

## Pressure sensors SPAE

**FESTO**



## Key features

### At a glance

- Single-button operation
- 7-segment display
- Various pneumatic connection options
- Choice of pressure ranges
- Switching status indication



### Function

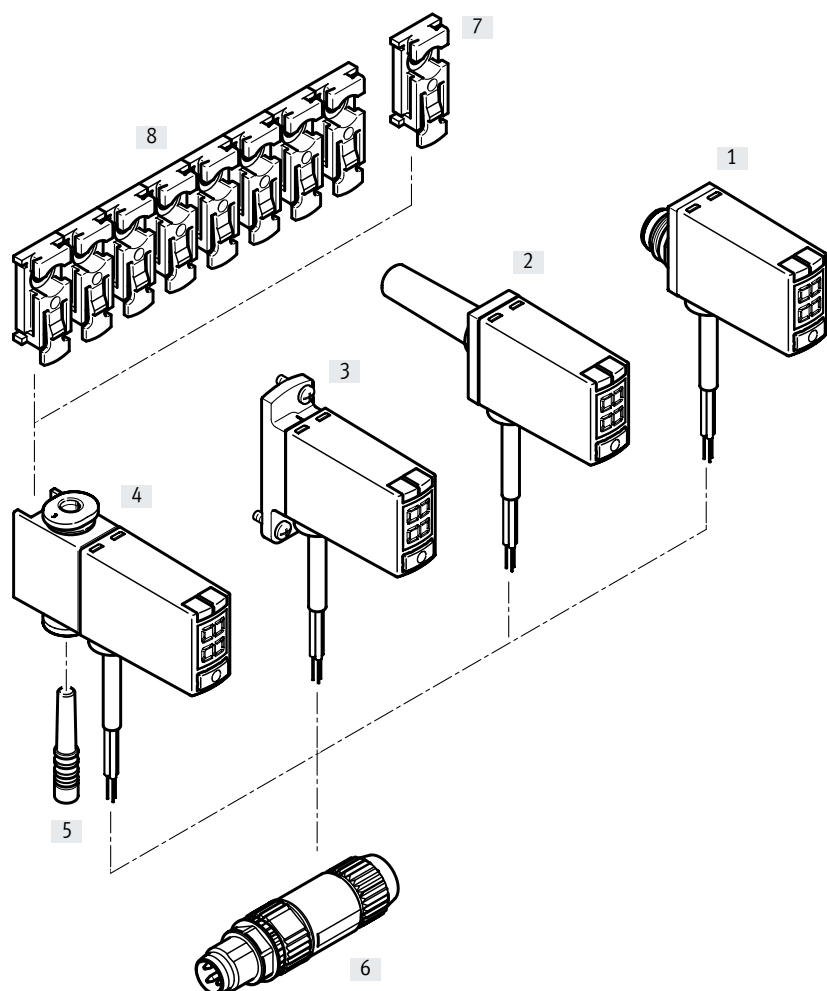
The SPAE is an electronic pressure sensor with piezoresistive pressure measuring cell, integrated signal processing, pressure indicator with percentage, control button and a switching output, PNP/NPN switchable. Two switching signals and the measured value can be transmitted via IO-Link.

- The sensor can be set using the key and display or alternatively using IO-Link or teach-in
- Switching functions: threshold value or window comparator
- Switching logic: normally open (NO) or normally closed (NC)
- Threshold values and hysteresis are adjustable
- Display of minimum and maximum measured values
- Display can be rotated and switched off
- Protection against tampering using security code
- All parameters that have been input can be transferred to other SPAE (replicator function)

| Measurement method             | Pressure measuring range | Measured variable | Pneumatic connection   | Output                      | Electrical connection  |
|--------------------------------|--------------------------|-------------------|------------------------|-----------------------------|------------------------|
|                                | [bar]                    |                   |                        |                             |                        |
| Piezoresistive pressure sensor | -1 ... +1<br>0 ... -1    | Relative pressure | Cartridge 10 mm        | PNP/NPN switchable, IO-Link | Cable, 3-wire open end |
|                                |                          |                   | Push-in sleeve 4 mm    |                             |                        |
|                                |                          |                   | Push-in sleeve 6 mm    |                             |                        |
|                                |                          |                   | Push-in connector 3 mm |                             |                        |
|                                |                          |                   | Push-in connector 4 mm |                             |                        |
|                                |                          |                   | Flange                 |                             |                        |
|                                | 0 ... 10                 |                   | Cartridge 10 mm        |                             |                        |
|                                |                          |                   | Push-in sleeve 4 mm    |                             |                        |
|                                |                          |                   | Push-in sleeve 6 mm    |                             |                        |
|                                |                          |                   | Push-in connector 3 mm |                             |                        |
|                                |                          |                   | Push-in connector 4 mm |                             |                        |
|                                |                          |                   | Flange                 |                             |                        |

