<td><strong>Output, additional data</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Protection against short circuit</td>
<td></td>
<td>Pulsed</td>
</tr>
<tr>
<td><strong>Electronic components</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Operating voltage range DC [V]</td>
<td></td>
<td>15 ... 30</td>
</tr>
<tr>
<td>Reverse polarity protection</td>
<td>For all electrical connections</td>
<td></td>
</tr>
<tr>
<td>Linearity error ±FS [%]</td>
<td></td>
<td>0.3</td>
</tr>
</tbody>
</table>

1) % FS = % of the measuring range final value (full scale)
### Pressure sensors SDE3, with display

**Technical data**

#### Electrical data

<table>
<thead>
<tr>
<th>SDE3</th>
<th>-2P</th>
<th>-2N</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Electromechanical components</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Electrical connection</strong></td>
<td>Plug M6x1, 4-pin, round design to EN 60 947-5-2</td>
<td>Plug M12x1, 5-pin, round design to EN 60 947-5-2</td>
</tr>
<tr>
<td></td>
<td>Cable with plug M6x1, 4-pin, round design to EN 60 947-5-2</td>
<td>Cable with plug M12x1, 5-pin, round design to EN 60 947-5-2</td>
</tr>
<tr>
<td></td>
<td>Cable 2.5 m, 4-wire, to EN 60 947-5-2</td>
<td></td>
</tr>
</tbody>
</table>

#### Pin allocation to EN 60947-5-2

**Plug, 4-pin**

<table>
<thead>
<tr>
<th>M6x1</th>
<th>Pin</th>
<th>Wire colour</th>
<th>Allocation</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Brown</td>
<td>+</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Blue</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Black</td>
<td>Output A</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>White</td>
<td>Output B</td>
<td></td>
</tr>
</tbody>
</table>

**Plug, 5-pin**

<table>
<thead>
<tr>
<th>M12x1</th>
<th>Pin</th>
<th>Wire colour</th>
<th>Allocation</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Brown</td>
<td>+</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Blue</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Black</td>
<td>Output A</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>White</td>
<td>Output B</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Unused</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### Mechanical components

<table>
<thead>
<tr>
<th>SDE3</th>
<th>-H...</th>
<th>-W...</th>
<th>-F...</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Type of mounting</strong></td>
<td>Via H-rail</td>
<td>Via through-hole</td>
<td>Front panel mounting</td>
</tr>
<tr>
<td><strong>Mounting position</strong></td>
<td>Any</td>
<td>Via H-rail</td>
<td>Via wall/surface bracket</td>
</tr>
<tr>
<td><strong>Pneumatic connection</strong></td>
<td>GS-4</td>
<td>GS-5/4</td>
<td></td>
</tr>
<tr>
<td><strong>Product weight [g]</strong></td>
<td>37</td>
<td>37</td>
<td>61</td>
</tr>
<tr>
<td><strong>Adapter plate weight [g]</strong></td>
<td>–</td>
<td>6</td>
<td>–</td>
</tr>
<tr>
<td><strong>Cable length [m]</strong></td>
<td>–</td>
<td>0.3</td>
<td></td>
</tr>
<tr>
<td><strong>Housing materials</strong></td>
<td>PA, reinforced</td>
<td>PC</td>
<td></td>
</tr>
</tbody>
</table>

#### Display/operation

| | Illuminated LCD |
| **Display type** |       |
| **Switching status display** | LCD yellow |
| **Setting options** | Teach-in |
| **Tamper protection** | PIN code |
| **Threshold value setting range [%]** | 0 ... 100 |
| **Hysteresis setting range [%]** | 0 ... 90 |

#### Immissions/emissions

| | IP65 |
| **Protection class** |       |
| **Corrosion resistance class CRC** | 2 |

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

Components subject to moderate corrosion stress. 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.

### ATEX

<table>
<thead>
<tr>
<th>SDE3...</th>
<th>-EX2</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>ATEX category for gas</strong></td>
<td>II 3G</td>
</tr>
<tr>
<td><strong>Explosion ignition protection type for gas</strong></td>
<td>Ex nA nL IIC T4 X</td>
</tr>
<tr>
<td><strong>ATEX category for dust</strong></td>
<td>II 3D</td>
</tr>
<tr>
<td><strong>Explosion ignition protection type for dust</strong></td>
<td>Ex d A22 IP65 T80°C X</td>
</tr>
<tr>
<td><strong>Explosion-proof temperature rating</strong></td>
<td>0 °C ≤ Ta ≤ +40 °C</td>
</tr>
</tbody>
</table>
## Pressure sensors SDE3, with display

### Technical data

#### Dimensions


**H-rail, wall or surface mounting**

<table>
<thead>
<tr>
<th>Type</th>
<th>B1</th>
<th>B2</th>
<th>B3</th>
<th>D1</th>
<th>D2</th>
<th>D3</th>
<th>H1</th>
<th>H2</th>
<th>L1</th>
<th>L2</th>
<th>L3</th>
<th>L4</th>
<th>L5</th>
<th>L6</th>
<th>L7</th>
<th>L8</th>
</tr>
</thead>
<tbody>
<tr>
<td>SDE3...-HQ4-M8</td>
<td>20</td>
<td>14</td>
<td>-</td>
<td>QS4</td>
<td>M8x1</td>
<td>3.4</td>
<td>37</td>
<td>4</td>
<td>65</td>
<td>14</td>
<td>35.4</td>
<td>75</td>
<td>24.3</td>
<td>30</td>
<td>33.2</td>
<td>-</td>
</tr>
<tr>
<td>SDE3...-HQ4-M12</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SDE3...-HT532-M8</td>
<td>20</td>
<td>14</td>
<td>-</td>
<td>QS4</td>
<td>M8x1</td>
<td>3.4</td>
<td>37</td>
<td>4</td>
<td>65</td>
<td>14</td>
<td>35.4</td>
<td>75</td>
<td>24.3</td>
<td>30</td>
<td>33.2</td>
<td>-</td>
</tr>
<tr>
<td>SDE3...-HT532-M12</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SDE3...-WQ4-M8</td>
<td>20</td>
<td>14</td>
<td>12</td>
<td>QS4</td>
<td>M8x1</td>
<td>3.4</td>
<td>37</td>
<td>4</td>
<td>65</td>
<td>14</td>
<td>35.4</td>
<td>75</td>
<td>24.3</td>
<td>30</td>
<td>33.2</td>
<td>9</td>
</tr>
<tr>
<td>SDE3...-WQ4-M12</td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SDE3...-WT532-M8</td>
<td>20</td>
<td>14</td>
<td>12</td>
<td>QS-5</td>
<td>M8x1</td>
<td>3.4</td>
<td>37</td>
<td>4</td>
<td>65</td>
<td>14</td>
<td>35.4</td>
<td>75</td>
<td>24.3</td>
<td>30</td>
<td>33.2</td>
<td>9</td>
</tr>
<tr>
<td>SDE3...-WT532-M12</td>
<td></td>
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<td></td>
<td></td>
</tr>
</tbody>
</table>

**Type**

- B1
- B2
- B3
- D1
- D2
- D3
- H1
- H2
- L1
- L2
- L3
- L4
- L5
- L6
- L7
- L8

**Front panel mounting**

<table>
<thead>
<tr>
<th>Type</th>
<th>B1</th>
<th>B2</th>
<th>B3</th>
<th>B4</th>
<th>B5</th>
<th>D1</th>
<th>D2</th>
<th>H1</th>
<th>H2</th>
<th>L1</th>
<th>L2</th>
<th>L3</th>
<th>L4</th>
<th>L5</th>
<th>L6</th>
<th>L7</th>
<th>L8</th>
</tr>
</thead>
<tbody>
<tr>
<td>SDE3...-FQ4-M8</td>
<td>27.4</td>
<td>14</td>
<td>35</td>
<td>24</td>
<td>21.6</td>
<td>QS-4</td>
<td>M8x1</td>
<td>32</td>
<td>5</td>
<td>79</td>
<td>35.4</td>
<td>74</td>
<td>300</td>
<td>69.8</td>
<td>65</td>
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<td>SDE3...-FQ4-M12</td>
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<tr>
<td>SDE3...-FT532-M8</td>
<td>27.4</td>
<td>14</td>
<td>35</td>
<td>24</td>
<td>21.6</td>
<td>QS-5</td>
<td>M8x1</td>
<td>32</td>
<td>5</td>
<td>79</td>
<td>35.4</td>
<td>74</td>
<td>300</td>
<td>69.8</td>
<td>65</td>
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<td>SDE3...-FT532-M12</td>
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</table>

**Type**

- B1
- B2
- B3
- B4
- B5
- D1
- D2
- H1
- H2
- L1
- L2
- L3
- L4
- L5
- L6

---

[Festo catalogue](http://www.festo.com/catalogue/...)

2012/08 – Subject to change – Sensors / Vision systems
### Pressure sensors SDE3, with display

#### Technical data

#### Ordering data – H-rail mounting

<table>
<thead>
<tr>
<th>Version</th>
<th>Pressure measuring range [bar]</th>
<th>Switching output</th>
<th>Electrical connection</th>
<th>Display</th>
<th>Part No.</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>Relative pressure</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0 ... –1</td>
<td>2x PNP</td>
<td>Plug M8x1, 4-pin</td>
<td>bar</td>
<td>540193</td>
<td>SDE3-V1S-B-HQ4-2P-M8</td>
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<tr>
<td>0 ... 10</td>
<td>2x PNP</td>
<td>Plug M8x1, 4-pin</td>
<td>bar</td>
<td>540194</td>
<td>SDE3-V1S-H-HQ4-2P-M8</td>
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<td>2x relative pressure</td>
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<td></td>
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<tr>
<td>0 ... –1</td>
<td>2x PNP</td>
<td>Plug M8x1, 4-pin</td>
<td>bar</td>
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<td>540199</td>
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<tr>
<td>1x relative pressure, 1x differential pressure</td>
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</tr>
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<td>0 ... –1</td>
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<td>Plug M8x1, 4-pin</td>
<td>bar</td>
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<td>0 ... 6</td>
<td>2x PNP</td>
<td>Plug M12x1, 5-pin</td>
<td>bar</td>
<td>568664</td>
<td>SDE3-V1D-B-HQ4-2P-M12</td>
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<tr>
<td>0 ... 10</td>
<td>2x PNP</td>
<td>Plug M8x1, 4-pin</td>
<td>bar</td>
<td>568665</td>
<td>SDE3-D10D-B-HQ4-2P-M8</td>
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<tr>
<td>Differential pressure</td>
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<td></td>
<td></td>
<td></td>
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<tr>
<td>0 ... –1</td>
<td>2x PNP</td>
<td>Plug M8x1, 4-pin</td>
<td>inches of mercury</td>
<td>540200</td>
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<tr>
<td>0 ... 2</td>
<td>2x PNP</td>
<td>Plug M8x1, 4-pin</td>
<td>bar</td>
<td>540202</td>
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<td>0 ... 10</td>
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<td>Plug M8x1, 4-pin</td>
<td>bar</td>
<td>540203</td>
<td>SDE3-D10Z-B-HQ4-2P-M8</td>
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</table>

#### Ordering data – Wall mounting

<table>
<thead>
<tr>
<th>Version</th>
<th>Pressure measuring range [bar]</th>
<th>Switching output</th>
<th>Electrical connection</th>
<th>Display</th>
<th>Part No.</th>
<th>Type</th>
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</thead>
<tbody>
<tr>
<td>Relative pressure</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0 ... –1</td>
<td>2x PNP</td>
<td>Plug M8x1, 4-pin</td>
<td>bar</td>
<td>568664</td>
<td>SDE3-V1D-B-WQ4-2P-M8</td>
<td></td>
</tr>
<tr>
<td>0 ... 10</td>
<td>2x PNP</td>
<td>Plug M12x1, 5-pin</td>
<td>bar</td>
<td>568665</td>
<td>SDE3-D10M-B-HQ4-2P-M12</td>
<td></td>
</tr>
</tbody>
</table>

1) Adapter plate SXE3-W included in the scope of delivery

---

Additional variants and accessories can be configured and ordered through the SDE3 modular product system ➔ 216.
## Ordering data – Front panel mounting

<table>
<thead>
<tr>
<th>Version</th>
<th>Pressure measuring range [bar]</th>
<th>Switching output</th>
<th>Electrical connection</th>
<th>Display</th>
<th>Part No.</th>
<th>Type</th>
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</thead>
<tbody>
<tr>
<td>Relative pressure</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0…–1 2x PNP</td>
<td></td>
<td></td>
<td>Cable with plug M8x1, 4-pin bar</td>
<td></td>
<td>540195</td>
<td>SDE3-V1S-B-FQ4-2P-M8</td>
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<td>0…10 2x PNP</td>
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<td>Cable with plug M8x1, 4-pin bar</td>
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<td>540208</td>
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<td>2x relative pressure</td>
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<td></td>
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<tr>
<td>0…–1 2x PNP</td>
<td></td>
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<td>Cable with plug M8x1, 4-pin bar</td>
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<tr>
<td>0…2 2x PNP</td>
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<td>Cable with plug M8x1, 4-pin bar</td>
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<td>0…10 2x PNP</td>
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<td>Cable with plug M8x1, 4-pin bar</td>
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<td>540210</td>
<td>SDE3-D10D-B-FQ4-2P-M8</td>
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<td>Differential pressure</td>
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<tr>
<td>0…–1 2x PNP</td>
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<td>Cable with plug M8x1, 4-pin bar</td>
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<td>Cable with plug M8x1, 4-pin bar</td>
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<td>SDE3-D10Z-B-FQ4-2P-M8</td>
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### Note
Additional variants and accessories can be configured and ordered through the SDE3 modular product system ➤ 216.
## Ordering table

<table>
<thead>
<tr>
<th>Conditions</th>
<th>Code</th>
<th>Enter code</th>
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</thead>
<tbody>
<tr>
<td><strong>0</strong> ... <strong>1</strong></td>
<td><strong>-V1</strong></td>
<td><strong>SDE3</strong></td>
</tr>
<tr>
<td><strong>1</strong> ... <strong>2</strong></td>
<td><strong>-B2</strong></td>
<td><strong>SDE3</strong></td>
</tr>
<tr>
<td><strong>0</strong> ... <strong>6</strong></td>
<td><strong>-D6</strong></td>
<td><strong>SDE3</strong></td>
</tr>
<tr>
<td><strong>0</strong> ... <strong>10</strong></td>
<td><strong>-D10</strong></td>
<td><strong>SDE3</strong></td>
</tr>
</tbody>
</table>

### Function
Pressure sensor: SDE3

### Pressure measuring range
- 0 ... **1**
- **1** ... 1
- **1** ... **2**
- 0 ... 6
- 0 ... 10

### Pressure input
- 1x relative pressure
- 2x relative pressure, independent
- 1x relative pressure, 1x differential pressure
- 1x differential pressure

### Display
- Values in bar: -B
- Values in psi: -P
- Values in kPa: -K
- Values in inches of mercury: -H
- Values in inches of water: -W

### Mounting/pneumatic connection
- H-rail mounting, 4 mm push-in connector: -HQ4
- H-rail mounting, 5/32” push-in connector: -HT532
- Wall mounting, 4 mm push-in connector: -WQ4
- Wall mounting, 5/32” push-in connector: -WT532
- Front panel mounting, 4 mm push-in connector: -FQ4
- Front panel mounting, 5/32” push-in connector: -FT532

### Electrical output
- 2 switching outputs PNP: -2P
- 2 switching outputs NPN: -2N

### Electrical connection
- Plug M8: -M8
- Plug M12, A-coded: -M12
- Cable, 2.5 m: -K

### EU certification
II 3GD to EU Directive 94/9/EG: -EX2

### Connecting cable (accessory)
- Connecting cable, straight socket, 2.5 m: -G
- Connecting cable, angled socket, 2.5 m: -W
- Connecting cable, straight socket, 5 m: -G5
- Connecting cable, angled socket, 5 m: -W5

---

**Transfer order code**: 539679

1. **W** Not with pressure measuring range D6 and pressure input M or pressure measuring range D10 and pressure input M.
2. **G, W, G5, W5** Not with electrical connection K.
Pressure sensors SDE3, with display

Accessories

Adapter plate SXE3-W
For wall or surface mounting

Material:
Steel

Ordering data

<table>
<thead>
<tr>
<th>Part No.</th>
<th>Type</th>
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<tbody>
<tr>
<td>540214</td>
<td>SXE3-W</td>
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1) Included in the scope of delivery with SDE3-…-W…

Ordering data – Connecting cables

<table>
<thead>
<tr>
<th>Designation</th>
<th>Number of wires</th>
<th>Cable length [m]</th>
<th>Part No.</th>
<th>Type</th>
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<tbody>
<tr>
<td>M8x1</td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Straight socket</td>
<td>4</td>
<td>2.5</td>
<td>541342</td>
<td>NEBU-M8G4-K-2.5-LE4</td>
</tr>
<tr>
<td></td>
<td></td>
<td>5</td>
<td>541343</td>
<td>NEBU-M8G4-K-5-LE4</td>
</tr>
<tr>
<td>Angled socket</td>
<td>4</td>
<td>2.5</td>
<td>541344</td>
<td>NEBU-M8W4-K-2.5-LE4</td>
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<td>541345</td>
<td>NEBU-M8W4-K-5-LE4</td>
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<tr>
<td>M12x1</td>
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<td></td>
</tr>
<tr>
<td>Straight socket</td>
<td>4</td>
<td>2.5</td>
<td>550326</td>
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<td>5</td>
<td>541328</td>
<td>NEBU-M12G5-K-5-LE4</td>
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<tr>
<td>Angled socket</td>
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<td>2.5</td>
<td>550325</td>
<td>NEBU-M12W5-K-2.5-LE4</td>
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Ordering data – Safety clip

<table>
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<tr>
<th>Size</th>
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<th>Type</th>
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<tr>
<td>M8</td>
<td>548067</td>
<td>NEAU-M8-GD</td>
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<tr>
<td>M12</td>
<td>548068</td>
<td>NEAU-M12-GD</td>
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Technical data

Internet: nebu

Designation

Straight socket

Number of wires

4

Cable length [m]

2.5

5

541342

541343

541344

541345

550326

541328

550325

541329

548067

548068

Sensors > Pressure and vacuum sensors >

Closing cover CTB2...

For wall surface mounting

Material:

Steel
1.4
Pressure sensors SDE1, with display
### Pressure sensors SDE1, with display

**Product range overview**

<table>
<thead>
<tr>
<th>Method of measurement</th>
<th>Operating voltage [V DC]</th>
<th>Measured variable</th>
<th>Pressure measuring range [bar]</th>
<th>Pneumatic connection</th>
<th>Type of mounting</th>
<th>Electrical output</th>
</tr>
</thead>
<tbody>
<tr>
<td>Piezoresistive pressure sensor with display</td>
<td>15 ... 30</td>
<td>Relative pressure</td>
<td>–1 ... 0, –1 ... +1, 0 ... 2, 0 ... 6, 0 ... 10</td>
<td>Male thread R5/8, R5/8</td>
<td>On service unit, via H-rail, via wall/surface bracket, front panel mounting</td>
<td>PNP –</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Differential and relative pressure</td>
<td></td>
<td>Push-in fitting for tubing O.D. 4 mm</td>
<td></td>
<td>2x PNP –</td>
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<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td>PNP 0 ... 10 V</td>
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<td></td>
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<td>PNP 4 ... 20 mA</td>
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<td></td>
<td>2x PNP 4 ... 20 mA</td>
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<td>NPN –</td>
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<td>2x NPN –</td>
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<td>NPN 0 ... 10 V</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td>NPN 4 ... 20 mA</td>
</tr>
</tbody>
</table>

**Variants**

- LCD display with backlighting (optimised operation)
- Illuminated LCD display (optimised reading)
- Electrical output PNP, 2x PNP, NPN, 2x NPN, 0 ... 10 V analogue, 4 ... 20 mA analogue and combinations thereof
- Electrical connection with plug M8x1 or M12x1
- Connecting cable
Pressure sensors SDE1, with display

Peripherals overview

Mounting attachments and accessories

<table>
<thead>
<tr>
<th></th>
<th>Description</th>
<th>Page/online</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Pressure sensor SDE1-...-R18, SDE1-...-R14</td>
<td>223</td>
</tr>
<tr>
<td>2</td>
<td>Pressure sensor SDE1-...-H18, SDE1-...-W18</td>
<td>223</td>
</tr>
<tr>
<td>3</td>
<td>Pressure sensor SDE1-...-FQ4</td>
<td>223</td>
</tr>
<tr>
<td>4</td>
<td>Pressure sensor SDE1-...-MS...</td>
<td>223</td>
</tr>
<tr>
<td>5</td>
<td>Connecting cable NEBU-M12G...</td>
<td>232</td>
</tr>
<tr>
<td>6</td>
<td>Connecting cable, straight socket NEBU-M8G...</td>
<td>232</td>
</tr>
<tr>
<td>7</td>
<td>Connecting cable, angled socket NEBU-M12W...</td>
<td>232</td>
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<tr>
<td>8</td>
<td>Connecting cable NEBU-M8W... with angled socket</td>
<td>232</td>
</tr>
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<td>9</td>
<td>Adapter plate SDE1-...-W...</td>
<td>232</td>
</tr>
<tr>
<td>10</td>
<td>Mounting rail to DIN EN 60715</td>
<td>32</td>
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<tr>
<td>11</td>
<td>Protective cover SDE1-SH</td>
<td>232</td>
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<tr>
<td>12</td>
<td>Clamping plate (included in the scope of delivery with SDE1-...-FQ4)</td>
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<tr>
<td>13</td>
<td>Push-in fitting Q5-1/4</td>
<td>232</td>
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### Pressure sensors SDE1, with display

#### Type codes

<table>
<thead>
<tr>
<th>Function</th>
<th>SDE1</th>
<th>Pressure sensor with display</th>
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<tbody>
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<td>Pressure measuring range</td>
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</tr>
<tr>
<td>V1</td>
<td>–1 ... 0 bar</td>
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<tr>
<td>B2</td>
<td>–1 ... +1 bar</td>
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</tr>
<tr>
<td>D2</td>
<td>0 ... 2 bar</td>
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</tr>
<tr>
<td>D6</td>
<td>0 ... 6 bar</td>
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</tr>
<tr>
<td>D10</td>
<td>0 ... 10 bar</td>
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<tr>
<td>Absolute accuracy</td>
<td>G2</td>
<td>Accuracy 2%</td>
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<td>Pneumatic connection and mounting</td>
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<tr>
<td>Measured variable: relative pressure</td>
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<tr>
<td>R18</td>
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<td>R14</td>
<td>Male thread R, mounting on service unit</td>
<td></td>
</tr>
<tr>
<td>MS4</td>
<td>Direct connection to MS4 series service units</td>
<td></td>
</tr>
<tr>
<td>MS6</td>
<td>Direct connection to MS6 series service units</td>
<td></td>
</tr>
<tr>
<td>H18</td>
<td>Female thread G, H-rail mounting</td>
<td></td>
</tr>
<tr>
<td>W18</td>
<td>Female thread G, wall or surface mounting</td>
<td></td>
</tr>
<tr>
<td>Measured variable: differential pressure and relative pressure</td>
<td></td>
<td></td>
</tr>
<tr>
<td>FQ4</td>
<td>Push-in connector QS-4, front panel mounting</td>
<td></td>
</tr>
<tr>
<td>HQ4</td>
<td>Push-in connector QS-4, DIN H-rail mounting</td>
<td></td>
</tr>
<tr>
<td>WQ4</td>
<td>Push-in connector QS-4, wall or surface mounting</td>
<td></td>
</tr>
<tr>
<td>Display and setting</td>
<td></td>
<td></td>
</tr>
<tr>
<td>C</td>
<td>LCD display with backlighting (optimised operation)</td>
<td></td>
</tr>
<tr>
<td>L</td>
<td>Illuminated LCD display (optimised reading)</td>
<td></td>
</tr>
<tr>
<td>Electrical output</td>
<td></td>
<td></td>
</tr>
<tr>
<td>P1</td>
<td>1 switching output PNP</td>
<td></td>
</tr>
<tr>
<td>P2</td>
<td>2 switching outputs PNP</td>
<td></td>
</tr>
<tr>
<td>PU</td>
<td>1 switching output PNP and 0 ... 10 V analogue</td>
<td></td>
</tr>
<tr>
<td>PI</td>
<td>1 switching output PNP and 4 ... 20 mA analogue</td>
<td></td>
</tr>
<tr>
<td>P2I</td>
<td>2 switching outputs PNP and 4 ... 20 mA analogue</td>
<td></td>
</tr>
<tr>
<td>NU</td>
<td>1 switching output NPN</td>
<td></td>
</tr>
<tr>
<td>NH</td>
<td>1 switching output NPN and 0 ... 10 V analogue</td>
<td></td>
</tr>
<tr>
<td>NI</td>
<td>1 switching output NPN and 4 ... 20 mA analogue</td>
<td></td>
</tr>
<tr>
<td>Electrical connection</td>
<td></td>
<td></td>
</tr>
<tr>
<td>M8</td>
<td>Plug M8x1</td>
<td></td>
</tr>
<tr>
<td>M12</td>
<td>Plug M12x1</td>
<td></td>
</tr>
<tr>
<td>Electric accessories</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Connecting cable, straight plug socket</td>
<td></td>
<td></td>
</tr>
<tr>
<td>G</td>
<td>2.5 m long</td>
<td></td>
</tr>
<tr>
<td>G5</td>
<td>5 m long</td>
<td></td>
</tr>
<tr>
<td>Connecting cable, angled plug socket</td>
<td></td>
<td></td>
</tr>
<tr>
<td>W</td>
<td>2.5 m long</td>
<td></td>
</tr>
<tr>
<td>W5</td>
<td>5 m long</td>
<td></td>
</tr>
</tbody>
</table>
Pressure sensors SDE1, with display

### Technical data

#### Function

![Function Diagram]

1) e.g. with 1 switching output PNP and 0 ... 10 V analogue

#### Voltage

- 15 ... 30 V DC

#### Pressure

- –1 ... +10 bar

#### Temperature range

- 0 ... 50 °C

### General technical data

<table>
<thead>
<tr>
<th>SDE1-...</th>
<th>R-...</th>
<th>MS-...</th>
<th>H-...</th>
<th>W-...</th>
<th>F-...</th>
</tr>
</thead>
<tbody>
<tr>
<td>Certification</td>
<td>cULus recognized (OL)</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>CE mark (see declaration of conformity)</td>
<td>To EU EMC Directive</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Note on materials</td>
<td>Free of copper and PTFE</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>RoHS-compliant</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

1) For information about the applicability of the component see the manufacturer's EC declaration of conformity at: www.festo.com.

### Input signal/measuring element

<table>
<thead>
<tr>
<th>SDE1</th>
<th>B2</th>
<th>V1</th>
<th>D2</th>
<th>D6</th>
<th>D10</th>
</tr>
</thead>
<tbody>
<tr>
<td>Measured variable</td>
<td>Relative pressure</td>
<td>-1 ... +1</td>
<td>0 ... –1</td>
<td>0 ... 2</td>
<td>0 ... 6</td>
</tr>
<tr>
<td>Method of measurement</td>
<td>Piezoresistive pressure sensor with display</td>
<td>-1 ... +1</td>
<td>0 ... –1</td>
<td>0 ... 2</td>
<td>0 ... 6</td>
</tr>
<tr>
<td>Operating medium</td>
<td>Compressed air in accordance with ISO 8573-1:2010 [7:4:4]</td>
<td>-1 ... +1</td>
<td>0 ... –1</td>
<td>0 ... 2</td>
<td>0 ... 6</td>
</tr>
<tr>
<td>Note on operating/pilot medium</td>
<td>Operation with lubricated medium possible (in which case lubricated operation will always be required)</td>
<td>-1 ... +1</td>
<td>0 ... –1</td>
<td>0 ... 2</td>
<td>0 ... 6</td>
</tr>
<tr>
<td>Pressure measuring range</td>
<td>[bar]</td>
<td>-1 ... +1</td>
<td>0 ... –1</td>
<td>0 ... 2</td>
<td>0 ... 6</td>
</tr>
<tr>
<td>Temperature of medium</td>
<td>[°C]</td>
<td>0 ... 50</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Ambient temperature</td>
<td>[°C]</td>
<td>0 ... 50</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

2) Versions with push-in connector QS-4

### Output, general

<table>
<thead>
<tr>
<th>Accuracy FS</th>
<th>[%]</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>-</td>
</tr>
</tbody>
</table>

3) % FS = % of the measuring range (full scale)

### Switching output

<table>
<thead>
<tr>
<th>Switching output</th>
<th>PNP</th>
<th>NPN</th>
</tr>
</thead>
<tbody>
<tr>
<td>Switching function</td>
<td>Freely programmable</td>
<td>-</td>
</tr>
<tr>
<td>Switching element function</td>
<td>Switchable</td>
<td>-</td>
</tr>
<tr>
<td>Reproducibility of switching value</td>
<td>[%]</td>
<td>0.3</td>
</tr>
<tr>
<td>Max. output current</td>
<td>[mA]</td>
<td>150</td>
</tr>
</tbody>
</table>

### Analogue output

| Analogue output | [V] | 0 ... 10 | - |
| Analogue output | [mA] | 4 ... 20 | - |

### Output, additional data

| Protection against short circuit | Pulsed | - | - | - | - |

---

2012/08 – Subject to change – Sensors / Vision systems

www.festo.com/catalogue/...
Pressure sensors SDE1, with display

### Technical data

#### Electronic components
| Operating voltage range DC [V] | 15 ... 30 |
| Reverse polarity protection | For all electrical connections |

#### Electromechanical components
<table>
<thead>
<tr>
<th>SDE1-...</th>
<th>M8</th>
<th>M12</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Electrical connection</strong></td>
<td>Plug M8x1, 3-pin</td>
<td>Plug M12x1, 3-pin</td>
</tr>
<tr>
<td></td>
<td>Plug M8x1, 4-pin</td>
<td>Plug M12x1, 4-pin</td>
</tr>
<tr>
<td></td>
<td>-</td>
<td>Plug M12x1, 5-pin</td>
</tr>
<tr>
<td>Round design</td>
<td>To EN 60947-5-2</td>
<td></td>
</tr>
</tbody>
</table>

#### Mechanical components
| Type of mounting | Via H-rail |
| | Via wall/surface bracket |
| | On service unit |
| | Front panel mounting |
| **Pneumatic connection** | R ¼ |
| | G ¼ |
| | QS-4 |
| **Housing materials** | PA, POM reinforced |

- **Display/operation**
  - **Display type**: Back illuminated LCD, Illuminated LCD
  - **Setting options**: Teach-in
  - **Threshold value setting range [%]**: 2 ... 99.8
  - **Hysteresis setting range [%]**: 0 ... 90

- **Immissions/emissions**
  - **Protection class**: IP65
  - **Corrosion resistance class CRC**: 2

---

**Note:** This product conforms with the ISO 1179-1 standard and the ISO 228-1 standard.

---

| 4) Corrosion resistance class 2 according to Festo standard 940 070 |

Components subject to moderate corrosion stress. 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.
### Pressure sensors SDE1, with display

#### Technical data

<table>
<thead>
<tr>
<th>Electrical outputs</th>
<th>Pin allocations</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1 switching output PNP</strong></td>
<td></td>
</tr>
</tbody>
</table>
| Variant P1 with plug M8 | 1 = +24 V  
3 = 0 V  
4 = Output A |
| Variant P1 with plug M12 | 1 = +24 V  
3 = 0 V  
4 = Output A |
| **2 switching outputs PNP** | |
| Variant P2 with plug M8 | 1 = +24 V  
2 = Output B  
3 = 0 V  
4 = Output A |
| Variant P2 with plug M12 | 1 = +24 V  
2 = Output A  
3 = 0 V  
4 = Output B |
| **1 switching output PNP and 0 ... 10 V analogue** | |
| Variant PU with plug M8 | 1 = +24 V  
2 = Output B (0 ... 10 V analogue)  
3 = 0 V  
4 = Output A |
| Variant PU with plug M12 | 1 = +24 V  
2 = Output A  
3 = 0 V  
4 = Output B (0 ... 10 V analogue) |
| **1 switching output PNP and 4 ... 20 mA analogue** | |
| Variant PI with plug M8 | 1 = +24 V  
2 = Output B (4 ... 20 mA analogue)  
3 = 0 V  
4 = Output A |
| Variant PI with plug M12 | 1 = +24 V  
2 = Output A  
3 = 0 V  
4 = Output B (4 ... 20 mA analogue) |
| **2 switching outputs PNP and 4 ... 20 mA analogue** | |
| Variant 2I with plug M12 | 1 = +24 V  
2 = Output B  
3 = 0 V  
4 = Output A  
5 = Output C (4 ... 20 mA analogue) |

1) Core colours indicated apply when using connecting cable NEBU.
### Pressure sensors SDE1, with display

#### Technical data

**Electrical outputs**

<table>
<thead>
<tr>
<th>Pin allocations</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1 switching output NPN</strong></td>
</tr>
</tbody>
</table>
| **Variant N1 with plug M8** | 1 = +24 V  
3 = 0 V  
4 = Output A |
| **Variant N1 with plug M12** | 1 = +24 V  
3 = 0 V  
4 = Output A |

| **2 switching outputs NPN** |
| **Variant N2 with plug M8** | 1 = +24 V  
2 = Output B  
3 = 0 V  
4 = Output A |
| **Variant N2 with plug M12** | 1 = +24 V  
2 = Output A  
3 = 0 V  
4 = Output B |

| **1 switching output NPN and 0 ... 10 V analogue** |
| **Variant NU with plug M8** | 1 = +24 V  
2 = Output B (0 ... 10 V analogue)  
3 = 0 V  
4 = Output A |
| **Variant NU with plug M12** | 1 = +24 V  
2 = Output A  
3 = 0 V  
4 = Output B (0 ... 10 V analogue) |

| **1 switching output NPN and 4 ... 20 mA analogue** |
| **Variant NI with plug M8** | 1 = +24 V  
2 = Output B (4 ... 20 mA analogue)  
3 = 0 V  
4 = Output A |
| **Variant NI with plug M12** | 1 = +24 V  
2 = Output A  
3 = 0 V  
4 = Output B (4 ... 20 mA analogue) |

1) Core colours indicated apply when using connecting cable NEBU.
Pressure sensors SDE1, with display

Technical data

Dimensions – Mounting via male thread R\(\frac{3}{4}\) or R\(\frac{1}{4}\)

<table>
<thead>
<tr>
<th>Type</th>
<th>B1</th>
<th>B2</th>
<th>D1</th>
<th>D2</th>
<th>H1</th>
<th>L1</th>
<th>L2</th>
<th>L3</th>
<th>L4</th>
<th>L5</th>
</tr>
</thead>
<tbody>
<tr>
<td>SDE1-...-R18-M8</td>
<td>32.3</td>
<td>25</td>
<td>R(\frac{3}{4})</td>
<td>M8</td>
<td>33</td>
<td>78</td>
<td>70</td>
<td>107</td>
<td>89</td>
<td>23</td>
</tr>
<tr>
<td>SDE1-...-R14-M8</td>
<td></td>
<td></td>
<td></td>
<td>R(\frac{1}{4})</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SDE1-...-R18-M12</td>
<td>32.3</td>
<td>25</td>
<td>R(\frac{3}{4})</td>
<td>M12</td>
<td>33</td>
<td>87</td>
<td>70</td>
<td>125</td>
<td>103</td>
<td>23</td>
</tr>
<tr>
<td>SDE1-...-R14-M12</td>
<td></td>
<td></td>
<td></td>
<td>R(\frac{1}{4})</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Dimensions – Direct connection to MS4/6 series service units

<table>
<thead>
<tr>
<th>Type</th>
<th>B1</th>
<th>D2</th>
<th>H1</th>
<th>H2</th>
<th>L1</th>
<th>L2</th>
<th>L3</th>
<th>L4</th>
<th>L5</th>
</tr>
</thead>
<tbody>
<tr>
<td>SDE1-...-MS-...-M8</td>
<td>32.3</td>
<td>M8</td>
<td>31.2</td>
<td>8.8</td>
<td>78</td>
<td>70</td>
<td>107</td>
<td>89</td>
<td>4.13</td>
</tr>
<tr>
<td>SDE1-...-MS-...-M12</td>
<td></td>
<td>M12</td>
<td></td>
<td>87</td>
<td>125</td>
<td>103</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Pressure sensors SDE1, with display

Technical data

Dimensions – H-rail, wall or surface mounting

<table>
<thead>
<tr>
<th>Type</th>
<th>B1</th>
<th>B2</th>
<th>D1</th>
<th>D2</th>
<th>H1</th>
<th>H2</th>
<th>L1</th>
<th>L2</th>
<th>L3</th>
<th>L4</th>
<th>L5</th>
<th>L6</th>
</tr>
</thead>
<tbody>
<tr>
<td>SDE1-...-H18-...-M8</td>
<td>32.3</td>
<td>25</td>
<td>G 1/8</td>
<td>M8</td>
<td>35.2</td>
<td>3.6</td>
<td>78</td>
<td>70</td>
<td>107</td>
<td>89</td>
<td>33</td>
<td>23</td>
</tr>
<tr>
<td>SDE1-...-W18-...-M8</td>
<td>32.3</td>
<td>25</td>
<td>G 1/8</td>
<td>M12</td>
<td>35.2</td>
<td>3.6</td>
<td>87</td>
<td>70</td>
<td>125</td>
<td>103</td>
<td>33</td>
<td>23</td>
</tr>
<tr>
<td>SDE1-...-H18-...-M12</td>
<td>32.3</td>
<td>25</td>
<td>QS-4</td>
<td>M8</td>
<td>35.2</td>
<td>3.6</td>
<td>78</td>
<td>70</td>
<td>107</td>
<td>89</td>
<td>33</td>
<td>23</td>
</tr>
<tr>
<td>SDE1-...-W18-...-M12</td>
<td>32.3</td>
<td>25</td>
<td>QS-4</td>
<td>M12</td>
<td>35.2</td>
<td>3.6</td>
<td>87</td>
<td>70</td>
<td>125</td>
<td>103</td>
<td>33</td>
<td>23</td>
</tr>
</tbody>
</table>

Dimensions – Panel mounting

<table>
<thead>
<tr>
<th>Type</th>
<th>B1</th>
<th>B2</th>
<th>B3</th>
<th>B4</th>
<th>D1</th>
<th>D2</th>
<th>H1</th>
<th>H2</th>
<th>L1</th>
<th>L2</th>
<th>L3</th>
<th>L4</th>
<th>L5</th>
<th>L6</th>
</tr>
</thead>
<tbody>
<tr>
<td>SDE1-...-FQ4-M8</td>
<td>48</td>
<td>55</td>
<td>35.8</td>
<td>25</td>
<td>QS-4</td>
<td>M8x1</td>
<td>8</td>
<td>29</td>
<td>98</td>
<td>320</td>
<td>85.3</td>
<td>23</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SDE1-...-FQ4-M12</td>
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<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>
### Pressure sensors SDE1, with display

#### Technical data

### Ordering data – Measured variable: relative pressure

<table>
<thead>
<tr>
<th>Version</th>
<th>Pressure measuring range [bar]</th>
<th>Switching output</th>
<th>Analogue output</th>
<th>Electrical connection</th>
<th>Display type</th>
<th>Part No.</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male thread R 1/4, mounting on D series service unit</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0 ... 10</td>
<td>PNP –</td>
<td>0 ... 10 V</td>
<td>LCD(1)</td>
<td>Plug M8x1, 3-pin</td>
<td>LCD(1)</td>
<td>192026</td>
<td>SDE1-D10-G2-R18-C-P1-M8</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Plug M8x1, 4-pin</td>
<td>LCD(1)</td>
<td>529970</td>
<td>SDE1-D10-G2-R18-L-P1-M8</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Plug M12x1, 3-pin</td>
<td>LCD(1)</td>
<td>534064</td>
<td>SDE1-D10-G2-R18-L-P1-M12</td>
</tr>
<tr>
<td></td>
<td>2x PNP –</td>
<td>0 ... 10 V</td>
<td>LCD(1)</td>
<td>Plug M8x1, 4-pin</td>
<td>LCD(1)</td>
<td>192027</td>
<td>SDE1-D10-G2-R18-C-P2-M8</td>
</tr>
<tr>
<td></td>
<td>PNP</td>
<td></td>
<td></td>
<td>Plug M8x1, 4-pin</td>
<td>LCD(1)</td>
<td>529958</td>
<td>SDE1-D10-G2-R18-C-PU-M8</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Plug M8x1, 4-pin</td>
<td>LCD(1)</td>
<td>529972</td>
<td>SDE1-D10-G2-R18-L-PU-M8</td>
</tr>
<tr>
<td>Male thread R 1/4, mounting on D series service unit</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0 ... 10</td>
<td>PNP –</td>
<td>0 ... 10 V</td>
<td>LCD(1)</td>
<td>Plug M8x1, 3-pin</td>
<td>LCD(1)</td>
<td>192028</td>
<td>SDE1-D10-G2-R14-C-P1-M8</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Plug M8x1, 4-pin</td>
<td>LCD(1)</td>
<td>529967</td>
<td>SDE1-D10-G2-R14-L-P1-M8</td>
</tr>
<tr>
<td></td>
<td>2x PNP –</td>
<td>0 ... 10 V</td>
<td>LCD(1)</td>
<td>Plug M8x1, 4-pin</td>
<td>LCD(1)</td>
<td>192029</td>
<td>SDE1-D10-G2-R14-C-P2-M8</td>
</tr>
<tr>
<td></td>
<td>PNP</td>
<td></td>
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<td>Plug M8x1, 4-pin</td>
<td>LCD(1)</td>
<td>529968</td>
<td>SDE1-D10-G2-R14-L-P1-M8</td>
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<tr>
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<td></td>
<td>Plug M8x1, 4-pin</td>
<td>LCD(1)</td>
<td>529969</td>
<td>SDE1-D10-G2-R14-L-PU-M8</td>
</tr>
<tr>
<td>Female thread G 1/4, H-rail mounting</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>0 ... –1</td>
<td>PNP –</td>
<td>0 ... 10 V</td>
<td>LCD(1)</td>
<td>Plug M8x1, 4-pin</td>
<td>LCD(1)</td>
<td>192034</td>
<td>SDE1-V1-G2-H18-C-P1-M8</td>
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<tr>
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<td>Plug M8x1, 3-pin</td>
<td>LCD(1)</td>
<td>529973</td>
<td>SDE1-V1-G2-H18-L-P1-M8</td>
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<tr>
<td></td>
<td>2x PNP –</td>
<td>0 ... 10 V</td>
<td>LCD(1)</td>
<td>Plug M8x1, 4-pin</td>
<td>LCD(1)</td>
<td>192035</td>
<td>SDE1-V1-G2-H18-C-P2-M8</td>
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<tr>
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<td>PNP</td>
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<td>Plug M8x1, 4-pin</td>
<td>LCD(1)</td>
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<td>Plug M8x1, 4-pin</td>
<td>LCD(1)</td>
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<td>Plug M8x1, 4-pin</td>
<td>LCD(1)</td>
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<td>0 ... 10</td>
<td>PNP –</td>
<td>LCD(1)</td>
<td>Plug M8x1, 4-pin</td>
<td>LCD(1)</td>
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<td>Plug M8x1, 3-pin</td>
<td>LCD(1)</td>
<td>529961</td>
<td>SDE1-D10-G2-H18-L-P1-M8</td>
</tr>
<tr>
<td></td>
<td>2x PNP –</td>
<td>0 ... 10 V</td>
<td>LCD(1)</td>
<td>Plug M8x1, 4-pin</td>
<td>LCD(1)</td>
<td>192031</td>
<td>SDE1-D10-G2-H18-C-P2-M8</td>
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<tr>
<td></td>
<td>PNP</td>
<td></td>
<td></td>
<td>Plug M8x1, 4-pin</td>
<td>LCD(1)</td>
<td>529962</td>
<td>SDE1-D10-G2-H18-L-P1-M8</td>
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<tr>
<td></td>
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<td>Plug M8x1, 4-pin</td>
<td>LCD(1)</td>
<td>529963</td>
<td>SDE1-D10-G2-H18-L-P1-M8</td>
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<tr>
<td>Female thread G 1/4, for wall or surface mounting*1)</td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>0 ... –1</td>
<td>PNP –</td>
<td>0 ... 10 V</td>
<td>LCD(1)</td>
<td>Plug M8x1, 4-pin</td>
<td>LCD(1)</td>
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<td>SDE1-V1-G2-H18-C-P1-M8</td>
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<td></td>
<td>Plug M12x1, 3-pin</td>
<td>LCD(1)</td>
<td>534065</td>
<td>SDE1-V1-G2-W18-L-P1-M12</td>
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<tr>
<td></td>
<td>PNP</td>
<td>4 ... 20 mA</td>
<td>LCD(1)</td>
<td>Plug M8x1, 4-pin</td>
<td>LCD(1)</td>
<td>537022</td>
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<td>Plug M12x1, 3-pin</td>
<td>LCD(1)</td>
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<tr>
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<td>0 ... 2</td>
<td>PNP –</td>
<td>LCD(1)</td>
<td>Plug M8x1, 3-pin</td>
<td>LCD(1)</td>
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<td>SDE1-D10-G2-W18-L-P1-M12</td>
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<tr>
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<td>Plug M8x1, 4-pin</td>
<td>LCD(1)</td>
<td>537025</td>
<td>SDE1-D10-G2-W18-L-P2-M8</td>
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<tr>
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<td>0 ... 6</td>
<td>PNP –</td>
<td>LCD(1)</td>
<td>Plug M8x1, 3-pin</td>
<td>LCD(1)</td>
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<td>SDE1-D10-G2-W18-L-P1-M8</td>
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<td>Plug M8x1, 4-pin</td>
<td>LCD(1)</td>
<td>537027</td>
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<tr>
<td></td>
<td>0 ... 10</td>
<td>PNP –</td>
<td>LCD(1)</td>
<td>Plug M8x1, 3-pin</td>
<td>LCD(1)</td>
<td>534063</td>
<td>SDE1-D10-G2-W18-L-P1-M12</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Plug M8x1, 4-pin</td>
<td>LCD(1)</td>
<td>530900</td>
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</tr>
<tr>
<td></td>
<td>2x PNP –</td>
<td>0 ... 10 V</td>
<td>LCD(1)</td>
<td>Plug M12x1, 4-pin</td>
<td>LCD(1)</td>
<td>534062</td>
<td>SDE1-D10-G2-W18-L-2I-M12</td>
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<tr>
<td></td>
<td>PNP</td>
<td>4 ... 20 mA</td>
<td>LCD(1)</td>
<td>Plug M12x1, 5-pin</td>
<td>LCD(1)</td>
<td>537020</td>
<td>SDE1-D10-G2-W18-L-P1-M8</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Plug M12x1, 4-pin</td>
<td>LCD(1)</td>
<td>537021</td>
<td>SDE1-D10-G2-W18-L-P1-M12</td>
</tr>
</tbody>
</table>

1) Back illuminated
2) Adapter plate SDE1-...-W... included in the scope of delivery.

---

Note

Additional variants and accessories can be configured and ordered through the SDE1 modular system ➔ 231.
## Pressure sensors SDE1, with display

### Technical data

#### Ordering data – Measured variable: differential pressure and relative pressure

<table>
<thead>
<tr>
<th>Version</th>
<th>Pressure measuring range [bar]</th>
<th>Switching output</th>
<th>Analogue output</th>
<th>Electrical connection</th>
<th>Display type</th>
<th>Part No.</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0…–1</td>
<td>PNP</td>
<td>–</td>
<td>Plug M8x1, 3-pin</td>
<td>LCD(^1)</td>
<td>192036</td>
<td>SDE1-V1-G2-HQ4-C-P1-M8</td>
</tr>
<tr>
<td></td>
<td>2x PNP</td>
<td>PNP</td>
<td>–</td>
<td>Plug M8x1, 4-pin</td>
<td>LCD(^1)</td>
<td>192037</td>
<td>SDE1-V1-G2-HQ4-C-P2-M8</td>
</tr>
<tr>
<td></td>
<td>0…10</td>
<td>PNP</td>
<td>–</td>
<td>Plug M8x1, 3-pin</td>
<td>LCD(^1)</td>
<td>192032</td>
<td>SDE1-D10-G2-HQ4-C-P1-M8</td>
</tr>
<tr>
<td></td>
<td>2x PNP</td>
<td>PNP</td>
<td>–</td>
<td>Plug M8x1, 4-pin</td>
<td>LCD(^1)</td>
<td>192033</td>
<td>SDE1-D10-G2-HQ4-C-P2-M8</td>
</tr>
<tr>
<td></td>
<td>0…10 V</td>
<td>PNP</td>
<td>0 … 10 V</td>
<td>Plug M8x1, 4-pin</td>
<td>LCD(^1)</td>
<td>529964</td>
<td>SDE1-D10-G2-HQ4-L-P1-M8</td>
</tr>
<tr>
<td></td>
<td>2x PNP</td>
<td>PNP</td>
<td>0 … 10 V</td>
<td>Plug M8x1, 4-pin</td>
<td>LCD(^1)</td>
<td>529965</td>
<td>SDE1-D10-G2-HQ4-L-P2-M8</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Plug M12x1, 3-pin</td>
<td>Illuminated LCD</td>
<td>529956</td>
<td>SDE1-D10-G2-HQ4-C-PU-M8</td>
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</tbody>
</table>

\(^1\) Back illuminated

---

**Note**

Additional variants and accessories can be configured and ordered through the SDE1 modular system ➔ 231.

---

1) Back illuminated
## Pressure sensors SDE1, with display

### Modular product system

### Mandatory data

<table>
<thead>
<tr>
<th>Module No.</th>
<th>Function</th>
<th>Pressure range</th>
<th>Absolute accuracy</th>
<th>Pneumatic connection and mounting</th>
<th>Display and setting</th>
<th>Electrical output</th>
<th>Electrical connection</th>
<th>Accessories: plug socket</th>
</tr>
</thead>
<tbody>
<tr>
<td>192766</td>
<td>SDE1</td>
<td>B2, V1, D2, D6, D10</td>
<td>G2</td>
<td>R18, R14, MS4, MS6, H18, W18, HQ4, WQ4, FQ4</td>
<td>C, L</td>
<td>P1, P2, PU, PI, N1, N2, NI</td>
<td>M8, M12, G, W, G5, W5</td>
<td></td>
</tr>
</tbody>
</table>

### Ordering example

<table>
<thead>
<tr>
<th>Module No.</th>
<th>Function</th>
<th>Pressure range</th>
<th>Absolute accuracy</th>
<th>Pneumatic connection and mounting</th>
<th>Display and setting</th>
<th>Electrical output</th>
<th>Electrical connection</th>
<th>Accessories: plug socket</th>
</tr>
</thead>
<tbody>
<tr>
<td>192766</td>
<td>SDE1</td>
<td>D6</td>
<td>G2</td>
<td>W18</td>
<td>L</td>
<td>P2</td>
<td>M12</td>
<td>W5</td>
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</table>

### Ordering table

<table>
<thead>
<tr>
<th>Module No.</th>
<th>Function</th>
<th>Pressure range</th>
<th>Absolute accuracy</th>
<th>Pneumatic connection and mounting</th>
<th>Display and setting</th>
<th>Electrical output</th>
<th>Electrical connection</th>
<th>Accessories: plug socket</th>
</tr>
</thead>
<tbody>
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<td>SDE1</td>
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<td>-</td>
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</tr>
</tbody>
</table>

**Not with electrical connection M12 in combination with electrical output P2, PU, PI, N2, N1, NI.**

### Transfer order code

<table>
<thead>
<tr>
<th>Module No.</th>
<th>Function</th>
<th>Pressure range</th>
<th>Absolute accuracy</th>
<th>Pneumatic connection and mounting</th>
<th>Display and setting</th>
<th>Electrical output</th>
<th>Electrical connection</th>
<th>Accessories: plug socket</th>
</tr>
</thead>
<tbody>
<tr>
<td>192766</td>
<td>SDE1</td>
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</table>
### Ordering data – Connecting cables

<table>
<thead>
<tr>
<th>Part No.</th>
<th>Type</th>
<th>Number of wires</th>
<th>Cable length [m]</th>
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<tbody>
<tr>
<td>M8x1, straight socket</td>
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<tr>
<td>3</td>
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<td>541333</td>
<td>NEBU-M8G3-K-2.5-LE3</td>
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<td>541343</td>
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<td>M8x1, angled socket</td>
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<tr>
<td>3</td>
<td>2.5</td>
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<table>
<thead>
<tr>
<th>Part No.</th>
<th>Type</th>
<th>Number of wires</th>
<th>Cable length [m]</th>
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</thead>
<tbody>
<tr>
<td>M12x1, straight socket</td>
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<td></td>
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<tr>
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<td>2.5</td>
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<td>541364</td>
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<tr>
<td>M12x1, angled socket</td>
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### Ordering data – Accessories

<table>
<thead>
<tr>
<th>Part No.</th>
<th>Type</th>
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</table>
| Adapter plate | 194297 SDE1-...-W-...
| Protective cover | 537074 SDE1-SH |

### Ordering data – Push-in fittings

<table>
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<th>For tubing O.D. [mm]</th>
<th>Part No.</th>
<th>Type</th>
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<tr>
<td>4</td>
<td>186093</td>
<td>QS-GV6-4</td>
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<td>6</td>
<td>186096</td>
<td>QS-GV6-6</td>
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<td>8</td>
<td>186098</td>
<td>QS-GV6-8</td>
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</tbody>
</table>

### Application examples

- **Basic pressure monitoring**: Pressure sensor SDE1 with display as basic pressure monitoring on the compressors
- **Pressure range monitoring**: Pressure range monitoring via a pressure sensor SDE1 with display in combination with an MS series service unit for operation of a pulsed air motor
Pressure sensors SPAB, with display
### Pressure sensors SPAB

#### Key features

**At a glance**

- **Variants:**
  - Plug M8x1
  - Plug, square design
  - Cable version

- **Multi-coloured, two-part display**

- **Alphanumeric pressure display**

- **Displayable units:**
  - bar
  - inch H₂O
  - inch Hg
  - kPa
  - psi
  - mmHg
  - kgf/cm²
  - MPa

- **Compact design** 30 x 30 mm

- **Country-specific pressure supply ports:**
  - G
  - R
  - NPT 3/8-27
  - M5 female thread

- **Wall or front panel mounting**

- **High ease of use thanks to intuitive operator prompting**

---

#### Product description

The pressure sensor SPAB can be used in all industries thanks to its wide range of connection and configuration options and its compact size. Switching point settings are emphasised via switching status indication and switching of the display value colour. Once programmed, the settings can be transferred to other pressure sensors SPAB.

#### Main applications

- Pressure/vacuum sensing
- Light assembly
- Wherever there is a need for space-saving pressure measurement with visualisation and limited robustness
- Easy identification of the system status by means of clear, colour-based switching status detection

#### Key features

- Pressure measuring range –1 … +1 or 0 … 10 bar
- Relative pressure measurement
- Pressure supply port G ¾, R ¾, NPT 3/8-27 or M5 female thread
- Electrical connection cable, plug M8x1 or plug, square design
- Switching output PNP, NPN and analogue output 1 … 5 V
- Two-part, multi-coloured display
- Compact design 30 x 30 mm
- Copy function (settings can be transferred from one device to another)
- Simple commissioning thanks to intuitive operation

#### Mounting options

- Wall mounting
- Manifold sub-bases via mounting bracket
## Pressure sensors SPAB, with display

### Product range overview

<table>
<thead>
<tr>
<th>Measurement method</th>
<th>Measured variable</th>
<th>Pressure measuring range [bar]</th>
<th>Switching function</th>
<th>Pneumatic connection</th>
<th>Electrical output</th>
</tr>
</thead>
<tbody>
<tr>
<td>Piezoresistive pressure sensor with display</td>
<td>1x relative pressure</td>
<td>–1 … +1 or 0 … 10</td>
<td>Freely programmable</td>
<td>G9/8, R3/4 or NPT3/4-27</td>
<td>M5</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1x PNP 1 … 5 V</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
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<td>2x PNP –</td>
</tr>
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<td></td>
<td></td>
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<td>1x NPN 1 … 5 V</td>
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<td></td>
<td>2x NPN –</td>
</tr>
</tbody>
</table>
Accessories | Page/online
---|---
1. Mounting bracket SAMH-...-A | 243
2. Adapter plate SASF for pressure sensor SPAB-...-F | 245
3. Electric adapter SASC-...-A | 244
4. Front panel installation kit SAMH-...-F | 243

Accessories | Page/online
---|---
5. Protective cover SACC | 243
6. Connecting cable NEBU-M8 | 246
7. Connecting cable NEBS-L1G4 | 246
8. Push-in fitting QSM-M5 | 246
### Pressure sensors SPAB, with display

<table>
<thead>
<tr>
<th>Type codes</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPAB</td>
<td>Piezoresistive pressure sensor with multi-coloured display</td>
</tr>
</tbody>
</table>

**Pressure measuring range [bar]**

<table>
<thead>
<tr>
<th>Type</th>
<th>Range</th>
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</thead>
<tbody>
<tr>
<td>B2</td>
<td>-1 ... +1</td>
</tr>
<tr>
<td>P10</td>
<td>0 ... 10</td>
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</tbody>
</table>

**Pressure input**

<table>
<thead>
<tr>
<th>Type</th>
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<tbody>
<tr>
<td>R</td>
<td>Relative pressure</td>
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</table>

**Pneumatic connection**

<table>
<thead>
<tr>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>G18</td>
<td>Male thread G1/4 and female thread M5</td>
</tr>
<tr>
<td>R18</td>
<td>Male thread R1/4 and female thread M5</td>
</tr>
<tr>
<td>N18</td>
<td>Male thread NPT1/4-27 and female thread M5</td>
</tr>
<tr>
<td>F</td>
<td>Female thread M5</td>
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</table>

**Electrical output**

<table>
<thead>
<tr>
<th>Type</th>
<th>Description</th>
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</thead>
<tbody>
<tr>
<td>2P</td>
<td>2 switching outputs PNP</td>
</tr>
<tr>
<td>2N</td>
<td>2 switching outputs NPN</td>
</tr>
<tr>
<td>PB</td>
<td>1 switching output PNP, 1 analogue output 1 ... 5 V</td>
</tr>
<tr>
<td>NB</td>
<td>1 switching output NPN, 1 analogue output 1 ... 5 V</td>
</tr>
</tbody>
</table>

**Electrical connection**

<table>
<thead>
<tr>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>K1</td>
<td>Cable, 2.5 m (included in the scope of delivery)</td>
</tr>
<tr>
<td>M8</td>
<td>Plug M8x1</td>
</tr>
<tr>
<td>L1</td>
<td>Plug, L1 design</td>
</tr>
</tbody>
</table>
## Pressure sensors SPAB, with display

### Technical data

#### Function
- E.g. switching output 2x PNP
  - Voltage
    - 12 ... 24 V DC
  - Pressure
    - –1 ... +10 bar
- E.g. switching output NPN, analogue output
  - Temperature range
    - –10 ... +50 °C

#### General technical data

<table>
<thead>
<tr>
<th>SPAB</th>
<th>B2</th>
<th>P10</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>General information</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Certification</strong></td>
<td>c UL us - Recognized (OL)</td>
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<tr>
<td></td>
<td>C-Tick</td>
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<tr>
<td><strong>CE mark (see declaration of conformity)</strong></td>
<td>To EU EMAC Directive 1)</td>
<td></td>
</tr>
<tr>
<td><strong>Note on materials</strong></td>
<td>Contains PWIS (paint wetting impairment substances)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>RoHS-compliant</td>
<td></td>
</tr>
<tr>
<td><strong>Input signal/measuring element</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Measured variable</strong></td>
<td>Relative pressure</td>
<td></td>
</tr>
<tr>
<td><strong>Measurement method</strong></td>
<td>Piezoresistive pressure sensor with display</td>
<td></td>
</tr>
<tr>
<td><strong>Pressure measuring range [bar]</strong></td>
<td>–1 ... +1</td>
<td>0 ... 10</td>
</tr>
<tr>
<td><strong>Overload capacity [bar]</strong></td>
<td>5</td>
<td>15</td>
</tr>
<tr>
<td><strong>Operating medium</strong></td>
<td>Compressed air in accordance with ISO 8573-1:2010 [7:4:4]</td>
<td></td>
</tr>
<tr>
<td><strong>Note on operating/pilot medium</strong></td>
<td>Operation with lubricated medium not possible</td>
<td></td>
</tr>
<tr>
<td><strong>Ambient temperature [°C]</strong></td>
<td>–10 ... +50</td>
<td></td>
</tr>
</tbody>
</table>

1) For information about the applicability of the component see the manufacturer’s EC declaration of conformity at: www.festo.com → Support → User documentation.

If the component is subject to restrictions on usage in residential, office or commercial environments or small businesses, further measures to reduce the emitted interference may be necessary.

#### Electrical data

<table>
<thead>
<tr>
<th>SPAB</th>
<th>B2</th>
<th>P10</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Electrical output</strong></td>
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<td></td>
</tr>
<tr>
<td><strong>Switching output</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2x PNP</td>
<td>2x NPN</td>
<td>PNP</td>
</tr>
<tr>
<td><strong>Switching function</strong></td>
<td>Freely programmable</td>
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</tr>
<tr>
<td><strong>Switching element function</strong></td>
<td>Switchable</td>
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<tr>
<td><strong>Accuracy of FS display [%]</strong></td>
<td>1</td>
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<tr>
<td><strong>Reproducibility of switching value [%]</strong></td>
<td>0.1</td>
<td>0.2</td>
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<tr>
<td><strong>Max. output current [mA]</strong></td>
<td>100</td>
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<tr>
<td><strong>Analogue output</strong></td>
<td></td>
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<tr>
<td><strong>Analogue output [V]</strong></td>
<td>–</td>
<td>1 ... 5</td>
</tr>
<tr>
<td><strong>Accuracy of analogue output zero point ±FS [%]</strong></td>
<td>–</td>
<td>5</td>
</tr>
<tr>
<td><strong>Accuracy of analogue output margin ±FS [%]</strong></td>
<td>–</td>
<td>5</td>
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<tr>
<td><strong>Reproducibility of analogue value [%]</strong></td>
<td>–</td>
<td>0.2</td>
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</tbody>
</table>

Output, additional data
- **Protection against short circuit** | Yes | |
## Pressure sensors SPAB, with display

### Technical data

<table>
<thead>
<tr>
<th><strong>Electrical data</strong></th>
<th>SPAB</th>
<th>B2</th>
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<td>2N</td>
<td>PB</td>
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<tr>
<td>Operating voltage range DC [V]</td>
<td>12 ... 24</td>
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<td>Reverse polarity protection</td>
<td>For operating voltage</td>
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</tr>
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<td><strong>Electrical connection</strong></td>
<td>Plug M8x1, 4-pin, round design to EN 60 947-5-2</td>
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<td></td>
</tr>
<tr>
<td>Cable, 4-wire, 2.5 m</td>
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<tr>
<td><strong>Mechanical components</strong></td>
<td>SPAB</td>
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<td>-R18</td>
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<td>Screw-in</td>
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<td>Female thread M5</td>
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<tr>
<td>Male thread G¼&quot;</td>
<td>Male thread R¼&quot;</td>
<td>Male thread NPT¼&quot;-27</td>
<td>-</td>
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<tr>
<td>Product weight [g]</td>
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<td>30</td>
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<td>Housing materials</td>
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<td>PB, reinforced</td>
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### Pin allocation to EN 60947-5-2

#### Plug, 4-pin

<table>
<thead>
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<th>M8x1</th>
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<th>Wire colour</th>
<th>Allocation</th>
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<tr>
<td>1</td>
<td>Brown</td>
<td>Operating voltage +24 V DC</td>
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</tr>
<tr>
<td>3</td>
<td>Blue</td>
<td>0 V</td>
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</tr>
<tr>
<td>4</td>
<td>Black</td>
<td>Switching output (Out A)</td>
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</tr>
<tr>
<td>2</td>
<td>White</td>
<td>Switching output (Out B)/analogue output</td>
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### Display/operation

<table>
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<th><strong>Display type</strong></th>
<th>SPAB</th>
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<td></td>
</tr>
<tr>
<td>bar</td>
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<td>inchH₂O</td>
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<td></td>
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<tr>
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</tr>
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<td>mmHg</td>
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</tr>
<tr>
<td>kgf/cm²</td>
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<td></td>
</tr>
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<td>MPa</td>
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<td><strong>Switching status display</strong></td>
<td>Yellow LCD</td>
<td></td>
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<tr>
<td><strong>Setting options</strong></td>
<td>Teach-In</td>
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<td></td>
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<tr>
<td><strong>Tamper protection</strong></td>
<td>PIN code</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Threshold value setting range [%]</strong></td>
<td>0 ... 100</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Hysteresis setting range [%]</strong></td>
<td>0 ... 90</td>
<td></td>
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</tbody>
</table>

### Immissions/ emissions

| **Protection class** | IP40 |
| **Corrosion resistance class CRC** | 2 |

---

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

Components subject to moderate corrosion stress. Internally 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.
### Pressure sensors SPAB, with display

#### Technical data


#### Dimensions

<table>
<thead>
<tr>
<th>Type</th>
<th>B1</th>
<th>D1</th>
<th>H1</th>
<th>L1</th>
<th>L2</th>
<th>ß</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPAB-...-G1B-...-K1</td>
<td>30</td>
<td>G½b</td>
<td>30</td>
<td>10</td>
<td>7</td>
<td>14</td>
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<tr>
<td>SPAB-...-R1B-...-K1</td>
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<td>R½b</td>
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<td>NPT½b</td>
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<tr>
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<td>M5</td>
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<td>4.4</td>
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</table>

[Diagram of SPAB-...-K1]

[Diagram of SPAB-...-F-...-K1]
### Pressure sensors SPAB, with display

#### Technical data

**Dimensions**

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<tr>
<th>Type</th>
<th>B1</th>
<th>D1</th>
<th>D2</th>
<th>H1</th>
<th>H2</th>
<th>H3</th>
<th>L1</th>
<th>L2</th>
<th>L3</th>
<th>L4</th>
<th>L5</th>
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<td>15</td>
<td>7</td>
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<td>SPAB-...-M8</td>
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<td>4.5</td>
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<td>4.5</td>
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### Pressure sensors SPAB, with display

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<th>Plug, square design</th>
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1) Connecting cable NEBU-L1... (2.5 m long) included in the scope of delivery.
Mounting bracket SAMH

Material:
Galvanised chromated steel

Note on materials:
RoHS-compliant

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Front panel installation kit SAMH

Materials:
PC, POM

Note on materials:
RoHS-compliant

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Protective cover SACC

Material:
PC

Note on materials:
RoHS-compliant

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Sensors > Pressure and vacuum sensors >
Pressure sensors SPAB, with display

Accessories

**Electric adapter SASC**

Material:
- Housing: PA-reinforced
- Plug housing: Nickel plated brass

Note on materials:
- RoHS-compliant

### Dimensions and ordering data

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<th>D1</th>
<th>H1</th>
<th>H2</th>
<th>L1</th>
<th>L2</th>
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1) Corrosion resistance class 2 according to Festo standard 940 070

Components subject to moderate corrosion stress. 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.
Adapter plate SASF
for pressure sensor SPAB-…-F

Materials:
PBT-reinforced
High-alloy stainless steel
HNBR

Note on materials:
Contains PWIS (paint wetting impairment substances)
RoHS-compliant

Dimensions and ordering data

| B1 | B2 | B3 | D1 | D2 | D3 | H1 | H2 | H3 | H4 | H5 | H6 | H7 | L1 | L2 | L3 | R1 | Part No. | Type       |
|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|-----|----------|
| 30 | 24 | 20 | R5 | 4.3| 3.4| 52.5| 44.5| 24 | 8  | 20 | 5.5| 6.5| 17.5| 11.5| 8.5| 9  | 570801  | SASF-P4-P-R18|
|    |    |    | G5 |    |    |    |    |    |    |    |    |    |    |    |    |    | 570802  | SASF-P4-P-G18|
|    |    |    | NPT|    |    |    |    |    |    |    |    |    |    |    |    |    | 570803  | SASF-P4-P-N18|
| 30 | 24 | 20 | M5 | 4.3| 3.4| –   | 44.5| 24 | –  | 20 | 5.5| 6.5| 17.5| 11.5| 8.5| –  | 570804  | SASF-P4-P-M5 |

1) Corrosion resistance class 2 according to Festo standard 940.070

Components subject to moderate corrosion stress. 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.
## Pressure sensors SPAB, with display

### Accessories

#### Ordering data – Connecting cables

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#### Ordering data – Push-in fittings

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Technical data → Internet: nebu

Technical data → Internet: quick star
## Product range overview

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<th>Pressure measuring range [bar]</th>
<th>Measured variable</th>
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## Peripherals overview

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## Pressure transmitters SPTE

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<td>V</td>
<td>0...10 V</td>
</tr>
<tr>
<td>Electrical connection</td>
<td></td>
</tr>
<tr>
<td>2.5K</td>
<td>2.5 m cable, open end</td>
</tr>
</tbody>
</table>

[ диаграмма ]

![Diagram](image-url)
### Pressure transmitters SPTE

#### Technical data

##### Function

- **Voltage**: 10 ... 30 V DC
- **Pressure**: –1 ... +10 bar
- **Temperature range**: 0 ... +50 °C

<table>
<thead>
<tr>
<th>Measured variable</th>
<th>Relative pressure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pressure measuring range</td>
<td></td>
</tr>
<tr>
<td>starting value</td>
<td>0 (bar)</td>
</tr>
<tr>
<td>final value</td>
<td>–1 (bar)</td>
</tr>
<tr>
<td>Max. overload pressure</td>
<td>5 (bar)</td>
</tr>
<tr>
<td>Operating medium</td>
<td>Compressed air in accordance with ISO 8573-1:2010 [7:4:4]</td>
</tr>
<tr>
<td>Temperature of medium</td>
<td>0 ... +50 (°C)</td>
</tr>
<tr>
<td>Ambient temperature</td>
<td>0 ... +50 (°C)</td>
</tr>
</tbody>
</table>

**Analogue output**

- **SPTE-...-B-V**
- **Analogue output**: 1 ... 5 V, 0 ... 10 V
- **Min. load resistance of voltage output**: 15 kΩ

**Electronic components**

- **SPTE-...-B-V**
- **Operating voltage range DC**: 10 ... 30 V, 18 ... 30 V
- **Reverse polarity protection**: For all electrical connections

---

1) For information about the applicability of the component see the manufacturer’s EC declaration of conformity at: www.festo.com [Support] [User documentation].

If the component is subject to restrictions on usage in residential, office or commercial environments or small businesses, further measures to reduce the emitted interference may be necessary.

---

### General technical data

- **Certification**: C-Tick
- **CE mark (see declaration of conformity)**: To EU EMC Directive
- **Note on materials**: RoHS-compliant

---

1) % FS = % of the measuring range (full scale)
Pressure transmitters SPTE

Technical data

### Electromechanical components

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Electrical connection</td>
<td>Cable, 3-wire, open end</td>
</tr>
<tr>
<td>Cable length</td>
<td>[m]</td>
</tr>
<tr>
<td></td>
<td>2.5</td>
</tr>
</tbody>
</table>

### Mechanical components

<table>
<thead>
<tr>
<th>SPTE-…</th>
<th>S4</th>
<th>S6</th>
<th>Q3</th>
<th>Q4</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type of mounting</td>
<td>Push-in</td>
<td>Via accessories</td>
<td>Via through-hole and screw</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mounting position</td>
<td>Any</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pneumatic connection</td>
<td>Push-in sleeve QS-4</td>
<td>Push-in sleeve QS-6</td>
<td>QS-3</td>
<td>QS-4</td>
<td>Flange</td>
</tr>
<tr>
<td>Product weight</td>
<td>[g]</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>35</td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Housing materials</td>
<td>PA, reinforced</td>
<td></td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>

### Immissions/emissions

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
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</thead>
<tbody>
<tr>
<td>Protection class</td>
<td>IP40</td>
</tr>
<tr>
<td>Corrosion resistance class CRC</td>
<td>2</td>
</tr>
</tbody>
</table>

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

Components subject to moderate corrosion stress. 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.
## Technical data

### Dimensions

<table>
<thead>
<tr>
<th>Type</th>
<th>B1</th>
<th>B2</th>
<th>B3</th>
<th>D1</th>
<th>D2</th>
<th>D3</th>
<th>D4</th>
<th>H1</th>
<th>H2</th>
<th>H3</th>
<th>L1</th>
<th>L2</th>
<th>L3</th>
<th>L4</th>
<th>L5</th>
<th>L6</th>
<th>L7</th>
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</thead>
<tbody>
<tr>
<td>SPTE-...-S4</td>
<td>9.8</td>
<td>-</td>
<td>-</td>
<td>4</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>18</td>
<td>13.3</td>
<td>11.8</td>
<td>-</td>
<td>20.5</td>
<td>-</td>
<td>2500</td>
<td>17.5</td>
<td>6.9</td>
<td>-</td>
</tr>
<tr>
<td>SPTE-...-S6</td>
<td>-</td>
<td>-</td>
<td>6</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>18</td>
<td>13.3</td>
<td>11.8</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>6.9</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>SPTE-...-Q3</td>
<td>0.7</td>
<td>-</td>
<td>3</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>24.7</td>
<td>17.5</td>
<td>8.5</td>
<td>-</td>
<td>-</td>
<td>13.6</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>SPTE-...-Q4</td>
<td>0.7</td>
<td>-</td>
<td>4</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>24.7</td>
<td>17.5</td>
<td>8.5</td>
<td>-</td>
<td>-</td>
<td>13.6</td>
<td>-</td>
<td>-</td>
<td>-</td>
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</tr>
<tr>
<td>SPTE-...-F</td>
<td>5.4</td>
<td>2.1</td>
<td>-</td>
<td>2.1</td>
<td>M2x6</td>
<td>15</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>30</td>
<td>-</td>
<td>25</td>
<td>13.9</td>
<td>2.3</td>
<td>-</td>
<td></td>
</tr>
</tbody>
</table>

1. Pneumatic connection
2. Blanking plug
3. Pneumatic connection with O-ring for flat mounting
4. M2x6 screw
## Pressure transmitters SPTE

**Technical data**

<table>
<thead>
<tr>
<th>Pressure measuring range [bar]</th>
<th>Analogue output [V]</th>
<th>Pneumatic connection</th>
<th>Electrical connection</th>
<th>Part No. Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 ... –1</td>
<td>1 ... 5</td>
<td>Push-in sleeve 4 mm</td>
<td>Cable, 3-wire, open end</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Push-in sleeve 6 mm</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Push-in connector 3 mm</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Push-in connector 4 mm</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Flange</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>571469 SPTE-V1R-S4-B-2.5K</td>
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<tr>
<td></td>
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<td>571470 SPTE-V1R-S6-B-2.5K</td>
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<td>571471 SPTE-V1R-Q3-B-2.5K</td>
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<td>571472 SPTE-V1R-Q4-B-2.5K</td>
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<td>0 ... 10</td>
<td>Push-in sleeve 4 mm</td>
<td></td>
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</tr>
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<td>Push-in sleeve 6 mm</td>
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<td>Push-in connector 3 mm</td>
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</tr>
<tr>
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<td>Push-in connector 4 mm</td>
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<td>Flange</td>
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<td>571473 SPTE-V1R-F-B-2.5K</td>
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<td>571474 SPTE-V1R-S4-V-2.5K</td>
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<td>571478 SPTE-V1R-F-V-2.5K</td>
<td></td>
<td></td>
</tr>
<tr>
<td>0 ... 10</td>
<td>1 ... 5</td>
<td>Push-in sleeve 4 mm</td>
<td>Cable, 3-wire, open end</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Push-in sleeve 6 mm</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Push-in connector 3 mm</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>Push-in connector 4 mm</td>
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<td>Flange</td>
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<td>571479 SPTE-P10R-S4-B-2.5K</td>
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<td>571480 SPTE-P10R-S6-B-2.5K</td>
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<td>571481 SPTE-P10R-Q3-B-2.5K</td>
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<td>571483 SPTE-P10R-F-B-2.5K</td>
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</tr>
<tr>
<td>0 ... 10</td>
<td>0 ... 10</td>
<td>Push-in sleeve 4 mm</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Push-in sleeve 6 mm</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Push-in connector 3 mm</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Push-in connector 4 mm</td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td>Flange</td>
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<td></td>
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<td>571484 SPTE-P10R-S4-V-2.5K</td>
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<td>571485 SPTE-P10R-S6-V-2.5K</td>
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<td>571486 SPTE-P10R-Q3-V-2.5K</td>
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<td></td>
<td></td>
<td>571487 SPTE-P10R-Q4-V-2.5K</td>
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<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>571488 SPTE-P10R-F-V-2.5K</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Sensors > Pressure and vacuum sensors

Pressure transmitters SPTE

Accessories

Mounting clip SAMH-PE-MC-1

Material:
POM

Note on materials:
RoHS-compliant

Dimensions and ordering data

<table>
<thead>
<tr>
<th>B1</th>
<th>D1</th>
<th>H1</th>
<th>L1</th>
<th>L2</th>
<th>L3</th>
<th>Part No.</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>3.2</td>
<td>5</td>
<td>17.5</td>
<td>5.3</td>
<td>4</td>
<td>571489</td>
<td>SAMH-PE-MC-1</td>
</tr>
</tbody>
</table>

Mounting clip SAMH-PE-MC-8

Material:
POM

Note on materials:
RoHS-compliant

Dimensions and ordering data

<table>
<thead>
<tr>
<th>B1</th>
<th>B2</th>
<th>B3</th>
<th>D1</th>
<th>H1</th>
<th>L1</th>
<th>L2</th>
<th>L3</th>
<th>L4</th>
<th>Part No.</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>17.5</td>
<td>4</td>
<td>5.3</td>
<td>3.2</td>
<td>5</td>
<td>80</td>
<td>70</td>
<td>10</td>
<td>5</td>
<td>571490</td>
<td>SAMH-PE-MC-8</td>
</tr>
</tbody>
</table>

Ordering data – Plugs

<table>
<thead>
<tr>
<th>Electrical connection</th>
<th>Part No.</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plug M8x1, 3-pin, straight, insulation displacement connector</td>
<td>562024</td>
<td>NECU-S-M8G3-HX</td>
</tr>
<tr>
<td>Plug M12x1, A-coded, 3-pin, straight, insulation displacement connector</td>
<td>562027</td>
<td>NECU-S-M12G3-HX</td>
</tr>
<tr>
<td>Straight plug/insulation displacement connector, 4-pin, square design</td>
<td>570922</td>
<td>NECU-S-ECG4-HX-Q3</td>
</tr>
</tbody>
</table>
Pressure transmitters SPTW

**Product range overview**

<table>
<thead>
<tr>
<th>Method of measurement</th>
<th>Pressure measuring range [bar]</th>
<th>Measured variable</th>
<th>Pneumatic connection</th>
<th>Operating voltage [V DC]</th>
<th>Electrical connection</th>
</tr>
</thead>
<tbody>
<tr>
<td>Piezoresistive pressure sensor</td>
<td>–1 ... +1</td>
<td>Relative pressure</td>
<td>G ¼</td>
<td>8 ... 30</td>
<td>Plug M 12x1, 4-pin, to EN 60947-5-2, round design</td>
</tr>
<tr>
<td>Thin-film metal pressure sensor</td>
<td>0 ... 10</td>
<td>Relative pressure</td>
<td>G ¼</td>
<td>8 ... 30</td>
<td>Plug M 12x1, 4-pin, to EN 60947-5-2, round design</td>
</tr>
</tbody>
</table>

**Peripherals overview**

<table>
<thead>
<tr>
<th>Mounting attachments and accessories</th>
<th>Page/online</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Connecting cable NEBU-M12</td>
<td>260</td>
</tr>
<tr>
<td>2 Pipe clamp (included in the scope of delivery)</td>
<td>-</td>
</tr>
<tr>
<td>3 Push-in fitting QS-¼</td>
<td>260</td>
</tr>
</tbody>
</table>

**Type codes**

<table>
<thead>
<tr>
<th>Function</th>
<th>Pressure transmitter</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPTW</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Pressure measuring range</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>B2</td>
<td>–1 ... +1 bar</td>
</tr>
<tr>
<td>B11</td>
<td>–1 ... +10 bar</td>
</tr>
<tr>
<td>P2</td>
<td>0 ... 2 bar</td>
</tr>
<tr>
<td>P6</td>
<td>0 ... 6 bar</td>
</tr>
<tr>
<td>P10</td>
<td>0 ... 10 bar</td>
</tr>
<tr>
<td>P16</td>
<td>0 ... 16 bar</td>
</tr>
<tr>
<td>P25</td>
<td>0 ... 25 bar</td>
</tr>
<tr>
<td>P50</td>
<td>0 ... 50 bar</td>
</tr>
<tr>
<td>P100</td>
<td>0 ... 100 bar</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Pressure input</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>R</td>
<td>Relative pressure</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Pneumatic connection</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>G ¼</td>
<td>Female thread G ¼</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Electrical output</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>4 ... 20 mA</td>
</tr>
<tr>
<td>VD</td>
<td>0.1 ... 10 V</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Electrical connection</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>M12</td>
<td>Plug M 12x1, 4-pin</td>
</tr>
</tbody>
</table>
### Technical data

#### Function
- **SPTW-...-A**
- **SPTW-...-VD**

#### General technical data

<table>
<thead>
<tr>
<th>Certification</th>
<th>cULus listed (OL)</th>
</tr>
</thead>
<tbody>
<tr>
<td>CE mark (see declaration of conformity)</td>
<td>To EU EMC Directive</td>
</tr>
<tr>
<td>Note on materials</td>
<td>Contains PWIS (paint wetting impairment substances)</td>
</tr>
<tr>
<td></td>
<td>RoHS-compliant</td>
</tr>
</tbody>
</table>

1) For information about the applicability of the component see the manufacturer’s EC declaration of conformity at: www.festo.com

#### Input signal/measuring element

<table>
<thead>
<tr>
<th>Measured variable</th>
<th>Relative pressure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Method of measurement</td>
<td>Piezoresistive pressure sensor</td>
</tr>
<tr>
<td></td>
<td>Thin-film metal pressure sensor</td>
</tr>
<tr>
<td>Pressure measuring range starting value [bar]</td>
<td>-1 0 0 -1 0 0 0 0 0</td>
</tr>
<tr>
<td>Pressure measuring range final value [bar]</td>
<td>1 2 6 10 10 16 25 50 100</td>
</tr>
<tr>
<td>Overload pressure [bar]</td>
<td>2 4 12 20 20 32 50 100 200</td>
</tr>
<tr>
<td>Operating medium</td>
<td>Compressed air in accordance with ISO 8573-1:2010 [–:–:–]</td>
</tr>
<tr>
<td></td>
<td>Neutral liquids</td>
</tr>
<tr>
<td></td>
<td>Gaseous media</td>
</tr>
<tr>
<td>Temperature of medium [°C]</td>
<td>0 ... 80</td>
</tr>
<tr>
<td>Ambient temperature [°C]</td>
<td>0 ... 80</td>
</tr>
</tbody>
</table>

#### Output, general

| Accuracy ±FS [%] | 1 |
| Repetition accuracy ±FS [%] | 0.1 |

1) % FS = % of the measuring range (full scale)

#### Analogue output

<table>
<thead>
<tr>
<th>Analogue output</th>
<th>SPTW-...-A</th>
<th>SPTW-...-VD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Analogue output [mA]</td>
<td>4 ... 20</td>
<td>–</td>
</tr>
<tr>
<td>Analogue output [V]</td>
<td>–</td>
<td>0.1 ... 10</td>
</tr>
<tr>
<td>Linearity error ±FS [%]</td>
<td>0.5</td>
<td></td>
</tr>
</tbody>
</table>

1) % FS = % of the measuring range (full scale)
### Pressure transmitters SPTW

#### Technical data

**Output, additional data**

| Protection against short circuit | Yes |

**Electronic components**

<table>
<thead>
<tr>
<th>SPTW-...</th>
<th>A</th>
<th>VD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating voltage range DC [V]</td>
<td>8 ... 30</td>
<td>14 ... 30</td>
</tr>
<tr>
<td>Reverse polarity protection</td>
<td>For operating voltage</td>
<td></td>
</tr>
</tbody>
</table>

**Electromechanical components**

<table>
<thead>
<tr>
<th>Electrical connection</th>
<th>Plug M12x1, 4-pin</th>
</tr>
</thead>
<tbody>
<tr>
<td>To EN 60947-5-2</td>
<td></td>
</tr>
<tr>
<td>Round design</td>
<td></td>
</tr>
<tr>
<td>Plug housing material</td>
<td>PA</td>
</tr>
</tbody>
</table>

**Mechanical components**

<table>
<thead>
<tr>
<th>Type of mounting</th>
<th>Via female thread</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mounting position</td>
<td>Any</td>
</tr>
<tr>
<td>Pneumatic connection</td>
<td>G5/4</td>
</tr>
<tr>
<td>Product weight [g]</td>
<td>80</td>
</tr>
<tr>
<td>Housing materials</td>
<td>High-alloy stainless steel</td>
</tr>
<tr>
<td></td>
<td>PA</td>
</tr>
<tr>
<td></td>
<td>VMQ (silicone)</td>
</tr>
<tr>
<td>Materials in contact with the medium</td>
<td>High-alloy stainless steel</td>
</tr>
</tbody>
</table>

**Immissions/emissions**

<table>
<thead>
<tr>
<th>Protection class</th>
<th>IP67</th>
</tr>
</thead>
<tbody>
<tr>
<td>Corrosion resistance class CRC</td>
<td>4</td>
</tr>
</tbody>
</table>

1) Corrosion resistance class 4 according to Festo standard 940 070

Components subject to particularly high corrosion stress. Parts used with aggressive media, e.g. in the food or chemical industry. These applications should be supported with special tests with the media if required.

