Pressure sensor SPAN

1 Product description
The operating instructions describe the entire function range. The function range is limited, depending on the product variant.

Note
You can find detailed specifications for the product, the device description file (IODD) with a description of the IO-Link parameters and the declaration of conformity at: www.festo.com/sp.

1.1 Overview

1 Display
2 Electrical connection
3 Pneumatic connection
4 B-key
5 Edit button
6 A-key

Note
In Fig. 1, representation of other variants can deviate from this.

1.2 Characteristics

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Value</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type</td>
<td>SPAN</td>
<td>Pressure sensor</td>
</tr>
<tr>
<td>Pressure measuring range</td>
<td>B2, B11, P025, P05, P1-P2, P6, P10, P12, P16, V025, V05, V1</td>
<td>Technical data</td>
</tr>
<tr>
<td>Supply port</td>
<td>R</td>
<td>Relative pressure</td>
</tr>
<tr>
<td>Pneumatic port</td>
<td>G1/8, R1/8, N1/8, M5, QA</td>
<td>Thread G1/4, R1/4, NPT1/4, M5 Push-in connector 4 mm</td>
</tr>
<tr>
<td>Thread type</td>
<td>M/F</td>
<td>None       Male thread      Female thread</td>
</tr>
<tr>
<td>Electrical output 1</td>
<td>PNP</td>
<td>Switching output PNP / NPN / IO-Link PNP / NPN</td>
</tr>
<tr>
<td>Electrical output 2</td>
<td>-PNVBA</td>
<td>PNP / NPN / 0…10 V / 1…5 V / 4…20 mA PNP / NPN</td>
</tr>
<tr>
<td>Electrical connection</td>
<td>L1</td>
<td>Plug connector, design L1</td>
</tr>
<tr>
<td>Certificate</td>
<td>+T</td>
<td>Without Without With inspection report</td>
</tr>
</tbody>
</table>

2 Safety
Intended use
The pressure sensor SPAN is intended for monitoring pressure of compressed air and inert gases in the piping.

General safety information
- Only use the product in its original status, without any unauthorised modifications.
- Only use the product if it is in an excellent technical status.
- The product is intended for use in industrial environments. Measures may need to be implemented in residential areas for radio interference suppression.
- Take into consideration the ambient conditions at the location of use.
- Operate the product only with compressed air of the specified air quality class (Technical data).
- Observe the specifications on the rating plate.
- Comply with all applicable national and international regulations.

Disposal
- Observe the local specifications for environmentally friendly disposal.

3 Function and application
The sensor converts pneumatic pressure values (relative pressure) into electrical signals, which can be used for control or regulating functions. Measurements are carried out using a piezoresistive sensor element with a following electronic evaluation unit. Interfacing to the higher-level system is provided by 1 or 2 switching outputs, an optional analogue output and an optional IO-Link interface. The switching outputs can be configured for monitoring of a threshold value, a pressure range or a differential pressure. The outputs can be set as PNP or NPN and normally open (NO) or normally closed (NC). Via the IO-Link interface, process values can be read out and parameters changed and transmitted to additional devices.

3.1 Operating statuses

<table>
<thead>
<tr>
<th>Operating status</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>RUN mode</td>
<td>Basic status after the operating voltage is switched on</td>
</tr>
<tr>
<td></td>
<td>- Display of the current measured value</td>
</tr>
<tr>
<td>SHOW mode</td>
<td>Display of the current settings</td>
</tr>
<tr>
<td>EDIT mode</td>
<td>- Setting or modification of parameters</td>
</tr>
<tr>
<td>TEACH mode</td>
<td>- Acceptance of the current measured value to determine switching points</td>
</tr>
</tbody>
</table>

Fig. 3

3.2 Switching functions

Threshold value comparator for monitoring of a pressure threshold

<table>
<thead>
<tr>
<th>Function</th>
<th>NO (normally open)</th>
<th>NC (normally closed)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Switching function:</td>
<td>- 1 switching point (SP)</td>
<td></td>
</tr>
<tr>
<td>TEACH mode:</td>
<td>- 2 teach-in points (TP1, TP2)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- SP = ½ (TP1+TP2)</td>
<td></td>
</tr>
</tbody>
</table>

