The transmitter PM36 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. The BUS version uses digital communication for the signal. The digital version can be equipped with a local display comprising digital display and bargraph whereas the analogue version allows only a bargraph display. The applied technology ensures reliable and simple operation.

The analogue-electronic is an economic, fast and simple version of transmitter PM36. 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 adjustment of Zero with ± 10 % within the cell limits.

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 plugable 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.

Absolute and gauge pressure in gases, vapours, liquids.
Polysilicon cell for ranges up to 400 bar

**PROFILE**

**DESCRIPTION**

**TECHNICAL DATA**

**INPUT**

**OUTPUT**

**Gauge Pressure**

<table>
<thead>
<tr>
<th>Cell</th>
<th>Measuring limits</th>
<th>Min. Span</th>
<th>Overload</th>
</tr>
</thead>
<tbody>
<tr>
<td>3H</td>
<td>0...1</td>
<td>0,1</td>
<td>4</td>
</tr>
<tr>
<td>3M</td>
<td>0...0.4</td>
<td>0.4</td>
<td>4</td>
</tr>
<tr>
<td>3P</td>
<td>0...10</td>
<td>1</td>
<td>40</td>
</tr>
<tr>
<td>3S</td>
<td>0...40*</td>
<td>4</td>
<td>160</td>
</tr>
<tr>
<td>3U</td>
<td>0...400*</td>
<td>40</td>
<td>600</td>
</tr>
<tr>
<td>7H</td>
<td>±1</td>
<td>0.2</td>
<td>4</td>
</tr>
<tr>
<td>7M</td>
<td>±1...+4</td>
<td>0.5</td>
<td>16</td>
</tr>
<tr>
<td>7P</td>
<td>±1...+10</td>
<td>1.0</td>
<td>40</td>
</tr>
</tbody>
</table>

*) Absolute pressure sensors

**Absolute Pressure**

<table>
<thead>
<tr>
<th>Cell</th>
<th>Measuring limits</th>
<th>Min. Span</th>
<th>Overload</th>
</tr>
</thead>
<tbody>
<tr>
<td>4H</td>
<td>0...1</td>
<td>0.1</td>
<td>4</td>
</tr>
<tr>
<td>4M</td>
<td>0...0.4</td>
<td>0.4</td>
<td>4</td>
</tr>
<tr>
<td>4P</td>
<td>0...10</td>
<td>1</td>
<td>40</td>
</tr>
<tr>
<td>4S</td>
<td>0...40</td>
<td>4</td>
<td>160</td>
</tr>
<tr>
<td>4U</td>
<td>0...400</td>
<td>10</td>
<td>400</td>
</tr>
<tr>
<td>4Z</td>
<td>0...400</td>
<td>40</td>
<td>600</td>
</tr>
</tbody>
</table>

Minimum pressure: 10 mbar absolute

**Process Media**

Liquids, gases, vapour (aggressive or corrosive with suitable material).

**Process Temperature**

Without isolator up to + 100 °C
**WETTED MATERIALS**

**Diaphragm**
- Stainless Steel 316 L (1.4435)
- others on request

**Flanges**
- Stainless Steel 316 L (1.4435)

**Filling media for sealing diaphragm**
Selection of the filling liquid for the isolating diaphragm depends from pressure and temperature conditions of the process. Second criteria is the immunity of the filling liquid with the process. Details see list above.

---

**Fig. 1 DIN-/ANSI flange**

**Fig. 2 Screw-in G and NPT**

**Fig. 3 Temp-Isolator G ½ A (max. 150 °C)**

**Fig. 4 Temp-Isolator ½ NPT (max. 150 °C)**

---

**Dimensions DIN flange**

<table>
<thead>
<tr>
<th>DN</th>
<th>PN</th>
<th>D</th>
<th>b</th>
<th>d₂</th>
<th>dₙ</th>
<th>Bolt hole</th>
<th>k₂</th>
<th>Tₐ Silicon oil *)</th>
<th>Effect of mounting</th>
<th>A_max</th>
<th>Weight total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>mm</td>
<td>mm</td>
<td>mm</td>
<td>mm</td>
<td></td>
<td></td>
<td>mbar/10K</td>
<td>mbar/10K</td>
<td></td>
<td>kg</td>
</tr>
<tr>
<td>25</td>
<td>64/160</td>
<td>140</td>
<td>68</td>
<td>28</td>
<td>4</td>
<td>18</td>
<td>100</td>
<td>+8</td>
<td>11</td>
<td>255</td>
<td>2,5</td>
</tr>
<tr>
<td>50</td>
<td>10/40</td>
<td>165</td>
<td>20</td>
<td>102</td>
<td>46</td>
<td>125</td>
<td>+1</td>
<td>+2</td>
<td>10</td>
<td>259</td>
<td>3,3</td>
</tr>
<tr>
<td>80</td>
<td>10/40</td>
<td>200</td>
<td>20</td>
<td>138</td>
<td>70</td>
<td>160</td>
<td>+1</td>
<td>+2</td>
<td>11</td>
<td>259</td>
<td>5,8</td>
</tr>
</tbody>
</table>