**Pin allocation**

**SPTW-...-A**

<table>
<thead>
<tr>
<th>Pin</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Operating voltage Uo/signal +</td>
</tr>
<tr>
<td>3</td>
<td>0 V/signal –</td>
</tr>
</tbody>
</table>

**SPTW-...-VD**

<table>
<thead>
<tr>
<th>Pin</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Operating voltage Uo</td>
</tr>
<tr>
<td>3</td>
<td>0 V</td>
</tr>
<tr>
<td>4</td>
<td>Analogue output</td>
</tr>
</tbody>
</table>
## Pressure transmitters SPTW

### Technical data

#### Dimensions

![Diagram](image)

#### Ordering data

<table>
<thead>
<tr>
<th>Pressure measuring range [bar]</th>
<th>Analogue output</th>
<th>Pneumatic connection</th>
<th>Electrical connection</th>
<th>Part No.</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>-1 ... +1</td>
<td>4 ... 20 mA</td>
<td>G1/4</td>
<td>Plug M12x1, 4-pin</td>
<td>8000100</td>
<td>SPTW-B2R-G14-A-M12</td>
</tr>
<tr>
<td>-1 ... +10</td>
<td></td>
<td>G1/4</td>
<td></td>
<td>8000101</td>
<td>SPTW-B11R-G14-A-M12</td>
</tr>
<tr>
<td>0 ... 2</td>
<td></td>
<td>G1/4</td>
<td></td>
<td>8000102</td>
<td>SPTW-P2R-G14-A-M12</td>
</tr>
<tr>
<td>0 ... 6</td>
<td></td>
<td>G1/4</td>
<td></td>
<td>8000103</td>
<td>SPTW-P6R-G14-A-M12</td>
</tr>
<tr>
<td>0 ... 10</td>
<td></td>
<td>G1/4</td>
<td></td>
<td>8000104</td>
<td>SPTW-P10R-G14-A-M12</td>
</tr>
<tr>
<td>0 ... 16</td>
<td></td>
<td>G1/4</td>
<td></td>
<td>8000105</td>
<td>SPTW-P16R-G14-A-M12</td>
</tr>
<tr>
<td>0 ... 25</td>
<td></td>
<td>G1/4</td>
<td></td>
<td>8000106</td>
<td>SPTW-P25R-G14-A-M12</td>
</tr>
<tr>
<td>0 ... 50</td>
<td></td>
<td>G1/4</td>
<td></td>
<td>8000107</td>
<td>SPTW-P50R-G14-A-M12</td>
</tr>
<tr>
<td>0 ... 100</td>
<td></td>
<td>G1/4</td>
<td></td>
<td>8000108</td>
<td>SPTW-P100R-G14-A-M12</td>
</tr>
<tr>
<td>-1 ... +1</td>
<td>0.1 ... 10 V</td>
<td>G1/4</td>
<td>Plug M12x1, 4-pin</td>
<td>8000109</td>
<td>SPTW-B2R-G14-VD-M12</td>
</tr>
<tr>
<td>-1 ... +10</td>
<td></td>
<td>G1/4</td>
<td></td>
<td>8000110</td>
<td>SPTW-B11R-G14-VD-M12</td>
</tr>
<tr>
<td>0 ... 2</td>
<td></td>
<td>G1/4</td>
<td></td>
<td>8000111</td>
<td>SPTW-P2R-G14-VD-M12</td>
</tr>
<tr>
<td>0 ... 6</td>
<td></td>
<td>G1/4</td>
<td></td>
<td>8000112</td>
<td>SPTW-P6R-G14-VD-M12</td>
</tr>
<tr>
<td>0 ... 10</td>
<td></td>
<td>G1/4</td>
<td></td>
<td>8000113</td>
<td>SPTW-P10R-G14-VD-M12</td>
</tr>
<tr>
<td>0 ... 16</td>
<td></td>
<td>G1/4</td>
<td></td>
<td>8000114</td>
<td>SPTW-P16R-G14-VD-M12</td>
</tr>
<tr>
<td>0 ... 25</td>
<td></td>
<td>G1/4</td>
<td></td>
<td>8000115</td>
<td>SPTW-P25R-G14-VD-M12</td>
</tr>
<tr>
<td>0 ... 50</td>
<td></td>
<td>G1/4</td>
<td></td>
<td>8000116</td>
<td>SPTW-P50R-G14-VD-M12</td>
</tr>
<tr>
<td>0 ... 100</td>
<td></td>
<td>G1/4</td>
<td></td>
<td>8000117</td>
<td>SPTW-P100R-G14-VD-M12</td>
</tr>
</tbody>
</table>
## Pressure transmitters SPTW

### Accessories

#### Ordering data – Connecting cables

<table>
<thead>
<tr>
<th>Number of wires/pins</th>
<th>Cable length [m]</th>
<th>Part No.</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>2.5</td>
<td>541363</td>
<td>NEBU-M12G5-K-2.5-LE3</td>
</tr>
<tr>
<td>5</td>
<td>2.5</td>
<td>541364</td>
<td>NEBU-M12G5-K-5-LE3</td>
</tr>
<tr>
<td>4</td>
<td>2.5</td>
<td>550326</td>
<td>NEBU-M12G5-K-2.5-LE4</td>
</tr>
<tr>
<td>5</td>
<td>2.5</td>
<td>541328</td>
<td>NEBU-M12G5-K-5-LE4</td>
</tr>
<tr>
<td>5</td>
<td>2.5</td>
<td>541330</td>
<td>NEBU-M12G5-K-2.5-LE5</td>
</tr>
<tr>
<td>5</td>
<td>2.5</td>
<td>541331</td>
<td>NEBU-M12G5-K-5-LE5</td>
</tr>
</tbody>
</table>

M12x1, angled socket, open end

<table>
<thead>
<tr>
<th>Number of wires/pins</th>
<th>Cable length [m]</th>
<th>Part No.</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>2.5</td>
<td>541367</td>
<td>NEBU-M12W5-K-2.5-LE3</td>
</tr>
<tr>
<td>5</td>
<td>2.5</td>
<td>541370</td>
<td>NEBU-M12W5-K-5-LE3</td>
</tr>
<tr>
<td>4</td>
<td>2.5</td>
<td>550325</td>
<td>NEBU-M12W5-K-2.5-LE4</td>
</tr>
<tr>
<td>5</td>
<td>2.5</td>
<td>541329</td>
<td>NEBU-M12W5-K-5-LE4</td>
</tr>
</tbody>
</table>

Socket M12x1, straight; plug M8x1, straight

<table>
<thead>
<tr>
<th>Number of wires/pins</th>
<th>Cable length [m]</th>
<th>Part No.</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>2.5</td>
<td>554034</td>
<td>NEBU-M12G5-E-2.5-W2-M8G4-V1</td>
</tr>
<tr>
<td>5</td>
<td>2.5</td>
<td>554033</td>
<td>NEBU-M12G5-E-2.5-W3-M8G4-V2</td>
</tr>
</tbody>
</table>

#### Technical data

- Internet: nebu
- Internet: quick star

**Ordering data – Push-in fittings**

<table>
<thead>
<tr>
<th>For tubing O.D.</th>
<th>Part No.</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>4 mm</td>
<td>190644</td>
<td>QS-¼-4³</td>
</tr>
<tr>
<td>6 mm</td>
<td>153003</td>
<td>QS-¼-6²</td>
</tr>
<tr>
<td>8 mm</td>
<td>153005</td>
<td>QS-¼-8²</td>
</tr>
</tbody>
</table>

1) Temperature-dependent operating pressure –0.95 … 14 bar

---

1) Pin allocation designed for connecting the pressure transmitter SPTW…-A-M12 to the signal converter SVE4-IS

2) Pin allocation designed for connecting the pressure transmitter SPTW…-VD-M12 to the signal converter SVE4-IS

---

1.4
Flow sensors

Key features

Flow rate measurement

Flow rate

The flow rate is the quantity of a flowing medium per unit of time \( t \), measured in volumetric units \( (Q_V = V/t) \) or in mass units \( (Q_M = m/t) \).

Typical applications include:
- Monitoring of coolant and lubricant circuits. Water-cooled spot welding guns must be continuously monitored, for example. If the cooling system remains off, this can lead to unclean welded joints and, in extreme cases, to the tip breaking off the welding gun. The water flow rate is therefore monitored with a pressure sensor and flow rate sensor in the coolant advance and return.
- Monitoring and measuring of delivery rates in pipe systems such as water distribution systems (protection against dry running for pumps), discharge monitoring, leakage detection, press hydraulics and vacuum units in the wood working industry, for example.
- Measurement of filling quantities and control of flow rates in process engineering and in industries that use liquids and gases.

Application examples

Various measured variables can be used for measurement. Flow meters are widely used in the industrial sector.

Typical applications include:
- Monitoring of coolant and lubricant circuits. Water-cooled spot welding guns must be continuously monitored, for example. If the cooling system remains off, this can lead to unclean welded joints and, in extreme cases, to the tip breaking off the welding gun. The water flow rate is therefore monitored with a pressure sensor and flow rate sensor in the coolant advance and return.
- Monitoring and measuring of delivery rates in pipe systems such as water distribution systems (protection against dry running for pumps), discharge monitoring, leakage detection, press hydraulics and vacuum units in the wood working industry, for example.
- Measurement of filling quantities and control of flow rates in process engineering and in industries that use liquids and gases.

Method of measurement

So how is the flow rate determined?

There are more than 30 different methods.

These include methods that use ultrasonic, magneto-inductive and thermal methods, methods that use the Coriolis effect and, last but not least, many designs using turbine or impeller wheels, which are driven by the flow.

Volumetric flow meters

Direct volumetric meters

In this case, “portions” of the medium are typically measured and added, e.g. by means of rotating measuring cells and rotary pistons.

Indirect volumetric meters

Indirect volumetric meters include those meters with which an impeller wheel is set in motion by the flow. The number of rotations is thus an initial approximation for the flow volume. The rotational frequency is measured magnetically. The result is then multiplied by the delivery chamber volume to produce the volumetric flow rate.

Differential pressure method

The differential pressure measurement principle uses the fluid-mechanical changes in the medium that result from a speed increase through a localised narrowing of the flow cross section. Orifices of different designs are used for narrowing purposes. Information about the flow rate is obtained by evaluating the difference between pressures \( p_1 \) and \( p_2 \) measured before and after the orifice. This method is particularly suited for large flow rates in liquids and gases, as well as for higher pressures, higher temperatures and aggressive media. For small flow rates, however, calorimetric measurement methods are more suitable. Almost 60% of orifice systems are used in industrial applications.
Magneto-inductive flow measurement

The effect of force on moving electrical charges Q in a magnetic field is used to measure the flow rate. A magnetic flux density B is generated by an externally fitted magnet. The required charges Q are present in liquids in the form of ions due to dissociation (disintegration of molecules). The resulting electrical voltage is tapped by two diametrically opposed electrodes. The material to be measured flows through an insulated lined tube piece, and a measuring transducer separates the required signal from the much larger noise signals. The voltage is proportional to the mean flow velocity. To keep measurement error to a minimum, a stabilising zone of 3 to 5 times the tube diameter is used. The same applies following major cross section changes or elbows. This reference value for the length of the stabilising zone applies to most flow sensors, since a usable and repeatable signal is only produced by measurement in a stabilised (laminar) flow.

Flow measurement according to the Coriolis principle

The Coriolis flow meter has been around for over 50 years, but has only gained popularity in recent years. It uses the Coriolis force, which is produced when a mass flows through a U-shaped tube. An electromagnetic converter, for example, causes the tube to vibrate, so that when there is no mass flow, the vibration mode is retained. When the medium flows, Coriolis forces are generated, which cause torsional vibration of the elbow. This is measured using sensitive converters. The measured angle is directly proportional to the mass flow. There is thus no conversion of volume to mass and the mass flow is obtained directly in kg/h.

The method is ideally suited to the metering of very small to medium amounts with measurement accuracies of approximately 0.5%. Measuring devices based on the Coriolis force are expensive, but can also be used for extremely small quantities, short-term metering, pulsed flow, high and low temperatures, tubes that are not completely filled and high pressures.
Flow measurement with ultrasonics

Ultrasonics let you successfully "look into" the liquid and thus obtain the volumetric flow rate. The effect is due to the propagation speed of sound waves in moving liquids, which changes with the flow velocity of the transmission medium. Ultrasonic flow meters are used externally on the tube. In order to be able to use ultrasonics for compact and inexpensive flow meters, capacitive ultrasonic membrane arrays are being developed, which can be produced using microsystems technologies. The sensors and electronics should be integrated on a single chip.

The origins of ultrasonic location go back to the First World War. In the wake of the sinking of the "Titanic", attempts were made (unsuccessfully at the time) to locate moving icebergs using sonar.

Drift method

With the drift method, the directed sound beam undergoes deflection as a result of the flow. There is therefore a difference between the output amplitudes of both receivers.

Doppler measuring method

With the Doppler measuring method, acoustic signals are reflected by air bubbles or solid particles. However, as reflectors, these particles must not be too small. The relative motion of the reflected body causes the sound to be compressed into a shorter wavelength, i.e. a higher frequency. The difference in frequency is now directly proportional to the flow velocity. The flow volume can be determined from the tube cross section and the speed.

Transmission principle

With the transit time method (transmission principle), the liquid must be "clean". Measuring probes that send ultrasonic signals back and forth alternately lie at an angle of 45° to one another. The signal travelling against the direction of flow is slowed down, while the signal travelling with the flow is speeded up. A transit time difference (frequency difference) results, which is not influenced by material or temperature and is dependent on the flow velocity.

1 Measuring probe
2 Transmission principle
3 Tube

Doppler measuring method

1 Transmitter
2 Receiver
3 Tube

Drift method

1 Transmitter
2 Receiver
3 Tube
Flow sensors

Key features

Calorimetric flow measurement
In the case of thermal-based flow measurement, the flow volume of a gas or a liquid is extrapolated from a temperature, a temperature difference or a variable derived from it. Measurement is therefore based on the quantification of the heat transport.

The flow monitor can be used as an immersion device as shown in the diagram. In order to avoid measuring errors, a distance L from elbows or cross section changes should be maintained. The minimum length of the stabilising zone for calorimetric flow measurements should be $L = 10 \times D$ before the measuring point and $L = 6 \times D$ after. This results in a low-turbulence and mainly laminar flow at the measuring device.

Hot-wire method
This method is based on measurement of the heat transport. An electrically heated metal wire with temperature-dependent electrical resistance is brought into the gas flow and cooled down. The electrical data for the heating and the ohmic resistance of the hot wire provide information about the flow velocity and produce a volume value when the tube cross section is taken into account (provided the tube cross section is completely filled).

Measurement with thermoelectric detector
NTC thermistors are introduced into the flow and heated electrically. A state of equilibrium is reached depending on the cooling by the flow. The prevailing temperature of the sensors determines its electrical resistance, from which a measuring signal is derived.

Measurement with PTC thermistor
A defined heat source is also cooled down by the flow in this case, but a PTC thermistor is used. This is a temperature-dependent resistance, which becomes more highly resistance with increasing temperature.

Measurement based on the warming-up method
A value for the mass flow rate is derived from a heat balance. A heating element and two temperature sensors are used in this case. The principle is illustrated in the diagram, whereby the measurement structure consists of a grid of thin-film resistors on a chip. The temperature sensor S1 measures the initial temperature of the liquid. This is then heated by element H and the sensor S2 measures the temperature rise in the liquid. The temperature difference between the sensors provides a measurement for the volumetric flow rate when the heat output remains constant. When the medium is at rest the temperature difference is zero.

The diagram shows a thermal mass flow meter for gases such as compressed air. The flow channel or a bypass contains platinum foil resistors arranged in parallel with the flow. The heated resistor 3 is surrounded by the fluid and cooled down. A controller 5 ensures that its temperature remains constant. Therefore if the flow velocity increases, the current 4 also increases, producing the value for the mass flow. The resistor 2 acts as a reference for the fluid temperature, whereby the temperature difference between the resistor 3 and the fluid can be kept constant by the controller. Festo flow sensors are based on this principle.
If a flow disrupter is integrated in the flow path, a vortex stream is created. The number of vortices is proportional to the flow velocity within a wide area. The shedding of vortices must thus be measured. This can be done using various methods, e.g. by measuring the pressure that is influenced by the vortices.

The figure shows a sensor principle, whereby a flow disrupter with a strain gauge projects into the laminar flow at a right angle to the flow. Vortices are created in the air flow, which separate periodically (vortex shedding frequency). This process is in turn characterised by local differential pressures, which cause the flow disrupter, which is also flexible, to vibrate. This is detected via the strain gauge. The frequency of break-off pulses is proportional to the volumetric flow rate.
### Flow sensors SFE

**Product range overview**

<table>
<thead>
<tr>
<th>Type</th>
<th>Operating pressure [bar]</th>
<th>Flow measuring range [l/min]</th>
<th>Pneumatic connection</th>
<th>Type of mounting</th>
<th>Electrical output</th>
<th>Page/online</th>
</tr>
</thead>
</table>
| Flow sensor SFE3, with integrated digital display | –0.7 … +7 | 0.05 … 0.5  
0.1 … 1  
0.5 … 5  
1 … 10  
5 … 50 | Push-in fitting 6 mm | Via through-hole, via mounting bracket | 2x PNP 2x NPN | 1 … 5 V | 271 |
| Flow sensor SFET-F, unidirectional | –0.7 … +7 | 0.05 … 0.5  
0.1 … 1  
0.5 … 5  
1 … 10  
5 … 50 | Push-in fitting 6 mm | Via through-hole, via mounting bracket | 2x PNP 2x NPN | 1 … 5 V | 273 |
| Flow sensor SFET-R, bidirectional | –0.9 … +2 | –0.05 … +0.05  
–0.1 … +0.1  
–0.5 … +0.5  
–1 … +1  
–5 … +5  
–10 … +10 | Push-in fitting 4 mm | Via through-hole, via mounting bracket | 2x PNP 2x NPN | 1 … 5 V | 275 |

1) In combination with flow indicator. Must be ordered separately as an accessory.
Flow sensors SFE

Peripherals overview

<table>
<thead>
<tr>
<th>Mounting attachments and accessories</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Flow sensor</td>
<td></td>
</tr>
<tr>
<td>SFE3-...-W18 with female thread</td>
<td>271</td>
</tr>
<tr>
<td>2. Flow sensor</td>
<td></td>
</tr>
<tr>
<td>SFE3-...-WQ... with QS push-in fitting</td>
<td>271</td>
</tr>
<tr>
<td>3. Flow sensor</td>
<td></td>
</tr>
<tr>
<td>SFET-...-W18 with female thread</td>
<td>273</td>
</tr>
<tr>
<td>4. Flow sensor</td>
<td></td>
</tr>
<tr>
<td>SFET-...-WQ... with QS push-in fitting</td>
<td>273</td>
</tr>
<tr>
<td>5. Flow indicator</td>
<td></td>
</tr>
<tr>
<td>SFEV for flow sensor SFET</td>
<td>277</td>
</tr>
<tr>
<td>6. Mounting bracket</td>
<td></td>
</tr>
<tr>
<td>SFEZ-BW1</td>
<td>278</td>
</tr>
<tr>
<td>7. Mounting bracket</td>
<td></td>
</tr>
<tr>
<td>SFEV-BW1</td>
<td>278</td>
</tr>
<tr>
<td>8. Mounting bracket</td>
<td></td>
</tr>
<tr>
<td>SFEV-WH1</td>
<td>278</td>
</tr>
<tr>
<td>9. Front panel installation kit</td>
<td></td>
</tr>
<tr>
<td>SFEV-FH1</td>
<td>279</td>
</tr>
<tr>
<td>10. Protective cover</td>
<td></td>
</tr>
<tr>
<td>SFEV-SH1</td>
<td>279</td>
</tr>
<tr>
<td>11. Push-in fitting</td>
<td></td>
</tr>
<tr>
<td>QS-G1/4</td>
<td>279</td>
</tr>
</tbody>
</table>
### Flow sensors SFE

**Type codes**

<table>
<thead>
<tr>
<th>Type</th>
<th>Design</th>
<th>Flow input</th>
<th>Flow measuring range [l/min]</th>
<th>Medium</th>
<th>Mounting</th>
<th>Pneumatic connection</th>
<th>Switching output</th>
<th>Analogue output</th>
<th>Electrical connection</th>
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<tr>
<td>SFE</td>
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<td>W</td>
<td>Q4</td>
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<td>B</td>
<td>K1</td>
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</table>

- **Flow sensor**
- **With integrated digital display**
- **Flow transmitter**
- **Compressed air**
- **Wall or surface mounting**
- **Push-in fitting 4 mm**
- **Push-in fitting 6 mm**
- **Female thread G 1/4**
- **1 m cable, open end**
- **3 m cable, open end**

**Flow measuring range [l/min]**

- **Unidirectional**
  - 005: 0.05 ... 0.5
  - 010: 0.1 ... 1
  - 050: 0.5 ... 5
  - 100: 1 ... 10
  - 500: 5 ... 50

- **Bidirectional**
  - 0005: -0.05 ... +0.05
  - 0010: -0.1 ... +0.1
  - 0030: -0.5 ... +0.5
  - 0100: -1 ... +1
  - 0500: -5 ... +5
  - 1000: -10 ... +10
## Flow sensors SFE3, with integrated digital display

### Technical data

#### Function
- Switching output 2x PNP or 2x NPN
- Analogue output 1 ... 5 V
- 3½-character digital display

#### Technical data

<table>
<thead>
<tr>
<th>Type</th>
<th>SFE3-F005</th>
<th>SFE3-F010</th>
<th>SFE3-F050</th>
<th>SFE3-F100</th>
<th>SFE3-F500</th>
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<tbody>
<tr>
<td><strong>General technical data</strong></td>
<td></td>
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<tr>
<td>Flow measuring range [l/min]</td>
<td>0.05 ... 0.5</td>
<td>0.1 ... 1</td>
<td>0.5 ... 5</td>
<td>1 ... 10</td>
<td>5 ... 50</td>
</tr>
<tr>
<td>Pneumatic connection</td>
<td>QS-6</td>
<td>Female thread G 1/4</td>
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<tr>
<td>Display range [l/min]</td>
<td>0.05 ... 0.5</td>
<td>0.1 ... 1</td>
<td>0.5 ... 5</td>
<td>1 ... 10</td>
<td>5 ... 50</td>
</tr>
<tr>
<td>Type of display</td>
<td>3½-character, alphanumeric</td>
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<tr>
<td>Mounting position</td>
<td>Vertical, horizontal</td>
<td></td>
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<tr>
<td>Accuracy FS 1) [%]</td>
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<td>5</td>
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<td><strong>Electrical data</strong></td>
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<td>2x NPN</td>
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<tr>
<td>Analogue output [V]</td>
<td>1 ... 5</td>
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<td>Switching element function</td>
<td>N/O contact</td>
<td>N/C contact</td>
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<tr>
<td>Switching function</td>
<td>Window comparator</td>
<td>Threshold comparator</td>
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<tr>
<td>Operating voltage range DC [V]</td>
<td>12 ... 24</td>
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<tr>
<td>Electrical connection</td>
<td>Cable</td>
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<td>Protection class</td>
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1) % FS = % of the measuring range (full scale)

#### Operating and environmental conditions

<table>
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<tr>
<th>Operating pressure [bar]</th>
<th>0.7 ... +7</th>
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<tbody>
<tr>
<td>Operating medium</td>
<td>Compressed air in accordance with ISO 8573-1:2010 [1:4:2]</td>
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<tr>
<td>Nitrogen</td>
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<tr>
<td>Ambient temperature [°C]</td>
<td>0 ... 50</td>
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<tr>
<td>CE mark (see declaration of conformity)</td>
<td>To EU EMC Directive</td>
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<td>Certification</td>
<td>C-Tick</td>
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#### Materials

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<thead>
<tr>
<th>Type</th>
<th>SFE3-F005</th>
<th>SFE3-F010</th>
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<th>SFE3-F100</th>
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<tr>
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<td>Polyvinyl chloride</td>
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<td>Polyvinyl chloride</td>
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<tr>
<td>Note on materials</td>
<td>Contains PWIS (paint-wetting impairment substances)</td>
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Flow sensors SFE3, with integrated digital display

Technical data

### Dimensions

<table>
<thead>
<tr>
<th>Push-in fitting QS-6</th>
<th>Female thread G 1/8</th>
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</thead>
</table>

#### Ordering data

<table>
<thead>
<tr>
<th>Version</th>
<th>Flow measuring range [l/min]</th>
<th>Switching output</th>
<th>Part No.</th>
<th>Type</th>
<th>Part No.</th>
<th>Type</th>
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<tbody>
<tr>
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<td>2x PNP</td>
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<td>0.05 – 0.5</td>
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Flow sensors SFET, unidirectional

Technical data

Function
- Analogue output 1 … 5 V
- Connection of a separate digital display SFEV-F possible

<table>
<thead>
<tr>
<th>Technical data</th>
<th>SFET-F005</th>
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<td>Operating voltage range</td>
<td>[V]</td>
<td>12 … 24</td>
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1) % FS = % of the measuring range (full scale)

Operating and environmental conditions

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<th>SFET-F010</th>
<th>SFET-F050</th>
<th>SFET-F100</th>
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Materials

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<th>SFET-F050</th>
<th>SFET-F100</th>
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<td>Polyamide, aluminium</td>
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<tr>
<td>Note on materials</td>
<td>Contains PWIS (paint-wetting impairment substances)</td>
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### Flow sensors SFET, unidirectional

#### Technical data

**Dimensions**

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**Ordering data**

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<tr>
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<th>Part No.</th>
<th>Type</th>
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<tbody>
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<td>0.5 ... 5</td>
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<td>1 ... 10</td>
<td>538532  SFET-F100-L-WQ6-B-K1</td>
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<td>5 ... 50</td>
<td>538533  SFET-F500-L-W18-B-K1</td>
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</table>

[Download CAD data](www.festo.com/en/engineering)
Flow sensors SFET, bidirectional

Technical data

**Function**
- Suitable for vacuum
- Bidirectional flow
- Analogue output 1 ... 5 V
- Connection of a separate digital display SFEV-R possible

<table>
<thead>
<tr>
<th>Technical data</th>
<th>SFET-R0005</th>
<th>SFET-R0010</th>
<th>SFET-R0050</th>
<th>SFET-R0100</th>
<th>SFET-R0500</th>
<th>SFET-R1000</th>
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<tr>
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<tr>
<td>Linearity error FS 1)</td>
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<tr>
<td><strong>Electrical data</strong></td>
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</tr>
<tr>
<td>Analogue output [V]</td>
<td>1 ... 5</td>
<td></td>
<td></td>
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<td></td>
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</tr>
<tr>
<td>Operating voltage range DC [V]</td>
<td>12 ... 24</td>
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<tr>
<td>Electrical connection</td>
<td>Cable</td>
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<td>Protection class</td>
<td>IP40</td>
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</table>

1) % FS = % of the measuring range (full scale)

**Operating and environmental conditions**

<table>
<thead>
<tr>
<th>Operating pressure [bar]</th>
<th>–0.9 ... +2</th>
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<tbody>
<tr>
<td>Operating medium Compressed air in accordance with ISO 8573-1:2010 [1:4:2] Nitrogen</td>
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<tr>
<td>Ambient temperature [°C]</td>
<td>0 ... 50</td>
</tr>
<tr>
<td>CE mark (see declaration of conformity)</td>
<td>To EU EMC Directive</td>
</tr>
<tr>
<td>Certification</td>
<td>C-Tick</td>
</tr>
</tbody>
</table>

**Materials**

- Housing: Polyamide
- Cable sheath: Polyvinyl chloride
- Note on materials: Contains PWIS (paint-wetting impairment substances)

**Dimensions**

Push-in fitting QS-4

Download CAD data: [www.festo.com/en/engineering]
### Flow sensors SFET, bidirectional

#### Technical data

<table>
<thead>
<tr>
<th>Version</th>
<th>Flow measuring range [l/min]</th>
<th>Part No.</th>
<th>Type</th>
</tr>
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<tbody>
<tr>
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<td>-1 … +1</td>
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<td>SFET-R0100-L-WQ4-D-K3</td>
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<td>-5 … +5</td>
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<td>-10 … +10</td>
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Flow sensors SFE

Flow indicator SFEV
for flow sensor SFET

Function

<table>
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<tr>
<th>Electrical data</th>
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<tbody>
<tr>
<td>Type of display</td>
<td>3½-character, alphanumeric</td>
</tr>
<tr>
<td>Switching output</td>
<td>2x PNP, 2x NPN</td>
</tr>
<tr>
<td>Analogue output</td>
<td>[V] 1…5</td>
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<tr>
<td>Switching element function</td>
<td>N/C contact, N/O contact</td>
</tr>
<tr>
<td>Switching function</td>
<td>Window comparator, Threshold comparator</td>
</tr>
<tr>
<td>Operating voltage range DC</td>
<td>[V] 12...24</td>
</tr>
<tr>
<td>Electrical connection</td>
<td>Cable</td>
</tr>
<tr>
<td>Protection class</td>
<td>IP40</td>
</tr>
</tbody>
</table>

Operating and environmental conditions

Ambient temperature | [°C] 0...50 |
CE mark (declaration of conformity) | To EU EMC Directive |
Certification | C-Tick |

Materials

Housing | Polyamide |
Cable sheath | Polyvinyl chloride |
Note on materials | Contains PWIS (paint-wetting impairment substances) |

Ordering data

<table>
<thead>
<tr>
<th>Version</th>
<th>Analogue output [V]</th>
<th>Display range [l/min]</th>
<th>Switching output 2x PNP</th>
<th>Part No.</th>
<th>Type</th>
<th>Switching output 2x NPN</th>
<th>Part No.</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>For flow sensor SFET-E, unidirectional</td>
<td>-0.05...+0.5</td>
<td>0.05...0.5</td>
<td>538540</td>
<td>SFEV-F005-L-2PB-K1</td>
<td>538545</td>
<td>SFEV-F005-L-2NB-K1</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>0.1...1</td>
<td>538541</td>
<td>SFEV-F010-L-2PB-K1</td>
<td>538546</td>
<td>SFEV-F010-L-2NB-K1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>0.5...5</td>
<td>538542</td>
<td>SFEV-F050-L-2PB-K1</td>
<td>538547</td>
<td>SFEV-F050-L-2NB-K1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>1...10</td>
<td>538543</td>
<td>SFEV-F100-L-2PB-K1</td>
<td>538548</td>
<td>SFEV-F100-L-2NB-K1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>5...50</td>
<td>538544</td>
<td>SFEV-F500-L-2PB-K1</td>
<td>538549</td>
<td>SFEV-F500-L-2NB-K1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>For flow sensor SFET-R, bidirectional</td>
<td>-0.05...+0.05</td>
<td>0.05...0.5</td>
<td>538550</td>
<td>SFEV-R0005-L-2PD-K1</td>
<td>538556</td>
<td>SFEV-R0005-L-2ND-K1</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>0.1...+0.1</td>
<td>538551</td>
<td>SFEV-R0010-L-2PD-K1</td>
<td>538557</td>
<td>SFEV-R0010-L-2ND-K1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>0.5...+0.5</td>
<td>538552</td>
<td>SFEV-R0050-L-2PD-K1</td>
<td>538558</td>
<td>SFEV-R0050-L-2ND-K1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>1...+1</td>
<td>538553</td>
<td>SFEV-R0100-L-2PD-K1</td>
<td>538559</td>
<td>SFEV-R0100-L-2ND-K1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>5...+5</td>
<td>538554</td>
<td>SFEV-R0500-L-2PD-K1</td>
<td>538560</td>
<td>SFEV-R0500-L-2ND-K1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>10...+10</td>
<td>538555</td>
<td>SFEV-R1000-L-2PD-K1</td>
<td>538561</td>
<td>SFEV-R1000-L-2ND-K1</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Flow sensors SFE

Accessories

Mounting bracket SFEZ-BW1

Material:
Nickel-plated steel
Free of copper and PTFE

<table>
<thead>
<tr>
<th>Use</th>
<th>Part No.</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flow sensors SFE3, SFE</td>
<td>538562</td>
<td>SFEZ-BW1</td>
</tr>
</tbody>
</table>

Mounting bracket SFEV-BW1

Material:
Nickel-plated steel
Free of copper and PTFE

<table>
<thead>
<tr>
<th>Use</th>
<th>Part No.</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flow indicator SFEV</td>
<td>538563</td>
<td>SFEV-BW1</td>
</tr>
</tbody>
</table>

Mounting bracket SFEV-WH1

Material:
Nickel-plated steel
Free of copper and PTFE

<table>
<thead>
<tr>
<th>Use</th>
<th>Part No.</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flow indicator SFEV</td>
<td>538564</td>
<td>SFEV-WH1</td>
</tr>
</tbody>
</table>

Flow sensors SFE

Accessories

**Front panel installation kit SFEV-FH1**

Material:
- Reinforced polyamide
- Free of copper and PTFE

**Ordering data**

<table>
<thead>
<tr>
<th>Use</th>
<th>Part No.</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flow indicator SFEV</td>
<td>538565</td>
<td>SFEV-FH1</td>
</tr>
</tbody>
</table>

**Protective cover SFEV-SH1**

Material:
- Reinforced polyamide
- Free of copper and PTFE

**Ordering data**

<table>
<thead>
<tr>
<th>Use</th>
<th>Part No.</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flow indicator SFEV</td>
<td>538566</td>
<td>SFEV-SH1</td>
</tr>
</tbody>
</table>

**Ordering data – Push-in fittings**

<table>
<thead>
<tr>
<th>Threaded connection</th>
<th>Push-in fitting for tubing O.D. (mm)</th>
<th>Technical data</th>
<th>Part No.</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>G1/8</td>
<td>4</td>
<td>Internet: quick star</td>
<td>186095</td>
<td>QS-G1/4-4</td>
</tr>
<tr>
<td></td>
<td>6</td>
<td></td>
<td>186096</td>
<td>QS-G1/4-6</td>
</tr>
<tr>
<td></td>
<td>8</td>
<td></td>
<td>186098</td>
<td>QS-G1/4-8</td>
</tr>
</tbody>
</table>
Flow sensors SFE...

Application examples

- Placement monitoring of lattice components with a small contact surface

- Placement monitoring of components with delicate surfaces

- Placement monitoring of a component with conical clamp nozzle (concentrated support)

- Detection of very small parts (<1 mm) with a flow sensor suitable for a vacuum.

- Vacuum monitoring of multiple components with just one flow sensor on a suction cup array

- Leak testing of plastic bottles

- Used as an air gap sensor for monitoring the gap between the printed circuit board and hotplate

- Checking the continuity and diameter of hypodermic needles
Flow sensors SFE...
Application examples

- Gripper sensing with flow sensor SFE3/SFET. Essential when other measuring systems cannot be used, e.g. with magnetised components.
- Quality inspection “Seal present and OK” when inserting bearings into the fixture
- Vacuum monitoring of the suction cup arrays, used to handle blister packaging in the pharmaceuticals industry
Flow sensors SFAB
Flow sensors SFAB

Key features

At a glance
Quick and secure installation thanks to QS fitting
Manifold assembly of the sensor via H-rail or individual assembly via adapter plate for wall mounting
Display can be rotated 270°
Central electrical connection via M12 plug

Impressive, simple, reliable
Designed according to the attractive display and operation concept, the flow sensors have produced outstanding results in the areas of:
- Leakage detection in production
- Leakage tightness testing of end products
- Flow monitoring in parts feeding

Flexible installation
This is enabled by the extremely compact design that does away with the need for an upstream and downstream smoothing section; the SFAB has an integrated stabilising flow channel.

Systematically more reliable
The sensor supplies precise information thanks to its very large measuring range, even in the case of fluctuating or unreliable flow rate conditions.

User-friendly
- Quick and easy menu navigation
- Integrated QS fittings
- Ultra-fast teach-in function as with the proven pressure sensor SDE1
- Secure connections with extremely short assembly times
- Manual consumption measurement with start/stop and reset functionality
- Rotatable display
- With or without flow control valve

Advantages
For the designer
- During design, minimal information is required regarding the applied flow rate
- Plug and work solution
- The same device can be used for different applications
- The sensor covers a large measuring range with a specified accuracy thanks to its high dynamic response of 1:100
- NPN/PNP switching via the software
- Minimal assembly times
- Alternatively with 4 ... 20 mA or 0 ... 10 V analogue output
- Flexible installation without restrictions imposed by smoothing sections, any installation position
- High pneumatic connection variance possible via the modular product system
- Design of more efficient machines

For the machine operator
- Precise information is available even in the event of fluctuating pressure conditions
- Flow rates can be read easily and reliably
- Visualisation (colour change, flashing measured value) of deviations
- Easy operation without the need for training
- Greater system reliability

Values up to 200 l/min, optional with integrated flow control valve/flow control element

Easier to operate
- A large, illuminated LCD display increases the operational safety and makes the currently displayed flow rate or consumption values easy to read
- Measured values outside the measuring range are visualised: flow rate values are shown flashing
- Values falling below or above the threshold can also be detected remotely or, if the sensor is in an inaccessible location, by means of the display changing colour
- Simple switching between consumption and flow rate display
- An integrated flow control valve can be ordered as a flow control element via the modular product system for values up to 200 l/min

Flexible installation
Systematically more reliable
User-friendly
Advantages
Peripheral overview

<table>
<thead>
<tr>
<th>Mounting attachments and accessories</th>
<th>Page/online</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Adapter plate SDE1-...-W...</td>
<td>293</td>
</tr>
<tr>
<td>(included in the scope of delivery</td>
<td></td>
</tr>
<tr>
<td>with SFAB-...-W...</td>
<td></td>
</tr>
<tr>
<td>2 Mounting rail to DIN EN 60715</td>
<td>nrh</td>
</tr>
<tr>
<td>3 Connecting cable</td>
<td></td>
</tr>
<tr>
<td>NEBU-M12G5, straight socket</td>
<td>293</td>
</tr>
<tr>
<td>4 Connecting cable</td>
<td></td>
</tr>
<tr>
<td>NEBU-M12G5, angled socket</td>
<td>293</td>
</tr>
</tbody>
</table>
## Flow sensors SFAB

### Type codes

<table>
<thead>
<tr>
<th>Type</th>
<th>SFAB</th>
<th>Flow sensor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flow measuring range [l/min]</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Max. 10</td>
<td></td>
</tr>
<tr>
<td>50</td>
<td>Max. 50</td>
<td></td>
</tr>
<tr>
<td>200</td>
<td>Max. 200</td>
<td></td>
</tr>
<tr>
<td>600</td>
<td>Max. 600</td>
<td></td>
</tr>
<tr>
<td>1000</td>
<td>Max. 1,000</td>
<td></td>
</tr>
<tr>
<td>Flow input</td>
<td>U</td>
<td>Unidirectional</td>
</tr>
<tr>
<td>Type of mounting</td>
<td>H</td>
<td>Via H-rail</td>
</tr>
<tr>
<td></td>
<td>W</td>
<td>Via wall bracket</td>
</tr>
<tr>
<td>Pneumatic connection</td>
<td>Q6</td>
<td>Push-in connector 6 mm</td>
</tr>
<tr>
<td></td>
<td>Q8</td>
<td>Push-in connector 8 mm</td>
</tr>
<tr>
<td></td>
<td>Q10</td>
<td>Push-in connector 10 mm</td>
</tr>
<tr>
<td>Electrical output</td>
<td>2SA</td>
<td>2x PNP or NPN, 1 analogue output 4 ... 20 mA</td>
</tr>
<tr>
<td></td>
<td>2SV</td>
<td>2x PNP or NPN, 1 analogue output 0 ... 10 V</td>
</tr>
<tr>
<td>Electrical connection</td>
<td>M12</td>
<td>Straight plug, M12x1, 5-pin</td>
</tr>
</tbody>
</table>

Additional variants can be ordered using the modular system [292]

- Pneumatic connection
- Additional function (flow control element)
- Electrical accessories
- EU certification (ATEX)
Flow sensors SFAB

Technical data

Function

- Current output 2SA
- Voltage output 2SV

Analogue output 0 … 10 V, adjustable switching outputs
2x PNP or 2x NPN

Analogue output 4 … 20 mA, adjustable switching outputs
2x PNP or 2x NPN

Freely selectable pulse output for consumption measurement

Analogue filter for setting the rise time

Digital filter for smoothing the display values

Flow control element (flow control valve) for setting the flow rate

General technical data

<table>
<thead>
<tr>
<th>General</th>
<th>-10U</th>
<th>-50U</th>
<th>200U</th>
<th>-600U</th>
<th>-1000U</th>
</tr>
</thead>
<tbody>
<tr>
<td>Certification</td>
<td>C-Tick / c-UL us - Recognized (UL)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CE mark (see declaration of conformity)</td>
<td>EU EMC Directive / In accordance with EU Explosion Protection Directive (ATEX)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Note on materials</td>
<td>RoHS-compliant</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Input signal/measuring element</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Measured variable</td>
<td>Flow rate, consumption</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Direction of flow</td>
<td>Unidirectional P1 → P2</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Measuring principle</td>
<td>Thermal</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Flow measuring range [l/min]</td>
<td>0.1 … 10</td>
<td>0.5 … 50</td>
<td>2 … 200</td>
<td>6 … 600</td>
<td>10 … 1,000</td>
</tr>
<tr>
<td>Operating pressure [bar]</td>
<td>0 … 10</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nominal pressure [bar]</td>
<td>6</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Temperature of medium [°C]</td>
<td>0 … 50</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ambient temperature [°C]</td>
<td>0 … 50</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Nominal temperature [°C]</td>
<td>23</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### Technical data

#### Electrical data

<table>
<thead>
<tr>
<th>Parameter</th>
<th>-10U</th>
<th>-50U</th>
<th>-200U</th>
<th>-600U</th>
<th>-1000U</th>
</tr>
</thead>
<tbody>
<tr>
<td>Output, general</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Accuracy of flow rate values</td>
<td>+/-  (3% o.m.v. + 0,3% FS)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Accuracy of zero point ±FS</td>
<td>0.3</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Accuracy of margin ±FS</td>
<td>3</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Repetition accuracy of zero point ±FS</td>
<td>0.2</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Repetition accuracy of margin ±FS</td>
<td>0.8</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Temperature coefficient of margin ±FS/K</td>
<td>0.1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pressure dependence of margin ±FS/bar</td>
<td>0.5</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### Switching output

<table>
<thead>
<tr>
<th>Parameter</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Switching output</td>
<td>2x PNP or 2x NPN, adjustable</td>
</tr>
<tr>
<td>Switching function</td>
<td>Window comparator or threshold value comparator, adjustable</td>
</tr>
<tr>
<td>Switching element function</td>
<td>N/C or N/O contact, adjustable</td>
</tr>
<tr>
<td>Switch-on time</td>
<td>Adjustable (factory setting: approx. 80 ms)</td>
</tr>
<tr>
<td>Switch-off time</td>
<td>Adjustable (factory setting: approx. 80 ms)</td>
</tr>
<tr>
<td>Max. output current [mA]</td>
<td>100</td>
</tr>
<tr>
<td>Voltage drop [V]</td>
<td>Max. 1.5</td>
</tr>
</tbody>
</table>

#### Inductive protective circuit

- Adapted to MZ, MY, ME coils

#### Analogue output

<table>
<thead>
<tr>
<th>Parameter</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Characteristic flow rate curve [l/min]</td>
<td>0...10</td>
</tr>
<tr>
<td>Output characteristic curve for current [mA]</td>
<td>4...20</td>
</tr>
<tr>
<td>Output characteristic curve for voltage [V]</td>
<td>0...10</td>
</tr>
<tr>
<td>Rise time [ms]</td>
<td></td>
</tr>
<tr>
<td>Max. load resistance at current output [ohms]</td>
<td>500</td>
</tr>
<tr>
<td>Min. load resistance at voltage output [kohms]</td>
<td>10</td>
</tr>
</tbody>
</table>

#### Output, additional data

- Protection against short circuit: Yes
- Protection against overloading: Yes

#### Electronic components

- Operating voltage range DC [V]: 15...30
- Protection against polarity reversal: For all electrical connections

#### Electromechanical components

- Electrical connection: Straight plug, M12x1, 5-pin
- Max. length of connecting cable [m]: <10

---

1) Accuracy with nominal conditions (6 bar, 23 °C and horizontal installation position).
2) % FS = % of the measuring range final value (full scale).

### Pin allocation

**Plug M12x1, 5-pin**

<table>
<thead>
<tr>
<th>Pin</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Operating voltage +24 V DC</td>
</tr>
<tr>
<td>2</td>
<td>Binary output B</td>
</tr>
<tr>
<td>3</td>
<td>0 V</td>
</tr>
<tr>
<td>4</td>
<td>Binary output A</td>
</tr>
<tr>
<td>5</td>
<td>Analogue output C</td>
</tr>
</tbody>
</table>
**Flow sensors SFAB**

**Technical data**

### Mechanical components

<table>
<thead>
<tr>
<th>Temperature dependence of the flow control valve setting [%]</th>
<th>-10U</th>
<th>-50U</th>
<th>-200U</th>
<th>-600U</th>
<th>-1000U</th>
</tr>
</thead>
<tbody>
<tr>
<td>(0 ... 50 °C)</td>
<td>8</td>
<td>8</td>
<td>2</td>
<td>–</td>
<td>–</td>
</tr>
</tbody>
</table>

Mounting position

- Any

Pneumatic connection

| QS6 | QS6 | - | - | - | - |
| QS8 | QS8 | QS8 | QS10 | QS10 | QS10 |
| QS12 | QS12 | QS12 | QS12 | QS12 |
| QS14 | QS14 | - | - | - | - |
| QS5%e | QS5%e | QS5%e | - | - | - |
| QS3%| QS3% | QS3% | QS3% |

Product weight [g]

- 160

Material

- Housing

1) The flow rate value set using the flow control valve is additionally dependent on the operating pressure. This means that the flow rate value changes if the operating pressure is changed, even if the flow control valve setting remains the same.

2) The pneumatic connections cannot be freely selected when configuring a sensor with flow control element, modular product system 292.

### Display/operation

<table>
<thead>
<tr>
<th>Indicator type</th>
<th>Illuminated LCD, blue</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Displayable units</th>
<th>l/min, l/h, m³/h, scfm, l/min, scfm, l/h, m³/h, scfm</th>
</tr>
</thead>
</table>

**Setting range for flow rate threshold value**

- 1% FS ... 100% FS

**Setting range for consumption impulse threshold value**

- [l]: 0.1 ... 1,999.9
- [m³]: 0.01 ... 199.99
- [scf]: 0.01 ... 199.99

**Hysteresis setting range**

- 0% FS ... 90% FS

### Immissions/emissions

<table>
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<th>Storage temperature [°C]</th>
<th>-10U</th>
<th>-50U</th>
<th>-200U</th>
<th>-600U</th>
<th>-1000U</th>
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<tbody>
<tr>
<td>(~20 ... +80 (characteristic: -10 ... +60))</td>
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<table>
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<thead>
<tr>
<th>Pressure drop [mbar]</th>
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<thead>
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<th>Electrical protection class</th>
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**Flow sensors SFAB**

**Technical data**

### Dimensions

**SFAB-…-H/W**

<table>
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<tr>
<th>Type</th>
<th>B1</th>
<th>D1</th>
<th>D2</th>
<th>H1</th>
<th>H2</th>
<th>H3</th>
<th>H4</th>
<th>H5</th>
<th>H6</th>
<th>H7</th>
<th>H8</th>
<th>L1</th>
<th>L2</th>
<th>L3</th>
<th>L4</th>
<th>L5</th>
<th>L6</th>
<th>L7</th>
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<tbody>
<tr>
<td>SFAB-…-HQ6</td>
<td>32.3</td>
<td>17.7</td>
<td>M12x1</td>
<td>–</td>
<td>52.5</td>
<td>11</td>
<td>49.4</td>
<td>45.2</td>
<td>24.8</td>
<td>1.1</td>
<td>11</td>
<td>95.6</td>
<td>69.8</td>
<td>78.9</td>
<td>54</td>
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<td>56</td>
<td>35</td>
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<tr>
<td>SFAB-…-HQ6-D</td>
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<td>M12x1</td>
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<td>52.5</td>
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<td>95.6</td>
<td>69.8</td>
<td>78.9</td>
<td>54</td>
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<td>56</td>
<td>35</td>
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<tr>
<td>SFAB-…-WQ6-D</td>
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</table>

**New**

Sensors > Flow sensors > Flow sensors SFAB
## Flow sensors SFAB

### Technical data

#### Ordering data

<table>
<thead>
<tr>
<th>Version</th>
<th>Electrical output</th>
<th>Flow measuring range (l/min)</th>
<th>Part No.</th>
<th>Type</th>
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<tr>
<td><strong>H-rail mounting</strong></td>
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<td></td>
<td></td>
<td></td>
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<tr>
<td>2x PNP or NPN, 1 analogue output 4 ... 20 mA</td>
<td>0.1 ... 10</td>
<td>565385</td>
<td>SFAB-10U-HQ6-2SA-M12</td>
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<tr>
<td></td>
<td>0.5 ... 50</td>
<td>565389</td>
<td>SFAB-50U-HQ6-2SA-M12</td>
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<tr>
<td></td>
<td>2 ... 200</td>
<td>565393</td>
<td>SFAB-200U-HQ8-2SA-M12</td>
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<tr>
<td></td>
<td>2 ... 200</td>
<td>565397</td>
<td>SFAB-200U-HQ10-2SA-M12</td>
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<tr>
<td></td>
<td>6 ... 600</td>
<td>565401</td>
<td>SFAB-600U-HQ10-2SA-M12</td>
<td></td>
</tr>
<tr>
<td></td>
<td>10 ... 1,000</td>
<td>565405</td>
<td>SFAB-1000U-HQ10-2SA-M12</td>
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<tr>
<td>2x PNP or NPN, 1 analogue output 0 ... 10 V</td>
<td>0.1 ... 10</td>
<td>565386</td>
<td>SFAB-10U-HQ6-2SV-M12</td>
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<tr>
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<td>0.5 ... 50</td>
<td>565390</td>
<td>SFAB-50U-HQ6-2SV-M12</td>
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<td>2 ... 200</td>
<td>565394</td>
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<td>2 ... 200</td>
<td>565398</td>
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<td>6 ... 600</td>
<td>565402</td>
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<td>10 ... 1,000</td>
<td>565406</td>
<td>SFAB-1000U-HQ10-2SV-M12</td>
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<td><strong>Wall or surface mounting</strong></td>
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<td>2x PNP or NPN, 1 analogue output 4 ... 20 mA</td>
<td>0.1 ... 10</td>
<td>565387</td>
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<td>2 ... 200</td>
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<td>6 ... 600</td>
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<td>10 ... 1,000</td>
<td>565407</td>
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## Flow sensors SFAB

### Ordering data – Modular products

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<tr>
<td>Function</td>
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<tr>
<td>Medium</td>
<td>Compressed air</td>
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<td>Flow measuring range</td>
<td>l/min</td>
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<td>Max. 10</td>
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<td>Max. 50</td>
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<td>Max. 200</td>
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<td>Max. 600</td>
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<td>Max. 1,000</td>
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<td>Flow input</td>
<td>Unidirectional</td>
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<td>Type of mounting</td>
<td>H-rail mounting</td>
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<td>Pneumatic connection</td>
<td>Push-in connector 6 mm</td>
<td>1</td>
<td>Q6</td>
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<td>Push-in connector 8 mm</td>
<td>2</td>
<td>Q8</td>
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<td>Push-in connector 10 mm</td>
<td>3</td>
<td>Q10</td>
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<td>Push-in connector 12 mm</td>
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<td>Q12</td>
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<td>Push-in connector for tubing ¼&quot;</td>
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<td>T14</td>
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<td>Push-in connector for tubing 5/16&quot;</td>
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<td>Push-in connector for tubing ¾&quot;</td>
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<td>Control element</td>
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<tr>
<td>Straight socket, cable 2.5 m</td>
<td>-2.5S</td>
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<td>Angled plug socket, cable 5 m</td>
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<td>Straight socket, cable 5 m</td>
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<td>EU certification</td>
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### Transfer order code

563795 SFAB - - - U - - - - M12 - - - -
Sensors > Flow sensors

Flow sensors SFAB

Accessories

Adapter plate SDE1-...-W...
for wall or surface mounting

Material: Steel

Ordering data

<table>
<thead>
<tr>
<th>Part No.</th>
<th>Type</th>
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<tbody>
<tr>
<td>194 297</td>
<td>SDE1-...-W...</td>
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1) Included in the scope of delivery with SFAB-...-W...

Ordering data – Connecting cables

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<th>Cable length [m]</th>
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<tr>
<td>5</td>
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<td>541331</td>
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<td>M12x1, angled socket</td>
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Sensors > Flow sensors >

1.5
### Flow sensors SFAM

#### Key features

**At a glance**

- Threaded mounting of individual device with stabilising zone
- Central electrical connection via M12 plug

**Compact and capable of high flow rates**

This modular flow sensor can operate either as a standalone unit or can be easily combined with the MS series service units. The sensor provides:
- Absolute flow rate information
- Convenient switching point adjustment via a display
- Cumulative air consumption measurement
- Patented – adjustable consumption-based switching pulse for cumulative air consumption measurement via the switching output

**Systematically more reliable**

The sensor covers a large measuring range with a specified accuracy thanks to its high dynamic response of 1:10. It can provide precise information even when flow conditions are fluctuating and unreliable.

**Easy to operate**

- A large, illuminated LCD display increases the operational safety and makes the currently displayed flow rate or consumption values easy to read
- Measured values outside the measuring range are visualised: flow rates are shown flashing
- Switching outputs (NPN/PNP) can be switched over via the menu
- Values that fall below or exceed the threshold values can also be identified from a distance or if the sensor is in an inaccessible location by means of the display changing colour
- Simple checking of the current sensor settings in SHOW mode
- Simple switching between consumption and flow rate indication
- Values shown on the display:
  - can be shown for different standard conditions (DIN 1343, ISO 2533, ISO 6358)
  - can be filtered/averaged independently of the analogue output in the case of high measuring dynamics

**Convenient**

- Plug and work solution
- Quick and easy menu prompting
- Fast commissioning thanks to easy-to-use, intuitive teach-in function
- Manual consumption measurement with start/stop and reset functionality

**Easy to combine**

With MS6 or MS9 series service unit combination thanks to innovative prism clamping technology. This saves additional installation time.

**Flexible installation**

The SFAM has an extremely compact, space-saving design optimised for flow performance.

**Right or left?**

The fluid stream of the unidirectional flow sensor can be selected: either from left to right or from right to left.

---

<table>
<thead>
<tr>
<th>Feature</th>
<th>Description</th>
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<tbody>
<tr>
<td>At a glance</td>
<td>Threaded mounting of individual device with stabilising zone</td>
</tr>
<tr>
<td>Compact and capable of high flow rates</td>
<td>This modular flow sensor can operate either as a standalone unit or can be easily combined with the MS series service units. The sensor provides:</td>
</tr>
<tr>
<td>Systematically more reliable</td>
<td>The sensor covers a large measuring range with a specified accuracy thanks to its high dynamic response of 1:10. It can provide precise information even when flow conditions are fluctuating and unreliable.</td>
</tr>
<tr>
<td>Easy to operate</td>
<td>A large, illuminated LCD display increases the operational safety and makes the currently displayed flow rate or consumption values easy to read. Measured values outside the measuring range are visualised: flow rates are shown flashing. Switching outputs (NPN/PNP) can be switched over via the menu. Values that fall below or exceed the threshold values can also be identified from a distance or if the sensor is in an inaccessible location by means of the display changing colour. Simple checking of the current sensor settings in SHOW mode. Simple switching between consumption and flow rate indication. Values shown on the display: can be shown for different standard conditions (DIN 1343, ISO 2533, ISO 6358). Can be filtered/averaged independently of the analogue output in the case of high measuring dynamics.</td>
</tr>
<tr>
<td>Convenient</td>
<td>Plug and work solution. Quick and easy menu prompting. Fast commissioning thanks to easy-to-use, intuitive teach-in function. Manual consumption measurement with start/stop and reset functionality.</td>
</tr>
<tr>
<td>Easy to combine</td>
<td>With MS6 or MS9 series service unit combination thanks to innovative prism clamping technology. This saves additional installation time.</td>
</tr>
<tr>
<td>Flexible installation</td>
<td>The SFAM has an extremely compact, space-saving design optimised for flow performance.</td>
</tr>
<tr>
<td>Right or left?</td>
<td>The fluid stream of the unidirectional flow sensor can be selected: either from left to right or from right to left.</td>
</tr>
</tbody>
</table>
Flow sensors SFAM

Peripheral overview

SFAM-62-...-M for manifold assembly in MS6 series service unit combination with laminar flow cartridge

SFAM-62-...-T/-W for individual assembly with connecting plates and stabilising zone

Mounting attachments and accessories

<table>
<thead>
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<th></th>
<th>In MS6 series service unit combination</th>
<th>Individual device</th>
<th>Page/online</th>
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<tr>
<td>1</td>
<td>Connecting plate MS6-AG...</td>
<td>■</td>
<td>ms6-ag</td>
</tr>
<tr>
<td>2</td>
<td>Mounting bracket MS6-WB</td>
<td>■</td>
<td>ms6-wb</td>
</tr>
<tr>
<td>3</td>
<td>Module connector MS6-MV</td>
<td>■</td>
<td>ms6-mv</td>
</tr>
<tr>
<td>4</td>
<td>Mounting bracket MS6-WP</td>
<td>■</td>
<td>ms6-wp</td>
</tr>
<tr>
<td>5</td>
<td>Mounting bracket MS6-WPB</td>
<td>■</td>
<td>ms6-wpb</td>
</tr>
<tr>
<td>6</td>
<td>Mounting bracket MS6-WPM</td>
<td>■</td>
<td>ms6-wpm</td>
</tr>
<tr>
<td>7</td>
<td>Connecting cable NEBU-M12W5, angled socket</td>
<td>■</td>
<td>308</td>
</tr>
<tr>
<td>8</td>
<td>Connecting cable NEBU-M12GS, straight socket</td>
<td>■</td>
<td>308</td>
</tr>
</tbody>
</table>

Note

Additional accessories:
- Module connector for combination with size MS4/MS6 or size MS9
  ➤ online: amv, rmv, armv
- Adapter for mounting on profiles
  ➤ online: ipm-80, ipm-40-80, ipm-80-80
Flow sensors SFAM

Peripherals overview

SFAM-90-...-M for manifold assembly in MS9 series service unit combination
with laminar flow cartridge

SFAM-90-...-T for individual assembly
with connecting plates and stabilising zone

Mounting attachments and accessories

<table>
<thead>
<tr>
<th></th>
<th>In MS9 series service unit combination</th>
<th>Individual device</th>
<th>Page/online</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Connecting plate</td>
<td></td>
<td>ms9-ag</td>
</tr>
<tr>
<td></td>
<td>MS9-AG...</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Module connector</td>
<td></td>
<td>ms9-mv</td>
</tr>
<tr>
<td></td>
<td>MS9-MV</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Mounting bracket</td>
<td></td>
<td>ms9-wp</td>
</tr>
<tr>
<td></td>
<td>MS9-WP</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Mounting bracket</td>
<td></td>
<td>ms9-wpb</td>
</tr>
<tr>
<td></td>
<td>MS9-WPB</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Mounting bracket</td>
<td></td>
<td>ms9-wpm</td>
</tr>
<tr>
<td></td>
<td>MS9-WPM</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Connecting cable</td>
<td></td>
<td>308</td>
</tr>
<tr>
<td></td>
<td>NEBU-M12WS, angled socket</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Connecting cable</td>
<td></td>
<td>308</td>
</tr>
<tr>
<td></td>
<td>NEBU-M12GS, straight socket</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note
Additional accessories:
- Module connector for combinations with size MS6, MS9 or MS12
  → online: rmv, armv
## Flow sensors SFAM

### Type codes

<table>
<thead>
<tr>
<th>Type</th>
<th>SFAM</th>
<th>Flow sensor</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Grid dimension</th>
<th>62</th>
<th>Grid dimension 62 mm</th>
</tr>
</thead>
<tbody>
<tr>
<td>90</td>
<td>Grid dimension 90 mm</td>
<td></td>
</tr>
</tbody>
</table>

### Flow measuring range [l/min]

<table>
<thead>
<tr>
<th>Type</th>
<th>SFAM</th>
<th>Flow sensor</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Grid dimension</th>
<th>SFAM-62</th>
<th>Grid dimension 62 mm</th>
</tr>
</thead>
<tbody>
<tr>
<td>1000</td>
<td>Max. 1,000</td>
<td></td>
</tr>
<tr>
<td>3000</td>
<td>Max. 3,000</td>
<td></td>
</tr>
<tr>
<td>5000</td>
<td>Max. 5,000</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Grid dimension</th>
<th>SFAM-90</th>
<th>Grid dimension 90 mm</th>
</tr>
</thead>
<tbody>
<tr>
<td>5000</td>
<td>Max. 5,000</td>
<td></td>
</tr>
<tr>
<td>10000</td>
<td>Max. 10,000</td>
<td></td>
</tr>
<tr>
<td>15000</td>
<td>Max. 15,000</td>
<td></td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Flow input</th>
<th>SFAM-62</th>
<th>Grid dimension 62 mm</th>
</tr>
</thead>
<tbody>
<tr>
<td>L</td>
<td>Unidirectional, from left to right</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Type of mounting</th>
<th>SFAM-90</th>
<th>Grid dimension 90 mm</th>
</tr>
</thead>
<tbody>
<tr>
<td>M</td>
<td>Manifold assembly</td>
<td></td>
</tr>
<tr>
<td>T</td>
<td>Threaded mounting</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Pneumatic connection</th>
<th>SFAM-62</th>
<th>Grid dimension 62 mm</th>
</tr>
</thead>
<tbody>
<tr>
<td>G12</td>
<td>Female thread G ½</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Electrical connection</th>
<th>SFAM-90-5000L</th>
<th>Grid dimension 90 mm</th>
</tr>
</thead>
<tbody>
<tr>
<td>G1</td>
<td>Female thread G</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Electrical accessories</th>
<th>SFAM-90-10000L/15000L</th>
<th>Grid dimension 90 mm</th>
</tr>
</thead>
<tbody>
<tr>
<td>G112</td>
<td>Female thread G ½</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Electrical output</th>
<th>SFAM-62</th>
<th>Grid dimension 62 mm</th>
</tr>
</thead>
<tbody>
<tr>
<td>2SA</td>
<td>2x PNP or NPN, 1 analogue output 4 … 20 mA</td>
<td></td>
</tr>
<tr>
<td>2SV</td>
<td>2x PNP or NPN, 1 analogue output 0 … 10 V</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Electrical connection</th>
<th>SFAM-62</th>
<th>Grid dimension 62 mm</th>
</tr>
</thead>
<tbody>
<tr>
<td>M12</td>
<td>Straight plug, M12x1, 5-pin</td>
<td></td>
</tr>
</tbody>
</table>

Additional variants can be ordered using the modular product system ➔ 307

- Flow input
- Type of mounting
- Pneumatic connection
- Electrical accessories
- EU certification (ATEX)
Flow sensors SFAM

Technical data

Function

- **Current output 2SA**
- **Voltage output 2SV**

**Flow rate**
- 10 ... 1,000 l/min
- 30 ... 3,000 l/min
- 50 ... 5,000 l/min
- 100 ... 10,000 l/min
- 150 ... 15,000 l/min

**Temperature range**
- 0 ... +50 °C

**Operating pressure**
- 0 ... 16 bar

- **Analogue output 0 ... 10 V, adjustable switching outputs 2x PNP or 2x NPN**
- **Analogue output 4 ... 20 mA, adjustable switching outputs 2x PNP or 2x NPN**
- **Freely selectable pulse output for consumption measurement**

- **Analogue filter for setting the rise time**
- **Digital filter for smoothing the display values**

**Note**
To comply with the specified accuracies, the SFAM must be supplied via the following connections:
- SFAM-62-...-M via a pneumatic connection of at least G½,
- SFAM-90-...-M via a pneumatic connection of at least G¾.
- SFAM-62-...-T/W via a connection with an inside diameter of at least 10 mm, SFAM-90-...-T via a connection with an inside diameter of at least 20 mm.

**Note**
When using a filter regulator MS-LFR or a pressure regulator MS-LR, a branching module MS6-FRM-1½ (with size MS6) or MS9-FRM-G (with size MS9) must be installed between the filter regulator or pressure regulator and the (downstream) flow sensor SFAM in order to maintain the specified accuracies.

---

**General technical data**

<table>
<thead>
<tr>
<th>Certification</th>
<th>C-Tick</th>
</tr>
</thead>
<tbody>
<tr>
<td>cULus recognized (OL)</td>
<td></td>
</tr>
<tr>
<td>CE marking (see declaration of conformity)</td>
<td>To EU EMC Directive[1]</td>
</tr>
<tr>
<td>Note on materials</td>
<td>RoHS-compliant</td>
</tr>
</tbody>
</table>

[1] For information about the applicability of the component see the manufacturer’s EC declaration of conformity at: www.festo.com ➔ Support ➔ User documentation.
If the component is subject to restrictions on usage in residential, office or commercial environments or small businesses, further measures to reduce the emitted interference may be necessary.

---

**ATEX**

<table>
<thead>
<tr>
<th>EU certification</th>
<th>EX2</th>
</tr>
</thead>
<tbody>
<tr>
<td>ATEX category for gas</td>
<td>II 3G</td>
</tr>
<tr>
<td>Explosion ignition protection type for gas</td>
<td>Ex nA IIC T5 X Gc</td>
</tr>
<tr>
<td>ATEX category for dust</td>
<td>I 3D</td>
</tr>
<tr>
<td>Explosion ignition protection type for dust</td>
<td>Ex tc III B T80°C X Dc IP54</td>
</tr>
<tr>
<td>Explosion-proof temperature rating</td>
<td>0 °C ≤ ta ≤ +50 °C</td>
</tr>
<tr>
<td>CE marking (see declaration of conformity)</td>
<td>To EU Explosion Protection Directive (ATEX)</td>
</tr>
</tbody>
</table>
## Flow sensors SFAM

### Technical data

<table>
<thead>
<tr>
<th>Input signal/measuring element</th>
<th>SFAM-62</th>
<th>SFAM-90</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Type</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Flow measuring range</strong></td>
<td>-1000</td>
<td>-3000</td>
</tr>
<tr>
<td></td>
<td>-5000</td>
<td>-5000</td>
</tr>
<tr>
<td></td>
<td>-10000</td>
<td>-15000</td>
</tr>
<tr>
<td>Measured variable</td>
<td>Flow rate, consumption</td>
<td></td>
</tr>
<tr>
<td><strong>Direction of flow</strong></td>
<td>-L</td>
<td>-R</td>
</tr>
<tr>
<td>Unidirectional P1 → P2</td>
<td>Unidirectional P2 → P1</td>
<td></td>
</tr>
<tr>
<td><strong>Measuring principle</strong></td>
<td>Thermal</td>
<td></td>
</tr>
<tr>
<td><strong>Flow measuring range</strong></td>
<td>[l/min]</td>
<td></td>
</tr>
<tr>
<td>10 ... 1,000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>30 ... 3,000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>50 ... 5,000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>50 ... 5,000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>100 ... 10,000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>150 ... 15,000</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Operating pressure</strong></td>
<td>[bar]</td>
<td></td>
</tr>
<tr>
<td>0 ... 16</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Nominal pressure</strong></td>
<td>[bar]</td>
<td>6</td>
</tr>
<tr>
<td><strong>Operating medium</strong></td>
<td>Compressed air in accordance with ISO 8573-1:2010 [7:4:4] Nitrogen</td>
<td></td>
</tr>
<tr>
<td><strong>Temperature of medium</strong></td>
<td>[°C]</td>
<td>0 ... +50</td>
</tr>
<tr>
<td><strong>Ambient temperature</strong></td>
<td>[°C]</td>
<td>0 ... +50</td>
</tr>
<tr>
<td><strong>Nominal temperature</strong></td>
<td>[°C]</td>
<td>23</td>
</tr>
</tbody>
</table>

#### Output, general\(^{1,2}\)

<table>
<thead>
<tr>
<th>Accuracy of flow rate values</th>
<th>+/- (3% o.m.v. + 0.3% FS)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Repetition accuracy of zero point in ±FS [FS]</td>
<td>0.2</td>
</tr>
<tr>
<td>Repetition accuracy of margin in ±FS [FS]</td>
<td>0.8</td>
</tr>
<tr>
<td>Temperature coefficient of margin in ±FS/K</td>
<td>Typically 0.1</td>
</tr>
<tr>
<td>Pressure dependence of margin in ±FS/bar</td>
<td>0.5</td>
</tr>
</tbody>
</table>

1) Accuracy with nominal conditions (6 bar, 23 °C and horizontal installation position)
2) % FS = % of the measuring range final value (full scale)

### Switching output

<table>
<thead>
<tr>
<th>Switching output</th>
<th>2x PNP or 2x NPN, adjustable</th>
</tr>
</thead>
<tbody>
<tr>
<td>Switching function</td>
<td>Window comparator or threshold value comparator, adjustable</td>
</tr>
<tr>
<td>Switching element function</td>
<td>N/C or N/O contact, adjustable</td>
</tr>
<tr>
<td>Switch-on time</td>
<td>Adjustable (factory setting: approx. 60 ms)</td>
</tr>
<tr>
<td>Switch-off time</td>
<td>Adjustable (factory setting: approx. 60 ms)</td>
</tr>
<tr>
<td>Max. output current [mA]</td>
<td>100</td>
</tr>
<tr>
<td>Voltage drop [V]</td>
<td>Max. 1.5</td>
</tr>
<tr>
<td>Inductive protective circuit</td>
<td>Adapted to MZ, MV, ME coils</td>
</tr>
</tbody>
</table>

### Analogue output

<table>
<thead>
<tr>
<th>Type</th>
<th>SFAM-62</th>
<th>SFAM-90</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Flow measuring range</strong></td>
<td>-1000</td>
<td>-3000</td>
</tr>
<tr>
<td></td>
<td>-5000</td>
<td>-5000</td>
</tr>
<tr>
<td></td>
<td>-10000</td>
<td>-15000</td>
</tr>
<tr>
<td>Characteristic curve for flow rate [l/min]</td>
<td>0 ... 1,000</td>
<td>0 ... 3,000</td>
</tr>
<tr>
<td>Output characteristic curve for current [mA]</td>
<td>4 ... 20</td>
<td></td>
</tr>
<tr>
<td>Output characteristic curve for voltage [V]</td>
<td>0 ... 10</td>
<td></td>
</tr>
<tr>
<td>Rise time [ms]</td>
<td>Possible settings: 15, 30, 60 (factory setting), 125, 250, 500, 999</td>
<td></td>
</tr>
<tr>
<td>Max. load resistance at current output [ohms]</td>
<td>500</td>
<td></td>
</tr>
<tr>
<td>Min. load resistance at voltage output [kohms]</td>
<td>10</td>
<td></td>
</tr>
</tbody>
</table>

### Output, additional data

| Protection against short circuit    | Yes |
| Protection against overloading     | Yes |
## Flow sensors SFAM

### Technical data

#### Electronic components

<table>
<thead>
<tr>
<th>Feature</th>
<th>SFAM-62</th>
<th>SFAM-90</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating voltage range DC [V]</td>
<td>15 … 30</td>
<td>15 … 30</td>
</tr>
<tr>
<td>Reverse polarity protection</td>
<td>For all electrical connections</td>
<td>For all electrical connections</td>
</tr>
</tbody>
</table>

#### Electromechanical components

<table>
<thead>
<tr>
<th>Feature</th>
<th>SFAM-62</th>
<th>SFAM-90</th>
</tr>
</thead>
<tbody>
<tr>
<td>Electrical connection</td>
<td>Straight plug, M12x1, 5-pin</td>
<td>-TG12/-WG12/-TN12/-WN12</td>
</tr>
<tr>
<td>Max. connecting cable length [m]</td>
<td>30</td>
<td>30</td>
</tr>
</tbody>
</table>

#### Mechanical components

<table>
<thead>
<tr>
<th>Feature</th>
<th>SFAM-62</th>
<th>SFAM-90</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type</td>
<td>-M</td>
<td>-TG1</td>
</tr>
<tr>
<td>Type of mounting</td>
<td>-M</td>
<td>-TN1</td>
</tr>
<tr>
<td>Type of mounting</td>
<td>-TG12</td>
<td>-TN112</td>
</tr>
<tr>
<td>Pneumatic connection</td>
<td>-G1/2</td>
<td>-G1</td>
</tr>
<tr>
<td>Product weight [g]</td>
<td>600</td>
<td>1,100</td>
</tr>
<tr>
<td>Housing materials</td>
<td>PA-reinforced, die-cast aluminium</td>
<td>NPT11/2</td>
</tr>
</tbody>
</table>

#### Display/operation

<table>
<thead>
<tr>
<th>Feature</th>
<th>SFAM-62</th>
<th>SFAM-90</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flow measuring range [l/min]</td>
<td>-1000</td>
<td>-5000</td>
</tr>
<tr>
<td>Display type</td>
<td>Illuminated LCD, blue</td>
<td>Illuminated LCD, blue</td>
</tr>
<tr>
<td>Displayable units</td>
<td>l/min, scf, l, m³, scf</td>
<td>l/min, scf, l, m³, scf</td>
</tr>
<tr>
<td>Setting range for flow rate threshold values [%FS]</td>
<td>1 … 100</td>
<td>1 … 100</td>
</tr>
<tr>
<td>Setting range for consumption pulse threshold values [l/min]</td>
<td>1 … 19,999</td>
<td>1 … 19,999</td>
</tr>
<tr>
<td>[l]</td>
<td>0.1 … 1,999.9</td>
<td>0.1 … 1,999.9</td>
</tr>
<tr>
<td>Hysteresis setting range [%FS]</td>
<td>0 … 90</td>
<td>0 … 90</td>
</tr>
</tbody>
</table>

#### Immissions/emissions

<table>
<thead>
<tr>
<th>Feature</th>
<th>SFAM-62</th>
<th>SFAM-90</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flow measuring range [l/min]</td>
<td>-1000</td>
<td>-5000</td>
</tr>
<tr>
<td>Storage temperature [°C]</td>
<td>-20 … +80</td>
<td>-20 … +80</td>
</tr>
<tr>
<td>Protection class</td>
<td>IP65</td>
<td>IP65</td>
</tr>
<tr>
<td>Pressure drop at 50 %FS flow rate and 6 bar with mounting type -M [mbar]</td>
<td>0 … 100</td>
<td>0 … 100</td>
</tr>
<tr>
<td>Pressure drop at 50 %FS flow rate with mounting type -T/-W [mbar]</td>
<td>0 … 100</td>
<td>0 … 100</td>
</tr>
<tr>
<td>Electrical protection class</td>
<td>III</td>
<td>III</td>
</tr>
<tr>
<td>Corrosion resistance class CRC1)</td>
<td>2</td>
<td>2</td>
</tr>
</tbody>
</table>

1) Corrosion resistance classes according to Festo standard 940 070
Components subject to moderate corrosion stress. 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.
Flow sensors SFAM

Technical data

<table>
<thead>
<tr>
<th>Pin allocation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plug M12x1, 5-pin</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Pin</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Operating voltage +24 V DC</td>
</tr>
<tr>
<td>2</td>
<td>Binary output B</td>
</tr>
<tr>
<td>3</td>
<td>0 V</td>
</tr>
<tr>
<td>4</td>
<td>Binary output A</td>
</tr>
<tr>
<td>5</td>
<td>Analogue output C</td>
</tr>
</tbody>
</table>

Flow measuring range\(^1\) \(q_n\) as a function of operating pressure \(p_1\)

\(^1\) For an operating pressure of more than 5 bar, the flow sensor can determine measured values with the specified accuracy over the entire measuring range. For an operating pressure below 5 bar, the measuring range with the specified accuracy is reduced as shown in the graph.
## Flow sensors SFAM

**Technical data**

### Dimensions – SFAM-62

SFAM-62-...-M for manifold assembly in MS6 series service unit combination

<table>
<thead>
<tr>
<th>Type</th>
<th>B1</th>
<th>B2</th>
<th>B3</th>
<th>B4</th>
<th>B5</th>
<th>B6</th>
<th>B7</th>
<th>D1</th>
<th>D2</th>
<th>D3</th>
<th>H1</th>
<th>H2</th>
<th>H3</th>
<th>H4</th>
<th>H5</th>
<th>H6</th>
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<tbody>
<tr>
<td>SFAM-62-...-M</td>
<td>62</td>
<td>31</td>
<td>78.7</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>12x1</td>
<td>-</td>
<td>63.5</td>
<td>62.1</td>
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<td>80</td>
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<tr>
<td>SFAM-62-...-M</td>
<td>62</td>
<td>31</td>
<td>78.7</td>
<td>277</td>
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<td>-</td>
<td>-</td>
<td>12x1</td>
<td>61.9</td>
<td>4.5</td>
<td>60</td>
<td>80</td>
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<tr>
<td>SFAM-62-...-M</td>
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<td>31</td>
<td>78.7</td>
<td>277</td>
<td>40</td>
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<td>-</td>
<td>12x1</td>
<td>61.9</td>
<td>4.5</td>
<td>60</td>
<td>80</td>
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<td>71</td>
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<td>78.7</td>
<td>277</td>
<td>40</td>
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<td>-</td>
<td>12x1</td>
<td>61.9</td>
<td>4.5</td>
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<td>80</td>
<td>-</td>
<td>71</td>
<td>6.6</td>
<td>26</td>
</tr>
</tbody>
</table>

1. Plug M1x1 to EN 60947-5-2
2. LCD display
3. Connecting cable, straight socket
4. Connecting cable, angled socket
5. Stabilising zone
6. Wall mounting (only with mounting type -W) with mounting bracket MS6-WB

**Flow direction**
Flow sensors SFAM

**Technical data**

### Dimensions – SFAM-90

SFAM-90-...M for manifold assembly in MS9 series service unit combination

<table>
<thead>
<tr>
<th>Type</th>
<th>B1</th>
<th>B2</th>
<th>B3</th>
<th>B4</th>
<th>D1</th>
<th>D2</th>
<th>D3</th>
<th>H1</th>
<th>H2</th>
<th>H3</th>
<th>H4</th>
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<td>90</td>
<td>45</td>
<td>109</td>
<td>-</td>
<td>-</td>
<td>M12x1</td>
<td>-</td>
<td>76.5</td>
<td>81.3</td>
<td>114</td>
<td>93</td>
<td>-</td>
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<tr>
<td>SFAM-90-...TG1</td>
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<td>267</td>
<td>301</td>
<td>G1</td>
<td>M12x1</td>
<td>G1½</td>
<td>76.5</td>
<td>81.3</td>
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<td>G1½</td>
<td>G2</td>
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<tr>
<td>SFAM-90-...TN1</td>
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<td>M12x1</td>
<td>NPT1½</td>
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<td>81.3</td>
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<td>NPT1½</td>
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## Flow sensors SFAM

### Technical data

#### Ordering data

<table>
<thead>
<tr>
<th>Version</th>
<th>Grid dimension [mm]</th>
<th>Electrical output</th>
<th>Flow measuring range [l/min]</th>
<th>Part No.</th>
<th>Type</th>
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<tr>
<td>Manifold assembly in MS series service unit combination</td>
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<td>10 ... 1,000</td>
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<td>10 ... 1,000</td>
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<td>100 ... 10,000</td>
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<td></td>
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<td>Threaded mounting of individual device</td>
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<td></td>
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<td>1 analogue output 4 ... 20 mA</td>
<td>10 ... 1,000</td>
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<td>50 ... 5,000</td>
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<td>100 ... 10,000</td>
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### Flow sensors SFAM

**Ordering data – Modular products**

**Ordering table**

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<tr>
<th>Conditions</th>
<th>Code</th>
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<td>Flow sensor</td>
<td>SFAM</td>
</tr>
<tr>
<td>62 mm</td>
<td>SFAM</td>
</tr>
<tr>
<td>90 mm</td>
<td>SFAM</td>
</tr>
<tr>
<td>Max. 1,000 l/min</td>
<td>1</td>
</tr>
<tr>
<td>Max. 3,000 l/min</td>
<td>1</td>
</tr>
<tr>
<td>Max. 5,000 l/min</td>
<td>1</td>
</tr>
<tr>
<td>Max. 10,000 l/min</td>
<td>2</td>
</tr>
<tr>
<td>Max. 15,000 l/min</td>
<td>2</td>
</tr>
<tr>
<td>Unidirectional, from left to right</td>
<td>L</td>
</tr>
<tr>
<td>Unidirectional, from right to left</td>
<td>R</td>
</tr>
<tr>
<td>Manifold assembly</td>
<td>-M</td>
</tr>
<tr>
<td>Threaded mounting</td>
<td>-T</td>
</tr>
<tr>
<td>Wall mounting</td>
<td>1/4</td>
</tr>
</tbody>
</table>

**Transfer order code**

563796 SFAM - - - - - M12 - -
## Ordering data – Connecting cables

<table>
<thead>
<tr>
<th>Number of wires</th>
<th>Cable length [m]</th>
<th>Part No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>M12x1, straight socket</td>
<td>5</td>
<td>2.5</td>
</tr>
<tr>
<td></td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>M12x1, angled socket</td>
<td>5</td>
<td>2.5</td>
</tr>
<tr>
<td></td>
<td>5</td>
<td>5</td>
</tr>
</tbody>
</table>

## Application example

- Compressed air consumption and function monitoring of various systems in the production process
Inductive sensors

**General**

An inductive proximity sensor is a contactless sensor, i.e. it responds without direct contact to the approach of a metal or galvanic object. Proximity sensors are one of the basic elements of industrial automation technology. At the heart of this sensor is a coil, carrying an alternating current, which generates an alternating magnetic field. When a metallic object enters this magnetic field, the impedance of the coil and, consequently, the vibration amplitude changes. This change can, when electrically amplified, be used as a variable for the distance between the detected object and the coil. Due to the hysteresis effect, there is a difference between the measured distance when the object moves towards the proximity sensor and the measured distance when it moves away. This prevents oscillation of the output.

A contactless sensor offers the following advantages:
- No mechanical wear and tear, which in turn means a longer service life
- No downtime due to contaminated or bonded contacts
- No contact bounce and thus no switching errors
- High switching frequencies
- Vibration-resistant
- High degree of protection thanks to a fully encapsulated housing
- Any mounting position

**Operating distances**

The operating distance is the distance at which an object approaching the active surface of the proximity sensor triggers a change of signal.

The operating distance is measured in accordance with IEC 60947-5-2 (EN 60947-5-2) using a square standard test plate, which moves in the axial direction.

This standard target is made of steel, e.g. type FE 360 to ISO 630, has a smooth surface, a square shape and a thickness of 1 mm. The length of the side of the square corresponds to the diameter of the active surface or to three times the rated operating distance $S_n$ of the proximity sensor, whichever value is the larger.

**Rated operating distance $S_n$:**
This is the distance for which the proximity sensor is designed. This value does not take deviations due to tolerances, voltage or temperature into account.

**Effective operating distance $S_e$:**
This is the measured operating distance for a specific switch with a nominal voltage and an ambient temperature of $23 \pm 5 \, ^\circ C$.

The following rule applies: $0.9 \times S_n < S_e < 1.1 \times S_n$. This means that the maximum permissible production tolerance is $\pm 10\%$.

**Usable operating distance $S_u$:**
This distance takes account of the expected additional deviations, which are caused in a specific range by temperature and operating voltage fluctuations.

The following rule applies: $0.9 \times S_e < S_u < 1.1 \times S_e$. The effective operating distance $S_u$ may therefore deviate from the real operating distance $S_e$ by a maximum of $\pm 10\%$.

The temperature and operating voltage ranges can be found in the technical data.

**Assured operating distance $S_a$:**
This operating distance is guaranteed by the manufacturer for all specified operating conditions. It provides the basis for a reliable design.

The following rule applies: $0 < S_a < 0.81 \times S_n$. The assured operating distance therefore lies between 0 and the lowest value for the effective operating distance.

**Note:**
Objects that are smaller than the standard target defined above generally lead to shorter operating distances.

**Installation instructions**

**Flush mounting**

Proximity sensors for flush mounting can be surrounded by metal up as far as the level of the active surface without their function being impaired.

**Non-flush mounting**

In the case of proximity sensors for non-flush mounting, a metal-free area is required around the active surface in order to guarantee faultless functioning.
Installation instructions (continued)

Mounting

Sensors without threads should if possible be secured with adhesive. Sensors can be clamped with moderate pressure if the pressure is distributed over as large an area as possible.

Distances between sensors

Concentrated pressure, e.g. as produced by grub screws, can easily cause damage to sensors. Inductive sensors must not be used as mechanical stops.

Adjacent sensors must not be allowed to interfere with each other during operation. For this reason, a minimum distance, which depends on the sensor size, must be maintained between the sensors (Table 311).

<table>
<thead>
<tr>
<th>Size / design</th>
<th>6.5 mm</th>
<th>M8x1</th>
<th>M12x1</th>
<th>M18x1</th>
<th>M30x1.5</th>
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<td>–</td>
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<td>Flush mounting</td>
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<td>–</td>
<td>28</td>
<td>34</td>
<td>–</td>
<td>–</td>
<td>–</td>
</tr>
</tbody>
</table>

Glossary

Repetition accuracy

Repetition accuracy as defined by IEC 60947-5-2 and EN 60947-5-2 refers to the repetition accuracy of the real operating distance Sr over a period of 8 hours, at an ambient temperature of 23 ± 5 °C and a fixed operating voltage Ua. The specified repetition accuracies refer to this definition. Consecutive measurements generally produce a much better repetition accuracy.

Switching frequency

The maximum switching frequency specifies the highest permissible number of pulses per second for a constant pulse/interval ratio of 1:2 at half of the rated operating distance Sn. Measurement is performed in compliance with IEC/EN 60947-5-2.

Magnetic fields

Inductive sensors SIEF are immune to interference caused by magnetic fields. The other sensor types are not normally influenced by permanent magnetic fields or low-frequency alternating fields. Nevertheless, strong fields can saturate the ferrite core of these sensors and thus increase the operating distance or even cause the device to switch. No permanent damage is caused, however. High-frequency fields in the order of several kHz (SIEH-…-CR) or several hundred kHz (other series) can severely impair the switching function, as the oscillator frequency of these devices lies within this range. If problems occur with interfering magnetic fields, screening is recommended.

Cable length

With proximity sensors, long cables result in:
- A capacitive load at the output
- Greater sensitivity to interference

The cable length should therefore be no longer than 300 m given favourable conditions.

Temperature drift of the real operating distance

The specified operating distances refer to a nominal ambient temperature of 23 °C. The operating distance as a function of the ambient temperature corresponds approximately to the curve shown in the diagram on the right. The temperature of the object itself has virtually no effect on the operating distance. Within the permissible temperature range, which generally lies between −25 °C and +70 °C, the operating distance varies by a maximum of ±10% compared with the value at 23 °C.
Reduction factors

The specified operating distances refer to precisely defined measurement conditions (see above). Other materials generally lead to a reduction in the operating distance. The corresponding reduction factors are specified for each individual sensor and for the most commonly used metals.

