PROFILE

The transmitter measures gauge- and absolute pressure in gases, vapours and liquids and can be used in nearly all areas of process engineering.

The transmitter works on the two-wire principle and features a polysilicon-measuring element. Gauge and absolute pressures from 100 mbar up to 400 bar respectively, are converted into a standard pressure proportional 4...20 mA signal.

With the smart version remote operation is possible by means of HART protocol. The BUS version uses digital communication for signal output.

The analogue-electronic is an economic, fast and simple version. Zero and span can be adjusted locally by means of two potentiometers. With dip switches coarse setting of span with a spread of 1:1 up to 10:1 is possible. The required pressure signals must be provided as reference.

The analogue electronics features within the cell limits adjustment of Zero with ± 10 %.

Digital-electronics provides widespread operating and adjustment facilities with the corresponding hand-held terminal or via PC engineering. It realises precise signal processing and monitors the transmitter function from sensor to output function. Local operation is performed by means of push buttons and the pluggable display. The required pressure signals must be provided as reference and will be stored via push button operation.

Based upon the used measuring cell a turn down of 10:1 is possible.

The transmitter monitoring function generates an alarm if any fault is being detected. The alarm acts onto the analogue output signal and can be set in its function.

DESCRIPTION

The transmitter comprises the measuring cell, the process coupling and the electronics housing. The connecting terminals are accessible in a separate compartment after opening the lid.

The process pressure acts onto a metallic isolating diaphragm. Via the filling media (vegetable or mineral oil) the pressure is transferred to the Polysilicon-sensor with the piezo-resistive bridge. The output signal of the bridge is being processed. According to the process requirements is the isolating diaphragm flush mounted.

TECHNICAL DATA

INPUT

Absolute and gauge pressure in gases, vapours, liquids.

Polysilicon cell for ranges up to 400 bar

GAUGE PRESSURE

<table>
<thead>
<tr>
<th>Type</th>
<th>Measuring limits</th>
<th>Min. Span</th>
<th>Overload</th>
</tr>
</thead>
<tbody>
<tr>
<td>3H</td>
<td>1</td>
<td>0.1</td>
<td>4</td>
</tr>
<tr>
<td>3M</td>
<td>4</td>
<td>0.4</td>
<td>4</td>
</tr>
<tr>
<td>3P</td>
<td>10</td>
<td>0.1</td>
<td>40</td>
</tr>
<tr>
<td>3S</td>
<td>40*</td>
<td>0...40</td>
<td>4</td>
</tr>
<tr>
<td>3U</td>
<td>100*</td>
<td>0...100</td>
<td>40</td>
</tr>
<tr>
<td>3Z</td>
<td>400*</td>
<td>0...400</td>
<td>400</td>
</tr>
<tr>
<td>7H</td>
<td>±1</td>
<td>-1...+1</td>
<td>0.2</td>
</tr>
<tr>
<td>7M</td>
<td>-1...4</td>
<td>-1...+4</td>
<td>0.5</td>
</tr>
<tr>
<td>7P</td>
<td>-1...10</td>
<td>-1...+10</td>
<td>1.0</td>
</tr>
</tbody>
</table>

*)Absolute pressure sensors

ABSOLUTE PRESSURE

<table>
<thead>
<tr>
<th>Type</th>
<th>Measuring limits</th>
<th>Min. Span</th>
<th>Overload</th>
</tr>
</thead>
<tbody>
<tr>
<td>4H</td>
<td>1</td>
<td>0.1</td>
<td>4</td>
</tr>
<tr>
<td>4M</td>
<td>4</td>
<td>0.4</td>
<td>4</td>
</tr>
<tr>
<td>4P</td>
<td>10</td>
<td>0.1</td>
<td>40</td>
</tr>
<tr>
<td>4S</td>
<td>40</td>
<td>0.4</td>
<td>4</td>
</tr>
<tr>
<td>4U</td>
<td>100</td>
<td>0...100</td>
<td>40</td>
</tr>
<tr>
<td>4Z</td>
<td>400</td>
<td>0...400</td>
<td>400</td>
</tr>
</tbody>
</table>