Fig. 4

Window comparator for monitoring of a pressure range

<table>
<thead>
<tr>
<th>Function</th>
<th>NO (normally open)</th>
<th>NC (normally closed)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Switching function:</td>
<td>- 2 Switching points (SPLO, SPHI)</td>
<td></td>
</tr>
<tr>
<td>TEACH mode:</td>
<td>- 2 teach in points (TP1, TP2)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- TP1 = SPLO, TP2 = SPHI</td>
<td></td>
</tr>
</tbody>
</table>

Fig. 5

Auto difference monitoring d|p|

This function permits monitoring of a pressure value for constancy. If the applied pressure is constant in the range between [SPLO] and [SPHI], the pressure difference [d|p] is automatically determined. The result is a switching operation at the output. The signal change signals the start of pressure monitoring.

If the pressure remains in the monitoring range [d|p] around PRef, the pressure is stable. When the monitoring range is left (e.g. caused by a leakage in the system), the output switches back.
Reference value is determined
Measured value deviates by [d.SP] from the reference value
Monitoring area

The parameters [SP.Lo], [SP.Hi], [t.Obs] and [d.SP] can be configured by the user. The greater [t.Obs] is set, the more constant the pressure signal must be to establish the reference value PRef.

<table>
<thead>
<tr>
<th>Function</th>
<th>NO (normally open)</th>
<th>NC (normally closed)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Switching function:</td>
<td>Out</td>
<td>+24 V DC</td>
</tr>
<tr>
<td>− 1 switching points (SPLo, SPHi) for setting the valid work range</td>
<td>SPLo</td>
<td>PRef</td>
</tr>
<tr>
<td>− 1 switching point (d.SP) for determination of the monitoring area</td>
<td>SPLo</td>
<td>PRef</td>
</tr>
<tr>
<td>TEACH mode1):</td>
<td>SPLo</td>
<td>PRef</td>
</tr>
<tr>
<td>− 2 teach-in points (TP1, TP2)</td>
<td>TP1 = SPLo, TP2 = SPHi</td>
<td></td>
</tr>
</tbody>
</table>

1) SP.Lo = smaller pressure value, SP.Hi = larger pressure value, independent of the Teach sequence

4 Installation

Note

Installation and commissioning are to be carried out only by qualified personnel in accordance with the operating instructions.

- Remove all transport packaging. The material used in the packaging has been specifically chosen for its recyclability.

4.1 Mechanical and pneumatic

Note

An unfavourable mounting position can impair the function of the product.
- Mount the sensor so that no condensate from the compressed air lines can gather in the device.
- Install the sensor so that it cannot be heated above the maximum permissible operating temperature (plan for convection possibilities).

<table>
<thead>
<tr>
<th>SPAN-...-G18M/R18M/N18M</th>
</tr>
</thead>
<tbody>
<tr>
<td>− Seal connecting thread.</td>
</tr>
</tbody>
</table>

Mounting bracket

Max. 10 Nm

Fig. 8 Example with G18M

4.2 Electrical

Warning

Use only power sources which guarantee reliable electrical isolation of the operating voltage in accordance with IEC/EN 60204-1. Consider also the general requirements for PELV circuits in accordance with IEC/EN 60204-1.

- Connect sensor.
  - Consider the maximum permissible line length: 30 m (20 m for IO-Link).

Pin | Colour1) | Allocation | Plug L1
---|----------|------------|-----
1 | Brown (BN) | Operating voltage +24 V DC | 1 2 3 4
2 | Black (BK) | Switching output OutA or IO-Link (C/Q line) |
3 | White (WH) | Switching output OutB or analogue output (pressure signal InA) |
4 | Blue (BU) | 0 V |

1) Colours apply for connecting cables NEBS-L1... or electrical adapter SASC-P4... with NEBU-MR...

Circuit diagrams

Front panel use SAMH-PN-F
- Size of the front panel cut-out in mm Fig. 10.
- Fasten panel frame to the sensor.
- Guide sensor from the front into the cut-out on the front panel.
- Attach the clamping element and press until it catches.