Typical value ranges:
- Steel (St37 or FE360) 1
- Brass 0.35 … 0.5
- Copper 0.25 … 0.45
- Aluminium 0.35 … 0.50
- Stainless steel 0.6 … 1

For special applications, sensors SIEF with a reduction factor of 1 for all metals are available ex-stock.

SIEF with reduction factor 1 for all metals

Like all inductive proximity sensors, proximity sensors SIEF are able to sense metals without contact and therefore without wear. Thanks to their special structure with a ferrite-free 3-coil system, they have properties that in many applications offer decisive advantages in comparison with conventional inductive sensors:

Reduction factor 1

Proximity sensors SIEF have the same long operating distance for all metals. In installations that frequently sense aluminium or stainless steel, this translates into an additional operating distance of up to 400% with aluminium.

Extremely long operating distance

Proximity sensors SIEF offer a particularly long operating distance, without compromising their ease of installation.

Magnetic field immune

The omission of the ferrite core means that proximity sensors SIEF are immune to interference caused by strong magnetic fields such as those found in electrical welding and many other applications (e.g. lifts, electronic furnaces, etc.).

Wide temperature range

The ambient temperature range of –30 ... +85 °C means that the proximity sensors can be used at extremes of temperature.

High switching frequencies

The fast air-core coils mean that a SIEF is up to 500% faster than a conventional sensor – vital for machines and systems that are becoming increasingly faster.

Excellent EMC resistance

All proximity sensors SIEF exceed the stringent requirements of EN 61 000-6-4. The proximity sensor SIEF is therefore optimally protected, particularly against conducted interference (e.g. from frequency converters), ensuring that your systems are equipped for the future.

Flush mounting

Flush mounting means that proximity sensors SIEF do not require a metal-free zone around their active surface. Most designs can even be recessed by 1 ... 2 mm to protect against mechanical damage. Unlike partially flush devices, flush proximity sensors SIEF can therefore be installed fully flush.

Non-flush mounting

An integrated pre-attenuation protection system means that non-flush proximity sensors will never be as flexible in terms of installation as flush proximity sensors. The protective effect is produced by means of self-compensation in the innovative multi-coil system. In practice this means that in contrast to conventional sensors with a ferrite core, the metal-free zones can be significantly smaller. Some designs can even be mounted with metal on three sides. The self-compensator automatically compensates the pre-attenuation. With conventional, non-flush ferrite core sensors, this type of partially flush installation leads to uncontrolled switching. For non-flush proximity sensors SIEF, the integrated self-compensator means maximum operating distance without compromise.

SIEA with analogue output

Devices with an analogue output supply an analogue signal, which is approximately proportional to the object distance. Most models have outputs for both voltage and current.

SIEH...-CR with stainless steel housing

A new technology for inductive proximity sensors. Unlike conventional technology, with which a high-frequency magnetic field is generated in front of the active surface, in this case the coil is supplied with a current with alternating polarity. This technology allows:

- Very large operating distances
- Large operating distances even with nonferrous metals such as aluminium, brass, copper, etc.
- Seamless stainless steel housing (active surface encapsulated)
<table>
<thead>
<tr>
<th>Version</th>
<th>Type</th>
<th>Operating voltage</th>
<th>Switching output/analogue output</th>
<th>Mounting type</th>
<th>Size</th>
<th>Page/online</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reduction factor, material-specific</td>
<td>SIEN Basic version</td>
<td>10 ... 30 V DC</td>
<td>PNP</td>
<td>Flush</td>
<td>Ø 4 mm, M5, Ø 6.5 mm, M8, M12, M18, M30</td>
<td>317</td>
</tr>
<tr>
<td></td>
<td>SIEN-...-PA Polyamide housing</td>
<td>10 ... 30 V DC</td>
<td>PNP</td>
<td>Flush</td>
<td>M12, M18, M30</td>
<td>323</td>
</tr>
<tr>
<td></td>
<td>SIED Basic version</td>
<td>20 ... 265 V AC 20 ... 320 V DC</td>
<td>Contactless, 2-wire</td>
<td>Flush</td>
<td>M12, M18, M30</td>
<td>326</td>
</tr>
<tr>
<td></td>
<td>SIED-...-PA Polyamide housing</td>
<td>20 ... 250 V AC 10 ... 300 V DC</td>
<td>Contactless, 2-wire</td>
<td>Flush</td>
<td>M12, M18, M30</td>
<td>331</td>
</tr>
<tr>
<td></td>
<td>SIES Special design</td>
<td>10 ... 30 V DC</td>
<td>PNP</td>
<td>Flush</td>
<td>5x5x25 mm ... 4x4x120 mm</td>
<td>334</td>
</tr>
</tbody>
</table>

| Increased switching distance | SIEH Basic version | 10 ... 30 V DC       | PNP                              | Flush         | Ø 3 mm, M12, M18      | 338         |
|                              | SIEH-...-CR Stainless steel housing | 10 ... 30 V DC | PNP                              | Flush         | M12, M18              | 342         |

| Analogue output    | SIEA            | 15 ... 30 V DC       | 0 ... 10 V and 4 ... 20 mA       | Flush         | M8, M12, M18, M30    | 345         |

| Reduction factor 1 for all metals, welding field immune | SIEF Basic version | 10 ... 65 V DC       | PNP                              | Flush         | M8, M12, M18, M30, 40x40x65 mm | 348         |
| Housing resistant to welding spatter | SIEF-...-WA | 10 ... 30 V DC       | PNP                              | Flush         | M12, M18, M30        | 354         |
**Sensors > Inductive sensors >**

**Proximity sensors SIE..., inductive**

**Peripherals overview**

### Proximity sensors SIE..., inductive

#### SIE...

![Image of SIE...](image)

<table>
<thead>
<tr>
<th>Mounting attachments and accessories</th>
<th>Page/online</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Connecting cable, straight socket NEBU-M...G...</td>
<td>358</td>
</tr>
<tr>
<td>2. Connecting cable, angled socket NEBU-M...W...</td>
<td>358</td>
</tr>
<tr>
<td>3. Sensor bracket SIEZ...B</td>
<td>358</td>
</tr>
<tr>
<td>4. Sensor bracket SIEZ-UV</td>
<td>358</td>
</tr>
<tr>
<td>5. Sensor bracket SIEZ-UH</td>
<td>358</td>
</tr>
<tr>
<td>6. Inscription label SIEZ-LB</td>
<td>358</td>
</tr>
<tr>
<td>7. Mounting bracket HV-M5</td>
<td>358</td>
</tr>
</tbody>
</table>

### SIES-V3B

![Image of SIES-V3B](image)

<table>
<thead>
<tr>
<th>Mounting attachments and accessories</th>
<th>Page/online</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Foot mounting HBN</td>
<td>358</td>
</tr>
<tr>
<td>- Foot mounting HBE</td>
<td>358</td>
</tr>
<tr>
<td>- Flange mounting FBN</td>
<td>358</td>
</tr>
<tr>
<td>- Stop for proximity SDA</td>
<td>358</td>
</tr>
<tr>
<td>Type</td>
<td>Proximity sensor, inductive</td>
</tr>
<tr>
<td>--------</td>
<td>----------------------------</td>
</tr>
<tr>
<td>A</td>
<td>With analogue output</td>
</tr>
<tr>
<td>D</td>
<td>For DC and AC voltage</td>
</tr>
<tr>
<td>F</td>
<td>With reduction factor 1 for all metals, welding field immune</td>
</tr>
<tr>
<td>H</td>
<td>With increased switching distance</td>
</tr>
<tr>
<td>N</td>
<td>With standard switching distance</td>
</tr>
<tr>
<td>S</td>
<td>Special design</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Design</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Round</td>
</tr>
<tr>
<td></td>
<td>Metric thread</td>
</tr>
<tr>
<td></td>
<td>Block-shaped</td>
</tr>
<tr>
<td></td>
<td>Block-shaped</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Size</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Round</td>
</tr>
<tr>
<td></td>
<td>Metric thread</td>
</tr>
<tr>
<td></td>
<td>Block-shaped</td>
</tr>
<tr>
<td></td>
<td>Block-shaped</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Mounting type</th>
<th>Flush</th>
</tr>
</thead>
<tbody>
<tr>
<td>NB</td>
<td>Non-flush</td>
</tr>
<tr>
<td>S</td>
<td>Partially flush</td>
</tr>
</tbody>
</table>

| Electrical output | Switching output PNP |
|                  | Switching output NPN |
| 2               | 2-wire output |
| PU              | Analogue output 0 ... 10 V |
| UI              | Analogue output 0 ... 10 V and 4 ... 20 mA |

<table>
<thead>
<tr>
<th>Switching element function</th>
<th>N/O contact</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>N/C contact</td>
</tr>
<tr>
<td>A</td>
<td>Antivalent</td>
</tr>
</tbody>
</table>

| Electrical connection | Cable |
|                      | Plug |
|                      | Screw terminals |

| Display            | Without display |
|                   | Switching status |
| 2L                 | Switching status and ready status |

| Version             | Standard |
|                     | Stainless steel housing |
|                     | Polyamide housing |
|                     | Housing resistant to welding spatter |
## Proximity sensors SIEN, inductive

### Technical data – Standard switching distance, basic version

#### General technical data

<table>
<thead>
<tr>
<th>Size</th>
<th>4 mm</th>
<th>M5</th>
<th>6.5 mm</th>
<th>M8</th>
<th>M12</th>
<th>M18</th>
<th>M30</th>
</tr>
</thead>
<tbody>
<tr>
<td>Conforms to</td>
<td>EN 60947-5-2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Certification</td>
<td>cULus listed (UL)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CE mark (see declaration of conformity)</td>
<td>To EU EMC Directive 1)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Note on materials</td>
<td>Free of copper and PTFE</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

1) For information about the applicability of the component see the manufacturer's EC declaration of conformity at: www.festo.com

#### Input signal/measuring element

<table>
<thead>
<tr>
<th>Size</th>
<th>4 mm</th>
<th>M5</th>
<th>6.5 mm</th>
<th>M8</th>
<th>M12</th>
<th>M18</th>
<th>M30</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ambient temperature</td>
<td>[°C]</td>
<td>-25</td>
<td>...</td>
<td>70</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### Output, general

<table>
<thead>
<tr>
<th>Mounting type</th>
<th>Flush</th>
<th>Non-flush</th>
</tr>
</thead>
<tbody>
<tr>
<td>Repetition accuracy</td>
<td>[mm]</td>
<td>0.04</td>
</tr>
</tbody>
</table>

#### Switching output

<table>
<thead>
<tr>
<th>Mounting type</th>
<th>Flush</th>
<th>Non-flush</th>
</tr>
</thead>
<tbody>
<tr>
<td>Switching output</td>
<td>PNP</td>
<td>NPN</td>
</tr>
<tr>
<td>Switching element function</td>
<td>N/O contact</td>
<td>N/C contact</td>
</tr>
<tr>
<td>Rated operating distance</td>
<td>[mm]</td>
<td>0.8</td>
</tr>
<tr>
<td>Assured switching distance</td>
<td>[mm]</td>
<td>0.64</td>
</tr>
</tbody>
</table>

#### Reduction factors

<table>
<thead>
<tr>
<th>Material</th>
<th>Aluminium</th>
<th>Stainless steel St 18/8</th>
<th>Copper</th>
<th>Brass</th>
<th>Steel St 37</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reduction factor</td>
<td>0.4</td>
<td>0.4</td>
<td>0.25</td>
<td>0.25</td>
<td>0.4</td>
</tr>
<tr>
<td></td>
<td>0.7</td>
<td>0.7</td>
<td>0.7</td>
<td>0.6</td>
<td>0.8</td>
</tr>
<tr>
<td></td>
<td>0.3</td>
<td>0.3</td>
<td>0.2</td>
<td>0.2</td>
<td>0.3</td>
</tr>
<tr>
<td></td>
<td>0.4</td>
<td>0.4</td>
<td>0.35</td>
<td>0.35</td>
<td>0.5</td>
</tr>
<tr>
<td></td>
<td>1.0</td>
<td>1.0</td>
<td>1.0</td>
<td>1.0</td>
<td>1.0</td>
</tr>
</tbody>
</table>

#### Hysteresis

<table>
<thead>
<tr>
<th>Material</th>
<th>Aluminium</th>
<th>Stainless steel St 18/8</th>
<th>Copper</th>
<th>Brass</th>
<th>Steel St 37</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hysteresis</td>
<td>[mm]</td>
<td>-</td>
<td>-</td>
<td>≤0.07</td>
<td>≤0.07</td>
</tr>
</tbody>
</table>

### Function

- Standard switching distance
- For DC voltage
- Round design

1) e.g. N/O contact with PNP output and cable

For information about the applicability of the component see the manufacturer's EC declaration of conformity at: www.festo.com
### Proximity sensors SIEN, inductive

#### Technical data – Standard switching distance, basic version

#### Output, additional data

<table>
<thead>
<tr>
<th>Size</th>
<th>4 mm</th>
<th>M5</th>
<th>6.5 mm</th>
<th>M8</th>
<th>M12</th>
<th>M18</th>
<th>M30</th>
</tr>
</thead>
</table>

- **Protection against short circuit**: Pulsed
- **Inductive protective circuit**: Integrated
- **Induced voltage protection**: Integrated

#### Electronic components

<table>
<thead>
<tr>
<th>Size</th>
<th>4 mm</th>
<th>M5</th>
<th>6.5 mm</th>
<th>M8</th>
<th>M12</th>
<th>M18</th>
<th>M30</th>
</tr>
</thead>
</table>

- **Pulsed**
- **Integrated**
- **Integrated**

- **Electronic components**
- **Size**: 4 mm, M5, 6.5 mm, M8, M12, M18, M30
- **Operating voltage range**: [V DC] 10 – 30
- **Residual ripple**: [%] 10 ±10 ±20
- **Idle current**: [mA] 0 – 10
- **Reverse polarity protection**: For all electrical connections

#### Electromechanical components

<table>
<thead>
<tr>
<th>Size</th>
<th>4 mm</th>
<th>M5</th>
<th>6.5 mm</th>
<th>M8</th>
<th>M12</th>
<th>M18</th>
<th>M30</th>
</tr>
</thead>
</table>

- **Cable**
- **Electrical connection**: Cable, 3-wire
- **Cable length**: [m] 2.5
- **Cable sheath material**: PUR

- **Plug**
- **Electrical connection**: Plug, M8x1, 3-pin, Plug, M8x1, 3-pin, Plug, M8x1, 3-pin, Plug, M8x1, 3-pin, Plug, M12x1, 3-pin, Plug, M12x1, 3-pin

#### Mechanical components

<table>
<thead>
<tr>
<th>Size</th>
<th>4 mm</th>
<th>M5</th>
<th>6.5 mm</th>
<th>M8</th>
<th>M12</th>
<th>M18</th>
<th>M30</th>
</tr>
</thead>
</table>

- **Attachment type**: Clamped
- **Mounting type**: Flush
- **Tightening torque**: [Nm] 2

- **Cable**
- **Product weight**: [g] 48, 48, 45, 53, 53, 110, 90, 108, 105, 155
- **Housing material**: High-alloy stainless steel, Nickel-plated brass, Chrome-plated brass

- **Plug**
- **Product weight**: [g] 9, 9, 4, 18, 18, 30, 25, 43, 40, 100
- **Housing material**: High-alloy stainless steel, Chrome-plated brass, Nickel-plated brass, Chrome-plated brass

#### Display/operation

- **Switching status display**: Yellow LED
Proximity sensors SIEN, inductive

Technical data – Standard switching distance, basic version

### Immissions/emissions

<table>
<thead>
<tr>
<th>Size</th>
<th>4 mm</th>
<th>M5</th>
<th>6.5 mm</th>
<th>M8</th>
<th>M12</th>
<th>M18</th>
<th>M30</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ambient temperature with flexible cable installation [°C]</td>
<td>-</td>
<td>-5 ... +70</td>
<td>-5 ... +70</td>
<td>-5 ... +70</td>
<td>-5 ... +70</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Protection class</td>
<td>-</td>
<td>IP65</td>
<td>-</td>
<td>IP67</td>
<td>-</td>
<td>IP67</td>
<td></td>
</tr>
<tr>
<td>Surge strength [kV]</td>
<td>-</td>
<td>1</td>
<td>-</td>
<td>0.8</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Corrosion resistance class CRC</td>
<td>-</td>
<td>4</td>
<td>2</td>
<td>3</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Degree of contamination</td>
<td>-</td>
<td>3</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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

Components subject to moderate corrosion stress. 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.

Corrosion resistance class 4 according to Festo standard 940 070

Components with very heavy corrosion exposure. Components in contact with aggressive media, e.g. in food or chemical industries. These applications must, if necessary, be verified by special tests with the media concerned.

### Pin allocation to EN 60947-5-2

#### M8x1, 3-pin

- **N/O contact and N/C contact**

<table>
<thead>
<tr>
<th>Pin</th>
<th>Wire colour</th>
<th>Allocation</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Brown</td>
<td>+</td>
</tr>
<tr>
<td>3</td>
<td>Blue</td>
<td>-</td>
</tr>
<tr>
<td>4</td>
<td>Black</td>
<td>Output</td>
</tr>
</tbody>
</table>

#### M12x1, 3-pin

- **N/O contact**

<table>
<thead>
<tr>
<th>Pin</th>
<th>Wire colour</th>
<th>Allocation</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Brown</td>
<td>+</td>
</tr>
<tr>
<td>3</td>
<td>Blue</td>
<td>-</td>
</tr>
<tr>
<td>4</td>
<td>Black</td>
<td>Output</td>
</tr>
</tbody>
</table>

- **N/C contact**

<table>
<thead>
<tr>
<th>Pin</th>
<th>Wire colour</th>
<th>Allocation</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>White</td>
<td>Output</td>
</tr>
</tbody>
</table>

### Dimensions – 4 mm

Flush fitting


- 1 Connecting cable
- 2 Active surface
- 3 LED
- 4 4x LED

### Dimensions – M5

Flush fitting


- 1 Connecting cable
- 2 Active surface
- 3 LED
- 4 4x LED

### Dimensions – 6.5 mm

Flush fitting


- 1 Connecting cable
- 2 Active surface
- 3 LED
- 4 4x LED
Proximity sensors SIEN, inductive
Technical data – Standard switching distance, basic version

Dimensions – M8
Flush fitting
Cable | Plug
--- | ---
![Diagram of M8 flush fitting]
Non-flush fitting
Cable | Plug
--- | ---
![Diagram of M8 non-flush fitting]

Dimensions – M12
Flush fitting
Cable | Plug
--- | ---
![Diagram of M12 flush fitting]
Non-flush fitting
Cable | Plug
--- | ---
![Diagram of M12 non-flush fitting]

Dimensions – M18
Flush fitting
Cable | Plug
--- | ---
![Diagram of M18 flush fitting]
Non-flush fitting
Cable | Plug
--- | ---
![Diagram of M18 non-flush fitting]

Dimensions – M30
Flush fitting
Cable | Plug
--- | ---
![Diagram of M30 flush fitting]
Non-flush fitting
Cable | Plug
--- | ---
![Diagram of M30 non-flush fitting]
## Proximity sensors SIEN, inductive

### Technical data – Standard switching distance, basic version

#### Fitting instructions

**Flush fitting**

<table>
<thead>
<tr>
<th>Size</th>
<th>B1</th>
<th>B2</th>
<th>H</th>
</tr>
</thead>
<tbody>
<tr>
<td>4 mm</td>
<td>2.5</td>
<td>5</td>
<td>2</td>
</tr>
<tr>
<td>M5</td>
<td>3.3</td>
<td>5</td>
<td>2.4</td>
</tr>
<tr>
<td>6.5 mm</td>
<td>5</td>
<td>9.5</td>
<td>4.5</td>
</tr>
<tr>
<td>M8</td>
<td>5.5</td>
<td>10</td>
<td>4.5</td>
</tr>
<tr>
<td>M12</td>
<td>8</td>
<td>18</td>
<td>6</td>
</tr>
<tr>
<td>M18</td>
<td>14</td>
<td>32</td>
<td>15</td>
</tr>
<tr>
<td>M30</td>
<td>25</td>
<td>60</td>
<td>30</td>
</tr>
</tbody>
</table>

**Non-flush fitting**

<table>
<thead>
<tr>
<th>Size</th>
<th>B1</th>
<th>B2</th>
<th>H1</th>
<th>H2</th>
</tr>
</thead>
<tbody>
<tr>
<td>M8</td>
<td>9</td>
<td>16</td>
<td>8</td>
<td>7.5</td>
</tr>
<tr>
<td>M12</td>
<td>12</td>
<td>28</td>
<td>6</td>
<td>12</td>
</tr>
<tr>
<td>M18</td>
<td>20</td>
<td>50</td>
<td>10</td>
<td>24</td>
</tr>
<tr>
<td>M30</td>
<td>30</td>
<td>75</td>
<td>15</td>
<td>45</td>
</tr>
</tbody>
</table>

#### Ordering data

<table>
<thead>
<tr>
<th>Size</th>
<th>( S_n )</th>
<th>Mounting type</th>
<th>Switching output</th>
<th>Switching element function</th>
<th>Electrical connection</th>
<th>Cable</th>
<th>Plug</th>
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<td>0.8</td>
<td>Flush</td>
<td>PNP</td>
<td>N/O contact</td>
<td>150362 SIEN-4B-PS-K-L</td>
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<td>150368 SIEN-M5B-NS-K-L</td>
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<td>N/C contact</td>
<td>150372 SIEN-M5B-NO-K-L</td>
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<td>6.5 mm</td>
<td>1.5</td>
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<td>N/O contact</td>
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<td>PNP</td>
<td>N/O contact</td>
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<td>M8</td>
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1) \( S_n \) Rated operating distance [mm]

2012/08 – Subject to change – Sensors / Vision systems

www.festo.com/catalogue/...
### Proximity sensors SIEN, inductive

**Technical data – Standard switching distance, basic version**

<table>
<thead>
<tr>
<th>Size (mm)</th>
<th>Sn 1)</th>
<th>Mounting type</th>
<th>Switching output</th>
<th>Switching element function</th>
<th>Electrical connection</th>
<th>Cable Part No.</th>
<th>Type</th>
<th>Plug Part No.</th>
<th>Type</th>
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<tbody>
<tr>
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<tr>
<td>2.0</td>
<td>Flush</td>
<td>PNP</td>
<td>N/O contact</td>
<td>150402 SIEN-M12B-PS-K-L</td>
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<tr>
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<td>N/C contact</td>
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<td>N/C contact</td>
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</table>

1) Sn: Rated operating distance [mm]
### Proximity sensors SIEN---PA, inductive

**Technical data – Standard switching distance, polyamide housing**

**Function**
- Standard switching distance
- Corrosion-resistant
- Polyamide housing
- For DC voltage
- Round design

1) e.g. N/O contact with PNP output and cable

#### General technical data

<table>
<thead>
<tr>
<th>Design</th>
<th>Round</th>
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<tbody>
<tr>
<td>Conforms to</td>
<td>EN 60947-5-2</td>
</tr>
<tr>
<td>Certification</td>
<td>cULus listed (UL)</td>
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<tr>
<td>CE mark (see declaration of conformity)</td>
<td>To EU EMC Directive 1)</td>
</tr>
<tr>
<td>Note on materials</td>
<td>Free of copper and PTFE</td>
</tr>
</tbody>
</table>

1) For information about the applicability of the component see the manufacturer’s EC declaration of conformity at: www.festo.com/support/user documentation.

If the component is subject to restrictions on usage in residential, office or commercial environments or small businesses, further measures to reduce the emitted interference may be necessary.

#### Input signal/measuring element

| Ambient temperature | [°C] | -25 ... +70 |

#### Output, general

<table>
<thead>
<tr>
<th>Mounting type</th>
<th>Flush</th>
<th>Non-flush</th>
</tr>
</thead>
<tbody>
<tr>
<td>Size</td>
<td>M12</td>
<td>M18</td>
</tr>
<tr>
<td>Repetition accuracy</td>
<td>[mm]</td>
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#### Switching output

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<tr>
<th>Mounting type</th>
<th>Flush</th>
<th>Non-flush</th>
</tr>
</thead>
<tbody>
<tr>
<td>Size</td>
<td>M12</td>
<td>M18</td>
</tr>
<tr>
<td>Switching output</td>
<td>PNP</td>
<td>PNP</td>
</tr>
<tr>
<td>Switching element function</td>
<td>N/O contact</td>
<td>N/O contact</td>
</tr>
<tr>
<td>Rated operating distance</td>
<td>[mm]</td>
<td>2</td>
</tr>
<tr>
<td>Assured switching distance</td>
<td>[mm]</td>
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#### Reduction factors

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<tr>
<th>Material</th>
<th>Aluminium</th>
<th>Stainless steel St 18/8</th>
<th>Copper</th>
<th>Brass</th>
<th>Steel St 37</th>
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<tbody>
<tr>
<td>Hysteresis</td>
<td>[mm]</td>
<td>0.06 ... 0.3</td>
<td>0.15 ... 0.75</td>
<td>0.3 ... 1.5</td>
<td>0.12 ... 0.6</td>
</tr>
<tr>
<td>Max. switching frequency DC</td>
<td>[Hz]</td>
<td>2,000</td>
<td>1,000</td>
<td>500</td>
<td>2,000</td>
</tr>
<tr>
<td>Max. output current</td>
<td>[mA]</td>
<td>200</td>
<td>200</td>
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<tr>
<td>Voltage drop</td>
<td>[V]</td>
<td>≤ 1.8</td>
<td>≤ 1.8</td>
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</tbody>
</table>

#### Output, additional data

| Protection against short circuit | Pulsed |
### Proximity sensors SIEN-...-PA, inductive

**Technical data – Standard switching distance, polyamide housing**

#### Electronic components

<table>
<thead>
<tr>
<th>Parameter</th>
<th>SIEN-12-PA</th>
<th>SIEN-18-PA</th>
<th>SIEN-30-PA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating voltage range [V DC]</td>
<td>10 … 30</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Residual ripple [%]</td>
<td>10</td>
<td></td>
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</tr>
<tr>
<td>Idle current [mA]</td>
<td>≤ 15</td>
<td></td>
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</tr>
<tr>
<td>Reverse polarity protection</td>
<td>For all electrical connections</td>
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</table>

#### Electromechanical components

<table>
<thead>
<tr>
<th>Parameter</th>
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<th>SIEN-18-PA</th>
<th>SIEN-30-PA</th>
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</thead>
<tbody>
<tr>
<td>Cable length [m]</td>
<td>2.5</td>
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<tr>
<td>Cable sheath material</td>
<td>PVC</td>
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</tr>
<tr>
<td>Insulating sheath material</td>
<td>PVC</td>
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#### Mechanical components

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<th>Parameter</th>
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<th>SIEN-18-PA</th>
<th>SIEN-30-PA</th>
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</thead>
<tbody>
<tr>
<td>Size</td>
<td>M12</td>
<td>M18</td>
<td>M30</td>
</tr>
<tr>
<td>Attachment type</td>
<td>Via lock nut</td>
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<tr>
<td>Mounting type</td>
<td>Flush</td>
<td>Non-flush</td>
<td>Flush</td>
</tr>
<tr>
<td>Tightening torque [Nm]</td>
<td>–</td>
<td>25</td>
<td>–</td>
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<tr>
<td>Product weight [g]</td>
<td>41</td>
<td>38</td>
<td>124</td>
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<tr>
<td>Housing material</td>
<td>PA-reinforced</td>
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</tbody>
</table>

#### Display/operation

- **Switching status display**: Yellow LED

#### Immissions/emissions

- **Mounting type**: Flush, Non-flush
- **Size**: M12, M18, M30
- **Ambient temperature with flexible cable installation [°C]**: 0 … +70
- **Protection class**: IP65, IP67
- **Corrosion resistance class CRC**: 4

1) Corrosion resistance class 4 according to Festo standard 940 070

Components subject to particularly high corrosion stress. Parts used with aggressive media, e.g. in the food or chemical industry. These applications should be supported with special tests with the media if required.

#### Dimensions

**Download CAD data ➔ www.festo.com/en/engineering**

**M12**

- Connecting cable
- M12
- 8
- 60
- 6
- 40
- 3

**M18**

- Connecting cable
- M18
- 8
- 60
- 6
- 40
- 3
## Proximity sensors SIEN-...,PA, inductive

### Technical data – Standard switching distance, polyamide housing

---

**Dimensions**

### M30

![Diagram of M30 sensor]

<table>
<thead>
<tr>
<th>Size</th>
<th>B1</th>
<th>B2</th>
<th>H</th>
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<tbody>
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<td>24</td>
<td>6</td>
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<td>M18</td>
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<tr>
<td>M30</td>
<td>45</td>
<td>60</td>
<td>30</td>
</tr>
</tbody>
</table>

---

### Fitting instructions

#### Flush fitting

| 1 Connecting cable | 2 Active surface | 3 LED |

---

#### Non-flush fitting

| 1 Connecting cable | 2 Active surface | 5 Metal-free zone |

---

### Fitting instructions

#### Flush fitting

- M12
- M18
- M30

#### Non-flush fitting

- M12
- M18
- M30

---

### Ordering data

#### Size

<table>
<thead>
<tr>
<th>Size</th>
<th>(S_n) (^\text{1)}) [mm]</th>
<th>Mounting type</th>
<th>Switching output</th>
<th>Switching element function</th>
<th>Electrical connection</th>
<th>Cable</th>
<th>Part No.</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>M12</td>
<td>2.0</td>
<td>Flush</td>
<td>PNP</td>
<td>N/O contact</td>
<td>538323</td>
<td>SIEN-M12B-PS-K-L-PA</td>
<td></td>
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<tr>
<td></td>
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<td>NPN</td>
<td></td>
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<tr>
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<td>4.0</td>
<td>Non-flush</td>
<td>PNP</td>
<td></td>
<td>538329</td>
<td>SIEN-M12NB-PS-K-L-PA</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>NPN</td>
<td></td>
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<td></td>
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<tr>
<td>M18</td>
<td>5.0</td>
<td>Flush</td>
<td>PNP</td>
<td>N/O contact</td>
<td>538325</td>
<td>SIEN-M18B-PS-K-L-PA</td>
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<td></td>
<td></td>
<td></td>
<td>NPN</td>
<td></td>
<td>538326</td>
<td>SIEN-M18B-NS-K-L-PA</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>8.0</td>
<td>Non-flush</td>
<td>PNP</td>
<td></td>
<td>538331</td>
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<td></td>
<td></td>
<td></td>
<td>NPN</td>
<td></td>
<td>538332</td>
<td>SIEN-M18NB-NS-K-L-PA</td>
<td></td>
<td></td>
</tr>
<tr>
<td>M30</td>
<td>10.0</td>
<td>Flush</td>
<td>PNP</td>
<td>N/O contact</td>
<td>538327</td>
<td>SIEN-M30B-PS-K-L-PA</td>
<td></td>
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</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>NPN</td>
<td></td>
<td>538328</td>
<td>SIEN-M30B-NS-K-L-PA</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>15.0</td>
<td>Non-flush</td>
<td>PNP</td>
<td></td>
<td>538333</td>
<td>SIEN-M30NB-PS-K-L-PA</td>
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<td></td>
<td></td>
<td>NPN</td>
<td></td>
<td>538334</td>
<td>SIEN-M30NB-NS-K-L-PA</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

---

1) \(S_n\) Rated operating distance [mm]
### Proximity sensors SIED, inductive

**Technical data – Standard switching distance, for DC and AC voltage**

#### Function

- Standard switching distance
- For DC and AC voltage
- Round design

1) e.g. N/O contact with cable

#### General technical data

<table>
<thead>
<tr>
<th>Design</th>
<th>Round</th>
</tr>
</thead>
<tbody>
<tr>
<td>Conforms to</td>
<td>EN 60947-5-2</td>
</tr>
<tr>
<td>Certification</td>
<td>cULus listed (UL)</td>
</tr>
</tbody>
</table>
| CE mark (see declaration of conformity) | To EU EMC Directive

1) To EU Low Voltage Directive

#### Note on materials

Free of copper and PTFE

1) For information about the applicability of the component see the manufacturer’s EC declaration of conformity at: www.festo.com

#### Input signal/measuring element

| Ambient temperature | °C | –25 ... +85 |

#### Output, general

<table>
<thead>
<tr>
<th>Mounting type</th>
<th>Flush</th>
<th>Non-flush</th>
</tr>
</thead>
<tbody>
<tr>
<td>Size</td>
<td>M12</td>
<td>M18</td>
</tr>
<tr>
<td>Repetition accuracy</td>
<td>[mm]</td>
<td>0.1</td>
</tr>
</tbody>
</table>

#### Switching output

<table>
<thead>
<tr>
<th>Mounting type</th>
<th>Flush</th>
<th>Non-flush</th>
</tr>
</thead>
<tbody>
<tr>
<td>Size</td>
<td>M12</td>
<td>M18</td>
</tr>
<tr>
<td>Switching output</td>
<td>Contactless, 2-wire</td>
<td>Contactless, 2-wire</td>
</tr>
<tr>
<td>Switching element function</td>
<td>N/O contact</td>
<td>N/O contact</td>
</tr>
<tr>
<td>Rated operating distance</td>
<td>[mm]</td>
<td>2</td>
</tr>
<tr>
<td>Assured switching distance</td>
<td>[mm]</td>
<td>1.62</td>
</tr>
</tbody>
</table>

#### Reduction factors

<table>
<thead>
<tr>
<th>Material</th>
<th>Aluminium</th>
<th>Stainless steel St 18/8</th>
<th>Copper</th>
<th>Brass</th>
<th>Steel St 37</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reduction factors</td>
<td>0.5</td>
<td>0.9</td>
<td>0.4</td>
<td>0.6</td>
<td>1.0</td>
</tr>
</tbody>
</table>

#### Hysteresis

| Hysteresis | [mm] | 0.02 ... 0.44 | 0.04 ... 1.15 | 0.05 ... 2.2 | 0.03 ... 0.88 | 0.03 ... 1.9 | 0.04 ... 3.3 |

#### Max. switching frequency AC

| Frequency | [Hz] | 25 | 25 |

#### Max. switching frequency DC

| Frequency | [Hz] | 1,200 | 490 | 200 | 900 | 340 | 220 |

#### Max. output current

| Current | [mA] | 200 | 300 | 300 | 200 | 300 | 300 |

#### Minimum load current

| Current | [mA] | 5 |

#### Voltage drop

| Voltage drop | [V] | ≤ 8 |

1) If the component is subject to restrictions on usage in residential, office or commercial environments or small businesses, further measures to reduce the emitted interference may be necessary.
## Proximity sensors SIED, inductive

**Technical data – Standard switching distance, for DC and AC voltage**

### Output, additional data

| Protection against short circuit | No |

### Electronic components

| Operating voltage range AC [V AC] | 20 ... 265 |
| Operating voltage range DC [V DC] | 20 ... 320 |
| Idle current [mA] | ≤ 1.5 |
| Reverse polarity protection | For all electrical connections |

### Electromechanical components

| Electrical connection | Cable, 2-wire | Plug, M12x1, 2-pin |
| Cable length [m] | 2.5 |
| Cable sheath material | PUR |
| Insulating sheath material | PVC |

### Mechanical components

<table>
<thead>
<tr>
<th>Size</th>
<th>M12</th>
<th>M18</th>
<th>M30</th>
</tr>
</thead>
<tbody>
<tr>
<td>Electrical connection</td>
<td>Cable</td>
<td>Plug</td>
<td>Cable</td>
</tr>
<tr>
<td>Attachment type</td>
<td>Via lock nut</td>
<td>Via lock nut</td>
<td>Via lock nut</td>
</tr>
<tr>
<td>Mounting type</td>
<td>Flush</td>
<td>Flush</td>
<td>Flush</td>
</tr>
<tr>
<td>Mounting type</td>
<td>Non-flush</td>
<td>Non-flush</td>
<td>Non-flush</td>
</tr>
<tr>
<td>Tightening torque [Nm]</td>
<td>10</td>
<td>20</td>
<td>40</td>
</tr>
<tr>
<td>Product weight [g]</td>
<td>90</td>
<td>20</td>
<td>110</td>
</tr>
<tr>
<td>Housing materials</td>
<td>Nickel-plated brass, PA</td>
<td>Nickel-plated brass, PA</td>
<td>Nickel-plated brass, PA</td>
</tr>
</tbody>
</table>

### Display/operation

| Switching status display | Yellow LED |

### Immissions/emissions

| Electrical connection | Cable | Plug |
| Ambient temperature with flexible cable installation [°C] | −5 ... +50 | – |
| Protection class | IP67 | IP67 |
| Corrosion resistance class CRC | 1 | 1 |

1) Corrosion resistance class 1 according to Festo standard 940 070

Components subject to low corrosion stress. Transport and storage protection. Parts that do not have primarily decorative surface requirements, e.g. in internal areas that are not visible or behind covers.

### Pin allocation to EN 60947-5-2

#### M12x1, 2-pin

<table>
<thead>
<tr>
<th>N/O contact</th>
<th>Pin</th>
<th>Wire colour</th>
<th>Allocation</th>
</tr>
</thead>
<tbody>
<tr>
<td>N/C contact</td>
<td>M12x1</td>
<td>Pin</td>
<td>Wire colour</td>
</tr>
<tr>
<td>3</td>
<td>Black</td>
<td><em>/+/</em></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Black</td>
<td><em>/+/</em></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Black</td>
<td><em>/+/</em></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Black</td>
<td><em>/+/</em></td>
<td></td>
</tr>
</tbody>
</table>

---

Components subject to low corrosion stress. Transport and storage protection. Parts that do not have primarily decorative surface requirements, e.g. in internal areas that are not visible or behind covers.
### Proximity sensors SIED, inductive

**Technical data – Standard switching distance, for DC and AC voltage**

#### Dimensions – M12

**Flush fitting**

<table>
<thead>
<tr>
<th>1</th>
<th>Connecting cable</th>
<th>2</th>
<th>Active surface</th>
<th>3</th>
<th>LED</th>
</tr>
</thead>
</table>

**Non-flush fitting**

<table>
<thead>
<tr>
<th>1</th>
<th>Connecting cable</th>
<th>2</th>
<th>Active surface</th>
<th>3</th>
<th>LED</th>
</tr>
</thead>
</table>

#### Dimensions – M18

**Flush fitting**

<table>
<thead>
<tr>
<th>1</th>
<th>Connecting cable</th>
<th>2</th>
<th>Active surface</th>
<th>3</th>
<th>LED</th>
</tr>
</thead>
</table>

**Non-flush fitting**

<table>
<thead>
<tr>
<th>1</th>
<th>Connecting cable</th>
<th>2</th>
<th>Active surface</th>
<th>3</th>
<th>LED</th>
</tr>
</thead>
</table>
Proximity sensors SIED, inductive

Dimensions – M30

<table>
<thead>
<tr>
<th>Size</th>
<th>B1</th>
<th>B2</th>
<th>H</th>
</tr>
</thead>
<tbody>
<tr>
<td>M12</td>
<td>6</td>
<td>12</td>
<td>6</td>
</tr>
<tr>
<td>M18</td>
<td>11</td>
<td>30</td>
<td>10</td>
</tr>
<tr>
<td>M30</td>
<td>25</td>
<td>37</td>
<td>16</td>
</tr>
</tbody>
</table>

Fitting instructions

<table>
<thead>
<tr>
<th>Size</th>
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<th>B2</th>
<th>H1</th>
<th>H2</th>
</tr>
</thead>
<tbody>
<tr>
<td>M12</td>
<td>15</td>
<td>27</td>
<td>8</td>
<td>8</td>
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<tr>
<td>M18</td>
<td>20</td>
<td>50</td>
<td>15</td>
<td>15</td>
</tr>
<tr>
<td>M30</td>
<td>30</td>
<td>80</td>
<td>15</td>
<td>25</td>
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Ordering data

<table>
<thead>
<tr>
<th>Size</th>
<th>Sₚ [mm]</th>
<th>Mounting type</th>
<th>Switching output</th>
<th>Switching element function</th>
<th>Electrical connection</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Cable</td>
</tr>
<tr>
<td>M12</td>
<td>2.0</td>
<td>Flush</td>
<td>Contactless, 2-wire</td>
<td>N/O contact</td>
<td>538272 SIED-M12B-ZS-K-L</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Plug</td>
</tr>
<tr>
<td>M18</td>
<td>5.0</td>
<td>Flush</td>
<td>Contactless, 2-wire</td>
<td>N/O contact</td>
<td>538268 SIED-M12NB-ZS-K-L</td>
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<tr>
<td></td>
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<td></td>
<td></td>
<td></td>
<td>Plug</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Part No. Type</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Plug</td>
</tr>
<tr>
<td></td>
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<td></td>
<td>538281 SIED-M18B-ZO-S-L</td>
</tr>
<tr>
<td>M30</td>
<td>8.0</td>
<td>Non-flush</td>
<td>Contactless, 2-wire</td>
<td>N/O contact</td>
<td>538276 SIED-M18NB-ZS-K-L</td>
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<tr>
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<td></td>
<td>Plug</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>538278 SIED-M18NB-ZO-K-L</td>
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</table>
### Proximity sensors SIED, inductive

**Technical data – Standard switching distance, for DC and AC voltage**

<table>
<thead>
<tr>
<th>Size</th>
<th>Sn</th>
<th>Mounting type</th>
<th>Switching output</th>
<th>Switching element function</th>
<th>Electrical connection</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>mm</td>
<td></td>
<td></td>
<td></td>
<td>Cable</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Part No.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Part No.</td>
</tr>
<tr>
<td>10.0</td>
<td>1)</td>
<td>Flush</td>
<td>2-wire, contactless</td>
<td>N/O contact</td>
<td>538288</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>538290</td>
</tr>
<tr>
<td>15.0</td>
<td>1)</td>
<td>Non-flush</td>
<td>2-wire, contactless</td>
<td>N/O contact</td>
<td>538284</td>
</tr>
</tbody>
</table>

1) Sn: Rated operating distance [mm]
## Proximity sensors SIED-...-PA, inductive

**Technical data – Standard switching distance, polyamide housing, for DC and AC voltage**

### General technical data

<table>
<thead>
<tr>
<th>Design</th>
<th>Round</th>
</tr>
</thead>
<tbody>
<tr>
<td>Conforms to</td>
<td>EN 60947-5-2</td>
</tr>
<tr>
<td>Certification</td>
<td>cULus listed (UL)</td>
</tr>
<tr>
<td>CE mark (see declaration of conformity)</td>
<td>To EU EMC Directive(^1)</td>
</tr>
<tr>
<td>Note on materials</td>
<td>Free of copper and PTFE</td>
</tr>
</tbody>
</table>

\(^1\) For information about the applicability of the component see the manufacturer’s EC declaration of conformity at: [www.festo.com](http://www.festo.com/barb4right)

### Input signal/measuring element

| Ambient temperature [°C] | –25 ... +70 |

### Output, general

<table>
<thead>
<tr>
<th>Mounting type</th>
<th>Flush</th>
<th>Non-flush</th>
</tr>
</thead>
<tbody>
<tr>
<td>Size</td>
<td>M12</td>
<td>M18</td>
</tr>
<tr>
<td>Repetition accuracy [mm]</td>
<td>0.04</td>
<td>0.1</td>
</tr>
</tbody>
</table>

### Switching output

<table>
<thead>
<tr>
<th>Mounting type</th>
<th>Flush</th>
<th>Non-flush</th>
</tr>
</thead>
<tbody>
<tr>
<td>Size</td>
<td>M12</td>
<td>M18</td>
</tr>
<tr>
<td>Switching output</td>
<td>Contactless, 2-wire</td>
<td>Contactless, 2-wire</td>
</tr>
<tr>
<td>Switching element function</td>
<td>N/O contact</td>
<td>N/O contact</td>
</tr>
<tr>
<td>Rated operating distance [mm]</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Assured switching distance [mm]</td>
<td>1.62</td>
<td>4.05</td>
</tr>
</tbody>
</table>

### Reduction factors

<table>
<thead>
<tr>
<th>Material</th>
<th>Aluminium</th>
<th>Stainless steel St 18/8</th>
<th>Copper</th>
<th>Brass</th>
<th>Steel St 37</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reduction factors</td>
<td>0.35 ... 0.5</td>
<td>0.06 ... 0.1</td>
<td>0.25 ... 0.45</td>
<td>0.35 ... 0.5</td>
<td>1.0</td>
</tr>
</tbody>
</table>

### Hysteresis

| [mm] | 0.06 ... 0.3 | 0.15 ... 0.75 | 0.3 ... 1.5 | 0.12 ... 0.6 | 0.24 ... 1.2 | 0.45 ... 2.25 |

### Output, additional data

| Protection against short circuit | No |

\[\text{www.festo.com/catalogue/...}\]
Proximity sensors SIED-...-PA, inductive

Technical data – Standard switching distance, polyamide housing, for DC and AC voltage

### Electronic components

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating voltage range AC [V AC]</td>
<td>20 ... 250</td>
</tr>
<tr>
<td>Operating voltage range DC [V DC]</td>
<td>10 ... 300</td>
</tr>
<tr>
<td>Idle current [mA]</td>
<td>≦ 1.5</td>
</tr>
<tr>
<td>Reverse polarity protection</td>
<td>For all electrical connections</td>
</tr>
</tbody>
</table>

### Electromechanical components

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Electrical connection</td>
<td>Cable, 2-wire</td>
</tr>
<tr>
<td>Cable length [m]</td>
<td>2.5</td>
</tr>
<tr>
<td>Cable sheath material</td>
<td>PVC</td>
</tr>
<tr>
<td>Insulating sheath material</td>
<td>PVC</td>
</tr>
</tbody>
</table>

### Mechanical components

<table>
<thead>
<tr>
<th>Parameter</th>
<th>M12</th>
<th>M18</th>
<th>M30</th>
</tr>
</thead>
<tbody>
<tr>
<td>Size</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Attachment type</td>
<td>Via lock nut</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mounting type</td>
<td>Flush</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tightening torque [Nm]</td>
<td>1</td>
<td>2</td>
<td>5</td>
</tr>
<tr>
<td>Product weight [g]</td>
<td>109</td>
<td>123</td>
<td>175</td>
</tr>
<tr>
<td>Housing material</td>
<td>PA-reinforced</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Display/operation

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Switching status display</td>
<td>Yellow LED</td>
</tr>
</tbody>
</table>

### Immissions/emissions

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ambient temperature with flexible cable installation [°C]</td>
<td>0 ... +70</td>
</tr>
<tr>
<td>Protection class</td>
<td>IP65, IP67</td>
</tr>
<tr>
<td>Corrosion resistance class CRC 1)</td>
<td>4</td>
</tr>
</tbody>
</table>

1) Corrosion resistance class 4 according to Festo standard 940 070

Components subject to particularly high corrosion stress. Parts used with aggressive media, e.g. in the food or chemical industry. These applications should be supported with special tests with the media if required.

### Dimensions

**Download CAD data** → www.festo.com/en/engineering

![Dimensions diagram](diagram.png)

<table>
<thead>
<tr>
<th>Parameter</th>
<th>M12</th>
<th>M18</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Connecting cable</td>
<td>2</td>
</tr>
</tbody>
</table>

---

**Download CAD data** → www.festo.com/en/engineering
Proximity sensors SIED-...-PA, inductive

**Technical data – Standard switching distance, polyamide housing, for DC and AC voltage**

### Dimensions

**M30**

<table>
<thead>
<tr>
<th></th>
<th>B1</th>
<th>B2</th>
<th>H</th>
</tr>
</thead>
<tbody>
<tr>
<td>M12</td>
<td>18</td>
<td>24</td>
<td>6</td>
</tr>
<tr>
<td>M18</td>
<td>27</td>
<td>36</td>
<td>15</td>
</tr>
<tr>
<td>M30</td>
<td>45</td>
<td>60</td>
<td>30</td>
</tr>
</tbody>
</table>

### Fitting instructions

#### Flush fitting

1. Connecting cable
2. Active surface
3. LED

#### Non-flush fitting

1. Active surface
2. Metal-free zone

### Size

<table>
<thead>
<tr>
<th></th>
<th>B1</th>
<th>B2</th>
<th>H1</th>
<th>H2</th>
</tr>
</thead>
<tbody>
<tr>
<td>M12</td>
<td>18</td>
<td>36</td>
<td>8</td>
<td>12</td>
</tr>
<tr>
<td>M18</td>
<td>27</td>
<td>54</td>
<td>16</td>
<td>24</td>
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<tr>
<td>M30</td>
<td>45</td>
<td>90</td>
<td>30</td>
<td>45</td>
</tr>
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</table>

### Ordering data

<table>
<thead>
<tr>
<th>Size</th>
<th>s(n)</th>
<th>Mounting type</th>
<th>Switching output</th>
<th>Switching element function</th>
<th>Electrical connection</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Part No.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Type</td>
</tr>
<tr>
<td>M12</td>
<td>2.0</td>
<td>Flush</td>
<td>Contactless, 2-wire</td>
<td>N/O contact</td>
<td>538336 SIED-M12B-ZS-K-L-PA</td>
</tr>
<tr>
<td></td>
<td>4.0</td>
<td>Non-Flush</td>
<td></td>
<td></td>
<td>538335 SIED-M12NB-ZS-K-L-PA</td>
</tr>
<tr>
<td>M18</td>
<td>5.0</td>
<td>Flush</td>
<td>Contactless, 2-wire</td>
<td>N/O contact</td>
<td>538338 SIED-M18B-ZS-K-L-PA</td>
</tr>
<tr>
<td></td>
<td>8.0</td>
<td>Non-Flush</td>
<td></td>
<td></td>
<td>538337 SIED-M18NB-ZS-K-L-PA</td>
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<tr>
<td>M30</td>
<td>10.0</td>
<td>Flush</td>
<td>Contactless, 2-wire</td>
<td>N/O contact</td>
<td>538340 SIED-M30B-ZS-K-L-PA</td>
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<tr>
<td></td>
<td>15.0</td>
<td>Non-Flush</td>
<td></td>
<td></td>
<td>538339 SIED-M30NB-ZS-K-L-PA</td>
</tr>
</tbody>
</table>

1) s(n) Rated operating distance [mm]
Proximity sensors SIES, inductive

Function 1)

1) e.g. antivalent with PNP output and terminals

- Standard switching distance
- For DC voltage
- Block-shaped design

General technical data

| Conforms to | EN 60947-5-2 |
| Certification | cULus listed (UL) |
| CE mark (see declaration of conformity) | To EU EMC Directive 1) |
| Note on materials | Free of copper and PTFE |

1) For information about the applicability of the component see the manufacturer’s EC declaration of conformity at: www.festo.com

If the component is subject to restrictions on usage in residential, office or commercial environments or small businesses, further measures to reduce the emitted interference may be necessary.

Input signal/measuring element

| Type | SIES-Q5 | SIES-Q8 | SIES-V3 | SIES-QB | SIES-Q40 |
| Size [mm] | 5x5x25 | 8x8x40 | 15x20x30 | 12x26x40 | 40x40x120 |
| Ambient temperature [°C] | –25 ... +70 | –25 ... +85 |

Output, general

| Type | SIES-Q5 | SIES-Q8 | SIES-V3 | SIES-QB | SIES-Q40 |
| Size [mm] | 5x5x25 | 8x8x40 | 15x20x30 | 12x26x40 | 40x40x120 |
| Repetition accuracy [mm] | 0.04 | 0.075 | 0.1 | 0.1 | 0.75 |

Switching output

| Type | SIES-Q5 | SIES-Q8 | SIES-V3 | SIES-QB | SIES-Q40 |
| Size [mm] | 5x5x25 | 8x8x40 | 15x20x30 | 12x26x40 | 40x40x120 |
| Switching output | PNP | PNP | | NPN | PNP |
| Switching element function | N/O contact | N/O contact | Antivalent | – | N/C contact |
| Rated operating distance [mm] | 0.8 | 1.5 | 2 | 15 |
| Assured switching distance [mm] | 0.64 | 1.2 | 1.6 | 12.2 |

Reduction factors

| Material | Aluminium | Stainless steel St 18/8 | Copper | Brass | Steel St 37 |
| | | | | | |
| | 0.4 | 0.65 | 0.3 | 0.3 | 0.3 |
| | 0.7 | 0.8 | 0.7 | 0.8 | 0.7 |
| | 0.3 | 0.2 | 0.3 | 0.35 | 0.25 |
| | 0.4 | 0.5 | 0.5 | 0.3 | 0.3 |
| | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 |

| Max. switching frequency DC [Hz] | 3,000 | 1,500 | 1,200 | 100 |
| Max. output current [mA] | 200 | – | – | – |
| Max. output current at ≤ 50 °C [mA] | – | 200 | 200 |
| Max. output current at ≤ 85 °C [mA] | – | 150 | 150 |
| Voltage drop [V] | – | ≤ 1.8 | ≤ 1.8 |
## Proximity sensors SIES, inductive

### Technical data – Standard switching distance, special design

#### Output, additional data

| Protection against short circuit | Pulsed |

#### Electronic components

<table>
<thead>
<tr>
<th>Type</th>
<th>SIES-Q5</th>
<th>SIES-Q8</th>
<th>SIES-V3</th>
<th>SIES-QB</th>
<th>SIES-Q40</th>
</tr>
</thead>
<tbody>
<tr>
<td>Size</td>
<td>[mm]</td>
<td>5x5x25</td>
<td>8x8x40</td>
<td>15x20x30</td>
<td>12x26x40</td>
</tr>
<tr>
<td>Operating voltage range</td>
<td>[V DC]</td>
<td>10 ... 30</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Residual ripple</td>
<td>[%]</td>
<td>10</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Idle current</td>
<td>[mA]</td>
<td>≤ 10</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reverse polarity protection</td>
<td>For all electrical connections</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### Electromechanical components

<table>
<thead>
<tr>
<th>Type</th>
<th>SIES-Q5</th>
<th>SIES-Q8</th>
<th>SIES-V3</th>
<th>SIES-QB</th>
<th>SIES-Q40</th>
</tr>
</thead>
<tbody>
<tr>
<td>Size</td>
<td>[mm]</td>
<td>5x5x25</td>
<td>8x8x40</td>
<td>12x26x40</td>
<td>8x8x40</td>
</tr>
<tr>
<td>Size</td>
<td>[mm]</td>
<td>15x20x30</td>
<td>12x26x40</td>
<td>40x40x120</td>
<td></td>
</tr>
<tr>
<td>Electrical connection</td>
<td>Cable, 3-wire</td>
<td>Plug, M8x1, 3-pin</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cable length</td>
<td>[m]</td>
<td>2.5</td>
<td>–</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cable sheath material</td>
<td>PUR</td>
<td>–</td>
<td></td>
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</table>

#### Mechanical components

<table>
<thead>
<tr>
<th>Type</th>
<th>SIES-Q5</th>
<th>SIES-Q8</th>
<th>SIES-V3</th>
<th>SIES-QB</th>
<th>SIES-Q40</th>
</tr>
</thead>
<tbody>
<tr>
<td>Size</td>
<td>[mm]</td>
<td>5x5x25</td>
<td>8x8x40</td>
<td>15x20x30</td>
<td>12x26x40</td>
</tr>
<tr>
<td>Size</td>
<td>[mm]</td>
<td>40x40x120</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Attachment type</td>
<td>Via female thread</td>
<td>Via through-hole</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mounting type</td>
<td>Flush</td>
<td>Flush</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Product weight</td>
<td>[g]</td>
<td>22</td>
<td>15</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Housing material</td>
<td>Nickel-plated brass</td>
<td>Die-cast zinc</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>PBT-reinforced</td>
<td>PBT</td>
<td></td>
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</table>

#### Display/operation

<table>
<thead>
<tr>
<th>Type</th>
<th>SIES-Q5</th>
<th>SIES-Q8</th>
<th>SIES-V3</th>
<th>SIES-QB</th>
<th>SIES-Q40</th>
</tr>
</thead>
<tbody>
<tr>
<td>Size</td>
<td>[mm]</td>
<td>5x5x25</td>
<td>8x8x40</td>
<td>15x20x30</td>
<td>12x26x40</td>
</tr>
<tr>
<td>Size</td>
<td>[mm]</td>
<td>40x40x120</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ready status display</td>
<td>–</td>
<td>Green LED</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Switching status display</td>
<td>Yellow LED</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### Immissions/emissions

<table>
<thead>
<tr>
<th>Type</th>
<th>SIES-Q5</th>
<th>SIES-Q8</th>
<th>SIES-V3</th>
<th>SIES-QB</th>
<th>SIES-Q40</th>
</tr>
</thead>
<tbody>
<tr>
<td>Size</td>
<td>[mm]</td>
<td>5x5x25</td>
<td>8x8x40</td>
<td>15x20x30</td>
<td>12x26x40</td>
</tr>
<tr>
<td>Size</td>
<td>[mm]</td>
<td>40x40x120</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Protection class</td>
<td>IP67</td>
<td>IP65</td>
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</tr>
</tbody>
</table>

#### Pin allocation to EN 60947-5-2

| M8x1, 3-pin |
| N/O contact and N/C contact |

<table>
<thead>
<tr>
<th>Pin</th>
<th>Wire colour</th>
<th>Allocation</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Brown</td>
<td>+</td>
</tr>
<tr>
<td>2</td>
<td></td>
<td>–</td>
</tr>
<tr>
<td>3</td>
<td>Blue</td>
<td>–</td>
</tr>
<tr>
<td>4</td>
<td>Black</td>
<td>Output</td>
</tr>
</tbody>
</table>

---

**Sensors > Inductive sensors**

**Proximity sensors SIES, inductive**

**Technical data – Standard switching distance, special design**

Festo

![Image](https://www.festo.com/catalogue/...)

2012/08 – Subject to change – Sensors / Vision systems
**Proximity sensors SIES, inductive**

Technical data – Standard switching distance, special design

### Dimensions

<table>
<thead>
<tr>
<th>SIES-Q5B</th>
<th>SIES-Q8B</th>
<th>Plug</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Cable</strong></td>
<td><strong>Cable</strong></td>
<td><strong>Plug</strong></td>
</tr>
<tr>
<td><img src="image1" alt="Cable Image" /></td>
<td><img src="image2" alt="Cable Image" /></td>
<td><img src="image3" alt="Plug Image" /></td>
</tr>
</tbody>
</table>

1. Connecting cable  
2. Active surface  
3. LED  
4. 4x LED

### Dimensions

<table>
<thead>
<tr>
<th>SIES-V3B</th>
<th>SIES-QB</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Plug</strong></td>
<td><strong>Cable</strong></td>
</tr>
<tr>
<td><img src="image4" alt="Plug Image" /></td>
<td><img src="image5" alt="Cable Image" /></td>
</tr>
</tbody>
</table>

1. Connecting cable  
2. Active surface  
3. LED  
4. Sensor centre

### Dimensions

<table>
<thead>
<tr>
<th>SIES-Q40B</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Plug</strong></td>
</tr>
<tr>
<td><img src="image6" alt="Plug Image" /></td>
</tr>
</tbody>
</table>

2. Supplied with active surface facing forward: sensor head can be adjusted to any one of 5 response directions

### Fitting instructions

**Flush fitting**

<table>
<thead>
<tr>
<th>Size</th>
<th>B1</th>
<th>B2</th>
<th>H</th>
</tr>
</thead>
<tbody>
<tr>
<td>5x5x25</td>
<td>2.5</td>
<td>5</td>
<td>2</td>
</tr>
<tr>
<td>8x8x40</td>
<td>4</td>
<td>12</td>
<td>3</td>
</tr>
<tr>
<td>15x20x30</td>
<td>6</td>
<td>12</td>
<td>5</td>
</tr>
<tr>
<td>12x26x40</td>
<td>6</td>
<td>12</td>
<td>5</td>
</tr>
<tr>
<td>40x40x120</td>
<td>25</td>
<td>75</td>
<td>30</td>
</tr>
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</table>

### Ordering data

<table>
<thead>
<tr>
<th>Size</th>
<th>S₁</th>
<th>Mounting type</th>
<th>Switching type</th>
<th>Switching output</th>
<th>Switching element function</th>
<th>Electrical connection</th>
<th>Part No.</th>
<th>Type</th>
<th>Part No.</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>5x5x25</td>
<td>0.8</td>
<td>Flush</td>
<td>PNP</td>
<td>N/O contact</td>
<td>–</td>
<td>–</td>
<td>178291</td>
<td>SIES-Q5B-PS-K-L</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td></td>
<td>1.5</td>
<td>Flush</td>
<td>PNP</td>
<td>N/O contact</td>
<td>–</td>
<td>–</td>
<td>178294</td>
<td>SIES-Q5B-PS-S-L</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td></td>
<td>2.0</td>
<td>Flush</td>
<td>PNP</td>
<td>N/O contact</td>
<td>–</td>
<td>–</td>
<td>178292</td>
<td>SIES-Q5B-NS-K-L</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td></td>
<td>2.0</td>
<td>Flush</td>
<td>NPN</td>
<td>N/O contact</td>
<td>–</td>
<td>150491</td>
<td>SIES-V3B-PS-S-L</td>
<td>150490</td>
<td>SIES-V3B-NS-S-L</td>
<td></td>
</tr>
<tr>
<td>15x20x30</td>
<td>2.5</td>
<td>Flush</td>
<td>PNP</td>
<td>N/O contact</td>
<td>–</td>
<td>150488</td>
<td>SIES-QB-PS-K-L</td>
<td>150489</td>
<td>SIES-QB-PO-K-L</td>
<td></td>
</tr>
</tbody>
</table>

1)  Sn Rated operating distance [mm]
2) Electrical connection via screw terminals
Sensors > Inductive sensors

Proximity sensors SIEH, inductive

Technical data – Increased switching distance

Function¹)

- Increased switching distance
- For DC voltage
- Round design

¹) e.g. N/O contact with PNP output and cable

General technical data

<table>
<thead>
<tr>
<th>Size</th>
<th>3 mm</th>
<th>M12</th>
<th>M18</th>
</tr>
</thead>
<tbody>
<tr>
<td>Design</td>
<td>Round</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>Conforms to</td>
<td>EN 60947-5-2</td>
<td>EN 60947-5-2</td>
<td>EN 60947-5-2</td>
</tr>
<tr>
<td>Certification</td>
<td>cULus listed (UL)</td>
<td>cULus listed (UL)</td>
<td>cULus listed (UL)</td>
</tr>
<tr>
<td>CE mark (see declaration of conformity)</td>
<td>To EU EMC Directive¹)</td>
<td>To EU EMC Directive¹)</td>
<td>To EU EMC Directive¹)</td>
</tr>
<tr>
<td>Note on materials</td>
<td>Free of copper and PTFE</td>
<td>Free of copper and PTFE</td>
<td>Free of copper and PTFE</td>
</tr>
<tr>
<td></td>
<td>–</td>
<td>–</td>
<td>RoHS-compliant</td>
</tr>
<tr>
<td></td>
<td>–</td>
<td>–</td>
<td>Contains PWIS (paint-wetting impairment substances)</td>
</tr>
<tr>
<td></td>
<td>–</td>
<td>–</td>
<td>Contains PWIS (paint-wetting impairment substances)</td>
</tr>
</tbody>
</table>

¹) For information about the applicability of the component see the manufacturer’s EC declaration of conformity at: www.festo.com

Input signal/measuring element

<table>
<thead>
<tr>
<th>Size</th>
<th>3 mm</th>
<th>M12</th>
<th>M18</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ambient temperature</td>
<td>[°C]</td>
<td>–25…+70</td>
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</tr>
</tbody>
</table>

Output, general

<table>
<thead>
<tr>
<th>Size</th>
<th>3 mm</th>
<th>M12</th>
<th>M18</th>
</tr>
</thead>
<tbody>
<tr>
<td>Repetition accuracy</td>
<td>[mm]</td>
<td>0.02</td>
<td>–</td>
</tr>
<tr>
<td>Repetition accuracy under constant conditions</td>
<td>[mm]</td>
<td>–</td>
<td>0.2</td>
</tr>
</tbody>
</table>

Switching output

<table>
<thead>
<tr>
<th>Size</th>
<th>3 mm</th>
<th>M12</th>
<th>M18</th>
</tr>
</thead>
<tbody>
<tr>
<td>Switching output</td>
<td>PNP</td>
<td>PNP</td>
<td>PNP</td>
</tr>
<tr>
<td></td>
<td>NPN</td>
<td>NPN</td>
<td>NPN</td>
</tr>
<tr>
<td>Switching element function</td>
<td>N/O contact</td>
<td>N/O contact</td>
<td>N/O contact</td>
</tr>
<tr>
<td></td>
<td>–</td>
<td>N/C contact</td>
<td>N/C contact</td>
</tr>
<tr>
<td>Rated operating distance</td>
<td>[mm]</td>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td>Assured switching distance</td>
<td>[mm]</td>
<td>0.81</td>
<td>3.24</td>
</tr>
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</table>

Reduction factors

<table>
<thead>
<tr>
<th>Material</th>
<th>Aluminium</th>
<th>Stainless steel St 18/8</th>
<th>Copper</th>
<th>Brass</th>
<th>Steel St 37</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0.5</td>
<td>0.8</td>
<td>0.45</td>
<td>0.6</td>
<td>1.0</td>
</tr>
<tr>
<td>Hysteresis</td>
<td>≤ 0.12</td>
<td>≤ 0.36</td>
<td>≤ 0.88</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Switch-on time</td>
<td>[ms]</td>
<td>0.02</td>
<td>–</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Max. switching frequency</td>
<td>[Hz]</td>
<td>3,000</td>
<td>2,500</td>
<td>1,500</td>
<td></td>
</tr>
<tr>
<td>Max. output current</td>
<td>[mA]</td>
<td>100</td>
<td>200</td>
<td>200</td>
<td></td>
</tr>
<tr>
<td>Voltage drop</td>
<td>[V]</td>
<td>0…2</td>
<td>–</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### Proximity sensors SIEH, inductive

#### Technical data – Increased switching distance

**Output, additional data**

<table>
<thead>
<tr>
<th></th>
<th>3 mm</th>
<th>M12</th>
<th>M18</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Size</strong></td>
<td>3 mm</td>
<td>M12</td>
<td>M18</td>
</tr>
<tr>
<td><strong>Protection against short circuit</strong></td>
<td>Pulsed</td>
<td>Pulsed</td>
<td>Pulsed</td>
</tr>
<tr>
<td><strong>Inductive protective circuit</strong></td>
<td>Integrated</td>
<td>Integrated</td>
<td>–</td>
</tr>
<tr>
<td><strong>Output current</strong></td>
<td>&lt;100 mA</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td><strong>Switching frequency</strong></td>
<td>&lt;10 Hz</td>
<td>–</td>
<td>–</td>
</tr>
</tbody>
</table>

**Electronic components**

<table>
<thead>
<tr>
<th></th>
<th>3 mm</th>
<th>M12</th>
<th>M18</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Size</strong></td>
<td>3 mm</td>
<td>M12</td>
<td>M18</td>
</tr>
<tr>
<td><strong>Operating voltage range</strong></td>
<td>[V DC]</td>
<td>10 ... 30</td>
<td>–</td>
</tr>
<tr>
<td><strong>Residual ripple</strong></td>
<td>[%]</td>
<td>20</td>
<td>±10</td>
</tr>
<tr>
<td><strong>Idle current</strong></td>
<td>[mA]</td>
<td>0 ... 10</td>
<td>–</td>
</tr>
<tr>
<td><strong>Reverse polarity protection</strong></td>
<td>For all electrical connections</td>
<td>–</td>
<td>–</td>
</tr>
</tbody>
</table>

**Electromechanical components**

<table>
<thead>
<tr>
<th></th>
<th>3 mm</th>
<th>M12</th>
<th>M18</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Size</strong></td>
<td>3 mm</td>
<td>M12</td>
<td>M18</td>
</tr>
<tr>
<td><strong>Electrical connection</strong></td>
<td>Cable, 3-wire</td>
<td>Cable with plug, M8x1, 3-pin</td>
<td>Plug, M12x1, 3-pin</td>
</tr>
<tr>
<td><strong>Cable length</strong></td>
<td>[m]</td>
<td>2.5</td>
<td>0.15</td>
</tr>
<tr>
<td><strong>Cable sheath material</strong></td>
<td>PUR</td>
<td>PUR</td>
<td>–</td>
</tr>
<tr>
<td><strong>Insulating sheath material</strong></td>
<td>PVC</td>
<td>–</td>
<td>–</td>
</tr>
</tbody>
</table>

**Mechanical components**

<table>
<thead>
<tr>
<th></th>
<th>3 mm</th>
<th>M12</th>
<th>M18</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Size</strong></td>
<td>3 mm</td>
<td>M12</td>
<td>M18</td>
</tr>
<tr>
<td><strong>Attachment type</strong></td>
<td>Clamped</td>
<td>Via lock nut</td>
<td>Clamped</td>
</tr>
<tr>
<td><strong>Mounting type</strong></td>
<td>Flush</td>
<td>–</td>
<td>Flush</td>
</tr>
<tr>
<td><strong>Tightening torque</strong></td>
<td>[Nm]</td>
<td>–</td>
<td>20</td>
</tr>
<tr>
<td><strong>Product weight</strong></td>
<td>[g]</td>
<td>18</td>
<td>110</td>
</tr>
<tr>
<td><strong>Housing material</strong></td>
<td>High-alloy stainless steel</td>
<td>Nickel-plated brass</td>
<td>High-alloy stainless steel</td>
</tr>
<tr>
<td></td>
<td>PBTP</td>
<td>–</td>
<td>PBTP</td>
</tr>
</tbody>
</table>

**Display/operation**

<table>
<thead>
<tr>
<th></th>
<th>3 mm</th>
<th>M12</th>
<th>M18</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Switching status display</strong></td>
<td>Yellow LED</td>
<td>–</td>
<td>–</td>
</tr>
</tbody>
</table>

**Immissions/emissions**

<table>
<thead>
<tr>
<th></th>
<th>3 mm</th>
<th>M12</th>
<th>M18</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Ambient temperature with flexible cable installation</strong></td>
<td>–5 ... +70</td>
<td>–5 ... +70</td>
<td>–</td>
</tr>
<tr>
<td><strong>Protection class</strong></td>
<td>IP65</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td></td>
<td>IP67</td>
<td>–</td>
<td>IP67</td>
</tr>
<tr>
<td><strong>Surge strength</strong></td>
<td>[kV]</td>
<td>–</td>
<td>0.8</td>
</tr>
<tr>
<td><strong>Corrosion resistance class CRC[1]</strong></td>
<td>4</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td><strong>Degree of contamination</strong></td>
<td>–</td>
<td>3</td>
<td>–</td>
</tr>
</tbody>
</table>

---

1) Corrosion resistance class 1 according to Festo standard 940 070
Components subject to low corrosion stress. Transport and storage protection. Parts that do not have primarily decorative surface requirements, e.g. in internal areas that are not visible or behind covers.

2) Corrosion resistance class 2 according to Festo standard 940 070
Components subject to moderate corrosion stress. 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.

3) Corrosion resistance class 4 according to Festo standard 940 070
Components subject to particularly high corrosion stress. Parts used with aggressive media, e.g. in the food or chemical industry. These applications should be supported with special tests with the media if required.
Proximity sensors SIEH, inductive

Technical data – Increased switching distance

<table>
<thead>
<tr>
<th>Pin allocation to EN 60947-5-2</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>M8x1, 3-pin</strong></td>
</tr>
<tr>
<td><strong>N/O contact</strong></td>
</tr>
<tr>
<td>1</td>
</tr>
<tr>
<td>2</td>
</tr>
<tr>
<td>3</td>
</tr>
<tr>
<td>4</td>
</tr>
</tbody>
</table>

| **M12x1, 3-pin** |
| **N/O contact** | **Pin** | **Wire colour** | **Allocation** |
| 1 | Brown | + |
| 2 | | |
| 3 | Blue | – |
| 4 | Black | Output |

| **N/C contact** | **Pin** | **Wire colour** | **Allocation** |
| 1 | Brown | + |
| 2 | | |
| 3 | Blue | – |
| 2 | White | Output |

Dimensions – 3 mm

Download CAD data ➔ www.festo.com/en/engineering

Dimensions – M12

Download CAD data ➔ www.festo.com/en/engineering

Dimensions – M18

Download CAD data ➔ www.festo.com/en/engineering

Fitting instructions

Flush fitting

<table>
<thead>
<tr>
<th>Size</th>
<th>B1</th>
<th>B2</th>
<th>H</th>
</tr>
</thead>
<tbody>
<tr>
<td>3 mm</td>
<td>2.5</td>
<td>5</td>
<td>3</td>
</tr>
<tr>
<td>M12</td>
<td>10</td>
<td>24</td>
<td>12</td>
</tr>
<tr>
<td>M18</td>
<td>18</td>
<td>40</td>
<td>24</td>
</tr>
</tbody>
</table>
### Proximity sensors SIEH, inductive

#### Technical data – Increased switching distance

<table>
<thead>
<tr>
<th>Size</th>
<th>Sn, 1) [mm]</th>
<th>Mounting type</th>
<th>Switching output</th>
<th>Switching element function</th>
<th>Electrical connection</th>
<th>Cable</th>
<th>Plug</th>
</tr>
</thead>
<tbody>
<tr>
<td>3 mm</td>
<td>1.0</td>
<td>Flush</td>
<td>PNP</td>
<td>N/O contact</td>
<td>538264 – SIEH-3B-PS-K-L – 538263 – SIEH-3B-PS-S-L</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>PNP</td>
<td>N/O contact</td>
<td>538266 – SIEH-3B-NS-K-L – 538265 – SIEH-3B-NS-S-L</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>N/P contact</td>
<td></td>
<td>150452 – SIEH-M12B-NO-K-L – 150453 – SIEH-M12B-NO-S-L</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>N/C contact</td>
<td></td>
<td>150462 – SIEH-M18B-PO-K-L – 150463 – SIEH-M18B-PO-S-L</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>N/C contact</td>
<td></td>
<td>150460 – SIEH-M18B-NO-K-L – 150461 – SIEH-M18B-NO-S-L</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

1) Sn: Rated operating distance [mm]
Proximity sensors SIEH-...-CR, inductive

Technical data - Increased switching distance

**Function**¹

- Increased switching distance
- For DC voltage
- Round design
- Resistant to chemicals and mechanical stress

1) e.g. N/O contact with PNP output and cable

### General technical data

<table>
<thead>
<tr>
<th></th>
<th>M12</th>
<th>M18</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Switching output</strong></td>
<td>PNP</td>
<td>PNP</td>
</tr>
<tr>
<td><strong>Conforms to</strong></td>
<td>EN 60947-5-2</td>
<td>EN 60947-5-2</td>
</tr>
<tr>
<td><strong>Certification</strong></td>
<td>cULus listed (UL)</td>
<td>–</td>
</tr>
<tr>
<td><strong>CE mark (see declaration of conformity)</strong></td>
<td>To EU EMC Directive¹¹</td>
<td>To EU EMC Directive¹¹</td>
</tr>
<tr>
<td><strong>Note on materials</strong></td>
<td>Free of copper and PTFE</td>
<td>Free of copper and PTFE</td>
</tr>
</tbody>
</table>

¹ For information about the applicability of the component see the manufacturer’s EC declaration of conformity at: www.festo.com > Support > User documentation. If the component is subject to restrictions on usage in residential, office or commercial environments or small businesses, further measures to reduce the emitted interference may be necessary.

### Input signal/measuring element

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Ambient temperature</strong></td>
<td>[°C]</td>
</tr>
<tr>
<td>–25 ... +70</td>
<td></td>
</tr>
</tbody>
</table>

### Output, general

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Size</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Reproducibility, switching value FS [mm]</strong></td>
<td></td>
</tr>
<tr>
<td>M12</td>
<td>0.3</td>
</tr>
<tr>
<td>M18</td>
<td>0.5</td>
</tr>
</tbody>
</table>

### Switching output

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Size</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Switching output</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Switching output</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Switching output</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Switching element function</strong></td>
<td>N/O contact</td>
</tr>
<tr>
<td><strong>Rated operating distance [mm]</strong></td>
<td>6</td>
</tr>
<tr>
<td><strong>Assured switching distance [mm]</strong></td>
<td>4.86</td>
</tr>
</tbody>
</table>

### Reduction factors

<table>
<thead>
<tr>
<th></th>
<th>M12</th>
<th>M18</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Aluminium</strong></td>
<td>1.0</td>
<td>1.0</td>
</tr>
<tr>
<td><strong>Stainless steel, 1 mm thick</strong></td>
<td>0.65</td>
<td>0.4</td>
</tr>
<tr>
<td><strong>Stainless steel, 2 mm thick</strong></td>
<td>0.9</td>
<td>0.8</td>
</tr>
<tr>
<td><strong>Copper</strong></td>
<td>0.85</td>
<td>0.8</td>
</tr>
<tr>
<td><strong>Brass</strong></td>
<td>1.3</td>
<td>1.3</td>
</tr>
<tr>
<td><strong>Steel St 37</strong></td>
<td>1.0</td>
<td>1.0</td>
</tr>
<tr>
<td><strong>Hysteresis [mm]</strong></td>
<td>≤ 0.73</td>
<td>≤ 1.22</td>
</tr>
<tr>
<td><strong>Max. switching frequency [Hz]</strong></td>
<td>400</td>
<td>600</td>
</tr>
<tr>
<td><strong>Max. output current [mA]</strong></td>
<td>200</td>
<td>200</td>
</tr>
<tr>
<td><strong>Voltage drop [V]</strong></td>
<td>2</td>
<td>≤ 2</td>
</tr>
</tbody>
</table>
## Output, additional data

<table>
<thead>
<tr>
<th>Protection against short circuit</th>
<th>Pulsed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inductive protective circuit</td>
<td>Integrated</td>
</tr>
<tr>
<td>Output current &lt; 100 mA</td>
<td></td>
</tr>
<tr>
<td>and switching frequency &lt; 10 Hz</td>
<td></td>
</tr>
</tbody>
</table>

## Electronic components

<table>
<thead>
<tr>
<th>Switching output</th>
<th>PNP</th>
<th>NPN</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating voltage range [V DC]</td>
<td>10 ... 30</td>
<td>10 ... 30</td>
</tr>
<tr>
<td>Residual ripple [%]</td>
<td>20</td>
<td>20</td>
</tr>
<tr>
<td>Idle current [mA]</td>
<td>&lt; 12</td>
<td>≤ 17</td>
</tr>
<tr>
<td>Reverse polarity protection</td>
<td>For all electrical connections</td>
<td>For all electrical connections</td>
</tr>
</tbody>
</table>

## Electromechanical components

<table>
<thead>
<tr>
<th>Electrical connection</th>
<th>Cable</th>
<th>Plug</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cable sheath material</td>
<td>PUR</td>
<td></td>
</tr>
</tbody>
</table>

## Mechanical components

<table>
<thead>
<tr>
<th>Size</th>
<th>M12</th>
<th>M18</th>
</tr>
</thead>
<tbody>
<tr>
<td>Size</td>
<td>M12</td>
<td>M18</td>
</tr>
<tr>
<td>Attachment type</td>
<td>Via lock nut</td>
<td>Via lock nut</td>
</tr>
<tr>
<td>Mounting type</td>
<td>Flush</td>
<td>Flush</td>
</tr>
<tr>
<td>Product weight [g]</td>
<td>90</td>
<td>28</td>
</tr>
<tr>
<td>Housing material</td>
<td>High-alloy stainless steel</td>
<td>High-alloy stainless steel</td>
</tr>
</tbody>
</table>

## Display/operation

| Switching status display | Yellow LED |

## Immissions/emissions

<table>
<thead>
<tr>
<th>Size</th>
<th>M12</th>
<th>M18</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ambient temperature with flexible cable installation [°C]</td>
<td>-5 ... +70</td>
<td>-5 ... +70</td>
</tr>
<tr>
<td>Protection class</td>
<td>IP67</td>
<td>IP67</td>
</tr>
<tr>
<td>Protection class</td>
<td>IP69K</td>
<td>IP69K</td>
</tr>
<tr>
<td>Corrosion resistance class CRC</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td>Resistance to sensor fitting pressure [bar]</td>
<td>80</td>
<td>60</td>
</tr>
</tbody>
</table>

1) Corrosion resistance class 2 according to Festo standard 940 070
Components subject to moderate corrosion stress. 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.

Corrosion resistance class 4 according to Festo standard 940 070
Components subject to particularly high corrosion stress. Parts used with aggressive media, e.g. in the food or chemical industry. These applications should be supported with special tests with the media if required.

## Pin allocation to EN 60947-5-2

### M8x1, 3-pin

<table>
<thead>
<tr>
<th>N/O contact</th>
<th>Pin</th>
<th>Wire colour</th>
<th>Allocation</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1</td>
<td>Brown</td>
<td>+</td>
</tr>
<tr>
<td>3</td>
<td>3</td>
<td>Blue</td>
<td>–</td>
</tr>
<tr>
<td>4</td>
<td>4</td>
<td>Black</td>
<td>Output</td>
</tr>
</tbody>
</table>

### M12x1, 3-pin

<table>
<thead>
<tr>
<th>N/O contact</th>
<th>Pin</th>
<th>Wire colour</th>
<th>Allocation</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1</td>
<td>Brown</td>
<td>+</td>
</tr>
<tr>
<td>3</td>
<td>3</td>
<td>Blue</td>
<td>–</td>
</tr>
<tr>
<td>4</td>
<td>4</td>
<td>Black</td>
<td>Output</td>
</tr>
</tbody>
</table>

### N/C contact

<table>
<thead>
<tr>
<th>N/O contact</th>
<th>Pin</th>
<th>Wire colour</th>
<th>Allocation</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1</td>
<td>Brown</td>
<td>+</td>
</tr>
<tr>
<td>3</td>
<td>3</td>
<td>Blue</td>
<td>–</td>
</tr>
<tr>
<td>2</td>
<td>2</td>
<td>White</td>
<td>Output</td>
</tr>
</tbody>
</table>
Proximity sensors SIEH-...-CR, inductive

Technical data – Increased switching distance

**Dimensions – M12**

<table>
<thead>
<tr>
<th>Component</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Connecting cable</td>
</tr>
<tr>
<td>2</td>
<td>Active surface</td>
</tr>
<tr>
<td>3</td>
<td>LED</td>
</tr>
</tbody>
</table>

**Dimensions – M18**

<table>
<thead>
<tr>
<th>Component</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Connecting cable</td>
</tr>
<tr>
<td>2</td>
<td>Active surface</td>
</tr>
<tr>
<td>3</td>
<td>LED</td>
</tr>
</tbody>
</table>

**Fitting instructions**

**Flush fitting**

<table>
<thead>
<tr>
<th>Size</th>
<th>B1</th>
<th>B2</th>
<th>H</th>
</tr>
</thead>
<tbody>
<tr>
<td>M12</td>
<td>12</td>
<td>40</td>
<td>18</td>
</tr>
<tr>
<td>M18</td>
<td>25</td>
<td>60</td>
<td>30</td>
</tr>
</tbody>
</table>

**Ordering data**

<table>
<thead>
<tr>
<th>Size</th>
<th>S₁</th>
<th>Mounting type</th>
<th>Switching output</th>
<th>Switching element function</th>
<th>Electrical connection</th>
<th>Cable</th>
<th>Plug</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>NPN</td>
<td>N/O contact</td>
<td>538254 SIEH-M12B-NS-K-L-CR</td>
<td>538253 SIEH-M12B-NS-S-L-CR</td>
<td></td>
</tr>
<tr>
<td>M18</td>
<td>10.0</td>
<td>Flush</td>
<td>PNP</td>
<td>N/O contact</td>
<td>538256 SIEH-M18B-PS-K-L-CR</td>
<td>538255 SIEH-M18B-PS-S-L-CR</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>NPN</td>
<td>N/O contact</td>
<td>538258 SIEH-M18B-NS-K-L-CR</td>
<td>538257 SIEH-M18B-NS-S-L-CR</td>
<td></td>
</tr>
</tbody>
</table>

1) Sn Rated operating distance [mm]
**Proximity sensors SIEA, inductive**

**Technical data – Analogue output**

### General technical data

<table>
<thead>
<tr>
<th>Design</th>
<th>Round</th>
</tr>
</thead>
<tbody>
<tr>
<td>Certification</td>
<td>cULus listed (UL)</td>
</tr>
<tr>
<td></td>
<td>C-Tick</td>
</tr>
<tr>
<td>CE mark (see declaration of conformity)</td>
<td>To EU EMC Directive</td>
</tr>
<tr>
<td>Note on materials</td>
<td>Free of copper and PTFE</td>
</tr>
</tbody>
</table>

1) For information about the applicability of the component see the manufacturer's EC declaration of conformity at: www.festo.com

### Input signal/measuring element

<table>
<thead>
<tr>
<th>Size</th>
<th>M8</th>
<th>M12</th>
<th>M18</th>
<th>M30</th>
</tr>
</thead>
<tbody>
<tr>
<td>Position measuring range [mm]</td>
<td>0 … 4</td>
<td>0 … 6</td>
<td>0 … 10</td>
<td>0 … 20</td>
</tr>
<tr>
<td>Distance resolution [mm]</td>
<td>0.001</td>
<td>0.002</td>
<td>0.005</td>
<td></td>
</tr>
<tr>
<td>Temperature drift of real switching distance [%]</td>
<td>±10 (–25 … 0 °C)</td>
<td>±10</td>
<td></td>
<td></td>
</tr>
<tr>
<td>[%]</td>
<td>±5 (0 … 70 °C)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Output, general

<table>
<thead>
<tr>
<th>Size</th>
<th>M8</th>
<th>M12</th>
<th>M18</th>
<th>M30</th>
</tr>
</thead>
<tbody>
<tr>
<td>Repetition accuracy [mm]</td>
<td>0.3</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Repetition accuracy under constant conditions [mm]</td>
<td>±0.01</td>
<td>±0.02</td>
<td>±0.05</td>
<td></td>
</tr>
</tbody>
</table>

### Switching output

<table>
<thead>
<tr>
<th>Size</th>
<th>M8</th>
<th>M12</th>
<th>M18</th>
<th>M30</th>
</tr>
</thead>
<tbody>
<tr>
<td>Analogue output [V]</td>
<td>0 … 10</td>
<td>0 … 10</td>
<td>0 … 10</td>
<td>0 … 10</td>
</tr>
<tr>
<td>[mA]</td>
<td>–</td>
<td>4 … 20</td>
<td>4 … 20</td>
<td>4 … 20</td>
</tr>
<tr>
<td>Output voltage at 23 °C [V]</td>
<td>+10/+0.4 (s = 4 mm)</td>
<td>+10/+0.4 (s = 6 mm)</td>
<td>+10/+0.4 (s = 10 mm)</td>
<td>+10/+0.4 (s = 20 mm)</td>
</tr>
<tr>
<td>[V]</td>
<td>+5.2/+0.4 (s = 2 mm)</td>
<td>+5.2/+0.4 (s = 3 mm)</td>
<td>+5.2/+0.4 (s = 5 mm)</td>
<td>+5.2/+0.4 (s = 10 mm)</td>
</tr>
<tr>
<td>[V]</td>
<td>0/+0.4 (s = 0 mm)</td>
<td>0/+0.4 (s = 0 mm)</td>
<td>0/+0.4 (s = 0 mm)</td>
<td>0/+0.4 (s = 0 mm)</td>
</tr>
<tr>
<td>Output current at 23 °C [mA]</td>
<td>20/0.8 (s = 6 mm)</td>
<td>20/0.8 (s = 10 mm)</td>
<td>20/0.8 (s = 20 mm)</td>
<td></td>
</tr>
<tr>
<td>[mA]</td>
<td>4/0.8 (s = 0 mm)</td>
<td>4/0.8 (s = 0 mm)</td>
<td>4/0.8 (s = 0 mm)</td>
<td></td>
</tr>
</tbody>
</table>

### Reduction factors

<table>
<thead>
<tr>
<th>Material</th>
<th>Aluminium</th>
<th>Stainless steel St 18/8</th>
<th>Copper</th>
<th>Brass</th>
<th>Steel St 37</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reduction</td>
<td>0.28</td>
<td>0.68</td>
<td>0.25</td>
<td>0.4</td>
<td>1.0</td>
</tr>
<tr>
<td>Factors</td>
<td>0.28</td>
<td>0.47</td>
<td>0.6</td>
<td>0.3</td>
<td>1.0</td>
</tr>
<tr>
<td></td>
<td>0.18</td>
<td>0.65</td>
<td>0.15</td>
<td>0.2</td>
<td>1.0</td>
</tr>
<tr>
<td></td>
<td>0.18</td>
<td>0.65</td>
<td>0.15</td>
<td>0.2</td>
<td>1.0</td>
</tr>
<tr>
<td></td>
<td>0.18</td>
<td>0.65</td>
<td>0.15</td>
<td>0.2</td>
<td>1.0</td>
</tr>
</tbody>
</table>
## Proximity sensors SIEA, inductive

### Technical data – Analogue output

#### Switching output

<table>
<thead>
<tr>
<th>Size</th>
<th>M8</th>
<th>M12</th>
<th>M18</th>
<th>M30</th>
</tr>
</thead>
<tbody>
<tr>
<td>Max. switching frequency DC [Hz]</td>
<td>1,600</td>
<td>1,000</td>
<td>500</td>
<td>200</td>
</tr>
<tr>
<td>Bandwidth [Hz]</td>
<td>1,600 (–3 dB at s = 2 mm)</td>
<td>1,000 (–3 dB at s = 3 mm)</td>
<td>500 (–3 dB at s = 5 mm)</td>
<td>200 (–3 dB at s = 10 mm)</td>
</tr>
<tr>
<td>Max. load at analogue-current output [Ω]</td>
<td>–</td>
<td>500</td>
<td>500</td>
<td>500</td>
</tr>
<tr>
<td>Max. load current at analogue voltage output [mA]</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td>Max. current/voltage output value without object [%]</td>
<td>120</td>
<td>120</td>
<td>120</td>
<td>120</td>
</tr>
</tbody>
</table>

#### Output, additional data

- Protection against short circuit: Pulsed
- Protection against overloading: Yes

#### Electronic components

- Operating voltage range [V DC]: 15 ... 30
- Residual ripple [%]: 20
- Idle current [mA]: ≤ 10
- Reverse polarity protection: For operating voltage

#### Electromechanical components

<table>
<thead>
<tr>
<th>Size</th>
<th>M8</th>
<th>M12</th>
<th>M18</th>
<th>M30</th>
</tr>
</thead>
<tbody>
<tr>
<td>Electrical connection</td>
<td>Plug, M8x1, 3-pin</td>
<td>Plug, M12x1, 4-pin</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cable length [m]</td>
<td>2.5</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### Mechanical components

<table>
<thead>
<tr>
<th>Size</th>
<th>M8</th>
<th>M12</th>
<th>M18</th>
<th>M30</th>
</tr>
</thead>
<tbody>
<tr>
<td>Attachment type</td>
<td>Via lock nut</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mounting type</td>
<td>Flush</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tightening torque [Nm]</td>
<td>4</td>
<td>10</td>
<td>25</td>
<td>70</td>
</tr>
<tr>
<td>Product weight [g]</td>
<td>25</td>
<td>33</td>
<td>55</td>
<td>155</td>
</tr>
<tr>
<td>Housing material</td>
<td>Chrome-plated brass</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### Immissions/emissions

- Protection class: IP67
- Corrosion resistance class CRC: 2

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

Components subject to moderate corrosion stress. 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.

