**Smart Pressure Transmitter**

**APCE-2000**

- 4…20 mA output signal + HART protocol
- ATEX Intrinsic safety
- Accuracy 0.1%
- Rangeability 100:1
- Gold plated diaphragm (Au)

**Application**

The APCE-2000 pressure transmitter is applicable to the measurement of the pressure, underpressure or absolute pressure of gases, vapours and liquids. The active sensing element is a piezoresistant silicon sensor separated from the medium by a diaphragm and by specially selected type of manometric liquid.

**PD version**

Economical version:
- housing 304ss
- protection IP66
- electrical connection DIN 43650
- the electronics encased in a protective silicon gel
- ATEX Intrinsic safety

II 1/2G Ex ia IIC T4/T5/T6 Ga/Gb
II 1D Ex ia IIIC T110C Da
IM1 Ex ia I Ma

**APCE-2000PD**

- 4…20 mA output signal + HART protocol
- ATEX Intrinsic safety
- Accuracy 0.1%
- Rangeability 100:1
- Gold plated diaphragm (Au)

**APCE-2000PZ**

Version designed to work in hard conditions:
- housing material: 304SS
- protection IP66
- the electronics encased in a protective silicon gel
- cup with knurled handgrip
- ATEX Intrinsic safety

II 1/2G Ex ia IIC T4/T5/T6 Ga/Gb
II 1D Ex ia IIIC T110C Da
IM1 Ex ia I Ma

**Communication and configuration**

The communication standard for data interchange with the transmitter is the Hart protocol.

Communication with the transmitter is carried out with:
- a KAP-03, KAP-03Ex communicator
- some other Hart type communicators, (*)
- a PC using an HART/USB/Bluetooth converter and Raport 2 configuration software.


The data interchange with the transmitter enables users to:
- identify the transmitter
- configure the output parameters:
  - measurement units and the values of the start points and end points at the measurement range
  - damping time constant
  - conversion characteristic (inversion, user’s non-linear characteristic)
- read the currently measured pressure value of the output current and the percentage output control level
- force an output current with a set value
- calibrate the transmitter in relation to a model pressure

**Version with direct or remote diaphragm seal**

Diaphragm seal data - see chapter III
Smart Pressure Transmitter TM-APCE-2000

Installation

The transmitter is not heavy, so it can be installed directly on the installation without additional mounting bracket. When the pressure of steam or other hot media is measured, a siphon or impulse line should be used. The needle valve placed upstream the transmitter simplifies installation process and enables the zero point adjustment or the transmitter replacement. When the special process connections are required for the measurement of levels and pressures (e.g. at food and chemical industries), the transmitter is provided with an Apilens diaphragm seal. Installing accessories and a full scope of diaphragm seals are described in detail in the further part of the catalogue. The transmitter’s electrical connections should be performed with twisted cable. The place for the communicator should be assigned before the communicator installation.