Fig. 10

Fig. 11

4.2 Electrical

Warning

Use only power sources which guarantee reliable electrical isolation of the operating voltage in accordance with IEC/EN 60204-1. Consider also the general requirements for PELV circuits in accordance with IEC/EN 60204-1.

- Connect sensor.
  - Consider the maximum permissible line length: 30 m (20 m for IO-Link).

Pin | Colour1) | Allocation | Plug L1
---|----------|------------|-----
1 | Brown (BN) | Operating voltage +24 V DC | 1 2 3 4
2 | Black (BK) | Switching output OutA or IO-Link (C/Q line) |
3 | White (WH) | Switching output OutB or analogue output (pressure signal InA) |
4 | Blue (BU) | 0 V |

1) Colours apply for connecting cables NEBS-L1... or electrical adapter SASC-P4... with NEBU-MR...

Fig. 12

Circuit diagrams
5 Commissioning

5.1 LCD display

Example for LCD display

<table>
<thead>
<tr>
<th>Output display</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>InA</td>
<td>Spec</td>
</tr>
<tr>
<td>[bin]</td>
<td>[Fctn]</td>
</tr>
<tr>
<td>Status information / signal indicator</td>
<td></td>
</tr>
<tr>
<td>[Lock]</td>
<td>Security code activated ( Chap. 5.6)</td>
</tr>
<tr>
<td>[Spec]</td>
<td>Special menu selected ( Chap. 5.6)</td>
</tr>
<tr>
<td>[InA]</td>
<td>Pressure signal InA or analogue signal is selected</td>
</tr>
<tr>
<td>IIIII</td>
<td>Graphic bar graph in the lower display (Sub.d)</td>
</tr>
</tbody>
</table>

5.2 Switch on sensor (RUN mode)

- Switch on the operating voltage.
- Current measured value is displayed. The sensor is in the basic status (RUN mode).

The basic status can be reached from other modes by:
- pressing edit button for 3 seconds
- expiration of a monitoring time (Timeout)

5.3 Displaying parameters (SHOW mode)

Requirement: The sensor is ready for operation (RUN mode).

Switching output OutA
- Press A-key.
- The first parameter set is displayed, [Fctn] flashes.

The subsequent parameters can be displayed by repeatedly pressing the A key (Fig. 18).
- At the end, the min. and max. values are displayed. This can be reset with the Edit key.

Switching output OutB or analogue output for pressure signal InA
- Press B-key.
- The first parameter set is displayed, [Fctn] with OutB or [Out] with InA flashes.

The subsequent parameters can be displayed by repeatedly pressing the B-key (Fig. 18).

Example for LCD display

<table>
<thead>
<tr>
<th>Main display</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>Main display (e.g. measured value)</td>
<td></td>
</tr>
<tr>
<td>Lower display (e.g. unit)</td>
<td></td>
</tr>
<tr>
<td>Signal indicator</td>
<td></td>
</tr>
</tbody>
</table>

Example for LCD display

<table>
<thead>
<tr>
<th>Output display</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>InA</td>
<td>Spec</td>
</tr>
<tr>
<td>[bin]</td>
<td>[Fctn]</td>
</tr>
<tr>
<td>Menu for the switching outputs (OutA and OutB)</td>
<td></td>
</tr>
<tr>
<td>[Edit]</td>
<td>[bin]</td>
</tr>
<tr>
<td>[Fctn]</td>
<td>Determination of the switching function: threshold value comparator</td>
</tr>
<tr>
<td>[OUT]</td>
<td>Determination of the switching function: window comparator</td>
</tr>
<tr>
<td>[1.80]</td>
<td>[SP]</td>
</tr>
<tr>
<td>[2.45]</td>
<td>[SPLO]</td>
</tr>
<tr>
<td>[6.45]</td>
<td>[SPHI]</td>
</tr>
<tr>
<td>[0.50]</td>
<td>[HY]</td>
</tr>
<tr>
<td>[0.25]</td>
<td>[d.SP]</td>
</tr>
<tr>
<td>[NO]</td>
<td>[LOGC]</td>
</tr>
<tr>
<td>[Extreme values (only SHOW mode)]</td>
<td></td>
</tr>
<tr>
<td>[1.64]</td>
<td>[MIN]</td>
</tr>
<tr>
<td>[6.50]</td>
<td>[MAX]</td>
</tr>
</tbody>
</table>