#### Pin allocation

**M8x1, 3-pin**

<table>
<thead>
<tr>
<th>Pin</th>
<th>Wire colour</th>
<th>Allocation</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Brown</td>
<td>+</td>
</tr>
<tr>
<td>2</td>
<td>Blue</td>
<td>–</td>
</tr>
<tr>
<td>3</td>
<td>Black</td>
<td>Voltage</td>
</tr>
</tbody>
</table>

**M12x1, 4-pin**

<table>
<thead>
<tr>
<th>Pin</th>
<th>Wire colour</th>
<th>Allocation</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Brown</td>
<td>+</td>
</tr>
<tr>
<td>2</td>
<td>White</td>
<td>Current</td>
</tr>
<tr>
<td>3</td>
<td>Blue</td>
<td>–</td>
</tr>
<tr>
<td>4</td>
<td>Black</td>
<td>Voltage</td>
</tr>
</tbody>
</table>
Proximity sensors SIEA, inductive
Technical data – Analogue output

Dimensions

<table>
<thead>
<tr>
<th>Size</th>
<th>M8</th>
<th>M12</th>
<th>M18</th>
<th>M30</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dimensions</td>
<td>60</td>
<td>60</td>
<td>63.5</td>
<td>73.5</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Active surface</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
</tr>
</tbody>
</table>

Fitting instructions

Flush fitting

<table>
<thead>
<tr>
<th>Size</th>
<th>B1</th>
<th>B2</th>
<th>H1</th>
<th>H2</th>
</tr>
</thead>
<tbody>
<tr>
<td>M8</td>
<td>8</td>
<td>20</td>
<td>1</td>
<td>12</td>
</tr>
<tr>
<td>M12</td>
<td>12</td>
<td>30</td>
<td>2</td>
<td>18</td>
</tr>
<tr>
<td>M18</td>
<td>19</td>
<td>44</td>
<td>4</td>
<td>30</td>
</tr>
<tr>
<td>M30</td>
<td>35</td>
<td>80</td>
<td>6</td>
<td>60</td>
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</tbody>
</table>

Ordering data

<table>
<thead>
<tr>
<th>Size</th>
<th>S1)</th>
<th>Mounting type</th>
<th>Analogue output</th>
<th>Electrical connection</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>S</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>M8</td>
<td>0…4</td>
<td>Flush</td>
<td>0…10 V</td>
<td>–</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>538291  SIEA-M8P-PU-S</td>
</tr>
<tr>
<td></td>
<td>0…6</td>
<td>Flush</td>
<td>0…10 V</td>
<td>4…20 mA</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>538292  SIEA-M12P-UI-S</td>
</tr>
<tr>
<td></td>
<td>0…10</td>
<td>Flush</td>
<td>0…10 V</td>
<td>4…20 mA</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>538293  SIEA-M18P-UI-S</td>
</tr>
<tr>
<td></td>
<td>0…20</td>
<td>Flush</td>
<td>0…10 V</td>
<td>4…20 mA</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>538294  SIEA-M30P-UI-S</td>
</tr>
</tbody>
</table>

1) S Position measuring range [mm]
Sensors > Inductive sensors

Proximity sensors SIEF, inductive

Technical data – Increased switching distance, reduction factor 1, welding field immune

Function

- Standard switching distance
- Reduction factor 1 for all metals
- For DC voltage
- Round design

1) e.g. N/O contact with PNP output and cable

---

**General technical data**

<table>
<thead>
<tr>
<th>Mounting type</th>
<th>Flush</th>
<th>Partially flush</th>
</tr>
</thead>
<tbody>
<tr>
<td>Size</td>
<td>M8 M12 M18 M30 M8 M12 M18 M30 M30 Q40</td>
<td></td>
</tr>
<tr>
<td>Design</td>
<td>Round</td>
<td>Round</td>
</tr>
<tr>
<td></td>
<td>Round</td>
<td>Block-shaped</td>
</tr>
<tr>
<td>Conforms to</td>
<td>EN 60947-5-2</td>
<td>EN 60947-5-2</td>
</tr>
<tr>
<td>Certification</td>
<td>cULus listed (UL)</td>
<td>cULus listed (UL)</td>
</tr>
<tr>
<td></td>
<td>C-Tick</td>
<td>C-Tick</td>
</tr>
<tr>
<td>CE mark (see declaration of conformity)</td>
<td>To EU EMC Directive (1)</td>
<td>To EU EMC Directive (1)</td>
</tr>
<tr>
<td>Note on materials</td>
<td>Free of copper and PTFE</td>
<td>Free of copper and PTFE</td>
</tr>
<tr>
<td></td>
<td>RoHS-compliant</td>
<td>–</td>
</tr>
</tbody>
</table>

1) For information about the applicability of the component see the manufacturer's EC declaration of conformity at: www.festo.com › Support › User documentation.

If the component is subject to restrictions on usage in residential, office or commercial environments or small businesses, further measures to reduce the emitted interference may be necessary.

---

**Input signal/measuring element**

<table>
<thead>
<tr>
<th>Mounting type</th>
<th>Flush</th>
<th>Partially flush</th>
</tr>
</thead>
<tbody>
<tr>
<td>Electrical connection</td>
<td>Cable Plug</td>
<td>Cable Plug</td>
</tr>
<tr>
<td>Ambient temperature [°C]</td>
<td>–30 … +70</td>
<td>–30 … +85</td>
</tr>
<tr>
<td></td>
<td>–30 … +85</td>
<td></td>
</tr>
</tbody>
</table>

---

**Output, general**

<table>
<thead>
<tr>
<th>Mounting type</th>
<th>Flush</th>
<th>Partially flush</th>
</tr>
</thead>
<tbody>
<tr>
<td>Size</td>
<td>M8 M12 M18 M30 M8 M12 M18 M30 M30 Q40</td>
<td></td>
</tr>
<tr>
<td>Repetition accuracy [mm]</td>
<td>0.08 0.16 0.28 0.55</td>
<td>0.08 0.16 0.24 0.4 0.7</td>
</tr>
</tbody>
</table>

---

**Switching output**

<table>
<thead>
<tr>
<th>Mounting type</th>
<th>Flush</th>
<th>Partially flush</th>
</tr>
</thead>
<tbody>
<tr>
<td>Size</td>
<td>M8 M12 M18 M30 M8 M12 M18 M30 M30 Q40</td>
<td></td>
</tr>
<tr>
<td>Switching output</td>
<td>PNP NPN</td>
<td>PNP NPN</td>
</tr>
<tr>
<td>Switching element function</td>
<td>N/O contact</td>
<td>N/O contact</td>
</tr>
<tr>
<td></td>
<td>Antivalent</td>
<td>Antivalent</td>
</tr>
<tr>
<td>Rated operating distance [mm]</td>
<td>1.5 3 5 10</td>
<td>4 8 12 20 35</td>
</tr>
<tr>
<td>Assured switching distance [mm]</td>
<td>– – – –</td>
<td>3.24 6.48 9.72 16.2 28.35</td>
</tr>
<tr>
<td>Reduction factors</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Aluminium</td>
<td>1.0</td>
<td>1.0</td>
</tr>
<tr>
<td>Stainless steel St 18/8</td>
<td>1.0</td>
<td>1.0</td>
</tr>
<tr>
<td>Copper</td>
<td>1.0</td>
<td>1.0</td>
</tr>
<tr>
<td>Brass</td>
<td>1.0</td>
<td>1.0</td>
</tr>
<tr>
<td>Steel St 37</td>
<td>1.0</td>
<td>1.0</td>
</tr>
<tr>
<td>Hysteresis [mm]</td>
<td>0.12...0.6</td>
<td>0.24...1.2</td>
</tr>
<tr>
<td></td>
<td>0.36...1.8</td>
<td>0.36...1.8</td>
</tr>
<tr>
<td></td>
<td>1.05...5.25</td>
<td>2.50</td>
</tr>
<tr>
<td>Max. switching frequency DC [Hz]</td>
<td>2,000 3,000 2,500 2,000</td>
<td>2,000 2,000 2,000 1,500 250</td>
</tr>
<tr>
<td>Max. output current [mA]</td>
<td>150 200</td>
<td>150 200</td>
</tr>
<tr>
<td>Voltage drop [V]</td>
<td>–</td>
<td>= 1.8</td>
</tr>
</tbody>
</table>
**Proximity sensors SIEF, inductive**

Technical data – Increased switching distance, reduction factor 1, welding field immune

### Output, additional data

- **Protection against short circuit**: Pulsed

### Electronic components

<table>
<thead>
<tr>
<th>Mounting type</th>
<th>Flush</th>
<th>Partially flush</th>
</tr>
</thead>
<tbody>
<tr>
<td>Size</td>
<td>M8</td>
<td>M12</td>
</tr>
<tr>
<td></td>
<td>M18</td>
<td>M30</td>
</tr>
<tr>
<td>Operating voltage range [V DC]</td>
<td>10 ... 30</td>
<td>10 ... 30</td>
</tr>
<tr>
<td>Residual ripple [%]</td>
<td>–</td>
<td>10</td>
</tr>
<tr>
<td>Idle current [mA]</td>
<td>–</td>
<td>≤ 10</td>
</tr>
<tr>
<td>Reverse polarity protection</td>
<td>For all electrical connections</td>
<td>For all electrical connections</td>
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</table>

### Electromechanical components

<table>
<thead>
<tr>
<th>Mounting type</th>
<th>Flush</th>
<th>Partially flush</th>
</tr>
</thead>
<tbody>
<tr>
<td>Size</td>
<td>M8</td>
<td>M12</td>
</tr>
<tr>
<td></td>
<td>M18</td>
<td>M30</td>
</tr>
<tr>
<td>Cable</td>
<td>Cable, 3-wire</td>
<td>Cable, 3-wire</td>
</tr>
<tr>
<td>Cable length [m]</td>
<td>2.5</td>
<td>2.5</td>
</tr>
<tr>
<td>Cable sheath material</td>
<td>TPE-U(PU)</td>
<td>PUR</td>
</tr>
<tr>
<td>Insulating sheath material</td>
<td>PVC</td>
<td>PVC</td>
</tr>
</tbody>
</table>

### Plug

| Electrical connection | Plug, M8x1, 3-pin | Plug, M12x1, 3-pin | Plug, M8x1, 3-pin, Fixcon | Plug, M12x1, 4-pin, Fixcon |

### Plug housing material

Chrome-plated brass

### Mechanical components

<table>
<thead>
<tr>
<th>Mounting type</th>
<th>Flush</th>
<th>Partially flush</th>
</tr>
</thead>
<tbody>
<tr>
<td>Size</td>
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<td>M12</td>
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<tr>
<td></td>
<td>M18</td>
<td>M30</td>
</tr>
<tr>
<td>Electrical connection</td>
<td>Cable, Plug</td>
<td>Cable, Plug</td>
</tr>
<tr>
<td>Product weight [g]</td>
<td>61.4</td>
<td>12.4</td>
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<tr>
<td>Housing material</td>
<td>High-alloy stainless steel</td>
<td>Chrome-plated brass</td>
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<tr>
<td></td>
<td>PA</td>
<td>LCP-reinforced</td>
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<tr>
<td></td>
<td>PP</td>
<td>TPE-O</td>
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### Mechanical components

<table>
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<tbody>
<tr>
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</tr>
<tr>
<td></td>
<td>M18</td>
</tr>
<tr>
<td>Electrical connection</td>
<td>Cable, Plug</td>
</tr>
</tbody>
</table>
| Attachment type | Via lock nut          | Via through-hole
| Tightening torque [Nm] | 10                     | 10                    |
| Product weight [g] | 77                     | 19                    |
| Housing material | High-alloy stainless steel | Chrome-plated brass |
|                 | PA                     | PBT                   |

---

**www.festo.com/catalogue/...**
## Proximity sensors SIEF, inductive

### Technical data – Increased switching distance, reduction factor 1, welding field immune

#### Display/operation

<table>
<thead>
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</thead>
<tbody>
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<td>M12</td>
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<tr>
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<td>M18</td>
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<td>M18</td>
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<tr>
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<td>M18</td>
<td>M30</td>
</tr>
<tr>
<td></td>
<td>Q40S</td>
<td></td>
</tr>
</tbody>
</table>

| Ready status display | –     | –               |
| Switching status display | Yellow LED | Yellow LED |

#### Immissions/emissions

<table>
<thead>
<tr>
<th>Electrical connection</th>
<th>Cable</th>
<th>Plug</th>
</tr>
</thead>
<tbody>
<tr>
<td>Size</td>
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<td>M12</td>
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<td>M12</td>
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<td></td>
<td>M18</td>
<td>M30</td>
</tr>
<tr>
<td></td>
<td>Q40S</td>
<td></td>
</tr>
</tbody>
</table>

| Ambient temperature with flexible cable installation [°C] | –5 … +70 | – |
| Protection class | IP68 | IP68 |
| Resistance to interference from magnetic fields | Magnetic direct and alternating field | Magnetic direct and alternating field |
| Surge resistance [kV] | 0.8 | 0.8 |
| Corrosion resistance class CRC | 2 | 2 |
| Degree of contamination | 3 | 3 |

**Partially flush**

| Ambient temperature with flexible cable installation [°C] | 0 … 80 | – |
| Protection class | IP67 | IP67 |
| Resistance to interference from magnetic fields | Magnetic direct and alternating field | Magnetic direct and alternating field |
| Surge resistance [kV] | – | – |
| Corrosion resistance class CRC | 4 | 2 |
| Degree of contamination | – | – |

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

Components subject to moderate corrosion stress. 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.

**Corrosion resistance class 4 according to Festo standard 940 070**

Components subject to particularly high corrosion stress. Parts used with aggressive media, e.g. in the food or chemical industry. These applications should be supported with special tests with the media if required.

#### Pin allocation to EN 60947-5-2

**M8x1, 3-pin**

<table>
<thead>
<tr>
<th>Pin</th>
<th>Wire colour</th>
<th>Allocation</th>
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<tbody>
<tr>
<td>1</td>
<td>Brown</td>
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<tr>
<td>3</td>
<td>Blue</td>
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</tr>
<tr>
<td>4</td>
<td>Black</td>
<td>Output</td>
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</table>

**M12x1, 3-pin**

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<th>Allocation</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Brown</td>
<td>+</td>
</tr>
<tr>
<td>3</td>
<td>Blue</td>
<td>–</td>
</tr>
<tr>
<td>4</td>
<td>Black</td>
<td>Output</td>
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</tbody>
</table>

**M12x1, 4-pin**

**NPN, antivalent**

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<th>Allocation</th>
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<td>1</td>
<td>Brown</td>
<td>+</td>
</tr>
<tr>
<td>2</td>
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<tr>
<td>3</td>
<td>Blue</td>
<td>–</td>
</tr>
<tr>
<td>4</td>
<td>Black</td>
<td>N/C contact</td>
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**PNP, antivalent**

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<th>Allocation</th>
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</thead>
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<td>1</td>
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<td>+</td>
</tr>
<tr>
<td>2</td>
<td>White</td>
<td>N/C contact</td>
</tr>
<tr>
<td>3</td>
<td>Blue</td>
<td>–</td>
</tr>
<tr>
<td>4</td>
<td>Black</td>
<td>N/O contact</td>
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**Proximity sensors SIEF, inductive**

Technical data – Increased switching distance, reduction factor 1, welding field immune

<table>
<thead>
<tr>
<th>Dimensions</th>
<th>Download CAD data ➔ <a href="http://www.festo.com/en/engineering">www.festo.com/en/engineering</a></th>
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</table>

### M8 – Flush fitting

<table>
<thead>
<tr>
<th>Mounting type</th>
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<th>D1</th>
<th>D2</th>
<th>L1</th>
<th>L2</th>
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### M12 – Flush fitting

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<tr>
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Sensors > Inductive sensors

Proximity sensors SIEF, inductive

Technical data – Increased switching distance, reduction factor 1, welding field immune

### Dimensions

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<th>Mounting type</th>
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<tr>
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<td>Partially flush</td>
<td>M30x1.5</td>
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<td>Plug</td>
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<td>62</td>
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### Dimensions – 40x40x65 mm

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<thead>
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<th>Mounting type</th>
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<th>B2</th>
<th>B3</th>
<th>B4</th>
<th>D1</th>
<th>D2</th>
<th>H1</th>
<th>H2</th>
<th>L1</th>
<th>L2</th>
<th>L3</th>
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<td>34</td>
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### Fitting instructions

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<th>B2</th>
<th>H</th>
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<table>
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## Sensors > Inductive sensors
### Proximity sensors SIEF, inductive

Technical data – Increased switching distance, reduction factor 1, welding field immune

<table>
<thead>
<tr>
<th>Size (mm)</th>
<th>Mounting type</th>
<th>Switching output</th>
<th>Switching element function</th>
<th>Electrical connection</th>
<th>Part No.</th>
<th>Type</th>
<th>Part No.</th>
<th>Type</th>
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</table>

1) Sn Rated operating distance [mm]
## Proximity sensors SIEF-...-WA, inductive

Technical data – Increased switching distance, reduction factor 1, welding field immune

### Function

- Standard switching distance
- Reduction factor 1 for all metals
- Welding field immune
- For DC voltage
- Round design

### General technical data

<table>
<thead>
<tr>
<th>Design</th>
<th>Round</th>
</tr>
</thead>
<tbody>
<tr>
<td>Conforms to</td>
<td>EN 60947-5-2</td>
</tr>
<tr>
<td>Certification</td>
<td>cULus listed (UL)</td>
</tr>
<tr>
<td>CE mark (see declaration of conformity)</td>
<td>To EU EMC Directive</td>
</tr>
</tbody>
</table>

1) For information about the applicability of the component see the manufacturer’s EC declaration of conformity at: [www.festo.com](http://www.festo.com).

### Input signal/measuring element

| Ambient temperature [°C] | –30 ... +85 |

### Output, general

<table>
<thead>
<tr>
<th>Mounting type</th>
<th>Flush</th>
<th>Partially flush</th>
</tr>
</thead>
<tbody>
<tr>
<td>Size</td>
<td>M12</td>
<td>M18</td>
</tr>
<tr>
<td>Repetition accuracy [mm]</td>
<td>0.06</td>
<td>0.1</td>
</tr>
</tbody>
</table>

### Switching output

<table>
<thead>
<tr>
<th>Mounting type</th>
<th>Flush</th>
<th>Partially flush</th>
</tr>
</thead>
<tbody>
<tr>
<td>Size</td>
<td>M12</td>
<td>M18</td>
</tr>
<tr>
<td>Switching output</td>
<td>PNP</td>
<td>NPN</td>
</tr>
</tbody>
</table>

### Switching element function

<table>
<thead>
<tr>
<th>Rated operating distance [mm]</th>
<th>3</th>
<th>5</th>
<th>10</th>
<th>8</th>
<th>12</th>
<th>20</th>
</tr>
</thead>
<tbody>
<tr>
<td>Assured switching distance [mm]</td>
<td>2.43</td>
<td>4.05</td>
<td>16.2</td>
<td>6.48</td>
<td>9.72</td>
<td>16.2</td>
</tr>
</tbody>
</table>

### Reduction factors

<table>
<thead>
<tr>
<th>Material</th>
<th>1.0</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aluminium</td>
<td>1.0</td>
</tr>
<tr>
<td>Stainless steel St 18/8</td>
<td>1.0</td>
</tr>
<tr>
<td>Copper</td>
<td>1.0</td>
</tr>
<tr>
<td>Brass</td>
<td>1.0</td>
</tr>
<tr>
<td>Steel St 37</td>
<td>1.0</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Hysteresis [mm]</th>
<th>0.24 ... 1.2</th>
<th>0.15 ... 0.75</th>
<th>0.36 ... 1.8</th>
<th>0.24 ... 1.2</th>
<th>0.36 ... 1.8</th>
<th>0.36 ... 1.8</th>
</tr>
</thead>
<tbody>
<tr>
<td>Max. switching frequency DC [Hz]</td>
<td>3,000</td>
<td>2,500</td>
<td>1,500</td>
<td>2,000</td>
<td>2,000</td>
<td>1,500</td>
</tr>
<tr>
<td>Max. output current [mA]</td>
<td>200</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Voltage drop [V]</td>
<td>≤ 1.8</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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</tbody>
</table>

### Protection against short circuit

- Pulsed
### Electronic components

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating voltage range</td>
<td>10 ... 30 V DC</td>
</tr>
<tr>
<td>Residual ripple</td>
<td>10 %</td>
</tr>
<tr>
<td>Idle current</td>
<td>≤ 15 mA</td>
</tr>
<tr>
<td>Reverse polarity protection</td>
<td>For all electrical connections</td>
</tr>
</tbody>
</table>

### Electromechanical components

<table>
<thead>
<tr>
<th>Component</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Electrical connection</td>
<td>Plug, M12x1, 3-pin, Fixcon</td>
</tr>
<tr>
<td>Plug housing material</td>
<td>PTFE-coated brass</td>
</tr>
</tbody>
</table>

### Mechanical components

<table>
<thead>
<tr>
<th>Size</th>
<th>M12</th>
<th>M18</th>
<th>M30</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mounting type</td>
<td>Flush/Partially flush</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Switching output</td>
<td>PNP/NPN/PNP/NPN/PNP/NPN</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Attachment type</td>
<td>Via lock nut</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tightening torque [Nm]</td>
<td>7/15/75/75/75</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Product weight [g]</td>
<td>26/48/373/464/919/1,010</td>
<td></td>
<td></td>
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<tr>
<td>Housing material</td>
<td>PTFE-coated brass/PBT</td>
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### Display/operation

- Switching status display: Yellow LED

### Immissions/ emissions

<table>
<thead>
<tr>
<th>Class</th>
<th>Protection class</th>
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<tbody>
<tr>
<td></td>
<td>IP67</td>
</tr>
<tr>
<td>Resistance to interference from magnetic fields</td>
<td>Magnetic direct and alternating field</td>
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</tbody>
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### Pin allocation to EN 60947-5-2

<table>
<thead>
<tr>
<th>Pin</th>
<th>Wire colour</th>
<th>Allocation</th>
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</thead>
<tbody>
<tr>
<td>1</td>
<td>Brown</td>
<td>+</td>
</tr>
<tr>
<td>3</td>
<td>Blue</td>
<td>–</td>
</tr>
<tr>
<td>4</td>
<td>Black</td>
<td>Output</td>
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</table>
## Proximity sensors SIEF-...-WA, inductive

Technical data – Increased switching distance, reduction factor 1, welding field immune

### Dimensions

<table>
<thead>
<tr>
<th>Mounting type</th>
<th>Electrical connection</th>
<th>D1</th>
<th>D2</th>
<th>L1</th>
<th>ß</th>
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</thead>
<tbody>
<tr>
<td>M12 Flush</td>
<td>Plug</td>
<td>M12x1</td>
<td>M12x1</td>
<td>52</td>
<td>17</td>
</tr>
<tr>
<td>M12 Partially flush</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>M18 Flush</td>
<td>Plug</td>
<td>M18x1</td>
<td>M12x1</td>
<td>52</td>
<td>24</td>
</tr>
<tr>
<td>M18 Partially flush</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>M30 Flush</td>
<td>Plug</td>
<td>M30x1.5</td>
<td>M12x1</td>
<td>62</td>
<td>36</td>
</tr>
<tr>
<td>M30 Partially flush</td>
<td></td>
<td></td>
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</tbody>
</table>

### Fitting instructions

<table>
<thead>
<tr>
<th>Size</th>
<th>B1</th>
<th>B2</th>
<th>H</th>
</tr>
</thead>
<tbody>
<tr>
<td>M12</td>
<td>18</td>
<td>24</td>
<td>9</td>
</tr>
<tr>
<td>M18</td>
<td>27</td>
<td>36</td>
<td>15</td>
</tr>
<tr>
<td>M30</td>
<td>45</td>
<td>60</td>
<td>30</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Size</th>
<th>B1</th>
<th>B2</th>
<th>H1</th>
<th>H2</th>
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</thead>
<tbody>
<tr>
<td>M12</td>
<td>18</td>
<td>48</td>
<td>16</td>
<td>24</td>
</tr>
<tr>
<td>M18</td>
<td>27</td>
<td>54</td>
<td>24</td>
<td>36</td>
</tr>
<tr>
<td>M30</td>
<td>45</td>
<td>90</td>
<td>40</td>
<td>60</td>
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</table>

## Proximity sensors SIEF-....WA, inductive

Technical data – Increased switching distance, reduction factor 1, welding field immune

<table>
<thead>
<tr>
<th>Size</th>
<th>Sn</th>
<th>Mounting type</th>
<th>Switching element function</th>
<th>Switching output</th>
<th>Electrical connection</th>
<th>Part No.</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>M12</td>
<td>3.0</td>
<td>Flush</td>
<td>N/O contact</td>
<td>PNP</td>
<td>538297</td>
<td>SIEF-M12B-PS-S-L-WA</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>NPN</td>
<td>538298</td>
<td>SIEF-M12B-NS-S-L-WA</td>
<td></td>
</tr>
<tr>
<td></td>
<td>8.0</td>
<td>Partially flush</td>
<td></td>
<td>PNP</td>
<td>538295</td>
<td>SIEF-M12NB-PS-S-L-WA</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>NPN</td>
<td>538296</td>
<td>SIEF-M12NB-NS-S-L-WA</td>
<td></td>
</tr>
<tr>
<td>M18</td>
<td>5.0</td>
<td>Flush</td>
<td>N/O contact</td>
<td>PNP</td>
<td>538301</td>
<td>SIEF-M18B-PS-S-L-WA</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>NPN</td>
<td>538302</td>
<td>SIEF-M18B-NS-S-L-WA</td>
<td></td>
</tr>
<tr>
<td></td>
<td>12.0</td>
<td>Partially flush</td>
<td></td>
<td>PNP</td>
<td>538303</td>
<td>SIEF-M18NB-PS-S-L-WA</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>NPN</td>
<td>538304</td>
<td>SIEF-M18NB-NS-S-L-WA</td>
<td></td>
</tr>
<tr>
<td>M30</td>
<td>10.0</td>
<td>Flush</td>
<td>N/O contact</td>
<td>PNP</td>
<td>538305</td>
<td>SIEF-M30B-PS-S-L-WA</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>NPN</td>
<td>538306</td>
<td>SIEF-M30B-NS-S-L-WA</td>
<td></td>
</tr>
<tr>
<td></td>
<td>20.0</td>
<td>Partially flush</td>
<td></td>
<td>PNP</td>
<td>538307</td>
<td>SIEF-M30NB-PS-S-L-WA</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>NPN</td>
<td>538308</td>
<td>SIEF-M30NB-NS-S-L-WA</td>
<td></td>
</tr>
</tbody>
</table>

1) $S_n$ Rated operating distance [mm]
## Ordering data – Connecting cables M8x1

<table>
<thead>
<tr>
<th>Number of wires</th>
<th>Cable length [m]</th>
<th>Part No.</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>2.5</td>
<td>541333</td>
<td>NEBU-M8G3-K-2.5-LE3</td>
</tr>
<tr>
<td>5</td>
<td>2.5</td>
<td>541334</td>
<td>NEBU-M8G3-K-5-LE3</td>
</tr>
</tbody>
</table>

**Angled socket**

<table>
<thead>
<tr>
<th>Number of wires</th>
<th>Cable length [m]</th>
<th>Part No.</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>2.5</td>
<td>541338</td>
<td>NEBU-M8W3-K-2.5-LE3</td>
</tr>
<tr>
<td>5</td>
<td>2.5</td>
<td>541339</td>
<td>NEBU-M8W3-K-5-LE3</td>
</tr>
</tbody>
</table>

**Straight socket, straight plug**

<table>
<thead>
<tr>
<th>Number of wires</th>
<th>Cable length [m]</th>
<th>Part No.</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>2.5</td>
<td>554037</td>
<td>NEBU-M8G3-K-2.5-M8G4</td>
</tr>
</tbody>
</table>

1) For connecting proximity sensor SIEA-M8B to signal converter SVE4-US.

## Ordering data – Connecting cables M12x1

<table>
<thead>
<tr>
<th>Number of wires</th>
<th>Cable length [m]</th>
<th>Part No.</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>2.5</td>
<td>541363</td>
<td>NEBU-M12G5-K-2.5-LE3</td>
</tr>
<tr>
<td>5</td>
<td>2.5</td>
<td>541364</td>
<td>NEBU-M12G5-K-5-LE3</td>
</tr>
<tr>
<td>4</td>
<td>2.5</td>
<td>550325</td>
<td>NEBU-M12W5-K-2.5-LE4</td>
</tr>
<tr>
<td>5</td>
<td>2.5</td>
<td>541328</td>
<td>NEBU-M12G5-K-5-LE4</td>
</tr>
</tbody>
</table>

**Angled socket**

<table>
<thead>
<tr>
<th>Number of wires</th>
<th>Cable length [m]</th>
<th>Part No.</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>2.5</td>
<td>541367</td>
<td>NEBU-M12W5-K-2.5-LE3</td>
</tr>
<tr>
<td>5</td>
<td>2.5</td>
<td>541370</td>
<td>NEBU-M12W5-K-5-LE3</td>
</tr>
<tr>
<td>4</td>
<td>2.5</td>
<td>550326</td>
<td>NEBU-M12W5-K-2.5-LE4</td>
</tr>
<tr>
<td>5</td>
<td>2.5</td>
<td>541329</td>
<td>NEBU-M12W5-K-5-LE4</td>
</tr>
</tbody>
</table>

**Straight, straight plug**

<table>
<thead>
<tr>
<th>Number of wires</th>
<th>Cable length [m]</th>
<th>Part No.</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>2.5</td>
<td>554036</td>
<td>NEBU-M12G5-K-2.5-M8G4</td>
</tr>
</tbody>
</table>

1) For connecting proximity sensor SIEA-M12/M18/M30 in N/C contact version with plug.
2) For connecting proximity sensor SIEA-MxxB to signal converter SVE4.

## Ordering data – Mounting attachments

### For size M8

- **Sensor bracket with stop for flush fitting**
  - M8: 538346 SIEZ-B-8
  - M12: 538348 SIEZ-B-12
  - M18: 538350 SIEZ-B-18
  - M30: 538352 SIEZ-B-30

- **Sensor bracket without stop**
  - 4: 538343 SIEZ-NB-4
  - 6.5: 538344 SIEZ-NB-6.5
  - M8: 538345 SIEZ-NB-8
  - M12: 538347 SIEZ-NB-12
  - M18: 538349 SIEZ-NB-18
  - M30: 538351 SIEZ-NB-30

- **M12, M18**
  - 538354 SIEZ-UH

- **M12, M30**
  - 538355 SIEZ-UH

### For size M12, M18

- **Foot mounting**
  - M12: 5123 HBN-8/10x1
  - M18: 188990 HBE-25

### For size M12, M18

- **Mounting bracket**
  - 9634 HV-M5

### Foot mounting

- **Stop**
  - M8: 11542 SDA-8x1-B
  - M12: 11541 SDA-12x1-B
Proximity sensors SIE..., inductive

Application examples

Proximity sensor with switch output

- End-position monitoring in welding robots and automatic welders with magnetic field immune sensors SIEF-WA.

- It can also be used directly next to welding electrodes.

- Thanks to their long operating distance for all metals, block-shaped proximity sensors SIEF-Q40 guarantee reliable operation in transport and conveying systems in the automotive industry.

- Detection of cans and checking for the presence of the lid

- Monitoring tools (drill breakage)

- Proximity sensing of the teeth of a gearwheel for monitoring of the machine speed

- Detection of valve positions
Proximity sensors SIE..., inductive

Application examples

Proximity sensors with analogue output

Festo proximity sensors SIEA with analogue output supply an electrical signal, which is proportional to the distance between the active surface of the sensor and the metallic object. This output signal also varies relative to the size of the detected object (if this is smaller than the standard test plate or smaller than the sensor) and its material (different metals require different reduction factors for the nominal operating distance \(Sn\)). These effects facilitate a wide range of applications in automation technology.

• Direct conversion of linear motion into an electrical signal.
• Conversion of linear motion into an electrical signal using a wedge-shaped conduction component.
• Conversion of rotation into an electrical signal.
• Checking the smooth running of an axis or shaft.
• Monitoring of metallic workpieces for position, size or material, for example.
• Conversion of a rotation angle or distance into an electrical signal.
Proximity sensors SIES-8M, inductive for T-slot
### Proximity sensors SIES-8M, inductive for T-slot

#### peripherals overview

<table>
<thead>
<tr>
<th>Mounting attachments and accessories</th>
<th>Page/Internet</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Connecting cable</td>
<td>366</td>
</tr>
<tr>
<td>2 Gripper with T-slot</td>
<td>Gripper</td>
</tr>
<tr>
<td>e.g. parallel gripper DHPS</td>
<td></td>
</tr>
<tr>
<td>3 Electric axis</td>
<td>EGC</td>
</tr>
</tbody>
</table>

#### type codes

<table>
<thead>
<tr>
<th>Type</th>
<th>SIE</th>
<th>S</th>
<th>8M</th>
<th>P</th>
<th>S</th>
<th>24V</th>
<th>K</th>
<th>2.5</th>
<th>M8D</th>
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<tbody>
<tr>
<td>Proximity sensor, inductive</td>
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<td>Design</td>
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<td>Special design</td>
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<td>Design</td>
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<td>Switching output</td>
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<td>PNP</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>N</td>
<td>NPN</td>
<td></td>
<td></td>
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<tr>
<td>Switching element function</td>
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<td>N/O contact</td>
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<td></td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>O</td>
<td>N/C contact</td>
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<tr>
<td>Rated operating voltage</td>
<td>24V</td>
<td>24 VDC</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cable attributes</td>
<td>K</td>
<td>Standard + energy chain</td>
<td></td>
<td></td>
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<td></td>
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<td></td>
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</tr>
<tr>
<td>Cable length</td>
<td>0.3</td>
<td>0.3 m</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>2.5</td>
<td>2.5 m</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>5.0</td>
<td>5.0 m</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>7.5</td>
<td>7.5 m</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
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<td>10 m</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Electrical connection</td>
<td>OE</td>
<td>Cable, 3-wire, open end</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>M8D</td>
<td>Cable with plug M8x1, 3-pin, knurled ring</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
## Proximity sensors SIES-8M, inductive for T-slot

### Technical data

- **Inductive proximity sensor**
  - for T-slot, insertable from above
- **Suitable for position sensing**
  - for electric axes EGC and grippers with T-slot
- **2 LEDs for better visibility,**
  - regardless of the side from which the axis approaches the sensor

### General technical data

<table>
<thead>
<tr>
<th>Feature</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type of mounting</td>
<td>Screw-clamped in slot, insertable from above, flush with T-slot</td>
</tr>
<tr>
<td>Connection direction</td>
<td>In-line</td>
</tr>
<tr>
<td>Rated operating distance $S_n$ [mm]</td>
<td>1.5</td>
</tr>
</tbody>
</table>
| Repetition accuracy under constant conditions [mm] | ≤ 0.05 lateral connection  
                                           | ≤ 0.02 axial connection      |
| Max. switching frequency [Hz]                | 5,000                          |
| Switching status display                     | Yellow LED                     |
| Conforms to                                  | EN 60947-5-2                  |
| Cable attributes                             | Standard + energy chain        |
| Cable test conditions                        | Energy chain: 5 million cycles, bending radius 75 mm  
                                           | Resistance to bending: to Festo standard; test conditions on request |
| Degree of contamination                      | 3                              |

### Electrical data

<table>
<thead>
<tr>
<th>Feature</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Switching output</td>
<td>PNP</td>
</tr>
<tr>
<td>Switching element function</td>
<td>N/C contact</td>
</tr>
<tr>
<td>Electrical connection</td>
<td>Cable, 3-wire</td>
</tr>
<tr>
<td>Operating voltage range DC [V]</td>
<td>10 ... 30</td>
</tr>
<tr>
<td>Insulation voltage [V]</td>
<td>50</td>
</tr>
<tr>
<td>Max. output current [mA]</td>
<td>150</td>
</tr>
<tr>
<td>Surge capacity [kV]</td>
<td>0.8</td>
</tr>
<tr>
<td>Idle current [mA]</td>
<td>≤ 10</td>
</tr>
<tr>
<td>Protection against short circuit</td>
<td>Pulsed</td>
</tr>
<tr>
<td>Protection against polarity reversal</td>
<td>For all electrical connections</td>
</tr>
<tr>
<td>Protection class</td>
<td>IP65</td>
</tr>
<tr>
<td></td>
<td>IP67</td>
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</table>

### Operating and environmental conditions

<table>
<thead>
<tr>
<th>Feature</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ambient temperature [°C]</td>
<td>–25 ... +70</td>
</tr>
<tr>
<td>Ambient temperature with flexible cable instalation [°C]</td>
<td>–5 ... +70</td>
</tr>
<tr>
<td>CE mark (see declaration of conformity)</td>
<td>To EU EMC Directive(^1)</td>
</tr>
<tr>
<td>Certification</td>
<td>C-Tick</td>
</tr>
<tr>
<td></td>
<td>cULus listed (OL)</td>
</tr>
</tbody>
</table>

---

1\) For information about the applicability of the component see the manufacturer's EC declaration of conformity at: [www.festo.com](http://www.festo.com)  
If the component is subject to restrictions on usage in residential, office or commercial environments or small businesses, further measures to reduce the emitted interference may be necessary.
## Proximity sensors SIES-8M, inductive for T-slot

### Technical data

#### Materials

<table>
<thead>
<tr>
<th>Component</th>
<th>SIES-8M-...-OE</th>
<th>SIES-8M-...-M8D</th>
</tr>
</thead>
<tbody>
<tr>
<td>Housing</td>
<td></td>
<td>Brass, nickel-plated</td>
</tr>
<tr>
<td></td>
<td>Polyamide</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Polyurethane</td>
<td></td>
</tr>
<tr>
<td></td>
<td>High-alloy stainless steel</td>
<td></td>
</tr>
<tr>
<td>Cable sheath</td>
<td>Thermoplastic polyurethane elastomer</td>
<td></td>
</tr>
<tr>
<td>Note on materials</td>
<td>Free of copper and PTFE</td>
<td></td>
</tr>
<tr>
<td></td>
<td>RoHS-compliant</td>
<td></td>
</tr>
</tbody>
</table>

#### Pin allocation

<table>
<thead>
<tr>
<th>Component</th>
<th>Cable</th>
<th>PNP N/O contact</th>
<th>NPN N/O contact</th>
<th>PNP N/C contact</th>
<th>NPN N/C contact</th>
</tr>
</thead>
<tbody>
<tr>
<td>Core colours</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BN</td>
<td>brown</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BK</td>
<td>black</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BU</td>
<td>blue</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### Dimensions

<table>
<thead>
<tr>
<th>Component</th>
<th>SIES-8M-...-OE</th>
<th>SIES-8M-...-M8D</th>
</tr>
</thead>
<tbody>
<tr>
<td>L1</td>
<td>300(\pm 50)</td>
<td>2,500(\pm 50)</td>
</tr>
<tr>
<td>SIES-8M-...-0,3-M8D</td>
<td>300(\pm 50)</td>
<td>2,500(\pm 50)</td>
</tr>
<tr>
<td>SIES-8M-...-2,5-M8D</td>
<td>2,500(\pm 50)</td>
<td>5,000(\pm 50)</td>
</tr>
<tr>
<td>SIES-8M-...-5,0-M8D</td>
<td>5,000(\pm 50)</td>
<td>7,500(\pm 50)</td>
</tr>
<tr>
<td>SIES-8M-...-7,5-M8D</td>
<td>7,500(\pm 50)</td>
<td>10,000(\pm 100)</td>
</tr>
<tr>
<td>SIES-8M-...-10-M8D</td>
<td>10,000(\pm 100)</td>
<td></td>
</tr>
</tbody>
</table>

## Proximity sensors SIES-8M, inductive for T-slot

### Technical data

#### Ordering data

<table>
<thead>
<tr>
<th>Size (mm)</th>
<th>Mounting position</th>
<th>Switching output</th>
<th>Switching element function</th>
<th>Cable length (m)</th>
<th>Part No.</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.5</td>
<td>Flush</td>
<td>PNP</td>
<td>N/O contact</td>
<td>7.5</td>
<td>551386</td>
<td>SIES-8M-PS-24V-K-7,5-OE</td>
</tr>
<tr>
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<td></td>
<td></td>
</tr>
<tr>
<td>1.5</td>
<td>Flush</td>
<td>PNP</td>
<td>N/C contact</td>
<td>7.5</td>
<td>551391</td>
<td>SIES-8M-PO-24V-K-7,5-OE</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>1.5</td>
<td>Flush</td>
<td>NPN</td>
<td>N/O contact</td>
<td>7.5</td>
<td>551396</td>
<td>SIES-8M-NS-24V-K-7,5-OE</td>
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</tr>
<tr>
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<td>Flush</td>
<td>NPN</td>
<td>N/C contact</td>
<td>7.5</td>
<td>551401</td>
<td>SIES-8M-NO-24V-K-7,5-OE</td>
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<tr>
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<td></td>
</tr>
</tbody>
</table>

1) $S_n$ Rated operating distance [mm]

---

2012/08 – Subject to change – Sensors / Vision systems  
[www.festo.com/catalogue/]...
Proximity sensors SIES-8M, inductive for T-slot

Accessories

Sensor bracket SIEZ-8M
For mounting proximity sensors SIES-8M on any housing

Material:
Wrought aluminium alloy, steel, thermoplastic polyurethane elastomer

Note on material:
RoHS-compliant

### Dimensions and ordering data

<table>
<thead>
<tr>
<th>Part No.</th>
<th>Type</th>
<th>L1</th>
<th>L2</th>
<th></th>
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<tbody>
<tr>
<td>551406</td>
<td>SIEZ-8M-200</td>
<td>200</td>
<td>–</td>
<td></td>
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<tr>
<td>551407</td>
<td>SIEZ-8M-400</td>
<td>400</td>
<td>100</td>
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</tr>
</tbody>
</table>

### Ordering data – Slot cover for T-slot

<table>
<thead>
<tr>
<th>Assembly</th>
<th>Length</th>
<th>Part No.</th>
<th>Type</th>
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<tr>
<td>Insertable from above</td>
<td>2x 0.5 m</td>
<td>563360</td>
<td>ABP-5-S1</td>
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### Ordering data – Connecting cables M8x1

<table>
<thead>
<tr>
<th>Electrical connection, left</th>
<th>Electrical connection, right</th>
<th>Cable length [m]</th>
<th>Part No.</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>Straight socket, M8x1, 3-pin</td>
<td>Cable, open end, 3-wire</td>
<td>2.5</td>
<td>541333</td>
<td>NEBU-MBG3-K-2.5-LE3</td>
</tr>
<tr>
<td></td>
<td></td>
<td>5</td>
<td>541334</td>
<td>NEBU-MBG3-K-5-LE3</td>
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<tr>
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<td></td>
<td>10</td>
<td>541332</td>
<td>NEBU-MBG3-K-10-LE3</td>
</tr>
<tr>
<td>Angled socket, M8x1, 3-pin</td>
<td>Cable, open end, 3-wire</td>
<td>2.5</td>
<td>541338</td>
<td>NEBU-MBW3-K-2.5-LE3</td>
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<tr>
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<td></td>
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<td>541341</td>
<td>NEBU-MBW3-K-5-LE3</td>
</tr>
<tr>
<td></td>
<td></td>
<td>10</td>
<td>541335</td>
<td>NEBU-MBW3-K-10-LE3</td>
</tr>
</tbody>
</table>
Opto-electronic sensors

Key features

Detection method
Diffuse sensor
SOEG-RT, energetic

With these sensors, which are sometimes referred to as energetic sensors, the transmitter and the receiver are located in the same housing. The light beam transmitted is reflected directly onto the receiver by the object. The intensity of the reflected light is then evaluated. The operating distance can be adjusted by changing the sensitivity of the receiver (using a potentiometer or the teach-in method). Diffuse sensors are one of the most cost-effective solutions and can be installed in a very short time. However, these sensors are not suitable for some applications, e.g. the detection of slightly reflective objects against a highly reflective background. In addition, objects with different surfaces (with respect to material or colour) are detected at different distances because of the different reflective properties.

Benefits of diffuse sensors (energetic)
- Longer operating distance
- More cost-effective
- Greater reliability in the detection of slightly reflective objects

SOEG-RTH with background suppression

The operating distance is not adjusted according to the sensitivity of the receiver, but instead by means of optical triangulation, mechanical modification of the lens and receiver angle (size Q50) or electronically using PSD (Position-Sensitive Detector) elements. Object detection is therefore virtually independent of other objects in the background as well as colour, size or surface finish. Only a very small diffuse reflection is required for these devices. They are therefore not suitable for objects with shiny or slightly reflective surfaces.

Benefits of diffuse sensors with background suppression
- Operating distance practically independent of colour and surface finish
- Can also be used with a shiny or reflective background
- Detection of small differences in distance
- Easy adjustment

Retro-reflective sensors

With these sensors the transmitter and the receiver are located in the same housing. The light transmitted is thrown back to the receiver by means of a reflector. An object located between the sensor and the reflector breaks the light beam and is thus detected. All Festo retro-reflective sensors use polarised light to prevent problems from occurring with reflective objects. There are two different types of retro-reflective sensor design:

- Retro-reflective sensors with two lenses
- Retro-reflective sensors with autocollimation

Retro-reflective sensors with two lenses

The light is transmitted by the sensor using a lens. The reflected light is transmitted back to the sensor via a second lens. The switching point can vary slightly depending on the distance.

The following sensors are retro-reflective sensors with two lenses: SOEG-RSP-M12/M18/M18W, SOEG-RSP-Q20/Q30 and SOEL-RSP-Q20 (laser).

Benefits of retro-reflective sensors with two lenses
- Cost-effective
**Opto-electronic sensors**

**Key features**

### Retro-reflective sensors with autocollimation

With the principle of autocollimation, the optical axes of the send channel and the receive channel are identical. This is possible, since the light from one channel is deflected using a semi-transparent mirror. This principle allows very short distances between the sensor and the reflector to be chosen. Retro-reflective sensors with autocollimation are ideally suited to transparent materials.

The following sensors are retro-reflective sensors with autocollimation: SOEG-RSP-Q50, SOEL-RSP-Q50 (laser) and SOEG-RSG-Q20 (for transparent objects).

### Benefits of retro-reflective sensors with autocollimation

- No blind zone
- High precision across the entire sensing range
- Radially symmetrical sensing range
- Good repeatability
- Low hysteresis
- Detection of transparent objects (SOEG-RSG-Q20)

### Through-beam sensors SOEG-S/E

The transmitter and receiver are located in different housings, and must be installed opposite one another. Each object that breaks the light beam between the transmitter and the receiver is detected. This is one of the most reliable principles in harsh environmental conditions. The disadvantage lies in the fact that two separate components (transmitter and receiver) have to be wired. Some transmitters for through-beam sensors have a test input. This can be used to switch the light on and off. The through-beam sensor can therefore be checked on the receiver side at regular intervals to ensure that it is functioning correctly.

### Colour sensor

The operational principle of the colour sensor SOEC-RT is based on the use of just one light source. The LED transmits visible white light. Objects can be detected over a long distance irrespective of their size. The colour to be detected is simply set in the teach-in procedure. The sensor is then ready for operation immediately. It compares the object to be scanned with the learned reference colour and if they match it sets one of the three available switch outputs. With five adjustable tolerance values, the colour sensor can be optimally adapted to the colour to be scanned and to deviations from this colour. The sensor also supports sensing of an entire colour range. This is a very flexible method, which offers advantages in the case of irregular colour structures in imprints and paint finishes in particular.

### Distance sensors

Like light sensors with background suppression, which use Position-Sensitive Detectors (PSD), these sensors transmit light to the object, evaluate the diffuse reflection detected by the sensor and thus calculate the distance. At the analogue output there is a signal that is proportional to the distance between the object and the sensor.

### Mounting

Opto-electronic sensors must not be allowed to interfere with each other during operation. A certain minimum distance must thus be maintained between the devices. This distance depends primarily on the level of sensitivity set for the sensors. For sensors equipped with fibre-optic cables, the distance basically depends on the type of fibre-optic cable used. It is therefore not possible to define general values in this case.
**Opto-electronic sensors**

**Key features**

### Types of reflection

**Diffuse reflection**

Diffuse reflection is the reflection of light from an uneven or grained surface when an incident beam is reflected in many different directions. This type of reflection is in contrast to specular reflection (total reflection). If a surface is absolutely non-specular, the reflected light is distributed evenly over a hemispherical surface.

![Diffuse reflection diagram](image)

1. Incident light beams
2. Reflected light beams

**Specular reflection (total reflection)**

Specular reflection is the perfect reflection of light (or other kinds of wave) from a surface, in which incident light from a single direction is reflected in a single direction. Such behaviour is described by the law of reflection. According to the law of reflection, the direction of the reflected light and the direction of the incident light make the same angle with respect to the axis of incidence; this is commonly expressed as $\theta_i = \theta_r$.

![Specular reflection diagram](image)

**Retro-reflection**

Retro-reflection is the reflection of light back in the direction of the light source irrespective of the angle of incidence. In contrast, this is only true in the case of a mirror when the mirror is exactly perpendicular to the light beam. This type of reflection can only be achieved using special reflectors (see: Reflectors).

![Retro-reflection diagram](image)

### Why are types of reflection important when using opto-electronic sensors?

In the case of diffuse sensors (energetic), sensors with background suppression and distance and colour sensors, sensing is based on diffuse reflection. These sensors therefore require diffuse reflection to the greatest possible extent. Total reflection makes sensing difficult and must therefore be avoided.

In the case of retro-reflective sensors and through-beam sensors, the type of reflection has no relevance in the case of retro-reflective sensors and through-beam sensors. In these cases the object only has to break the light beam. With retro-reflective sensors, polarising filters are used to achieve perfect differentiation between the reflection from the object as opposed to the reflector.

The type of reflection has no relevance in the case of retro-reflective sensors and through-beam sensors. In these cases the object only has to break the light beam. With retro-reflective sensors, polarising filters are used to achieve perfect differentiation between the reflection from the object as opposed to the reflector.

**Note**

The sensors should not be mounted perpendicular to the surface of shiny objects in order to prevent total internal reflection on the receiver.
Opto-electronic sensors

Key features

Glossary

Ambient light limit

Ambient light is the luminous radiation generated by external light sources. The illumination intensity is measured on the receiver. Use of modulated light makes the devices insensitive to ambient light. There is, however, an upper limit to the permitted intensity of external luminous radiation. This limit is also referred to as the ambient light limit. It is specified in the technical data for sunlight (unmodulated light) and for halogen lamps (with double the mains frequency for modulated light). If the illumination intensity is above the respective ambient light limit, reliable operation of the devices can no longer be guaranteed.

Modulated light

The devices in this catalogue use modulated light, i.e. the phototransmitter is only switched on briefly and remains switched off for a much longer time (ratio of approx. 1:25). With diffuse sensors and retro-reflective sensors, the receiver is only active during the light pulse. It is closed between the pulses. Operation with modulated light offers the following advantages:

- The devices are largely insensitive to ambient light
- Greater operating distances are possible
- Small temperature rise of the transmitter diodes and therefore longer service life

Fibre-optic cable

A fibre-optic cable can consist of a bundle of glass fibres, or one or more polymer fibres. It is used to conduct light from one place to another, even around bends and curves. This is made possible via the phenomenon of total internal reflection. Total internal reflection occurs whenever light from a material with a high refractive index impinges on the boundary between this material and a medium with a lower refractive index at an angle less than the maximum angle for total internal reflection.

Laser

The laser components currently offered by Festo comply with laser protection class 1 or 2 according to EN 60825-1/94

Laser protection class 1

Devices of laser protection class 1 are safe due to their low radiation level; these devices cannot pose a threat to human life. Protective eyewear is not required when using these devices; use of optical instruments for direct observation of the laser beam is also harmless.

For devices of laser protection class 1 there is no obligation for identification provided the key laser data is included in the operating instructions.

Laser protection class 2

Maximum radiant energy 1 mW (cw).

- Beam only in the visible spectral range
- Due to the high light intensity, the eye is protected by what is termed the lid shutting reflex (< 0.25 s)
- Suitable laser warnings must be attached to the device
- No protective measures required (cover, encapsulation, etc.)
- Class 2 lasers are completely harmless to use. No safety precautions are therefore required for devices of laser protection class 2.
- The presence of a laser protection officer is not required during use.

Operating distance

The operating distance is the maximum possible distance between: The transmitter and receiver (through-beam sensor), device and reflector (retro-reflective sensor) or device and object (diffuse sensor and sensor with background suppression). To obtain this maximum, a suitable setting must be made using a potentiometer or the teach-in procedure.

In the case of retro-reflective sensors the specified reflector must be used. Unless otherwise specified in the technical data, the operating distance for diffuse sensors is determined using white paper (degree of reflection 90%) with the format 200 x 200 mm.

With diffuse sensors, the compensation factors listed below apply to objects that differ from the standard object.

- Test card: 100%
- White paper: 80%
- Grey PVC: 57%
- Newsprint: 60%
- Light wood: 73%
- Cork: 65%
- White plastic: 70%
- Black plastic: 22%
- Black neoprene: 20%
- Car tyres: 15%
- Raw aluminium: 200%
- Black anodised aluminium: 150%
- Matt (brushed) aluminium: 120%
- Polished stainless steel: 230%
Opto-electronic sensors

Key features

<table>
<thead>
<tr>
<th>Feature</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Polarising filter</td>
<td>Natural light (and light from the transmitter diodes) is unpolarised. How-</td>
</tr>
<tr>
<td></td>
<td>ever, when light goes through a polarising filter, only the portion of the</td>
</tr>
<tr>
<td></td>
<td>original light that moves in the polarising direction of the filter is still</td>
</tr>
<tr>
<td></td>
<td>available. Polarisation is retained with reflection on reflective surfaces;</td>
</tr>
<tr>
<td></td>
<td>only the polarising direction may change in this case. On the other hand,</td>
</tr>
<tr>
<td></td>
<td>diffuse reflection destroys polarisation. This difference is used for</td>
</tr>
<tr>
<td></td>
<td>suppression of the interference effects on retro-reflective sensors caused</td>
</tr>
<tr>
<td></td>
<td>by reflective surfaces.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Feature</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Switching frequency</td>
<td>The maximum switching frequency is determined with the aid of a rotating</td>
</tr>
<tr>
<td></td>
<td>slotted disc. The disc, which is positioned in the light beam, is designed</td>
</tr>
<tr>
<td></td>
<td>to produce a bright/dark ratio of 1:1. The maximum switching frequency is</td>
</tr>
<tr>
<td></td>
<td>achieved when no output signal pulses are lost.</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Feature</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Magnetic fields</td>
<td>Permanent magnetic fields and low-frequencyalternating fields do not</td>
</tr>
<tr>
<td></td>
<td>normally affect the function of photo-electric proximity sensors.</td>
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</table>

<table>
<thead>
<tr>
<th>Feature</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Temperature influence</td>
<td>The set operating distances are subject to a minor temperature influence.</td>
</tr>
<tr>
<td></td>
<td>Most devices have temperature compensation, so that the influence is</td>
</tr>
<tr>
<td></td>
<td>typically below 0.4%/°C.</td>
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</table>

**Operational reserve display**

The indicating circuit for the operating reserve detects the excess radiant energy which falls on the receiver. Operating reserve may diminish over a period of time due to contamination, changing reflection factor of the object to be scanned and ageing of the transmitter diode, so that reliable operation is no longer assured.

Some devices are therefore equipped with a second LED, which indicates if less than approx. 80% of the available operating distance is used. In other devices, the yellow LED flashes when the available operating reserve is insufficient. With Q50 sensors, insufficient operating reserve is indicated by means of a red LED. Conditions in which reliable operation is no longer guaranteed can therefore be recognised at an early stage.

**Reflectors**

Retro-reflective sensors are equipped with polarising filters which ensure that they respond only to light returned by special reflectors. These reflectors function according to the principle of a corner cube. The choice of the right reflector for a specific application will be given by the required operating distance and the available mounting facilities. The reflector should be installed perpendicular to the optical axis (tolerance ±15°).
Sensors SOE... Opto-electronic

- Diffuse sensors and retro-reflective sensors
- Sensors with background suppression
- Fibre-optic units
- Distance sensors
- Laser contrast sensors, diffuse sensors and retro-reflective sensors
- Colour sensors
- Ranges up to 20 m
- Adjustment using teach-in or potentiometer

Product overview

<table>
<thead>
<tr>
<th>Variant</th>
<th>Type</th>
<th>Operating voltage</th>
<th>Switch output</th>
<th>Analogue output</th>
<th>Design</th>
<th>Page/online</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diffuse sensor</td>
<td>SOEG-RT</td>
<td>10 ... 36 V DC</td>
<td>PNP</td>
<td>–</td>
<td>Round</td>
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<tr>
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<td>SOEG-RIZ</td>
<td>PNP</td>
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<td>Round</td>
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<tr>
<td>With cylindrical light beam</td>
<td>NPN</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Sensor with background suppression</td>
<td>SOEG-RTH</td>
<td>10 ... 36 V DC</td>
<td>PNP</td>
<td>–</td>
<td>Round</td>
<td>378</td>
</tr>
<tr>
<td>10 ... 30 V DC</td>
<td>NPN</td>
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<tr>
<td>Retro-reflective sensor</td>
<td>SOEG-RSP</td>
<td>10 ... 36 V DC</td>
<td>PNP</td>
<td>–</td>
<td>Round</td>
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<td>SOEG-RSG</td>
<td>PNP</td>
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<td>Block-shaped</td>
<td>382</td>
<td></td>
<td></td>
</tr>
<tr>
<td>For transparent objects</td>
<td>NPN</td>
<td></td>
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<tr>
<td>Through-beam sensor</td>
<td>SOEG-S</td>
<td>10 ... 36 V DC</td>
<td>–</td>
<td>–</td>
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<td>Fibre-optic unit</td>
<td>SOEG-L</td>
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<td>SOEG-RTD</td>
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<td>PNP</td>
<td>0 ... 10 V</td>
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<td>–</td>
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<td>SOEL-RTD</td>
<td>16 ... 30 V DC</td>
<td>2x PNP</td>
<td>4 ... 20 mA</td>
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<td>0 ... 10 V</td>
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<td>SOEC-RT</td>
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<td>3x PNP</td>
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Detailed product information

⇒ www.festo.com/catalogue/soe
### Sensors SOE..., opto-electronic

#### Type codes

<table>
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<tr>
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<th>SOE</th>
<th>Opto-electronic sensors</th>
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#### Design

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<td>C</td>
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<td>S</td>
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<tr>
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<td>E</td>
<td>Through-beam sensor, receiver</td>
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<tr>
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<td>L</td>
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<td>RTH</td>
<td>Sensor with background suppression</td>
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<td>RTZ</td>
<td>Diffuse sensor with cylindrical light beam</td>
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<td></td>
<td>RTD</td>
<td>Distance sensor</td>
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<td>RSS</td>
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#### Design, size, version

<table>
<thead>
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<tbody>
<tr>
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<tr>
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<td>M12</td>
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<td>M18</td>
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<td>M18W</td>
<td>Round, M18, beam exit angled</td>
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<td>Q20</td>
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<td>Q30</td>
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<td>Q50</td>
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#### Switch output

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<th>PS</th>
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<td>NS</td>
<td>NPN, normally open</td>
</tr>
<tr>
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<td>PA</td>
<td>PNP, antivalent</td>
</tr>
<tr>
<td></td>
<td>NA</td>
<td>NPN, antivalent</td>
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<tr>
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<td>PP</td>
<td>PNP, switchable</td>
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<tr>
<td></td>
<td>NP</td>
<td>NPN, switchable</td>
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<tr>
<td></td>
<td>PU</td>
<td>Analogue 0 ... 10 V</td>
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#### Electrical connection

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<tr>
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<th>K</th>
<th>Cable</th>
</tr>
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<tr>
<td></td>
<td>S</td>
<td>Plug</td>
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#### Indication

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<tr>
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<tr>
<td></td>
<td>3L</td>
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<td>7L</td>
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#### Options

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<th>Options</th>
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<td></td>
<td>Teach-in by means of a button and via electrical connection</td>
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#### Position measuring range
### Diffuse sensors SOEG-RT

**Technical data**

#### General technical data

<table>
<thead>
<tr>
<th>Size</th>
<th>∅ 4 mm</th>
<th>M5</th>
<th>M12x1, straight</th>
<th>M18x1, angled</th>
<th>20x32x12 mm</th>
<th>30x30x15 mm</th>
</tr>
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<tbody>
<tr>
<td>Working range</td>
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</tr>
<tr>
<td>Light type</td>
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<tr>
<td>Setting options</td>
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#### Electrical data

<table>
<thead>
<tr>
<th>Size</th>
<th>∅ 4 mm</th>
<th>M5</th>
<th>M12x1, straight</th>
<th>M18x1, angled</th>
<th>20x32x12 mm</th>
<th>30x30x15 mm</th>
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</thead>
<tbody>
<tr>
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<tr>
<td>Operating voltage range</td>
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<td>Max. switching frequency</td>
<td>[Hz]</td>
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<td>Protection against polarity reversal</td>
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#### Operating and environmental conditions

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<tr>
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<tr>
<td>Ambient temperature with flexible cable installation</td>
<td>[°C]</td>
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<tr>
<td>CE mark (see declaration of conformity)</td>
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#### Materials

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<tbody>
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<td>Cable sheath</td>
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<tr>
<td>Size</td>
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<td>Switching element function</td>
<td>Switch output</td>
<td>Electrical connection</td>
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<td>30x30x15 mm</td>
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**Diffuse sensors SOEG-RTZ, with cylindrical light beam**

### General technical data

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<th>Parameter</th>
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<tr>
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### Electrical data

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<td>Cable, 3-wire</td>
</tr>
<tr>
<td>Operating voltage range [V DC]</td>
<td>10 ... 30</td>
</tr>
<tr>
<td>Max. output current [mA]</td>
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</tr>
<tr>
<td>Max. switching frequency [Hz]</td>
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<tr>
<td>Protection against polarity reversal</td>
<td>For all electrical connections</td>
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<td>Protection class</td>
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### Operating and environmental conditions

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<td>Ambient temperature with flexible cable installation [°C]</td>
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### Materials

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<tr>
<td>Housing</td>
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<td>Cable sheath</td>
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### Ordering data

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<th>Switching element function</th>
<th>Switch output</th>
<th>Electrical connection</th>
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<tr>
<td>10</td>
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<td>PNP</td>
<td>SOEG-RTZ-4-PS-K-L</td>
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<td>SOEG-RTZ-4-NS-K-L</td>
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<td>PNP</td>
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## General technical data

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<thead>
<tr>
<th>Size</th>
<th>M18x1, straight</th>
<th>M18x1, angled</th>
<th>20x32x12 mm</th>
<th>30x30x15 mm</th>
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<tbody>
<tr>
<td>Working range [mm]</td>
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<td>10 ... 120</td>
<td>25 ... 100</td>
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<td>30 ... 300</td>
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<td>Light type</td>
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<tr>
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<td>Potentiometer</td>
<td>Teach-in</td>
<td>Potentiometer</td>
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## Electrical data

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<th>30x30x15 mm</th>
<th>50x50x17 mm</th>
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<tr>
<td>Electrical connection</td>
<td>Cable 3-wire</td>
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<td>3-wire</td>
<td>4-wire</td>
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<tr>
<td></td>
<td>Plug M12x1, 3-pin</td>
<td>M8x1, 4-pin</td>
<td>M12x1, 3-pin</td>
<td>M12x1, 4-pin</td>
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<tr>
<td>Operating voltage range [V DC]</td>
<td>10 ... 36</td>
<td>10 ... 30</td>
<td>10 ... 36</td>
<td>10 ... 30</td>
<td></td>
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<tr>
<td>Max. output current [mA]</td>
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## Operating and environmental conditions

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<th>20x32x12 mm</th>
<th>30x30x15 mm</th>
<th>50x50x17 mm</th>
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<tbody>
<tr>
<td>Ambient temperature [°C]</td>
<td>–25 ... +55</td>
<td>–20 ... +60</td>
<td>–25 ... +55</td>
<td>–20 ... +60</td>
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<tr>
<td>Ambient temperature with flexible cable installation [°C]</td>
<td>–5 ... +55</td>
<td>–5 ... +60</td>
<td>–5 ... +55</td>
<td>–5 ... +60</td>
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<tr>
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<td>In accordance with EU EMC directive</td>
<td>In accordance with EU Low Voltage Directive</td>
<td>In accordance with EU EMC directive</td>
<td>In accordance with EU Low Voltage Directive</td>
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<td>Certification</td>
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## Materials

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<th>20x32x12 mm</th>
<th>30x30x15 mm</th>
<th>50x50x17 mm</th>
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<tbody>
<tr>
<td>Housing</td>
<td>Brass, chrome-plated</td>
<td>Acrylic butadiene styrene</td>
<td>Polybutylene terephthalate, reinforced</td>
<td>Acrylic butadiene styrene</td>
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<tr>
<td>Cable sheath</td>
<td>Polyurethane</td>
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## Sensors SOEG-RTH, with background suppression

### Technical data

<table>
<thead>
<tr>
<th>Size</th>
<th>Working range (mm)</th>
<th>Switching element function</th>
<th>Switch output</th>
<th>Electrical connection</th>
<th>Part No. Type</th>
<th>Part No. Type</th>
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<td>M18, beam exit straight</td>
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<tr>
<td>M18, beam exit angled</td>
<td>10 ... 120</td>
<td>Light switching</td>
<td>PNP</td>
<td>537688 SOEG-RTH-M18W-PS-K-2L</td>
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<td>PNP</td>
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### Technical data

#### General technical data

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<th>M18x1, angled</th>
<th>20x32x12 mm</th>
<th>30x30x15 mm</th>
<th>50x50x17 mm</th>
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<tbody>
<tr>
<td>Working range [mm]</td>
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<td>Teach-in</td>
<td>Teach-in via electrical connection(^1)</td>
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\(^1\) Low-cost variants without the teach-in and programming functionality available

#### Electrical data

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<th>M18x1, straight</th>
<th>M18x1, angled</th>
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<th>30x30x15 mm</th>
<th>50x50x17 mm</th>
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</thead>
<tbody>
<tr>
<td>Electrical connection</td>
<td>Cable</td>
<td>3-wire</td>
<td>4-wire</td>
<td>3-wire</td>
<td>4-wire</td>
<td></td>
</tr>
<tr>
<td>Plug</td>
<td>M12x1, 3-pin</td>
<td>M8x1, 4-pin</td>
<td>M8x1, 3-pin</td>
<td>M12x1, 4-pin</td>
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</tr>
<tr>
<td>Operating voltage range [V DC]</td>
<td>10 ... 36</td>
<td>10 ... 30</td>
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<td>Protection against polarity reversal</td>
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#### Operating and environmental conditions

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<th>M18x1, straight</th>
<th>M18x1, angled</th>
<th>20x32x12 mm</th>
<th>30x30x15 mm</th>
<th>50x50x17 mm</th>
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</thead>
<tbody>
<tr>
<td>Ambient temperature [°C]</td>
<td>−25 ... +55</td>
<td>−20 ... +60</td>
<td>−25 ... +55</td>
<td>−20 ... +60</td>
<td></td>
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</tr>
<tr>
<td>Ambient temperature with flexible cable installation [°C]</td>
<td>−5 ... +55</td>
<td>−5 ... +60</td>
<td>−5 ... +55</td>
<td>−5 ... +60</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CE mark (see declaration of conformity)</td>
<td>In accordance with EU EMC directive</td>
<td>In accordance with EU EMC directive</td>
<td>In accordance with EU EMC directive</td>
<td>In accordance with EU EMC directive</td>
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<td>In accordance with EU Low Voltage Directive</td>
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#### Materials

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<tr>
<th>Size</th>
<th>M12x1</th>
<th>M18x1, straight</th>
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<th>50x50x17 mm</th>
</tr>
</thead>
<tbody>
<tr>
<td>Housing</td>
<td>Brass, chrome-plated</td>
<td>Acrylic butadiene styrene</td>
<td>Polyethylene terephthalate, reinforced</td>
<td>Acrylic butadiene styrene</td>
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<tr>
<td>Cable sheath</td>
<td>Polyurethane</td>
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## Technical data

### Retro-reflective sensors SOEG-RSP

<table>
<thead>
<tr>
<th>Size</th>
<th>Working range [mm]</th>
<th>Switching element function</th>
<th>Switch output</th>
<th>Electrical connection</th>
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<tbody>
<tr>
<td><strong>M12</strong></td>
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<td>PNP</td>
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<td>537685 SOEG-RSP-M12-NS-K-2L 537686 SOEG-RSP-M12-NS-S-2L</td>
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<td><strong>M18, beam exit straight</strong></td>
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<td>Dark switching</td>
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<td>Dark switching</td>
<td>NPN</td>
<td>537713 SOEG-RSP-M18-NS-K-2L 537715 SOEG-RSP-M18-NS-S-2L</td>
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<td><strong>M18, beam exit angled</strong></td>
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<td>Dark switching</td>
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1) Low-cost variants without the teach-in and programming functionality
### General technical data

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<tbody>
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<td>Working range</td>
<td>5 … 500</td>
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<td>Light type</td>
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</tr>
<tr>
<td>Setting options</td>
<td>Teach-in, Teach-in via electrical connection</td>
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### Electrical data

<table>
<thead>
<tr>
<th>Size</th>
<th>20x32x12 mm</th>
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<tbody>
<tr>
<td>Electrical connection</td>
<td>Cable 4-wire</td>
</tr>
<tr>
<td></td>
<td>Plug M8x1, 4-pin</td>
</tr>
<tr>
<td>Operating voltage range</td>
<td>[V DC] 10 … 30</td>
</tr>
<tr>
<td>Max. output current</td>
<td>[mA] 100</td>
</tr>
<tr>
<td>Max. switching frequency</td>
<td>[Hz] 1,000</td>
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<tr>
<td>Protection against short circuit</td>
<td>Pulsed</td>
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<td>For all electrical connections</td>
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### Operating and environmental conditions

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<thead>
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<th>Size</th>
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<tr>
<td>Ambient temperature</td>
<td>[°C] –20 … +60</td>
</tr>
<tr>
<td>Ambient temperature with flexible cable installation</td>
<td>[°C] –5 … +60</td>
</tr>
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<td>CE mark (see declaration of conformity)</td>
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<td>In accordance with EU Low Voltage Directive</td>
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### Materials

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<thead>
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<th>Size</th>
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<tr>
<td>Housing</td>
<td>Acrylic butadiene styrene</td>
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<td>Cable sheath</td>
<td>Polysurethane</td>
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### Ordering data

<table>
<thead>
<tr>
<th>Size</th>
<th>Working range [mm]</th>
<th>Switching element function</th>
<th>Switch output</th>
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### General technical data

<table>
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<tr>
<th>Size</th>
<th>M18x1, straight</th>
<th>M18x1, angled</th>
<th>20x32x12 mm</th>
<th>30x30x15 mm</th>
<th>50x50x17 mm</th>
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</thead>
<tbody>
<tr>
<td>Working range</td>
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<td>Teach-in via electrical connection</td>
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### Electrical data

<table>
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<th>M18x1, straight</th>
<th>M18x1, angled</th>
<th>20x32x12 mm</th>
<th>30x30x15 mm</th>
<th>50x50x17 mm</th>
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<tbody>
<tr>
<td>Electrical connection</td>
<td>Transmitter</td>
<td>Cable 3-wire</td>
<td>4-wire</td>
<td>3-wire</td>
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<tr>
<td></td>
<td>Plug M12x1, 3-pin</td>
<td></td>
<td>M8x1, 4-pin</td>
<td>M8x1, 3-pin</td>
<td>M12x1, 4-pin</td>
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<tr>
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<td>Receiver</td>
<td>Cable 4-wire</td>
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<tr>
<td></td>
<td>Plug M12x1, 4-pin</td>
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<td>M8x1, 4-pin</td>
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<td>Max. switching frequency</td>
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### Operating and environmental conditions

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<th>M18x1, angled</th>
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<th>30x30x15 mm</th>
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<tbody>
<tr>
<td>Ambient temperature</td>
<td>[°C]</td>
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<td>–25 ... +55</td>
<td>–20 ... +60</td>
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<td>Ambient temperature with flexible cable installation</td>
<td>[°C]</td>
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<td>–5 ... +60</td>
<td>–5 ... +55</td>
<td>–5 ... +60</td>
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<td>CE mark (see declaration of conformity)</td>
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<td>In accordance with EU EMC directive</td>
<td>In accordance with EU EMC directive</td>
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### Materials

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<th>30x30x15 mm</th>
<th>50x50x17 mm</th>
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<tr>
<td>Housing</td>
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<td>Polybutylene terephthalate, reinforced</td>
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### Through-beam sensors SOEG-S/E

#### Technical data

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<thead>
<tr>
<th>Size</th>
<th>Working range [mm]</th>
<th>Function</th>
<th>Switching element function</th>
<th>Switch output</th>
<th>Electrical connection</th>
<th>Part No.</th>
<th>Type</th>
<th>Part No.</th>
<th>Type</th>
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</thead>
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<tr>
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<td>Antivalent</td>
<td>PNP</td>
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<td>--</td>
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<td>537695 SOEG-S-M18W-S-L</td>
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<td>PNP</td>
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<td>165352 SOEG-S-Q30-K-L</td>
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<td>PNP</td>
<td>165322 SOEG-E-Q30-PS-K-2L</td>
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</table>
## General technical data

<table>
<thead>
<tr>
<th>Size</th>
<th>Working range [mm]</th>
<th>Light type</th>
<th>Setting options</th>
</tr>
</thead>
<tbody>
<tr>
<td>20x32x12 mm</td>
<td>0 … 250</td>
<td>Red</td>
<td>Teach-in</td>
</tr>
<tr>
<td>30x30x15 mm</td>
<td>0 … 120</td>
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<td>Teach-in via electrical connection</td>
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## Electrical data

<table>
<thead>
<tr>
<th>Size</th>
<th>Electrical connection</th>
<th>Operating voltage range [V DC]</th>
<th>Max. output current [mA]</th>
<th>Max. switching frequency [Hz]</th>
<th>Protection against short circuit</th>
<th>Protection against polarity reversal</th>
<th>Protection class</th>
</tr>
</thead>
<tbody>
<tr>
<td>20x32x12 mm</td>
<td>Cable</td>
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<td>30x30x15 mm</td>
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## Operating and environmental conditions

<table>
<thead>
<tr>
<th>Size</th>
<th>Ambient temperature [°C]</th>
<th>Ambient temperature with flexible cable installation [°C]</th>
<th>CE mark (see declaration of conformity)</th>
<th>Certification</th>
</tr>
</thead>
<tbody>
<tr>
<td>20x32x12 mm</td>
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<td>–5 … +55</td>
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## Materials

<table>
<thead>
<tr>
<th>Size</th>
<th>Housing</th>
<th>Cable sheath</th>
</tr>
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<tbody>
<tr>
<td>20x32x12 mm</td>
<td>Acrylic butadiene styrene</td>
<td>Polyurethane</td>
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<tr>
<td>30x30x15 mm</td>
<td>Polybutylene terephthalate, reinforced</td>
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## Ordering data

<table>
<thead>
<tr>
<th>Size</th>
<th>Working range [mm]</th>
<th>Switching element function</th>
<th>Switch output</th>
<th>Electrical connection</th>
<th>Part No. Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>20x32x12 mm</td>
<td>0 … 250</td>
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<td>PNP</td>
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<tr>
<td>30x30x15 mm</td>
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# Distance sensors SOEG-RTD

## Technical data

### General technical data

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<tr>
<td>Displacement resolution</td>
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</tr>
<tr>
<td>Light type</td>
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</tr>
<tr>
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### Electrical data

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<tr>
<td>Analogue output</td>
<td>[V] 0 ... 10</td>
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</tr>
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<td>Operating voltage range</td>
<td>[V DC] 15 ... 30</td>
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<tr>
<td>Max. output current</td>
<td>[mA] 100</td>
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<tr>
<td>Max. switching frequency</td>
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<td>Pulsed</td>
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<td>For all electrical connections</td>
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<tr>
<td>Protection class</td>
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### Operating and environmental conditions

<table>
<thead>
<tr>
<th>Size</th>
<th>20x32x12 mm</th>
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</thead>
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<tr>
<td>Ambient temperature</td>
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<td>[°C] 0 ... 60</td>
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<td>Certification</td>
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### Materials

<table>
<thead>
<tr>
<th>Size</th>
<th>20x32x12 mm</th>
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</thead>
<tbody>
<tr>
<td>Housing</td>
<td>Acrylic butadiene styrene</td>
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<tr>
<td>Cable sheath</td>
<td>Polyurethane</td>
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### Ordering data

<table>
<thead>
<tr>
<th>Size</th>
<th>Working range</th>
<th>Switching element function</th>
<th>Switch output</th>
<th>Electrical connection</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>[mm]</td>
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<td>Plug</td>
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<td>Part No. Type</td>
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## Technical data

### General technical data

<table>
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<th>Contrast sensor (diffuse)</th>
<th>With background suppression</th>
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<tr>
<td>Size</td>
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<td>20x32x12 mm</td>
</tr>
<tr>
<td></td>
<td>50x50x17 mm</td>
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</tr>
<tr>
<td>Working range [mm]</td>
<td>40 … 150</td>
<td>30 … 110</td>
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<tr>
<td></td>
<td>50 … 300</td>
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<tr>
<td>Light type</td>
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<td></td>
</tr>
<tr>
<td>Laser protection class</td>
<td>2</td>
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</tr>
<tr>
<td>Setting options</td>
<td>Teach-in</td>
<td>Teach-in via electrical connection</td>
</tr>
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<td>Potentiometer</td>
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### Electrical data

<table>
<thead>
<tr>
<th>Method of measurement</th>
<th>Contrast sensor (diffuse)</th>
<th>With background suppression</th>
</tr>
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<tbody>
<tr>
<td>Size</td>
<td>20x32x12 mm</td>
<td>20x32x12 mm</td>
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<tr>
<td></td>
<td>50x50x17 mm</td>
<td></td>
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<tr>
<td>Electrical connection</td>
<td>Cable 4-wire</td>
<td>4-wire</td>
</tr>
<tr>
<td></td>
<td>Plug M8x1, 4-pin</td>
<td>M8x1, 4-pin</td>
</tr>
<tr>
<td></td>
<td>4-wire</td>
<td>M12x1, 4-pin</td>
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<tr>
<td>Operating voltage range [V DC]</td>
<td>10 ... 30</td>
<td>10 ... 30</td>
</tr>
<tr>
<td>Max. output current [mA]</td>
<td>100</td>
<td>100</td>
</tr>
<tr>
<td>Max. switching frequency [Hz]</td>
<td>4,000</td>
<td>1,000</td>
</tr>
<tr>
<td>Protection against short circuit</td>
<td>Pulsed</td>
<td></td>
</tr>
<tr>
<td>Protection against polarity reversal</td>
<td>For all electrical connections</td>
<td></td>
</tr>
<tr>
<td>Protection class</td>
<td>IP67</td>
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### Operating and environmental conditions

<table>
<thead>
<tr>
<th>Method of measurement</th>
<th>Contrast sensor (diffuse)</th>
<th>With background suppression</th>
</tr>
</thead>
<tbody>
<tr>
<td>Size</td>
<td>20x32x12 mm</td>
<td>20x32x12 mm</td>
</tr>
<tr>
<td></td>
<td>50x50x17 mm</td>
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</tr>
<tr>
<td>Ambient temperature [°C]</td>
<td>–20 ... +60</td>
<td>–20 ... +60</td>
</tr>
<tr>
<td></td>
<td>–20 ... +45</td>
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</tr>
<tr>
<td>Ambient temperature with flexible cable installation [°C]</td>
<td>–5 ... +60</td>
<td>–5 ... +60</td>
</tr>
<tr>
<td>CE mark (see declaration of conformity)</td>
<td>In accordance with EU EMC directive</td>
<td>In accordance with EU Low Voltage Directive</td>
</tr>
<tr>
<td>Certification</td>
<td>cULus - Listed (OL)</td>
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<tr>
<td></td>
<td>C-Tick</td>
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### Materials

- Housing: Acrylic butadiene styrene
- Cable sheath: Polyurethane

### Ordering data

<table>
<thead>
<tr>
<th>Size</th>
<th>Working range [mm]</th>
<th>Switching element function</th>
<th>Switch output</th>
<th>Electrical connection</th>
<th>Cable</th>
<th>Plug Part No. Type</th>
<th>Plug Part No. Type</th>
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<tbody>
<tr>
<td>20x32x12 mm, contrast sensor (diffuse)</td>
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<td>Switchable</td>
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<td>537735 SOEL-RT-Q20-PP-S-2L-TI</td>
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<td>20x32x12 mm, with background suppression</td>
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<td>Switchable</td>
<td>PNP</td>
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<td>NPN</td>
<td>537730 SOEL-RT-Q20-NP-K-2L-TI</td>
<td>537728 SOEL-RT-Q20-NP-S-2L-TI</td>
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<tr>
<td>50x50x17 mm, with background suppression</td>
<td>50 ... 300</td>
<td>Antivalent</td>
<td>PNP</td>
<td>537777 SOEL-RT-Q50-PA-K-3L</td>
<td>537775 SOEL-RT-Q50-PA-S-3L</td>
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</table>
# Laser retro-reflective sensors SOEL-RSP

## General technical data

<table>
<thead>
<tr>
<th>Size</th>
<th>20x32x12 mm</th>
<th>50x50x17 mm</th>
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</thead>
<tbody>
<tr>
<td>Working range [mm]</td>
<td>70 ... 3,000</td>
<td>20,000</td>
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<td>Light type</td>
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<td>Laser protection class</td>
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<td>1</td>
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<tr>
<td>Setting options</td>
<td>Teach-in</td>
<td>Teach-in via electrical connection</td>
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</tbody>
</table>

## Electrical data

<table>
<thead>
<tr>
<th>Size</th>
<th>20x32x12 mm</th>
<th>50x50x17 mm</th>
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<tbody>
<tr>
<td>Electrical connection</td>
<td>Cable 4-wire</td>
<td>4-wire</td>
</tr>
<tr>
<td></td>
<td>Plug M8x1, 4-pin</td>
<td>M12x1, 4-pin</td>
</tr>
<tr>
<td>Operating voltage range [V DC]</td>
<td>10 ... 30</td>
<td></td>
</tr>
<tr>
<td>Max. output current [mA]</td>
<td>100</td>
<td>200</td>
</tr>
<tr>
<td>Max. switching frequency [Hz]</td>
<td>4,000</td>
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<tr>
<td>Protection against short circuit</td>
<td>Pulsed</td>
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</tr>
<tr>
<td>Protection against polarity reversal</td>
<td>For all electrical connections</td>
<td></td>
</tr>
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<td>Protection class</td>
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## Operating and environmental conditions

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<thead>
<tr>
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<th>20x32x12 mm</th>
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</thead>
<tbody>
<tr>
<td>Ambient temperature [°C]</td>
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<td>−20 ... +45</td>
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<tr>
<td>Ambient temperature with flexible cable installation [°C]</td>
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<td>−5 ... +45</td>
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<td>In accordance with EU Low Voltage Directive</td>
</tr>
<tr>
<td>Certification</td>
<td>c UL us - Listed (OL)</td>
<td>C-Tick</td>
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## Materials

<table>
<thead>
<tr>
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<th>50x50x17 mm</th>
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</thead>
<tbody>
<tr>
<td>Housing</td>
<td>Acrylic butadiene styrene</td>
<td></td>
</tr>
<tr>
<td>Cable sheath</td>
<td>Polyurethane</td>
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## Ordering data

<table>
<thead>
<tr>
<th>Size</th>
<th>Working range [mm]</th>
<th>Switching element function</th>
<th>Switch output</th>
<th>Electrical connection</th>
<th>Plug</th>
<th>Part No.</th>
<th>Type</th>
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<tbody>
<tr>
<td>20x32x12 mm</td>
<td>70 ... 3,000</td>
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## General technical data

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<td>Working range [mm]</td>
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<td></td>
<td>44 … 84</td>
</tr>
<tr>
<td></td>
<td>80 … 300</td>
</tr>
<tr>
<td>Position measuring range [mm]</td>
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<tr>
<td>Displacement resolution [mm]</td>
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<tr>
<td>Laser protection class</td>
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<tr>
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## Electrical data

<table>
<thead>
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<th>Size</th>
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</thead>
<tbody>
<tr>
<td>Working range [mm]</td>
<td>38 … 58</td>
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<tr>
<td></td>
<td>44 … 84</td>
</tr>
<tr>
<td></td>
<td>80 … 300</td>
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<tr>
<td>Analogue output [mA]</td>
<td>–</td>
</tr>
<tr>
<td></td>
<td>–</td>
</tr>
<tr>
<td></td>
<td>4 … 20</td>
</tr>
<tr>
<td>Analogue output [V]</td>
<td>0 ... 10</td>
</tr>
<tr>
<td></td>
<td>0 ... 10</td>
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<td></td>
<td>–</td>
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<td>Plug M12x1, 4-pin</td>
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<tr>
<td></td>
<td>Plug M12x1, 4-pin</td>
</tr>
<tr>
<td></td>
<td>Plug M12x1, 8-pin</td>
</tr>
<tr>
<td>Operating voltage range [V DC]</td>
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<td>18 ... 28</td>
</tr>
<tr>
<td></td>
<td>16 ... 30</td>
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<td>Max. load current on the analogue voltage output [mA]</td>
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<td>3,0</td>
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<td>–</td>
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<tr>
<td>Max. output current [mA]</td>
<td>–</td>
</tr>
<tr>
<td></td>
<td>–</td>
</tr>
<tr>
<td></td>
<td>100</td>
</tr>
<tr>
<td>Measuring frequency [Hz]</td>
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<tr>
<td></td>
<td>–</td>
</tr>
<tr>
<td>Max. switching frequency [Hz]</td>
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</tr>
<tr>
<td></td>
<td>–</td>
</tr>
<tr>
<td></td>
<td>1,000</td>
</tr>
<tr>
<td>Protection against short circuit</td>
<td>Pulsed</td>
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<tr>
<td>Protection against polarity reversal</td>
<td>For operating voltage</td>
</tr>
<tr>
<td>Protection class</td>
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## Operating and environmental conditions

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</tr>
<tr>
<td>Certification</td>
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<td></td>
<td>C-Tick</td>
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## Materials

<table>
<thead>
<tr>
<th>Size</th>
<th>50x50x17 mm</th>
</tr>
</thead>
<tbody>
<tr>
<td>Housing</td>
<td>Acrylic butadiene styrene</td>
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</tbody>
</table>

## Ordering data

<table>
<thead>
<tr>
<th>Size</th>
<th>Working range [mm]</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>38 … 58</td>
</tr>
<tr>
<td></td>
<td>44 … 84</td>
</tr>
<tr>
<td></td>
<td>80 … 300</td>
</tr>
<tr>
<td>Switching element function</td>
<td>–</td>
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<tr>
<td></td>
<td>–</td>
</tr>
<tr>
<td></td>
<td>2x PNP</td>
</tr>
<tr>
<td>Switch output</td>
<td>–</td>
</tr>
<tr>
<td></td>
<td>–</td>
</tr>
<tr>
<td></td>
<td>2x PNP</td>
</tr>
<tr>
<td>Analogue output</td>
<td>0 … 10 V</td>
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<tr>
<td></td>
<td>0 … 10 V</td>
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<tr>
<td></td>
<td>0 … 10 V</td>
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<tr>
<td>Electrical connection</td>
<td>Plug</td>
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<td>Plug</td>
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<td>Plug</td>
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<td>SOEL-RTD-Q50-PP-S-7L</td>
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### General technical data

<table>
<thead>
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<th>Size</th>
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<td>Working range</td>
<td>[mm] 12 ... 32</td>
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<td>Setting options</td>
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### Electrical data

<table>
<thead>
<tr>
<th>Size</th>
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</thead>
<tbody>
<tr>
<td>Electrical connection</td>
<td>Plug M12x1, 8-pin</td>
</tr>
<tr>
<td>Operating voltage range</td>
<td>[V DC] 10 ... 30</td>
</tr>
<tr>
<td>Max. output current</td>
<td>[mA] 100</td>
</tr>
<tr>
<td>Max. switching frequency</td>
<td>[Hz] 500</td>
</tr>
<tr>
<td>Protection against short circuit</td>
<td>Pulsed</td>
</tr>
<tr>
<td>Protection against polarity reversal</td>
<td>For all electrical connections</td>
</tr>
<tr>
<td>Protection class</td>
<td>IP67</td>
</tr>
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### Materials

<table>
<thead>
<tr>
<th>Size</th>
<th>50x50x17 mm</th>
</tr>
</thead>
<tbody>
<tr>
<td>Housing</td>
<td>Acrylic butadiene styrene</td>
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</tbody>
</table>

### Operating and environmental conditions

<table>
<thead>
<tr>
<th>Size</th>
<th>50x50x17 mm</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ambient temperature</td>
<td>[°C] -10 ... +55</td>
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</tr>
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<td>Certification</td>
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### Ordering data

<table>
<thead>
<tr>
<th>Size</th>
<th>Working range</th>
<th>Switching element function</th>
<th>Switch output</th>
<th>Electrical connection</th>
</tr>
</thead>
<tbody>
<tr>
<td>50x50x17 mm</td>
<td>12 ... 32</td>
<td>Light switching</td>
<td>3x PNP</td>
<td>538236 SOEC-RT-Q50-PS-5-7L</td>
</tr>
</tbody>
</table>
### Peripherals overview

#### Round design, ∅ 4 mm, M12, M18, M18W

- [1] Round design, ∅ 4 mm, M12, M18... with plug
- [2] Round design, ∅ 4 mm, M12, M18... with cable

#### Block design, 20x32x12 mm

- [3] Block design, 20x32x12 mm, with plug
- [4] Block design, 20x32x12 mm, with cable

#### Block design, 30x30x15 mm

- [5] Block design, 30x30x15 mm, with plug
- [6] Block design, 30x30x15 mm, with cable

#### Block design, 50x50x17 mm

- [7] Block design, 50x50x17 mm, with plug
- [8] Block design, 50x50x17 mm, with cable

### Connecting cables

- [9] NEBU-M...G...
- [10] NEBU-M...W...