**Dimensions ANSI flange (inch)**

<table>
<thead>
<tr>
<th>DN</th>
<th>PN</th>
<th>D</th>
<th>b</th>
<th>d₂</th>
<th>dₙ</th>
<th>Bolt hole</th>
<th>k₂</th>
<th>Tₐ Silicon oil *)</th>
<th>Effect of mounting</th>
<th>A_max</th>
<th>Weight total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>400</td>
<td>0.69</td>
<td>2.00</td>
<td>28</td>
<td>4</td>
<td>0.79</td>
<td>3.50</td>
<td>+8</td>
<td>10</td>
<td>250.5</td>
<td>2.5</td>
</tr>
<tr>
<td>2</td>
<td>300</td>
<td>0.88</td>
<td>3.62</td>
<td>46</td>
<td>8</td>
<td>0.88</td>
<td>5.00</td>
<td>+1</td>
<td>+2</td>
<td>10</td>
<td>257.4</td>
</tr>
<tr>
<td>3</td>
<td>200</td>
<td>1.12</td>
<td>5.00</td>
<td>70</td>
<td>8</td>
<td>0.88</td>
<td>6.62</td>
<td>+1</td>
<td>+2</td>
<td>11</td>
<td>259.7</td>
</tr>
</tbody>
</table>

**Dimensions screw-in coupling G and NPT**

<table>
<thead>
<tr>
<th>Inch</th>
<th>PN</th>
<th>d₁</th>
<th>d₂</th>
<th>x₁</th>
<th>SW</th>
<th>dₙ</th>
<th>Tₐ Silicon oil *)</th>
<th>Min. span</th>
<th>Effect of mounting</th>
<th>A_max</th>
<th>Weight total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>mm</td>
<td>mm</td>
<td>mm</td>
<td>mm</td>
<td>mm</td>
<td>mbar/10K</td>
<td>mbar</td>
<td>bar</td>
<td></td>
<td>kg</td>
</tr>
<tr>
<td>G1½</td>
<td>44</td>
<td>55</td>
<td>58</td>
<td>30</td>
<td>41</td>
<td>38</td>
<td>+2</td>
<td>+4</td>
<td>232.5</td>
<td>1.9</td>
<td></td>
</tr>
<tr>
<td>G 2</td>
<td>56</td>
<td>68</td>
<td>78</td>
<td>46</td>
<td>60</td>
<td>46</td>
<td>+1</td>
<td>+2</td>
<td>237.5</td>
<td>2.9</td>
<td></td>
</tr>
<tr>
<td>½-NPT</td>
<td>56</td>
<td>68</td>
<td>78</td>
<td>46</td>
<td>60</td>
<td>46</td>
<td>+1</td>
<td>+2</td>
<td>233.5</td>
<td>1.9</td>
<td></td>
</tr>
<tr>
<td>2 NPT</td>
<td>-</td>
<td>-</td>
<td>78</td>
<td>65</td>
<td>36</td>
<td>36</td>
<td>+3</td>
<td>+4</td>
<td>233.5</td>
<td>2.9</td>
<td></td>
</tr>
</tbody>
</table>

**Filling fluid for sealing diaphragm**

<table>
<thead>
<tr>
<th>Filling fluid</th>
<th>Medium temp. at 50 mbar ≤ Pₐbs ≤ 1 bar</th>
<th>Medium temp. at Pₐbs ≥ 1 bar</th>
<th>Max. height-difference at Pₐbs ≥ 1 bar</th>
<th>Tₐ-correct.-factor</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Silicone oil</td>
<td>-40 bis 180 °C</td>
<td>-40 bis +250 °C</td>
<td>max. 7m</td>
<td>1</td>
<td>Standard</td>
</tr>
<tr>
<td>Vegetable oil</td>
<td>-10 bis +120 °C</td>
<td>-40 bis +200 °C</td>
<td>max. 7m</td>
<td>1.05</td>
<td>Food and beverage</td>
</tr>
<tr>
<td>Glycerine</td>
<td>-</td>
<td>+15 bis +200 °C</td>
<td>max. 4m</td>
<td>0.64</td>
<td>Food and beverage</td>
</tr>
<tr>
<td>High temp. oil</td>
<td>-10...+200 °C</td>
<td>-10...+350 °C</td>
<td>max. 7m</td>
<td>0.72</td>
<td></td>
</tr>
</tbody>
</table>

