

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:

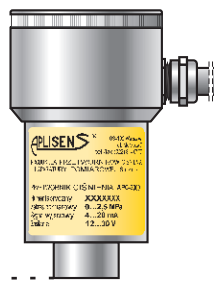
- housing 304ss
- protection IP65
- electrical connection DIN 43650
- the electronics encased in a protective silicon gel
- ATEX Intrinsic safety

Ex II 1/2G Ex ia IIC T4/T5/T6 Ga/Gb
II 1D Ex ia IIIC T110°C Da
I M1 Ex ia I Ma

APCE-2000PD



APCE-2000PZ

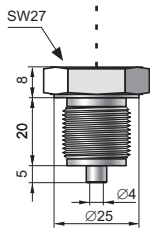


PZ version

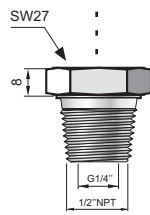
Version designed to work in hard conditions:

- housing material: 304SS
- protection IP66
- the electronics encased in a protective silicon gel
- cup with knurled handgrip
- ATEX Intrinsic safety

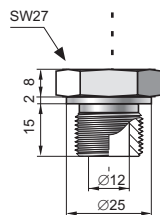
Ex II 1/2G Ex ia IIC T4/T5/T6 Ga/Gb
II 1D Ex ia IIIC T110°C Da
I M1 Ex ia I Ma



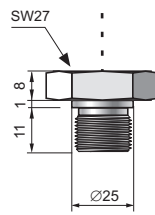
G1/2 type M type
G1/2", Ø4 hole
M20×1.5, Ø4 hole



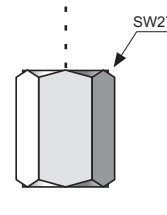
1/2"NPT M type
1/2"NPT male + internal thread G1/4"



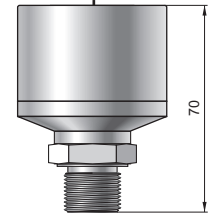
GP type P type
G1/2", Ø12 hole
M20×1.5, Ø12 hole



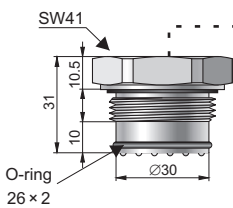
G1/4" type



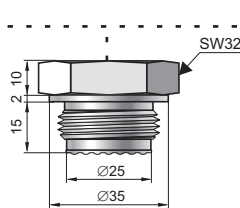
1/2"NPT F type
internal thread
1/2-14NPT



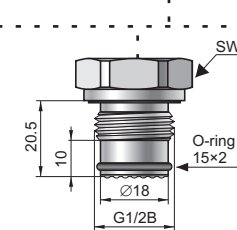
GP type P type
1/2"NPT M type for HS version



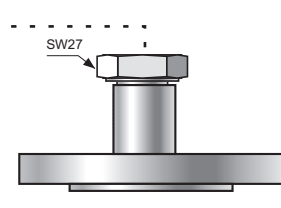
CG1 type
G1" with flush diaphragm



CM30×2 type
M30×2 with flush diaphragm



CG1/2 type
G1/2" with flush diaphragm



Version with direct or remote diaphragm seal
Diaphragm seal data - see chapter III

Communication and configuration

The communication standard for data interchange with the transmitter is the Hart protocol. The data interchange with the transmitter enables users to:

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 converter and Raport 2 configuration software.
- (*) .eddl files available on www.aplisen.com.

- 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

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 Aplisens 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