### Sensor retainers

- [12] SIEZ-UV
- [13] SIEZ-UH

### Mounting brackets

- [14] SOEZ-HW-Q20
- [15] SOEZ-HW-Q30
- [16] SOEZ-HW-Q50

### Inscription label

- [17] SIEZ-LB

### Fibre-optic cables, polymer

- SOEZ-LLK-RT, diffuse sensor
- SOEZ-LLK-SE, through-beam sensor

### Fibre-optic cables, glass fibre

- SOEZ-LLG-RT, diffuse sensor
- SOEZ-LLG-SE, through-beam sensor

### Reflectors

- Reflector
- Reflector foil
- Reflector for laser light
## Sensors > Opto-electrical sensors

### Sensors SOE..., opto-electronic

#### Accessories

#### Ordering data – Connecting cables M8x1

<table>
<thead>
<tr>
<th>Number of wires</th>
<th>Cable length [m]</th>
<th>Part No.</th>
<th>Type</th>
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<tbody>
<tr>
<td>3</td>
<td>2.5</td>
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<td>NEBU-M8G3-K-2.5-LE3</td>
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<td>5</td>
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<td>NEBU-M8G3-K-5-LE3</td>
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<td>4</td>
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#### Ordering data – Connecting cables M12x1

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<td>2.5</td>
<td>541363</td>
<td>NEBU-M12G5-K-2.5-LE3</td>
</tr>
<tr>
<td>5</td>
<td>2.5</td>
<td>541364</td>
<td>NEBU-M12G5-K-5-LE3</td>
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<tr>
<td>4</td>
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<td>541328</td>
<td>NEBU-M12G5-K-5-LE4</td>
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<tr>
<td>8</td>
<td>2</td>
<td>525616</td>
<td>SIM-M12-BGD-2-PU</td>
</tr>
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<td>5</td>
<td>2</td>
<td>525618</td>
<td>SIM-M12-BGD-5-PU</td>
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</table>

#### Ordering data – Mounting attachments

<table>
<thead>
<tr>
<th>For design</th>
<th>Part No.</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mounting bracket</td>
<td>Q20</td>
<td>537785</td>
</tr>
<tr>
<td></td>
<td>Q30</td>
<td>165355</td>
</tr>
<tr>
<td></td>
<td>Q50</td>
<td>537786</td>
</tr>
<tr>
<td>Sensor retainer</td>
<td>4</td>
<td>538343</td>
</tr>
<tr>
<td></td>
<td>M12</td>
<td>538347</td>
</tr>
<tr>
<td></td>
<td>M18, M18W</td>
<td>538349</td>
</tr>
<tr>
<td></td>
<td>M12, M18, M18W</td>
<td>538354</td>
</tr>
<tr>
<td></td>
<td>M12, M18, M18W</td>
<td>538355</td>
</tr>
<tr>
<td></td>
<td>M12, M18, M18W</td>
<td></td>
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</table>

#### Ordering data – Reflectors

<table>
<thead>
<tr>
<th>Size [mm]</th>
<th>Part No.</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ø 20</td>
<td>165363</td>
<td>SOEZ-RFS-20</td>
</tr>
<tr>
<td>Ø 40</td>
<td>165364</td>
<td>SOEZ-RFS-40</td>
</tr>
<tr>
<td>Ø 84</td>
<td>165365</td>
<td>SOEZ-RFS-80</td>
</tr>
<tr>
<td>10 x 50</td>
<td>537788</td>
<td>SOEZ-RFL-50</td>
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<tr>
<td>10 x 50</td>
<td>537787</td>
<td>SOEZ-RFL-10</td>
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#### Ordering data – Fibre-optic cables

<table>
<thead>
<tr>
<th>Use</th>
<th>Part No.</th>
<th>Type</th>
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<tbody>
<tr>
<td>Polymer</td>
<td>R1(1)</td>
<td>165356</td>
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<tr>
<td></td>
<td>S/E(2)</td>
<td>165357</td>
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<tr>
<td>Glass fibre</td>
<td>R1(1)</td>
<td>165358</td>
</tr>
<tr>
<td></td>
<td>S/E(2)</td>
<td>165360</td>
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</table>

#### Fibre-optic cable cutter

For polymer fibre-optic cables

<table>
<thead>
<tr>
<th>Part No.</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>36479</td>
<td>SOE-LKS</td>
</tr>
</tbody>
</table>

#### 1) Diffuse sensor

#### 2) Through-beam sensor
General application examples

- Opto-electronic sensors SOEG check whether the boxes are filled.
- Edge detection using opto-electronic sensors SOEG

Fibre-optic technology for high-temperature ranges

- SOEG-L can be combined with SOEZ-LLG glass fibre-optic cables to detect objects in high-temperature environments.
Sensors with background suppression

- Sensors SOEG-RTH with background suppression detect objects on the basis of their geometric position rather than the strength of the reflection.
- The objects are detected practically independently of their color. It makes no difference how shiny any objects in the background are.

- Detection of objects of different colors at the same distance and close to the background.
- Colour-independent detection of trays.
- Detection of lids of different colors on yogurt pots with a sensor SOEG-RTH with background suppression. Metallic lids can also be detected by inductive sensors SIE.

- Detection of overlaps with SOEG-RTH-Q30/Q50.
- Checking that snack food quantities are correct using sensors SOEG-RTH with background suppression.
- The distance sensor SOEG-RTD can also check that the number of items is correct.
- Checking that the position of bowls is correct using sensors SOEG-RTH with background suppression.
- Metallic bowls can also be detected by inductive sensors SIE.

- Counting of connections using the laser sensor SOEL-RTH with background suppression.

- The presence or absence of small objects can be detected easily using the laser sensor SOEL-RTH with background suppression.
- Detection of O-rings using the laser sensor SOEL-RTH with background suppression.
Retro-reflective sensors

- The laser retro-reflective sensors SOEL-RSP detect small gaps between objects.
- The laser beam of a retro-reflective sensor SOEL-RSP can thus be set to detect variations in alignment.
- After moulding, the laser retro-reflective sensor SOEL-RSP detects whether the workpieces are still in the metallic mould.
- SOEG-RSG – the perfect retro-reflective sensor for transparent objects.

Contrast sensor

- The laser contrast sensor SOEL-RT-Q20 can detect a thread, even in a hole.

Distance sensor

- The laser distance sensors SOEL-RTD can gauge the shapes of different workpieces.

Colour sensor

- The colour sensor SOEC-RT-Q50 has three channels. Each of these channels can be adjusted separately by means of a simple teach-in procedure.
- Parts are sorted by colour using the colour sensor SOEC-RT-Q50.
Fibre-optic units SOE4

Product overview

- High precision fibre-optic units
- Switching frequencies up to 8,000 Hz
- Working ranges up to 2,000 mm
- Variants with LED display, switching and analogue outputs
- Setting via teach-in
- Comprehensive range of fibre-optic cables

<table>
<thead>
<tr>
<th>Version</th>
<th>Type</th>
<th>Type of display</th>
<th>Timer function</th>
<th>Switching output</th>
<th>Analogue output</th>
<th>Page/online</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fibre-optic unit</td>
<td>SOE4-FO-L</td>
<td>LED</td>
<td>–</td>
<td>PNP</td>
<td>–</td>
<td>399</td>
</tr>
<tr>
<td></td>
<td>SOE4-FO-D</td>
<td>LED display</td>
<td>1 ... 2,000 ms</td>
<td>PNP</td>
<td>–</td>
<td>399</td>
</tr>
<tr>
<td></td>
<td>SOE4-FO-D</td>
<td>LED display</td>
<td>1 ... 2,000 ms</td>
<td>PNP</td>
<td>0 ... 10 V</td>
<td>399</td>
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</tbody>
</table>

Detailed product information
→ www.festo.com/catalogue/soe4
## Fibre-optic units SOE4

**Type codes**

<table>
<thead>
<tr>
<th>Type</th>
<th>FO</th>
<th>D</th>
<th>H</th>
<th>F2</th>
<th>1PU</th>
<th>K</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fibre-optic unit</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
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<td>Fibre-optic cable</td>
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<td>LED</td>
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<td></td>
</tr>
<tr>
<td>LED display</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>H-rail mounting or via through-holes</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Fibre-optic cable Ø 2 mm</td>
<td></td>
<td></td>
<td></td>
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<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>1 switching output PNP and 0 … 10 V analogue</td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>1 switching output NPN and 0 … 10 V analogue</td>
<td></td>
<td></td>
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<td>Cable, 2 m long</td>
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</tr>
<tr>
<td>Plug M8x1</td>
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</table>
### General technical data

<table>
<thead>
<tr>
<th>Type of display</th>
<th>LED</th>
<th>LED display</th>
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</thead>
<tbody>
<tr>
<td>Working range</td>
<td>Depends on the measuring mode and fibre-optic cables, value tables 401, 402</td>
<td>Depends on the measuring mode and fibre-optic cables, value tables for standard mode 401, 402</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Standard mode: 100%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Fine mode: approx. 40%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Fast mode: approx. 40%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>High-distance mode: approx. 190%</td>
</tr>
<tr>
<td>Mutual interference</td>
<td>–</td>
<td>Protected against interference with up to four devices mounted directly next to one another</td>
</tr>
<tr>
<td>Light type</td>
<td>Red</td>
<td>–</td>
</tr>
<tr>
<td>Setting options</td>
<td>Teach-in</td>
<td>Teach-in via electrical connection</td>
</tr>
</tbody>
</table>

### Electrical data

<table>
<thead>
<tr>
<th>Type of display</th>
<th>LED</th>
<th>LED display</th>
</tr>
</thead>
<tbody>
<tr>
<td>Max. switching frequency [Hz]</td>
<td>1,500</td>
<td>Standard mode: 1,000</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Fine mode: 125</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Fast mode: 8,000</td>
</tr>
<tr>
<td></td>
<td></td>
<td>High-distance mode: 125</td>
</tr>
<tr>
<td>Timer function [ms]</td>
<td>–</td>
<td>1 ... 2,000</td>
</tr>
<tr>
<td>Operating voltage range [V DC]</td>
<td>10 ... 30</td>
<td>–</td>
</tr>
<tr>
<td>Max. output current [mA]</td>
<td>100</td>
<td>–</td>
</tr>
<tr>
<td>Protection against short circuit</td>
<td>Pulsed</td>
<td>–</td>
</tr>
<tr>
<td>Protection against polarity reversal</td>
<td>For operating voltage</td>
<td>–</td>
</tr>
<tr>
<td>Protection class</td>
<td>IP64</td>
<td>–</td>
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### Operating and environmental conditions

<table>
<thead>
<tr>
<th>Condition</th>
<th>Value</th>
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<tbody>
<tr>
<td>Ambient temperature [°C]</td>
<td>–20 ... +60</td>
</tr>
<tr>
<td>Ambient temperature with flexible cable installation [°C]</td>
<td>–5 ... +60</td>
</tr>
<tr>
<td>CE symbol (see declaration of conformity)</td>
<td>In accordance with EU EMC directive 1)</td>
</tr>
<tr>
<td>Certification</td>
<td>C-UL-US listed (UL)</td>
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<tr>
<td></td>
<td>Ticks</td>
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</tbody>
</table>

1) For information about the applicability of the component see the manufacturer’s EC declaration of conformity at: www.festo.com Support User documentation.

### Materials

<table>
<thead>
<tr>
<th>Component</th>
<th>Material</th>
</tr>
</thead>
<tbody>
<tr>
<td>Housing</td>
<td>Acrylic butadiene styrene</td>
</tr>
<tr>
<td>Cable sheath</td>
<td>Polyurethane</td>
</tr>
</tbody>
</table>

### Ordering data

<table>
<thead>
<tr>
<th>Version</th>
<th>Type of display</th>
<th>Switching output, switching function</th>
<th>Analogue output</th>
<th>Electrical connection</th>
<th>Part No.</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>LED</td>
<td>PNP, switchable</td>
<td>–</td>
<td>Cable, 4-wire</td>
<td>Plug M8x1, 4-pin</td>
<td>552 795</td>
<td>SOE4-FO-L-HF2-1P-K</td>
</tr>
<tr>
<td></td>
<td>NPN, switchable</td>
<td>–</td>
<td>Cable, 4-wire</td>
<td>Plug M8x1, 4-pin</td>
<td>552 796</td>
<td>SOE4-FO-L-HF2-1P-MB</td>
</tr>
<tr>
<td>LED display</td>
<td>PNP, switchable</td>
<td>–</td>
<td>Plug M8x1, 4-pin</td>
<td>–</td>
<td>552 798</td>
<td>SOE4-FO-L-HF2-1N-M8</td>
</tr>
<tr>
<td></td>
<td>NPN, switchable</td>
<td>–</td>
<td>Cable, 5-wire</td>
<td>Plug M8x1, 4-pin</td>
<td>552 800</td>
<td>SOE4-FO-D-HF2-1N-MB</td>
</tr>
<tr>
<td></td>
<td>PNP, switchable</td>
<td>0 ... 10 V</td>
<td>Cable, 5-wire</td>
<td>–</td>
<td>552 801</td>
<td>SOE4-FO-D-HF2-1PU-K</td>
</tr>
<tr>
<td></td>
<td>NPN, switchable</td>
<td>0 ... 10 V</td>
<td>Cable, 5-wire</td>
<td>–</td>
<td>552 802</td>
<td>SOE4-FO-D-HF2-1NU-K</td>
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## Accessories

<table>
<thead>
<tr>
<th></th>
<th>Brief description</th>
<th>Page/online</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Fibre-optic unit SOE4-...-K &lt;br&gt;With cable</td>
<td>399</td>
</tr>
<tr>
<td>2</td>
<td>Fibre-optic unit SOE4-...-M8 &lt;br&gt;With plug M8x1, 4-pin</td>
<td>399</td>
</tr>
<tr>
<td>3</td>
<td>Connecting cable &lt;br&gt;With socket M8x1, 4-pin</td>
<td>404</td>
</tr>
<tr>
<td>4</td>
<td>Mounting rail to DIN EN 60715 &lt;br&gt;For wall mounting of more than 2 fibre-optic units</td>
<td>-</td>
</tr>
<tr>
<td>5</td>
<td>Adapter plate SXE3-W &lt;br&gt;For wall mounting of max. 2 fibre-optic units</td>
<td>404</td>
</tr>
<tr>
<td>6</td>
<td>Fibre-optic cable &lt;br&gt;As diffuse sensor, through-beam sensor, fixed focus or series designs</td>
<td>401</td>
</tr>
<tr>
<td>7</td>
<td>Ancillary lens &lt;br&gt;For adapting the optical characteristics of fibre-optic cables</td>
<td>403</td>
</tr>
<tr>
<td>8</td>
<td>Adapter &lt;br&gt;For fibre-optic cables with O.D. 1.0 and 1.25 ... 1.3 mm</td>
<td>403</td>
</tr>
<tr>
<td></td>
<td>Fibre-optic cutter &lt;br&gt;For fibre-optic cables made from plastic with O.D. 1.0 and 1.25 ... 1.3 as well as 2.2 mm</td>
<td>403</td>
</tr>
</tbody>
</table>
### Technical data – Fibre-optic cable (diffuse sensor)

<table>
<thead>
<tr>
<th>Special feature of fibre-optic cable</th>
<th>Standard</th>
<th>Coaxial</th>
<th>Large working range</th>
<th>Flexible</th>
</tr>
</thead>
<tbody>
<tr>
<td>Working range [mm]</td>
<td>140</td>
<td>75</td>
<td>200</td>
<td>130</td>
</tr>
<tr>
<td>Min. object diameter [mm]</td>
<td>0.1</td>
<td>0.1</td>
<td>0.1</td>
<td>0.1</td>
</tr>
<tr>
<td>Min. bending radius [mm]</td>
<td>25</td>
<td>15</td>
<td>40</td>
<td>2</td>
</tr>
<tr>
<td>Outer Ø [mm]</td>
<td>2.2</td>
<td>1.25</td>
<td>2.2</td>
<td>1.3</td>
</tr>
<tr>
<td>Head size</td>
<td>M6</td>
<td>M4</td>
<td>M6</td>
<td>M4</td>
</tr>
<tr>
<td>Protection class</td>
<td>IP66</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ambient temperature [°C]</td>
<td>–55 ... +70</td>
<td></td>
<td>–40 ... +70</td>
<td></td>
</tr>
<tr>
<td>Material</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Housing</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Fibre-optic cable</td>
<td>Polyethylene</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

1) With SOE4-FO-L and SOE4-FO-D in standard mode
2) An attempt was made to obtain a signal at 10% of the range using a copper wire. The smallest wire diameter that was still detected corresponds to the diameter of the smallest detectable object.

### Technical data – Fibre-optic cable (diffuse sensor)

<table>
<thead>
<tr>
<th>Special feature of fibre-optic cable</th>
<th>High temperature</th>
<th>Precision</th>
<th>Series</th>
<th>Fixed focus</th>
</tr>
</thead>
<tbody>
<tr>
<td>Working range [mm]</td>
<td>150</td>
<td>12</td>
<td>65</td>
<td>130</td>
</tr>
<tr>
<td>Min. object diameter [mm]</td>
<td>0.1</td>
<td>0.05</td>
<td>0.15</td>
<td>0.1</td>
</tr>
<tr>
<td>Min. bending radius [mm]</td>
<td>25</td>
<td>10</td>
<td>15</td>
<td>25</td>
</tr>
<tr>
<td>Outer Ø [mm]</td>
<td>2.2</td>
<td>1.0</td>
<td>1.25</td>
<td>2.2</td>
</tr>
<tr>
<td>Head size</td>
<td>M6</td>
<td>M3</td>
<td>M4</td>
<td>19x25x6 mm</td>
</tr>
<tr>
<td>Protection class</td>
<td>IP66</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ambient temperature [°C]</td>
<td>–55 ... +115</td>
<td>–55 ... +70</td>
<td></td>
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<tr>
<td>Material</td>
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<tr>
<td>Housing</td>
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<tr>
<td>Fibre-optic cable</td>
<td>Polyethylene</td>
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</tr>
</tbody>
</table>

1) With SOE4-FO-L and SOE4-FO-D in standard mode
2) An attempt was made to obtain a signal at 10% of the range using a copper wire. The smallest wire diameter that was still detected corresponds to the diameter of the smallest detectable object.

### Ordering data – Fibre-optic cable (diffuse sensor)

<table>
<thead>
<tr>
<th>Measuring method</th>
<th>Special feature of fibre-optic cable</th>
<th>Outer Ø [mm]</th>
<th>1m</th>
<th>2m</th>
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<tbody>
<tr>
<td></td>
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</tr>
<tr>
<td>Standard</td>
<td>2.2</td>
<td>–</td>
<td>552 838</td>
<td>SOOC-DS-M6-1-R25</td>
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<td>552 836</td>
<td>SOOC-DS-M6-2-R25</td>
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<td>552 839</td>
<td>SOOC-DS-M6-1-R25-S4</td>
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<td>552 837</td>
<td>SOOC-DS-M6-2-R25-S4</td>
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<tr>
<td>Coaxial</td>
<td>1.25</td>
<td>–</td>
<td>552 842</td>
<td>SOOC-DS-C-M4-2-R15</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>552 840</td>
<td>SOOC-DS-H-M6-2-R40</td>
</tr>
<tr>
<td>Large working range</td>
<td>1.3</td>
<td>–</td>
<td>552 843</td>
<td>SOOC-DS-F-M4-2-R2</td>
</tr>
<tr>
<td>Flexible</td>
<td>2.2</td>
<td>–</td>
<td>552 809</td>
<td>SOOC-DS-M6-2-R25-T1</td>
</tr>
<tr>
<td>High temperature</td>
<td>1.25</td>
<td>–</td>
<td>552 804</td>
<td>SOOC-DS-P-M3-1-R10</td>
</tr>
<tr>
<td>Precision</td>
<td></td>
<td></td>
<td>552 844</td>
<td>SOOC-DS-P-M3-2-R10</td>
</tr>
<tr>
<td></td>
<td></td>
<td>40</td>
<td>552 803</td>
<td>SOOC-DS-P-M3-1-R10-S4</td>
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<tr>
<td></td>
<td></td>
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<td>552 805</td>
<td>SOOC-DS-P-M4-2-R15</td>
</tr>
<tr>
<td>Series</td>
<td>2.2</td>
<td>–</td>
<td>552 808</td>
<td>SOOC-DS-P-M4-1-R15-S4</td>
</tr>
<tr>
<td>Fixed focus</td>
<td>2.2</td>
<td>–</td>
<td>552 810</td>
<td>SOOC-DS-M-A11-2-R25</td>
</tr>
</tbody>
</table>

1) The scope of delivery for fibre-optic cables with fibre-optic cable Ø < 2.2 mm includes an adapter SASA.
Fibre-optic units SOE4

Accessories

Technical data – Fibre-optic cable (through-beam sensor)

<table>
<thead>
<tr>
<th>Special feature of fibre-optic cable</th>
<th>Standard</th>
<th>Large working range</th>
<th>Flexible</th>
<th>High temperature</th>
</tr>
</thead>
<tbody>
<tr>
<td>Working range(^1) [mm]</td>
<td>400</td>
<td>650</td>
<td>300</td>
<td>400</td>
</tr>
<tr>
<td>Min. object diameter(^2) [mm]</td>
<td>0.35</td>
<td>0.2</td>
<td>0.15</td>
<td>0.35</td>
</tr>
<tr>
<td>Min. bending radius [mm]</td>
<td>25</td>
<td>40</td>
<td>2</td>
<td>25</td>
</tr>
<tr>
<td>Outer (\varnothing) [mm]</td>
<td>2.2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Head size [mm]</td>
<td>M4</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Protection class</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ambient temperature [\degree C]</td>
<td>(-55 \ldots +70)</td>
<td>(-40 \ldots +70)</td>
<td>(-55 \ldots +115)</td>
<td></td>
</tr>
<tr>
<td>Material Housing</td>
<td>High-alloy stainless steel</td>
<td>Nickel-plated brass</td>
<td>High-alloy stainless steel</td>
<td></td>
</tr>
<tr>
<td>Fibre-optic cable</td>
<td>Polyethylene</td>
<td>Polyethylene</td>
<td>Polyethylene</td>
<td></td>
</tr>
</tbody>
</table>

1) With SOE4-FO-L and SOE4-FO-D in standard mode
2) An attempt was made to obtain a signal at 10% of the range using a copper wire. The smallest wire diameter that was still detected corresponds to the diameter of the smallest detectable object.

Technical data – Fibre-optic cable (through-beam sensor)

<table>
<thead>
<tr>
<th>Special feature of fibre-optic cable</th>
<th>Precision</th>
<th>Series</th>
<th>Fork light barrier</th>
</tr>
</thead>
<tbody>
<tr>
<td>Working range(^1) [mm]</td>
<td>30</td>
<td>120</td>
<td>250</td>
</tr>
<tr>
<td>Min. object diameter(^2) [mm]</td>
<td>0.05</td>
<td>0.2</td>
<td>0.1</td>
</tr>
<tr>
<td>Min. bending radius [mm]</td>
<td>10</td>
<td>15</td>
<td>25</td>
</tr>
<tr>
<td>Outer (\varnothing) [mm]</td>
<td>1.0</td>
<td>2.2</td>
<td>2.2</td>
</tr>
<tr>
<td>Head size [mm]</td>
<td>M3</td>
<td>M4</td>
<td>10x10x5 \text{mm}</td>
</tr>
<tr>
<td>Fork pit size [mm]</td>
<td>–</td>
<td></td>
<td>5x29</td>
</tr>
<tr>
<td>Protection class</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ambient temperature [\degree C]</td>
<td>(-55 \ldots +70)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Material Housing</td>
<td>High-alloy stainless steel</td>
<td>Nickel-plated brass</td>
<td>Acrylic butadiene styrene</td>
</tr>
<tr>
<td>Fibre-optic cable</td>
<td>Polyethylene</td>
<td>Polyethylene</td>
<td>Polyethylene</td>
</tr>
</tbody>
</table>

1) With SOE4-FO-L and SOE4-FO-D in standard mode
2) An attempt was made to obtain a signal at 10% of the range using a copper wire. The smallest wire diameter that was still detected corresponds to the diameter of the smallest detectable object.

Ordering data – Fibre-optic cable (through-beam sensor)

<table>
<thead>
<tr>
<th>Measuring method</th>
<th>Special feature of fibre-optic cable</th>
<th>Outer (\varnothing) (^1) [mm]</th>
<th>Sleeve length [mm]</th>
<th>Fibre-optic cable length [m]</th>
<th>Part No.</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>Through-beam sensor</td>
<td>Standard</td>
<td>2.2</td>
<td>–</td>
<td>1 m</td>
<td>552 814</td>
<td>SOOC-TB-M4-1-R25</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>552 815</td>
<td>SOOC-TB-M4-1-R25-S4</td>
</tr>
<tr>
<td></td>
<td>Large working range</td>
<td>2.2</td>
<td>–</td>
<td>2 m</td>
<td>552 817</td>
<td>SOOC-TB-H-M4-1-R40</td>
</tr>
<tr>
<td></td>
<td>Flexible</td>
<td>2.2</td>
<td>–</td>
<td>–</td>
<td>552 818</td>
<td>SOOC-TB-F-M4-2-R2</td>
</tr>
<tr>
<td></td>
<td>High temperature</td>
<td>2.2</td>
<td>–</td>
<td>40 m</td>
<td>552 821</td>
<td>SOOC-TB-P-M3-1-R10</td>
</tr>
<tr>
<td></td>
<td>Precision</td>
<td>1</td>
<td>–</td>
<td>10 m</td>
<td>552 819</td>
<td>SOOC-TB-P-M3-1-R10-S4</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>552 820</td>
<td>SOOC-TB-P-M3-1-R10-S4</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>552 823</td>
<td>SOOC-TB-P-M4-2-R15</td>
</tr>
<tr>
<td></td>
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<td></td>
<td></td>
<td>552 824</td>
<td>SOOC-TB-P-M4-2-R15-S4</td>
</tr>
<tr>
<td></td>
<td>Series</td>
<td>2.2</td>
<td>–</td>
<td>10 m</td>
<td>552 825</td>
<td>SOOC-TB-P-M4-1-R15</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>552 826</td>
<td>SOOC-TB-P-M4-2-R15-T1</td>
</tr>
<tr>
<td></td>
<td>Fork light barrier</td>
<td>1.25</td>
<td>–</td>
<td>10 m</td>
<td>552 827</td>
<td>SOOC-TB-P-M5-2-R25</td>
</tr>
</tbody>
</table>

1) The scope of delivery for fibre-optic cables with fibre-optic cable \(\varnothing<2.2\ \text{mm}\) includes an adapter SASA
### Technical data and order codes – Ancillary lenses

<table>
<thead>
<tr>
<th>Lens function</th>
<th>Protection class</th>
<th>Ambient temperature °C</th>
<th>Material Housing</th>
<th>Part No.</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>Increasing working range Factor 4 1)</td>
<td>IP66</td>
<td>-30 ... +150</td>
<td>Nickel-plated brass</td>
<td>552 829</td>
<td>SASF-L1-LD-M2</td>
</tr>
<tr>
<td>Light exit 90° Focussing 2)</td>
<td></td>
<td></td>
<td>Anodised aluminium</td>
<td>552 832</td>
<td>SASF-L1-LD-M4</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Nickel-plated brass</td>
<td>552 830</td>
<td>SASF-L1-LA-M2</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Anodised aluminium</td>
<td>552 831</td>
<td>SASF-L1-LS2-M4</td>
</tr>
</tbody>
</table>

1) Depending on the fibre-optic cable
2) Light spot diameter 0.7 mm at a distance of 10 mm, depending on the fibre-optic cable

### Compatibility table – Ancillary lenses

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Diffuse sensor</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SOOC-DS-P-M4-2-R15</td>
<td>-</td>
<td>-</td>
<td></td>
<td>-</td>
</tr>
<tr>
<td>SOOC-DS-P-M4-1-R15</td>
<td>-</td>
<td>-</td>
<td></td>
<td>-</td>
</tr>
<tr>
<td>SOOC-DS-C-M4-2-R15</td>
<td>-</td>
<td>-</td>
<td></td>
<td>-</td>
</tr>
<tr>
<td>Through-beam sensor</td>
<td>-</td>
<td>-</td>
<td></td>
<td>-</td>
</tr>
<tr>
<td>SOOC-TB-M4-2-R25</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>SOOC-TB-M4-1-R25</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>SOOC-TB-H-M4-2-R40</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>SOOC-TB-H-M4-1-R40</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>SOOC-TB-F-M4-2-R2</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>SOOC-TB-P-M4-2-R15</td>
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<tr>
<td>SOOC-TB-P-M4-1-R15</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>SOOC-TB-M4-2-R25-T1</td>
<td>-</td>
<td>-</td>
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</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- Note
Only the fibre-optic cables listed here are suitable for combination with an ancillary lens.

### Technical data and order codes – Adapter 1)

<table>
<thead>
<tr>
<th>Outer ∅ [mm]</th>
<th>Suitable for fibre-optic cable ∅ [mm]</th>
<th>Protection class</th>
<th>Ambient temperature °C</th>
<th>Material Housing</th>
<th>Part No.</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.2</td>
<td>1.0</td>
<td>IP64</td>
<td>-20 ... +60</td>
<td>Acrylic butadiene styrene</td>
<td>552 834</td>
<td>SASA-L1-10</td>
</tr>
<tr>
<td></td>
<td>1.25 ... 1.3</td>
<td></td>
<td></td>
<td></td>
<td>552 833</td>
<td>SASA-L1-13</td>
</tr>
</tbody>
</table>

1) Included in the scope of delivery for fibre-optic cables SOOC with fibre-optic cable ∅ < 2.2 mm

### Technical data and order codes – Fibre-optic cable cutter

<table>
<thead>
<tr>
<th>Use</th>
<th>Suitable for fibre-optic cable ∅ [mm]</th>
<th>Radius of bending tool 1) [mm]</th>
<th>Ambient temperature °C</th>
<th>Material Housing</th>
<th>Part No.</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>For polymer fibre-optic cables</td>
<td>1.0; 1.25 ... 1.3; 2.2</td>
<td>5, 8, 10</td>
<td>10 ... 60</td>
<td>Acrylic butadiene styrene, reinforced</td>
<td>552 835</td>
<td>SATC-L1-C</td>
</tr>
</tbody>
</table>

1) Bending tool for fibre-optic cable sleeves
### Ordering data – Connecting cables

<table>
<thead>
<tr>
<th>Number of wires</th>
<th>Cable length [m]</th>
<th>Part No.</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>M8x1, straight socket</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>2.5</td>
<td>541 342</td>
<td>NEBU-M8G4-K-2.5-LE4</td>
</tr>
<tr>
<td>5</td>
<td>5</td>
<td>541 343</td>
<td>NEBU-M8G4-K-5-LE4</td>
</tr>
<tr>
<td>M8x1, angled socket</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>2.5</td>
<td>541 344</td>
<td>NEBU-M8W4-K-2.5-LE4</td>
</tr>
<tr>
<td>5</td>
<td>5</td>
<td>541 345</td>
<td>NEBU-M8W4-K-5-LE4</td>
</tr>
</tbody>
</table>

### Ordering data – Adapter plate

<table>
<thead>
<tr>
<th>Part No.</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>540 214</td>
<td>SXE3-W</td>
</tr>
</tbody>
</table>
Polymer optic cables are generally more flexible than copper cables and are therefore less susceptible to wear. This property is particularly important in dynamic applications with small bending radii.

A fibre-optic unit SOE4 with one fibre-optic cable set up as an array through-beam sensor counts small workpieces that fall randomly from a feeder.

A fibre-optic unit SOE4 with one fibre-optic cable set up as a precision diffuse sensor in combination with an ancillary lens focuses the light beam on a very small point (approx. 0.7 mm in diameter). This facilitates cost-effective yet precision sensing of small parts even in compact systems.
Fork light barriers SOOF
## Fork light barriers SOOF

### Product range overview

<table>
<thead>
<tr>
<th>Method of measurement</th>
<th>Size</th>
<th>Min. object diameter [mm]</th>
<th>Max. switching frequency [Hz]</th>
<th>Switching output</th>
<th>Type of light</th>
<th>Page/online</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Metal</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fork light barrier</td>
<td>SOOF-M-…-C30</td>
<td>Fork 30x35</td>
<td>0.5</td>
<td>4,000</td>
<td>PNP</td>
<td></td>
</tr>
<tr>
<td></td>
<td>SOOF-M-…-C50</td>
<td>Fork 50x55</td>
<td>0.5</td>
<td>4,000</td>
<td>PNP</td>
<td></td>
</tr>
<tr>
<td></td>
<td>SOOF-M-…-C80</td>
<td>Fork 80x55</td>
<td>0.5</td>
<td>4,000</td>
<td>PNP</td>
<td></td>
</tr>
<tr>
<td></td>
<td>SOOF-M-…-C120</td>
<td>Fork 120x60</td>
<td>2.0</td>
<td>2,000</td>
<td>PNP</td>
<td></td>
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<tr>
<td><strong>Polymer</strong></td>
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<td></td>
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</tr>
<tr>
<td>Fork light barrier</td>
<td>SOOF-P-…-C30</td>
<td>Fork 30x35</td>
<td>0.5</td>
<td>2,000</td>
<td>PNP</td>
<td></td>
</tr>
<tr>
<td></td>
<td>SOOF-P-…-C50</td>
<td>Fork 50x55</td>
<td>0.3</td>
<td>2,000</td>
<td>PNP</td>
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</tr>
<tr>
<td></td>
<td>SOOF-P-…-C80</td>
<td>Fork 80x55</td>
<td>0.5</td>
<td>2,000</td>
<td>PNP</td>
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<tr>
<td></td>
<td>SOOF-P-…-C120</td>
<td>Fork 120x60</td>
<td>0.4</td>
<td>2,000</td>
<td>PNP</td>
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Fork light barriers SOOF

Overview of peripherals

<table>
<thead>
<tr>
<th>Accessories</th>
<th>Page/online</th>
</tr>
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<tbody>
<tr>
<td>1</td>
<td>Connecting cable M8x1 NEBU</td>
</tr>
<tr>
<td>2</td>
<td>Inscription label holder (included in the scope of delivery for NEBU)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Accessories</th>
<th>Page/online</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>Mounting SAMH</td>
</tr>
<tr>
<td>–</td>
<td>Inscription label ASLR-423</td>
</tr>
</tbody>
</table>
### Fork light barriers SOOF

#### Type codes

<table>
<thead>
<tr>
<th>Type</th>
<th>SOOF Opto-electronic sensor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Version</td>
<td></td>
</tr>
<tr>
<td>M</td>
<td>Metal</td>
</tr>
<tr>
<td>P</td>
<td>Polymer</td>
</tr>
<tr>
<td>Function</td>
<td>Fork light barrier</td>
</tr>
<tr>
<td>Switching function</td>
<td>N/O or N/C contacts, switchable</td>
</tr>
<tr>
<td>Setting option</td>
<td>Potentiometer</td>
</tr>
<tr>
<td>Teach-in</td>
<td></td>
</tr>
<tr>
<td>Fork gap</td>
<td>C30 30 mm</td>
</tr>
<tr>
<td></td>
<td>C50 50 mm</td>
</tr>
<tr>
<td></td>
<td>C80 80 mm</td>
</tr>
<tr>
<td></td>
<td>C120 120 mm</td>
</tr>
<tr>
<td>Switching output</td>
<td>PNP</td>
</tr>
<tr>
<td></td>
<td>NPN</td>
</tr>
</tbody>
</table>
**Fork light barriers SOOF**

**Technical data**

- **Function**
  - PNP, switchable
  - NPN, switchable

  - Transmitter and receiver in one compact housing
  - Minimum installation effort
  - Sturdy housing: high shock and vibration resistance

  ![SOOF-M](image1)
  ![SOOF-P](image2)

<table>
<thead>
<tr>
<th><strong>General technical data</strong></th>
<th><strong>Version</strong></th>
<th><strong>Metal</strong></th>
<th><strong>Polymer</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Fork gap</strong> [mm]</td>
<td>30</td>
<td>50</td>
<td>80</td>
</tr>
<tr>
<td><strong>Method of measurement</strong></td>
<td>Fork light barrier</td>
<td>Fork light barrier</td>
<td></td>
</tr>
<tr>
<td><strong>Size</strong> [mm]</td>
<td>Fork 30x35</td>
<td>Fork 50x55</td>
<td>Fork 80x55</td>
</tr>
<tr>
<td><strong>Minimum object diameter</strong> [mm]</td>
<td>0.5</td>
<td>0.5</td>
<td>0.5</td>
</tr>
<tr>
<td><strong>Repetition accuracy</strong> [mm]</td>
<td>0.02</td>
<td>0.04</td>
<td>0.06</td>
</tr>
<tr>
<td><strong>Hysteresis</strong> [mm]</td>
<td>≤ 0.25</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Type of light</strong></td>
<td>Red</td>
<td>Red</td>
<td></td>
</tr>
<tr>
<td><strong>Setting options</strong></td>
<td>Potentiometer</td>
<td>Teach-in</td>
<td></td>
</tr>
<tr>
<td><strong>Switching status display</strong></td>
<td>Yellow LED</td>
<td>Yellow LED</td>
<td>Green LED</td>
</tr>
<tr>
<td><strong>Ready status display</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Product weight</strong> [g]</td>
<td>75</td>
<td>110</td>
<td>130</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Electrical data</strong></th>
<th><strong>Version</strong></th>
<th><strong>Metal</strong></th>
<th><strong>Polymer</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Fork gap</strong> [mm]</td>
<td>30</td>
<td>50</td>
<td>80</td>
</tr>
<tr>
<td><strong>Max. switching frequency</strong> [Hz]</td>
<td>4,000</td>
<td>4,000</td>
<td>4,000</td>
</tr>
<tr>
<td><strong>Operating voltage range</strong> [V DC]</td>
<td>10 … 35</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Residual ripple</strong> [%]</td>
<td>±5</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Max. output current</strong> [mA]</td>
<td>200</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Idle current</strong> [mA]</td>
<td>30</td>
<td>32.5</td>
<td>30</td>
</tr>
<tr>
<td><strong>Electrical connection</strong></td>
<td>Plug M8x1, 3-pin</td>
<td>Plug M8x1, 3-pin</td>
<td></td>
</tr>
<tr>
<td><strong>Switching element function</strong></td>
<td>Switchable</td>
<td>Switchable</td>
<td></td>
</tr>
<tr>
<td><strong>Protection against short circuit</strong></td>
<td>Pulsed</td>
<td>Pulsed</td>
<td></td>
</tr>
<tr>
<td><strong>Reverse polarity protection</strong></td>
<td>For operating voltage connections</td>
<td>For operating voltage connections</td>
<td></td>
</tr>
<tr>
<td><strong>Surge capacity</strong> [kV]</td>
<td>0.8</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Insulation voltage</strong> [V]</td>
<td>50</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Protection class</strong></td>
<td>IP67</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Operating and environmental conditions</strong></th>
<th><strong>Ambient temperature</strong> [°C]</th>
<th><strong>Degree of contamination</strong></th>
<th><strong>CE mark</strong> (see declaration of conformity)</th>
<th><strong>Certification</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>–10 … +60</td>
<td>3</td>
<td>To EU EMC Directive</td>
<td>cULus listed (UL)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>1)</td>
<td></td>
</tr>
</tbody>
</table>

1) For information about the applicability of the component see the manufacturer's EC declaration of conformity at: www.festo.com. If the component is subject to restrictions on usage in residential, office or commercial environments or small businesses, further measures to reduce the emitted interference may be necessary.
## Materials

<table>
<thead>
<tr>
<th></th>
<th>Metal</th>
<th>Polymer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Housing</td>
<td>Painted die-cast zinc</td>
<td>PC</td>
</tr>
<tr>
<td>Note on materials</td>
<td>Free of copper and PTFE</td>
<td>–</td>
</tr>
<tr>
<td></td>
<td>Contains PWIS (paint wetting impairment substances)</td>
<td>–</td>
</tr>
<tr>
<td></td>
<td>RoHS-compliant</td>
<td>RoHS-compliant</td>
</tr>
</tbody>
</table>

## Dimensions – Metal

### Fork gap 30 ... 80

- Switching status display, yellow LED
- N/O or N/C, switchable
- Potentiometer
- Transmitter
- Receiver

### Fork gap 120

- Switching status display, yellow LED
- N/O or N/C, switchable
- Potentiometer
- Transmitter
- Receiver

### Fork gap H2

<table>
<thead>
<tr>
<th>Fork gap H2</th>
<th>H1</th>
<th>L1</th>
<th>L2</th>
</tr>
</thead>
<tbody>
<tr>
<td>30</td>
<td>50</td>
<td>60</td>
<td>35</td>
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<td>50</td>
<td>70</td>
<td>80</td>
<td>55</td>
</tr>
<tr>
<td>80</td>
<td>90</td>
<td>80</td>
<td>55</td>
</tr>
<tr>
<td>120</td>
<td>144</td>
<td>90</td>
<td>60</td>
</tr>
</tbody>
</table>
Fork light barriers SOOF

Technical data

Dimensions – Polymer

<table>
<thead>
<tr>
<th>Fork gap</th>
<th>H1</th>
<th>H3</th>
<th>H4</th>
<th>H5</th>
<th>H6</th>
<th>L1</th>
<th>L2</th>
<th>L3</th>
</tr>
</thead>
<tbody>
<tr>
<td>30</td>
<td>50</td>
<td>30</td>
<td>62.2</td>
<td>20</td>
<td>–</td>
<td>59.5</td>
<td>34</td>
<td>71.7</td>
</tr>
<tr>
<td>50</td>
<td>70</td>
<td>50</td>
<td>82.2</td>
<td>20</td>
<td>28</td>
<td>79.5</td>
<td>54</td>
<td>91.7</td>
</tr>
<tr>
<td>80</td>
<td>100</td>
<td>80</td>
<td>112.2</td>
<td>20</td>
<td>2x28</td>
<td>79.5</td>
<td>54</td>
<td>91.7</td>
</tr>
<tr>
<td>120</td>
<td>140</td>
<td>120</td>
<td>152.2</td>
<td>20</td>
<td>3x28</td>
<td>79.5</td>
<td>54</td>
<td>91.7</td>
</tr>
</tbody>
</table>

1) With mounting SAMH.

Ordering data

<table>
<thead>
<tr>
<th>Version</th>
<th>Fork gap [mm]</th>
<th>Switching output</th>
<th>Part No.</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>Metal</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>30</td>
<td>30</td>
<td>PNP</td>
<td>553 553</td>
<td>SOOF-M-FL-SM-C30-P</td>
</tr>
<tr>
<td></td>
<td>30</td>
<td>NPN</td>
<td>553 554</td>
<td>SOOF-M-FL-SM-C30-N</td>
</tr>
<tr>
<td>50</td>
<td>50</td>
<td>PNP</td>
<td>553 555</td>
<td>SOOF-M-FL-SM-C50-P</td>
</tr>
<tr>
<td></td>
<td>50</td>
<td>NPN</td>
<td>553 556</td>
<td>SOOF-M-FL-SM-C50-N</td>
</tr>
<tr>
<td>80</td>
<td>80</td>
<td>PNP</td>
<td>553 557</td>
<td>SOOF-M-FL-SM-C80-P</td>
</tr>
<tr>
<td></td>
<td>80</td>
<td>NPN</td>
<td>553 558</td>
<td>SOOF-M-FL-SM-C80-N</td>
</tr>
<tr>
<td>120</td>
<td>120</td>
<td>PNP</td>
<td>553 559</td>
<td>SOOF-M-FL-SM-C120-P</td>
</tr>
<tr>
<td></td>
<td>120</td>
<td>NPN</td>
<td>553 560</td>
<td>SOOF-M-FL-SM-C120-N</td>
</tr>
<tr>
<td>Polymer</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>30</td>
<td>30</td>
<td>PNP</td>
<td>553 561</td>
<td>SOOF-P-FL-ST-C30-P</td>
</tr>
<tr>
<td></td>
<td>30</td>
<td>NPN</td>
<td>553 562</td>
<td>SOOF-P-FL-ST-C30-N</td>
</tr>
<tr>
<td>50</td>
<td>50</td>
<td>PNP</td>
<td>553 563</td>
<td>SOOF-P-FL-ST-C50-P</td>
</tr>
<tr>
<td></td>
<td>50</td>
<td>NPN</td>
<td>553 564</td>
<td>SOOF-P-FL-ST-C50-N</td>
</tr>
<tr>
<td>80</td>
<td>80</td>
<td>PNP</td>
<td>553 565</td>
<td>SOOF-P-FL-ST-C80-P</td>
</tr>
<tr>
<td></td>
<td>80</td>
<td>NPN</td>
<td>553 566</td>
<td>SOOF-P-FL-ST-C80-N</td>
</tr>
<tr>
<td>120</td>
<td>120</td>
<td>PNP</td>
<td>553 567</td>
<td>SOOF-P-FL-ST-C120-P</td>
</tr>
<tr>
<td></td>
<td>120</td>
<td>NPN</td>
<td>553 568</td>
<td>SOOF-P-FL-ST-C120-N</td>
</tr>
</tbody>
</table>
### Ordering data – Connecting cables

<table>
<thead>
<tr>
<th>Electrical connection, left</th>
<th>Electrical connection, right</th>
<th>Cable length [m]</th>
<th>Part No.</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>Straight socket, M8x1, 3-pin</td>
<td>Cable, open end, 3-wire</td>
<td>2.5</td>
<td>541 333</td>
<td>NEBU-M8G3-K-2.5-LE3</td>
</tr>
<tr>
<td>Angled socket, M8x1, 3-pin</td>
<td>Cable, open end, 3-wire</td>
<td>2.5</td>
<td>541 338</td>
<td>NEBU-M8W3-K-2.5-LE3</td>
</tr>
<tr>
<td>Straight socket, M8x1, 3-pin</td>
<td>Straight plug, M8x1, 3-pin</td>
<td>0.5</td>
<td>541 346</td>
<td>NEBU-M8G3-K-0.5-M8G3</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1</td>
<td>541 347</td>
<td>NEBU-M8G3-K-1-M8G3</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2.5</td>
<td>541 348</td>
<td>NEBU-M8G3-K-2.5-M8G3</td>
</tr>
<tr>
<td></td>
<td></td>
<td>5</td>
<td>541 349</td>
<td>NEBU-M8G3-K-5-M8G3</td>
</tr>
</tbody>
</table>

### Ordering data – Mounting

<table>
<thead>
<tr>
<th>Part No.</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>553 569</td>
<td>SAMH-G3-Q</td>
</tr>
</tbody>
</table>

### Ordering data – Inscription labels

<table>
<thead>
<tr>
<th>Part No.</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>541 598</td>
<td>ASLR-423</td>
</tr>
</tbody>
</table>
**Key features**

<table>
<thead>
<tr>
<th>General</th>
<th>Precise</th>
<th>Easy to use</th>
<th>Reliable and flexible</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lightweight, compact and highly precise, this pneumatic solution offers impressive scope for integration: SOPA features a control module, compressed air regulation, measurement air switch-off and air jet function as well as up to four measuring modules. All in all, an attractively priced solution for low tolerances.</td>
<td>The air gap sensor SOPA senses exactly in the μm range whether the workpiece is lying flat or resting against other workpieces before clamping and whether the machining tool is exactly aligned on the spindle. Two different distance values can be sensed with one measuring module. The solution for two-stage workpiece machining with different surface finishes.</td>
<td>Lightweight, compact and simple into the bargain: thanks to parameterisation via teach-in or numerical setting using three buttons. Simple assembly and commissioning thanks to the inclusion of virtually unregulated compressed air and an integrated air jet function that needs no additional peripheral devices.</td>
<td>The multi-coloured LCD display with clear operating status indication ensures maximum reliability, while selectable monitoring points (1 to 4) and further functions make the application extremely flexible.</td>
</tr>
</tbody>
</table>

**Air gap sensors SOPA**  
Product range overview

- Sensing range 20 ... 200 μm
- Switch outputs 2x PNP or 2x NPN
- Sensing of two distance values possible
- Integrated air jet function
- Two-colour LCD display
- 2 distance thresholds, for teach-in

Detailed product information  
[www.festo.com/catalogue/sopa](http://www.festo.com/catalogue/sopa)
**Air gap sensors SOPA**

**Type codes**

<table>
<thead>
<tr>
<th>Function</th>
<th>SOPA</th>
<th>CM1</th>
<th>H</th>
<th>R1</th>
<th>H</th>
<th>Q6</th>
<th>2P</th>
<th>M12</th>
<th>E1</th>
</tr>
</thead>
<tbody>
<tr>
<td>SOPA Air gap sensor for contact and distance monitoring via LCD display</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Modules**

- **CM1** Control module with one sensor module
- **CM2** Control module with two sensor modules, pneumatically interlinked
- **CM3** Control module with three sensor modules, pneumatically interlinked
- **CM4** Control module with four sensor modules, pneumatically interlinked
- **M1** Sensor module

**Manual override for control module**

- **H** With manual override

**Distance sensing range**

- **R1** 20 ... 200 μm

**Type of mounting**

- **H** H-rail mounting/through-hole
- **W** Additional wall mounting

**Pneumatic connection**

- **Q6** Push-in connector QS-6

**Electrical output**

- **2P** 2 switch outputs PNP
- **2N** 2 switch outputs NPN

**Electrical connection**

- **M12** Plug M12x1, A-coded

**Electrical accessories**

- **E1** Straight socket, cable 2.5 m
- **E2** Straight socket, cable 5 m
- **E3** Angled socket, cable 2.5 m
- **E4** Angled socket, cable 5 m
### Technical data

<table>
<thead>
<tr>
<th>Type</th>
<th>SOPA-M1-...</th>
<th>SOPA-CM1-...-H...</th>
<th>SOPA-CM1-...-W...</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Sensing range (μm)</strong></td>
<td>20 ... 200</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Repetition accuracy of switching point</strong></td>
<td>± 2.5 μm: sensing range 30 μm to 150 μm</td>
<td>± 5 μm: sensing range 20 μm to 200 μm</td>
<td></td>
</tr>
<tr>
<td><strong>Setting options</strong></td>
<td>Teach-in via display and buttons</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Protection against manipulation</strong></td>
<td>Electronic lock</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Type of display</strong></td>
<td>Multi-colored illuminated LCD</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Type of mounting</strong></td>
<td>Alternatively: Via H-rail, Via through-holes, Via wall/surface bracket&lt;sup&gt;1)&lt;/sup&gt;</td>
<td>Alternatively: Via H-rail, Via through-holes, Via wall/surface bracket&lt;sup&gt;1)&lt;/sup&gt;</td>
<td></td>
</tr>
<tr>
<td><strong>Sensing principle</strong></td>
<td>Pneumatic</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Pneumatic connection</strong></td>
<td>QS-6</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Operating voltage range (V DC)</strong></td>
<td>15 ... 30</td>
<td>22.8 ... 26.4</td>
<td></td>
</tr>
<tr>
<td><strong>Max. output current (mA)</strong></td>
<td>100</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Electrical connection</strong></td>
<td>Plug M12x1, 5-pin, round design to EN 60947-5-2</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Protection against short circuit</strong></td>
<td>Pulsed</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Protection against polarity reversal</strong></td>
<td>For all electrical connections</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Protection class</strong></td>
<td>IP65 to IEC 60529</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<sup>1</sup> Under constant operating conditions (temperature and supply pressure) and nominal measuring nozzle diameter (2 mm).

### Operating and environmental conditions

<table>
<thead>
<tr>
<th>Type</th>
<th>SOPA-M1-...</th>
<th>SOPA-CM1-...</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Operating pressure (bar)</strong></td>
<td>–</td>
<td>4 ... 7</td>
</tr>
<tr>
<td><strong>Supply pressure (bar)</strong></td>
<td>0.8 ... 1.6</td>
<td>–</td>
</tr>
<tr>
<td><strong>Operating medium</strong></td>
<td>Compressed air in accordance with ISO 8573-1:2010 [7:4:4]</td>
<td></td>
</tr>
<tr>
<td><strong>Note on operating/pilot medium</strong></td>
<td>Operation with lubricated medium possible (in which case lubricated operation will always be required)</td>
<td></td>
</tr>
<tr>
<td><strong>Ambient temperature (°C)</strong></td>
<td>0 ... +50</td>
<td></td>
</tr>
<tr>
<td><strong>CE mark (see declaration of conformity)</strong></td>
<td>In accordance with EU EMC directive</td>
<td></td>
</tr>
<tr>
<td><strong>Certification</strong></td>
<td>C-tick</td>
<td></td>
</tr>
</tbody>
</table>

### Weight

<table>
<thead>
<tr>
<th>Type</th>
<th>SOPA-M1-...</th>
<th>SOPA-CM1-...</th>
<th>SOPA-CM2-...</th>
<th>SOPA-CM3-...</th>
<th>SOPA-CM4-...</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Product weight (g)</strong></td>
<td>60</td>
<td>510</td>
<td>570</td>
<td>630</td>
<td>690</td>
</tr>
</tbody>
</table>

### Materials

- **Housing**: Reinforced polyamide
- **Note on materials**: Free of copper and PTFE
- **Conforms to RoHS**
## Air gap sensors SOPA

### Technical data

#### Ordering data

<table>
<thead>
<tr>
<th>Version</th>
<th>Type of mounting</th>
<th>Number of sensor modules</th>
<th>Switch output PNP</th>
<th>Switch output NPN</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Part No. Type</td>
<td>Part No. Type</td>
</tr>
<tr>
<td>Control module with sensor modules</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Via H-rail</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>552130</td>
<td>SOPA-CM1H-R1-HQ6-2P-M12</td>
<td>552134 SOPA-CM1H-R1-HQ6-2N-M12</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>552131</td>
<td>SOPA-CM2H-R1-HQ6-2P-M12</td>
<td>552135 SOPA-CM2H-R1-HQ6-2N-M12</td>
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</tr>
<tr>
<td>3</td>
<td>552132</td>
<td>SOPA-CM3H-R1-HQ6-2P-M12</td>
<td>552136 SOPA-CM3H-R1-HQ6-2N-M12</td>
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</tr>
<tr>
<td>4</td>
<td>552133</td>
<td>SOPA-CM4H-R1-HQ6-2P-M12</td>
<td>552137 SOPA-CM4H-R1-HQ6-2N-M12</td>
<td></td>
</tr>
<tr>
<td>Via wall/surface bracket1)</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>1</td>
<td>552138</td>
<td>SOPA-CM1H-R1-WQ6-2P-M12</td>
<td>552142 SOPA-CM1H-R1-WQ6-2N-M12</td>
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<td>SOPA-CM2H-R1-WQ6-2P-M12</td>
<td>552143 SOPA-CM2H-R1-WQ6-2N-M12</td>
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<td>SOPA-CM3H-R1-WQ6-2P-M12</td>
<td>552144 SOPA-CM3H-R1-WQ6-2N-M12</td>
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<td>4</td>
<td>552141</td>
<td>SOPA-CM4H-R1-WQ6-2P-M12</td>
<td>552145 SOPA-CM4H-R1-WQ6-2N-M12</td>
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<tr>
<td>Individual sensor module</td>
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<tr>
<td>Via H-rail</td>
<td></td>
<td></td>
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<td></td>
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<tr>
<td>1</td>
<td>552146</td>
<td>SOPA-M1-R1-HQ6-2P-M12</td>
<td>552147 SOPA-M1-R1-HQ6-2N-M12</td>
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</table>

1) 2 adapter plates SXE3-W included in scope of delivery.
## Air gap sensors SOPA

### Ordering data – Modular products

<table>
<thead>
<tr>
<th>Mandatory data</th>
<th>Options</th>
<th>Mandatory data</th>
<th>Options</th>
</tr>
</thead>
<tbody>
<tr>
<td>Module No.</td>
<td>Function</td>
<td>Control module override</td>
<td>Distance sensing range</td>
</tr>
<tr>
<td>549902</td>
<td>Air gap sensor for contact and distance monitoring with LCD display</td>
<td>SOPA CM1</td>
<td>H</td>
</tr>
<tr>
<td></td>
<td></td>
<td>SOPA CM2</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>SOPA CM3</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>SOPA CM4</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>SOPA M1</td>
<td></td>
</tr>
<tr>
<td>Ordering example</td>
<td>Modules</td>
<td>Type of mounting</td>
<td>Electrical output</td>
</tr>
<tr>
<td>549902</td>
<td>SOPA – M1</td>
<td>R1 – H</td>
<td>Q6 – 2P – M12</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Ordering table</th>
<th>Conditions</th>
<th>Code</th>
<th>Enter code</th>
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<tr>
<td>Module No.</td>
<td>549 902</td>
<td></td>
<td></td>
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<tr>
<td>Function</td>
<td>Air gap sensor for contact and distance monitoring with LCD display</td>
<td>SOPA</td>
<td></td>
</tr>
<tr>
<td>Modules</td>
<td>SOPA CM1</td>
<td>SOPA CM2</td>
<td>SOPA CM3</td>
</tr>
<tr>
<td>Control module override</td>
<td>With manual override for control module</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Distance sensing range [μm]</td>
<td>20 – 200</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Type of mounting</td>
<td>H-rail mounting/through-hole</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pneumatic connection</td>
<td>Push-in connector 6 mm</td>
<td>Q6</td>
<td></td>
</tr>
<tr>
<td>Electrical output</td>
<td>2 switch outputs PNP</td>
<td>2N</td>
<td></td>
</tr>
<tr>
<td>Electrical connection</td>
<td>Plug M12, A-coded</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Electrical accessories</td>
<td>Straight socket, cable 2.5 m</td>
<td>+E1</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Straight socket, cable 5 m</td>
<td>+E2</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Angled socket, cable 2.5 m</td>
<td>+E3</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Angled socket, cable 5 m</td>
<td>+E4</td>
<td></td>
</tr>
</tbody>
</table>

| Not with module M1 (sensor module) | |

### Transfer order code

549902 SOPA – R1 – Q6 – M12 + E3
Air gap sensors SOPA

Peripherals overview

Accessories

1 Connecting cable for switch output
2 Adapter plate SXE3-W (2 included in scope of delivery with SOPA-…-W-…)
3 Mounting rail to DIN EN 60715
4 Sensor module SOPA-M1-…
5 Inscription label holder SXE3 (included in scope of delivery)
6 Control module with one sensor module SOPA-CM1-…

Ordering data – Connecting cables M12x1

<table>
<thead>
<tr>
<th>Number of wires</th>
<th>Cable length [m]</th>
<th>Part No.</th>
<th>Type</th>
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<tbody>
<tr>
<td>4</td>
<td>2.5</td>
<td>550326</td>
<td>NEBU-M12GS-K-2.5-LE4</td>
</tr>
<tr>
<td>5</td>
<td>2.5</td>
<td>541328</td>
<td>NEBU-M12GS-K-5-LE4</td>
</tr>
<tr>
<td>4</td>
<td>2.5</td>
<td>550325</td>
<td>NEBU-M12WS-K-2.5-LE4</td>
</tr>
<tr>
<td>5</td>
<td>2.5</td>
<td>541329</td>
<td>NEBU-M12WS-K-5-LE4</td>
</tr>
</tbody>
</table>

Ordering data – Adapter plate

<table>
<thead>
<tr>
<th>Part No.</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>540214</td>
<td>SXE3-W</td>
</tr>
</tbody>
</table>

Application example

- Air gap sensor SOPA for contact monitoring (illustration: typical arrangement with 3 monitoring points, nozzle diameter from 0.8 ... 2 mm) within the engine manufacturing arm of the automotive industry. Simply put, the air gap sensor checks whether the workpieces to be machined are lying flat. Gaps under workpieces can be detected within a range of 20 ... 200 μm. A customer-defined maximum acceptable gap width can be set in the control module by means of a teach-in process.
Sensor boxes SRBP, binary

Key features

### General information
- Whether for transporting, metering or bottling gaseous, paste and liquid media or bulk materials, sensor boxes are used in the process industry as position indicators for the end positions of the semi-rotary actuator.
- The binary sensor boxes SRBP not only convert the mechanical open and closed position of the actuator or process valve into electrical output signals, but also permit the optional sensing of a mid-position.

### Advantages
- Sturdy aluminium housing to IP65 and CRC 3 also enables use in harsh environments.
- Mounting on DFPB without additional adapter kit as well as mounting on other actuators via adapter kits as per VDI/VDE 3845.
- Clearly visible 3D position indicator offers the option of fast recognition of the current position of the semi-rotary actuator, including from a distance.
- Correct indication of the flow direction (I, L, T) of the medium, even with 3-way valves.
- Captive screws and name plates offer trouble-free assembly and ordering.
- Version available for the ATEX zone 2/22.
- Just one product for multiple applications thanks to the wide, adjustable swivel range of up to 270°.
- Integrated reed contacts in N/O or changeover contact versions.
- The innovative design makes setting the two end positions as well as the mid-position within the wide swivel range of up to 270° quick and easy.
- Internal LEDs as setting aid during commissioning.
- Optional sensing of the mid-position.
- You can find information on the media resistance of the product at www.festo.com.

### 1 cable connector
- Power supply for sensor box only.

### 2 cable connectors
- Common power supply for sensor box and solenoid valve.
### Mounting attachments and accessories

<table>
<thead>
<tr>
<th></th>
<th>Brief description</th>
<th>Page/Internet</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Adapter kit DASB-P1-HA-SB&lt;br&gt;Hole pattern 30x80 mm, height 20 mm</td>
<td>dasb</td>
</tr>
<tr>
<td>2</td>
<td>Adapter kit DASB-P1-HL-SB&lt;br&gt;Hole pattern 30x130 mm, height 50 mm</td>
<td>dasb</td>
</tr>
<tr>
<td>3</td>
<td>Adapter kit DASB-P1-HB-SB&lt;br&gt;Hole pattern 30x80 mm, height 30 mm</td>
<td>dasb</td>
</tr>
<tr>
<td>4</td>
<td>Adapter kit DASB-P1-HC-SB&lt;br&gt;Hole pattern 30x130 mm, height 30 mm</td>
<td>dasb</td>
</tr>
<tr>
<td>5</td>
<td>Coupling DARQ-C-S9&lt;br&gt;For direct mounting on semi-rotary actuators DFPB</td>
<td>danq</td>
</tr>
<tr>
<td></td>
<td>Coupling DARQ-C-S11&lt;br&gt;For direct mounting on semi-rotary actuators DFPB</td>
<td>danq</td>
</tr>
<tr>
<td></td>
<td>Coupling DARQ-C-S14&lt;br&gt;For direct mounting on semi-rotary actuators DFPB</td>
<td>danq</td>
</tr>
<tr>
<td></td>
<td>Coupling DARQ-C-S17&lt;br&gt;For direct mounting on semi-rotary actuators DFPB</td>
<td>danq</td>
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<tr>
<td></td>
<td>Coupling DARQ-C-S22&lt;br&gt;For direct mounting on semi-rotary actuators DFPB</td>
<td>danq</td>
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<tr>
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<td>Coupling DARQ-C-S27&lt;br&gt;For direct mounting on semi-rotary actuators DFPB</td>
<td>danq</td>
</tr>
</tbody>
</table>

1) The adapter kit DASB-P1-HA-SB can optionally be used for all DFPB actuators.
## Sensor boxes SRBP, binary

### Type codes

<table>
<thead>
<tr>
<th>Function</th>
<th>SRBP - Binary sensor box</th>
</tr>
</thead>
<tbody>
<tr>
<td>Product version</td>
<td>M - Primarily metal</td>
</tr>
<tr>
<td>Design</td>
<td>C - Sensor box</td>
</tr>
<tr>
<td>Mechanical interface</td>
<td>A1 - Direct mounting, hole pattern 30x80 mm</td>
</tr>
<tr>
<td>Indicator type</td>
<td>BB - Blue/black position indicator</td>
</tr>
<tr>
<td>Measuring range</td>
<td>270 - 0 ... 270°</td>
</tr>
<tr>
<td>Sensor principle</td>
<td>MS - Floating contact, N/O contact</td>
</tr>
<tr>
<td>Mid-position sensing</td>
<td>A - With sensing</td>
</tr>
<tr>
<td>Nominal operating voltage</td>
<td>20N - 8.2 V DC</td>
</tr>
<tr>
<td>Electrical connection</td>
<td>1 - Terminal box</td>
</tr>
<tr>
<td>Valve connection</td>
<td>2 - With valve connection</td>
</tr>
<tr>
<td>Cable connector</td>
<td>P20 - M20x1.5, polymer</td>
</tr>
<tr>
<td>Temperature range</td>
<td>Standard -20 ... +80 °C</td>
</tr>
<tr>
<td>EU certification</td>
<td>EX2 - II 3GD</td>
</tr>
</tbody>
</table>
**Sensors boxes SRBP, binary**

**Technical data**

- The binary sensor box is a so-called position sensor for semi-rotary actuators and reports the open and closed position of the actuator.
- Sensors are based on reed technology.

**General technical data**

<table>
<thead>
<tr>
<th>Specification</th>
<th>Value</th>
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<tbody>
<tr>
<td>Adjustment range for angle detection</td>
<td>0...270°</td>
</tr>
<tr>
<td>Based on standard</td>
<td>VDI/VDE 3845 (NAMUR)</td>
</tr>
<tr>
<td>Design</td>
<td>Angular</td>
</tr>
<tr>
<td>Mounting position</td>
<td>Any</td>
</tr>
<tr>
<td>Measured variable</td>
<td>Swivel angle</td>
</tr>
<tr>
<td>Measuring principle</td>
<td>Magnetic reed</td>
</tr>
<tr>
<td>Switching element function</td>
<td>➔ Page 428</td>
</tr>
<tr>
<td>Mid-position</td>
<td>➔ Page 428</td>
</tr>
<tr>
<td>Switching status display</td>
<td>➔ Page 428</td>
</tr>
<tr>
<td>Max. output current</td>
<td>➔ Page 428</td>
</tr>
<tr>
<td>Idle current</td>
<td>➔ Page 428</td>
</tr>
<tr>
<td>Position indicator</td>
<td>➔ Page 428</td>
</tr>
<tr>
<td>Reproducibility of switching point</td>
<td>+/- 1 deg</td>
</tr>
<tr>
<td>Max. switching capacity</td>
<td>Direct voltage DC [W] - 10</td>
</tr>
<tr>
<td></td>
<td>Alternating voltage AC [VA]  - 10</td>
</tr>
<tr>
<td>Operating voltage range</td>
<td>Direct voltage DC [V] 7.8...8.6</td>
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<tr>
<td></td>
<td>Alternating voltage AC [V] 19.2...28.8</td>
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<tr>
<td>Insulation voltage</td>
<td>[V] 50</td>
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<tr>
<td>Surge capacity</td>
<td>[kV] 0.8</td>
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<tr>
<td>Voltage drop</td>
<td>[V] 0...0.2</td>
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<tr>
<td>Protection against short circuit</td>
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</tr>
<tr>
<td>Protection against overloading</td>
<td>No</td>
</tr>
<tr>
<td>Output signal</td>
<td>Digital</td>
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<tr>
<td>Reverse polarity protection</td>
<td>For operating voltage</td>
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<tr>
<td>Electrical connection</td>
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<td></td>
<td>Screw terminal</td>
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<td>Plug-in</td>
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<tr>
<td>Cable connector</td>
<td>M20x1.5</td>
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<tr>
<td>Max. cable length</td>
<td>[m] 30</td>
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<tr>
<td>Permissible cable diameter</td>
<td>[mm] 5...13</td>
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<tr>
<td>Connectable nominal conductor cross section</td>
<td>[mm²] 2.5</td>
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<tr>
<td>Product weight</td>
<td>[g] 1,000</td>
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<tr>
<td>Housing material</td>
<td>Wrought aluminium alloy</td>
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<td>Note on materials</td>
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### Technical data

#### Operating and environmental conditions

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<tr>
<td>Ambient temperature (°C)</td>
<td>-20...+80°C</td>
</tr>
<tr>
<td>Protection class</td>
<td>IP65</td>
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#### Operating and environmental conditions with explosion protection

<table>
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<tr>
<th>Certification</th>
<th>C-Tick</th>
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<tbody>
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</tr>
<tr>
<td>Ambient temperature (°C)</td>
<td>-20...+80°C</td>
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<tr>
<td>Protection class</td>
<td>IP65</td>
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<tr>
<td>CE mark (see declaration of conformity)</td>
<td>To EU EMC Directive</td>
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<tr>
<td></td>
<td>To EU Explosion Protection Directive (ATEX)</td>
</tr>
<tr>
<td>ATEX category for gas</td>
<td>II 3G</td>
</tr>
<tr>
<td>ATEX category for dust</td>
<td>II 3D</td>
</tr>
<tr>
<td>Explosion ignition protection type for gas</td>
<td>Ex nA II T5 X</td>
</tr>
<tr>
<td>Explosion ignition protection type for dust</td>
<td>Ex td A22 IP65 T90°C X</td>
</tr>
<tr>
<td>Explosion-proof ambient temperature</td>
<td>-20°C ≤ Ta ≤ +80°C</td>
</tr>
<tr>
<td>Electrical protection class</td>
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</tr>
<tr>
<td>Degree of contamination</td>
<td>3</td>
</tr>
<tr>
<td>Corrosion resistance class CRC</td>
<td>3</td>
</tr>
</tbody>
</table>

1. Corrosion resistance class 3 according to Festo standard 940 070: Components subject to high corrosion stress. External visible parts in direct contact with industrial atmospheres or media such as solvents and cleaning agents, with a predominantly functional requirement for the surface.
Sensor boxes SRBP, binary

Dimensions – Sensor boxes SRBP, binary

<table>
<thead>
<tr>
<th>Type</th>
<th>B1</th>
<th>B2</th>
<th>B3</th>
<th>B4</th>
<th>D1</th>
<th>H1</th>
<th>H2</th>
<th>H3</th>
<th>H4</th>
<th>L1</th>
<th>L2</th>
<th>L3</th>
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</thead>
<tbody>
<tr>
<td>SRBP-...</td>
<td>94</td>
<td>82</td>
<td>30</td>
<td>-</td>
<td>M5</td>
<td>112.7</td>
<td>80</td>
<td>74.5</td>
<td>7.8</td>
<td>148</td>
<td>120</td>
<td>80</td>
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<tr>
<td>SRBP-...-T2P20</td>
<td>94</td>
<td>82</td>
<td>30</td>
<td>27</td>
<td>M5</td>
<td>112.7</td>
<td>80</td>
<td>74.5</td>
<td>7.8</td>
<td>148</td>
<td>120</td>
<td>80</td>
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</tbody>
</table>
### Ordering data – Sensor boxes SRBP, binary without explosion protection

<table>
<thead>
<tr>
<th>Switching element function</th>
<th>Mid-position</th>
<th>Switching status</th>
<th>Max. output current [mA]</th>
<th>Idle current [mA]</th>
<th>Position indicator</th>
<th>Part No.</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>N/O contact</td>
<td>–</td>
<td>LED</td>
<td>500</td>
<td>0…10</td>
<td>Green/red</td>
<td>570402</td>
<td>SRBP-M-CA1-GR270-MS-1U-TP20</td>
</tr>
<tr>
<td>N/O contact</td>
<td>Yes</td>
<td>LED</td>
<td>500</td>
<td>0…10</td>
<td>Green/red</td>
<td>570403</td>
<td>SRBP-M-CA1-GR270-MSA-1U-TP20</td>
</tr>
<tr>
<td>N/O contact</td>
<td>–</td>
<td>LED</td>
<td>500</td>
<td>0…10</td>
<td>Yellow/black</td>
<td>570404</td>
<td>SRBP-M-CA1-YB270-MS-1U-TP20</td>
</tr>
<tr>
<td>N/O contact</td>
<td>Yes</td>
<td>LED</td>
<td>500</td>
<td>0…10</td>
<td>Yellow/black</td>
<td>570405</td>
<td>SRBP-M-CA1-YB270-MSA-1U-TP20</td>
</tr>
<tr>
<td>Changeover switch</td>
<td>–</td>
<td>LED</td>
<td>500</td>
<td>0…10</td>
<td>Green/red</td>
<td>570406</td>
<td>SRBP-M-CA1-GR270-MW-1U-TP20</td>
</tr>
<tr>
<td>Changeover switch</td>
<td>Yes</td>
<td>LED</td>
<td>500</td>
<td>0…10</td>
<td>Green/red</td>
<td>570407</td>
<td>SRBP-M-CA1-GR270-MWA-1U-TP20</td>
</tr>
<tr>
<td>Changeover switch</td>
<td>–</td>
<td>LED</td>
<td>500</td>
<td>0…10</td>
<td>Yellow/black</td>
<td>570408</td>
<td>SRBP-M-CA1-YB270-MW-1U-TP20</td>
</tr>
<tr>
<td>Changeover switch</td>
<td>Yes</td>
<td>LED</td>
<td>500</td>
<td>0…10</td>
<td>Yellow/black</td>
<td>570409</td>
<td>SRBP-M-CA1-YB270-MWA-1U-TP20</td>
</tr>
<tr>
<td>N/O contact</td>
<td>–</td>
<td>LED</td>
<td>500</td>
<td>0…10</td>
<td>Green/red</td>
<td>570410</td>
<td>SRBP-M-CA1-GR270-MS-1U-T2P20</td>
</tr>
<tr>
<td>N/O contact</td>
<td>–</td>
<td>LED</td>
<td>500</td>
<td>0…10</td>
<td>Yellow/black</td>
<td>570411</td>
<td>SRBP-M-CA1-YB270-MS-1U-T2P20</td>
</tr>
</tbody>
</table>

### Ordering data – Sensor boxes SRBP, binary with explosion protection

<table>
<thead>
<tr>
<th>Switching element function</th>
<th>Mid-position</th>
<th>Switching status</th>
<th>Max. output current [mA]</th>
<th>Idle current [mA]</th>
<th>Position indicator</th>
<th>Part No.</th>
<th>Type</th>
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<tbody>
<tr>
<td>N/O contact</td>
<td>–</td>
<td>LED</td>
<td>500</td>
<td>0…10</td>
<td>Blue/black</td>
<td>568249</td>
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## Sensor boxes SRBP, binary

### Accessories

#### Dimensions and ordering data

<table>
<thead>
<tr>
<th>Brief description</th>
<th>Part No.</th>
<th>Type</th>
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<tr>
<td><strong>Adapter kit</strong></td>
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<tr>
<td>Adapter kit for DRD/DRE, DAPS and DFPB, shaft height 20 mm, hole patterns 80x30 mm</td>
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<td>DASB-P1-HA-SB</td>
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<td>Adapter kit for third-party drives, shaft height 50 mm, hole patterns 130x30 mm</td>
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<td>Couplings for direct mounting of sensor boxes SRBP/SRAP on quarter turn actuators DFPB. Technical data <a href="http://www.festo.com/catalogue/dfpb">Internet: dfpb</a></td>
<td>568674</td>
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Sensor boxes SRAP, analogue
General information

- Analogue sensor box for greater functionality. The analogue sensor box monitors the position of semi-rotary actuators and reports this back to the controller via an analogue 4 … 20 mA output signal.

Advantages

- Simple mounting and commissioning: can be mounted directly on the semi-rotary actuator DFPB without the need for mounting accessories, with teach-in function for flexible adjustment of the zero point within a range from 0 – 270°
- Everything in view, including from a distance: colour-based indication of the current position of the semi-rotary actuator
- Innovative and intelligent: homing to the actual swivel angle makes optimum use of the initial range
- Sturdy and explosion-proof: a match for even harsh, corrosive and potentially explosive environments thanks to corrosion-resistant and waterproof metal housing
- Insensitive to vibration. Always supplies a stable signal as there is no contact between the shaft and sensor
- Quick and easy integration in existing systems thanks to the industrial analogue output signal
- Cost and time savings thanks to the common power supply for the sensor box and solenoid valve
- Cost-efficient regulation in combination with 5/3-way valve compared with positioner solution
- Festo know-how in automation: concept and solution from a single source
- You can find information on the media resistance of the product at www.festo.com

1 cable connector

- Power supply for sensor box only

2 cable connectors

- Common power supply for sensor box and solenoid valve
### Mounting attachments and accessories

<table>
<thead>
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<th>Brief description</th>
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</table>

<sup>1</sup> The adapter kit DASB-P1-HA-SB can optionally be used for all DFPB actuators.
### Sensor boxes SRAP, analogue

**Function**
- SRAP - Analogue sensor box

**Product version**
- M - Primarily metal

**Design**
- C - Sensor box

**Mechanical interface**
- A1 - Direct mounting, hole pattern 30x80 mm

**Indicator type**
- BB - Blue/black position indicator
- GR - Green/red position indicator
- YB - Yellow/black position indicator

**Measuring range**
- 270° - 0 ... 270°

**Nominal operating voltage**
- 1 - 24 V DC

**Electrical output**
- A - 4 ... 20 mA

**Electrical connection**
- T - Terminal box

**Valve connection**
- None
- 2 - With valve connection

**Cable connector**
- M20 - M20x1.5, metal
- P20 - M20x1.5, polymer

**Temperature range**
- Standard -20 ... +80 °C

**EU certification**
- None
- EX2 - II 3GD
The analogue sensor box not only reports the open/closed position of the semi-rotary actuator, but also detects the entire swivel range and reports this back to the controller via an analogue signal.

The integrated sensors are based on proven 2D Hall technology.

### General technical data

<table>
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<tr>
<th>Specification</th>
<th>Value</th>
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<tr>
<td>Adjustment range for angle detection</td>
<td>[°] 0 … 270</td>
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<td>Based on standard</td>
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<td>Design</td>
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<tr>
<td>Mounting position</td>
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<tr>
<td>Measured variable</td>
<td>Swivel angle</td>
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<tr>
<td>Measuring principle</td>
<td>Magnetic Hall</td>
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<tr>
<td>Adjustment options</td>
<td>Teach-in</td>
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<tr>
<td>Teach-in via electrical connection</td>
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<tr>
<td>Idle current ([mA])</td>
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<tr>
<td>Analogue output ([mA])</td>
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<td>Repetition accuracy of analogue output</td>
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<td>Insulation voltage ([V])</td>
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<td>Surge capacity ([kV])</td>
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<tr>
<td>Protection against short circuit</td>
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<tr>
<td>Protection against overloading</td>
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<td>Reverse polarity protection</td>
<td>For all electrical connections</td>
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<tr>
<td>Electrical connection</td>
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<tr>
<td>Screw terminal</td>
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<td>Plug-in</td>
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<td>Product weight ([g])</td>
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<td>Housing material</td>
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### Technical data

#### Operating and environmental conditions

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<td>–20...+80°C</td>
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<tr>
<td>Protection class</td>
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<td>CE mark (see declaration of conformity)</td>
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<tr>
<td>Electrical protection class</td>
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<td>Degree of contamination</td>
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<tr>
<td>Corrosion resistance class CRC 1)</td>
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1) Corrosion resistance class 3 according to Festo standard 940 070

Components subject to high corrosion stress. External visible parts in direct contact with industrial atmospheres or media such as solvents and cleaning agents, with a predominantly functional requirement for the surface.