**Note**  
The version with 10 mm cartridge is designed for the vacuum generator OVEL.

Peripherals overview



| Accessories |   | → Page/Internet |
|-------------|---|-----------------|
| [1]         | Pressure sensor SPAE-...-PC10...                                      | 5               |
| [2]         | Pressure sensor SPAE-...-S...   | 5               |
| [3]         | Pressure sensor SPAE-...-F...   | 5               |
| [4]         | Pressure sensor SPAE-...-Q...   | 5               |
| [5]         | Blanking plug<br>(included in the scope of delivery of SPAE-...-Q...) | qs              |
| [6]         | Plug NECU-S-M8G3-HX-Q3  | 10              |
| [7]         | Mounting clip SAMH-PE-MC-1  | 10              |
| [8]         | Mounting clip SAMH-PE-MC-8  | 10              |

## Type codes

|             |                  |  |
|-------------|------------------|--|
| <b>001</b>  | Baureihe         |  |
| <b>SPAE</b> | Drucksensor SPAE |  |

|            |                  |  |
|------------|------------------|--|
| <b>002</b> | Druckmessbereich |  |
| <b>P10</b> | 0 ... 10 bar     |  |
| <b>V1</b>  | 0 ... -1 bar     |  |
| <b>B2</b>  | -1 ... 1 bar     |  |

|            |              |  |
|------------|--------------|--|
| <b>003</b> | Druckeingang |  |
| <b>R</b>   | Relativdruck |  |

|             |                         |  |
|-------------|-------------------------|--|
| <b>004</b>  | Pneumatischer Anschluss |  |
| <b>S4</b>   | Steckhülse 4 mm         |  |
| <b>S6</b>   | Steckhülse 6 mm         |  |
| <b>Q3</b>   | Steckanschluss 3mm      |  |
| <b>Q4</b>   | Steckanschluss 4 mm     |  |
| <b>F</b>    | Flansch/Anschlussplatte |  |
| <b>PC10</b> | Cartridge 10 mm         |  |

|             |                        |  |
|-------------|------------------------|--|
| <b>005</b>  | Elektrischer Ausgang 1 |  |
| <b>PNLK</b> | PNP/NPN/IO-Link        |  |

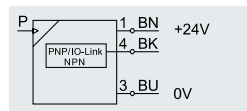
|             |                           |  |
|-------------|---------------------------|--|
| <b>006</b>  | Elektrischer Anschluss    |  |
| <b>2.5K</b> | Kabel 2,5 m, offenes Ende |  |




 **Note**

Pressure measuring range: Additional pressure ranges on request (batch size 80)

## Data sheet

### Function



-  Voltage  
18 ... 30 V DC
-  Pressure measuring range  
-1 ... +10 bar
-  Temperature range  
0 ... +50°C



| General technical data                       |                                   |
|--|-----------------------------------|
| Certification                                | RCM<br>c UL us - Recognized (OL)  |
| Degree of protection                         | IP40                              |
| Note on materials                            | RoHS-compliant                    |
| Corrosion resistance class CRC <sup>1)</sup> | 2                                 |
| CE marking (see declaration of conformity)   | To EU EMC Directive <sup>2)</sup> |

- 1) Corrosion resistance class CRC 2 to Festo standard FN 940070  
Moderate corrosion stress. Indoor applications in which condensation can occur. External visible parts with primarily decorative surface requirements which are in direct contact with a normal industrial environment.
- 2) For information about the area of use, see the EC declaration of conformity at: [www.festo.com/catalogue/...](http://www.festo.com/catalogue/...) → Support/Downloads.  
If the devices are subject to usage restrictions in residential, commercial or light-industrial environments, further measures for the reduction of the emitted interference may be necessary.