Measuring ranges

<table>
<thead>
<tr>
<th>No.</th>
<th>Nominal measuring range (FSO)</th>
<th>Minimum set range</th>
<th>Rangeability</th>
<th>Overpressure limit (without hysteresis)***</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0...1000 bar (0...100 MPa)</td>
<td>10 bar (1 MPa)</td>
<td>100:1</td>
<td>1200 bar (120 MPa)</td>
</tr>
<tr>
<td>2</td>
<td>0...300 bar (0...30 MPa)</td>
<td>3 bar (300 kPa)</td>
<td>100:1</td>
<td>450 bar (45 MPa)</td>
</tr>
<tr>
<td>3</td>
<td>0...160 bar (0...16 MPa)</td>
<td>1,6 bar (160 kPa)</td>
<td>100:1</td>
<td>450 bar (45 MPa)</td>
</tr>
<tr>
<td>4</td>
<td>0...70 bar (0...7 MPa)</td>
<td>0,7 bar (70 kPa)</td>
<td>100:1</td>
<td>140 bar (14 MPa)</td>
</tr>
<tr>
<td>5</td>
<td>0...25 bar (0...2,5 MPa)</td>
<td>0,25 bar (25 kPa)</td>
<td>100:1</td>
<td>50 bar (5 MPa)</td>
</tr>
<tr>
<td>6</td>
<td>0...7 bar (0...0,7 MPa)</td>
<td>0,7 bar (7 kPa)</td>
<td>100:1</td>
<td>14 bar (1,4 MPa)</td>
</tr>
<tr>
<td>7</td>
<td>-1...7 bar (-100...700 kPa)</td>
<td>0,07 bar (7 kPa)</td>
<td>114:1</td>
<td>14 bar (1,4 MPa)</td>
</tr>
<tr>
<td>8</td>
<td>-1...1,5 bar (-100...150 kPa)</td>
<td>0,12 bar (12 kPa)</td>
<td>20:1</td>
<td>4 bar (400 kPa)</td>
</tr>
<tr>
<td>9</td>
<td>0...2 bar (0...200 kPa)</td>
<td>2 bar (200 kPa)</td>
<td>20:1</td>
<td>4 bar (400 kPa)</td>
</tr>
<tr>
<td>10</td>
<td>0...1 bar (0...100 kPa)</td>
<td>0,05 bar (5 kPa)</td>
<td>20:1</td>
<td>2 bar (200 kPa)</td>
</tr>
<tr>
<td>11</td>
<td>-0.5...0,5 bar (-50...50 kPa)</td>
<td>0,05 bar (5 kPa)</td>
<td>20:1</td>
<td>2 bar (200 kPa)</td>
</tr>
<tr>
<td>12</td>
<td>0...0,25 bar (0...2,5 kPa)</td>
<td>25 mbar (2,5 kPa)</td>
<td>10:1</td>
<td>1 bar (100 kPa)</td>
</tr>
<tr>
<td>13</td>
<td>-100...100 mbar (-1...10 kPa)</td>
<td>20 mbar (2 kPa)</td>
<td>10:1</td>
<td>1 bar (100 kPa)</td>
</tr>
<tr>
<td>14</td>
<td>-15...7 mbar (-1,5...7 kPa)</td>
<td>5 mbar (0,5 kPa)</td>
<td>17:1</td>
<td>0,5 bar (50 kPa)</td>
</tr>
<tr>
<td>15</td>
<td>-25...25 mbar ** (-2,5...2,5 kPa)</td>
<td>2 mbar (0,2 kPa)</td>
<td>25:1</td>
<td>1 bar (100 kPa)</td>
</tr>
<tr>
<td>16</td>
<td>-7...7 mbar ** (-0,7...0,7 kPa)</td>
<td>1 mbar (0,1 kPa)</td>
<td>14:1</td>
<td>1 bar (100 kPa)</td>
</tr>
<tr>
<td>17</td>
<td>0...1,3 bar abs (0...130 kPa abs)</td>
<td>100 mbar abs (10 kPa abs)</td>
<td>13:1</td>
<td>2 bar (200 kPa)</td>
</tr>
<tr>
<td>18</td>
<td>0...7 bar abs (0...0,7 MPa abs)</td>
<td>100 mbar abs (10 kPa abs)</td>
<td>10:1</td>
<td>1 bar (100 kPa)</td>
</tr>
<tr>
<td>19</td>
<td>0...25 bar abs (0...2,5 MPa abs)</td>
<td>25 mbar abs (2,5 kPa)</td>
<td>10:1</td>
<td>1 bar (100 kPa)</td>
</tr>
<tr>
<td>20</td>
<td>0...70 bar abs (0...7 MPa abs)</td>
<td>0,7 bar abs (70 kPa abs)</td>
<td>100:1</td>
<td>140 bar (14 MPa)</td>
</tr>
<tr>
<td>21</td>
<td>0...0,25 bar abs (0...25 kPa abs)</td>
<td>0,25 bar abs (2,5 kPa)</td>
<td>10:1</td>
<td>1 bar (100 kPa)</td>
</tr>
<tr>
<td>22</td>
<td>0...1 bar abs (0...100 kPa abs)</td>
<td>0,1 bar abs (10 kPa abs)</td>
<td>10:1</td>
<td>1 bar (100 kPa)</td>
</tr>
</tbody>
</table>

**Transmitters not available with diaphragm seal.
***Transmitters available only in HS version.
****Overpressure limit can be different for version according to PED norm No. 97/23/EC

Technical data

Metrological parameters

- **Accuracy** ≤ ±0,1% of the calibrated range
- Long-term stability: ≤ 2 x accuracy for 5 years
- **Max. Ranges** (for the nominal measuring range) ≤ accuracy for 8 years
- **Thermal error** ≤ ±0,08% (FSO) / 10°C (0,1% for ranges 13, 14, 16)
- **Max. Temperature Range** (full compensation range) ± 0,25% (FSO)
- **Response time** typically 16...230 ms (programmable)
- **Additionnal electronic damping** min. 240 Ω

**Electrical parameters**

- **Power supply:** 7,5...55 VDC (Ex ia 7,5...28 VDC)
- **Output signal:** 4...20 mA, two wire transmission
- **Loadresistance** R[(V) - 7,5V] ≤ U(V) / 0,0225A
- **Resistance required for communication** 0,002% (FSO) / V