No.	Nominal measuring range (FSO)	Minimum set range	Rangeability	Overpressure limit (without hysteresis)***
1	0...1000 bar (0...100 MPa)	10 bar (1 MPa)	100:1	1200 bar (120 MPa)
2	0...600 bar (0...60 MPa)	6 bar (600 kPa)	100:1	1200 bar (120 MPa)
3	0...300 bar ** (0...30 MPa)	3 bar (300 kPa)	100:1	450 bar (45 MPa)
4	0...160 bar ** (0...16 MPa)	1,6 bar (160 kPa)	100:1	450 bar (45 MPa)
5	0...70 bar ** (0...7 MPa)	0,7 bar (70 kPa)	100:1	140 bar (14 MPa)
6	0...25 bar ** (0...2,5 MPa)	0,25 bar (25 kPa)	100:1	50 bar (5 MPa)
7	0...7 bar ** (0...0,7 MPa)	0,07 bar (7 kPa)	100:1	14 bar (1,4 MPa)
8	-1...7bar ** (-100...700 kPa)	0,07 bar (7 kPa)	114:1	14 bar (1,4 MPa)
9	-1...1,5bar ** (-100...150 kPa)	0,12 bar (12 kPa)	20:1	4 bar (400 kPa)
10	0...2 bar ** (0...200 kPa)	100 mbar (10 kPa)	20:1	4 bar (400 kPa)
11	0...1 bar ** (0...100 kPa)	50 mbar (5 kPa)	20:1	2 bar (200 kPa)
12	-0,5...0,5 bar ** (-50...50 kPa)	50 mbar (5 kPa)	20:1	2 bar (200 kPa)
13	0...0,25 bar ** (0...25 kPa)	25 mbar (2,5 kPa)	10:1	1 bar (100 kPa)
14	-100...100 mbar ** (-10...10 kPa)	20 mbar (2 kPa)	10:1	1 bar (100 kPa)
15	-15...70 mbar **/*** (-1,5...7 kPa)	5 mbar (0,5 kPa)	17:1	0,5 bar (50 kPa)
16	-25...25 mbar **/*** (-2,5...2,5 kPa)	2 mbar (0,2 kPa)	25:1	1 bar (100 kPa)
17	-7...7 mbar **/*** (-0,7...0,7 kPa)	1 mbar (0,1 kPa)	14:1	1 bar (100 kPa)
18	0...1,3 bar abs (0...130 kPa abs)	100 mbar abs (10 kPa abs)	13:1	2 bar (200 kPa)
19	0...7 bar abs (0...0,7 MPa abs)	100 mbar abs (10 kPa abs)	70:1	14 bar (1,4 MPa)
20	0...25 bar abs (0...2,5 MPa abs)	0,25 bar abs (25 kPa abs)	100:1	50 bar (5 MPa)
21	0...70 bar abs (0...7 MPa abs)	0,7 bar abs (70 kPa abs)	100:1	140 bar (14 MPa)
22	0...300 bar abs (0...30 MPa abs)	3 bar abs (300 kPa abs)	100:1	450 bar (45 MPa)

* 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

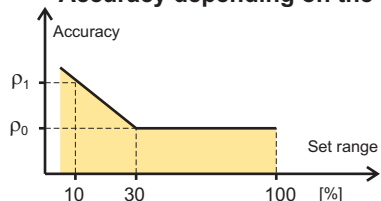
Metrological parameters

Accuracy	≤ ±0,1% of the calibrated range
Long-term stability (for the nominal measuring range)	≤ accuracy for 3 years ≤ 2 x accuracy for 5 years HS version: ≤ accuracy for 6 years HS version: ≤ 2 x accuracy for 10 years
Thermal error	< ±0,08% (FSO) / 10°C 0,1% for ranges no. 14, 15, 17 max. ±0,25% (FSO) in the whole compensation range (0,4% for ranges 14, 15, 17)
Thermal compensation range	-25...80°C Special version: -40...80°C
Response time	16...230ms (programmable)
Additional electronic damping	0...60 s
Error due to supply voltage changes	0,002% (FSO) / V

Electrical parameters

Power supply:	7,5...55 VDC (Ex ia 7,5...28 VDC)
Output signal	4...20 mA, two wire transmission
Loadresistance	$R[\Omega] \leq \frac{U_{supL}[V] - 7,5V}{0,0225A}$
Resistance required for communication	min. 240 Ω

Accuracy depending on the set range



ρ_0 – error for nominal measuring range (0...100% FSO)

ρ_1 – error for range 0...10% FSO

$\rho_1 = 2 \times \rho_0$

Numerical error values are given in the technical data under metrological parameters

Materials

Wetted parts and diaphragms: SS316L, Hastelloy C 276, Au

Casing: SS304

Operating conditions

Operating temperature range (ambient temp.) -40...85°C

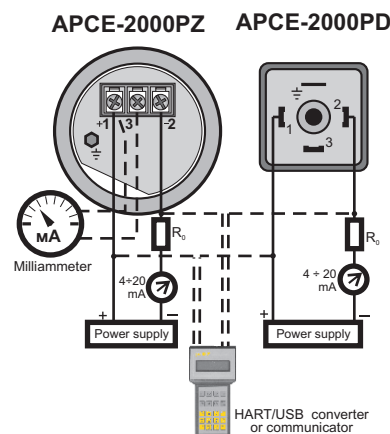
Ex version -40...80°C

Medium temperature range -40...120°C

over 120°C – measurement with use an impulse line or diaphragm seals
up to 100°C – PED version