| Input signal for measuring element         | V1R   | B2R | P10R |
|--|---|-----|------|
| Measured variable                          | Relative pressure                           |     |      |
| Measurement method                         | Piezoresistive pressure sensor with display |     |      |
| Pressure measuring range start value [bar] | 0   | -1  | 0    |
| Pressure measuring range end value [bar]   | -1  | 1   | 10   |
| Max. overload pressure [bar]               | 5   | 5   | 15   |
| Operating medium                           | Compressed air to ISO 8573-1:2010 [7:4:4]   |     |      |
| Note on the operating/pilot medium         | Lubricated operation possible               |     |      |
| Temperature of medium [°C]                 | 0 ... +50                                   |     |      |
| Ambient temperature [°C]                   | 0 ... +50                                   |     |      |

| Signal processing |         |
|-------------------|---------|
| Resolution ADC    | 10 bits |

| Output, general                  |                         |  |
|----------------------------------|-------------------------|--|
| Accuracy [% FS]                  | 1.5 at room temperature |  |
| Repetition accuracy [% FS]       | 0.3                     |  |
| Temperature coefficient [% FS/K] | Typically 0.05          |  |

| Switching output             |                                |  |
|------------------------------|--------------------------------|--|
| Switching output             | PNP/NPN, switchable            |  |
| Switching function           | Freely programmable            |  |
| Switching element function   | N/C or N/O contact, switchable |  |
| Switch-on time [ms]          | 1                              |  |
| Switch-off time [ms]         | 1                              |  |
| Max. output current [mA]     | 100                            |  |
| Short circuit current rating | Yes                            |  |

## Data sheet

| Measured value display    |           |
|---------------------------|-----------|
| Display range start value | [% FS] 0  |
| Display range end value   | [% FS] 99 |

| Communication interface           |                                      |
|-----------------------------------|--------------------------------------|
| Protocol                          | IO-Link                              |
| IO-Link, protocol version         | Device V 1.1                         |
| IO-Link, profile                  | Smart sensor profile                 |
| IO-Link, function classes         | Binary data channel (BDC)            |
|                                   | Diagnostics                          |
|                                   | Identification                       |
|                                   | Process data variable (PDV)          |
|                                   | Teach channel                        |
| IO-Link, communication mode       | COM2 (38.4 kBd)                      |
| IO-Link, port class               | A                                    |
| IO-Link, process data width OUT   | 0 byte                               |
| IO-Link, process data width IN    | 2 bytes                              |
| IO-Link, process data contents IN | 2 bit BDC (pressure monitoring)      |
|                                   | 14 bit PDV (pressure measured value) |
| IO-Link, minimum cycle time       | [ms] 3                               |
| IO-Link, SIO mode support         | Yes                                  |
| IO-Link, data memory required     | 0.5 KB                               |

| Electronics                 |                                |
|-----------------------------|--------------------------------|
| Operating voltage range DC  | [V] 18 ... 30                  |
| Reverse polarity protection | For all electrical connections |

| Electromechanical systems |                        |
|---------------------------|------------------------|
| Electrical connection     | Cable, 3-wire open end |
| Cable length              | [m] 2.5                |

| Mechanical system    | S4             | S6             | Q3               | Q4  | F                      | PC10                |
|----------------------|----------------|----------------|------------------|-----|------------------------|---------------------|
| Type of mounting     | Plug-in        |                | With accessories |     | Through-hole and screw | Pin-type connection |
| Mounting position    | Any            |                |                  |     |                        |                     |
| Pneumatic connection | Push-in sleeve | Push-in sleeve | QS3              | QS4 | Flange                 | Cartridge 10 mm     |
|                      | QS-4           | QS-6           |                  |     |                        |                     |

| Mechanical system, general       |               |
|----------------------------------|---------------|
| Product weight                   | [g] 40        |
| Information on housing materials | Reinforced PA |

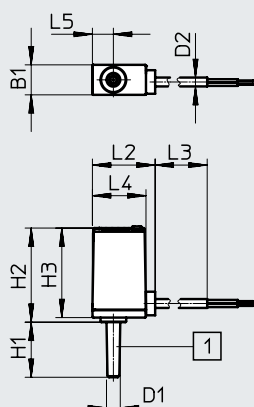
| Display/operation             |   |
|-------------------------------|---|
| Display type                  | LED display, 2-digit                    |
| Displayable units             | % FS                                    |
| Switching status indication   | Yellow LED                              |
| Setting options               | Via display and keys, teach-in, IO-Link |
| Threshold value setting range | [%] 1 ... 98                            |
| Protection against tampering  | PIN code                                |

## Data sheet

### Dimensions

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

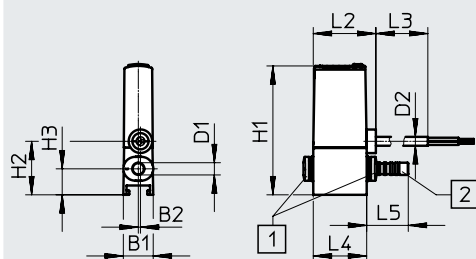
SPAE...S.....