#### Operating and environmental conditions with explosion protection

<table>
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<td>Protection class</td>
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<td>Ex ia II T5 X</td>
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<td>ATEX category for dust</td>
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<td>Degree of contamination</td>
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<td>Corrosion resistance class CRC 1)</td>
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1) Corrosion resistance class 3 according to Festo standard 940 070

Components subject to high corrosion stress. External visible parts in direct contact with industrial atmospheres or media such as solvents and cleaning agents, with a predominantly functional requirement for the surface.
## Technical data

### Dimensions

<table>
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<th>B2 ±1</th>
<th>B3</th>
<th>B4</th>
<th>D1</th>
<th>H1</th>
<th>H2</th>
<th>H3</th>
<th>H4</th>
<th>L1</th>
<th>L2 ±1</th>
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### Ordering data – Sensor boxes SRAP, analogue without explosion protection

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<th>Part No.</th>
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### Ordering data – Sensor boxes SRAP, analogue with explosion protection

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<td>Blue/black</td>
<td>568237</td>
<td>SRAP-M-CA1-BB270-1-A-TP20-Ex2</td>
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<td>Red/green</td>
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<td>Metal cable connector M20x1.5</td>
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Limit switch attachments SRBF

Sensors > Sensor boxes >

www.festo.com/catalogue/...
## Limit switch attachments SRBF

### Type codes

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<tr>
<th>Type</th>
<th>CA3</th>
<th>YR90</th>
<th>MW</th>
<th>22A</th>
<th>C2M20</th>
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### Mechanical interface

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<th>Description</th>
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<td>A4</td>
<td>Mounting adapter, hole pattern 30x80 mm, for drives with shaft height 30 mm</td>
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<td>A5</td>
<td>Mounting adapter, hole pattern 30x130 mm, for drives with shaft height 30 mm</td>
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### Display type

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### Measuring range

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### Sensor principle

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<th>Code</th>
<th>Floating contact, changeover switch</th>
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<td>MW</td>
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### Nominal operating voltage

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<th>250 V AC</th>
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<td>22A</td>
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### Electrical connection

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<tr>
<th>Code</th>
<th>Screw terminal</th>
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### Cable connector

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<th>M20x1.5, metal</th>
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<td>M20</td>
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## Mounting kits DARQ

### Type codes

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<td>Function</td>
<td>K — Mounting kit</td>
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<tr>
<td>Drive outlet</td>
<td>A1 — Hole pattern 30x80 mm</td>
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<td>A2 — Hole pattern 30x130 mm</td>
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<tr>
<td>Adapter or reducing outlet</td>
<td>F05 — Hole pattern F05</td>
</tr>
<tr>
<td>Length</td>
<td>20 — 20 mm</td>
</tr>
<tr>
<td></td>
<td>30 — 30 mm</td>
</tr>
<tr>
<td></td>
<td>50 — 50 mm</td>
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<tr>
<td>Corrosion protection</td>
<td>R1 — Stainless steel</td>
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**Limit switch attachments SRBF**

**Technical data**

- Limit switch attachment with two mechanical switches in painted aluminium housing
- With 8-pin terminal block and yellow/red visual indicator

### General technical data

<table>
<thead>
<tr>
<th>Specification</th>
<th>Unit(s)</th>
<th>Details</th>
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<tbody>
<tr>
<td>Setting range for angle acquisition</td>
<td>°</td>
<td>0 … 90</td>
</tr>
<tr>
<td>Based on standard</td>
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<td>ISO 5211, EN 60947-5-1</td>
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<tr>
<td>Type of mounting</td>
<td></td>
<td>Via accessories</td>
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<tr>
<td>Design</td>
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<td>Square</td>
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<tr>
<td>Mounting position</td>
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<td>Any</td>
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<tr>
<td>Measuring principle</td>
<td></td>
<td>For mechanical, electrical proximity sensors</td>
</tr>
<tr>
<td>Switching element function</td>
<td></td>
<td>Changeover switch</td>
</tr>
<tr>
<td>Operating voltage range</td>
<td>V</td>
<td>Direct voltage DC 0 … 24</td>
</tr>
<tr>
<td>(Alternating voltage AC)</td>
<td>V</td>
<td>0 … 250</td>
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<tr>
<td>Max. switching capacity</td>
<td>W</td>
<td>Direct voltage DC 36</td>
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<tr>
<td>(Alternating voltage AC)</td>
<td>VA</td>
<td>1,770</td>
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<tr>
<td>Insulation voltage</td>
<td>V</td>
<td>250</td>
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<tr>
<td>Surge capacity</td>
<td>kV</td>
<td>4</td>
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<tr>
<td>Connectable nominal conductor cross section</td>
<td>mm²</td>
<td>0.5 … 1.5</td>
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<tr>
<td>CE mark</td>
<td></td>
<td>To EU Low-Voltage Directive</td>
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<td>Paint-wetting impairment substances criterion</td>
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<td>Protection class</td>
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<td>Ambient temperature</td>
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<td>–25 … +80</td>
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<td>Degree of contamination</td>
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### Materials

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<thead>
<tr>
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<th>Item</th>
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<tbody>
<tr>
<td>1</td>
<td>Housing</td>
<td>Painted die-cast aluminium</td>
</tr>
<tr>
<td>2</td>
<td>Screws</td>
<td>High-alloy stainless steel</td>
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<td>3</td>
<td>Mounting</td>
<td>High-alloy steel</td>
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<td>Note on materials</td>
<td>Contains paint-wetting impairment substances, RoHS-compliant</td>
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Limit switch attachments SRBF

Technical data

Dimensions

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<th>B3</th>
<th>B4</th>
<th>B5</th>
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<th>D2</th>
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<th>D4</th>
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<th>H2</th>
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<td>88</td>
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1. Cable connector M20x1.5
2. Screw DIN 933 M5x8

Download CAD data [www.festo.com/en/engineering]
Limit switch attachments SRBF

Technical data

Dimensions

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<tr>
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<th>B3</th>
<th>B4</th>
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<th>L4</th>
<th>L5</th>
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1 Cable connector M20x1.5
2 Screw DIN 933 M5x8
# Limit switch attachments SRBF

## Technical data

### Dimensions

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<th><a href="http://www.festo.com/en/engineering">www.festo.com/en/engineering</a></th>
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**Limit switch attachments SRBF**

|附图1 | Cable connector M20x1.5 |
|附图2 | Screw DIN 933 M5x8 |

### Ordering data

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<th>Mounting adapter dimensions [mm]</th>
<th>Weight [g]</th>
<th>Part No.</th>
<th>Type</th>
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## Limit switch attachments SRBF

### Technical data

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1. Screw DIN 933 M5x8

#### Dimensions

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1. Screw DIN 933 M5x8
### Limit switch attachments SRBF

#### Technical data

**Dimensions**

![Diagram of limit switch attachments SRBF]

**Ordering data**

<table>
<thead>
<tr>
<th>Brief description</th>
<th>Materials</th>
<th>CRC ¹</th>
<th>Weight [g]</th>
<th>Part No.</th>
<th>Type</th>
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<td>1162560</td>
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¹ Corrosion resistance class 1 according to Festo standard 940 070

Components subject to low corrosion stress. Transport and storage protection. Parts that do not have primarily decorative surface requirements, e.g. in internal areas that are not visible or behind covers.
Limit switch attachments DAPZ/QH-DR-E
## Limit switch attachments DAPZ

### Type codes

**Type**

- **DAPZ** - Limit switch attachment

**Specification**

- **SB** - Sensor box

**Measuring principle**

- **I** - Inductive
- **M** - Electrical, micro switch

**Operating voltage**

- **25DC** - 8 V DC
- **30DC** - 30 V DC
- **250AC** - 250 V AC/DC

**Version**

- **EX** - Explosion-proof
- **D** - Display
- **S** - Square design
- **R** - Round design
- **A** - AS-interface connection
- **M** - Solenoid plug

**Variant**

- **RO** - Foot height fixed
- **AR** - Foot height adjustable
Limit switch attachments DAPZ, square design

Technical data

- Drive interface to Namur
- VDI/VDE 3845
- Quick and easy assembly and connection
- Integrated solenoid valve actuation
- DAPZ-SB-I-... with AS-interface

### General technical data

<table>
<thead>
<tr>
<th></th>
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<tbody>
<tr>
<td>Measuring principle</td>
<td>Mechanical, electrical</td>
<td>Mechanical, electrical</td>
<td>Inductive</td>
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<td>Based on standard</td>
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<td>EN 60947-5-1</td>
<td>EN 60947-5-6</td>
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<td>VDI/VDE 3845 (NAMUR)</td>
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<td>Design</td>
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<td>Protection against reverse polarity</td>
<td>No</td>
<td>No</td>
<td>For all electrical connections</td>
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<tr>
<td>Operating voltage range</td>
<td>Direct current DC  [V]</td>
<td>0 ... 250</td>
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<td></td>
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<td>Nominal operating voltage DC [V]</td>
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<td>Insulation voltage [V]</td>
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<td>Surge capacity [kV]</td>
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<tr>
<td>Max. output current [mA]</td>
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### Operating and environmental conditions

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<td>Explosion ignition protection type for gas</td>
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<td>Ex e IIC T6</td>
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<td>Explosion-proof temperature rating</td>
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<td>Corrosion resistance class CRC</td>
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1) Corrosion resistance class 2 according to Festo standard 940 070
Components subject to moderate corrosion stress. 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.
Limit switch attachments DAPZ, square design

Technical data

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<thead>
<tr>
<th></th>
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<tr>
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<td>PA</td>
<td>PC</td>
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<td>2. Housing socket, bracket</td>
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<td>3. Seals</td>
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Note on materials

RoHS-compliant

Dimensions – DAPZ-SB-I-30 V/DC...


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<th>H1</th>
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<td>80</td>
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<td>Foot 50 (order accessories separately)</td>
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<th>H1</th>
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<td>300</td>
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| Mounting via adapter (order accessories separately) | DAPZ-SBZ-K0-RO | 25 | 64 | 20 | 80  | 50  | 145 | 300 |
|                                                      | DAPZ-SBZ-K3-RO | 30 | 64 | 30 | 80  | 150 | 145 | 300 |

1. Connection for AS-interface flat cable
2. Cable connector M12x1.5
3. Solenoid plug
Limit switch attachments DAPZ, square design

Technical data

Dimensions – DAPZ-SB-M-250 V/AC-...

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Mounting via adapter (order accessories separately)

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<th>H2</th>
<th>L1</th>
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Ordering data

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<th>Part No.</th>
<th>Type</th>
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<td>534 468</td>
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<td>Mechanical</td>
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<td>Mechanical, electrical</td>
<td>534 470</td>
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<td>Basic version</td>
<td>Inductive</td>
<td>534 473</td>
<td>DAPZ-SB-I-30DC-DSAM-RO</td>
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</table>

1. Cable connector M20x1.5
2. Cable connector M12x1.5
3. Solenoid plug

Download CAD data ➔ www.festo.com/en/engineering

Sensors > Sensor boxes

1.9
## Limit switch attachments DAPZ, round design, variant RO

### Technical data

- Drive interface to Namur
- VDI/VDE 3845
- Quick and easy assembly and connection
- Integrated solenoid valve actuation

### General technical data

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<td>Protection against short circuit</td>
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<td>Changeover switch</td>
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<td>Normally closed contact</td>
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<td>Protection against reverse polarity</td>
<td>No</td>
<td>For all electrical connections</td>
<td>For all electrical connections</td>
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<td>Yes</td>
<td>No</td>
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<td>Non-attenuated</td>
<td>PNP Namur</td>
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<td>Direct current DC 0 ... 250</td>
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<td>Alternating current AC</td>
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<td>[V] –</td>
<td>–</td>
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<td>Insulation voltage</td>
<td>[V] 250</td>
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<td>[kV] 4</td>
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<td>Non-attenuated –</td>
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<td>Screw terminal, plug-in</td>
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<td>[mm] 8 ... 13</td>
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### Operating and environmental conditions

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<td>To EU Explosion Protection Directive (ATEX) –</td>
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### Materials

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<td>(2) Housing socket, bracket</td>
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<td>(3) Seals</td>
<td>EPDM</td>
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<td>Note on materials</td>
<td>RoHS-compliant</td>
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Limit switch attachments DAPZ, round design, variant RO

### Technical data

#### Dimensions

**Basic version**

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<th>B2</th>
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<td>50</td>
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**Feet mounted outwards**

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<th>H2</th>
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**Mounting via adapter (order accessories separately)**

<table>
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#### Ordering data

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<th>Variant</th>
<th>Measuring principle</th>
<th>Part No.</th>
<th>Type</th>
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## Limit switch attachments DAPZ

### Accessories

<table>
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<tr>
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<th><strong>Brief description</strong></th>
<th><strong>Part No.</strong></th>
<th><strong>Type</strong></th>
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</thead>
</table>
| **Foot** | Kit for limit switch attachment DAPZ-...-RO  
Shaft height 50 mm, port pattern 130 x 30 mm | 534 477 | DAPZ-SBZ-F50-RO |
| **Adapter for foot mounting** | Kit for limit switch attachment DAPZ-...-RO  
on the quarter turn actuator DRD/DRE sizes 1 and 2  
Foot connection L50 x W25 x H20 mm | 534 478 | DAPZ-SBZ-K0-RO |
| | Kit for limit switch attachment DAPZ-...-RO  
on the quarter turn actuator DRD/DRE sizes 375 ... 880  
Foot connection L150 x W30 x H30 mm | 534 479 | DAPZ-SBZ-K3-RO |
| **Fieldbus connection** | Flat cable for AS-interface components, yellow, 100 m | 18 940 | KASI-1,5-Y-100 |
| | Cable distributor for flat cable, cable rotatable | 18 786 | ASI-KVT-FK |
| | Cable distributor for flat cable, cable symmetrical | 18 797 | ASI-KVT-FK-S |
| | Cable cap for flat cable  
(50 included in the scope of delivery) | 18 787 | ASI-KK-FK |
| | Cable sleeve  
(20 included in the scope of delivery) | 165 593 | ASI-KT-FK |
| **Miscellaneous** | Addressing device for AS-interface stations | 18 959 | ASI-PRG-ADR |
| | Addressing cable for addressing device | 18 960 | KASI-ADR |
Limit switch attachments DAPZ, round design, variant AR

- Drive interface to Namur
- VDI/VDE 3845
- Quick and easy assembly and connection
- Integrated solenoid valve actuation

<table>
<thead>
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<td>EN 60947-5-2</td>
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<tr>
<td>Design</td>
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<tr>
<td>Mounting position</td>
<td>Any</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Protection against short circuit</td>
<td>No</td>
<td>Pulsed</td>
<td>No</td>
</tr>
<tr>
<td>Switching element function</td>
<td>Changeover switch</td>
<td>Normally-open contact</td>
<td>Normally-closed contact</td>
</tr>
<tr>
<td>Protection against reverse polarity</td>
<td>No</td>
<td>For all electrical connections</td>
<td>No</td>
</tr>
<tr>
<td>Switching position display</td>
<td>Yes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Switching output</td>
<td></td>
<td>PNP</td>
<td>Namur</td>
</tr>
<tr>
<td>Operating voltage range</td>
<td>Direct current DC [V]</td>
<td>4...250</td>
<td>10...30</td>
</tr>
<tr>
<td>Alternating current AC [V]</td>
<td>4...250</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>Intrinsic current consumption at operating voltage [mA]</td>
<td>1...5</td>
<td>0...100</td>
<td>–</td>
</tr>
<tr>
<td>Nominal operating voltage DC [V]</td>
<td>–</td>
<td>–</td>
<td>8</td>
</tr>
<tr>
<td>Max. input power Pi [mW]</td>
<td>–</td>
<td>–</td>
<td>34</td>
</tr>
<tr>
<td>Max. input voltage Ui [V]</td>
<td>Direct current DC</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>Max. input current II [mA]</td>
<td>–</td>
<td>–</td>
<td>25</td>
</tr>
<tr>
<td>Insulation voltage [V]</td>
<td>250</td>
<td>50</td>
<td>25</td>
</tr>
<tr>
<td>Surge capacity [kV]</td>
<td>2.5</td>
<td>0.5</td>
<td>0.5</td>
</tr>
<tr>
<td>Max. output current [mA]</td>
<td>5,000</td>
<td>100</td>
<td>–</td>
</tr>
<tr>
<td>Switching current [mA]</td>
<td>Attenuated</td>
<td>–</td>
<td>0...1</td>
</tr>
<tr>
<td>Non-attenuated</td>
<td>–</td>
<td>3</td>
<td>–</td>
</tr>
<tr>
<td>Minimum load current</td>
<td>1 mA at 4 V/DC</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>Electrical connection</td>
<td>Screw terminal</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cable diameter [mm]</td>
<td>7...13</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cable connector</td>
<td>M20</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Limit switch attachments DAPZ, round design, variant AR

Technical data

<table>
<thead>
<tr>
<th>Operating and environmental conditions</th>
<th>DAPZ-SB-M-250AC-DR-AR</th>
<th>DAPZ-SB-I-30DC-DR-AR</th>
<th>DAPZ-SB-I-25DC-EXDR-AR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ambient temperature</td>
<td>[°C] –20 … +70 ºC</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Protection class</td>
<td>IP67</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CE marking (see declaration of conformity)</td>
<td>To EU Low Voltage Directive</td>
<td>–</td>
<td>To EU Explosion Protection Directive (ATEX)</td>
</tr>
<tr>
<td>ATEX category for gas</td>
<td>–</td>
<td>–</td>
<td>II 2G X</td>
</tr>
<tr>
<td>Explosion ignition protection type for gas</td>
<td>–</td>
<td>–</td>
<td>Ex ia IIB T6</td>
</tr>
<tr>
<td>Explosion-proof temperature rating</td>
<td>–</td>
<td>–</td>
<td>–20 °C ≤ Ta ≤ +70 ºC</td>
</tr>
<tr>
<td>Certificate issuing authority</td>
<td>–</td>
<td>–</td>
<td>PTB 00 ATEX 2032 K</td>
</tr>
<tr>
<td>PFD</td>
<td>–</td>
<td>–</td>
<td>4,69E-04</td>
</tr>
<tr>
<td>PFH</td>
<td>–</td>
<td>–</td>
<td>1,07E-07</td>
</tr>
<tr>
<td>Degree of contamination</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Corrosion resistance class CRC 1)</td>
<td>2</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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

Components subject to moderate corrosion stress. 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.

Materials

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Housing cover</td>
</tr>
<tr>
<td>2</td>
<td>Housing socket, bracket</td>
</tr>
<tr>
<td>3</td>
<td>Seals</td>
</tr>
</tbody>
</table>

– Note on materials | RoHS-compliant
Limit switch attachments DAPZ, round design, variant AR

Technical data

### Dimensions

![Dimensions Diagram]

- **Cable connector M20x1.5**

<table>
<thead>
<tr>
<th>Feet mounted inwards</th>
<th>B1</th>
<th>B2</th>
<th>B3</th>
<th>H1</th>
<th>H2</th>
<th>L1</th>
<th>L2</th>
<th>L3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Foot height adjustable</td>
<td>30</td>
<td>62</td>
<td>52.5</td>
<td>20, 30, 50</td>
<td>100</td>
<td>80</td>
<td>144</td>
<td>130</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Feet mounted outwards</th>
<th>B1</th>
<th>B2</th>
<th>B3</th>
<th>H1</th>
<th>H2</th>
<th>L1</th>
<th>L2</th>
<th>L3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Foot height adjustable</td>
<td>30</td>
<td>62</td>
<td>52.5</td>
<td>20, 30, 50</td>
<td>100</td>
<td>130</td>
<td>144</td>
<td>130</td>
</tr>
</tbody>
</table>

### Ordering data

<table>
<thead>
<tr>
<th>Sensing type</th>
<th>Variant</th>
<th>Measuring principle</th>
<th>Part No.</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mechanical</td>
<td>Basic version</td>
<td>Mechanical, electrical</td>
<td>534 474</td>
<td>DAPZ-SB-M-250AC-DR-AR</td>
</tr>
<tr>
<td>Contactless</td>
<td>Basic version</td>
<td>Inductive</td>
<td>534 475</td>
<td>DAPZ-SB-I-30DC-DR-AR</td>
</tr>
<tr>
<td>Contactless</td>
<td>Explosion-proof</td>
<td>Inductive</td>
<td>534 476</td>
<td>DAPZ-SB-I-25DC-EXDR-AR</td>
</tr>
</tbody>
</table>

Download CAD data [www.festo.com/en/engineering]
Limit switch attachment
with 3 measuring principles:
- Pneumatic
- Mechanical, electrical
- Inductive

<table>
<thead>
<tr>
<th>General technical data</th>
<th>QH-DR-E-S3-PK-3-B-B</th>
<th>QH-DR-E-S3-E-SW-B</th>
<th>QH-DR-E-SIEN-M12-NB-B</th>
</tr>
</thead>
<tbody>
<tr>
<td>Measuring principle</td>
<td>Pneumatic&lt;sup&gt;1&lt;/sup&gt;</td>
<td>Mechanical, electrical&lt;sup&gt;2&lt;/sup&gt;</td>
<td>Inductive&lt;sup&gt;3&lt;/sup&gt;</td>
</tr>
<tr>
<td>Pneumatic connection</td>
<td>G4A</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>Based on standard</td>
<td>VDI/VDE 3845 (NAMUR)</td>
<td>–</td>
<td>EN 60947-5-1</td>
</tr>
<tr>
<td>Design</td>
<td>Square</td>
<td>–</td>
<td>EN 60947-5-2</td>
</tr>
<tr>
<td>Mounting position</td>
<td>–</td>
<td>No</td>
<td>Pulsed</td>
</tr>
<tr>
<td>Protection against short circuit</td>
<td>–</td>
<td>No</td>
<td>–</td>
</tr>
<tr>
<td>Switching element function</td>
<td>–</td>
<td>Changeover switch</td>
<td>Normally open contact</td>
</tr>
<tr>
<td>Protection against reverse polarity</td>
<td>–</td>
<td>–</td>
<td>For all electrical connections</td>
</tr>
<tr>
<td>Switching position display</td>
<td>No</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>Switching output</td>
<td>–</td>
<td>–</td>
<td>PNP</td>
</tr>
<tr>
<td>Operating voltage range</td>
<td>Direct current DC</td>
<td>0 ... 250</td>
<td>10 ... 30</td>
</tr>
<tr>
<td></td>
<td>[V]</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Alternating current AC</td>
<td>0 ... 250</td>
<td>–</td>
</tr>
<tr>
<td></td>
<td>[V]</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Insulation voltage</td>
<td>–</td>
<td>250</td>
<td>50</td>
</tr>
<tr>
<td>[V]</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Surge capacity</td>
<td>–</td>
<td>2.5</td>
<td>0.5</td>
</tr>
<tr>
<td>[mA]</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Max. output current</td>
<td>–</td>
<td>16,000</td>
<td>200</td>
</tr>
<tr>
<td>[kV]</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Electrical connection</td>
<td>–</td>
<td>Screw terminal</td>
<td>Screw terminal</td>
</tr>
<tr>
<td>Cable diameter</td>
<td>–</td>
<td>8 ... 13</td>
<td>8 ... 13</td>
</tr>
<tr>
<td>[mm]</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cable connector</td>
<td>–</td>
<td>M20</td>
<td>M20</td>
</tr>
</tbody>
</table>

1) With stem actuated micro valve S-3-PK-3-B
2) With micro switch with roller lever (splash-proof) S-3-E-SW-B
3) With proximity sensor SIEN-M12-NB-B

<table>
<thead>
<tr>
<th>Operating and environmental conditions</th>
<th>QH-DR-E-S3-PK-3-B-B</th>
<th>QH-DR-E-S3-E-SW-B</th>
<th>QH-DR-E-SIEN-M12-NB-B</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating medium</td>
<td>Compressed air in accordance with ISO 8573-1:2010 [7;7;7]</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>Note on operating/pilot medium</td>
<td>Operation with lubricated medium possible (in which case lubricated operation will always be required)</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>Operating pressure</td>
<td>–0.95 ... +8</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>[bar]</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ambient temperature</td>
<td>–10 ... +60 °C</td>
<td>–20 ... +85 °C</td>
<td>–25 ... +70 °C</td>
</tr>
<tr>
<td>[°C]</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Protection class</td>
<td>IP65</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>CE marking (see declaration of conformity)</td>
<td>To EU Low Voltage Directive</td>
<td>To EU EMC Directive</td>
<td></td>
</tr>
<tr>
<td>Degree of contamination</td>
<td>–</td>
<td>3</td>
<td>–</td>
</tr>
<tr>
<td>Corrosion resistance class CRC&lt;sup&gt;1&lt;/sup&gt;</td>
<td>2</td>
<td>–</td>
<td>–</td>
</tr>
</tbody>
</table>

1) Corrosion resistance class 2 according to Festo standard 940 070
Components subject to moderate corrosion stress. 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.
## Limit switch attachments QH-DR-E

### Technical data

#### Materials

<p>| | | | | | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Bracket</td>
<td>High-alloy stainless steel</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Housing cover</td>
<td>PC</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Housing socket</td>
<td>PA</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Seals</td>
<td>EPDM</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

---

#### Note on materials

RoHS-compliant

### Dimensions

![Diagram of QH-DR-E dimensions]

<table>
<thead>
<tr>
<th></th>
<th>B1</th>
<th>B2</th>
<th>D1</th>
<th>H1</th>
<th>H2</th>
<th>L1</th>
<th>L2</th>
</tr>
</thead>
<tbody>
<tr>
<td>QH-DR-E-…</td>
<td>64</td>
<td>30</td>
<td>5.5</td>
<td>102</td>
<td>28.5</td>
<td>146</td>
<td>80</td>
</tr>
</tbody>
</table>

### Ordering data

<table>
<thead>
<tr>
<th>Measuring principle</th>
<th>Part No.</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pneumatic with S3-PK-3-B</td>
<td>164 855</td>
<td>QH-DR-E-S3-PK-3-B-B</td>
</tr>
<tr>
<td>Electrical with S3-E-SW-B</td>
<td>164 854</td>
<td>QH-DR-E-S3-E-SW-B</td>
</tr>
<tr>
<td>Inductive with SIE-M12-NB-B</td>
<td>164 853</td>
<td>QH-DR-E-SIE-M12-NB-B</td>
</tr>
</tbody>
</table>

---

Based on the diagram provided, the dimensions for QH-DR-E are as follows:

- **B1**: 64 mm
- **B2**: 30 mm
- **D1**: 5.5 mm
- **H1**: 102 mm
- **H2**: 28.5 mm
- **L1**: 146 mm
- **L2**: 80 mm
Vision systems

Table of contents

2.1 Function monitoring

Compact Vision System
SB0C-M
- High-speed camera for diagnostics and commissioning as well as for function monitoring of fast motion sequences
- Recording and storage electronics integrated in the camera
- Can be networked via Ethernet
Page 466

2.2 Position and quality inspection

Compact Vision System
SB0C-Q/SBOI-Q
- Quality assurance, position and rotary orientation, text, 1D and 2D code recognition
- Compact dimensions
- Can be networked via Ethernet
Page 478

Checkbox CHB-C, Compact
- Compact design
- User-friendly
- Defined Interfaces
- Customised integration
Page 492
Vision systems > Function monitoring

Compact Vision System SBOC-M
**Problem description**

Modern automation systems are for the most part designed for high production speeds which the human eye has trouble following. Disadvantage of this high speed: Fitters and service employees cannot detect errors in the motion sequence and their causes straight away. It is also becoming increasingly difficult to set the system parameters to their optimum values.

**Typical applications**

Mobile deployment of the high-speed camera for service and commissioning to increase the productivity and availability of automation systems

- Cycle time reduction through pinpointing of idle periods in motion sequences
- Optimum harmonisation of the travel times of individual axes in multi-axis systems, localisation of critical movements
- Time-synchronised visualisation of movement processes from several sides on a PC for greater ease of handling
- Localisation of unwanted vibrations which have a negative effect on the repetition accuracy of movement processes and can cause premature material fatigue

Stationary mounting of the high-speed camera to increase the availability of automation systems

- Continuous recording of processes in the ring buffer of the camera
- If a fault occurs, recording is stopped by an external signal. The case history of the fault is then stored in the camera, thus permitting an analysis of the cause

**Interfaces**

1. Ethernet connection
2. Power supply and inputs/outputs
3. Status LEDs:
   A. Operating system
   B. Ethernet traffic
   C. Recording
   D. Recording status
Compact Vision System SBOC-M

Key features

FCT software with SBO.. Network plug-in

Configuring a camera network

The "SBO..-M Network" is a plug-in for the Festo configuration tool (FCT for short). It provides the following functions:

- Configuration and commissioning of a camera network with any desired number of Compact Vision Systems of the type SBOC-M
- Creation of time-synchronised recordings using all devices in the camera network in order to record a scene from various angles, for example

Setting the camera

Using the live pictures from the camera, the lens can be set and parameters such as exposure time, frames per second, recording duration and picture quality, for example, adjusted.

With the parameters you can also define what is to happen when a trigger signal (edge change of an external 24 V signal) occurs:

- Start the recording
- Stop the recording
- Record only one picture

Time delays between trigger signal and start of recording or stop recording as well as recording several films or pictures in the camera memory (multi-recording) can also be determined in a user-friendly manner.

Recording control

Recording can be started once the camera has been set up. You can choose whether the camera should wait for the occurrence of an external trigger condition, start recording directly following initialisation or store the pictures sent via Ethernet on a PC without buffering them in the camera. The PC can be removed once recording has been started in "Wait for trigger signal" mode. The camera operates automatically and waits for the trigger condition to occur. Recorded sequences are stored in the internal memory of the respective camera and can be transmitted to the FCT software once a connection has been re-established with a PC. The sequences are archived and can be analysed on the PC.
## Compact Vision System SBOC-M

### Peripherals overview

<table>
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<tr>
<th>Accessories</th>
<th>Brief description</th>
<th>Page/online</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Compact Vision System</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>SBOC-M-R1B-H</td>
<td>For standard lens with C mount connection</td>
</tr>
<tr>
<td><strong>Cable with socket</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>SBOA-K30E-M12S</td>
<td>Ethernet diagnostic cable</td>
</tr>
<tr>
<td>3</td>
<td>SIM-M12-8GD…-PU</td>
<td>For supplying the operating voltage</td>
</tr>
<tr>
<td><strong>Lens</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>–</td>
<td>SASF-C-L-F…</td>
<td>Focal distance 6 … 35 mm</td>
</tr>
<tr>
<td><strong>Mounting components</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Adapter kit SBOA-HMSV-39</td>
<td>With screw-on adapter plate</td>
</tr>
<tr>
<td>5</td>
<td>Adapter kit SBOA-HMSV-40</td>
<td>Without screw-on adapter plate</td>
</tr>
<tr>
<td>6</td>
<td>Adapter kit SBOA-HMSV-41</td>
<td>With female thread G ¼ for mounting on commercially available tripods</td>
</tr>
<tr>
<td>–</td>
<td>Adapter SBOC-C-5</td>
<td>5 mm spacer ring (CS mount to C mount)</td>
</tr>
</tbody>
</table>

---

**New**

SBOC-M-R1B-H
### Vision systems > Function monitoring

#### Compact Vision System SBOC-M

**Type codes**

<table>
<thead>
<tr>
<th>Function</th>
<th>Design</th>
<th>Equipment</th>
<th>Sensor resolution</th>
<th>Sensor type</th>
<th>Additional Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>SBO</td>
<td>C</td>
<td>M</td>
<td>R1</td>
<td>B</td>
<td>H</td>
</tr>
<tr>
<td>Compact Vision System</td>
<td>For standard lens with C mount or CS mount connection</td>
<td>With integrated application-specific software</td>
<td>640 x 480 pixels, VGA resolution</td>
<td>Monochrome</td>
<td>CS mount without protective tube.</td>
</tr>
</tbody>
</table>

1) CS mount without protective tube.
### General technical data

<table>
<thead>
<tr>
<th>Type</th>
<th>SBOC-M-R1B-H</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sensor resolution</td>
<td>640 x 480 (VGA)</td>
</tr>
<tr>
<td>Length</td>
<td>139.4 mm</td>
</tr>
<tr>
<td>Width</td>
<td>45 mm</td>
</tr>
<tr>
<td>Height</td>
<td>45 mm</td>
</tr>
<tr>
<td>Exposure time</td>
<td>1 ... 1,000,000 μs</td>
</tr>
<tr>
<td>Frame rate (full image)</td>
<td>24 fps</td>
</tr>
<tr>
<td>Sensor type</td>
<td>Monochrome</td>
</tr>
<tr>
<td>Lens mounting</td>
<td>CS mount (C mount with lens protective tube)</td>
</tr>
<tr>
<td>Operating distance</td>
<td>Dependent on the lens selected</td>
</tr>
<tr>
<td>Field of vision</td>
<td>Dependent on the lens selected</td>
</tr>
</tbody>
</table>

### Electrical data

<table>
<thead>
<tr>
<th>Type</th>
<th>SBOC-M-R1B-H</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nominal operating voltage [V DC]</td>
<td>24</td>
</tr>
<tr>
<td>Permissible voltage fluctuations [%]</td>
<td>±10</td>
</tr>
<tr>
<td>Current consumption with load-free outputs [mA]</td>
<td>120</td>
</tr>
<tr>
<td>Max. residual current [A]</td>
<td>1.5 at the 24 V outputs</td>
</tr>
<tr>
<td>Protection class</td>
<td>IP65, IP67</td>
</tr>
<tr>
<td>Ethernet interface</td>
<td>IEEE802.3U (100BaseT)</td>
</tr>
<tr>
<td>Bus interface</td>
<td>Plug M12</td>
</tr>
<tr>
<td>Transmission speed [Mbps]</td>
<td>100</td>
</tr>
<tr>
<td>Supported protocols</td>
<td>TCP/IP</td>
</tr>
</tbody>
</table>

### Operating and environmental conditions

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Ambient temperature</td>
<td>−10 ... +50 °C</td>
</tr>
<tr>
<td>Storage temperature</td>
<td>−10 ... +60 °C</td>
</tr>
<tr>
<td>Ambient conditions</td>
<td>Screened from extreme external light sources</td>
</tr>
<tr>
<td></td>
<td>Cleanest possible ambient air</td>
</tr>
<tr>
<td>CE mark (see declaration of conformity)</td>
<td>To EU EMC Directive</td>
</tr>
<tr>
<td>Certification</td>
<td>cUL us - Recognized (OL)</td>
</tr>
<tr>
<td></td>
<td>C-Tick</td>
</tr>
</tbody>
</table>

---

1) For information about the applicability of the component see the manufacturer’s CE declaration of conformity at: www.festo.com → Support → User documentation. If the component is subject to restrictions on usage in residential, office or commercial environments or small business, further measures to reduce the emitted interference may be necessary.
Compact Vision System SBOC-M

### Technical data

#### Materials

<table>
<thead>
<tr>
<th>Material</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Housing</td>
<td>Anodised aluminium</td>
</tr>
<tr>
<td>Cap</td>
<td>Acrylic butadiene styrene, glass fibre reinforced</td>
</tr>
<tr>
<td>Note on materials</td>
<td>Free of copper and PTFE RoHS-compliant</td>
</tr>
</tbody>
</table>

#### Weight [g]

<table>
<thead>
<tr>
<th>Lens mounting</th>
<th>CS mount (C mount with lens protective tube)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type</td>
<td>SBOC-M-R1B-H</td>
</tr>
<tr>
<td>Compact Vision System</td>
<td>182</td>
</tr>
</tbody>
</table>

#### Dimensions

<table>
<thead>
<tr>
<th>Type</th>
<th>B1</th>
<th>B2</th>
<th>B3</th>
<th>B4</th>
<th>B5</th>
<th>B6</th>
<th>D1</th>
<th>H1</th>
<th>H2</th>
<th>H3</th>
<th>H4</th>
<th>H5</th>
<th>H6</th>
<th>H7</th>
<th>H8</th>
<th>H9</th>
<th>L1</th>
<th>L2</th>
<th>L3</th>
<th>L4</th>
<th>L5</th>
</tr>
</thead>
<tbody>
<tr>
<td>SBOC-M-R1B-H</td>
<td>45</td>
<td>13.91</td>
<td>42.2</td>
<td>18.8</td>
<td>1.4</td>
<td>45</td>
<td>45</td>
<td>24.65</td>
<td>1.15</td>
<td>2</td>
<td>0.3</td>
<td>21.8</td>
<td>–</td>
<td>1.4</td>
<td>139</td>
<td>71</td>
<td>85</td>
<td>50</td>
<td>1.3</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### Ordering data

<table>
<thead>
<tr>
<th>Sensor type</th>
<th>Part No.</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>640 x 480 pixels (VGA)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CS mount (C mount with lens protective tube)</td>
<td>574642</td>
<td>SBOC-M-R1B-H</td>
</tr>
</tbody>
</table>
Vision systems > Function monitoring

Compact Vision System SBOC-M

Accessories

Adapter kit SBOA-HMSV-39

with screw-on adapter plate

Material: Anodised wrought aluminium alloy

<table>
<thead>
<tr>
<th>Ordering data</th>
<th>Part No.</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adapter kit</td>
<td>541599</td>
<td>SBOA-HMSV-39</td>
</tr>
</tbody>
</table>

Adapter kit SBOA-HMSV-40

without screw-on adapter plate

Material: Anodised wrought aluminium alloy

<table>
<thead>
<tr>
<th>Ordering data</th>
<th>Part No.</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adapter kit</td>
<td>541600</td>
<td>SBOA-HMSV-40</td>
</tr>
</tbody>
</table>

Adapter kit SBOA-HMSV-41

with female thread G1/4 for mounting on commercially available tripods

Material: Anodised wrought aluminium alloy

<table>
<thead>
<tr>
<th>Ordering data</th>
<th>Part No.</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adapter kit</td>
<td>542140</td>
<td>SBOA-HMSV-41</td>
</tr>
</tbody>
</table>

Adapter SBOL-C-5

3 mm spacer ring (CS mount to C mount)

Material: Anodised wrought aluminium alloy

<table>
<thead>
<tr>
<th>Ordering data</th>
<th>Part No.</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adapter SBOL-C-5</td>
<td>541601</td>
<td>SBOL-C-5</td>
</tr>
</tbody>
</table>

www.festo.com/catalogue/...
Compact Vision System SBOC-M

Accessories

Vision system
SBOA-M-SYSTAINER

Systainer with Compact Vision System SBOC-M-R1B and accessories for mains voltage 230 V

Note on materials:
Contains PWIS (paint wetting impairment substances)

Ordering data

<table>
<thead>
<tr>
<th>Contents</th>
<th>Pieces</th>
<th>Part No.</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>Compact Vision System SBOC-M-R1B, without protective tube</td>
<td>1</td>
<td>543408</td>
<td>SBOA-M-SYSTAINER</td>
</tr>
<tr>
<td>Zoom lens, focal depth 30 ... 40 mm, CS mount</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Adapter kit SBOA-HMSV-41 for mounting on commercially available tripods</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tripod for camera and lighting</td>
<td>2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ethernet diagnostic cable SBOA-K30E-M1.2S</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Crossover patch cable</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Coupler, RS4</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>System light 1,000 W/75 h, with tilting head and four-way folding frame</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Spare light bulb, U-shaped halogen lamp, 1,000 W/75 h, 230 V</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Manual cable drum</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Trigger with pushbutton and extension cable</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Power supply for camera/power supply unit</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CD-ROM with FCT configuration package and documentation</td>
<td>1</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Vision system
SBOA-M-SYSTAINER-110V

Systainer with Compact Vision System SBOC-M-R1B and accessories for mains voltage 110 V

Note on materials:
Contains PWIS (paint wetting impairment substances)

Ordering data

<table>
<thead>
<tr>
<th>Contents</th>
<th>Pieces</th>
<th>Part No.</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>Compact Vision System SBOC-M-R1B, without protective tube</td>
<td>1</td>
<td>572909</td>
<td>SBOA-M-SYSTAINER-110V</td>
</tr>
<tr>
<td>Zoom lens, focal depth 30 ... 40 mm, CS mount</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Adapter kit SBOA-HMSV-41 for mounting on commercially available tripods</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tripod for camera and lighting</td>
<td>2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ethernet diagnostic cable SBOA-K30E-M1.2S</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Crossover patch cable</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Coupler, RS4</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>System light incl. plug for USA, 850 W/75 h, with tilting head and four-way folding frame</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Spare light bulb, U-shaped halogen lamp, 850 W/110 V</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Trigger with pushbutton and extension cable</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Power supply for camera/power supply unit with plug-in adapter for USA</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CD-ROM with FCT configuration package and documentation</td>
<td>1</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
## Compact Vision System SBOC-M

### Accessories

**Lens SASF-C-L-F6**  
Focal depth 6 mm  
Note on materials:  
Contains PWIS (paint wetting impairment substances)  
RoHS-compliant

![Image of Lens SASF-C-L-F6](image1.png)

**Lens SASF-C-L-F16**  
Focal depth 16 mm  
Note on materials:  
Contains PWIS (paint wetting impairment substances)  
RoHS-compliant

![Image of Lens SASF-C-L-F16](image2.png)

**Lens SASF-C-L-F12/25/35**  
Focal depth 12/25/35 mm  
Note on materials:  
Contains PWIS (paint wetting impairment substances)  
RoHS-compliant

![Image of Lens SASF-C-L-F12/25/35](image3.png)

### Technical data

#### Dimensions

<table>
<thead>
<tr>
<th>Type</th>
<th>D₁</th>
<th>D₂</th>
<th>D₃</th>
<th>D₄</th>
<th>D₅</th>
<th>L₁</th>
<th>L₂</th>
<th>L₃</th>
<th>L₄</th>
</tr>
</thead>
<tbody>
<tr>
<td>SASF-C-L-F6</td>
<td>32</td>
<td>29</td>
<td>–</td>
<td>1-32UN</td>
<td>22.5</td>
<td>37.5</td>
<td>1.9</td>
<td>4</td>
<td>6.5</td>
</tr>
<tr>
<td>SASF-C-L-F16</td>
<td>29.5</td>
<td>28.5</td>
<td>27, P=0.5</td>
<td>1-32UN-2A</td>
<td>–</td>
<td>33.2</td>
<td>–</td>
<td>4</td>
<td>–</td>
</tr>
<tr>
<td>SASF-C-L-F12</td>
<td>29.5</td>
<td>28.5</td>
<td>27, P=0.5</td>
<td>1-32UN-2A</td>
<td>16.5</td>
<td>28.5</td>
<td>7.1</td>
<td>4</td>
<td>–</td>
</tr>
<tr>
<td>SASF-C-L-F25</td>
<td>32</td>
<td>28.5</td>
<td>27, P=0.5</td>
<td>1-32UN-2A</td>
<td>16.5</td>
<td>32</td>
<td>6.9</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>SASF-C-L-F35</td>
<td>19.5</td>
<td>35.4</td>
<td>6</td>
<td></td>
<td>6</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### Ordering data – Lenses

<table>
<thead>
<tr>
<th>Brief description</th>
<th>Operating distance [mm]</th>
<th>Focal depth [mm]</th>
<th>Part No.</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>C mount for Compact Vision System with sensor resolution R1 and R3</td>
<td>≥200</td>
<td>6</td>
<td>572910</td>
<td>SASF-C-L-F6</td>
</tr>
<tr>
<td>C mount for Compact Vision System with sensor resolution R1 and R3</td>
<td>≥250</td>
<td>12</td>
<td>572911</td>
<td>SASF-C-L-F12</td>
</tr>
<tr>
<td>C mount for Compact Vision System with sensor resolution R1, R2 and R3</td>
<td>≥250</td>
<td>16</td>
<td>572912</td>
<td>SASF-C-L-F16</td>
</tr>
<tr>
<td>C mount for Compact Vision System with sensor resolution R1, R2 and R3</td>
<td>≥350</td>
<td>25</td>
<td>572913</td>
<td>SASF-C-L-F25</td>
</tr>
<tr>
<td>C mount for Compact Vision System with sensor resolution R1, R2 and R3</td>
<td>≥350</td>
<td>35</td>
<td>572914</td>
<td>SASF-C-L-F35</td>
</tr>
</tbody>
</table>
# Compact Vision System SBOC-M

## Accessories

### Ordering data – Cable M12x1

<table>
<thead>
<tr>
<th>Assembly</th>
<th>Use</th>
<th>Connection</th>
<th>Cable length [m]</th>
<th>Part No.</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>Union nut M12x1</td>
<td>Operating voltage supply</td>
<td>8-pin</td>
<td>2</td>
<td>525616</td>
<td>SIM-M12-8GD-2-PU</td>
</tr>
<tr>
<td>Union nut M12x1</td>
<td>Ethernet diagnostic cable</td>
<td>4-pin, d-coded</td>
<td>3</td>
<td>542139</td>
<td>SBOA-K30E-M125</td>
</tr>
</tbody>
</table>

### Ordering data – Software

<table>
<thead>
<tr>
<th>Brief description</th>
<th>Language</th>
<th>Part No.</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operator package, Information software</td>
<td>–</td>
<td>8001253</td>
<td>GDCS-EPCP-SBOC-D2</td>
</tr>
<tr>
<td>Description</td>
<td>German</td>
<td>8001258</td>
<td>GDCS-SBOC-DE</td>
</tr>
<tr>
<td>Description</td>
<td>English</td>
<td>8001260</td>
<td>GDCS-SBOC-EN</td>
</tr>
</tbody>
</table>
Compact Vision Systems SBOC-Q/SBOI-Q
Mode of operation

The camera not only contains the sensor system for image data acquisition, but also the complete electronic evaluation unit for image processing, an integrated PLC and the interfaces for communication with higher-level controllers. The CheckKon and CheckOpti software tools make configuring the image processing task very straightforward. The user creates reference images with the camera by presenting different sample parts and then defines the desired inspection criteria. These can include, for example, brightness, distance, angle and circularity, but also the reading of text and/or 1D or 2D codes. The sample parts define the tolerance range, within which parts are identified as good, for each inspection characteristic. Up to 256 characteristics can be combined in a single program and up to 256 inspection programs can be stored on the camera. The camera can also be used to carry out sorting functions, as it is capable of storing and distinguishing between up to 16 different part types per inspection program.

The characteristics calculated by the camera are not dependent on the rotary orientation and position of the inspection part, as they are determined relative to the position of the inspection part – any tilting and/or movement of the inspection part in the field of vision is therefore irrelevant for the inspection process.

The behaviour of the camera during inspection is determined by the evaluation mode. There are four different modes.

Evaluation modes

<table>
<thead>
<tr>
<th>Mode</th>
<th>Function</th>
<th>Application</th>
</tr>
</thead>
<tbody>
<tr>
<td>Triggered</td>
<td>Frame capture and inspection with each valid triggering signal. The triggering signal is generated by a master controller or a sensor as soon as the inspection part is in front of the camera. The inspection results are output following the inspection, and the camera then waits for the next valid triggering signal.</td>
<td>Inspection of single parts when there is a triggering signal for image capture.</td>
</tr>
<tr>
<td>Idle run with image trigger with Compact Vision System SBOC...Q...R...B</td>
<td>Image capture is performed continuously, but image evaluation only if there is an inspection part in front of the camera, i.e. if the trigger condition has been satisfied in a freely defined image area (e.g. a specific brightness is exceeded/fallen below). The inspection results are output following the inspection. The camera then waits for the next image-based trigger.</td>
<td>Inspection of single parts at a medium to fast rate without an external sensor.</td>
</tr>
<tr>
<td>Idle run without image trigger</td>
<td>Image capture and inspection (without fixed frame rate) are performed continuously. The triggering signal is permanently present, irrespective of whether or not there is an inspection part in front of the camera. The camera acts like a basic sensor. The inspection results are output following the inspection, and the camera then starts the next inspection immediately.</td>
<td>Inspection of single or continuous parts at a medium to fast (continuous) rate.</td>
</tr>
<tr>
<td>Fixed frame rate with Compact Vision Systems SBOC...Q...R1 and SBOC...Q...R2</td>
<td>Image capture and inspection are performed continuously at a defined frame rate. The triggering signal is permanently present. The inspection results are output following the inspection. The camera starts the next inspection in accordance with the defined frame rate.</td>
<td>Inspection of continuous parts at a constant speed.</td>
</tr>
</tbody>
</table>

Programming

Integrated PLC

The integrated PLC can be programmed in all programming languages covered by IEC 61131-3 (e.g. LDR, ST, sequential function chart, etc.) using the software tool CoDeSys provided by Festo. The predefined function blocks enable straightforward data exchange between the image processing task and the integrated PLC. This provides an easy means of implementing extensive inspection tasks or even communication between different cameras.
### Compact Vision Systems SBOC-Q/SBOI-Q

#### Interfaces

<table>
<thead>
<tr>
<th>Key Feature</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Interfaces</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Connection and display components</strong></td>
<td></td>
</tr>
<tr>
<td>1. Fieldbus connection for Compact Vision Systems SBO…-Q-R1 and</td>
<td>Inputs:</td>
</tr>
<tr>
<td>2. Ethernet connection</td>
<td>- Camera trigger</td>
</tr>
<tr>
<td>3. Operating voltage supply and inputs/outputs</td>
<td>- Error acknowledgment</td>
</tr>
<tr>
<td>4. Adjusting screw for focus</td>
<td>Outputs (can be parameterised):</td>
</tr>
<tr>
<td>5. Status LEDs:</td>
<td>- Ready status</td>
</tr>
<tr>
<td>A. Ready status</td>
<td>- Good part correctly oriented</td>
</tr>
<tr>
<td>B. Ethernet traffic</td>
<td>- Good part incorrectly oriented</td>
</tr>
<tr>
<td>C. Activity</td>
<td>- Reject part</td>
</tr>
<tr>
<td>D. Output</td>
<td>- Error</td>
</tr>
<tr>
<td></td>
<td>- Warning</td>
</tr>
<tr>
<td></td>
<td>- External lighting</td>
</tr>
</tbody>
</table>

**Ethernet – TCP/IP**

- Visualisation of the camera images and inspection results via SBO…-Q WebViewer
- All parameters can be modified and all inspection results and characteristic values can be read via the Ethernet interface with EasyIP, Telnet and Modbus TCP.

**Commissioning and diagnostics:**
- PC for configuration and diagnostics with TCP/IP
- Integration of the camera in a corporate network (integrated web server)
- Front End Display FED, e.g. for teach-in, status signals, type selection or parameter modification
- Robot controllers and programmable logic controllers, e.g. CECX for reading characteristic values (e.g. coordinates and rotation angle)

**CANopen master functionality**

Servo controllers and remote I/O can be addressed directly via the CANopen master functionality.
## Key features

### Interfaces (continued)

<table>
<thead>
<tr>
<th>CAN – Vision system as CPI module</th>
<th>CAN – I/O expansion</th>
</tr>
</thead>
<tbody>
<tr>
<td>For Compact Vision Systems SBO...-Q-R1 and SBO...-Q-R2</td>
<td>For Compact Vision Systems SBO...-Q-R1 and SBO...-Q-R2</td>
</tr>
</tbody>
</table>

- The Compact Vision System SBO...-Q can be integrated into a Festo CPI network. In this case it functions like a binary module with 16 inputs and outputs.
- In combination with a CPX-CPI module and a CPX fieldbus node, for example, the camera can be accessed via Profinet, Interbus, DeviceNet, CANopen and CC-Link.

An input and output module can be connected to the camera via the camera’s CAN interface.

- Input module CP-E08-M12-CL for binary preselection of the inspection program
- Output module CP-A04-M12-CL for binary signalling of part types

### Software

**CheckKon**

Using the CheckKon software, all processes within the camera – from image capture to the input and output parameters – can be displayed, logged and modified.

This includes:
- Selecting the evaluation mode
- Displaying and editing system parameters
- Displaying analysis of most recently inspected parts
- Displaying and logging inspection part images and the characteristics derived from them
- Loading new inspection programs
- System documentation
Compact Vision Systems SBOC-Q/SBOI-Q

Key features

CheckOpti

CheckOpti is used to configure inspection programs. Following the presentation of sample parts, the user defines the characteristics to be inspected with the aid of the software. This is done by selecting the characteristics from a list and then dragging and dropping them to the area of the sample part to be inspected. A total of 256 performance characteristics can thus be defined and optimised within the framework of an inspection program. The inspection program can then be uploaded to one of the camera’s 256 memory locations.

Examples of inspection characteristics:
- Vertical length measurement
- Horizontal length measurement
- Angle measurement
- Counting of events
- Measurements on the inspection part contour
- Area definition
- Calculation of grey tone or colour differences

Application examples

Quality inspection of tube with union nut

The inspection takes place with backlighting; calculated characteristics:
- Length of nut
- Threaded coupling distances
- Diameter of tube
- Thread outside diameter
- Angle measurement on the flange
- Circumference of the screw
- Area of the screw

Screw type differentiation

The inspection takes place with reflected light; calculated characteristics:
- Centre of gravity coordinates x, y
- Average grey tone of area
- Angle of screw drive to horizontal
## Compact Vision Systems SBOC-Q/SBOI-Q

### Peripherals overview

<table>
<thead>
<tr>
<th>Accessories</th>
<th>Brief description</th>
<th>Page/online</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Compact Vision System</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1) SBOC-Q-...</td>
<td>For standard lenses with C mount or CS mount&lt;sup&gt;1&lt;/sup&gt; connection</td>
<td>484</td>
</tr>
<tr>
<td>2) SBOI-Q-...</td>
<td>With integrated lens and light</td>
<td></td>
</tr>
<tr>
<td><strong>Plug socket with cable</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3) SIM-M12-8GD-...-PU</td>
<td>For supplying the operating voltage</td>
<td>490</td>
</tr>
<tr>
<td><strong>Cable</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4) SBOA-K30E-M12S</td>
<td>Ethernet diagnostic cable</td>
<td>490</td>
</tr>
<tr>
<td>– SBOA-K20CP-WS</td>
<td>For integration in a CPI system</td>
<td></td>
</tr>
<tr>
<td>– SBOA-K20CP-SUP</td>
<td>For I/O expansion</td>
<td></td>
</tr>
<tr>
<td><strong>Lens</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>– SASF-C-L-F...</td>
<td>Focal length 6...35 mm</td>
<td>489</td>
</tr>
<tr>
<td><strong>Mounting attachments</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5) Adapter kit SBOA-HMSV-39</td>
<td>With screw-on adapter plate</td>
<td>488</td>
</tr>
<tr>
<td>6) Adapter kit SBOA-HMSV-40</td>
<td>Without screw-on adapter plate</td>
<td></td>
</tr>
<tr>
<td>7) Adapter kit SBOA-HMSV-41</td>
<td>With female thread G 1/4 for mounting on commercially available tripods</td>
<td></td>
</tr>
<tr>
<td>– Adapter SBOL-C-5</td>
<td>5 mm spacer ring (CS mount to C mount)</td>
<td>488</td>
</tr>
</tbody>
</table>

<sup>1</sup> CS mount without protective tube.
## Compact Vision Systems SBOC-Q/SBOI-Q

### Type codes

<table>
<thead>
<tr>
<th>Function</th>
<th>Design</th>
<th>Equipment</th>
<th>Sensor resolution</th>
<th>Sensor type</th>
<th>Fieldbus interface</th>
<th>Application</th>
</tr>
</thead>
<tbody>
<tr>
<td>SBO</td>
<td>C</td>
<td>Q</td>
<td>R3</td>
<td>B</td>
<td>WB</td>
<td>S1</td>
</tr>
<tr>
<td></td>
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<td></td>
<td></td>
</tr>
</tbody>
</table>

### Function

- **SBO**: Compact Vision System

### Design

- **C**: For standard lenses with C mount or CS mount1 connection
- **I**: Integrated lens

### Equipment

- **Q**: Field-based camera for quality inspection

### Sensor resolution

- **R1**: 640 x 480 pixels, VGA resolution
- **R3**: 752 x 480 pixels, Wide VGA resolution
- **R2**: 1,280 x 1,024 pixels, SXGA resolution

### Sensor type

- **B**: Monochrome
- **C**: Colour

### Fieldbus interface

- **CAN**: Interface
- **WB**: Without fieldbus interface

### Application

- **S1**: Tools add-in

1) CS mount without protective tube.
## Compact Vision Systems SBOC-Q/SBOI-Q

### General technical data

<table>
<thead>
<tr>
<th>Type</th>
<th>SBOC-Q-R1</th>
<th>SBOI-Q-R1</th>
<th>SBOC-Q-R3</th>
<th>SBOI-Q-R3</th>
<th>SBOC-Q-R2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sensor resolution [pixels]</td>
<td>640 x 480</td>
<td>752 x 480</td>
<td>1,280 x 1,024</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Exposure time [ms]</td>
<td>0.019 ... 1,000</td>
<td>0.018 ... 200</td>
<td>0.008 ... 1,000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Frame rate (full image) [fps]</td>
<td>150</td>
<td>60</td>
<td>27</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sensor type</td>
<td>Monochrome</td>
<td>Monochrome</td>
<td>Monochrome</td>
<td>Colour</td>
<td>Colour</td>
</tr>
<tr>
<td>Lens mounting</td>
<td>C mount</td>
<td>Integrated lens</td>
<td>C mount</td>
<td>Integrated lens</td>
<td>C mount</td>
</tr>
<tr>
<td>Lens mounting</td>
<td></td>
<td>CS mount</td>
<td></td>
<td>CS mount</td>
<td>CS mount</td>
</tr>
<tr>
<td>Operating distance [mm]</td>
<td>Dependent on the lens selected</td>
<td>22 ... 1,000</td>
<td>Dependent on the lens selected</td>
<td>20 ... 550</td>
<td>Dependent on the lens selected</td>
</tr>
<tr>
<td>Field of vision [mm]</td>
<td>Dependent on the lens selected</td>
<td>14x10 ... 520x390</td>
<td>Dependent on the lens selected</td>
<td>7.9x5.5 ... 195x125</td>
<td>Dependent on the lens selected</td>
</tr>
<tr>
<td>Max. no. of inspection programs</td>
<td>256</td>
<td>256</td>
<td>256</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Max. no. of orientations</td>
<td>8 per part type</td>
<td>8 per part type</td>
<td>8 per part type</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sorting function</td>
<td>Up to 16 types per inspection program</td>
<td>-</td>
<td>Up to 16 types per inspection program</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

1) Without protective tube.

### Electrical data

<table>
<thead>
<tr>
<th>Type</th>
<th>SBOC-Q</th>
<th>SBOI-Q</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nominal operating voltage [V DC]</td>
<td>24</td>
<td></td>
</tr>
<tr>
<td>Permissible voltage fluctuations [%]</td>
<td>±10</td>
<td></td>
</tr>
<tr>
<td>Current consumption with load-free outputs [mA]</td>
<td>120</td>
<td></td>
</tr>
<tr>
<td>Max. residual current [A]</td>
<td>1.5 at the 24 V outputs</td>
<td></td>
</tr>
<tr>
<td>Input 1</td>
<td>Trigger signal</td>
<td>Used by CoDeSys</td>
</tr>
<tr>
<td>Input 2</td>
<td>Applying inputs</td>
<td>Acknowledging errors</td>
</tr>
<tr>
<td>Outputs</td>
<td>Good part</td>
<td>Reject part</td>
</tr>
<tr>
<td>Protection class</td>
<td>IP65, IP67</td>
<td>IP65, IP67</td>
</tr>
</tbody>
</table>

1) Only in combination with protective tube (included in the scope of delivery).
## Compact Vision Systems SBOC-Q/SBOI-Q

### Technical data

#### Electrical data

<table>
<thead>
<tr>
<th>Type</th>
<th>SBOC-Q-R1</th>
<th>SBOC-Q-R3</th>
<th>SBOC-Q-R2</th>
<th>SBOI-Q-R1</th>
<th>SBOI-Q-R2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sensor resolution [pixels]</td>
<td>640 x 480</td>
<td>752 x 480</td>
<td>1,280 x 1,024</td>
<td>1,280 x 1,024</td>
<td>1,280 x 1,024</td>
</tr>
<tr>
<td>Ethernet interface</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bus interface</td>
<td>IEEE802.3U (100BaseT)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Connection technology</td>
<td>Plug M12</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Data transmission speed [Mbps]</td>
<td>100</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Supported protocols</td>
<td>TCP/IP</td>
<td>EasyIP</td>
<td>Telnet</td>
<td>Modbus/TCP</td>
<td></td>
</tr>
</tbody>
</table>

#### Fieldbus interface

<table>
<thead>
<tr>
<th>Type</th>
<th>SBOC-Q-R1</th>
<th>SBOC-Q-R3</th>
<th>SBOC-Q-R2</th>
<th>SBOI-Q-R1</th>
<th>SBOI-Q-R2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Connector plug</td>
<td>Plug M12</td>
<td></td>
<td>Plug M12</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Supported protocols</td>
<td>CP fieldbus</td>
<td></td>
<td>CP fieldbus</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Operating and environmental conditions

<table>
<thead>
<tr>
<th>Condition</th>
<th>SBOC-Q-R1</th>
<th>SBOC-Q-R3</th>
<th>SBOC-Q-R2</th>
<th>SBOI-Q-R1</th>
<th>SBOI-Q-R2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ambient temperature [°C]</td>
<td>–10 … +50</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Storage temperature [°C]</td>
<td>–10 … +60</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ambient conditions</td>
<td>Screened from extreme external light sources</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Cleanest possible ambient air</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CE mark</td>
<td>In accordance with EU EMC Directive</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(see declaration of conformity)</td>
<td>c-UL us Recognized (UL)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Certification</td>
<td>C-Tick</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

1) For information about the applicability of the component see the manufacturer’s CE declaration of conformity at: [www.festo.com](http://www.festo.com)

### Materials

<table>
<thead>
<tr>
<th>Component</th>
<th>SBOC-Q-R1</th>
<th>SBOC-Q-R3</th>
<th>SBOC-Q-R2</th>
<th>SBOI-Q-R1</th>
<th>SBOI-Q-R2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Housing</td>
<td>Anodised aluminium</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cap</td>
<td>ABS, fibre glass reinforced</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Note on materials</td>
<td>Free of copper and PTFE</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>RoHS-compliant</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Weight [g]

<table>
<thead>
<tr>
<th>Lens mounting</th>
<th>SBOC-Q-R1</th>
<th>SBOC-Q-R3</th>
<th>SBOC-Q-R2</th>
<th>SBOI-Q-R1</th>
<th>SBOI-Q-R2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Compact Vision System</td>
<td>182</td>
<td>172</td>
<td>182</td>
<td>184</td>
<td>174</td>
</tr>
</tbody>
</table>

1) CS mount without protective tube.
Compact Vision Systems SBOC-Q/SBOI-Q

Technical data

Dimensions

C mount/CS mount\(^1\) SBOC-Q-R1/-R2

<table>
<thead>
<tr>
<th>Type</th>
<th>B1</th>
<th>B3</th>
<th>B4</th>
<th>B5</th>
<th>B6</th>
<th>D1</th>
<th>H1</th>
<th>H3</th>
<th>H4</th>
<th>H5</th>
<th>H6</th>
<th>H7</th>
<th>H8</th>
<th>H9</th>
<th>L1</th>
<th>L2</th>
<th>L3</th>
<th>L4</th>
<th>L5</th>
</tr>
</thead>
<tbody>
<tr>
<td>SBOC-Q-R1/-R2</td>
<td>45</td>
<td>13.91</td>
<td>42.2</td>
<td>18.8</td>
<td>1.4</td>
<td>45</td>
<td>45</td>
<td>24.65</td>
<td>1.15</td>
<td>2</td>
<td>0.3</td>
<td>21.8</td>
<td>19.8</td>
<td>1.4</td>
<td>139.4</td>
<td>71</td>
<td>85.4</td>
<td>50</td>
<td>1.7</td>
</tr>
<tr>
<td>SBOC-Q-R3</td>
<td></td>
<td>139</td>
<td>85</td>
<td>1.3</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>

C mount/CS mount\(^1\) SBOC-Q-R3

<table>
<thead>
<tr>
<th>Type</th>
<th>B1</th>
<th>B3</th>
<th>B4</th>
<th>B5</th>
<th>B6</th>
<th>D1</th>
<th>H1</th>
<th>H3</th>
<th>H4</th>
<th>H5</th>
<th>H6</th>
<th>H7</th>
<th>H8</th>
<th>H9</th>
<th>L1</th>
<th>L2</th>
<th>L3</th>
<th>L4</th>
<th>L5</th>
</tr>
</thead>
<tbody>
<tr>
<td>SBOC-Q-R3</td>
<td></td>
<td>139</td>
<td>85</td>
<td>1.3</td>
<td></td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

1) CS mount without protective tube.
Compact Vision Systems SBOC-Q/SBOI-Q

Technical data

Dimensions

Integrated lens SBOI-Q-R1

<table>
<thead>
<tr>
<th>Type</th>
<th>B1</th>
<th>B2</th>
<th>B3</th>
<th>B4</th>
<th>B5</th>
<th>B6</th>
<th>H1</th>
<th>H2</th>
<th>H3</th>
<th>H4</th>
<th>H5</th>
<th>H6</th>
<th>H7</th>
<th>H8</th>
<th>H9</th>
<th>L1</th>
<th>L2</th>
</tr>
</thead>
<tbody>
<tr>
<td>SBOI-Q-R1</td>
<td>45</td>
<td>30.2</td>
<td>13.91</td>
<td>42.2</td>
<td>18.8</td>
<td>1.4</td>
<td>45</td>
<td>35</td>
<td>24.65</td>
<td>1.15</td>
<td>2</td>
<td>0.3</td>
<td>21.8</td>
<td>19.8</td>
<td>1.4</td>
<td>83.7</td>
<td>71</td>
</tr>
<tr>
<td>SBOI-Q-R3</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
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<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
</tr>
</tbody>
</table>

Integrated lens SBOI-Q-R3

<table>
<thead>
<tr>
<th>Type</th>
<th>B1</th>
<th>B2</th>
<th>B3</th>
<th>B4</th>
<th>B5</th>
<th>B6</th>
<th>H1</th>
<th>H2</th>
<th>H3</th>
<th>H4</th>
<th>H5</th>
<th>H6</th>
<th>H7</th>
<th>H8</th>
<th>H9</th>
<th>L1</th>
<th>L2</th>
</tr>
</thead>
<tbody>
<tr>
<td>SBOI-Q-R1</td>
<td>45</td>
<td>30.2</td>
<td>13.91</td>
<td>42.2</td>
<td>18.8</td>
<td>1.4</td>
<td>45</td>
<td>35</td>
<td>24.65</td>
<td>1.15</td>
<td>2</td>
<td>0.3</td>
<td>21.8</td>
<td>19.8</td>
<td>1.4</td>
<td>83.7</td>
<td>71</td>
</tr>
<tr>
<td>SBOI-Q-R3</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
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<td>–</td>
</tr>
</tbody>
</table>

Ordering data

<table>
<thead>
<tr>
<th>Sensor type</th>
<th>Part No.</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>640 x 480 pixels, VGA resolution</td>
<td></td>
<td></td>
</tr>
<tr>
<td>For standard lenses with C mount or CS mount connection</td>
<td>Monochrome</td>
<td>SBOC-Q-R1B 541399</td>
</tr>
<tr>
<td>Integrated lens</td>
<td>Monochrome</td>
<td>SBOI-Q-R1B 541396</td>
</tr>
<tr>
<td>Colour</td>
<td>SBOC-Q-R1B-S1 569771</td>
<td></td>
</tr>
<tr>
<td>Colour</td>
<td>SBOI-Q-R1B-S1 569773</td>
<td></td>
</tr>
<tr>
<td>752 x 480 pixels, Wide VGA resolution</td>
<td></td>
<td></td>
</tr>
<tr>
<td>For standard lenses with C mount or CS mount connection</td>
<td>Monochrome</td>
<td>SBOC-Q-R3B-WB 555841</td>
</tr>
<tr>
<td>Integrated lens</td>
<td>Monochrome</td>
<td>SBOI-Q-R3B-WB 555842</td>
</tr>
<tr>
<td>Colour</td>
<td>SBOC-Q-R3B-WB-S1 569777</td>
<td></td>
</tr>
<tr>
<td>Colour</td>
<td>SBOI-Q-R3B-WB-S1 569778</td>
<td></td>
</tr>
<tr>
<td>1,280 x 1,024 pixels, SXGA resolution</td>
<td></td>
<td></td>
</tr>
<tr>
<td>For standard lenses with C mount or CS mount connection</td>
<td>Monochrome</td>
<td>SBOC-Q-R2B 551021</td>
</tr>
<tr>
<td>Colour</td>
<td>SBOC-Q-R2B-S1 569772</td>
<td></td>
</tr>
<tr>
<td>For standard lenses with C mount or CS mount connection</td>
<td>Colour</td>
<td>SBOC-Q-R2C 551022</td>
</tr>
</tbody>
</table>

1) CS mount without protective tube.
Compact Vision Systems SBOC-Q/SBOI-Q

Accessories

Adapter kit
SBOA-HMSV-39
with screw-on adapter plate

Material:
Anodised wrought aluminium alloy

Ordering data

<table>
<thead>
<tr>
<th>Part No.</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>541599</td>
<td>SBOA-HMSV-39</td>
</tr>
</tbody>
</table>

Adapter kit
SBOA-HMSV-40
without screw-on adapter plate

Material:
Anodised wrought aluminium alloy

Ordering data

<table>
<thead>
<tr>
<th>Part No.</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>541600</td>
<td>SBOA-HMSV-40</td>
</tr>
</tbody>
</table>

Adapter kit
SBOA-HMSV-41
with female thread G¼ for mounting on commercially available tripods

Material:
Anodised wrought aluminium alloy

Ordering data

<table>
<thead>
<tr>
<th>Part No.</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>542140</td>
<td>SBOA-HMSV-41</td>
</tr>
</tbody>
</table>

Adapter SBOL-C-5
3 mm spacer ring
(CS mount to C mount)

Material:
Anodised wrought aluminium alloy

Ordering data

<table>
<thead>
<tr>
<th>Part No.</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>541601</td>
<td>SBOL-C-5</td>
</tr>
</tbody>
</table>
Compact Vision Systems SBOC-Q/SBOI-Q

Accessories

Lens SASF-C-L-F6
Focal depth 6 mm

Note on materials:
Contains PWIS (paint wetting impairment substances)
RoHS-compliant

Lens SASF-C-L-F16
Focal depth 16 mm

Note on materials:
Contains PWIS (paint wetting impairment substances)
RoHS-compliant

Lens SASF-C-L-F12/25/35
Focal depth 12/25/35 mm

Note on materials:
Contains PWIS (paint wetting impairment substances)
RoHS-compliant

<table>
<thead>
<tr>
<th>Dimensions</th>
<th>Type</th>
<th>D1</th>
<th>D2</th>
<th>D3</th>
<th>D4</th>
<th>D5</th>
<th>L1</th>
<th>L2</th>
<th>L3</th>
<th>L4</th>
</tr>
</thead>
<tbody>
<tr>
<td>SASF-C-L-F6</td>
<td>32</td>
<td>29</td>
<td>–</td>
<td>1-32UN</td>
<td>22.5</td>
<td>37.5</td>
<td>1.9</td>
<td>4</td>
<td>6.5</td>
<td></td>
</tr>
<tr>
<td>SASF-C-L-F16</td>
<td>29.5</td>
<td>28.5</td>
<td>27, P=0.5</td>
<td>1-32UN-2A</td>
<td>–</td>
<td>33.2</td>
<td>–</td>
<td>4</td>
<td>–</td>
<td></td>
</tr>
<tr>
<td>SASF-C-L-F12</td>
<td>29.5</td>
<td>28.5</td>
<td>27, P=0.5</td>
<td>1-32UN-2A</td>
<td>16.5</td>
<td>28.5</td>
<td>7.1</td>
<td>–</td>
<td>–</td>
<td></td>
</tr>
<tr>
<td>SASF-C-L-F25</td>
<td>29.5</td>
<td>28.5</td>
<td>27, P=0.5</td>
<td>1-32UN-2A</td>
<td>16.5</td>
<td>28.5</td>
<td>7.1</td>
<td>4</td>
<td>–</td>
<td></td>
</tr>
<tr>
<td>SASF-C-L-F35</td>
<td>19.5</td>
<td>35.4</td>
<td>6</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td></td>
</tr>
</tbody>
</table>

Ordering data – Lenses

<table>
<thead>
<tr>
<th>Brief description</th>
<th>Operating distance [mm]</th>
<th>Focal depth [mm]</th>
<th>Part No.</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>C mount for Compact Vision System with sensor resolution R1 and R3</td>
<td>≥200</td>
<td>6</td>
<td>572910 SASF-C-L-F6</td>
<td>–</td>
</tr>
<tr>
<td>C mount for Compact Vision System with sensor resolution R1 and R3</td>
<td>≥250</td>
<td>12</td>
<td>572911 SASF-C-L-F12</td>
<td>–</td>
</tr>
<tr>
<td>C mount for Compact Vision System with sensor resolution R1, R2 and R3</td>
<td>≥250</td>
<td>16</td>
<td>572912 SASF-C-L-F16</td>
<td>–</td>
</tr>
<tr>
<td>C mount for Compact Vision System with sensor resolution R1, R2 and R3</td>
<td>≥250</td>
<td>25</td>
<td>572913 SASF-C-L-F25</td>
<td>–</td>
</tr>
<tr>
<td>C mount for Compact Vision System with sensor resolution R1, R2 and R3</td>
<td>≥350</td>
<td>35</td>
<td>572914 SASF-C-L-F35</td>
<td>–</td>
</tr>
</tbody>
</table>
## Compact Vision Systems SBOC-Q/SBOI-Q

### Accessories

#### Ordering data

<table>
<thead>
<tr>
<th>Use</th>
<th>Connection</th>
<th>Cable length [m]</th>
<th>Part No.</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plug socket with cable</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>For supplying the operating voltage</td>
<td>Straight socket, M12x1, 8-pin</td>
<td>2</td>
<td>525616</td>
<td>SIM-M12-8GD-2-PU</td>
</tr>
<tr>
<td></td>
<td>Open end, 8-pin</td>
<td>5</td>
<td>525618</td>
<td>SIM-M12-8GD-5-PU</td>
</tr>
<tr>
<td>Cable</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ethernet diagnostic cable</td>
<td>Straight socket, M12x1, 4-pin</td>
<td>3</td>
<td>542139</td>
<td>SBOA-K30E-M125</td>
</tr>
<tr>
<td>For integration in a CPI system</td>
<td>Straight socket, M12x1, 5-pin</td>
<td>2</td>
<td>548823</td>
<td>SBOA-K20CP-WS</td>
</tr>
<tr>
<td>For I/O expansion</td>
<td>Straight socket, M12x1, 5-pin</td>
<td>2</td>
<td>548824</td>
<td>SBOA-K20CP-SUP</td>
</tr>
</tbody>
</table>

#### Technical data

- Plug socket with cable: Internet: sim-m12
- Ethernet diagnostic cable: Internet: sboa

#### Ordering data – Documentation

<table>
<thead>
<tr>
<th>Brief description</th>
<th>Language</th>
<th>Part No.</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>Manual</td>
<td>German</td>
<td>548318</td>
<td>PBE-SBO-Q-DE</td>
</tr>
<tr>
<td>User manual in paper form is not included in the scope of delivery for the Compact Vision System</td>
<td>English</td>
<td>548319</td>
<td>PBE-SBO-Q-EN</td>
</tr>
<tr>
<td>Documentation package</td>
<td>German</td>
<td>549036</td>
<td>PBE-SBO-Q-UDOK</td>
</tr>
<tr>
<td>User manual on CD-ROM is included in the scope of delivery for the Compact Vision System</td>
<td>English</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### Ordering data – Software

<table>
<thead>
<tr>
<th>Brief description</th>
<th>Language</th>
<th>Part No.</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>CheckKon software</td>
<td>German</td>
<td>194496</td>
<td>PSW-KON</td>
</tr>
<tr>
<td>CheckOpti software</td>
<td>English</td>
<td>568339</td>
<td>PSW-OPTI</td>
</tr>
<tr>
<td>SBO...-Q Tools add-in software licence for unlocking tools on the Compact Vision System</td>
<td></td>
<td>570043</td>
<td>GSOL</td>
</tr>
</tbody>
</table>
Checkbox CHB-C, Compact

Vision systems > Orientation and quality inspection >

Festo
**High functionality**

The integrated inspection units in detail

The Checkbox CHB-C consists of a housing which comprises all the necessary components. In addition to the user interface (keys, LEDs, displays), the connectors for the electrical connection of actuators, buffer zone sensors, diagnostics PC, voltage supply, encoder and master PLC, there is the entire imaging sensor system (optics, lighting and camera).

The optical channel underneath the Checkbox CHB-C is open towards the rear side, thus it can be easily integrated in the material flow.

**Optimum inspection of parts**

Economical, variable, reliable

Components are scanned as they pass through the "optical channel". Compared with recognition by means of an area scan camera, this image detection concept has major advantages: A mixture of any number of parts as well as objects of considerable length (up to 1 000 mm) can be recognized and processed without the need to observe minimum distances.

In order to obtain a reliable and reproducible inspection result, the speed of the parts to be checked must be constant and their position stable. A fluctuating object speed can be compensated by means of connecting an encoder.
Checkbox CHB-C, Compact

**Key features**

**Which parts are suitable?**

Here is a small selection of the many possibilities:

- Axes
- Bolts
- Brushes
- Buttons
- Ceramic seals
- Curtain hangers
- Drill bits
- Drills
- Fuses
- Game pieces
- Glass ampoules
- Inserts
- Insulating terminals
- Lever stoppers
- Link plates
- Lipstick casings
- Lock nuts
- Mouldings
- Mountings
- Needles
- O-rings
- Pen tops
- Plastic housings
- Plug connectors
- Screws
- Self-locking nuts
- Sensor housings
- Shafts
- Sleeves
- Small wares
- Sockets
- Spring washers
- Springs
- Stampings
- Switch contacts
- Tablets
- Threaded pins
- Toothbrush components
- Turned parts
- Wall plugs
- Washers
- Wooden dowels
- Zip-fastener components

**In which branches of industry is the Checkbox CHB-C used?**

- Metalworking industry
- Electrical engineering industry
- Woodworking industry
- Electroplating industry
- Injection moulding industry
- Packaging industry
- Pharmaceutical industry
- Cosmetics industry
- Jewellery industry
- Textile and clothing industry
- Assembly-systems industry
- Food industry
- Precision engineering industry

Vision systems  Orientation and quality inspection  

Vision systems  Position and quality inspection
**Checkbox CHB-C, Compact**

**Key features**

**What does the camera see?**

<table>
<thead>
<tr>
<th>Part to be checked</th>
<th>Insulating terminal insert</th>
<th>Valve spring</th>
</tr>
</thead>
<tbody>
<tr>
<td>Camera image</td>
<td>Insulating terminal insert</td>
<td>Valve spring</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Part to be checked</th>
<th>Glass ampoule</th>
<th>Glow bar</th>
</tr>
</thead>
<tbody>
<tr>
<td>Camera image</td>
<td>Glass ampoule</td>
<td>Glow bar</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Part to be checked</th>
<th>O-ring</th>
<th>Aroma valve</th>
</tr>
</thead>
<tbody>
<tr>
<td>Camera image</td>
<td>O-ring</td>
<td>Aroma valve</td>
</tr>
</tbody>
</table>
### Mounting attachments and accessories

<table>
<thead>
<tr>
<th></th>
<th>Description</th>
<th>Page/online</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>DUO cable</td>
<td>500</td>
</tr>
<tr>
<td></td>
<td>KM12-DUO-M8-GGD</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Plug</td>
<td>500</td>
</tr>
<tr>
<td></td>
<td>SEA</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Programming cable</td>
<td>500</td>
</tr>
<tr>
<td></td>
<td>KDI-SB202-BU9</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Socket</td>
<td>500</td>
</tr>
<tr>
<td></td>
<td>NTSD</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Adapter kit</td>
<td>500</td>
</tr>
<tr>
<td></td>
<td>SBOA-HMSV</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Connecting cable</td>
<td>500</td>
</tr>
<tr>
<td></td>
<td>KM12-M12-GSGD</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Software</td>
<td>499</td>
</tr>
</tbody>
</table>

**Vision systems > Orientation and quality inspection**

**Checkout CHB-C, Compact**

Peripherals overview
### Checkbox CHB-C, Compact

#### Technical data

**Checkbox CHB-C-X**

<table>
<thead>
<tr>
<th>General technical data</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Min. component ∅ [mm]</td>
<td>0.5</td>
</tr>
<tr>
<td>Max. component ∅ [mm]</td>
<td>25</td>
</tr>
<tr>
<td>Min. component length [mm]</td>
<td>1</td>
</tr>
<tr>
<td>Max. component length</td>
<td>Dependent on belt speed and required resolution</td>
</tr>
<tr>
<td>Component range</td>
<td>Rotationally symmetrical parts and pre-oriented parts of any shape</td>
</tr>
<tr>
<td>Internal passage of optical channel [mm]</td>
<td>60</td>
</tr>
<tr>
<td>Internal height of optical channel [mm]</td>
<td>40</td>
</tr>
<tr>
<td>Camera resolution [mm]</td>
<td>0.06</td>
</tr>
<tr>
<td>Exposure time [μs]</td>
<td>128 ... 1 024</td>
</tr>
<tr>
<td>Number of part memories</td>
<td>12</td>
</tr>
<tr>
<td>Counting function</td>
<td>Yes</td>
</tr>
<tr>
<td>Quantity pre-selection</td>
<td>CheckKon software</td>
</tr>
<tr>
<td>Counting range</td>
<td>1 ... 2 billion</td>
</tr>
<tr>
<td>Max. number of different orientations per memorised part</td>
<td>8</td>
</tr>
</tbody>
</table>

**Orientation**

Part orientation function within checking and counting process can be switched off via diagnostic interface

<table>
<thead>
<tr>
<th>Electrical data</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating voltage DC [V]</td>
<td>24</td>
</tr>
<tr>
<td>Permissible voltage fluctuation ±15%</td>
<td></td>
</tr>
<tr>
<td>Current consumption at load-free outputs [mA]</td>
<td>750</td>
</tr>
<tr>
<td>Internal fuse protection 8 A fuse</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Operating and environmental conditions</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Ambient temperature [°C]</td>
<td>−5 ... +50</td>
</tr>
<tr>
<td>Storage temperature [°C]</td>
<td>−20 ... +70</td>
</tr>
<tr>
<td>Protection class</td>
<td>IP64</td>
</tr>
<tr>
<td>CE marking (see declaration of conformity)</td>
<td>To EU EMC Directive</td>
</tr>
<tr>
<td>Installation site</td>
<td>Dry, screened from extreme external light sources, cleanest possible ambient air</td>
</tr>
</tbody>
</table>
## Interfaces to EN 61 131-2

<table>
<thead>
<tr>
<th>Outputs</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Part acceptable and correctly oriented</td>
<td></td>
</tr>
<tr>
<td>Part acceptable but incorrectly oriented</td>
<td></td>
</tr>
<tr>
<td>Wrong part</td>
<td></td>
</tr>
<tr>
<td>Feeder control</td>
<td></td>
</tr>
<tr>
<td>Conveyor belt control/ready for operation</td>
<td></td>
</tr>
<tr>
<td>“Warning” status signal</td>
<td></td>
</tr>
<tr>
<td>Error output</td>
<td></td>
</tr>
<tr>
<td>Preselect counter reached</td>
<td></td>
</tr>
<tr>
<td>All outputs electronically limited to max. 700 mA</td>
<td></td>
</tr>
<tr>
<td>Max. sum current at “PLC” connection 1A</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Inputs</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Buffer sensor 1</td>
<td></td>
</tr>
<tr>
<td>Buffer sensor 2</td>
<td></td>
</tr>
<tr>
<td>Camera enable</td>
<td></td>
</tr>
<tr>
<td>External error</td>
<td></td>
</tr>
<tr>
<td>Counter reset</td>
<td></td>
</tr>
<tr>
<td>External start</td>
<td></td>
</tr>
<tr>
<td>External sensor</td>
<td></td>
</tr>
<tr>
<td>Key lock</td>
<td></td>
</tr>
<tr>
<td>Type select 0</td>
<td></td>
</tr>
<tr>
<td>Type select 1</td>
<td></td>
</tr>
<tr>
<td>Type select 2</td>
<td></td>
</tr>
<tr>
<td>Type select 3</td>
<td></td>
</tr>
<tr>
<td>External teach</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Connection for encoder</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>To RS 485 specification</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Diagnosis interface</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>RS 232 interface (115 kbaud), socket, M12x1, 4-pin</td>
<td></td>
</tr>
</tbody>
</table>

## Dimensions

![Dimensions Diagram]

<table>
<thead>
<tr>
<th>Dimension</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>100</td>
<td>Actuator connection</td>
</tr>
<tr>
<td>200</td>
<td>Buffer/feeder connection</td>
</tr>
<tr>
<td>250</td>
<td>Diagnostics connection</td>
</tr>
<tr>
<td>124</td>
<td>24 V DC connection</td>
</tr>
<tr>
<td>60</td>
<td>Start/stop button</td>
</tr>
<tr>
<td>50</td>
<td>Status/teach button</td>
</tr>
<tr>
<td>40</td>
<td>Display</td>
</tr>
<tr>
<td>30</td>
<td>Encoder connection</td>
</tr>
<tr>
<td>25</td>
<td>PLC connection</td>
</tr>
<tr>
<td>20</td>
<td>Connecting kit HMSV-12 (not included in scope of delivery)</td>
</tr>
<tr>
<td>5</td>
<td>Connector plug, 4-pin M18 socket (not included in scope of delivery)</td>
</tr>
</tbody>
</table>

# Checkbox CHB-C, Compact

## Technical data

<table>
<thead>
<tr>
<th>Designation</th>
<th>Part No.</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>Checkbox CHB-C-X</td>
<td>536084</td>
<td>CHB-C-X</td>
</tr>
</tbody>
</table>

## Ordering data – Documentation

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<tr>
<th>Description</th>
<th>Language</th>
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<td>User documentation included in scope of delivery</td>
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<td>533411</td>
<td>PBE-CB-COMP-DE</td>
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<tr>
<td></td>
<td>English</td>
<td>533412</td>
<td>PBE-CB-COMP-EN</td>
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Software to meet individual requirements

**CheckKon**

**Performance characteristics**
Using this software the processes within the Checkbox CHB-C can be displayed, logged and adapted from the camera image evaluation through to the I/O parameters.