Menu of the pressure signal (InA)

| Edit | [ANG] | Edit menu for the analogue output |
| [1...5] | [Out]/[V] | Output function of the analogue output |
| (9) | [In.MHI] | Scaling of the analogue output in percent of the final value of the pressure measuring range (FS - full scale) |
| [3] | [In.LO] | Scaling of the analogue output in percent of the initial value of the pressure measuring range (offset) |

Menu for device settings (Spec)

| Edit | [MENU] | Edit menu for additional settings |
| [16] | [Filt] | Value of the filter time constant for the pressure measurement signal |
| [bar] | [Unit] | Unit for the pressure indicator |

Menu of the pressure signal (OutA)

| [OFF] | [Z.AdJ] | [OFF] = zero point synchronisation (zero adjust) deactivated |
| [Unit] | [Sub.d] | Settings of the lower display in RUN mode: selected unit or switching point of OutA or bar graph |
| [40] | [Eco] | Economy mode: period after which the display background lighting is switched off |
| [PNP] | [BIN]/[OUT] | Shift of the switching outputs (binary) between PNP and NPN |
| [bin] | [PIN]/[OUT] | Shift between switching output (binary) and analogue output (InA) at Pin3 |
| [OFF] | [Code] | Activation and determination of the security code |

Measured value indicator (RUN mode)
5.4 Enter the security code (EDIT mode)

Requirement: The sensor is ready for operation (RUN mode).
1. Press the Edit button.
   ➔ The EDIT mode is active. If the security code is activated, the parameter entry option is blocked: [Lock] flashes.
2. Enter security code set with A or B key.
3. Press the Edit button briefly.
   ➔ [OutA] flashes. The parameter entry option is unblocked.

5.5 Configuring switching output (EDIT mode)

Note
The process is the same for configuring the switching outputs for OutA and OutB. In the following, the process is described using the switching output OutA.

Menu structure

Fig. 20.

Requirement: The sensor is ready for operation (RUN mode).

Set threshold value comparator _I_\(^{-}\), window comparator _I_\(^{-}\)\(^{-}\), auto difference monitoring d_\(^{-}\)\(^{-}\).
1. Press the Edit button briefly.
2. Press the Edit button briefly.
   ➔ [Fctn] flashes.
3. With A or B key, select _I_\(^{-}\) or _I_\(^{-}\)\(^{-}\) or d_\(^{-}\)\(^{-}\).
4. Press the Edit button briefly.
   ➔ The set value is saved.
5. Set parameters with A- or B-key.
6. Repeat points 4 and 5 until all parameters are set.
7. Press the Edit button.
   ➔ Switch to the RUN mode.

5.6 Change device settings (EDIT mode)

Requirement: The sensor is ready for operation (RUN mode).
1. Press the Edit button briefly.
2. With A or B key, select special menu [Spec].
   ➔ [Spec] flashes.
3. Press the Edit button briefly.
   ➔ [Filt] flashes.
4. Set parameters with A- or B-key.
5. Press the Edit button briefly.
   ➔ The set value is saved.
6. The next adjustable parameter is displayed.
7. Repeat points 4 and 5 until all parameters are set.
8. Press the Edit button.
   ➔ Switch to the RUN mode.

5.7 Set analogue output (EDIT mode)

Requirement: The sensor is ready for operation (RUN mode).
1. Press the Edit button briefly.
2. Select [InA] with the A-key or B-key.
   ➔ [Edit] appears. [InA] flashes.
3. Press the Edit button briefly.
4. Set parameters with A- or B-key.
5. Press the Edit button briefly.
   ➔ The set value is saved.
6. The next adjustable parameter is shown.
7. Repeat points 4 and 5 until all parameters are set.
8. Press the Edit button.
   ➔ Switch to the RUN mode.