**Temperature isolator G ½ A; ½ NPT**

<table>
<thead>
<tr>
<th>Type</th>
<th>PN</th>
<th>Tₐ amb</th>
<th>Tₐ process</th>
<th>Range min</th>
<th>Mounting effect</th>
<th>Add. weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>G 1/2A</td>
<td>160</td>
<td>+1</td>
<td>+2</td>
<td>0.1</td>
<td>7</td>
<td>1.2</td>
</tr>
<tr>
<td>½-NPT</td>
<td>0.1</td>
<td>7</td>
<td>1.2</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Smallest span**
Based upon the thermal expansion of the filling liquid, isolating diaphragms cause an additional temperature effect with the measurement.

Following points should be considered for selection:
- The nominal width determines the diameter of the diaphragm.
- Large diameter of diaphragm results in a smaller temperature effect.
- Small spans require large diameter to minimize temperature effects.
- The larger the diameter of the diaphragm, the larger permissible process temperature range.
POSITION EFFECTS
(See also diaphragm seal tables)
The transmitter calibration is based upon
the limit point method according to
DIN 16086. Depending on the orientation
of the device, there might be a slight
shift in the measuring value. Diaphragm
seals do have also a zero shift depending
on the orientation of the transmitter.

- neutral calibration position
- max. positive zero shift
- max. negative zero shift

This zero shift due to the position can be
compensated for up to +/- 10 %. (Not
possible with negative span start and
analogue electronics)
The max. effect of mounting position is
given in the tables for all diaphragms on
the page before.
The values given are for silicone oil. For
other oils it varies according to the
density of the oil in use.

TEMPERATURE EFFECTS
Main temperature effect depends mainly
from the process temperature adjacent
to the sealing diaphragm.
- The temperature coefficient $T_C$ given
  in the technical specification applies to
  Silicone oil calibrated at 20 °C.
- For other filling fluids these values are
to be multiplied with the correction
  factor given in the table.
The total temperature coefficient $T_C$ is
the result of adding $T_C$ of the single
coefficients (transmitter, diaphragm seal
as possibly capillary).
The $T_C$ of the capillary is effected by the
ambient temperature. $T_C$ per meter for
Silicone oil filling fluid: 0.5 mbar/10 K

GUIDELINES FOR MOUNTING
WITH CAPILLARY
The transmitter generally should be
mounted below the tapping point.
A maximum difference in height
between the tapping point and the
transmitter should not be exceeded, to
avoid interruption in the fluid column in
the capillary which leads to substantial
damage of the diaphragm seal.
- Minimum bending radius of capillary
tubing: 100 mm (4-in)
- In case of vacuum application the
  transmitter must be mounted below
  the pressure tapping point.
- For temperature effects see separate
  section.

OUTPUT

| Signal | 4...20 mA | 4...20 mA, with
| Signal on alarm | > 20.5 mA or < 3.8 mA, settable to > 20.5 mA or < 3.6 mA or HOLD |
| Ripple | $U_{PP}$ = 200 mV, 47...125 Hz, Noise: 500 mV up to 10 kHz $U_{PP}$ = 22 mV/µm (max) |
| Characteristic | Pressure proportional |
| Conformity error incl. hysteresis and reproducibility (limit point method) | ± 0.3 % |
| Integration time (settable) | 0s, 2 s, 0s, 2s, via HART 0...40 s |
| Rise time | 60 ms, 220 ms |
| Response time | 180 ms, 600 ms |
| Warm-up time | 200 ms, 1 s |
| Long term drift | 0.1 % (FS) / year |

Output BUS: Profibus PA

MAX. LOAD

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

1) Inverse output signal possible, specify span
start and span end in clear text xxx9x
DISPLAY
Analogue signal via 28 segment LCD bargraph 0...100 %; with smart additionally 4 digit 7 segment display.
Fig. 8 Display smart

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.