This means:
- Transfer of new programs to the Checkbox CHB-C
- Display and editing of system parameters
- Display of the evaluation of the last inspected parts recorded
- Display and logging of part contour and characteristics derived
- Display and print-out of system configuration

**CheckOpti**

**Software program**
“CheckOpti” is used in cases where the standard Checkbox CHB-C learning program reaches its limits due to the fact that contour differences are too small, meaning that part orientation or quality features cannot be reliably recognised.

“CheckOpti” enables a complete analysis of the Checkbox CHB-C recognition processes based on the contour data of the parts to be inspected.

Additional, high performance test features can be defined and optimised if necessary. The new configuration can subsequently be transferred to the Checkbox CHB-C.

Further product information
- Internet: sbox-q

**Ordering data – Software**

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<th>Version</th>
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<td>RSW-KON</td>
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<td>CheckOpti software</td>
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<td>568339</td>
<td>RSW-OPTI</td>
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Vision systems > Orientation and quality inspection > Checkbox CHB-C, Compact

Accessories

Vision systems > Position and quality inspection > 2.2
### Ordering data

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<td></td>
</tr>
<tr>
<td><strong>Connection</strong></td>
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<td></td>
</tr>
<tr>
<td><strong>Cable length [m]</strong></td>
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<td></td>
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<td></td>
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<tr>
<td><strong>Type</strong></td>
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<td><strong>Connection</strong></td>
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<td><strong>Cable length [m]</strong></td>
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</tr>
<tr>
<td><strong>Connection</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Cable length [m]</strong></td>
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<td></td>
</tr>
<tr>
<td><strong>Part No.</strong></td>
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<td></td>
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<tr>
<td><strong>Type</strong></td>
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<tr>
<td><strong>Connection</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Cable length [m]</strong></td>
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<tr>
<td><strong>Part No.</strong></td>
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<td></td>
</tr>
<tr>
<td><strong>Connection</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Cable length [m]</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Part No.</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Type</strong></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Application examples

Orientation detection and quality inspection of electrocoils
The Checkbox CHB-C checks the electrocoils and controls the complete supply process, e.g. a following turning station for turning incorrectly orientated good parts and a reject nozzle for sorting out bad parts.

The following features are checked:
- Orientation
- Diameter
- Length

Position and quality check of fibre optic parts
The Checkbox CHB-C checks the transparent display elements, controls the parts flow and removes incorrectly orientated or faulty parts reliably by means of reject nozzles.

The following features are checked:
- Orientation
- Form
- Diameter
Electrical connection technology
## Electrical connection technology

### Table of contents

<table>
<thead>
<tr>
<th>3 Accessories</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>3.1 Connecting cables</td>
<td>Connecting cables NEBU/SIM</td>
<td>Connecting cables NEBS</td>
<td>Connecting cables NEBS</td>
</tr>
<tr>
<td>• Connecting cables for standard, energy chain and robot applications</td>
<td>• Connections: plug socket with square design, open end</td>
<td>• Connections: plug socket with square design, open end</td>
<td></td>
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<tr>
<td>➔ Page 510</td>
<td>➔ Page 548</td>
<td>➔ Page 548</td>
<td></td>
</tr>
<tr>
<td>3.2 Plug connectors</td>
<td>Universal plug connectors NECU/SIE, for self-assembly</td>
<td>Electrical connection technology NEDU, for fieldbus connection</td>
<td>Electrical connection technology NEDU, for fieldbus connection</td>
</tr>
<tr>
<td>• Can be assembled with any cable lengths</td>
<td>• Branch line for connecting and disconnecting fieldbus components</td>
<td>• Screw-in</td>
<td></td>
</tr>
<tr>
<td>• With quick connection, screw terminal, cable connector or spring-loaded terminal</td>
<td>➔ Page 552</td>
<td>➔ Page 552</td>
<td></td>
</tr>
<tr>
<td>➔ Page 552</td>
<td>➔ Page 552</td>
<td>➔ Page 566</td>
<td></td>
</tr>
<tr>
<td>Electrical connection technology SEA, for inputs/outputs</td>
<td>Angled socket PEV/Plug socket MSSD</td>
<td>Angled socket PEV/Plug socket MSSD</td>
<td></td>
</tr>
<tr>
<td>• Can be assembled with any cable lengths</td>
<td>• Angled design</td>
<td>• Angled design</td>
<td></td>
</tr>
<tr>
<td>• With screw terminal or soldered connection</td>
<td>• Available with LED display</td>
<td>• Available with LED display</td>
<td></td>
</tr>
<tr>
<td>➔ Page 576</td>
<td>➔ Page 577</td>
<td>➔ Page 577</td>
<td></td>
</tr>
<tr>
<td>Angled socket SD-4</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• For swivel module DSMI</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Angled design</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>➔ Page 578</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.3 Sensor testers</td>
<td>Sensor testers SM-TEST-1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• For testing and adjusting sensors and proximity switches</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>➔ Page 579</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
## Connecting cables, universal

### Key features

#### Cable attributes

The connecting cables NEBU can be configured using the modular system. You can choose from attributes that are suited to basic, standard, energy chain or robot applications.

<table>
<thead>
<tr>
<th>Basic application</th>
<th>Standard application</th>
</tr>
</thead>
<tbody>
<tr>
<td>Basic applications are characterised by fixed cable installation with no mechanical loads.</td>
<td>Standard applications are characterised by fixed cable installation or small to medium mechanical loads.</td>
</tr>
</tbody>
</table>

#### Electrical connection technology > Universal connecting cables >

<table>
<thead>
<tr>
<th>Energy chain application</th>
<th>Robot application</th>
</tr>
</thead>
<tbody>
<tr>
<td>Energy chain applications involve high mechanical loads, particularly if very small radii are required.</td>
<td>Robot applications involve high mechanical loads that are primarily caused by torsion.</td>
</tr>
<tr>
<td>Type</td>
<td>Electrical connection</td>
</tr>
<tr>
<td>--------------</td>
<td>-----------------------</td>
</tr>
<tr>
<td></td>
<td>Left-hand end</td>
</tr>
<tr>
<td>Cable property: Basic</td>
<td></td>
</tr>
<tr>
<td>NEBU-LE</td>
<td>Open end</td>
</tr>
<tr>
<td>NEBU-M8</td>
<td>Socket M8x1</td>
</tr>
<tr>
<td>NEBU-M12</td>
<td>Socket M12x1</td>
</tr>
<tr>
<td>Cable property: Standard</td>
<td></td>
</tr>
<tr>
<td>NEBU-LE</td>
<td>Open end</td>
</tr>
<tr>
<td>NEBU-M5</td>
<td>Socket M5x0.5</td>
</tr>
<tr>
<td>NEBU-M8</td>
<td>Socket M8x1</td>
</tr>
<tr>
<td>SIM-M8</td>
<td>Socket M8x1</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>SIM-M12</td>
<td>Socket M12x1</td>
</tr>
<tr>
<td>KM12-8</td>
<td>Socket M12x1</td>
</tr>
<tr>
<td>Cable property: Suitable for use with energy chains</td>
<td></td>
</tr>
<tr>
<td>NEBU-M8</td>
<td>Socket M8x1</td>
</tr>
<tr>
<td>NEBU-M12</td>
<td>Socket M12x1</td>
</tr>
<tr>
<td>Cable property: Suitable for robots</td>
<td></td>
</tr>
<tr>
<td>NEBU-M8</td>
<td>Socket M8x1</td>
</tr>
<tr>
<td>NEBU-M12</td>
<td>Socket M12x1</td>
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</table>
### Connecting cables, universal

**Product range overview**

<table>
<thead>
<tr>
<th>Type</th>
<th>Electrical connection</th>
<th>Number of wires</th>
<th>Cable length [m]</th>
<th>Page/online</th>
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</thead>
<tbody>
<tr>
<td>With switching status display</td>
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<td></td>
</tr>
<tr>
<td>NEBU-M8</td>
<td>Socket M8x1</td>
<td>3</td>
<td>0.1 ... 30</td>
<td>516</td>
</tr>
<tr>
<td></td>
<td>Plug M8x1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Plug M12x1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SIM-M8</td>
<td>Socket M8x1</td>
<td>3</td>
<td>2.5/5</td>
<td>531</td>
</tr>
<tr>
<td></td>
<td>Open end</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>NEBU-M12</td>
<td>Socket M1 2x1</td>
<td>3</td>
<td>0.1 ... 30</td>
<td>516</td>
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<td></td>
<td>Plug M8x1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Plug M12x1</td>
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<tr>
<td>SIM-M12</td>
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<tr>
<td></td>
<td>Open end</td>
<td></td>
<td></td>
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<tr>
<td>Welding field immune</td>
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<tr>
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<td>Clip-on socket</td>
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<td>4</td>
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<td></td>
<td>Open end</td>
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<td>2.5/5</td>
<td></td>
</tr>
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<td>Clean Design</td>
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<td></td>
</tr>
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<td>SIM-K-CDN</td>
<td>Clip-on socket</td>
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<td>2.5/5</td>
<td>543</td>
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### Connecting cables NEBU-M5

#### Type codes

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<thead>
<tr>
<th>Function</th>
<th>NEBU Connecting cable</th>
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<tbody>
<tr>
<td>Connection technology, left-hand end</td>
<td>M5 Socket with connecting thread</td>
</tr>
<tr>
<td>Socket design</td>
<td>G Straight</td>
</tr>
<tr>
<td>Number of pins/wires (left-hand end)</td>
<td>4 4-pin</td>
</tr>
<tr>
<td>Cable property</td>
<td>A Standard</td>
</tr>
<tr>
<td>Cable length</td>
<td>1 1 m</td>
</tr>
<tr>
<td></td>
<td>5 5 m</td>
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<td>Alternative wire cross section</td>
<td>Q3 0.14 mm²</td>
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#### Connection technology, right-hand end

<table>
<thead>
<tr>
<th>Connection technology, right-hand end</th>
<th>Cable length 5 m</th>
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<tbody>
<tr>
<td>LE</td>
<td>Open end</td>
</tr>
<tr>
<td>M8</td>
<td>Plug with connecting thread</td>
</tr>
<tr>
<td>M12</td>
<td>Plug with connecting thread, A-coded</td>
</tr>
<tr>
<td>Plug design</td>
<td>G Straight</td>
</tr>
<tr>
<td>Number of pins/wires (right-hand end)</td>
<td>Connection technology, right-hand end, LE or M8</td>
</tr>
<tr>
<td>3</td>
<td>3-pin</td>
</tr>
<tr>
<td>Connection technology, right-hand end, M12</td>
<td>4 4-pin</td>
</tr>
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---

Electrical connection technology > Universal connecting cables > Connecting cables

![Diagram showing type codes and connection details](image-url)
## Connecting cable NEBU-M5

### Electronic components

<table>
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<tr>
<th>Parameter</th>
<th>Value</th>
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</tr>
<tr>
<td>Operating voltage range [V DC]</td>
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</table>

### Electromechanical components – Connection technology

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<th>NEBU-M5G4-K-1-Q3-M8G3</th>
<th>NEBU-M5G4-K-1-Q3-M12G4</th>
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<td>Connection technology, left-hand end</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Electrical connection</td>
<td>Straight socket</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>M5x0.5</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>4-pin</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Connection technology, right-hand end</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Electrical connection</td>
<td>Open end</td>
<td>Straight plug</td>
<td>Straight plug</td>
</tr>
<tr>
<td></td>
<td>–</td>
<td>M8x1</td>
<td>M12x1</td>
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<tr>
<td></td>
<td>3-wire</td>
<td>4-pin</td>
<td>4-pin</td>
</tr>
<tr>
<td>Max. tightening torque, socket</td>
<td>0.3</td>
<td>0.3</td>
<td>0.3</td>
</tr>
<tr>
<td>Max. tightening torque, plug</td>
<td>–</td>
<td>0.3</td>
<td>0.5</td>
</tr>
<tr>
<td>Cable property</td>
<td>Standard</td>
<td>Standard</td>
<td>Standard</td>
</tr>
<tr>
<td>Cable test conditions, standard</td>
<td>Energy chain: 5 million cycles, bending radius 75 mm</td>
<td>Resistance to bending: to Festo standard</td>
<td>Test conditions on request</td>
</tr>
<tr>
<td>Cable length</td>
<td>5</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Cable sheath colour</td>
<td>Grey</td>
<td>Grey</td>
<td>Grey</td>
</tr>
<tr>
<td>Cable composition</td>
<td>3x0.14 mm²</td>
<td>3x0.14 mm²</td>
<td>4x0.14 mm²</td>
</tr>
<tr>
<td>Cable type</td>
<td>LHF11Y</td>
<td>LHF11Y</td>
<td>LHF11Y</td>
</tr>
<tr>
<td>Information on cable sheath materials</td>
<td>TPE-U(PU)</td>
<td>TPE-U(PU)</td>
<td>TPE-U(PU)</td>
</tr>
<tr>
<td>Information on pin contact materials</td>
<td>Gold-plated brass</td>
<td>Gold-plated brass</td>
<td>Gold-plated brass</td>
</tr>
<tr>
<td>Cable diameter</td>
<td>2.9</td>
<td>2.9</td>
<td>3.4</td>
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<td>Conductor nominal cross section</td>
<td>0.14</td>
<td>0.14</td>
<td>0.14</td>
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<td>Wire ends</td>
<td>Wire end sleeve</td>
<td>–</td>
<td>–</td>
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<tr>
<td>Acceptable current load</td>
<td>1.7</td>
<td>1.7</td>
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### Mechanical components

<table>
<thead>
<tr>
<th>Type</th>
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<th>NEBU-M5G4-K-1-Q3-M8G3</th>
<th>NEBU-M5G4-K-1-Q3-M12G4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Min. cable bending radius [mm]</td>
<td>30</td>
<td>30</td>
<td>35</td>
</tr>
<tr>
<td>Type of mounting</td>
<td>Via knurled nut</td>
<td>Via union nut</td>
<td></td>
</tr>
<tr>
<td>Housing colour</td>
<td>Black</td>
<td>Black</td>
<td></td>
</tr>
<tr>
<td>Information on housing materials</td>
<td>TPE (PU)</td>
<td>TPE (PU)</td>
<td></td>
</tr>
<tr>
<td>Information on union nut materials</td>
<td>Nickel-plated brass</td>
<td>Nickel-plated brass</td>
<td></td>
</tr>
</tbody>
</table>

### Immisions/emissions

| Protection class | IP65, IP67 |
| Degree of contamination | 3 |

### Pin allocation

#### NEBU-M5G4-K-5-Q3-LE3

<table>
<thead>
<tr>
<th>Socket M5x0.5, 4-pin</th>
<th>Pin</th>
<th>Wire colour</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>1</td>
<td>Brown</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>Blue</td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>Black</td>
</tr>
</tbody>
</table>

#### NEBU-M5G4-K-1-Q3-M8G3

<table>
<thead>
<tr>
<th>Socket M5x0.5, 4-pin</th>
<th>Pin</th>
<th>Wire colour</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>1</td>
<td>Brown</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>Blue</td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>Black</td>
</tr>
</tbody>
</table>

#### NEBU-M5G4-K-1-Q3-M12G4

<table>
<thead>
<tr>
<th>Socket M5x0.5, 4-pin</th>
<th>Pin</th>
<th>Wire colour</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>1</td>
<td>Brown</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>White</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>Blue</td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>Black</td>
</tr>
</tbody>
</table>

### Dimensions

**NEBU-M5G4-K-5-Q3-LE3**

- **D1** = 2.9
- **D2** = M5x0.5
- **D3** = 6
- **L1** = 5
- **L2** = 27.5
- **L3** = 50

[Download CAD data](www.festo.com/en/engineering)
Connecting cables NEBU-M5

Technical data

Dimensions

<table>
<thead>
<tr>
<th>Type</th>
<th>D1</th>
<th>D2</th>
<th>D3</th>
<th>D4</th>
<th>D5</th>
<th>L1</th>
<th>L2</th>
<th>L3</th>
</tr>
</thead>
<tbody>
<tr>
<td>NEBU-M5G4-K-1-Q3-M8G3</td>
<td>2.9</td>
<td>M5x0.5</td>
<td>6</td>
<td>M8x1</td>
<td>9.6</td>
<td>1</td>
<td>27.5</td>
<td>43</td>
</tr>
<tr>
<td>NEBU-M5G4-K-1-Q3-M12G4</td>
<td>3.4</td>
<td>M5x0.5</td>
<td>6</td>
<td>M12x1</td>
<td>15</td>
<td>1</td>
<td>27.5</td>
<td>49</td>
</tr>
</tbody>
</table>

Ordering data

<table>
<thead>
<tr>
<th>Electrical connection</th>
<th>Number of wires</th>
<th>Cable length [m]</th>
<th>Part No.</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>Left-hand end</td>
<td>Right-hand end</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Socket M5x0.5, straight, 4-pin</td>
<td>Open end, 3-wire</td>
<td>3</td>
<td>5</td>
<td>539508</td>
</tr>
<tr>
<td></td>
<td>Plug M8x1, straight, 3-pin</td>
<td>3</td>
<td>1</td>
<td>539510</td>
</tr>
<tr>
<td></td>
<td>Plug M12x1, straight, 4-pin</td>
<td>4</td>
<td>1</td>
<td>539512</td>
</tr>
</tbody>
</table>
### Connecting cables NEBU-LE

<table>
<thead>
<tr>
<th>Type codes</th>
</tr>
</thead>
<tbody>
<tr>
<td>NEBU–LE–K–1–M12G5</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>NEBU: Connecting cable</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Connection technology, left-hand end</th>
</tr>
</thead>
<tbody>
<tr>
<td>LE: Open end</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Number of pins/wires (left-hand end)</th>
</tr>
</thead>
<tbody>
<tr>
<td>3: 3-pin</td>
</tr>
<tr>
<td>4: 4-pin</td>
</tr>
<tr>
<td>5: 5-pin</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Cable characteristics</th>
</tr>
</thead>
<tbody>
<tr>
<td>P: Basic</td>
</tr>
<tr>
<td>K: Standard</td>
</tr>
<tr>
<td>E: Suitable for use with energy chains</td>
</tr>
<tr>
<td>R: Suitable for robot applications</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Cable length</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.1 – 30 m</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Cable designation</th>
</tr>
</thead>
<tbody>
<tr>
<td>With inscription label holder (standard)</td>
</tr>
<tr>
<td>Without inscription label holder</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Connection technology, right-hand end</th>
</tr>
</thead>
<tbody>
<tr>
<td>M8: Plug with connecting thread</td>
</tr>
<tr>
<td>M12: Plug with connecting thread, A-coded</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Plug design</th>
</tr>
</thead>
<tbody>
<tr>
<td>G: Straight</td>
</tr>
<tr>
<td>W: Angled</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Number of pins/wires (right-hand end)</th>
</tr>
</thead>
<tbody>
<tr>
<td>3: 3-pin</td>
</tr>
<tr>
<td>4: 4-pin</td>
</tr>
<tr>
<td>5: 5-pin</td>
</tr>
</tbody>
</table>

**Additional variants can be ordered using the modular product system ➔ 525**

- Number of pins/wires (left-hand end)
- Cable characteristics
- Cable designation
- Connection technology, right-hand end
- Plug design
- Number of pins/wires (right-hand end)
### Type codes

<table>
<thead>
<tr>
<th>Function</th>
<th>NEBU Connecting cable</th>
</tr>
</thead>
<tbody>
<tr>
<td>Connection technology, left-hand end</td>
<td>M8 Socket with connecting thread</td>
</tr>
<tr>
<td>Socket design</td>
<td>G Straight</td>
</tr>
<tr>
<td></td>
<td>W Angled</td>
</tr>
<tr>
<td></td>
<td>R Rotatable</td>
</tr>
<tr>
<td>Number of pins/wires (left-hand end)</td>
<td>3 3-pin</td>
</tr>
<tr>
<td></td>
<td>4 4-pin</td>
</tr>
<tr>
<td>Display</td>
<td>Without LED (standard)</td>
</tr>
<tr>
<td></td>
<td>P LED, PNP</td>
</tr>
<tr>
<td></td>
<td>N LED, NPN</td>
</tr>
<tr>
<td></td>
<td>L LED, DC</td>
</tr>
<tr>
<td>Cable characteristics</td>
<td>F Basic</td>
</tr>
<tr>
<td></td>
<td>K Standard</td>
</tr>
<tr>
<td></td>
<td>E Suitable for use with energy chains</td>
</tr>
<tr>
<td></td>
<td>R Suitable for robot applications</td>
</tr>
<tr>
<td>Cable length</td>
<td>0.1 … 30</td>
</tr>
<tr>
<td></td>
<td>0.1 … 30 m</td>
</tr>
<tr>
<td>Cable designation</td>
<td>With inscription label holder (standard)</td>
</tr>
<tr>
<td></td>
<td>N Without inscription label holder</td>
</tr>
<tr>
<td>Connection technology, right-hand end</td>
<td>LE Open end</td>
</tr>
<tr>
<td></td>
<td>M8 Plug with connecting thread</td>
</tr>
<tr>
<td></td>
<td>M12 Plug with connecting thread, A-coded</td>
</tr>
<tr>
<td>Plug design</td>
<td>Open end</td>
</tr>
<tr>
<td></td>
<td>G Straight</td>
</tr>
<tr>
<td></td>
<td>W Angled</td>
</tr>
<tr>
<td>Number of pins/wires (right-hand end)</td>
<td>2 2-pin</td>
</tr>
<tr>
<td></td>
<td>3 3-pin</td>
</tr>
<tr>
<td></td>
<td>4 4-pin</td>
</tr>
</tbody>
</table>

Additional variants can be ordered using the modular product system ➔ 526

- Display
- Cable characteristics
- Number of pins/wires (right-hand end)
## Connecting cables NEBU-M12

### Type codes

<table>
<thead>
<tr>
<th>Function</th>
<th>NEBU</th>
<th>Connecting cable</th>
</tr>
</thead>
<tbody>
<tr>
<td>Connection technology, left-hand end</td>
<td>M12</td>
<td>Socket with connecting thread, A-coded</td>
</tr>
<tr>
<td>Socket design</td>
<td>G</td>
<td>Straight</td>
</tr>
<tr>
<td></td>
<td>W</td>
<td>Angled</td>
</tr>
<tr>
<td>Number of pins/wires (left-hand end)</td>
<td>5</td>
<td>5-pin</td>
</tr>
<tr>
<td>Display</td>
<td>P</td>
<td>Without LED (standard)</td>
</tr>
<tr>
<td></td>
<td>N</td>
<td>LED, NPN</td>
</tr>
<tr>
<td></td>
<td>P2</td>
<td>2x LED, PNP</td>
</tr>
<tr>
<td>Cable characteristics</td>
<td>P</td>
<td>Basic</td>
</tr>
<tr>
<td></td>
<td>K</td>
<td>Standard</td>
</tr>
<tr>
<td></td>
<td>E</td>
<td>Suitable for use with energy chains</td>
</tr>
<tr>
<td></td>
<td>R</td>
<td>Suitable for robot applications</td>
</tr>
<tr>
<td>Cable length</td>
<td>0.1 – 30</td>
<td>0.1 – 30 m</td>
</tr>
<tr>
<td>Cable designation</td>
<td>With inscription label holder (standard)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>N</td>
<td>Without inscription label holder</td>
</tr>
<tr>
<td>Connection technology, right-hand end</td>
<td>LE</td>
<td>Open end</td>
</tr>
<tr>
<td>Plug design</td>
<td>G</td>
<td>Straight</td>
</tr>
<tr>
<td></td>
<td>W</td>
<td>Angled</td>
</tr>
<tr>
<td>Number of pins/wires (right-hand end)</td>
<td>3</td>
<td>3-pin</td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>4-pin</td>
</tr>
<tr>
<td></td>
<td>5</td>
<td>5-pin</td>
</tr>
</tbody>
</table>

Additional variants can be ordered using the modular product system → 527

- Display
- Cable characteristics
### Connecting cables NEBU-LE/M8/M12

#### General technical data

<table>
<thead>
<tr>
<th>Type</th>
<th>NEBU-LE</th>
<th>NEBU-M8</th>
<th>NEBU-M12</th>
</tr>
</thead>
<tbody>
<tr>
<td>Conforms to</td>
<td>EN 61076-2-101</td>
<td>EN 61076-2-104</td>
<td>EN 61076-2-101</td>
</tr>
<tr>
<td>Note on materials</td>
<td>Free of copper and PTFE</td>
<td>RoHS-compliant</td>
<td></td>
</tr>
<tr>
<td>Cable characteristics</td>
<td>NEBU-...-E</td>
<td>Halogen-free and oil-resistant</td>
<td>NEBU-...-R</td>
</tr>
<tr>
<td></td>
<td></td>
<td>NEBU-...-R</td>
<td></td>
</tr>
</tbody>
</table>

#### Type

<table>
<thead>
<tr>
<th>Type</th>
<th>NEBU-M8</th>
<th>NEBU-M12</th>
</tr>
</thead>
<tbody>
<tr>
<td>Display</td>
<td>2x0.25 mm²</td>
<td>3x0.25 mm²</td>
</tr>
<tr>
<td></td>
<td>3x0.25 mm²</td>
<td>4x0.25 mm²</td>
</tr>
</tbody>
</table>

| Conforms to   | EN 61076-2-104            | EN 61076-2-101          |
| Note on materials | Free of copper and PTFE | RoHS-compliant          |
| Cable characteristics | NEBU-...-E    | Halogen-free and oil-resistant | NEBU-...-R  |
|                | NEBU-...-R               |                         |

<table>
<thead>
<tr>
<th>Type</th>
<th>NEBU-M8</th>
<th>NEBU-M12</th>
</tr>
</thead>
<tbody>
<tr>
<td>Display</td>
<td>3x0.25 mm²</td>
<td>4x0.25 mm²</td>
</tr>
<tr>
<td></td>
<td>4x0.25 mm²</td>
<td>5x0.25 mm²</td>
</tr>
</tbody>
</table>

| Conforms to   | EN 61984           | EN 61076-2-104          |
| Note on materials | Free of copper and PTFE | RoHS-compliant          |
| Cable characteristics | NEBU-...-E    | Halogen-free and oil-resistant | NEBU-...-R  |
|                | NEBU-...-R               |                         |

1) For NEBU-M8R: Conforms to EN 61076-2-104.

#### Electrical connection technology > Universal connecting cables > Connecting cables NEBU-LE/M8/M12

#### Technical data

<table>
<thead>
<tr>
<th>Type</th>
<th>NEBU-M8</th>
<th>NEBU-M12</th>
</tr>
</thead>
<tbody>
<tr>
<td>Display</td>
<td>L</td>
<td>–</td>
</tr>
<tr>
<td>Conforms to</td>
<td>EN 61076-2-104</td>
<td>EN 61076-2-101</td>
</tr>
<tr>
<td>CE marking (see declaration of conformity)</td>
<td>–</td>
<td>To EU Low Voltage Directive</td>
</tr>
<tr>
<td>Note on materials</td>
<td>Free of copper and PTFE</td>
<td>RoHS-compliant</td>
</tr>
<tr>
<td>Cable characteristics</td>
<td>NEBU-...-E</td>
<td>Halogen-free and oil-resistant</td>
</tr>
<tr>
<td></td>
<td>NEBU-...-R</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Type</th>
<th>NEBU-M8</th>
<th>NEBU-M12</th>
</tr>
</thead>
<tbody>
<tr>
<td>Display</td>
<td>–</td>
<td>P, N</td>
</tr>
<tr>
<td>Conforms to</td>
<td>EN 61076-2-101</td>
<td>EN 61984</td>
</tr>
<tr>
<td>CE marking (see declaration of conformity)</td>
<td>To EU Low Voltage Directive</td>
<td>–</td>
</tr>
<tr>
<td>Note on materials</td>
<td>Free of copper and PTFE</td>
<td>RoHS-compliant</td>
</tr>
<tr>
<td>Cable characteristics</td>
<td>NEBU-...-E</td>
<td>Halogen-free and oil-resistant</td>
</tr>
<tr>
<td></td>
<td>NEBU-...-R</td>
<td></td>
</tr>
</tbody>
</table>

2) When different connection technologies are combined the lower value applies.
# Connecting cables NEBU-LE/M8/M12

## Technical data

<table>
<thead>
<tr>
<th>Type</th>
<th>NEBU-M12</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cable composition</td>
<td>3x0.25 mm²</td>
</tr>
<tr>
<td>Display</td>
<td>P, N</td>
</tr>
<tr>
<td>Operating voltage range</td>
<td>0 ... 250</td>
</tr>
</tbody>
</table>

2) When different connection technologies are combined the lower value applies.

## Electromechanical components

### Type

- **NEBU-LE**
- **NEBU-M8**
- **NEBU-M12**

### Electrical connection

- **Open end**
- **Socket M8x1**
- **Socket M12x1**

### Connection technology, left-hand end

#### Electrical connection

- **Closed end**
- **Straight**
- **Rotatable**

| – | 3-pin | 3-pin | – |
| – | 4-pin | 4-pin | – |
| – | 5-pin | –     | 5-pin |

#### Plug coding

- **A**
- **–**
- **–**

### Connection technology, right-hand end

#### Electrical connection

- **Plug M8x1**
- **Plug M12x1**

<table>
<thead>
<tr>
<th>Plug M8x1</th>
<th>Open end</th>
<th>Plug M12x1</th>
<th>Open end</th>
</tr>
</thead>
<tbody>
<tr>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>2-wire</td>
<td>3-pin</td>
<td>3-pin</td>
<td>3-pin</td>
</tr>
<tr>
<td>3-pin</td>
<td>4-pin</td>
<td>4-pin</td>
<td>4-pin</td>
</tr>
<tr>
<td>5-pin</td>
<td>–</td>
<td>5-pin</td>
<td>–</td>
</tr>
</tbody>
</table>

#### Plug coding

| – | A |

### Acceptable current load at 40 °C

| – | 0.5 | 4 |

### Type

- **NEBU-...-P**
- **NEBU-...-K**
- **NEBU-...-E**
- **NEBU-...-R**

### Cable characteristics

- **Basic**
- **Standard**
- **Suitable for use with energy chains**
- **Suitable for robot applications**

### Cable test conditions

- **Resistance to bending: to Festo standard**
- **Energy chain: 5 million cycles, bending radius 75 mm**
- **Energy chain: 5 million cycles, bending radius 28 mm**

### Test conditions on request

| – | – |

### Cable length

| – | 0.1 ... 30 |

### Cable sheath colour

| – | Grey |

### Cable composition

<table>
<thead>
<tr>
<th>M8x1</th>
<th>2x0.25 mm²</th>
<th>3x0.25 mm²</th>
<th>4x0.25 mm²</th>
</tr>
</thead>
<tbody>
<tr>
<td>M12x1</td>
<td>3x0.25 mm²</td>
<td>4x0.25 mm²</td>
<td>5x0.25 mm²</td>
</tr>
</tbody>
</table>

### Cable type

- **LiYY**
- **LiFYY11Y**
- **Li12Y11Y**
- **Li12Y11Y**

### Cable sheath materials

- **PVC-P**
- **PTE-UP(U)**
- **PTE-UP(U)**

### Insulating sheath materials

- **PVC-P**
- **PVC-P**
- **PTE-E**
- **PTE-E**

### Pin contact materials

- **Gold-plated brass**

### Cable diameter

| – | 4.5 | 4.5 | 4.5 | 4.5 |

### Nominal conductor cross section

| – | 0.25 |

2) When different connection technologies are combined the lower value applies.

3) Depending on the combination of connection technology.

4) Also applies to display L.

5) Also applies to display P2.

6) For NEBU-...-K with display L and LE connection technology at right-hand end:
- **Cable type: LiFYY11Y cable diameter**: 3.4 mm
- **Cable sheath materials**: Insulating sheath PP
- **Cable diameter**: 4.5 mm
- **Note on materials**: Insulating sheath PP
- **Cable diameter**: 3.4 mm

2012/08 – Subject to change – Sensors / Vision systems
### Connecting cables NEBU-LE/M8/M12

#### Mechanical components

<table>
<thead>
<tr>
<th>Socket design</th>
<th>Straight</th>
<th>Angled</th>
<th>Rotatable</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rotation range of socket</td>
<td>–</td>
<td>–</td>
<td>360</td>
</tr>
<tr>
<td>Housing colour</td>
<td>Black</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Housing materials</td>
<td>TPE-U(PU)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Union nut materials</td>
<td>Nickel-plated brass</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### Display/operation

<table>
<thead>
<tr>
<th>Type</th>
<th>NEBU-…P</th>
<th>NEBU-…N</th>
<th>NEBU-…L</th>
<th>NEBU-…P2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Display</td>
<td>LED, PNP</td>
<td>LED, NPN</td>
<td>LED, DC</td>
<td>2x LED, PNP</td>
</tr>
<tr>
<td>Ready status display</td>
<td>Green LED</td>
<td>Green LED</td>
<td>–</td>
<td>Green LED</td>
</tr>
<tr>
<td>Switching status display</td>
<td>Yellow LED</td>
<td>Yellow LED</td>
<td>Yellow LED</td>
<td>Yellow LED</td>
</tr>
<tr>
<td>–</td>
<td>–</td>
<td>–</td>
<td>Blue LED</td>
<td></td>
</tr>
</tbody>
</table>

#### Immissions/emissions

<table>
<thead>
<tr>
<th>Type</th>
<th>NEBU-…-P</th>
<th>NEBU-…-K</th>
<th>NEBU-…-E</th>
<th>NEBU-…-R</th>
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</thead>
<tbody>
<tr>
<td>Cable characteristics</td>
<td>Basic</td>
<td>Standard</td>
<td>Suitable for use with energy chains</td>
<td>Suitable for robot applications</td>
</tr>
<tr>
<td>Ambient temperature with flexible cable installation</td>
<td>–5 … +70</td>
<td>–5 … +80</td>
<td>–5 … +80</td>
<td>–5 … +80</td>
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<tr>
<td>Protection class</td>
<td>IP65, IP68</td>
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</table>

#### Type NEBU-M8

<table>
<thead>
<tr>
<th>Type</th>
<th>Cable composition</th>
<th>Display</th>
<th>Surge capacity²</th>
<th>Degree of contamination</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2x0.25 mm²</td>
<td>L</td>
<td>0.8</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>3x0.25 mm²</td>
<td>–</td>
<td>1.5</td>
<td></td>
</tr>
<tr>
<td></td>
<td>4x0.25 mm²</td>
<td>P, N</td>
<td>–</td>
<td></td>
</tr>
<tr>
<td></td>
<td>5x0.25 mm²</td>
<td>P, N</td>
<td>0.8</td>
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#### Type NEBU-M12

<table>
<thead>
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<th>Display</th>
<th>Surge capacity²</th>
<th>Degree of contamination</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>3x0.25 mm²</td>
<td>P, N</td>
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<td>3</td>
</tr>
<tr>
<td></td>
<td>4x0.25 mm²</td>
<td>–</td>
<td>0.8</td>
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</tr>
<tr>
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<td>5x0.25 mm²</td>
<td>P2</td>
<td>2.5</td>
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<td>5x0.25 mm²</td>
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<td>0.8</td>
<td></td>
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</table>

² When different connection technologies are combined the lower value applies.

⁷ For NEBU-M8R: Surge capacity 0.8 kV.
## Technical data

### Pin allocation to EN 60947-5-2

#### Socket M8x1

<table>
<thead>
<tr>
<th>Pin</th>
<th>Wire colour</th>
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<tbody>
<tr>
<td>1</td>
<td>Brown</td>
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<tr>
<td>3</td>
<td>Blue</td>
</tr>
<tr>
<td>4</td>
<td>Black</td>
</tr>
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</table>

#### Plug M8x1

<table>
<thead>
<tr>
<th>Pin</th>
<th>Wire colour</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Brown</td>
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<tr>
<td>3</td>
<td>Blue</td>
</tr>
<tr>
<td>4</td>
<td>Black</td>
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#### Socket M12x1

<table>
<thead>
<tr>
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<th>Wire colour</th>
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<td>1</td>
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<td>3</td>
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<tr>
<td>4</td>
<td>Black</td>
</tr>
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#### Plug M12x1

<table>
<thead>
<tr>
<th>Pin</th>
<th>Wire colour</th>
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</thead>
<tbody>
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<tr>
<td>3</td>
<td>Blue</td>
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<tr>
<td>4</td>
<td>Black</td>
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</table>

### Pin allocation – Display L

#### Socket M8x1

<table>
<thead>
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<td>4</td>
<td>Black</td>
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#### Plug M8x1

<table>
<thead>
<tr>
<th>Pin</th>
<th>Wire colour</th>
</tr>
</thead>
<tbody>
<tr>
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<td>Black</td>
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</tbody>
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#### Plug M12x1

<table>
<thead>
<tr>
<th>Pin</th>
<th>Wire colour</th>
</tr>
</thead>
<tbody>
<tr>
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<td>Black</td>
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### Pin allocation – NEBU-M12 suitable for use with energy chains

#### NEBU-M12G5-E-2.5-W2-M8G4-V1

<table>
<thead>
<tr>
<th>Socket M12x1, 5-pin</th>
<th>Plugs M8x1, 4-pin</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>3</td>
<td>3</td>
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#### NEBU-M12G5-E-2.5-W3-M8G4-V2

<table>
<thead>
<tr>
<th>Socket M12x1, 5-pin</th>
<th>Plugs M8x1, 4-pin</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>4</td>
<td>4</td>
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</tbody>
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### Circuit diagram

#### LED display, PNP

```
1 4 3
GK -
VT HU
```

#### LED display, NPN

```
1 4 3
GK -
VT HU
```

#### LED display, DC

```
1 4 3
GK -
VT HU
```

#### 2X LED display, PNP

```
1 4 3
GK -
VT HU
```

---

2012/08 – Subject to change – Sensors / Vision systems


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### Connecting cables NEBU-LE/M8/M12

#### Dimensions – Connection technology at left-hand end

**Open end**

- **1** Socket M8x1, straight
- **2** Inscription label holder
- **3** Cable
- **4** Display field with version P, N or L
- **5** Socket

**Socket M8x1, straight**

- **1** Socket M8x1, straight
- **2** Inscription label holder
- **3** Cable
- **4** Display field with version P, N or L

**Socket M8x1, angled**

- **1** Socket M8x1, angled
- **2** Inscription label holder
- **3** Cable
- **4** Display field with version P, N or L

**Socket M8x1, rotatable**

- **1** Socket M8x1, rotatable
- **2** Inscription label holder
- **3** Cable

#### Technical data

<table>
<thead>
<tr>
<th>Type</th>
<th>Connection technology, left-hand end</th>
<th>D1 [mm]</th>
<th>D2</th>
<th>D3</th>
<th>L1 [m]</th>
<th>L2</th>
<th>L3</th>
<th>L4 [mm]</th>
<th>H1 [mm]</th>
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</thead>
<tbody>
<tr>
<td>NEBU-LE</td>
<td>Open end</td>
<td>4.5</td>
<td>–</td>
<td>–</td>
<td>0.1 ... 30</td>
<td>–</td>
<td>50</td>
<td>23</td>
<td>–</td>
</tr>
<tr>
<td>NEBU-M8G</td>
<td>Socket M8x1, straight</td>
<td>4.5</td>
<td>M8x1</td>
<td>9</td>
<td>0.1 ... 30</td>
<td>34.6</td>
<td>–</td>
<td>23</td>
<td>17</td>
</tr>
<tr>
<td>NEBU-M8W</td>
<td>Socket M8x1, angled</td>
<td>4.5</td>
<td>M8x1</td>
<td>10</td>
<td>20.9</td>
<td>23</td>
<td>16.3</td>
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<td></td>
</tr>
<tr>
<td>NEBU-M8R</td>
<td>Socket M8x1, rotatable</td>
<td>4.5</td>
<td>M8x1</td>
<td>9</td>
<td>0.1 ... 30</td>
<td>34.6</td>
<td>–</td>
<td>23</td>
<td>17</td>
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</tbody>
</table>

**With display**

<table>
<thead>
<tr>
<th>Type</th>
<th>Connection technology, left-hand end</th>
<th>D1 [mm]</th>
<th>D2</th>
<th>D3</th>
<th>L1 [m]</th>
<th>L2</th>
<th>L3</th>
<th>L4 [mm]</th>
<th>H1 [mm]</th>
</tr>
</thead>
<tbody>
<tr>
<td>NEBU-M8GP/-...N/-...L</td>
<td>Socket M8x1, straight</td>
<td>3.4</td>
<td>M8x1</td>
<td>9</td>
<td>0.1 ... 30</td>
<td>34.6</td>
<td>–</td>
<td>23</td>
<td>–</td>
</tr>
<tr>
<td>NEBU-M8WP/-...N/-...L</td>
<td>Socket M8x1, angled</td>
<td>3.4</td>
<td>M8x1</td>
<td>9</td>
<td>0.1 ... 30</td>
<td>26.9</td>
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<td>23</td>
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</table>

---

3.1

[www.festo.com/en/engineering]
### Dimensions – Connection technology at left-hand end

<table>
<thead>
<tr>
<th>Type</th>
<th>Connection technology, left-hand end</th>
<th>D1 (mm)</th>
<th>D2 (mm)</th>
<th>D3 (mm)</th>
<th>L1 (m)</th>
<th>L2</th>
<th>L3</th>
<th>L4</th>
<th>H1 (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>NEBU-M12G</td>
<td>Socket M12x1, straight</td>
<td>4.5</td>
<td>M12x1</td>
<td>15</td>
<td>0.1 ... 30</td>
<td>47.5</td>
<td>–</td>
<td>23</td>
<td>–</td>
</tr>
<tr>
<td>NEBU-M12W</td>
<td>Socket M12x1, angled</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>With display</td>
<td>NEBU-M12GP/-…N/-…P2</td>
<td>4.5</td>
<td>M12x1</td>
<td>15</td>
<td>0.1 ... 30</td>
<td>47.5</td>
<td>–</td>
<td>23</td>
<td>–</td>
</tr>
<tr>
<td></td>
<td>NEBU-M12WP/-…N/-…P2</td>
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</table>
Connecting cables NEBU-LE/M8/M12

Technical data

**Dimensions – Connection technology at right-hand end**

<table>
<thead>
<tr>
<th>Type</th>
<th>Connection technology, right-hand end</th>
<th>D1</th>
<th>D4</th>
<th>D5</th>
<th>L1</th>
<th>L2</th>
<th>L3</th>
<th>L4</th>
<th>H1</th>
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</thead>
<tbody>
<tr>
<td>NEBU-M...-...-LE</td>
<td>Open end</td>
<td>4.5</td>
<td>-</td>
<td>-</td>
<td>0.1 ... 30</td>
<td>-</td>
<td>50</td>
<td>23</td>
<td>-</td>
</tr>
<tr>
<td>NEBU-M...-...-M8G</td>
<td>Plug M8x1, straight</td>
<td>4.5</td>
<td>M8x1</td>
<td>9.6</td>
<td>0.1 ... 30</td>
<td>41.1</td>
<td>-</td>
<td>23</td>
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</tr>
<tr>
<td>NEBU-M...-...-M8W</td>
<td>Plug M8x1, angled</td>
<td>4.5</td>
<td>M8x1</td>
<td>15</td>
<td>0.1 ... 30</td>
<td>54.5</td>
<td>-</td>
<td>23</td>
<td>-</td>
</tr>
<tr>
<td>NEBU-M...-...-M12G</td>
<td>Plug M12x1, straight</td>
<td>4.5</td>
<td>M12x1</td>
<td>9.6</td>
<td>0.1 ... 30</td>
<td>54.5</td>
<td>-</td>
<td>23</td>
<td>-</td>
</tr>
<tr>
<td>NEBU-M...-...-M12W</td>
<td>Plug M12x1, angled</td>
<td>4.5</td>
<td>M12x1</td>
<td>15</td>
<td>0.1 ... 30</td>
<td>54.5</td>
<td>-</td>
<td>23</td>
<td>33.2</td>
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Download CAD data: www.festo.com/en/engineering
### Technical data

#### Electrical connection technology > Universal connecting cables >

#### Connecting cables NEBU-LE/M8/M12

**Ordering data**

<table>
<thead>
<tr>
<th>Electrical connection</th>
<th>Cable length [m]</th>
<th>Part No.</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>Left-hand end</td>
<td>Right-hand end</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### Cable characteristics: Standard

| 5-pin | Open end |  |  |  |
|-------|----------|  |  |  |
| 3-pin | Socket M8x1, straight | 5-wire | 2.5 | 541338 NEBU-M8G3-K-2.5-L63 |
|       |          | 5  | 541342 NEBU-M8W3-K-5-L63 |
|       |          | 10 | 541344 NEBU-M8W3-K-10-L63 |
| 3-pin | Plug M8x1, straight | 2.5 | 541346 NEBU-M8G3-K-0.5-M8G3 |
|       |          | 5  | 541348 NEBU-M8G3-K-1-M8G3 |
|       |          | 10 | 541349 NEBU-M8G3-K-10-M8G3 |

| 4-pin | Socket M8x1, angled | 3-wire | 2.5 | 541338 NEBU-M8G3-K-2.5-L63 |
|       | Socket M8x1, straight | 4-wire | 2.5 | 541342 NEBU-M8G3-K-2.5-L64 |
|       | Socket M8x1, angled | 4-wire | 2.5 | 541344 NEBU-M8G3-K-2.5-L64 |

| 5-pin | Socket M12x1, straight | 3-wire | 2.5 | 541363 NEBU-M12G5-K-2.5-L63 |
|       | Socket M12x1, straight | 4-wire | 2.5 | 541367 NEBU-M12G5-K-2.5-L63 |
|       | Socket M12x1, straight | 5-wire | 2.5 | 541370 NEBU-M12G5-K-5-L63 |
|       | Socket M12x1, angled | 3-wire | 2.5 | 541363 NEBU-M12G5-K-2.5-L63 |

#### Cable characteristics: Suitable for use with energy chains

| 3-pin | Socket M8x1, straight | 3-wire | 5  | 569843 NEBU-M8G3-E-5-L63 |
|       | Socket M12x1, straight | 4-pin | 2.5 | 554034 NEBU-M12G5-E-2.5-W3-M8G4-V1 |
|       | Socket M12x1, straight | 5  | 569843 NEBU-M12G5-E-5-L63 |

#### Cable characteristics: Suitable for robot applications

| 3-pin | Socket M8x1, straight | 3-wire | 2.5 | 569845 NEBU-M8G3-R-2.5-L63 |
|       | Socket M8x1, straight | 5  | 569846 NEBU-M8G3-R-5-L63 |
|       | Socket M8x1, angled  | 3-wire | 2.5 | 569847 NEBU-M8W3-R-2.5-L63 |
|       | Socket M8x1, straight | 4-pin | 2  | 556946 NEBU-M8G3-R-2-M8G4 |

---

8) Pin allocation designed for connecting the pressure transmitter SPTW—A M12 to the signal converter SVE4 IS

9) Pin allocation designed for connecting the pressure transmitter SPTW—VD M12 to the signal converter SVE4 US
### Connecting cables NEBU-LE/M8/M12

**Technical data**

<table>
<thead>
<tr>
<th>Electrical connection</th>
<th>Switching output</th>
<th>Cable length [m]</th>
<th>Part No.</th>
<th>Type</th>
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<tr>
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<td></td>
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</tr>
<tr>
<td>Socket M8x1, angled</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Left-hand end</td>
<td>Right-hand end</td>
<td>3-wire, open end</td>
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<tr>
<td>PNP</td>
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<td>NEBU-M8W3P-K-2.5-LE3</td>
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<td>541340</td>
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<tr>
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<td>NEBU-M8W3N-K-2.5-LE3</td>
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<td>NEBU-M8W3N-K-5-LE3</td>
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<tr>
<td><strong>5-pin</strong></td>
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<td></td>
</tr>
<tr>
<td>Socket M12x1, angled</td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Left-hand end</td>
<td>Right-hand end</td>
<td>3-wire, open end</td>
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<td></td>
</tr>
<tr>
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## Ordering table

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<td>NEBU-LE</td>
</tr>
<tr>
<td>Function</td>
<td>Connecting cable</td>
<td>NEBU</td>
</tr>
<tr>
<td>Connection technology, left-hand end</td>
<td>Open end</td>
<td>LE</td>
</tr>
<tr>
<td>Number of pins/wires (left-hand end)</td>
<td>3-pin (suitable for open end, M8 plug)</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>4-pin (suitable for open end, M8 plug)</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>5-pin (suitable for 3, 4 and 5-pin M12 plug)</td>
<td>5</td>
</tr>
<tr>
<td>Cable characteristics</td>
<td>Basic</td>
<td>-P</td>
</tr>
<tr>
<td></td>
<td>Standard</td>
<td>-K</td>
</tr>
<tr>
<td></td>
<td>Suitable for use with energy chains</td>
<td>-E</td>
</tr>
<tr>
<td></td>
<td>Suitable for robot applications</td>
<td>-R</td>
</tr>
<tr>
<td>Cable length</td>
<td>0.1 ... 30 m (0.1 ... 2.5 m in 0.1 m increments, 2.5 ... 30 m in 0.5 m increments)</td>
<td>-</td>
</tr>
<tr>
<td>Wire cross section</td>
<td>0.25 mm² (standard)</td>
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</tr>
<tr>
<td>Cable colour</td>
<td>Grey (standard)</td>
<td>-</td>
</tr>
<tr>
<td>Cable designation</td>
<td>With inscription label holder (standard)</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>Without inscription label holder</td>
<td>-N</td>
</tr>
<tr>
<td>Connection technology, right-hand end</td>
<td>Plug with connecting thread M8</td>
<td>-M8</td>
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<tr>
<td></td>
<td>Plug with connecting thread M12, A-coded</td>
<td>-M12</td>
</tr>
<tr>
<td>Plug design</td>
<td>Straight</td>
<td>G</td>
</tr>
<tr>
<td></td>
<td>Angled</td>
<td>W</td>
</tr>
<tr>
<td>Number of pins/wires (right-hand end)</td>
<td>3-pin (suitable for M8/M12 socket)</td>
<td>9</td>
</tr>
<tr>
<td></td>
<td>4-pin (suitable for M8/M12 socket)</td>
<td>9</td>
</tr>
<tr>
<td></td>
<td>5-pin (suitable for M12 socket)</td>
<td>9</td>
</tr>
</tbody>
</table>

---

3, 4, 5 With LE connection technology at the left-hand end, the number of wires (left-hand end) must be copied over.

3, 4, 5 With LE connection technology at left-hand end, the number of wires chosen must be equal to the number of pins (right-hand end).
### Ordering table

<table>
<thead>
<tr>
<th>Conditions</th>
<th>Code</th>
<th>Enter code</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>M</strong> Module No.</td>
<td>539052</td>
<td>NEBU-M8</td>
</tr>
<tr>
<td><strong>Function</strong></td>
<td>Connecting cable</td>
<td>NEBU-M8</td>
</tr>
<tr>
<td><strong>Connection technology, left-hand end</strong></td>
<td>Socket with connecting thread M8</td>
<td>NEBU-M8</td>
</tr>
<tr>
<td><strong>Socket design</strong></td>
<td>Straight</td>
<td>G</td>
</tr>
<tr>
<td></td>
<td>Angled</td>
<td>W</td>
</tr>
<tr>
<td></td>
<td>Rotatable</td>
<td>R</td>
</tr>
<tr>
<td><strong>Number of pins/wires (left-hand end)</strong></td>
<td>3-pin (suitable for open end, M8 plug)</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>4-pin (suitable for open end, M8 plug)</td>
<td>4</td>
</tr>
<tr>
<td><strong>Display</strong></td>
<td>Without LED, DC (standard)</td>
<td>LED, PNP</td>
</tr>
<tr>
<td></td>
<td>LED, NPN</td>
<td>LED, DC</td>
</tr>
<tr>
<td></td>
<td></td>
<td>L</td>
</tr>
<tr>
<td><strong>Cable characteristics</strong></td>
<td>Basic</td>
<td>-P</td>
</tr>
<tr>
<td></td>
<td>Standard</td>
<td>-K</td>
</tr>
<tr>
<td></td>
<td>Suitable for use with energy chains</td>
<td>-E</td>
</tr>
<tr>
<td></td>
<td>Suitable for robot applications</td>
<td>-R</td>
</tr>
<tr>
<td><strong>Cable length</strong></td>
<td>0.1…30 m (0.1…2.5 m in 0.1 m increments, 2.5…30 m in 0.5 m increments)</td>
<td>-</td>
</tr>
<tr>
<td><strong>Wire cross section</strong></td>
<td>0.25 mm² (standard)</td>
<td>Grey (standard)</td>
</tr>
<tr>
<td><strong>Cable designation</strong></td>
<td>With inscription label holder (standard)</td>
<td>Without inscription label holder</td>
</tr>
<tr>
<td><strong>Connection technology, right-hand end</strong></td>
<td>Open end</td>
<td>LE</td>
</tr>
<tr>
<td></td>
<td>Plug with connecting thread M8</td>
<td>M8</td>
</tr>
<tr>
<td></td>
<td>Plug with connecting thread M12, A-coded</td>
<td>M12</td>
</tr>
<tr>
<td><strong>Plug design</strong></td>
<td>Straight</td>
<td>G</td>
</tr>
<tr>
<td></td>
<td>Angled</td>
<td>W</td>
</tr>
<tr>
<td><strong>Number of pins/wires (right-hand end)</strong></td>
<td>2-pin</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>3-pin (suitable for M8/M12 socket)</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>4-pin (suitable for M8/M12 socket)</td>
<td>4</td>
</tr>
</tbody>
</table>

**Transfer order code**

539052 NEBU-M8
## Connecting cables NEBU-M12

### Ordering table

<table>
<thead>
<tr>
<th>Conditions</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Module No.</td>
<td>539052</td>
</tr>
<tr>
<td>Function</td>
<td>Connecting cable</td>
</tr>
<tr>
<td>Connection technology, left-hand end</td>
<td>Socket with connecting thread M12, A-coded</td>
</tr>
<tr>
<td>Socket design</td>
<td>Straight</td>
</tr>
<tr>
<td>Number of pins/wires (left-hand end)</td>
<td>5-pin (suitable for 3, 4 and 5-pin M12 plug)</td>
</tr>
<tr>
<td>Display</td>
<td>Without LED, DC (standard)</td>
</tr>
<tr>
<td>Cable characteristics</td>
<td>Basic</td>
</tr>
<tr>
<td>Connection technology, right-hand end</td>
<td>Open end</td>
</tr>
<tr>
<td>Number of pins/wires (right-hand end)</td>
<td>3-pin (suitable for M8/M12 socket)</td>
</tr>
</tbody>
</table>

### Notes

- Can only be combined with socket design W and number of pins/wires (left-hand end) 5 and number of pins/wires (right-hand end) 3.
- Can only be combined with number of pins/wires (right-hand end) 4.
- Cannot be combined with LE connection technology at right-hand end.
- Can only be combined with number of pins/wires (right-hand end) 4.

---

**Transfer order code**

539052 NEBU - M12 5 - - - - - -
### Technical data

**Connecting cable**

NEBU-M12...8-pin

<table>
<thead>
<tr>
<th><strong>Electronic components</strong></th>
<th><strong>Electromechanical components</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Operating voltage range</strong> [V AC]</td>
<td>0 ... 30</td>
</tr>
<tr>
<td><strong>Operating voltage range</strong> [V DC]</td>
<td>0 ... 36</td>
</tr>
<tr>
<td><strong>Connection technology, left-hand end</strong></td>
<td><strong>Connection technology, right-hand end</strong></td>
</tr>
<tr>
<td><strong>Electrical connection</strong></td>
<td><strong>Electrical connection</strong></td>
</tr>
<tr>
<td>Angled socket M12x1 8-pin</td>
<td>Open end 8-wire</td>
</tr>
<tr>
<td><strong>Plug coding</strong></td>
<td><strong>Cable length</strong> [m]</td>
</tr>
<tr>
<td>A</td>
<td>2</td>
</tr>
<tr>
<td>5</td>
<td>10</td>
</tr>
<tr>
<td><strong>Cable sheath colour</strong></td>
<td><strong>Cable composition</strong></td>
</tr>
<tr>
<td>Grey</td>
<td>8x0.25 mm² Screened</td>
</tr>
<tr>
<td><strong>Wire ends</strong></td>
<td><strong>Information on cable sheath materials</strong></td>
</tr>
<tr>
<td>Tin-plated</td>
<td>PUR</td>
</tr>
<tr>
<td><strong>Min. cable bending radius</strong> [mm]</td>
<td><strong>Acceptable current load</strong> [A]</td>
</tr>
<tr>
<td>66</td>
<td>1.5</td>
</tr>
<tr>
<td><strong>Immissions/emissions</strong></td>
<td><strong>Pin allocation</strong></td>
</tr>
<tr>
<td>Ambient temperature [°C]</td>
<td>Socket M12x1 8-pin</td>
</tr>
<tr>
<td>–25 ... +90</td>
<td>Pin</td>
</tr>
<tr>
<td>Protection class</td>
<td>1</td>
</tr>
<tr>
<td>IP67</td>
<td>2</td>
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</tr>
<tr>
<td></td>
<td>7</td>
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<tr>
<td></td>
<td>8</td>
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</tbody>
</table>
### Technical data

#### Dimensions

<table>
<thead>
<tr>
<th>Electrical connection, left-hand end</th>
<th>Electrical connection, right-hand end</th>
</tr>
</thead>
<tbody>
<tr>
<td>Socket M1x1, angled</td>
<td>Open end</td>
</tr>
</tbody>
</table>

#### Ordering data

<table>
<thead>
<tr>
<th>Electrical connection</th>
<th>Cable length L (m)</th>
<th>Part No.</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>Left-hand end</td>
<td>Right-hand end</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cable property: Standard</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8-pin</td>
<td>8-wire</td>
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<td></td>
</tr>
<tr>
<td>Socket M1x1, angled</td>
<td>Cable, open end</td>
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<td></td>
</tr>
<tr>
<td>2</td>
<td>$42256$</td>
<td>NEBU-M12WB-2-N-LE8</td>
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</tr>
<tr>
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<td>$42257$</td>
<td>NEBU-M12WB-5-N-LE8</td>
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</tr>
<tr>
<td>10</td>
<td>$570007$</td>
<td>NEBU-M12WB-10-N-LE8</td>
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</tr>
</tbody>
</table>
## Connecting cables SIM

### Type codes

<table>
<thead>
<tr>
<th>Type</th>
<th>Plug socket with cable for sensors</th>
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<tbody>
<tr>
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### Electrical connection

<table>
<thead>
<tr>
<th>Type</th>
<th>Union nut M8x1</th>
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</thead>
<tbody>
<tr>
<td>M8</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Type</th>
<th>Union nut M12x1</th>
</tr>
</thead>
<tbody>
<tr>
<td>M12</td>
<td></td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Type</th>
<th>Clip-on plug</th>
</tr>
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<tbody>
<tr>
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### Welding field immunity

<table>
<thead>
<tr>
<th>Type</th>
<th>Basic type, no welding field immunity</th>
</tr>
</thead>
<tbody>
<tr>
<td>RS</td>
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</table>

<table>
<thead>
<tr>
<th>Type</th>
<th>Welding field immune</th>
</tr>
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<tbody>
<tr>
<td>RS</td>
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### Number of wires

<table>
<thead>
<tr>
<th>Type</th>
<th>3-wire</th>
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<tbody>
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<table>
<thead>
<tr>
<th>Type</th>
<th>4-wire</th>
</tr>
</thead>
<tbody>
<tr>
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<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Type</th>
<th>5-wire</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
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<table>
<thead>
<tr>
<th>Type</th>
<th>8-wire</th>
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<tbody>
<tr>
<td>8</td>
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### Connection direction

<table>
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<tr>
<th>Type</th>
<th>In-line</th>
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<tbody>
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<table>
<thead>
<tr>
<th>Type</th>
<th>Lateral</th>
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<tbody>
<tr>
<td>WD</td>
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### Cable length

<table>
<thead>
<tr>
<th>Type</th>
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<tbody>
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<table>
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<table>
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<tr>
<th>Type</th>
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</thead>
<tbody>
<tr>
<td>3</td>
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</tbody>
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<table>
<thead>
<tr>
<th>Type</th>
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<tbody>
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<td>5</td>
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</tbody>
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<table>
<thead>
<tr>
<th>Type</th>
<th>10 m</th>
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</thead>
<tbody>
<tr>
<td>10</td>
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</tr>
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</table>

### Switching output

<table>
<thead>
<tr>
<th>Type</th>
<th>PNP or NPN</th>
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<tbody>
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<table>
<thead>
<tr>
<th>Type</th>
<th>PNP</th>
</tr>
</thead>
<tbody>
<tr>
<td>NS</td>
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### Display

<table>
<thead>
<tr>
<th>Type</th>
<th>LED</th>
</tr>
</thead>
<tbody>
<tr>
<td>L</td>
<td></td>
</tr>
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</table>

### Cable sheath material

<table>
<thead>
<tr>
<th>Type</th>
<th>Polyurethane</th>
</tr>
</thead>
<tbody>
<tr>
<td>PU</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Type</th>
<th>Polyvinyl chloride</th>
</tr>
</thead>
<tbody>
<tr>
<td>PVC</td>
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</tbody>
</table>

### Ease of cleaning

<table>
<thead>
<tr>
<th>Type</th>
<th>Clean Design, suitable for the food industry</th>
</tr>
</thead>
<tbody>
<tr>
<td>CDN</td>
<td></td>
</tr>
</tbody>
</table>
## General technical data

<table>
<thead>
<tr>
<th>Type</th>
<th>SIM-M8</th>
<th>SIM-M12</th>
<th>SIM-M12-...-L</th>
</tr>
</thead>
<tbody>
<tr>
<td>Conforms to</td>
<td>EN 61076-2-104</td>
<td>EN 61076-2-101</td>
<td>EN 61984</td>
</tr>
<tr>
<td>Note on materials</td>
<td>Free of copper and PTFE</td>
<td>RoHS-compliant</td>
<td></td>
</tr>
</tbody>
</table>

## Electronic components

<table>
<thead>
<tr>
<th>Type</th>
<th>SIM-M8</th>
<th>SIM-M12</th>
<th>SIM-M12-...-L</th>
</tr>
</thead>
<tbody>
<tr>
<td>Electrical connection</td>
<td>3-pin</td>
<td>4-pin</td>
<td>3-pin</td>
</tr>
<tr>
<td>Operating voltage range [V AC]</td>
<td>0 ... 60</td>
<td>0 ... 30</td>
<td>0 ... 250</td>
</tr>
<tr>
<td>Operating voltage range [V DC]</td>
<td>0 ... 60</td>
<td>0 ... 30</td>
<td>0 ... 250</td>
</tr>
</tbody>
</table>

## Electromechanical components

<table>
<thead>
<tr>
<th>Type</th>
<th>SIM-M8</th>
<th>SIM-M12</th>
<th>SIM-M8-...-L</th>
<th>SIM-M12-...-L</th>
</tr>
</thead>
<tbody>
<tr>
<td>Electrical connection</td>
<td>3-pin</td>
<td>4-pin</td>
<td>3-pin</td>
<td>4-pin</td>
</tr>
<tr>
<td>Connection technology, left-hand end</td>
<td>Straight socket</td>
<td>Straight socket</td>
<td>Angled socket</td>
<td></td>
</tr>
<tr>
<td>Connection technology, right-hand end</td>
<td>Open end</td>
<td>Open end</td>
<td>Open end</td>
<td></td>
</tr>
</tbody>
</table>

## Cable property

<table>
<thead>
<tr>
<th>Cable property</th>
<th>Standard</th>
</tr>
</thead>
</table>

## Mechanical components

<table>
<thead>
<tr>
<th>Housing colour</th>
<th>Black</th>
</tr>
</thead>
<tbody>
<tr>
<td>Information on housing materials</td>
<td>TPE-IPU</td>
</tr>
<tr>
<td>Information on union nut materials</td>
<td>Nickel-plated brass</td>
</tr>
</tbody>
</table>
### Display/operation

<table>
<thead>
<tr>
<th>Type</th>
<th>SIM-M8/L</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ready status display</td>
<td>Green LED</td>
</tr>
<tr>
<td>Switching status display</td>
<td>Yellow LED</td>
</tr>
</tbody>
</table>

### Immissions/emissions

<table>
<thead>
<tr>
<th>Type</th>
<th>SIM-M8</th>
<th>SIM-M12</th>
<th>SIM-M8/L</th>
</tr>
</thead>
<tbody>
<tr>
<td>Electrical connection</td>
<td>3-pin</td>
<td>4-pin</td>
<td>3-pin</td>
</tr>
<tr>
<td>Ambient temperature [°C]</td>
<td>–25 ... +70</td>
<td>–25 ... +70</td>
<td>–25 ... +70</td>
</tr>
<tr>
<td>Ambient temperature [°C] with flexible cable installation</td>
<td>–5 ... +70</td>
<td>–5 ... +70</td>
<td>–5 ... +70</td>
</tr>
<tr>
<td>Protection class</td>
<td>IP65, IP68</td>
<td>IP65, IP68</td>
<td>IP65, IP68</td>
</tr>
<tr>
<td>Surge capacity [kV]</td>
<td>1.5</td>
<td>0.8</td>
<td>2.5</td>
</tr>
<tr>
<td>Degree of contamination</td>
<td>3</td>
<td>3</td>
<td>3</td>
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</table>

### Pin allocation to EN 60947-5-2

#### M8x1

<table>
<thead>
<tr>
<th>Socket, 3-pin</th>
<th>Pin</th>
<th>Wire colour</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Brown</td>
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</tr>
<tr>
<td>3</td>
<td>Blue</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Black</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Socket, 4-pin</th>
<th>Pin</th>
<th>Wire colour</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
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</tr>
<tr>
<td>2</td>
<td>White</td>
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</tr>
<tr>
<td>3</td>
<td>Blue</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Black</td>
<td></td>
</tr>
</tbody>
</table>

#### M12x1

<table>
<thead>
<tr>
<th>Socket, 3-pin</th>
<th>Pin</th>
<th>Wire colour</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Brown</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Blue</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Black</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Socket, 4-pin</th>
<th>Pin</th>
<th>Wire colour</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Brown</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>White</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Blue</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Black</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Socket, 5-pin</th>
<th>Pin</th>
<th>Wire colour</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Brown</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>White</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Blue</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Black</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Grey</td>
<td></td>
</tr>
</tbody>
</table>

### Dimensions

<table>
<thead>
<tr>
<th>SIM-M8...GD...PU</th>
<th>SIM-M8...WD...PU</th>
</tr>
</thead>
<tbody>
<tr>
<td>D1 ≥0.1</td>
<td>D2 ≥0.1</td>
</tr>
<tr>
<td>D3 ≥0.3/-0.4</td>
<td>H1 +3%</td>
</tr>
<tr>
<td>L1 ±2</td>
<td>L2 +0.4/-0.5</td>
</tr>
</tbody>
</table>

- **SIM-M8...GD-2,5-PU**
  - D1: 4.5
  - D2: 9
  - M8x1: 2,500
  - L3: 50
  - L2: 34.4

- **SIM-M8...GD-5-PU**
  - D1: 4.5
  - D2: 9
  - M8x1: 5,000
  - L3: 50

- **SIM-M8...GD-10-PU**
  - D1: 4.5
  - D2: 9
  - M8x1: 10,000
  - L3: 50

- **SIM-M8...WD-2,5-PU**
  - D1: 4.5
  - D2: 9
  - M8x1: 2,500
  - L3: 50
  - L2: 26.8
Connecting cables SIM-M8/M12

Technical data

Dimensions

<table>
<thead>
<tr>
<th></th>
<th>D1</th>
<th>D2</th>
<th>D3</th>
<th>H1</th>
<th>L1</th>
<th>L2</th>
<th>L3</th>
</tr>
</thead>
<tbody>
<tr>
<td>SIM-M12-...GD-2,5-PU</td>
<td>4.5</td>
<td>15</td>
<td>M12x1</td>
<td>–</td>
<td>2,500</td>
<td>50</td>
<td>48.5</td>
</tr>
<tr>
<td>SIM-M12-...GD-5-PU</td>
<td>4.5</td>
<td>15</td>
<td>M12x1</td>
<td>26</td>
<td>2,500</td>
<td>50</td>
<td>37.5</td>
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</tbody>
</table>

Dimensions

<table>
<thead>
<tr>
<th></th>
<th>D1</th>
<th>D2</th>
<th>D3</th>
<th>H1</th>
<th>L1</th>
<th>L2</th>
<th>L3</th>
</tr>
</thead>
<tbody>
<tr>
<td>SIM-M8-...WD-2,5-...L-PU</td>
<td>4.5</td>
<td>9</td>
<td>M8x1</td>
<td>16.8</td>
<td>2,500</td>
<td>50</td>
<td>26.8</td>
</tr>
<tr>
<td>SIM-M8-...WD-5-...L-PU</td>
<td>4.5</td>
<td>15</td>
<td>M12x1</td>
<td>26</td>
<td>2,500</td>
<td>50</td>
<td>37.5</td>
</tr>
</tbody>
</table>

Download CAD data ➔ www.festo.com/en/engineering
## Connecting cables SIM-M8/M12

### Technical data

<table>
<thead>
<tr>
<th>Electrical connection</th>
<th>Number of wires</th>
<th>Cable length [m]</th>
<th>Part No.</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Socket M8x1, straight</strong></td>
<td><strong>Open end</strong></td>
<td><strong>3</strong></td>
<td><strong>2.5</strong></td>
<td>159420</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td><strong>5</strong></td>
<td>159421</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td><strong>10</strong></td>
<td>192964</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td><strong>4</strong></td>
<td>158960</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td><strong>5</strong></td>
<td>158961</td>
</tr>
<tr>
<td><strong>Socket M8x1, angled</strong></td>
<td><strong>Open end</strong></td>
<td><strong>3</strong></td>
<td><strong>2.5</strong></td>
<td>159422</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td><strong>5</strong></td>
<td>159423</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td><strong>10</strong></td>
<td>192965</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td><strong>4</strong></td>
<td>158962</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td><strong>5</strong></td>
<td>158963</td>
</tr>
<tr>
<td><strong>Socket M12x1, straight</strong></td>
<td><strong>Open end</strong></td>
<td><strong>3</strong></td>
<td><strong>2.5</strong></td>
<td>159428</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td><strong>5</strong></td>
<td>159429</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td><strong>4</strong></td>
<td>164259</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td><strong>5</strong></td>
<td>175715</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td><strong>5</strong></td>
<td>175716</td>
</tr>
<tr>
<td><strong>Socket M12x1, angled</strong></td>
<td><strong>Open end</strong></td>
<td><strong>3</strong></td>
<td><strong>2.5</strong></td>
<td>159430</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td><strong>5</strong></td>
<td>159431</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td><strong>4</strong></td>
<td>164258</td>
</tr>
</tbody>
</table>

**With switching status display for sensor with switching output PNP**

| **Socket M8x1, angled** | **Open end** | **3** | **2.5** | 159424 | SIM-M8-3WD-2,5-PSL-PU |
| | | | **5** | 159425 | SIM-M8-3WD-5-PSL-PU |
| **Socket M12x1, angled** | **Open end** | **3** | **2.5** | 159432 | SIM-M12-3WD-2,5-PSL-PU |
| | | | **5** | 159433 | SIM-M12-3WD-5-PSL-PU |

**With switching status display for sensor with switching output NPN**

| **Socket M8x1, angled** | **Open end** | **3** | **2.5** | 159426 | SIM-M8-3WD-2,5-NSL-PU |
| | | | **5** | 159427 | SIM-M8-3WD-5-NSL-PU |
| **Socket M12x1, angled** | **Open end** | **3** | **2.5** | 159434 | SIM-M12-3WD-2,5-NSL-PU |
| | | | **5** | 159435 | SIM-M12-3WD-5-NSL-PU |
**General technical data**

**Note on materials**
RoHS-compliant

**Electronic components**

<table>
<thead>
<tr>
<th>Operating voltage range [V AC]</th>
<th>0 ... 45</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating voltage range [V DC]</td>
<td>0 ... 70</td>
</tr>
</tbody>
</table>

**Electromechanical components**

**Connection technology, left-hand end**
- Electrical connection: Straight socket
  - M12x1
  - 8-pin

**Connection technology, right-hand end**
- Electrical connection: Open end
  - 8-wire

<table>
<thead>
<tr>
<th>Cable length [m]</th>
<th>2</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>10</td>
</tr>
</tbody>
</table>

**Cable sheath colour**
- Grey

**Cable composition**
- 8x0.25 mm²

**Information on cable sheath materials**
- PUR

**Acceptable current load at 40 °C [A]**
- 1.5

**Immissions/emissions**

<table>
<thead>
<tr>
<th>Ambient temperature [°C]</th>
<th>-25 ... +80</th>
</tr>
</thead>
</table>

**Protection class**
- IP68

**Pin allocation**

**M12x1**

<table>
<thead>
<tr>
<th>Socket, 8-pin</th>
<th>Pin</th>
<th>Wire colour</th>
<th>Pin</th>
<th>Wire colour</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1</td>
<td>White</td>
<td>5</td>
<td>Grey</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>Brown</td>
<td>6</td>
<td>Pink</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>Green</td>
<td>7</td>
<td>Blue</td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>Yellow</td>
<td>8</td>
<td>Red</td>
</tr>
</tbody>
</table>
Connecting cables SIM-M12-8

Technical data

Dimensions

![Diagram of a connector with dimensions](image)

<table>
<thead>
<tr>
<th>Part No.</th>
<th>Type</th>
<th>L1</th>
<th>L2</th>
</tr>
</thead>
<tbody>
<tr>
<td>SIM-M12-8GD-2-PU</td>
<td>6.2, ±3%</td>
<td>2,000</td>
<td>50</td>
</tr>
<tr>
<td>SIM-M12-8GD-5-PU</td>
<td>14.6, +20</td>
<td>5,000</td>
<td></td>
</tr>
<tr>
<td>SIM-M12-8GD-10-PU</td>
<td>10,000</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Ordering data

<table>
<thead>
<tr>
<th>Electrical connection</th>
<th>Number of wires</th>
<th>Cable length [m]</th>
<th>Part No.</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>Left-hand end</td>
<td>Right-hand end</td>
<td>Socket M12x1, straight</td>
<td>0</td>
<td>525616 SIM-M12-8GD-2-PU</td>
</tr>
<tr>
<td>Right-hand end</td>
<td>Open end</td>
<td>2</td>
<td>525618 SIM-M12-8GD-5-PU</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>5</td>
<td>570008 SIM-M12-8GD-10-PU</td>
<td></td>
</tr>
</tbody>
</table>
## Connecting cables KM12

**Technical data**

### Electronic components

| Operating voltage range [V AC] | 0 ... 30 |
| Operating voltage range [V DC] | 0 ... 36 |

### Electromechanical components

#### Connection technology, left-hand end

- **Electrical connection**
  - Straight plug
  - M12x1
  - 8-pin

#### Connection technology, right-hand end

- **Electrical connection**
  - Straight socket
  - M12x1
  - 8-wire

| Information on pin contact materials | Nickel-plated and gold-plated bronze |
| Cable length [m] | 2 |
| Cable composition | 8x0.25 mm² |
| Information on cable sheath materials | PUR |
| Cable diameter [mm] | 6.2 |
| Acceptable current load [A] | 1.5 |

### Mechanical components

| Type of mounting | Via threaded connector |
| Mounting position | Any |
| Product weight [g] | 156 |
| Information on union nut materials | Nickel-plated brass |

### Immissions/ emissions

| Ambient temperature [°C] | -25 ... +80 |
| Protection class | IP68 |
### Pin allocation

#### M12x1

<table>
<thead>
<tr>
<th>Socket, 8-pin</th>
<th>Plug, 8-pin</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Pin</strong></td>
<td><strong>Wire colour</strong></td>
</tr>
<tr>
<td>1</td>
<td>White</td>
</tr>
<tr>
<td>2</td>
<td>Brown</td>
</tr>
<tr>
<td>3</td>
<td>Green</td>
</tr>
<tr>
<td>4</td>
<td>Yellow</td>
</tr>
<tr>
<td>5</td>
<td>Grey</td>
</tr>
<tr>
<td>6</td>
<td>Pink</td>
</tr>
<tr>
<td>7</td>
<td>Blue</td>
</tr>
<tr>
<td>8</td>
<td>Red</td>
</tr>
<tr>
<td>Housing</td>
<td>Screened</td>
</tr>
</tbody>
</table>

### Dimensions

**Dimensions**

<table>
<thead>
<tr>
<th>D1</th>
<th>D2</th>
<th>D3</th>
<th>L1</th>
</tr>
</thead>
<tbody>
<tr>
<td>6.2</td>
<td>14.6</td>
<td>M12x1</td>
<td>2,000</td>
</tr>
</tbody>
</table>

**KM12-8GD8GS-2-PU**

#### Ordering data

<table>
<thead>
<tr>
<th>Electrical connection</th>
<th>Number of wires</th>
<th>Cable length [m]</th>
<th>Part No.</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>Left-hand end</td>
<td>Right-hand end</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Straight socket, M12x1</td>
<td>Straight plug, M12x1</td>
<td>8</td>
<td>2</td>
<td>523617</td>
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</tbody>
</table>
## Technical data

### Electronic components

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating voltage range [V AC]</td>
<td>0 ... 45</td>
</tr>
<tr>
<td>Operating voltage range [V DC]</td>
<td>0 ... 70</td>
</tr>
</tbody>
</table>

### Electromechanical components

<table>
<thead>
<tr>
<th>Type</th>
<th>SIM-...-3GD</th>
<th>SIM-...-3WD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Connection technology, left-hand end</td>
<td>Straight socket</td>
<td>Angled socket</td>
</tr>
<tr>
<td>Electrical connection</td>
<td>M12x1</td>
<td>3-pin</td>
</tr>
<tr>
<td>Connection technology, right-hand end</td>
<td>Open end</td>
<td>3-wire</td>
</tr>
<tr>
<td>Cable property</td>
<td>Standard</td>
<td></td>
</tr>
<tr>
<td>Cable test conditions</td>
<td>Energy chain: 5 million cycles, bending radius 75 mm</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Resistance to bending: to Festo standard</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Test conditions on request</td>
<td></td>
</tr>
<tr>
<td>Cable length [m]</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Cable sheath colour</td>
<td>Orange</td>
<td></td>
</tr>
<tr>
<td>Cable composition</td>
<td>3x0.5 mm²</td>
<td></td>
</tr>
<tr>
<td>Information on cable sheath materials</td>
<td>PVC, radiation crosslinking</td>
<td></td>
</tr>
<tr>
<td>Acceptable current load [A]</td>
<td>4</td>
<td></td>
</tr>
</tbody>
</table>

### Mechanical components

| Information on housing materials  | TPE-U(PU) |
| Information on union nut materials | Nickel-plated brass |

### Immissions/emissions

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ambient temperature [°C]</td>
<td>-25 ... +80</td>
</tr>
<tr>
<td>Ambient temperature [°C]</td>
<td>0 ... +80</td>
</tr>
<tr>
<td>with flexible cable installation</td>
<td>IP65, IP67</td>
</tr>
<tr>
<td>Protection class</td>
<td>IP65, IP67</td>
</tr>
</tbody>
</table>

### Pin allocation to EN 60947-5-2

<table>
<thead>
<tr>
<th>Socket, 3-pin</th>
<th>Pin</th>
<th>Wire colour</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1</td>
<td>Brown</td>
</tr>
<tr>
<td>3</td>
<td>3</td>
<td>Blue</td>
</tr>
<tr>
<td>4</td>
<td>4</td>
<td>Black</td>
</tr>
</tbody>
</table>
Connecting cables SIM, welding field immune

Technical data

Dimensions

<table>
<thead>
<tr>
<th></th>
<th>D1</th>
<th>D2</th>
<th>D3</th>
<th>H1</th>
<th>L1</th>
<th>L2</th>
<th>L3</th>
</tr>
</thead>
<tbody>
<tr>
<td>SIM-M12-RS-3GD-3</td>
<td>5.2</td>
<td>15 ±0.2</td>
<td>M12x1</td>
<td>–</td>
<td>3,000</td>
<td>50</td>
<td>38</td>
</tr>
<tr>
<td>SIM-M12-RS-3WD-3</td>
<td>5.2</td>
<td>13.5 ±0.3</td>
<td>M12x1</td>
<td>25</td>
<td>3,000</td>
<td>50</td>
<td>31</td>
</tr>
</tbody>
</table>

Ordering data

<table>
<thead>
<tr>
<th>Electrical connection</th>
<th>Number of wires</th>
<th>Cable length [m]</th>
<th>Part No.</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>Welding field immune</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Straight socket, M12x1</td>
<td>Open end</td>
<td>3</td>
<td>30450</td>
<td>SIM-M12-RS-3GD-3</td>
</tr>
<tr>
<td>Angled socket, M12x1</td>
<td>Open end</td>
<td>3</td>
<td>30451</td>
<td>SIM-M12-RS-3WD-3</td>
</tr>
</tbody>
</table>
## General technical data

| Conforms to   | EN 61076-2-104  
|              | EN 61984        |
| Note on materials | Free of copper and PTFE  
|                 | RoHS-compliant |

## Electronic components

<table>
<thead>
<tr>
<th>Electrical connection</th>
<th>3-pin</th>
<th>4-pin</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating voltage range [V AC]</td>
<td>0 ... 60</td>
<td>0 ... 30</td>
</tr>
<tr>
<td>Operating voltage range [V DC]</td>
<td>0 ... 60</td>
<td>0 ... 30</td>
</tr>
</tbody>
</table>

## Electromechanical components

<table>
<thead>
<tr>
<th>Electrical connection</th>
<th>3-pin</th>
<th>4-pin</th>
</tr>
</thead>
<tbody>
<tr>
<td>Connection technology, left-hand end</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
| Electrical connection | Straight socket | Angled socket  
|                        | 3-pin | 4-pin |
| Plug coding | A |
| Connection technology, right-hand end | | |
| Electrical connection | Open end | 3-wire | 4-wire  
| Cable property | Standard |
| Cable test conditions | Energy chain: 5 million cycles, bending radius 75 mm  
|                        | Resistance to bending: to Festo standard  
|                        | Test conditions on request |
| Cable length [m] | 2.5 | 2.5  
|                  | 5   | 5   
|                  | 10  | -   |
| Cable sheath colour | Grey |
| Cable composition | 3x0.25 mm² | 4x0.25 mm² |
| Information on cable sheath materials | TPE-U(PU) |
| Information on insulating sheath materials | PVC |
| Cable diameter [mm] | 4.5 |
| Conductor nominal cross section [mm²] | 0.25 |
| Acceptable current load at 40 °C [A] | 3 |

## Mechanical components

| Housing colour | Black |
| Information on housing materials | TPE-U(PU) |
Connecting cables SIM, clip-on

Technical data

<table>
<thead>
<tr>
<th>Immissions/emissions</th>
<th>3-pin</th>
<th>4-pin</th>
</tr>
</thead>
<tbody>
<tr>
<td>Electrical connection</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ambient temperature [°C]</td>
<td>-25 ... +70</td>
<td></td>
</tr>
<tr>
<td>Ambient temperature [°C] with flexible</td>
<td></td>
<td></td>
</tr>
<tr>
<td>cable installation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Protection class</td>
<td>IP65, IP67</td>
<td></td>
</tr>
<tr>
<td>Surge capacity [kV]</td>
<td>1.5</td>
<td>0.8</td>
</tr>
<tr>
<td>Degree of contamination</td>
<td>3</td>
<td></td>
</tr>
</tbody>
</table>

| Pin allocation to EN 60947-5-2             |                  |                  |
| Socket, 3-pin                              | 1 Brown          | 1 Brown          |
| Pin                                        | 3 Blue           | 2 White          |
| Wire colour                                | 4 Black          | 3 Blue           |

Dimensions

| SIM-K-...-GD-...-PU                       |                  |                  |
| Dimensions                                |                  |                  |
| SIM-K-...-GD-2,5-PU                       | 4.5              | 2.5              |
| SIM-K-...-GD-5-PU                        | 5                | 10               |
| SIM-K-...-GD-10-PU                       | 10               |                  |
| SIM-K-...-WD-2,5-PU                       | 4.5              | 5                |
| SIM-K-...-WD-5-PU                        | 5                | 10               |
| SIM-K-...-WD-10-PU                       | 10               |                  |

Ordering data

| Electrical connection                     |                  |                  |
| Left-hand end                             | Right-hand end   |                  |
| Clip-on                                   |                  |                  |
| Straight socket                           | Open end         | 3 2.5 164257 SIM-K-GD-2,5-PU |
| Angled socket                             | Open end         | 3 2.5 164255 SIM-K-WD-2,5-PU |
| Straight socket                           | Open end         | 4 2.5 164250 SIM-K-4-GD-2,5-PU |
| Angled socket                             | Open end         | 4 2.5 164252 SIM-K-4-WD-2,5-PU |

Download CAD data [www.festo.com/en/engineering]
Connecting cables SIM, Clean Design

**Technical data**

**Connecting cable**

SIM-K-...-CDN,
3-pin, clip-on, Clean Design

Suitable for food, resistant to cleaning and disinfecting agents to DIN 11483

---

<table>
<thead>
<tr>
<th>General technical data</th>
</tr>
</thead>
<tbody>
<tr>
<td>Conforms to</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Note on materials</td>
</tr>
<tr>
<td></td>
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</tbody>
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<table>
<thead>
<tr>
<th>Electronic components</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating voltage range [V AC]</td>
</tr>
<tr>
<td>Operating voltage range [V DC]</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Electromechanical components</th>
</tr>
</thead>
<tbody>
<tr>
<td>Connection technology, left-hand end</td>
</tr>
<tr>
<td>Electrical connection</td>
</tr>
<tr>
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</tr>
<tr>
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<tr>
<td>Plug coding</td>
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<tr>
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<table>
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<tr>
<th>Cable property</th>
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<tr>
<td>Standard</td>
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<table>
<thead>
<tr>
<th>Cable test conditions</th>
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</thead>
<tbody>
<tr>
<td>Energy chain: 5 million cycles, bending radius 75 mm</td>
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<tr>
<td>Resistance to bending: to Festo standard</td>
</tr>
<tr>
<td>Test conditions on request</td>
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<table>
<thead>
<tr>
<th>Cable length [m]</th>
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<td>2.5</td>
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<table>
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<th>Cable sheath colour</th>
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<tr>
<td>Grey</td>
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<tr>
<th>Cable composition</th>
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<td>3x0.25 mm²</td>
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<thead>
<tr>
<th>Information on cable sheath materials</th>
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<tbody>
<tr>
<td>PVC, radiation crosslinking</td>
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</table>