**Materials**

- Wetted parts and diaphragms: SS316L, Hastelloy C 276, Au
- Casing: SS304

**Operating conditions**

- **Operating temperature range** (ambient temp.) -40...85°C
- **Medium temperature range** -40...120°C
- **Ex version** -40...80°C

Medium temperature range over 120°C – measurement with use of impulse line or diaphragm seals

CAUTION: the medium must not be allowed to freeze in the impulse line or close to the process connection of the transmitter

**Electrical diagram**

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#### Technical data

**Accuracy depending on the set range**

- **Set range**: 0...100%
- **Error**: ±2 x Error range
- **Numerical error values are given in the technical data under metrological parameters**
### Smart Pressure Transmitter TM-APCE-2000

**Ordering procedure**

<table>
<thead>
<tr>
<th>Model</th>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>APCE-2000</td>
<td></td>
<td>Smart pressure transmitter</td>
</tr>
</tbody>
</table>

#### Casing, output signal, electrical connection

<table>
<thead>
<tr>
<th>/PED</th>
<th>/PZ</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>/Exia</td>
<td></td>
<td>Housing IP65 with DIN43650 connector, without display, output 4-20mA + Hart 304SS housing, IP66, without display, output 4-20mA + Hart packing gland M20x1,5</td>
</tr>
</tbody>
</table>

#### Versions, certificates

<table>
<thead>
<tr>
<th>/Exia</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>II 1/2G Ex ia IIC T110°C Da</td>
<td>Exia for HS version available from Q4/2016</td>
</tr>
<tr>
<td>I M1 Ex ia I Ma</td>
<td>Exia for HS version available from Q4/2016</td>
</tr>
</tbody>
</table>

#### More than one option is available

<table>
<thead>
<tr>
<th>HS</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>For oxygen service (sensor filled with Fluorolube fluid), only M and G1/2 connection</td>
</tr>
</tbody>
</table>

#### Extended thermal compensation range -60 + 50°C

<table>
<thead>
<tr>
<th>Range</th>
<th>Min. set range</th>
</tr>
</thead>
<tbody>
<tr>
<td>/0÷1000 bar</td>
<td>0÷1000 bar (0÷1000 bar)</td>
</tr>
<tr>
<td>/0÷100 bar</td>
<td>0÷100 bar (0÷100 bar)</td>
</tr>
<tr>
<td>/0÷10 bar</td>
<td>0÷10 bar (0÷10 bar)</td>
</tr>
<tr>
<td>/0÷1 bar</td>
<td>0÷1 bar (0÷1 bar)</td>
</tr>
<tr>
<td>/0÷0,1 bar</td>
<td>0÷0,1 bar (0÷0,1 bar)</td>
</tr>
<tr>
<td>/0÷0,07 bar</td>
<td>0÷0,07 bar (0÷0,07 bar)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Code of diaphragm seal</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diaphragm seal (see chapter of diaphragm seals)</td>
<td></td>
</tr>
</tbody>
</table>

#### Process connections

- Thread M20x1,5 (male) with Ø3 hole, wetted parts SS316L
- Thread M20x1,5 (male) with Ø3 hole, gold plated diaphragm (range no. 1, 2, 3, 4)
- Thread G1/2 (male) with Ø3 hole, wetted parts SS316L
- Thread G1/2 (male) with Ø3 hole, gold plated diaphragm (range no. 1, 2, 3, 4)
- Thread G1/4 (male), wetted parts SS316L (Pressure limits: min. 10bar / max. 400bar)
- Thread M20x1,5 (male) with Ø12 hole, wetted parts SS316L
- Thread G1/2 (male) with Ø12 hole, wetted parts SS316L
- Thread G1/2 (male) with Ø12 hole, wetted parts Hastelloy C 276
- Thread M30x2 with flush diaphragm, wetted parts SS316L
- Thread M30x2 with flush diaphragm, wetted parts Hastelloy C 276
- Thread G1 with flush diaphragm, wetted parts SS316L (Pressure limits: min. 0,10bar / max. 70bar)
- Thread G1 with flush diaphragm, wetted parts SS316L (Pressure limits: min. 0,10bar / max. 70bar)
- Thread 1/2"NPT Male, wetted parts SS316L
- Thread 1/2"NPT Female, wetted parts SS316L
- Thread M20x1,5 with adapter to 1/2"NPT Female, wetted parts SS316L
- Diaphragm seal (see chapter of diaphragm seals)

#### Measuring set range

- [required units] Calibrated range in relation to 4mA and 20mA output

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**Example:** Pressure transmitter, output 4 ...20mA + HART, version Exia, nominal measuring range 0.7bar, calibrated range 0.6bar, process connection M20x1.5, electrical connection DIN43650 connector.

**APCE-2000PD/Exia/0.7bar/0.6bar/M**