5.8 Replicating parameters (EDIT mode)

Requirement:
– The pre-configured sensor (master sensor) is ready for operation (RUN mode).
– Master sensor and device sensor have the same design regarding the parameters (same device ID).
– The master sensor is connected with the device sensor (Fig. 19).
– Parameterisation of the device sensor must not be blocked via IO-Link®.
– The device sensor is in an unswitched status (switching output PNP, display OutA off).

Fig. 19

1. Select special menu [Spec] at the master sensor via device settings.
2. Press the Edit button briefly until [MASt] appears.
3. With A or B key, select [ON].
4. Press the Edit button.
5. Press A- or B-key.
   ➔ The parameters are transmitted to the device sensor.
   If an error occurs, an error message appears (Fig. 21).
6. Repeat point 5 if an additional sensor should be parameterised.
7. Press the Edit button briefly.
   ➔ Switch to the RUN mode.
5.9 Menu structure

Measured value indicator (RUN mode)

- OutA
- OutB
- InA
- Spec

<table>
<thead>
<tr>
<th>Fctn</th>
<th>d_Fctn</th>
<th>Fctn</th>
</tr>
</thead>
<tbody>
<tr>
<td>SP</td>
<td>SPLo</td>
<td>0...60...100 % FS</td>
</tr>
<tr>
<td>SPHi</td>
<td>SPHi</td>
<td>0...70...100 % FS</td>
</tr>
</tbody>
</table>

- Out
- In
- d_OUT

<table>
<thead>
<tr>
<th>Filt</th>
<th>0...10 V</th>
<th>0...5...10 V</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spec</td>
<td>4...20 mA</td>
<td></td>
</tr>
</tbody>
</table>

- Spec
- Out
- In

<table>
<thead>
<tr>
<th>Unit</th>
<th>bar, kPa, MPa, PSI, mmHG, inHG, kGF</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sub.d</td>
<td>bar, kPa, MPa, PSI, mmHG, inHG, kGF</td>
</tr>
</tbody>
</table>

- LOGC
- COLR

<table>
<thead>
<tr>
<th>d.SP</th>
<th>NO, NC</th>
</tr>
</thead>
</table>

- d.SP
- LOGC
- COLR

- d.SP
- NO, NC

- d.SP
- d.SP

- d.SP
- d.SP

- d.SP
- NO, NC

- d.SP
- NO, NC

- d.SP
- NO, NC

- d.SP
- NO, NC

- d.SP
- NO, NC

- d.SP
- NO, NC

- d.SP
- NO, NC

- d.SP
- NO, NC

- d.SP
- NO, NC

- d.SP
- NO, NC

- d.SP
- NO, NC

- d.SP
- NO, NC

- d.SP
- NO, NC

- d.SP
- NO, NC

- d.SP
- NO, NC

- d.SP
- NO, NC

- d.SP
- NO, NC

- d.SP
- NO, NC

- d.SP
- NO, NC

- d.SP
- NO, NC

- d.SP
- NO, NC

- d.SP
- NO, NC

- d.SP
- NO, NC

= Edit button

= A- or B-key

bold = factory setting

1) The values refer to the respective measuring range. The display takes place in the selected unit.
2) Not applicable with PN-PN variant
3) Not valid with -B2 and -B11 variant (factory setting ON)

Fig. 20

5.10 Zero point synchronisation (zero adjust)

Requirement:
- The sensor is ready for operation (RUN mode).
- [Z.AdJ] [ON] is set (Chap. 5.6).
- The measured value lies in the range 0 bar ± 3 % FS.

- Press the A- and B-key and Edit button simultaneously.
  - [OK] appears. The zero point synchronisation was successful.
  - [FAIL] appears. The zero point synchronisation was not successful. Check requirements.

Note
If [Z.AdJ] [OFF] is set for a later time, the device takes over the factory setting calibration values.

5.11 Teach switching points (TEACH mode)

Note
The process for teaching the switching outputs for OutA (A-key) and OutB (B-key) is the same. In the following, the process is described using the switching output OutA.