Minimum pressure: 10 mbar absolute

PROCESSMEDIA

Liquids, gases, vapour (abrasive, aggressive or corrosive with suitable material).
**WETTED MATERIALS**

**Diaphragm**
- Stainless Steel SS 316 L (1.4435)

**Process coupling**
- Stainless Steel SS 316 L (1.4435)

**PROCESS CONDITIONS**
Process temperature -40...+125 °C (150 °C duration max 1 h)

**OUTPUT**

<table>
<thead>
<tr>
<th>Signal</th>
<th>Analogue, Smart</th>
</tr>
</thead>
<tbody>
<tr>
<td>Signal</td>
<td>4...20 mA, with superimposed communication protocol</td>
</tr>
<tr>
<td>Signal on alarm</td>
<td>&gt; 20.5 mA or &lt; 3.6 mA or HOLD</td>
</tr>
<tr>
<td>Ripple (HART), measured on 500 Ω, 47...125 Hz, U&lt;sub&gt;pp&lt;/sub&gt;=200 mV, Noise 500 Hz up to 10 kHz</td>
<td>≤ 0.5%</td>
</tr>
<tr>
<td>Characteristic Pressure</td>
<td>Proportional</td>
</tr>
<tr>
<td>Conformity error incl. hysteresis and reproducibility, (limit point method)</td>
<td>± 0.3 %</td>
</tr>
<tr>
<td>Integration time (settable)</td>
<td>0s, 2s, via HART 0...40 s</td>
</tr>
<tr>
<td>Rise time</td>
<td>60 ms</td>
</tr>
<tr>
<td>Response time</td>
<td>180 ms</td>
</tr>
<tr>
<td>Warm-up time</td>
<td>200 ms</td>
</tr>
<tr>
<td>Long term drift</td>
<td>0.1 % (FS) year</td>
</tr>
</tbody>
</table>

**Output BUS:** Profibus PA

**DISPLAY**
Analogue, bargraph with 28 segment LCD ± 0...100 %, smart version additional 4 digit 7 segment display.

**OPERATION**

**Analogue**
Adjustment of zero and span via DIP switches and two potentiometer direct. Selection of damping.

**Smart**
Adjustment of zero and span by means of two push buttons direct. Setting of damping. Remote operation via HART protocol

**BUS**
Adjustment of zero and span by means of two push buttons direct. Setting of address. Remote operation via digital protocol

**EXPLOSION PROTECTION**

**Mode:** ATEX 100, II 1 / 2 G, EEEx ia IIC T6

**Certificate of conformity**
No. applied for

**Mounting**
Transmitter in hazarded area zone 1

**SUPPLY**

**DIRECT CURRENT**
11.5 ... 45 VDC
11.5 ... 30 VDC with EEx

**Ripple of supply voltage**
No effect for U<sub>RMS</sub> ≤ ± 5 % within permissible range

**Overvoltage category**
II to DIN EN 61 010-1

**EXPLOSION PROTECTION**

**Mode:** ATEX 100, II 1 / 2 G, EEEx ia IIC T6

**Certificate of conformity**
No. applied for

**Mounting**
Transmitter in hazarded area zone 1

**MAX. LOAD**

\[ R_{\text{Load}} = \frac{U_{\text{Supply}} - 115 [V]}{0.023 [V]} - R_{\text{Load}} [\Omega] \]
ENVIRONMENTAL CONDITIONS

PERMISSIBLE TEMPERATURES

For operation: -40... +85 °C
For storage: -40.... +100 °C (with display +85 °C)

Temperature effect $T_k$*) for span start and span
(Referred to nominal value of cell)

<table>
<thead>
<tr>
<th>Temperature Range</th>
<th>Analyse</th>
<th>Smart</th>
</tr>
</thead>
<tbody>
<tr>
<td>-10...+60°C</td>
<td>± 0.15%/10 K</td>
<td>± 0.08%/10 K</td>
</tr>
<tr>
<td>-40...10 °C</td>
<td>± 0.2%/10 K</td>
<td>± 0.1%/10 K</td>
</tr>
<tr>
<td>30...+60°C</td>
<td>± 0.09%/10 K</td>
<td>± 0.1%/10 K</td>
</tr>
<tr>
<td>40...90°C</td>
<td>± 0.1%/10 K</td>
<td></td>
</tr>
</tbody>
</table>

*) But not exceeding error due to thermal effects.