[1] Supply port, push-in sleeve  
for SPAE-S4  
for SPAE-S6

| Type             | B1  | D1<br>∅ | D2<br>∅ | H1 | H2   | H3   | L2   | L3   | L4   | L5  |
|------------------|-----|---------|---------|----|------|------|------|------|------|-----|
| SPAE-V1R-S4-...  | 9.8 | 4       | 2.9     | 18 | 30.8 | 29.3 | 20.5 | 2500 | 17.5 | 6.9 |
| SPAE-V1R-S6-...  |     | 6       |         | 21 |      |      |      |      |      |     |
| SPAE-P10R-S4-... |     | 4       |         | 18 |      |      |      |      |      |     |
| SPAE-P10R-S6-... |     | 6       |         | 21 |      |      |      |      |      |     |

SPAE...Q.....



[1] Supply port on both sides  
for SPAE-Q3 / QSIK-M-3-X  
for SPAE-Q4 / QSIK-M-4-X  
[2] Blanking plug  
for SPAE-Q3 / QSMC-3H  
for SPAE-Q4 / QSC-4H  
supplied

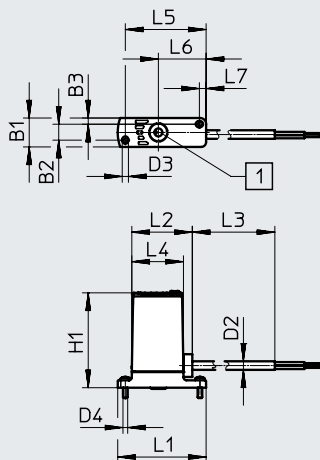
| Type             | B1  | B2  | D1<br>∅ | D2<br>∅ | H1  | H2   | H3  | L2   | L3   | L4   | L5   |
|------------------|-----|-----|---------|---------|-----|------|-----|------|------|------|------|
| SPAE-V1R-Q3-...  | 9.8 | 0.7 | 3       | 2.9     | ~42 | 17.5 | 8.5 | 20.5 | 2500 | 17.5 | 13.6 |
| SPAE-V1R-Q4-...  |     |     | 4       |         |     |      |     |      |      |      | 16.6 |
| SPAE-P10R-Q3-... |     |     | 3       |         |     |      |     |      |      |      | 13.6 |
| SPAE-P10R-Q4-... |     |     | 4       |         |     |      |     |      |      |      | 16.6 |

Data sheet

Dimensions

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

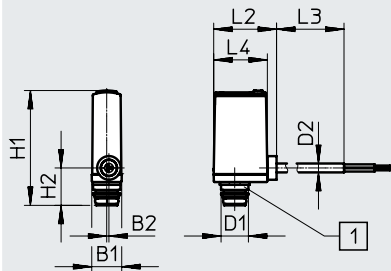
SPAE...F...



[1] Supply port with O-ring for flat mounting with SPAE-F

| Type           | B1  | B2   | B3  | D2<br>∅ | D3<br>∅ | D4   | H1  | L1 | L2   | L3   | L4   | L5 | L6   | L7  |
|----------------|-----|------|-----|---------|---------|------|-----|----|------|------|------|----|------|-----|
| SPAE-V1R-F...  | 9.8 | ~5.4 | 2.1 | 2.9     | 2.1     | M2x6 | ~32 | 30 | 20.5 | 2500 | 17.5 | 25 | 13.9 | 2.3 |
| SPAE-P10R-F... |     |      |     |         |         |      |     |    |      |      |      |    |      |     |

SPAE...PC10...










[1] Supply port: pin-type cartridge 10 mm with SPAE-PC-10

| Type              | B1  | B2  | D1<br>∅ | D2<br>∅ | H1    | H2   | L2   | L3   | L4   |
|-------------------|-----|-----|---------|---------|-------|------|------|------|------|
| SPAE-V1R-PC10-... | 9.8 | 0.7 | 8.9     | 2.9     | ~37.5 | 12.2 | 20.5 | 2500 | 17.5 |
| SPAE-B2R-PC10-... |     |     |         |         |       |      |      |      |      |