Note
There is no Timeout in the TEACH mode. The sensor changes to the RUN mode only after the entire teach process is ended.

Requirement: The sensor is ready for operation (RUN mode).
If the security code is activated, the parameter entry option is blocked: [Lock] flashes.
- Enter the security code (Chap. 5.4).

1. Establish switching function in the EDIT mode (Chap. 5.5).
2. Create pressure value 1.
3. Press the A-key and Edit button.
   - The current pressure value will then be adopted as the first teach point (TP1).
   - [t-IN] flashes.
4. Create pressure value 2.
5. Press the A-key and Edit button.
   - The current pressure value is adopted as the second teach point (TP2).
   - Switch to the RUN mode.

6 Operation

Caution
Property damage due to high temperatures.
Extreme pneumatic conditions (high cycle rate with large pressure amplitude) can heat the product above 80° C.
- Select the operating conditions (in particular the ambient temperature, pressure amplitude, cycle rate, current consumption) such that the product does not heat up above the maximum permitted operating temperature.

Restoring factory settings (restore)

Note
By resetting to factory settings, the current settings are lost.

1. Switch off the operating voltage.
2. Keep the A- and B-keys pressed down simultaneously.
3. Switch on the operating voltage.
4. Additionally press the Edit button.
   - [Rsto] [PARM] appears. All parameters are reset to the factory settings (Fig. 20).

7 Maintenance and care

1. Switch off the energy sources (operating voltage, compressed air).
2. Clean sensor with non-abrasive cleaning agents.

8 Disassembly

1. Switch off the energy sources (operating voltage, compressed air).
2. Separate connections from the sensor.
3. Loosen the mountings.
### 9 Fault clearance

<table>
<thead>
<tr>
<th>Malfunction</th>
<th>Possible cause</th>
<th>Remedy</th>
</tr>
</thead>
<tbody>
<tr>
<td>No display</td>
<td>No operating voltage or impermissible operating voltage</td>
<td>Apply permissible operating voltage</td>
</tr>
<tr>
<td></td>
<td>Electrical connections swapped</td>
<td>Connect the device in accordance with the circuit diagram</td>
</tr>
<tr>
<td></td>
<td>Device defective</td>
<td>Replace device</td>
</tr>
<tr>
<td>Display or switching output does not react in accordance with the settings</td>
<td>Short circuit or overload at the output</td>
<td>Eliminate short circuit or overload</td>
</tr>
<tr>
<td></td>
<td>Incorrect switching point taught (e.g. at 0 bar)</td>
<td>Repeat teaching procedure</td>
</tr>
<tr>
<td></td>
<td>Device defective</td>
<td>Replace device</td>
</tr>
<tr>
<td></td>
<td>Parameter incorrect</td>
<td>Reset to factory settings</td>
</tr>
<tr>
<td>[Err] / [BUSY]</td>
<td>OutA is switched active</td>
<td>Check device settings</td>
</tr>
<tr>
<td>[Err] / [ID]</td>
<td>Device ID error, replication function failed</td>
<td>When replicating, use sensors with the same type (same device ID)</td>
</tr>
<tr>
<td>[Err] / [COMM]</td>
<td>IO-Link communication error</td>
<td>Check the C/Q line</td>
</tr>
</tbody>
</table>

### 10 Accessories

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

### 11 Technical data

#### SPAN-

**General**
- Approval certificate: RCM
- CE marking ( declaration of conformity): In accordance with EU EMC directive

**Note on materials**
- RoHS compliant

**Input signal / measuring element**
- Operating medium: Compressed air in accordance with ISO 8573-1:2010 [7:4:4]; inert gases, operation with lubricated medium possible
- Temperature of medium [°C]: 0 ... +50
- Ambient temperature [°C]: 0 ... +50