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

Electrical diagram



Ordering procedure

Model	Code	Description																																														
APCE-2000		Smart pressure transmitter																																														
Casing, output signal, electrical connection	/PD..... /PZ.....	Housing IP65 with DIN43650 connector, without display, output 4-20mA + Hart 304SS housing, IP66, without display, output 4-20mA + Hart packing gland M20x1,5																																														
Versions, certificates	/Exia..... /PED..... /HS..... /Tlen..... /-60...+50°C.....	<div style="display: flex; align-items: center;"> <div style="margin-right: 10px;"> </div> <div> II 1/2G Ex ia IIC T4/T5/T6 Ga/Gb II 1D Ex ia IIIC T110°C Da I M1 Ex ia I Ma Exia for HS version available from Q4/2016 European Pressure Equipment Directive N° 97/23/EC, category IV not available for transmitters with Hastelloy C 276 wetted parts Ultra stable version (only ranges no. 3+17, process connections: P, GP and 1/2"NPTM) For oxygen service (sensor filled with Fluorolube fluid), only M and G1/2 connection Extended thermal compensation range -60 + 50°C </div> </div>																																														
more than one option is available																																																
Nominal measuring range	/0+1000 bar.....	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: center;">Range</th> <th style="text-align: center;">Min. set range</th> </tr> </thead> <tbody> <tr> <td>0+1000 bar (0+100 MPa)</td> <td>10 bar (1 MPa)</td> </tr> <tr> <td>0+600 bar (0+60 MPa)</td> <td>6 bar (600 kPa)</td> </tr> <tr> <td>0+300 bar (0+30 MPa)</td> <td>3 bar (300 kPa)</td> </tr> <tr> <td>0+160 bar (0+16 MPa)</td> <td>1,6 bar (160 kPa)</td> </tr> <tr> <td>0+70 bar (0+7 MPa)</td> <td>0,7 bar (70 kPa)</td> </tr> <tr> <td>0+25 bar (0+2,5 MPa)</td> <td>0,25 bar (25 kPa)</td> </tr> <tr> <td>0+7 bar (0+700 kPa)</td> <td>0,07 bar (7 kPa)</td> </tr> <tr> <td>-1+7 bar (-100+700 kPa)</td> <td>0,07 bar (7 kPa)</td> </tr> <tr> <td>-1+1,5 bar (-100+150 kPa)</td> <td>120 mbar (12 kPa)</td> </tr> <tr> <td>0+2 bar (0+200 kPa)</td> <td>100 mbar (10 kPa)</td> </tr> <tr> <td>0+1 bar (0+100 kPa)</td> <td>50 mbar (5 kPa)</td> </tr> <tr> <td>-0,5+0,5 bar (-50+50k Pa)</td> <td>50 mbar (5 kPa)</td> </tr> <tr> <td>0+0,25 bar (0+25 kPa)</td> <td>25 mbar (2,5 kPa)</td> </tr> <tr> <td>-100+100 mbar (-10+10 kPa)</td> <td>20 mbar (2 kPa)</td> </tr> <tr> <td>-15+70 mbar (-1,5+7 kPa)</td> <td>5 mbar (0,5 kPa)</td> </tr> <tr> <td>-25+25 mbar (-2,5+2,5 kPa)</td> <td>2 mbar (0,2 kPa)</td> </tr> <tr> <td>-7+7 mbar (-0,7+0,7 kPa)</td> <td>1 mbar (0,1 kPa)</td> </tr> <tr> <td>0+1,3 bar ABS (0+130 kPa ABS)</td> <td>0,1 bar ABS (10 kPa ABS)</td> </tr> <tr> <td>0+7 bar ABS (0+700 kPa ABS)</td> <td>0,1 bar ABS (10 kPa ABS)</td> </tr> <tr> <td>0+25 bar ABS (0+2,5 MPa ABS)</td> <td>0,25 bar ABS (25 kPa ABS)</td> </tr> <tr> <td>0+70 bar ABS (0+7 MPa ABS)</td> <td>0,7 bar ABS (70 kPa ABS)</td> </tr> <tr> <td>0+300 bar ABS (0+30 MPa ABS)</td> <td>0,3 bar ABS (30 kPa ABS)</td> </tr> </tbody> </table>	Range	Min. set range	0+1000 bar (0+100 MPa)	10 bar (1 MPa)	0+600 bar (0+60 MPa)	6 bar (600 kPa)	0+300 bar (0+30 MPa)	3 bar (300 kPa)	0+160 bar (0+16 MPa)	1,6 bar (160 kPa)	0+70 bar (0+7 MPa)	0,7 bar (70 kPa)	0+25 bar (0+2,5 MPa)	0,25 bar (25 kPa)	0+7 bar (0+700 kPa)	0,07 bar (7 kPa)	-1+7 bar (-100+700 kPa)	0,07 