SUPPLY
DIRECT CURRENT
11.5 ... 45 VDC
11.5 ... 30 VDC with EEx
Ripple of supply voltage
No effect for U_{rms} ≤ ± 5 % within permissible range
Overvoltage category
II to DIN EN 61 010-1

EXPLOSION PROTECTION
Mode: ATEX 100, II 1 / 2 G, EEx ia IIC T6
Certificate of conformity applied for
Mounting Transmitter in hazardous area zone 1

ENVIRONMENTAL CONDITIONS
AMBIENT TEMPERATURES
For operation: -40... + 65 °C
For storage: -40... 100 °C (with display +85 °C)
Temperature effect T_c^*) for span start and span (Referred to nominal value of cell)
*) But not exceeding error due to thermal effects.

Thermal effect Referred to set span
\[ ± \left( \frac{X \% \times TD + 0.3 \%}{TD = \text{nominal value/set span}} \right) \]

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

ELECTROMAGNETIC COMPATIBILITY
Complies with EN 50 081-1 and EN 50 082-2 as also NAMUR recommendation NE21: effect < 0.5 %

GENERAL
ELECTRONIC HOUSING
Di-cast aluminium (AlSi12)
surface chromated, Epoxy coated
Cover seal: Silicone rubber
Type label: Stainless steel

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).

ELECTRICAL CONNECTION
Screw terminals for 0.5...2.5 mm^2.
selectable via
Cable gland M20 x 1.5
Cable conduit for ½ NPT
or Harting plug HAN 7
or Fixed cable 5m with reference air feed
Profibus connection via screw plug M12x1

1) protect against heat radiation
INSTALLATION CONDITIONS
Orientation as required, orientation-dependent zero offset must be adjusted.

WEIGHT
approximately 1.6 kg plus diaphragm seal see corresponding table.

ACCESSORY
Instructions
Analogue electronics 9499-040-64511
Smart-electronics 9499-040-64311

ADDITIONAL ACCESSORIES
Bracket for wall or pipe mounting 9407-290-00051
### Ordering Structure

**Process-coupling**

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>G 1 ½&quot;, AISI SS316L (no. 1.4435)</td>
</tr>
<tr>
<td>1</td>
<td>G 2&quot;, AISI SS316L (no. 1.4435)</td>
</tr>
<tr>
<td>2</td>
<td>Isolator G ½&quot; male</td>
</tr>
<tr>
<td>3</td>
<td>Isolator NPT ½&quot; male</td>
</tr>
<tr>
<td>4</td>
<td>DIN flange DN 25 PN 64/160</td>
</tr>
<tr>
<td>5</td>
<td>DIN flange DN 50 PN 10/40</td>
</tr>
<tr>
<td>6</td>
<td>DIN flange DN 80 PN 10/40</td>
</tr>
<tr>
<td>7</td>
<td>ANSI flange 1&quot; 600 lbs</td>
</tr>
<tr>
<td>8</td>
<td>ANSI flange 2&quot; 300 lbs</td>
</tr>
<tr>
<td>9</td>
<td>ANSI flange 3&quot; 300 lbs</td>
</tr>
</tbody>
</table>

**Measuring cell**

- **Span within the sensor limits**
  - in mbar / bar: 0-100 bar
  - in kPa / MPa: 0-100 bar
  - in inch H2O: 0-100 bar
  - in kgf / cm²: 0-100 bar
  - in psi: 0-100 bar

**Measuring media and remote seal**

- Seal direct, silicone oil
- Seal direct, vegetable oil
- Seal direct, Glycerine
- Temp. isolator 100 mm, HT-oil
- Capillary 1 m with HT-oil
- Capillary x m with silicone oil*)
- Capillary x m with vegetable oil*)
- Capillary x m with HT-oil*)
- Diaphragm: other than SS 316 L (1.4435)

**Electronic/Display**

- Analogue
- Analogue, Bargraph
- Smart
- Smart, display
- Profibus PA
- Profibus, display

**Housing / el. conn.**

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>Standard; M20 x 1,5</td>
</tr>
<tr>
<td>1</td>
<td>EEx; M20 x 1,5</td>
</tr>
<tr>
<td>2</td>
<td>Standard; ½-inch NPT</td>
</tr>
<tr>
<td>3</td>
<td>EEx; ½-inch NPT</td>
</tr>
<tr>
<td>4</td>
<td>Standard; connector HAN 7</td>
</tr>
<tr>
<td>5</td>
<td>EEx; connector HAN 7</td>
</tr>
<tr>
<td>6</td>
<td>Standard; IP68, fixed cable</td>
</tr>
<tr>
<td>7</td>
<td>EEx; IP 68, fixed cable</td>
</tr>
</tbody>
</table>

*) Connection for Profibus via M12 x 1 plug

---

**Your local distributor**

PMA Prozeß- und Maschinen-Automation GmbH
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Internet: http://www.pma-online.de

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