**Output, general**
- Accuracy
  - P16: ± 0.1 % FS ± 2° at room temperature
  - B2, B11, V1, P1, P2, P6, P10, P25, P0, V025, V05, P12: ±1.5 % FS ± 3° at room temperature
  - B2, B11, V1, P1, P2, P10, P0, V025, V05, P12: ±1.5 % FS ± 3 in the entire temperature range
  - P25, P0, V025, V05, P12, P16: ±4 % FS ± 4 in the entire temperature range
- Repeat accuracy ±0.3 with Filt = OFF
- Temperature coefficient [% FS/K]: Typically 0.05

**Switching output**
- Switching output: 2x PNP or 2x NPN switchable
- Switching function: Threshold value comparator
- Switch-on/switch-off time [ms]: typ.: 2, max.: 4 with Filt = OFF
- Max. output current [mA]: 100
- Capacitive load maximum DC [nF]: 100
- Voltage drop [V]: Max. 2
- Pull-down / pull-up resistor
  - PNP: integrated
  - NPN: not integrated
- Inductive protective circuit: Present

**Analogue output**
- Output characteristic curve initial value ... value end [V]: 0 ... 10
- Max. load resistance of current output [Ω]: 500
- Min. load resistance of voltage output [kΩ]: 20

**Output, additional data**
- Short circuit protection: Yes
- Overload protection: Present

**Electronics**
- Max. current consumption [mA]: 230
- Nominal operating voltage DC [V]: 24
- Operating voltage range DC [V]: 15 … 30
- No-load supply current [mA]: Max. 30

### Ready-state delay [ms] typ. [B1]
- Protection against polarity reversal: All connections against each other

### Mechanical system
- Mounting position: Any, avoid condensation gathering in the sensor
- Housing material: PA reinforced
- Keyboard material: TPE-0
- Threaded connections material: Brass (nickel-plated)

**Display**
- Displayable units: bar, kPa, MPa, psi, mmHg, inchHg, inchH2O, °C
- Max. permissible relative air humidity [%]: 85
- Degree of protection (in accordance with EN 60529): IP40
- Protection class (in accordance with DIN VDE 0106-1): III
- Resistance to shocks (in accordance with EN 60608-2): 30 g acceleration with 11 ms duration (half-sine)
- Vibration resistance (in accordance with EN 60608-2): 10 ... 60 Hz: 0.35 mm / 60 ... 150 Hz: 5 g

1) After this time, the electrical outputs take a defined, stable condition

### 12 Technical data

#### SPAN-

<table>
<thead>
<tr>
<th>Pressure measurement range [bar]</th>
<th>B2</th>
<th>B11</th>
<th>V025</th>
<th>V05</th>
<th>V1</th>
<th>P025</th>
<th>P05</th>
</tr>
</thead>
<tbody>
<tr>
<td>Start value</td>
<td>-1</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pressure measurement range [bar]</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>End value</td>
<td>1</td>
<td>10</td>
<td>-0.25</td>
<td>-0.5</td>
<td>-1</td>
<td>0.25</td>
<td>0.05</td>
</tr>
<tr>
<td>Overload range [bar]</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Start value</td>
<td>0.1</td>
<td>1</td>
<td>-0.25</td>
<td>-0.5</td>
<td>-1</td>
<td>0.25</td>
<td>0.05</td>
</tr>
<tr>
<td>Overload range [bar]</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>End value</td>
<td>5</td>
<td>15</td>
<td>1</td>
<td>2</td>
<td>5</td>
<td>1</td>
<td>2</td>
</tr>
</tbody>
</table>

#### IO-Link1)

- Protocol version: Device V1.1
- Profiles: Smart sensor profile
- Function classes: Binary data channel (BDC)
- Process data variable (PDV)
- Identification
- Diagnostics
- Teach channel

**Communication mode**
- COM2 (38.4 kbaud)

**Part class**
- A

**Process data width IN**
- 2 byte

**Process data content IN**
- 2 bit BDC (pressure monitoring)
- 14 bit PDV (pressure reading)

**IDDD, IO-Link device description** [www.festo.com/sp](http://www.festo.com/sp)

1) Only SPAN...-PNLK-PNVA

---

1) Display flashes red
2) Display illuminated red

**Fig. 21**

**Fig. 22**

**Fig. 23**

**Fig. 24**

**Fig. 25**