bar (7 kPa)	-1+1,5 bar (-100+150 kPa)	120 mbar (12 kPa)	0+2 bar (0+200 kPa)	100 mbar (10 kPa)	0+1 bar (0+100 kPa)	50 mbar (5 kPa)	-0,5+0,5 bar (-50+50k Pa)	50 mbar (5 kPa)	0+0,25 bar (0+25 kPa)	25 mbar (2,5 kPa)	-100+100 mbar (-10+10 kPa)	20 mbar (2 kPa)	-15+70 mbar (-1,5+7 kPa)	5 mbar (0,5 kPa)	-25+25 mbar (-2,5+2,5 kPa)	2 mbar (0,2 kPa)	-7+7 mbar (-0,7+0,7 kPa)	1 mbar (0,1 kPa)	0+1,3 bar ABS (0+130 kPa ABS)	0,1 bar ABS (10 kPa ABS)	0+7 bar ABS (0+700 kPa ABS)	0,1 bar ABS (10 kPa ABS)	0+25 bar ABS (0+2,5 MPa ABS)	0,25 bar ABS (25 kPa ABS)	0+70 bar ABS (0+7 MPa ABS)	0,7 bar ABS (70 kPa ABS)	0+300 bar ABS (0+30 MPa ABS)	0,3 bar ABS (30 kPa ABS)
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Measuring set range	/...+... [required units]	Calibrated range in relation to 4mA and 20mA output																																														
Process connections	/M.....	Thread M20x1,5 (male) with Ø4 hole, wetted parts SS316L																																														
	/M(Au).....	Thread M20x1,5 (male) with Ø4 hole, gold plated diaphragm (range no. 1, 2, 3, 4, 5)																																														
	/G1/2.....	Thread G1/2" (male) with Ø4 hole, wetted parts SS316L																																														
	/G1/2(Au).....	Thread G1/2" (male) with Ø4 hole, gold plated diaphragm (range no. 1, 2, 3, 4, 5)																																														
	/G1/4.....	Thread G1/4" (male), wetted parts SS316L (Pressure limits: min. 10mbar / max. 400bar)																																														
	/P.....	Thread M20x1,5 (male) with Ø12 hole, wetted parts SS316L																																														
	/P(Hastelloy).....	Thread M20x1,5 (male) with Ø12 hole, wetted parts Hastelloy C 276																																														
	/GP.....	Thread G1/2" (male) with Ø12 hole, wetted parts SS316L																																														
	/GP(Hastelloy).....	Thread G1/2" (male) with Ø12 hole, wetted parts Hastelloy C 276																																														
	/CM30x2.....	Thread M30x2 with flush diaphragm, wetted parts SS316L (Pressure limits: min. 0,1bar / max. 70bar)																																														
	/CM30x2(Hastelloy).....	Thread M30x2 with flush diaphragm, wetted parts Hastelloy C 276 (Pressure limits: min. 0,1bar / max. 70bar)																																														
	/CG1".....	Thread G1" with flush diaphragm, wetted parts SS316L (Pressure limits: min. 0,1bar / max. 70bar)																																														
	CG1"(Hastelloy).....	Thread G1" with flush diaphragm, wetted parts Hastelloy C 276 (Pressure limits: min. 0,1bar / max. 70bar)																																														
/CG1/2".....	Thread G1/2" with flush diaphragm, wetted parts SS316L (Pressure limits: min. 2,5bar / max. 300bar)																																															
/1/2"NPTM.....	Thread 1/2"NPT Male, wetted parts SS316L																																															
/1/2"NPTF.....	Thread M20x1,5 with adapter to 1/2"NPT Female, wetted parts SS316L																																															
/code of diaphragm seal.....	Diaphragm seal (see chapter of diaphragm seals)																																															
Other specification	/.....	Description of required parameters (e.g. non-standard pr/ connection G3/4", M22x1,5)																																														

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