## Data sheet

| Ordering data   | Pressure measuring range <sup>1)</sup>  | Pneumatic connection   | Electrical connection  | Part no.                     | Type                           |                                |
|---|---|--|------------------------|------------------------------|--------------------------------|--------------------------------|
|  | 0 ... -1 bar  | Push-in sleeve 4 mm  | Cable, 3-wire open end | <b>8001440</b>               | <b>SPAE-V1R-S4-PNLK-2.5K</b>   |                                |
|   |   | Push-in sleeve 6 mm  |                        | <b>8001441</b>               | <b>SPAE-V1R-S6-PNLK-2.5K</b>   |                                |
|  |   | Push-in connector 3 mm   |                        | <b>8001442</b>               | <b>SPAE-V1R-Q3-PNLK-2.5K</b>   |                                |
|   |   | Push-in connector 4 mm   |                        | <b>8001443</b>               | <b>SPAE-V1R-Q4-PNLK-2.5K</b>   |                                |
|  |   | Flange   |                        | <b>8001444</b>               | <b>SPAE-V1R-F-PNLK-2.5K</b>    |                                |
|   |   |   |                        | Cartridge 10 mm              | <b>8025978</b>                 | <b>SPAE-V1R-PC10-PNLK-2.5K</b> |
| 0 ... 10 bar  |   |  |                        | Push-in sleeve 4 mm          | <b>8001445</b>                 | <b>SPAE-P10R-S4-PNLK-2.5K</b>  |
|   |   | Push-in sleeve 6 mm  |                        | <b>8001446</b>               | <b>SPAE-P10R-S6-PNLK-2.5K</b>  |                                |
|   |   |   |                        | Push-in connector 3 mm       | <b>8001447</b>                 | <b>SPAE-P10R-Q3-PNLK-2.5K</b>  |
|   |   |  |                        | Push-in connector 4 mm       | <b>8001448</b>                 | <b>SPAE-P10R-Q4-PNLK-2.5K</b>  |
|   |  | Flange   | <b>8001449</b>         | <b>SPAE-P10R-F-PNLK-2.5K</b> |                                |                                |
|   |   |  | Cartridge 10 mm        | <b>8025979</b>               | <b>SPAE-B2R-PC10-PNLK-2.5K</b> |                                |
|   | -1 ... 1 bar  |  |                        |                              |                                |                                |

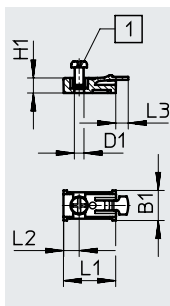
1) Additional pressure ranges on request (batch size 80)

## Accessories

### Mounting clip SAMH-PE-MC-1

Material:  
POM

Note on materials:  
RoHS-compliant



[1] M3x6 screw (included in the scope of delivery)

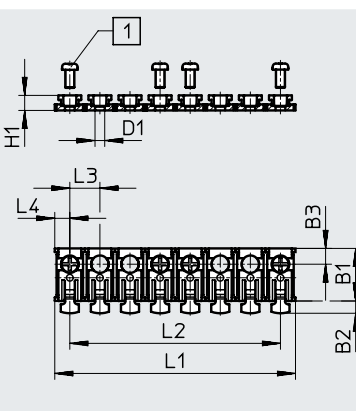
#### Dimensions and ordering data

| B1 | D1<br>∅ | H1 | L1   | L2  | L3 | Part no. | Type         |
|----|---------|----|------|-----|----|----------|--------------|
| 10 | 3.2     | 5  | 17.5 | 5.3 | 4  | 571489   | SAMH-PE-MC-1 |

### Mounting clip SAMH-PE-MC-8

Material:  
POM

Note on materials:  
RoHS-compliant



[1] M3x6 screw (4 included in the scope of delivery)

#### Note

The mounting clip SAMH-PE-MC-8 can be shortened by the user to the required number of slots.

#### Dimensions and ordering data

| B1   | B2 | B3  | D1<br>∅ | H1 | L1 | L2 | L3 | L4 | Part no. | Type         |
|------|----|-----|---------|----|----|----|----|----|----------|--------------|
| 17.5 | 4  | 5.3 | 3.2     | 5  | 80 | 70 | 10 | 5  | 571490   | SAMH-PE-MC-8 |

#### Ordering data – Plugs

|  | Electrical connection   | Part no. | Type              |
|--|---|----------|-------------------|
|  | Plug M8x1, 3-pin, straight, insulation displacement connector | 564945   | NECU-S-M8G3-HX-Q3 |
|  | Straight plug, 4-pin, straight, screw terminal                | 192008   | SEA-4GS-7-2.5     |