<table>
<thead>
<tr>
<th>Information on insulating sheath materials</th>
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</thead>
<tbody>
<tr>
<td>PVC, radiation crosslinking</td>
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</table>

<table>
<thead>
<tr>
<th>Cable diameter [mm]</th>
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<th>Conductor nominal cross section [mm²]</th>
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<td>0.25</td>
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<tr>
<th>Acceptable current load at 40 °C [A]</th>
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<tr>
<td>3</td>
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<thead>
<tr>
<th>Mechanical components</th>
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<tr>
<td>Housing colour</td>
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<td>Black</td>
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<table>
<thead>
<tr>
<th>Information on housing materials</th>
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<tbody>
<tr>
<td>TPE-U(PU)</td>
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</table>
Immissions/emissions

<table>
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<tr>
<th>Parameter</th>
<th>Value</th>
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<tbody>
<tr>
<td>Ambient temperature [°C]</td>
<td>-25 ... +70</td>
</tr>
<tr>
<td>Ambient temperature with flexible cable installation [°C]</td>
<td>-5 ... +70</td>
</tr>
<tr>
<td>Protection class</td>
<td>IP65, IP67, IP69K</td>
</tr>
<tr>
<td>Surge capacity [kV]</td>
<td>1.5</td>
</tr>
<tr>
<td>Degree of contamination</td>
<td>3</td>
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Pin allocation to EN 60947-5-2

<table>
<thead>
<tr>
<th>Socket, 3-pin</th>
<th>Pin</th>
<th>Wire colour</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1</td>
<td>Brown</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>Blue</td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>Black</td>
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Dimensions

<table>
<thead>
<tr>
<th>Model</th>
<th>D1</th>
<th>D2</th>
<th>H1</th>
<th>L1</th>
<th>L2</th>
<th>L3</th>
</tr>
</thead>
<tbody>
<tr>
<td>SIM-K-GD-2,5-CDN</td>
<td>4.5</td>
<td>8.5</td>
<td>–</td>
<td>2.5</td>
<td>50</td>
<td>28.5</td>
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<tr>
<td>SIM-K-GD-5-CDN</td>
<td>4.5</td>
<td>8.5</td>
<td>18.4</td>
<td>2.5</td>
<td>50</td>
<td>21</td>
</tr>
<tr>
<td>SIM-K-WD-2,5-CDN</td>
<td>4.5</td>
<td>8.5</td>
<td>18.4</td>
<td>2.5</td>
<td>50</td>
<td>21</td>
</tr>
<tr>
<td>SIM-K-WD-5-CDN</td>
<td>4.5</td>
<td>8.5</td>
<td>18.4</td>
<td>2.5</td>
<td>50</td>
<td>21</td>
</tr>
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</table>

Ordering data

<table>
<thead>
<tr>
<th>Electrical connection</th>
<th>Number of wires</th>
<th>Cable length [m]</th>
<th>Part No.</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>Left-hand end</td>
<td>Right-hand end</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Clean Design</td>
<td>Open end</td>
<td>3</td>
<td>2.5</td>
<td>525259</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>525260</td>
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<tr>
<td>Straight socket</td>
<td>Open end</td>
<td>3</td>
<td>2.5</td>
<td>525261</td>
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<td>525262</td>
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### Ordering data

<table>
<thead>
<tr>
<th>Material</th>
<th>Use</th>
<th>Size</th>
<th>Part No.</th>
<th>Type</th>
<th>Pu(1)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Polycarbonate</td>
<td>For insertion in the inscription label holder</td>
<td>23x4 mm</td>
<td>541598</td>
<td>ASLR-L-423</td>
<td>34</td>
</tr>
<tr>
<td>Polyamide</td>
<td>For protecting against inadvertent disconnection of the union nuts (no tool needed) For captive attachment to the cable</td>
<td>M8</td>
<td>548067</td>
<td>NEAU-M8-GD</td>
<td>1</td>
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<tr>
<td></td>
<td></td>
<td>M12</td>
<td>548068</td>
<td>NEAU-M12-GD</td>
<td>1</td>
</tr>
</tbody>
</table>

1) Packaging unit per frame
### Connecting cables NEBS, for sensors

**Product range overview**

<table>
<thead>
<tr>
<th>Type</th>
<th>Electrical connection</th>
<th>Number of wires</th>
<th>Cable length [m]</th>
<th>Page/online</th>
</tr>
</thead>
<tbody>
<tr>
<td>NEBS</td>
<td>Socket, rectangular design</td>
<td>4</td>
<td>2.5</td>
<td>549</td>
</tr>
<tr>
<td></td>
<td>Open end</td>
<td>4, 5</td>
<td>5</td>
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</table>

**Type codes**

<table>
<thead>
<tr>
<th>Function</th>
<th>NEBS Connecting cable</th>
</tr>
</thead>
<tbody>
<tr>
<td>Connection technology, left-hand end</td>
<td></td>
</tr>
<tr>
<td>L1</td>
<td>Socket, rectangular design L1</td>
</tr>
<tr>
<td>L2</td>
<td>Socket, rectangular design L2</td>
</tr>
<tr>
<td>Socket design</td>
<td>G Straight</td>
</tr>
<tr>
<td>Number of pins/wires (left-hand end)</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>4-pin</td>
</tr>
<tr>
<td>5</td>
<td>5-pin</td>
</tr>
<tr>
<td>Cable characteristics</td>
<td></td>
</tr>
<tr>
<td>K</td>
<td>Standard</td>
</tr>
<tr>
<td>Cable length</td>
<td>2.5 m</td>
</tr>
<tr>
<td>5</td>
<td>5 m</td>
</tr>
<tr>
<td>Connection technology, right-hand end</td>
<td></td>
</tr>
<tr>
<td>LE</td>
<td>Open end</td>
</tr>
<tr>
<td>Number of pins/wires (right-hand end)</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>4-pin</td>
</tr>
<tr>
<td>5</td>
<td>5-pin</td>
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</tbody>
</table>
## Connecting cables NEBS, for sensors

### Technical data

#### Connecting cable NEBS

#### General technical data

<table>
<thead>
<tr>
<th>Note on materials</th>
<th>Free of copper and PTFE</th>
<th>RoHS-compliant</th>
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</table>

#### Electronic components

<table>
<thead>
<tr>
<th>Operating voltage range (V DC)</th>
<th>0 ... 30</th>
</tr>
</thead>
</table>

#### Electromechanical components

<table>
<thead>
<tr>
<th>Type</th>
<th>NEBS-L1G4</th>
<th>NEBS-L2G4</th>
<th>NEBS-L2G5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Electrical connection 1</td>
<td>Socket, rectangular design L1, 4-pin</td>
<td>Socket, rectangular design L2, 4-pin</td>
<td>Socket, rectangular design L2, 5-pin</td>
</tr>
<tr>
<td>Electrical connection 2</td>
<td>Open end, 4-wire</td>
<td>Open end, 4-wire</td>
<td>Open end, 5-wire</td>
</tr>
<tr>
<td>Cable test conditions</td>
<td>Test conditions on request</td>
<td>Resistance to bending: to Festo standard</td>
<td></td>
</tr>
<tr>
<td>Cable characteristics</td>
<td>Standard</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Housing materials</td>
<td>PA</td>
<td>PBT</td>
<td>PBT</td>
</tr>
<tr>
<td>Housing materials</td>
<td>PA</td>
<td>PBT</td>
<td>PBT</td>
</tr>
</tbody>
</table>

#### Cable test conditions

- Test conditions on request
- Resistance to bending: to Festo standard

#### Cable sheath colour

- NEBS-L1G4: Grey
- NEBS-L2G4: Grey
- NEBS-L2G5: Grey

#### Cable sheath composition

- 4x0.14 mm³
- 4x0.14 mm³
- 5x0.14 mm³

#### Insulating sheath materials

- PVC
- PP

#### Ambient temperature

- -20 ... +60 °C
- -5 ... +60 °C

#### Surge capacity

- 0.8 kV

#### Degree of contamination

- 2
Connecting cables NEBS, for sensors

Technical data

Dimensions

NEBS-L1G4

NEBS-L2G4

NEBS-L2G5

Type | B1 | B2 | B3 | B4 | D1 | H1 | L1 | L2 | L3 | L4 | L5 | L6
---|---|---|---|---|---|---|---|---|---|---|---|---
NEBS-L1G4-K-2,5-LE4 | 10 | 8.4 | 6 | 2 | 5.8 | 2.5 | 8 | 50 | 23 | 15 | ≥ 5
NEBS-L1G4-K-5-LE4 | 6.3 | – | 3.8 | 1.3 | 4.1 | 4.2 | 5.7 | 5 | 23 | 15 | ≥ 5
NEBS-L2G4-K-2,5-LE4 | 7.5 | 5 | 2.5 | 5 | 5.7 | 5 | 23 | 15 | ≥ 5
NEBS-L2G4-K-5-LE4 | 5 | 5 | 2.5 | 5 | 5 | 23 | 15 | ≥ 5
NEBS-L2G5-K-2,5-LE5 | 6.3 | – | 3.8 | 1.3 | 4.1 | 4.2 | 5.7 | 5 | 23 | 15 | ≥ 5
NEBS-L2G5-K-5-LE5 | 7.5 | 5 | 2.5 | 5 | 5.7 | 5 | 23 | 15 | ≥ 5

Ordering data

Electrical connection

<table>
<thead>
<tr>
<th>To the left</th>
<th>To the right</th>
<th>Cable length [m]</th>
<th>Part No.</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>4-pin</td>
<td>Socket, rectangular design L1</td>
<td>4-wire</td>
<td>Open end</td>
<td>2.5</td>
</tr>
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<td></td>
<td></td>
<td></td>
<td></td>
<td>5</td>
</tr>
<tr>
<td>5-pin</td>
<td>Socket, rectangular design L2</td>
<td>5-wire</td>
<td>Open end</td>
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<td></td>
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Accessories: Ordering data

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<th>Use</th>
<th>Size</th>
<th>Part No.</th>
<th>Type</th>
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<tbody>
<tr>
<td>Polycarbonate</td>
<td>For insertion in the inscription label holder</td>
<td>23x4 mm</td>
<td>541598</td>
<td>ASLR-L-423</td>
</tr>
</tbody>
</table>

1) Packaging unit per frame
Universal plug connectors, for self-assembly
### Universal plug connectors, for self-assembly

#### Product range overview

<table>
<thead>
<tr>
<th>Version</th>
<th>Type</th>
<th>Connection cross section [mm²]</th>
<th>Connector type</th>
<th>Electrical connection</th>
<th>Protection class</th>
<th>Bus protocol/activation</th>
<th>Page/online</th>
</tr>
</thead>
<tbody>
<tr>
<td>Harax® quick connection</td>
<td>NECU-S-...-HX</td>
<td>0.14 ... 0.34</td>
<td>Plug</td>
<td>M8x1, 3-pin</td>
<td>IP65, IP67</td>
<td>–</td>
<td>553</td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.34 ... 0.75</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Screw terminal</td>
<td>NECU-S-M8G4</td>
<td>0.14 ... 0.5</td>
<td>Plug</td>
<td>M8x1, 4-pin</td>
<td>IP67</td>
<td>–</td>
<td>555</td>
</tr>
<tr>
<td></td>
<td>NECU-...-D12-C2</td>
<td>0.14 ... 0.75</td>
<td>Plug</td>
<td>M12x1, 4-pin, D-coded</td>
<td>IP65, IP67</td>
<td>Ethernet</td>
<td>556</td>
</tr>
<tr>
<td></td>
<td>NECU-...-S-B12G5</td>
<td>0.14 ... 0.75</td>
<td>Plug</td>
<td>M12x1, 5-pin, B-coded</td>
<td>IP65, IP67</td>
<td>–</td>
<td>557</td>
</tr>
<tr>
<td></td>
<td>NECU-...-B12G5</td>
<td>0.14 ... 0.75</td>
<td>Socket</td>
<td>M12x1, 5-pin, B-coded</td>
<td>IP65, IP67</td>
<td>–</td>
<td>558</td>
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<tr>
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<td>NECU-G78-...-C2</td>
<td>0.25 ... 2</td>
<td>Socket</td>
<td>G7/8&quot;, 4-pin</td>
<td>IP65, IP67, IP68</td>
<td>–</td>
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<td></td>
<td></td>
<td></td>
<td>G7/8&quot;, 5-pin</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Cable connector</td>
<td>NECU-M8G4</td>
<td>0.14 ... 0.5</td>
<td>Socket</td>
<td>M8x1, 4-pin</td>
<td>IP67</td>
<td>–</td>
<td>560</td>
</tr>
<tr>
<td></td>
<td>SIE-GD</td>
<td>0.25 ... 0.75</td>
<td>Socket</td>
<td>M12x1, 4-pin</td>
<td>IP67</td>
<td>–</td>
<td>561</td>
</tr>
<tr>
<td></td>
<td>SIE-WD-1R</td>
<td>0.25 ... 0.75</td>
<td>Socket</td>
<td>M12x1, 4-pin</td>
<td>IP67</td>
<td>–</td>
<td>562</td>
</tr>
<tr>
<td>Spring-loaded terminal</td>
<td>NECU-...-PPG5</td>
<td>0.75 ... 2.5</td>
<td>Socket</td>
<td>AIDA push-pull, 5-pin</td>
<td>IP65, IP67</td>
<td>–</td>
<td>563</td>
</tr>
<tr>
<td>Insulation displacement connector</td>
<td>NECU-S-ECG4</td>
<td>0.14</td>
<td>Plug</td>
<td>Insulation displacement connector, square design, 4-pin</td>
<td>IP40</td>
<td>–</td>
<td>564</td>
</tr>
</tbody>
</table>

Harax® is a registered trademark of its respective trademark holder in certain countries.
Universal plug connectors NECU, for self-assembly

Plug NECU-S-...-HX

Reconnectable M8 and M12 round plug connectors with Harax® quick connection technology for low-voltage applications.

General technical data

<table>
<thead>
<tr>
<th>NECU-S-...-HX</th>
<th>M8G3-HX</th>
<th>M8G4-HX</th>
<th>M12G3-HX</th>
<th>M12G4-HX</th>
<th>M12G3-HX-Q7</th>
<th>M12G4-HX-Q7</th>
</tr>
</thead>
<tbody>
<tr>
<td>Electrical connection</td>
<td>Straight plug / insulation displacement connector</td>
<td>M8x1</td>
<td>M12x1</td>
<td>M12x1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Operating voltage range</td>
<td>[V DC] 0 ... 32</td>
<td>0 ... 32</td>
<td>0 ... 32</td>
<td>0 ... 48</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>[V AC] 0 ... 32</td>
<td>0 ... 32</td>
<td>0 ... 48</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Surge capacity</td>
<td>[kV] 0.8</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Acceptable current load at 40 °C</td>
<td>[A] 4</td>
<td>4</td>
<td>6</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Based on standard</td>
<td>EN 61076-2-104</td>
<td>EN 61076-2-101</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cable diameter</td>
<td>[mm] 2.5 ... 5.1</td>
<td>2.9 ... 5.1</td>
<td>4.7 ... 6.0</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Individual wire diameter</td>
<td>[mm] ≤0.1</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Connection cross section</td>
<td>[mm²] 0.14 ... 0.34</td>
<td>0.14 ... 0.34</td>
<td>0.34 ... 0.75</td>
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<td></td>
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</tr>
<tr>
<td>Wire diameter</td>
<td>[mm] 0.9 ... 1.6</td>
<td>0.9 ... 1.6</td>
<td>1.6 ... 2.0</td>
<td></td>
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</tr>
<tr>
<td>Wire insulation</td>
<td>PP</td>
<td>PVC</td>
<td>TPE-E</td>
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<tr>
<td>Connection frequency</td>
<td>3</td>
<td></td>
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</tr>
<tr>
<td>Max. tightening torque of locking clip</td>
<td>[Nm] 0.3</td>
<td>0.5</td>
<td>0.5</td>
<td></td>
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<tr>
<td>Protection class</td>
<td>IP65</td>
<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>

Materials

| Housing | PA | Nickel-plated die-cast zinc |
| Seals | FPM | PUR |
| Pin contact | Gold-plated |
| Note on materials | Free of copper and PTFE | RoHS-compliant |

Operating and environmental conditions

| Ambient temperature | [°C] | −25 ... +85 |
| Corrosion resistance class CRC | 1 |
| Degree of contamination | 3 |
| Certification | cULus recognized (OL) |

Harax® is a registered trademark of its respective trademark holder in certain countries.

1) Corrosion resistance class 1 according to Festo standard 940 070
Components subject to low corrosion stress. Transport and storage protection. Parts that do not have primarily decorative surface requirements, e.g. in internal areas that are not visible or behind covers.
### Universal plug connectors NECU, for self-assembly

#### Technical data

**Plug symbols**

<table>
<thead>
<tr>
<th>Type</th>
<th>Pin</th>
<th>Wire Colour</th>
</tr>
</thead>
<tbody>
<tr>
<td>M8x1</td>
<td>1</td>
<td>Brown</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>Blue</td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>Black</td>
</tr>
<tr>
<td>M12x1</td>
<td>1</td>
<td>Brown</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>White</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>Blue</td>
</tr>
<tr>
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<td>4</td>
<td>Black</td>
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#### Compatibility matrix

<table>
<thead>
<tr>
<th>Type</th>
<th>NECU-S-</th>
<th>M8G3-HX</th>
<th>M8G4-HX</th>
<th>M12G3-HX</th>
<th>M12G4-HX</th>
<th>M12G3-HX-Q7</th>
<th>M12G4-HX-Q7</th>
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</thead>
<tbody>
<tr>
<td>Sensors</td>
<td>NEBU-SIM</td>
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<td></td>
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<td></td>
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<tr>
<td></td>
<td>SML.../M</td>
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<td>SM...10/M</td>
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<td>SM...-10</td>
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<td>Valves</td>
<td>KME-1</td>
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<td>KMEB-3</td>
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<td></td>
<td>KM-2/3/7/9</td>
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<td></td>
<td>NEDV-M8G4L</td>
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<td>NEDV-M12G4L</td>
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<td>NEBV-H11G2</td>
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<td></td>
<td>KMEB-2</td>
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#### Dimensions

<table>
<thead>
<tr>
<th>Type</th>
<th>D1</th>
<th>D2</th>
<th>L1</th>
<th>Ø</th>
<th>Ø1</th>
<th>Ø2</th>
</tr>
</thead>
<tbody>
<tr>
<td>NECU-S-M8G...-HX</td>
<td>11.5</td>
<td>40.8</td>
<td></td>
<td>9</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>NECU-S-M12G...-HX</td>
<td>15.3</td>
<td>46.75</td>
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<td>-</td>
<td>13</td>
<td>14</td>
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<tr>
<td>NECU-S-M12G...-HX-Q7</td>
<td>20.5</td>
<td>52.2</td>
<td></td>
<td>17</td>
<td>-</td>
<td>-</td>
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#### Ordering data

<table>
<thead>
<tr>
<th>Connection cross section [mm²]</th>
<th>Electrical connection</th>
<th>Weight [g]</th>
<th>Part No.</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>0,14 ... 0,34</td>
<td>Plug M8x1, 3-pin, straight, insulation displacement connector</td>
<td>7.8</td>
<td>562024</td>
<td>NECU-S-M8G3-HX</td>
</tr>
<tr>
<td></td>
<td>Plug M8x1, 4-pin, straight, insulation displacement connector</td>
<td>7.8</td>
<td>562025</td>
<td>NECU-S-M8G4-HX</td>
</tr>
<tr>
<td></td>
<td>Plug M12x1, A-coded, 3-pin, straight, insulation displacement connector</td>
<td>17.5</td>
<td>562027</td>
<td>NECU-S-M12G3-HX</td>
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<tr>
<td></td>
<td>Plug M12x1, A-coded, 4-pin, straight, insulation displacement connector</td>
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<td>562028</td>
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<tr>
<td>0,34 ... 0,75</td>
<td>Plug M12x1, A-coded, 3-pin, straight, insulation displacement connector</td>
<td>32.8</td>
<td>564946</td>
<td>NECU-S-M12G3-HX-Q7</td>
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<tr>
<td></td>
<td>Plug M12x1, A-coded, 4-pin, straight, insulation displacement connector</td>
<td>33.3</td>
<td>564947</td>
<td>NECU-S-M12G4-HX-Q7</td>
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</tbody>
</table>
### Universal plug connectors NECU, for self-assembly

#### Technical data

**Plug NECU-S-M8G4**
- Plug
- 4-pin
- Can be assembled with any cable length

### General technical data

<table>
<thead>
<tr>
<th>Feature</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Electrical connection</strong></td>
<td>Plug M8x1, 4-pin, straight, screw terminal</td>
</tr>
<tr>
<td><strong>Plug coding</strong></td>
<td>Coded via contact arrangement</td>
</tr>
<tr>
<td><strong>Operating voltage range [V DC]</strong></td>
<td>0 ... 30</td>
</tr>
<tr>
<td><strong>Surge capacity [KV]</strong></td>
<td>0.8</td>
</tr>
<tr>
<td><strong>Acceptable current load [A]</strong></td>
<td>4</td>
</tr>
<tr>
<td><strong>Based on standard</strong></td>
<td>EN 61076-2-101</td>
</tr>
<tr>
<td></td>
<td>EN 61984</td>
</tr>
<tr>
<td><strong>Transmission characteristics</strong></td>
<td>DIN EN 50173 / CAT 5</td>
</tr>
<tr>
<td><strong>Permissible cable φ [mm]</strong></td>
<td>3.5 ... 5.0</td>
</tr>
<tr>
<td><strong>Connection cross section [mm²]</strong></td>
<td>0.14 ... 0.5</td>
</tr>
<tr>
<td><strong>Type of mounting</strong></td>
<td>Via knurled nut</td>
</tr>
<tr>
<td><strong>Protection class</strong></td>
<td>IP67</td>
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</tbody>
</table>

### Materials

<table>
<thead>
<tr>
<th>Feature</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pin contact</td>
<td>Gold-plated brass</td>
</tr>
<tr>
<td>Union nut</td>
<td>Nickel-plated brass</td>
</tr>
<tr>
<td>Note on materials</td>
<td>RoHS-compliant</td>
</tr>
</tbody>
</table>

### Operating and environmental conditions

<table>
<thead>
<tr>
<th>Feature</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ambient temperature [°C]</td>
<td>–25 ... +85</td>
</tr>
<tr>
<td>Degree of contamination</td>
<td>3</td>
</tr>
</tbody>
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### Dimensions

**NECU-S-M8G4-C2**

<table>
<thead>
<tr>
<th>Type</th>
<th>D1</th>
<th>D2</th>
<th>L1</th>
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</thead>
<tbody>
<tr>
<td>NECU-S-M8G4-C2</td>
<td>A8</td>
<td>12</td>
<td>49.6</td>
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</table>

### Ordering data

<table>
<thead>
<tr>
<th>Electrical connection</th>
<th>Part No.</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plug M8x1, 4-pin, straight</td>
<td>1068198</td>
<td>NECU-S-M8G4-C2</td>
</tr>
</tbody>
</table>

---

Universal plug connectors NECU, for self-assembly

**Plug NECU---D12---C2**

- Plug for power supply
- 4-pin
- Can be assembled with any cable lengths
- With screw terminal

### General technical data

<table>
<thead>
<tr>
<th>Feature</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Electrical connection</strong></td>
<td>Plug M1 2x1, round plug connector, 4-pin, straight, suitable for self-assembly, screw terminal, can be screened</td>
</tr>
<tr>
<td><strong>Plug coding</strong></td>
<td>D, for Ethernet</td>
</tr>
<tr>
<td><strong>Operating voltage range</strong></td>
<td>[V DC] 0 … 250, [V AC] 0 … 250</td>
</tr>
<tr>
<td><strong>Surge capacity</strong></td>
<td>[kV] 2.5</td>
</tr>
<tr>
<td><strong>Acceptable current load</strong></td>
<td>[A] 4</td>
</tr>
<tr>
<td><strong>Based on standard</strong></td>
<td>EN 61076-2-101, EN 61984</td>
</tr>
<tr>
<td><strong>Transmission characteristics</strong></td>
<td>DIN EN 50173 / CAT 5</td>
</tr>
<tr>
<td><strong>Permissible cable Ø</strong></td>
<td>[mm] 6.0 … 8.0</td>
</tr>
<tr>
<td><strong>Connection cross section</strong></td>
<td>[mm²] 0.14 … 0.75</td>
</tr>
<tr>
<td><strong>Protection class</strong></td>
<td>IP65/IP67</td>
</tr>
<tr>
<td><strong>Housing</strong></td>
<td>Nickel-plated die-cast zinc</td>
</tr>
<tr>
<td><strong>Pin contact</strong></td>
<td>Gold-plated brass</td>
</tr>
<tr>
<td><strong>Note on materials</strong></td>
<td>Free of copper and PTFE, RoHS-compliant</td>
</tr>
<tr>
<td><strong>Ambient temperature</strong></td>
<td>[°C] -40 … +85</td>
</tr>
<tr>
<td><strong>Corrosion resistance class CRC</strong></td>
<td>1</td>
</tr>
<tr>
<td><strong>Degree of contamination</strong></td>
<td>3</td>
</tr>
<tr>
<td><strong>CE mark</strong></td>
<td>To EU Low Voltage Directive</td>
</tr>
</tbody>
</table>

### Operating and environmental conditions

1) Corrosion resistance class 1 according to Festo standard 940 070

Components subject to low corrosion stress. Transport and storage protection. Parts that do not have primarily-decorative surface requirements, e.g. in internal areas that are not visible or behind covers.

### Dimensions


**Cable diameter 6.0 ... 8.0 mm**

### Ordering data

<table>
<thead>
<tr>
<th>Electrical connection</th>
<th>Weight [g]</th>
<th>Part No.</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plug M1 2x1, round plug connector, 4-pin, straight, suitable for self-assembly, screw terminal, can be screened</td>
<td>47</td>
<td>543109</td>
<td>NECU-M-S-D12G4-C2-ET</td>
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</tbody>
</table>
Universal plug connectors NECU, for self-assembly

Technical data

Plug NECU-S-B12G5

- Plug
- 5-pin
- Can be assembled with any cable length

General technical data

<table>
<thead>
<tr>
<th>Feature</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Electrical connection</td>
<td>Plug M12x1, 5-pin, straight, screw terminal</td>
</tr>
<tr>
<td>Plug coding</td>
<td>B, for Profinet</td>
</tr>
<tr>
<td>Operating voltage range</td>
<td>[V DC] 0 … 60</td>
</tr>
<tr>
<td></td>
<td>[V AC] 0 … 60</td>
</tr>
<tr>
<td>Surge capacity</td>
<td>1.5</td>
</tr>
<tr>
<td>Acceptable current load</td>
<td>4</td>
</tr>
<tr>
<td>Based on standard</td>
<td>EN 61076-2-101</td>
</tr>
<tr>
<td></td>
<td>EN 61984</td>
</tr>
<tr>
<td>Transmission characteristics</td>
<td>DIN EN 50173 / CAT 5</td>
</tr>
<tr>
<td>Permissible cable</td>
<td>Ø 6 … 8</td>
</tr>
<tr>
<td>Connection cross section</td>
<td>0.14 … 0.75</td>
</tr>
<tr>
<td>Protection class</td>
<td>IP65/IP67</td>
</tr>
</tbody>
</table>

Materials

Housing: Nickel-plated die-cast zinc
Pin contact: Gold-plated brass
Note on materials: RoHS-compliant

Operating and environmental conditions

<table>
<thead>
<tr>
<th>Condition</th>
<th>Specification</th>
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</thead>
<tbody>
<tr>
<td>Ambient temperature</td>
<td>-25 … +85</td>
</tr>
<tr>
<td>Degree of contamination</td>
<td>3</td>
</tr>
<tr>
<td>CE mark</td>
<td>To EU Low Voltage Directive</td>
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Dimensions

<table>
<thead>
<tr>
<th>Type</th>
<th>D1</th>
<th>D2</th>
<th>L1</th>
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Ordering data

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<th>Electrical connection</th>
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<tbody>
<tr>
<td>Plug M12x1, 5-pin, straight</td>
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<td>NECU-M-S-B12G5-C2-PB</td>
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</table>
### General technical data

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Specification</th>
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</thead>
<tbody>
<tr>
<td>Electrical connection</td>
<td>Socket M12x1, 5-pin, straight, screw terminal</td>
</tr>
<tr>
<td>Plug coding</td>
<td>B, for Profinet</td>
</tr>
<tr>
<td>Operating voltage range (V DC)</td>
<td>0 ... 60</td>
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<tr>
<td>Operating voltage range (V AC)</td>
<td>0 ... 60</td>
</tr>
<tr>
<td>Surge capacity (kV)</td>
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</tr>
<tr>
<td>Acceptable current load (A)</td>
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</tr>
<tr>
<td>Based on standard</td>
<td>EN 61076-2-101, EN 61984</td>
</tr>
<tr>
<td>Transmission characteristics</td>
<td>DIN EN 50173 / CAT 5</td>
</tr>
<tr>
<td>Permissible cable (mm)</td>
<td>6 ... 8</td>
</tr>
<tr>
<td>Connection cross section (mm²)</td>
<td>0.14 ... 0.75</td>
</tr>
<tr>
<td>Protection class</td>
<td>IP65/IP67</td>
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### Materials

<table>
<thead>
<tr>
<th>Component</th>
<th>Material</th>
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</thead>
<tbody>
<tr>
<td>Housing</td>
<td>Nickel-plated die-cast zinc</td>
</tr>
<tr>
<td>Pin contact</td>
<td>Gold-plated brass</td>
</tr>
<tr>
<td>Note on materials</td>
<td>RoHS-compliant</td>
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### Operating and environmental conditions

<table>
<thead>
<tr>
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<th>Specification</th>
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</thead>
<tbody>
<tr>
<td>Ambient temperature (°C)</td>
<td>-25 ... +85</td>
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<tr>
<td>Degree of contamination</td>
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<td>CE mark</td>
<td>To EU Low Voltage Directive</td>
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### Dimensions

#### Pin allocation

<table>
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<th>L1</th>
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### Ordering data

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<th>Part No.</th>
<th>Type</th>
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<tbody>
<tr>
<td>Electrical connection</td>
<td>Socket M12x1, 5-pin, straight</td>
<td>1067905</td>
<td>NECU-M-B12G5-C2-PB</td>
</tr>
</tbody>
</table>

---

Universal plug connectors NECU, for self-assembly

- Socket
- 5-pin
- Can be assembled with any cable length
Universal plug connectors NECU, for self-assembly

Technical data

**Power supply socket**
**NECU-G78...-C2**

- Power supply socket for fieldbus connection
- 4-pin and 5-pin
- Can be assembled with any cable lengths
- With screw terminal
- Wire cross section of up to 2 mm²

### General technical data

<table>
<thead>
<tr>
<th>Type</th>
<th>NECU-G78GA-C2</th>
<th>NECU-G78GS-C2</th>
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<tbody>
<tr>
<td><strong>Electrical connection</strong></td>
<td>Socket 7/8”, round plug connector, 4-pin, straight, suitable for self-assembly, screw terminal</td>
<td>Socket 7/8”, round plug connector, 5-pin, straight, suitable for self-assembly, screw terminal</td>
</tr>
<tr>
<td><strong>Plug coding</strong></td>
<td>ODVA AutoSIG</td>
<td>NFPA/T3.5.29 R1-2003</td>
</tr>
<tr>
<td><strong>Operating voltage range</strong></td>
<td>[V DC] 0 ... 250</td>
<td>[V AC] 0 ... 250</td>
</tr>
<tr>
<td><strong>Surge capacity</strong></td>
<td>[kV] 2.5</td>
<td></td>
</tr>
<tr>
<td><strong>Acceptable current load</strong></td>
<td>[A] 8</td>
<td></td>
</tr>
<tr>
<td><strong>Based on standard</strong></td>
<td>EN 61984</td>
<td></td>
</tr>
<tr>
<td><strong>Permissible cable Ø [mm]</strong></td>
<td>5.0 ... 12.0</td>
<td></td>
</tr>
<tr>
<td><strong>Connection cross section [mm²]</strong></td>
<td>0.25 ... 2.0</td>
<td></td>
</tr>
<tr>
<td><strong>Protection class</strong></td>
<td>IP65/IP67/IP68</td>
<td></td>
</tr>
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### Materials

<table>
<thead>
<tr>
<th>Housing</th>
<th>PA (colour: black)</th>
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</thead>
<tbody>
<tr>
<td>Seals</td>
<td>NBR</td>
</tr>
<tr>
<td>Pin contact</td>
<td>Gold-plated copper base alloy</td>
</tr>
<tr>
<td>Union nut</td>
<td>Nickel-plated brass</td>
</tr>
<tr>
<td>Note on materials</td>
<td>Free of copper and PTFE</td>
</tr>
<tr>
<td></td>
<td>RoHS-compliant</td>
</tr>
</tbody>
</table>

### Operating and environmental conditions

<table>
<thead>
<tr>
<th>Ambient temperature [°C]</th>
<th>-40 ... +80</th>
</tr>
</thead>
<tbody>
<tr>
<td>Corrosion resistance class CRC¹</td>
<td>1</td>
</tr>
<tr>
<td>Degree of contamination</td>
<td>3</td>
</tr>
<tr>
<td>CE mark (see declaration of conformity)</td>
<td>To EU Low Voltage Directive</td>
</tr>
<tr>
<td>Certification</td>
<td>CSA C/US (OL)</td>
</tr>
</tbody>
</table>

¹) Corrosion resistance class 1 according to Festo standard 940 070

Components subject to low corrosion stress. Transport and storage protection. Parts that do not have primarily decorative surface requirements, e.g. in internal areas that are not visible or behind covers.

### Dimensions


- x Cable diameter 5.0 ... 12.0 mm

### Ordering data

<table>
<thead>
<tr>
<th>Electrical connection</th>
<th>Weight [g]</th>
<th>Part No.</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>Socket 7/8”, round plug connector, 4-pin, straight, suitable for self-assembly, screw terminal</td>
<td>49</td>
<td>543108</td>
<td>NECU-G78GA-C2</td>
</tr>
<tr>
<td>Socket 7/8”, round plug connector, 5-pin, straight, suitable for self-assembly, screw terminal</td>
<td>51</td>
<td>543107</td>
<td>NECU-G78GS-C2</td>
</tr>
</tbody>
</table>
Universal plug connectors NECU, for self-assembly

Cable socket NECU-M8G4

- Socket for power supply
- 4-pin
- Can be assembled with any cable lengths
- With cable connector PG7

General technical data

<table>
<thead>
<tr>
<th>Feature</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Electrical connection</td>
<td>Socket M8x1, 4-pin, straight</td>
</tr>
<tr>
<td>Operating voltage range [V DC]</td>
<td>0...30</td>
</tr>
<tr>
<td>Operating voltage range [V AC]</td>
<td>0...30</td>
</tr>
<tr>
<td>Surge capacity [kV]</td>
<td>0.8</td>
</tr>
<tr>
<td>Acceptable current load [A]</td>
<td>3</td>
</tr>
<tr>
<td>Based on standard</td>
<td>EN 61984</td>
</tr>
<tr>
<td>Permissible cable Ø [mm]</td>
<td>3.5...5.0</td>
</tr>
<tr>
<td>Connection cross section [mm²]</td>
<td>0.14...0.5</td>
</tr>
<tr>
<td>Connection frequency</td>
<td>500</td>
</tr>
<tr>
<td>Type of mounting</td>
<td>Via knurled nut</td>
</tr>
<tr>
<td>Mounting position</td>
<td>Any</td>
</tr>
<tr>
<td>Max. tightening torque of plug</td>
<td>[Nm]</td>
</tr>
<tr>
<td>Protection class</td>
<td>IP67</td>
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</tbody>
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Materials

<table>
<thead>
<tr>
<th>Component</th>
<th>Material</th>
</tr>
</thead>
<tbody>
<tr>
<td>Housing</td>
<td>PBT (colour: black)</td>
</tr>
<tr>
<td></td>
<td>Nickel-plated die-cast zinc</td>
</tr>
<tr>
<td>Pin contact</td>
<td>Gold-plated brass</td>
</tr>
<tr>
<td>Union nut</td>
<td>Nickel-plated brass</td>
</tr>
<tr>
<td>Note on materials</td>
<td>RoHS-compliant</td>
</tr>
</tbody>
</table>

Operating and environmental conditions

<table>
<thead>
<tr>
<th>Condition</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ambient temperature</td>
<td>–40...+80</td>
</tr>
<tr>
<td>Storage temperature</td>
<td>–40...+80</td>
</tr>
<tr>
<td>Corrosion resistance class CRC&lt;sup&gt;1&lt;/sup&gt;</td>
<td>2</td>
</tr>
<tr>
<td>Degree of contamination</td>
<td>3</td>
</tr>
</tbody>
</table>

<sup>1</sup> Corrosion resistance class 2 according to Festo standard 940 070

Components subject to moderate corrosion stress. 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.

Dimensions

Download CAD data ➔ www.festo.com/en/engineering

Ordering data

<table>
<thead>
<tr>
<th>Electrical connection</th>
<th>Weight [g]</th>
<th>Part No.</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>Socket M8x1, 4-pin, straight</td>
<td>9.5</td>
<td>544392</td>
<td>NECU-M8G4</td>
</tr>
</tbody>
</table>

Dimensions

Download CAD data ➔ www.festo.com/en/engineering

x Cable diameter 3.5...5.0 mm
Universal plug connectors SIE, for self-assembly

Technical data

Sensor socket SIE-GD

- Reconnectable for low-voltage applications
- 4-pin
- Can be assembled with any cable lengths
- With cable connector PG7

General technical data

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Electrical connection</td>
<td>Straight socket M12x1, 4-pin</td>
</tr>
<tr>
<td>Operating voltage range [V DC]</td>
<td>0 … 250</td>
</tr>
<tr>
<td></td>
<td>[V AC] 0 … 250</td>
</tr>
<tr>
<td>Surge capacity [kV]</td>
<td>2.5</td>
</tr>
<tr>
<td>Acceptable current load at 40 °C</td>
<td>4</td>
</tr>
<tr>
<td>Conforms to</td>
<td>EN 61076-2-101</td>
</tr>
<tr>
<td></td>
<td>EN 61984</td>
</tr>
<tr>
<td>Permissible cable [mm]</td>
<td>4 … 6</td>
</tr>
<tr>
<td>Connection cross section [mm²]</td>
<td>0.25 … 0.75</td>
</tr>
<tr>
<td>Connection frequency</td>
<td>50</td>
</tr>
<tr>
<td>Type of mounting</td>
<td>Via knurled nut</td>
</tr>
<tr>
<td>Max. tightening torque [Nm]</td>
<td>0.5</td>
</tr>
<tr>
<td>Protection class</td>
<td>IP67</td>
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</tbody>
</table>

Materials

- Housing: PA
- Union nut: PA
- Note on materials: RoHS-compliant

Operating and environmental conditions

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
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</thead>
<tbody>
<tr>
<td>Ambient temperature [°C]</td>
<td>−25 … +85</td>
</tr>
<tr>
<td>Corrosion resistance class CRC</td>
<td>4</td>
</tr>
<tr>
<td>Degree of contamination</td>
<td>3</td>
</tr>
<tr>
<td>CE mark (see declaration of conformity)</td>
<td>To EU Low Voltage Directive</td>
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</table>

Dimensions

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<tr>
<th>Dimensions</th>
<th>Download CAD data [<a href="http://www.festo.com/en/engineering">www.festo.com/en/engineering</a>]</th>
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Ordering data

<table>
<thead>
<tr>
<th>Electrical connection</th>
<th>Part No.</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>Straight socket M12x1, 4-pin</td>
<td>18494</td>
<td>SIE-GD</td>
</tr>
</tbody>
</table>
Universal plug connectors SIE, for self-assembly

Angled socket SIE-WD-TR

- Reconnectable for low-voltage applications
- 4-pin
- Can be assembled with any cable lengths

General technical data

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Electrical connection</td>
<td>Angled socket M12x1, 4-pin</td>
</tr>
<tr>
<td>Operating voltage range [V DC]</td>
<td>0 ... 250</td>
</tr>
<tr>
<td>Operating voltage range [V AC]</td>
<td>0 ... 250</td>
</tr>
<tr>
<td>Surge capacity [kV]</td>
<td>2.5</td>
</tr>
<tr>
<td>Acceptable current load at 40 °C</td>
<td>4</td>
</tr>
<tr>
<td>Conforms to</td>
<td>EN 61076-2-101</td>
</tr>
<tr>
<td>Permissible cable [mm]</td>
<td>4 ... 6</td>
</tr>
<tr>
<td>Connection cross section [mm²]</td>
<td>0.25 ... 0.75</td>
</tr>
<tr>
<td>Connection frequency</td>
<td>50</td>
</tr>
<tr>
<td>Type of mounting</td>
<td>Via knurled nut</td>
</tr>
<tr>
<td>Max. tightening torque [Nm]</td>
<td>0.5</td>
</tr>
<tr>
<td>Protection class</td>
<td>IP67</td>
</tr>
<tr>
<td>Materials</td>
<td></td>
</tr>
<tr>
<td>Housing</td>
<td>PA</td>
</tr>
<tr>
<td>Union nut</td>
<td>PA</td>
</tr>
<tr>
<td>Note on materials</td>
<td>RoHS-compliant</td>
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Operating and environmental conditions

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ambient temperature [°C]</td>
<td>-25 ... +85</td>
</tr>
<tr>
<td>Corrosion resistance class CRC</td>
<td>4</td>
</tr>
<tr>
<td>Degree of contamination</td>
<td>3</td>
</tr>
<tr>
<td>CE mark (see declaration of conformity)</td>
<td>To EU Low Voltage Directive</td>
</tr>
</tbody>
</table>

1) Corrosion resistance class 4 according to Festo standard 940 070
Components subject to particularly high corrosion stress. Parts used with aggressive media, e.g. in the food or chemical industry. These applications should be supported with special tests with the media if required.

Dimensions

Download CAD data ➔ www.festo.com/en/engineering

Ordering data

<table>
<thead>
<tr>
<th>Part No.</th>
<th>Type</th>
<th>Electrical connection</th>
</tr>
</thead>
<tbody>
<tr>
<td>12956</td>
<td>SIE-WD-TR</td>
<td>Angled socket M12x1, 4-pin</td>
</tr>
</tbody>
</table>
Universal plug connectors NECU, for self-assembly

Socket NECU-PPGS

- Power supply socket
- 5-pin
- Can be assembled with any cable length

### General technical data

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Electrical connection</td>
<td>Socket AIDA push-pull, 5-pin, straight, spring-loaded terminal</td>
</tr>
<tr>
<td>Plug coding</td>
<td>Black insulator</td>
</tr>
<tr>
<td>Operating voltage range [V DC]</td>
<td>0 ... 24</td>
</tr>
<tr>
<td>Surge capacity [kV]</td>
<td>2.5</td>
</tr>
<tr>
<td>Acceptable current load [A]</td>
<td>16</td>
</tr>
<tr>
<td>Based on standard</td>
<td>EN 61984</td>
</tr>
<tr>
<td>Permissible cable [mm]</td>
<td>9 ... 13</td>
</tr>
<tr>
<td>Connection cross section [mm²]</td>
<td>0.75 ... 2.5</td>
</tr>
<tr>
<td>Protection class</td>
<td>IP65/IP67</td>
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### Materials

<table>
<thead>
<tr>
<th>Description</th>
<th>Specification</th>
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</thead>
<tbody>
<tr>
<td>Housing</td>
<td>Nickel-plated die-cast zinc</td>
</tr>
<tr>
<td>Housing colour</td>
<td>Silver</td>
</tr>
<tr>
<td>Seals</td>
<td>NBR, TPE</td>
</tr>
<tr>
<td>Pin contact</td>
<td>Nickel-plated and gold-plated copper based alloy</td>
</tr>
<tr>
<td>Note on materials</td>
<td>RoHS-compliant</td>
</tr>
</tbody>
</table>

### Operating and environmental conditions

<table>
<thead>
<tr>
<th>Condition</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ambient temperature [°C]</td>
<td>–40 ... +100</td>
</tr>
<tr>
<td>Degree of contamination</td>
<td>3</td>
</tr>
<tr>
<td>Fire protection classification to UL 94</td>
<td>V-0</td>
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</table>

### Ordering data

<table>
<thead>
<tr>
<th>Electrical connection</th>
<th>Part No.</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>Socket AIDA push-pull, 5-pin, straight</td>
<td>563059</td>
<td>NECU-M-PPGS-C1</td>
</tr>
</tbody>
</table>
### General technical data

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Electrical connection</td>
<td>Straight plug/insulation displacement connector, 4-pin, square design</td>
</tr>
<tr>
<td>Operating voltage range</td>
<td>[V DC] 0...30</td>
</tr>
<tr>
<td>Surge capacity</td>
<td>[kV] 0.8</td>
</tr>
<tr>
<td>Acceptable current load</td>
<td>[A] 3</td>
</tr>
<tr>
<td>Individual wire diameter</td>
<td>[mm] ≥ 0.07</td>
</tr>
<tr>
<td>Connection cross section</td>
<td>[mm²] 0.14</td>
</tr>
<tr>
<td>Wire diameter</td>
<td>[mm] 0.8...1</td>
</tr>
<tr>
<td>Wire insulation</td>
<td>PP, PVC, TPE-E</td>
</tr>
<tr>
<td>Connection frequency</td>
<td>1</td>
</tr>
<tr>
<td>Type of mounting</td>
<td>Engaging</td>
</tr>
<tr>
<td>Protection class</td>
<td>IP40</td>
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### Materials

<table>
<thead>
<tr>
<th>Component</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Housing</td>
<td>PC, PBT</td>
</tr>
<tr>
<td>Pin contacts</td>
<td>Bronze</td>
</tr>
<tr>
<td>Note on materials</td>
<td>RoHS-compliant</td>
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### Operating and environmental conditions

<table>
<thead>
<tr>
<th>Condition</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ambient temperature</td>
<td>[°C] –20…+60</td>
</tr>
<tr>
<td>Corrosion resistance class</td>
<td>CRC 1</td>
</tr>
<tr>
<td>Degree of contamination</td>
<td>2</td>
</tr>
<tr>
<td>Certification</td>
<td>cULus recognized (OL)</td>
</tr>
</tbody>
</table>

1) Corrosion resistance class 1 according to Festo standard 940-070

Components subject to low corrosion stress. Transport and storage protection. Parts that do not have primarily decorative surface requirements, e.g. in internal areas that are not visible or behind covers.

### Dimensions

#### NECU-S-ECG4

<table>
<thead>
<tr>
<th>Type</th>
<th>B1</th>
<th>H1</th>
<th>L1</th>
</tr>
</thead>
<tbody>
<tr>
<td>NECU-S-ECG4</td>
<td>5.9</td>
<td>14.9</td>
<td>15.6</td>
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</tbody>
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### Ordering data

<table>
<thead>
<tr>
<th>Electrical connection</th>
<th>Part No.</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>Straight plug/insulation displacement connector, 4-pin, square design</td>
<td>570922</td>
<td>NECU-S-ECG4-HX-Q3</td>
</tr>
</tbody>
</table>

[Download CAD data](www.festo.com/en/engineering)
Universal plug connectors SIE, for self-assembly

Operational status indicator
SIE-LP-LED-GR
Indicates the ready status of a proximity sensor SIE connected via the angled socket SIE-WD-TR by illuminating a green LED.

<table>
<thead>
<tr>
<th>Ordering data</th>
<th>Ambient temperature (°C)</th>
<th>Part No.</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating voltage range [V DC]</td>
<td>-25 ... +70</td>
<td>12957</td>
<td>SIE-LP-LED-GR</td>
</tr>
</tbody>
</table>
## Push-in T-connector NEDU-M

### T-adapter

### General technical data

<table>
<thead>
<tr>
<th>Type</th>
<th>NEDU-M12D5-M12T4</th>
<th>NEDU-M8D3-M12T4</th>
<th>NEDU-M8D3-M8T4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type of mounting</td>
<td>Screw-in</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mounting position</td>
<td>Any</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Connection frequency</td>
<td>500</td>
<td>500</td>
<td>100</td>
</tr>
<tr>
<td>Nominal operating voltage</td>
<td>250 [V AC]</td>
<td>60 [V AC]</td>
<td>32 [V DC]</td>
</tr>
<tr>
<td></td>
<td>60 [V DC]</td>
<td>60 [V DC]</td>
<td>32 [V DC]</td>
</tr>
<tr>
<td>Acceptable current load</td>
<td>4 [A]</td>
<td>4 [A]</td>
<td>2 [A]</td>
</tr>
<tr>
<td>Protection class to EN 60529</td>
<td>IP65/67</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Electrical connection</td>
<td>To EN 60947-5-2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Max. tightening torque</td>
<td>0.5 [Nm]</td>
<td>0.3 with M8</td>
<td>0.5 with M12</td>
</tr>
</tbody>
</table>

### Materials

<table>
<thead>
<tr>
<th>Type</th>
<th>NEDU-M12D5-M12T4</th>
<th>NEDU-M8D3-M12T4</th>
<th>NEDU-M8D3-M8T4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Housing</td>
<td>Reinforced TPE-U(PU)</td>
<td></td>
<td>PA</td>
</tr>
<tr>
<td>Housing colour</td>
<td>Black</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pin contacts</td>
<td>Gold-plated brass</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Union nut</td>
<td>Chrome-plated and nickel-plated brass</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Note on materials</td>
<td>Free of copper and PTFE</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Corrosion resistance class CRC</td>
<td>2</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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

Components subject to moderate corrosion stress. 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.

### Operating and environmental conditions

<table>
<thead>
<tr>
<th>Condition</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ambient temperature [°C]</td>
<td>-25 ... +85</td>
</tr>
<tr>
<td>Storage temperature [°C]</td>
<td>-25 ... +85</td>
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</tbody>
</table>
Push-in T-connectors NEDU, general

Technical data

### Circuitry (socket/plug view)

**NEDU-M12D5-M12T4**

<table>
<thead>
<tr>
<th>Socket</th>
<th>Circuitry</th>
<th>Socket</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="socket1.png" alt="Socket Diagram" /></td>
<td><img src="circuitry1.png" alt="Circuitry Diagram" /></td>
<td><img src="socket2.png" alt="Socket Diagram" /></td>
</tr>
</tbody>
</table>

**NEDU-M8D3-M12T4**

<table>
<thead>
<tr>
<th>Socket</th>
<th>Circuitry</th>
<th>Socket</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="socket3.png" alt="Socket Diagram" /></td>
<td><img src="circuitry2.png" alt="Circuitry Diagram" /></td>
<td><img src="socket4.png" alt="Socket Diagram" /></td>
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</table>

**NEDU-M8D3-M8T4**

<table>
<thead>
<tr>
<th>Socket</th>
<th>Circuitry</th>
<th>Socket</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="socket5.png" alt="Socket Diagram" /></td>
<td><img src="circuitry3.png" alt="Circuitry Diagram" /></td>
<td><img src="socket6.png" alt="Socket Diagram" /></td>
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Electrical connection technology > Universal plug connectors >

Accessories

Plug connectors

3.2

[www.festo.com/catalogue/]
Push-in T-connectors NEDU, general

Technical data

Dimensions

<table>
<thead>
<tr>
<th>Type</th>
<th>Dimensions</th>
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</thead>
<tbody>
<tr>
<td>NEDU-M12D5-M12T4</td>
<td></td>
</tr>
<tr>
<td>NEDU-M8D3-M12T4</td>
<td></td>
</tr>
<tr>
<td>NEDU-M8D3-M8T4</td>
<td></td>
</tr>
</tbody>
</table>

Electrical connection technology > Universal plug connectors > Accessories

Ordering data

<table>
<thead>
<tr>
<th>Electrical connection</th>
<th>Product weight</th>
<th>Part No.</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plugs/sockets, 4-pin/4-pin, M12x1/M12x1, A-coded</td>
<td>25.5</td>
<td>541596</td>
<td>NEDU-M12D5-M12T4</td>
</tr>
<tr>
<td>Plugs/sockets, 4-pin/3-pin, M12x1/M8x1</td>
<td>16.9</td>
<td>541597</td>
<td>NEDU-M8D3-M12T4</td>
</tr>
<tr>
<td>Plugs/sockets, 4-pin/3-pin, M8x1/M8x1</td>
<td>9.5</td>
<td>544391</td>
<td>NEDU-M8D3-M8T4</td>
</tr>
</tbody>
</table>
## Electrical connection technology > Universal plug connectors > Pre-assembled plug connectors

### Product range overview

### Pre-assembled plug connectors

<table>
<thead>
<tr>
<th>Function</th>
<th>Electrical connection</th>
<th>Type</th>
<th>Cable connector</th>
<th>Version</th>
<th>Page/online</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Round plug connector</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>M8, 3-pin</td>
<td>SEA-3GS-M8-5</td>
<td>Pg7</td>
<td>Straight/screw terminal</td>
<td>570</td>
<td></td>
</tr>
<tr>
<td></td>
<td>SEA-GB-M8</td>
<td>Pg7</td>
<td>Straight/solder lug</td>
<td>570</td>
<td></td>
</tr>
<tr>
<td>M12, 4-pin</td>
<td>SEA-GBS-7</td>
<td>Pg7</td>
<td>Straight/screw terminal</td>
<td>572</td>
<td></td>
</tr>
<tr>
<td></td>
<td>SEA-GBS-9</td>
<td>Pg9</td>
<td>Straight/screw terminal</td>
<td>572</td>
<td></td>
</tr>
<tr>
<td></td>
<td>SEA-GBS-11-DUO</td>
<td>Pg11</td>
<td>Straight/screw terminal</td>
<td>572</td>
<td></td>
</tr>
<tr>
<td></td>
<td>SEA-GBS-HAR</td>
<td>Pg9</td>
<td>Straight/insulation displacement connector</td>
<td>572</td>
<td></td>
</tr>
<tr>
<td></td>
<td>SEA-4GS-7-2,5</td>
<td>Pg7</td>
<td>Straight/screw terminal</td>
<td>572</td>
<td></td>
</tr>
<tr>
<td>M12, 5-pin</td>
<td>SAE-M12-5GS</td>
<td>Pg7</td>
<td>Straight/screw terminal</td>
<td>574</td>
<td></td>
</tr>
<tr>
<td></td>
<td>SAE-5GS-11-DUO</td>
<td>Pg11</td>
<td>Straight/screw terminal</td>
<td>574</td>
<td></td>
</tr>
<tr>
<td><strong>Plug socket</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>M12, 4-pin</td>
<td>SAE-M12-4WD</td>
<td>Pg7</td>
<td>Angled/screw terminal</td>
<td>576</td>
<td></td>
</tr>
</tbody>
</table>
Pre-assembled plug connectors, M8, 3-pin

Technical data – SEA-GS-M8

Plug

SEA-GS-M8

- Sensor plug/socket for inputs/outputs
- Can be assembled with any cable lengths
- 3-pin
- With screw terminals or soldered connection
- Wire cross section up to 0.5 mm²

General technical data

<table>
<thead>
<tr>
<th>Type</th>
<th>SEA-GS-M8</th>
<th>SEA-3GS-M8-S</th>
</tr>
</thead>
<tbody>
<tr>
<td>Electrical connection</td>
<td>Straight plug, 3-pin, M8x1</td>
<td>Screw terminal</td>
</tr>
<tr>
<td>Type of mounting</td>
<td>Via threaded sleeve</td>
<td></td>
</tr>
<tr>
<td>Permissible cable diameter</td>
<td>3.5 ... 5</td>
<td>2.5 ... 5</td>
</tr>
<tr>
<td>Connection cross section</td>
<td>0.25</td>
<td>0.14 ... 0.5</td>
</tr>
<tr>
<td>Acceptable current load at 40 °C</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Surge resistance</td>
<td>1.5</td>
<td></td>
</tr>
<tr>
<td>Operating voltage range</td>
<td>60 V AC 60 V DC</td>
<td></td>
</tr>
<tr>
<td>Protection class to EN 60529</td>
<td>IP67 (assembled)</td>
<td>IP65 (assembled)</td>
</tr>
<tr>
<td>Based on standard</td>
<td>EN 61076-2-101, EN 61984</td>
<td></td>
</tr>
</tbody>
</table>

Materials

<table>
<thead>
<tr>
<th>Type</th>
<th>SEA-GS-M8</th>
<th>SEA-3GS-M8-S</th>
</tr>
</thead>
<tbody>
<tr>
<td>Housing colour</td>
<td>Black</td>
<td></td>
</tr>
<tr>
<td>Housing material</td>
<td>PA</td>
<td></td>
</tr>
<tr>
<td>Contact material</td>
<td>Gold-plated brass</td>
<td>Nickel-plated brass</td>
</tr>
<tr>
<td>Union nut material</td>
<td>Nickel-plated/chrome-plated brass</td>
<td></td>
</tr>
<tr>
<td>Note on materials</td>
<td>RoHS-compliant</td>
<td></td>
</tr>
<tr>
<td>Max. tightening torque of locking clip</td>
<td>0.3</td>
<td></td>
</tr>
</tbody>
</table>

Operating and environmental conditions

<table>
<thead>
<tr>
<th>Ambient temperature [°C]</th>
<th>-40 ... +85</th>
</tr>
</thead>
<tbody>
<tr>
<td>Corrosion resistance class CRC 1)</td>
<td>2</td>
</tr>
<tr>
<td>CE marking (see declaration of conformity)</td>
<td>To EU Low Voltage Directive</td>
</tr>
<tr>
<td>Degree of contamination</td>
<td>3</td>
</tr>
</tbody>
</table>

1) Corrosion resistance class 2 according to Festo standard 940 070
Components subject to moderate corrosion stress. 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.
### Pre-assembled plug connectors, M8, 3-pin

#### Technical data – SEA-GS-M8

**Dimensions**

**SEA-3GS-M8-S**

1. Cable connector:
   - Black for cables 3.5 … 5 mm
   - Blue for cables 2.5 … 4 mm

**SEA-GS-M8**

**Ordering data**

<table>
<thead>
<tr>
<th>Electrical connection</th>
<th>Cable connector</th>
<th>Product weight [g]</th>
<th>Part No.</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>Straight plug, 3-pin, screw terminal</td>
<td>Pg7</td>
<td>11</td>
<td>192009</td>
<td>SEA-3GS-M8-S</td>
</tr>
<tr>
<td>Straight plug, 3-pin, solder lug</td>
<td>Pg7</td>
<td>9</td>
<td>18696</td>
<td>SEA-GS-M8</td>
</tr>
</tbody>
</table>

Pre-assembled plug connectors, M12, 4-pin
Technical data – SEA-GS

Plug
SEA-GS
SEA-GS-HAR
SEA-4GS

- Sensor plug for inputs/outputs
- Can be assembled with any cable lengths
- 4-pin
- Wire cross section up to 0.75 mm²

General technical data

<table>
<thead>
<tr>
<th></th>
<th>SEA-GS ...</th>
<th>SEA-4GS ...</th>
<th>SEA-GS-HAR ...</th>
</tr>
</thead>
<tbody>
<tr>
<td>Electrical connection</td>
<td>Straight plug, 4-pin, M12x1</td>
<td>Screw terminal</td>
<td>Insulation displacement connector</td>
</tr>
<tr>
<td>Type of mounting</td>
<td>Via threaded sleeve</td>
<td>Via threaded sleeve</td>
<td>Via thread</td>
</tr>
<tr>
<td>Mounting position</td>
<td>Any</td>
<td>Any</td>
<td>Any</td>
</tr>
<tr>
<td>Max. tightening torque of locking clip [Nm]</td>
<td>0.5</td>
<td>0.5</td>
<td>0.5</td>
</tr>
<tr>
<td>Connection cross section [mm²]</td>
<td>0.75</td>
<td>0.14 ... 0.5</td>
<td>0.25 ... 0.5</td>
</tr>
<tr>
<td>Permissible individual wire diameter [mm]</td>
<td>–</td>
<td>–</td>
<td>0.1</td>
</tr>
<tr>
<td>Permissible wire diameter [mm]</td>
<td>–</td>
<td>–</td>
<td>1.2 ... 1.6</td>
</tr>
<tr>
<td>Acceptable current load at 40 °C [A]</td>
<td>4</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>Surge resistance [kV]</td>
<td>2.5</td>
<td>2.5</td>
<td>0.8</td>
</tr>
<tr>
<td>Operating voltage range [V AC]</td>
<td>250</td>
<td>250</td>
<td>32</td>
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<tr>
<td></td>
<td>250</td>
<td>250</td>
<td>32</td>
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<tr>
<td>Protection class to EN 60529</td>
<td>IP67 (assembled)</td>
<td>IP65 (assembled)</td>
<td>IP67 (assembled)</td>
</tr>
<tr>
<td>Based on standard</td>
<td>EN 61076-2-101, EN 61984</td>
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Materials

<table>
<thead>
<tr>
<th></th>
<th>SEA-GS ...</th>
<th>SEA-4GS ...</th>
<th>SEA-GS-HAR ...</th>
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</thead>
<tbody>
<tr>
<td>Housing colour</td>
<td>Black</td>
<td>Black</td>
<td>–</td>
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<tr>
<td>Housing</td>
<td>PBT</td>
<td>PA</td>
<td>Nickel-plated die-cast zinc</td>
</tr>
<tr>
<td>Contacts</td>
<td>Brass, coated with white bronze</td>
<td>Brass, coated with white bronze</td>
<td>Gold-plated copper base alloy</td>
</tr>
<tr>
<td>Union nut</td>
<td>PBT</td>
<td>PA</td>
<td>–</td>
</tr>
<tr>
<td>Permissible wire insulation</td>
<td>–</td>
<td>–</td>
<td>PVC</td>
</tr>
<tr>
<td>Note on materials</td>
<td>RoHS-compliant</td>
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Operating and environmental conditions

<table>
<thead>
<tr>
<th></th>
<th>SEA-GS ...</th>
<th>SEA-4GS ...</th>
<th>SEA-GS-HAR ...</th>
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</thead>
<tbody>
<tr>
<td>Ambient temperature [°C]</td>
<td>–40 ... +85</td>
<td>–25 ... +85</td>
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<tr>
<td>Corrosion resistance class CRC 1)</td>
<td>2</td>
<td>2</td>
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</tr>
<tr>
<td>CE marking (see declaration of conformity)</td>
<td>To EU Low Voltage Directive</td>
<td>–</td>
<td></td>
</tr>
<tr>
<td>Degree of contamination</td>
<td>3</td>
<td>3</td>
<td></td>
</tr>
</tbody>
</table>

1) Corrosion resistance class 2 according to Festo standard 940 070
Components subject to moderate corrosion stress. 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.
Pre-assembled plug connectors, M12, 4-pin

**Technical data – SEA-GS**

### Dimensions

<table>
<thead>
<tr>
<th>SEA-GS 7</th>
<th>SEA-4GS-7-2.5</th>
</tr>
</thead>
<tbody>
<tr>
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<td><img src="https://via.placeholder.com/150" alt="Diagram" /></td>
</tr>
<tr>
<td>4 ... 6 mm</td>
<td>2.5 ... 2.9 mm</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>SEA-GS-9</th>
<th>SEA-GS-11-DUO</th>
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</thead>
<tbody>
<tr>
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<td><img src="https://via.placeholder.com/150" alt="Diagram" /></td>
</tr>
<tr>
<td><img src="https://via.placeholder.com/150" alt="Diagram" /></td>
<td><img src="https://via.placeholder.com/150" alt="Diagram" /></td>
</tr>
<tr>
<td>Pg7</td>
<td>Pg9</td>
</tr>
<tr>
<td>Pg7</td>
<td>Pg11</td>
</tr>
<tr>
<td>Pg9</td>
<td>Pg11</td>
</tr>
<tr>
<td>Pg9</td>
<td>Pg11</td>
</tr>
<tr>
<td>4 ... 6 mm</td>
<td>6 ... 8</td>
</tr>
<tr>
<td>2.5 ... 2.9 mm</td>
<td>3 ... 5</td>
</tr>
<tr>
<td>17</td>
<td>18</td>
</tr>
<tr>
<td>18</td>
<td>24</td>
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</table>

### Ordering data

<table>
<thead>
<tr>
<th>Electrical connection</th>
<th>Cable connector</th>
<th>Perm. cable Ø [mm]</th>
<th>Product weight [g]</th>
<th>Part No.</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>Straight plug (type A), 4-pin, screw terminal</td>
<td>Pg7</td>
<td>4 ... 6</td>
<td>17</td>
<td>18666</td>
<td>SEA-GS-7</td>
</tr>
<tr>
<td></td>
<td>Pg9</td>
<td>2.5 ... 2.9</td>
<td>18</td>
<td>192008</td>
<td>SEA-4GS-7-2.5</td>
</tr>
<tr>
<td></td>
<td>Pg11</td>
<td>6 ... 8</td>
<td>18</td>
<td>18778</td>
<td>SEA-GS-9</td>
</tr>
<tr>
<td></td>
<td>Pg11</td>
<td>3 ... 5</td>
<td>24</td>
<td>18779</td>
<td>SEA-GS-11-DUO</td>
</tr>
<tr>
<td>Straight plug, 4-pin, insulation displacement</td>
<td>Pg9</td>
<td>4 ... 5.1</td>
<td>11.5</td>
<td>525928</td>
<td>SEA-GS-HAR-4POL</td>
</tr>
<tr>
<td>connector</td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Pre-assembled plug connectors, M12, 5-pin

**Plug**

**SEA-M12-5GS**

- Sensor plug for inputs/outputs
- Can be assembled with any cable lengths
- 5-pin
- Wire cross section up to 0.75 mm²

### General technical data

<table>
<thead>
<tr>
<th>Type</th>
<th>SEA-M12-5GS-PG7</th>
<th>SEA-5GS-11-DUO</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Type</strong></td>
<td>Straight plug (type A), 5-pin</td>
<td>M12, screw terminal</td>
</tr>
<tr>
<td><strong>Electrical connection</strong></td>
<td>Via threaded sleeve</td>
<td></td>
</tr>
<tr>
<td><strong>Type of mounting</strong></td>
<td>M12, screw terminal</td>
<td></td>
</tr>
<tr>
<td><strong>Max. tightening torque of locking clip [Nm]</strong></td>
<td>0.5</td>
<td></td>
</tr>
<tr>
<td><strong>Mounting position</strong></td>
<td>Any</td>
<td></td>
</tr>
<tr>
<td><strong>Permissible cable diameter [mm]</strong></td>
<td>4...6</td>
<td>2 x 2.5 ... 2.9 or 2 x 5</td>
</tr>
<tr>
<td><strong>Connection cross section [mm²]</strong></td>
<td>0.75</td>
<td>0.14...0.5</td>
</tr>
<tr>
<td><strong>Acceptable current load at 40 °C [A]</strong></td>
<td>4</td>
<td></td>
</tr>
<tr>
<td><strong>Surge resistance [kV]</strong></td>
<td>1.5</td>
<td></td>
</tr>
<tr>
<td><strong>Operating voltage range [V AC]</strong></td>
<td>60</td>
<td></td>
</tr>
<tr>
<td><strong>[V DC]</strong></td>
<td>60</td>
<td></td>
</tr>
<tr>
<td><strong>Protection class to EN 60529</strong></td>
<td>IP67 (assembled)</td>
<td>IP65 (assembled)</td>
</tr>
<tr>
<td><strong>Based on standard</strong></td>
<td>EN 61076-2-101, EN 61984</td>
<td></td>
</tr>
</tbody>
</table>

### Materials

<table>
<thead>
<tr>
<th>Type</th>
<th>SEA-M12-5GS-PG7</th>
<th>SEA-5GS-11-DUO</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Housing colour</strong></td>
<td>Black</td>
<td></td>
</tr>
<tr>
<td><strong>Housing</strong></td>
<td>PBT</td>
<td></td>
</tr>
<tr>
<td><strong>Contacts</strong></td>
<td>Brass, coated with white bronze</td>
<td></td>
</tr>
<tr>
<td><strong>Union nut</strong></td>
<td>Nickel-plated die-cast zinc</td>
<td></td>
</tr>
<tr>
<td><strong>Note on materials</strong></td>
<td>RoHS-compliant</td>
<td></td>
</tr>
</tbody>
</table>

### Operating and environmental conditions

| **Ambient temperature [°C]** | 40 ... 85 |
| **Corrosion resistance class CRC** | 2 |
| **CE marking (see declaration of conformity)** | To EU Low Voltage Directive |

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

Components subject to moderate corrosion stress. 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.
### Pre-assembled plug connectors, M12, 5-pin

**Technical data – SEA-...5GS**

#### Dimensions

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>SEA-M12-5GS-PG7</td>
<td><img src="image" alt="Dimensions" /></td>
<td></td>
</tr>
</tbody>
</table>

#### SEA-5GS-11-DUO

- 1 included in the scope of delivery:
  - 1 seal insert for 2 cables with Ø 2.5 … 2.9 mm
  - 1 seal insert for 2 cables with Ø 5 mm
  - 1 cable tie

#### Ordering data

<table>
<thead>
<tr>
<th>Electrical connection</th>
<th>Cable connector</th>
<th>Product weight [g]</th>
<th>Part No.</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>Straight plug (type A), 5-pin, screw terminal</td>
<td>Pg7</td>
<td>21.5</td>
<td>175487</td>
<td>SEA-M12-5GS-PG7</td>
</tr>
<tr>
<td></td>
<td>Pg11</td>
<td>24</td>
<td>192010</td>
<td>SEA-5GS-11-DUO</td>
</tr>
</tbody>
</table>
Pre-assembled plug connectors, M12, 4-pin

Technical data – SEA-M12-4WD

Plug socket
SEA-M12-4WD

- Plug socket for inputs/outputs
- Can be assembled with any cable lengths
- 4-pin
- Wire cross section up to 0.75 mm²

General technical data

| Electrical connection | Angled plug socket (type A), 4-pin
| Type of mounting      | M12, screw terminal
| Mounting position     | Via union nut
| Permissible cable diameter [mm] | 4...6
| Max. tightening torque of locking clip [Nm] | 0.5
| Connection cross section [mm²] | 0.75
| Acceptable current load at 40 °C [A] | 4
| Surge resistance [kV] | 2.5
| Operating voltage range [V AC] | 250
|                      | [V DC] | 250
| Protection class to EN 60529 | IP67 (assembled)
| Based on standard | EN 61076-2-101, EN 61984

Materials

- Housing colour: Black
- Housing: PBT
- Contacts: Brass, coated with white bronze
- Seals: Nitrile rubber
- Union nut: Nickel-plated die-cast zinc
- Note on materials: RoHS-compliant

Operating and environmental conditions

- Ambient temperature [°C]: –40 ... +85
- CE marking (see declaration of conformity): To EU Low Voltage Directive
- Degree of contamination: 3

Dimensions

Download CAD data ➔ www.festo.com/en/engineering

Ordering data

<table>
<thead>
<tr>
<th>Electrical connection</th>
<th>Cable connector</th>
<th>Product weight [g]</th>
<th>Part No.</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>Angled plug socket (type A), 4-pin, screw terminal</td>
<td>Pg7</td>
<td>30</td>
<td>185498</td>
<td>SEA-M12-4WD-PG7</td>
</tr>
</tbody>
</table>
### Angled socket PEV-WD/Plug socket MSSD

#### Pressure and vacuum switches PEV/VPEV

<table>
<thead>
<tr>
<th>Serial No.</th>
<th>Description</th>
<th>Operating voltage range</th>
<th>Part No.</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Pressure switch</td>
<td>180 – 230</td>
<td>161209</td>
<td>PEV-1/4-A-WD</td>
</tr>
<tr>
<td>2</td>
<td>Pressure switch</td>
<td>15 – 30</td>
<td>161274</td>
<td>PEV-1/4-WD-LED-24</td>
</tr>
<tr>
<td>3</td>
<td>Pressure switch with scale for pressure adjustment</td>
<td>180 – 230</td>
<td>161275</td>
<td>PEV-1/4-WD-LED-230</td>
</tr>
<tr>
<td>4</td>
<td>Angled socket</td>
<td>300 – 250</td>
<td>171157</td>
<td>MSSD-C-4P</td>
</tr>
</tbody>
</table>

**Ordering data**

- **Without switching status display**: Operating voltage range: 180 – 230, Part No.: 161209, Type: PEV-1/4-A-WD
- **With switching status display**: Operating voltage range: 15 – 30, Part No.: 161274, Type: PEV-1/4-WD-LED-24
- **With switching status display**: Operating voltage range: 180 – 230, Part No.: 161275, Type: PEV-1/4-WD-LED-230
- **With switching status display**: Operating voltage range: 300 – 250, Part No.: 171157, Type: MSSD-C-4P
## Plug socket SD-4

### Technical data

#### Plug socket SD-4/Swivel module DSMI

<table>
<thead>
<tr>
<th>Type</th>
<th>Part No.</th>
<th>Pin allocation</th>
<th>Designation</th>
<th>Part No.</th>
<th>Type</th>
</tr>
</thead>
<tbody>
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<td>Swivel module DSMI</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Plug socket SD-4-WD-7</td>
<td>194332</td>
<td>Power supply</td>
<td>Plug socket</td>
<td>194332</td>
<td>SD-4-WD-7</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Signal</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>0V</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>PE (yellow), screened</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

---

**Electrical connection technology > Universal plug connectors >**

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**Accessories**

**Plug connectors**

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3.2
Sensor testers SM-TEST-1

Technical data

Description
The sensor tester is used to test and adjust sensors and proximity switches. The sensor tester also facilitates commissioning and servicing work.

Functions:
- Testing of operation of proximity sensors using the integrated voltage supply
- Adjustment of proximity switches whilst attached to cylinders
- Identification of switching outputs of proximity switches and sensors with PNP, NPN, NC and NO functions by means of the appropriate LED

Ordering data

<table>
<thead>
<tr>
<th>Part No.</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>158 481</td>
<td>SM-TEST-1</td>
</tr>
</tbody>
</table>

Note
The tester is powered by two 9 V block batteries, which are not included in the scope of delivery.
Technical information

Sensors

Switching functions

<table>
<thead>
<tr>
<th>N/O function</th>
<th>N/C function</th>
<th>Antivalent</th>
</tr>
</thead>
<tbody>
<tr>
<td>The output is disabled when the sensor is not activated. The output is switched through when the sensor is activated.</td>
<td>The output is switched through when the sensor is not activated. The output is disabled when the sensor is activated.</td>
<td>In the case of devices with antivalent outputs, there is one output for the N/O contact signal and another for the N/C contact signal. Both functions are therefore available simultaneously, which means maximum flexibility for connection to the control unit. In addition, logic circuits can be implemented without using series connections.</td>
</tr>
</tbody>
</table>

PNP circuit

The output stage includes a PNP transistor which switches the load to the positive power supply (+U_B). The load is connected between the output and the negative power supply (0 V).

NPN circuit

The output stage includes an NPN transistor which switches the load to the negative power supply (0 V). The load is connected between the output and the positive power supply (+U_B).

Parallel connection

Sensors can easily be connected in parallel to implement logic functions. Please note:
- The idle current increases.
- The residual currents are cumulative, with the result that an excessive voltage drop may occur across the load even when the sensors are not conducting.

Series connection

The series connection of sensors is possible in principle provided the sensors thus connected in series are supplied with the necessary minimum operating voltage. The switching capacity and thus also the magnitude of the temporarily flowing starting currents increase with components connected in series. This can result in the short circuit detection being triggered. The effect is dependent on the number of sensors connected in series and their design. A field test is therefore recommended.

Cables

The sensor cables included as standard are not suitable for recurrent bending loads. In such cases, plug designs and connecting cables suitable for chain link trunking or robot applications from the NEBU range must be used. The following rule of thumb applies: The recommended maximum bending radius is ten times the cable diameter.

Load resistance

The smallest load resistance that is permissible for proper operation can be calculated from the actual operating voltage U_B and the specified maximum output current. Example: At a voltage of 24 V and a specified maximum output current of 200 mA, the smallest load resistance is 1.20 ohms; at 15 V the value would be 75 ohms. If the maximum power consumption of a product is specified, this value must be taken into account when calculating the minimum load or maximum current.

Residual current

The residual current is the current that flows through the output transistor and, consequently, through the load when the output is disabled. (This has particular significance to the connection of multiple circuits in series, as the residual currents are cumulative.)

Output overvoltage protection – Inductive loads

Disconnection of inductive loads without a safety circuit would cause the output voltage to rise to a very high value, which could damage the output transistor. For this reason, most sensors have an integrated Zener diode at the output, with which the switch-off voltage can be limited to a value that is harmless for the output transistor. When an inductive load with a current of >100 mA and a simultaneous switching frequency of >10 Hz is connected, installation of a free-wheeling diode directly on the load is recommended (due to the power loss in the integrated Zener diode). The technical data for proximity sensors contains information about the recommended valves for use with the sensor.
## Sensors

### Technical information

#### Operating voltage $U_b$

The specified operating voltages must not be exceeded, particularly by the maximum expected residual ripple. Operating voltages below the specified lower limit value do not damage the switches, but can lead to a malfunction if they occur for even a short time.

#### Voltage drop

A (current-dependent) voltage drop is produced via the output transistor in the activated state. The output voltage does not therefore fully reach the corresponding operating voltage (which must be taken into account with series connections and electronic inputs in particular).

#### Switch-on time

The time required by the circuit to set the output in the active state after the physical value to be monitored has reached the specified level.

#### Switch-off time

The time required by the circuit to set the output in the inactive state after the physical value to be monitored has fallen from the specified level.

#### Residual ripple

The residual ripple in the operating voltage causes an undefined switching behaviour. The maximum permissible operating voltage $U_b$ must not be exceeded even in the peaks of $U_{SS}$.

#### Short circuit protection

All DC voltage devices are equipped with an integrated safety circuit against short circuits and overloads. Short circuits between the output and the operating voltage connections do not damage the device and are permissible over a long period of time. The same applies to overloads. The LEDs do not function during a short circuit. Please note that proximity sensors SME… do not have protection against short circuits, overloads or reverse polarity.

#### Idle current

Idle current refers to the intrinsic current consumption of the proximity sensor in the inactive state (for oscillators, amplifiers, etc.). This does not include the current that flows through the load.

#### Hysteresis (differential)

Hysteresis (or differential) is the distance between the switch-on point when the object approaches the sensor and the switch-off point when the object moves away. The movement of the object in relation to the sensor should be as shown in the diagram.

#### Repetition accuracy

If an object is measured repeatedly, e.g. when replacing sensors under stable conditions (voltage, temperature, etc.), the maximum deviation between the results represent the repetition accuracy of the device. It is specified as $\pm$- mm, for example.

#### Output current

The devices are designed for a specific maximum output current. If this current is exceeded for even a short period of time, the overload protection is activated. Bulbs, capacitors and other highly capacitive loads (e.g. long cables) have a similar effect to an overload.

#### Wiring

The sensor cables must not be installed in parallel in the same cable channels as cables that are connected to inductive loads (i.e. contactor coils, magnet detectors, motors, etc.) or that carry currents from electronic motor drives. The cables should be kept as short as possible. The following measures should be implemented to reduce electromagnetic interference:

- Maintain a distance of $>100$ mm from interfering cables
- Use screening
- Connect inductances (contactors, magnet detectors, relays) with RC elements or varistors.

#### Protection against polarity reversal

All of the proximity sensors contained in this catalogue are protected against polarity reversal on all outputs.

#### Security

The proximity sensors contained in this catalogue must not be used for applications where the safety of persons depends on operation of the proximity sensor.
## Technical information

### Sensors

<table>
<thead>
<tr>
<th>Ready-state delay</th>
<th>Vibration resistance</th>
<th>Shock resistance</th>
<th>Resolution</th>
</tr>
</thead>
<tbody>
<tr>
<td>The ready-state delay is the maximum time that the device requires to reach the ready state after the operating voltage is connected.</td>
<td>The proximity sensors contained in this catalogue are tested to IEC standards for vibration resistance.</td>
<td>The devices contained in this catalogue are tested to IEC standards for shock resistance.</td>
<td>The smallest increment that a sensor with an analogue output, e.g. a displacement sensor, can supply. The value is determined by the integrated control system and the measuring range to be monitored.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Temperature drift</th>
<th>Torque</th>
<th>Ambient temperature</th>
</tr>
</thead>
<tbody>
<tr>
<td>The expected drift of the output signal in the event of a temperature rise or drop, specified in K/mm.</td>
<td>The maximum values are specified in the individually supplied operating instructions.</td>
<td>The specified ambient temperature range must not be exceeded. Doing so can damage the device and impair its function.</td>
</tr>
</tbody>
</table>

### Approvals

<table>
<thead>
<tr>
<th>UL/C-UL approval (Underwriters Laboratories)</th>
<th>CSA/CSA-NRTL approval (Canadian Standard Association)</th>
</tr>
</thead>
<tbody>
<tr>
<td>The certification procedure based on North American standards for electro-technical products facilitates market access. Cooperation agreements with UL guarantee recognition of the VDE inspection results and allow direct use for export business. Specialist support is provided by experts and a service team in the United States.</td>
<td>The certification procedure based on North American standards for electro-technical products facilitates market access. Cooperation agreements with the CSA guarantee recognition of the VDE inspection results and allow direct use for export business. Specialist support is provided by experts and a service team in North America.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>C-Tick</th>
<th>CCC approval for China</th>
</tr>
</thead>
<tbody>
<tr>
<td>In 2000, the Australian Communications Authority (ACA) convened an electromagnetic compatibility (EMC) review committee to discuss areas of deficiency identified during ACA’s course of management as well as from industry submissions. Fifteen recommendations were considered, and the law was changed in late 2001 to accommodate the most important proposals. The most significant change was the adoption of the list of International Special Committee on Radio Interference (CISPR), European Committee for Electrotechnical Standardization (CENELEC) and International Electrotechnical Commission (IEC) standards as mandatory ACA standards. This change better identifies the applicable mandatory standard for virtually any electrical product on the market.</td>
<td>The CCC mark is required for a wide range of products. The presence of the mark facilitates export to China and increases user acceptance. The VDE can obtain Chinese approvals upon presentation of CB documents with samples to the Chinese certification authority. In such cases, factory inspections are carried out by VDE inspectors acting on behalf of the Chinese certification authority. Specialist support is provided by experts and a service team on site.</td>
</tr>
</tbody>
</table>

### ATEX

<table>
<thead>
<tr>
<th>ATEX</th>
<th>CE identification</th>
</tr>
</thead>
<tbody>
<tr>
<td>ATEX is a European directive for explosion-proof devices. This directive is referred to as ATEX 95 and ATEX 100a; the abbreviation comes from the French term “Atmosphères Explosibles”.</td>
<td>All proximity sensors in this catalogue meet the requirements of European standards EN 60947-1 and EN 60947-5-2 and thus comply with the EMC Directive 89/336/EEC and the Low Voltage Directive 73/23/EEC. They therefore have a CE mark.</td>
</tr>
</tbody>
</table>

Primary explosion protection describes measures that prevent the formation of an explosive atmosphere. Secondary explosion protection, on the other hand, prevents ignition of an explosive atmosphere. The latter is used for operating components.
### Technical information

#### Sensors

**Protection classes**

The IP protection classes are defined in DIN 40050 / IEC 60529.

<table>
<thead>
<tr>
<th>Code number</th>
<th>Description</th>
<th>Test conditions</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>First digit</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>The housing provides complete protection against contact with live or moving parts within the housing as well as complete protection against the entry of dust.</td>
<td>–</td>
</tr>
<tr>
<td><strong>Second digit</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>– 4</td>
<td>Protection against splashed water: Water splashing against the housing from any angle must not have any harmful effect.</td>
<td>Spray with washing pipe or swivelling spray nozzle; water pressure: 1 bar; flow rate: 10 l/min ±5%; duration: 5 min</td>
</tr>
<tr>
<td>– 5</td>
<td>Protection against water jets: A water jet from a nozzle, which is directed at the housing from any angle under specified conditions, must not have any harmful effect.</td>
<td>Nozzle with a diameter of 6.3 mm; flow rate: 12.5 l/min. ±5%; distance: 3 m; duration: 3 min</td>
</tr>
<tr>
<td>– 7</td>
<td>Protection against water when the device is immersed in water under specified pressure and time conditions. Water must not enter the equipment in harmful amounts. Devices with protection class IP67 are thus not intended for continuous operation in water and in a continuously wet state. Compatibility with liquids other than water must be examined on a case-by-case basis.</td>
<td>Immersion depth in water: 1 m; duration: 30 min</td>
</tr>
<tr>
<td>– 8</td>
<td>The purpose and definition of the test are similar to those of class 7. The conditions differ only with respect to the duration.</td>
<td>The test is similar to that carried out for class 7, but the duration of the test must be more than 30 minutes. Given the fact that the conditions for class 8 are fulfilled with any test duration &gt;30 min, the duration can be defined by person who initiates the test, with the result that the total immersion time varies from product to product and from company to company. The respective duration must be specified for all products in the technical data. Festo IP68 is currently based on a test duration of 24 hours.</td>
</tr>
<tr>
<td>– 9k</td>
<td>Protection against water directed at the housing from any angle under high pressure. Spraying with water under these conditions must not have any damaging effects.</td>
<td>Sensor mounted on table that rotates at a speed of 5 ±1 rpm; spraying with fan nozzle; flow rate: 14 ... 16 l/min; distance: 100 ... 150 mm; angle: 0°, 30°, 60° and 90°; temperature: 80 ±5 °C; pressure: 8,000 ... 10,000 kPa (80 ... 100 bar); duration: 30 s per position.</td>
</tr>
</tbody>
</table>
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<td>CRSMBR, Mounting kit, corrosion resistant, for proximity sensor SMEO/SMT0-4</td>
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<td>– Limit switch attachments, square design</td>
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<td>HB..., Foot mounting for inductive proximity sensor</td>
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<td>HMSV-12, Connecting kit for Checkbox CHB-C, Compact</td>
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<td>HV, Mounting bracket for inductive proximity sensor</td>
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<td>KDI, Programming cable for Checkbox CHB-C, Compact</td>
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<td>KM12, Connecting cable, 8-pin</td>
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<td>KM12-DUO, DUO cable for Checkbox CHB-C, Compact</td>
<td>500</td>
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<tr>
<td>KM12-M12, Connecting cable for Checkbox CHB-C, Compact</td>
<td>500</td>
</tr>
<tr>
<td>N</td>
<td></td>
</tr>
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<td>NEAU – Safety clip, For connecting cables</td>
<td>545</td>
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