Thermal effect
Referred to set span

$$\pm \left( X \% \times TD + 0.3\% \right)$$

(FOX = normal value/set span)

<table>
<thead>
<tr>
<th>Temperature Range</th>
<th>Analyse</th>
<th>Smart</th>
</tr>
</thead>
<tbody>
<tr>
<td>-10...+60°C</td>
<td>X = 0.3</td>
<td>X = 0.5</td>
</tr>
<tr>
<td>-40...10 °C</td>
<td>X = 0.2</td>
<td></td>
</tr>
<tr>
<td>30...+60°C</td>
<td>X = 0.4</td>
<td></td>
</tr>
</tbody>
</table>

Climatic class
4K4H to DIN EN 60721-3

Vibrations
No effects with 4 mm stroke at 5...15 Hz, or
2g at 15...150 Hz, or 1 g at 150...2000 Hz

ELECTRICAL CONNECTION

Electrical connection analogue

<table>
<thead>
<tr>
<th>Terminal 1</th>
<th>Positive (+)</th>
<th>2</th>
<th>Negative (-)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>+ (bl)</td>
<td>2</td>
<td>- (bn)</td>
</tr>
<tr>
<td>8</td>
<td>± (gn/y)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Electrical connection digital

<table>
<thead>
<tr>
<th>Terminal 1</th>
<th>Positive (+)</th>
<th>2</th>
<th>Negative (-)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>+ (bl)</td>
<td>2</td>
<td>- (bn)</td>
</tr>
<tr>
<td>8</td>
<td>± (gn/y)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

ELECTRONIC HOUSING

Stainless steel SS304 (no. 1.4301)
Cover seal: Silicone rubber
Type label: engraved with LASER in housing

MODE OF PROTECTION

IP 66 / Nema 4 with cable gland
IP 68 / Nema 6P with fixed cable (1m WG for 24 h, respectively 1.8 m WG for 30 minutes).

INSTALLATION CONDITIONS

Orientation as required, orientation-dependent zero shifts up to 3 mbar can be adjusted.

WEIGHT

Approximately 1.1 kg

ACCESSORY

Anologue electronics 9499-040-64511
Smart-electronics 9499-040-64311

OPTIONAL ACCESSORIES

Welding nozzle G1A 9407-290-00061
Dummy sensor to prevent any distortion during welding of nozzle 9407-290-00071
Housing / el. conn.\(^1\) / EEx
- Standard; M20 x 1,5
- EEx; M20 x 1,5
- Standard; ½-inch NPT
- EEx; ½-inch NPT
- Standard; connector HAN 7
- EEx; connector HAN 7
- Standard; IP68, fixed cable
- EEx; IP 68, fixed cable

1) Connection for Profibus via M12 x 1 plug

Process- coupling
- Material. AISI SS316L (no. 1.4435)
- 0: Miniclamp DN20/PN40
- 1: DIN 11851 DN 25/PN40
- 2: Varivent 50 mm/PN40
- 3: Triclamp 1”
- 4: G1” metal cone seal
- 5: 3/4”-NPT male flush diaphragm

Measuring span...
- Span within the sensor limits
- in
  - mbar / bar
  - kPa / MPa
  - mm / m H₂O
  - inch H₂O
  - kgf / cm²
  - psi

Pressure
- Gauge
  - 0: gauge
  - 1: absolute
  - 2: gauge with start at minus

Electronic / Display
- analogue
- analogue, Bargraph
- smart
- smart, display
- Profibus PA
- Profibus, display

Diaphragm / filling
- SS 316L; Vegetable oil
- SS 316L; Mineral oil\(^1\)

Measuring cell
- 2: 1 bar
- 3: 4 bar
- 4: 10 bar
- 5: 40 bar
- 6: 100 bar
- 7: 400 bar

Manual
- 0: without
- E: English
- F: French
- D: German