

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:

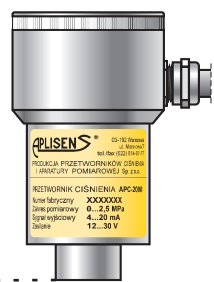
- housing 304ss
- protection IP65
- electrical connection DIN 43650
- the electronics encased in a protective silicon gel
- ATEX Intrinsic safety

II 1/2G
Exia IIC T4/T5/T6 Ga/Gb
I M1 Ex ia I Ma
II 1D Ex ia IIIC T110C Da

APCE-2000PD



APCE-2000PZ

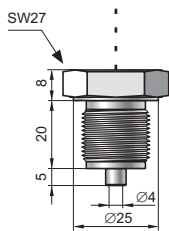


PZ version

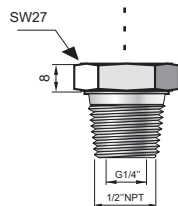
Version designed to work in hard conditions:

- housing material: 304SS / 316SS
- protection IP66
- the electronics encased in a protective silicon gel
- cup with knurled handgrip
- ATEX Intrinsic safety

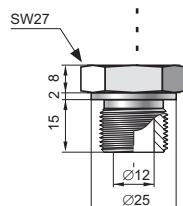
II 1/2G
Exia IIC T4/T5/T6 Ga/Gb
I M1 Ex ia I Ma
II 1D Ex ia IIIC T110C Da



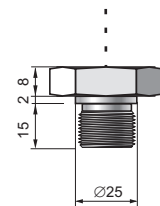
G1/2 type
G1/2", $\varnothing 4$ hole
M type
M20x1.5, $\varnothing 4$ hole



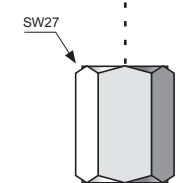
1/2" NPT type
1/2" NPT male +
internal thread G1/4"



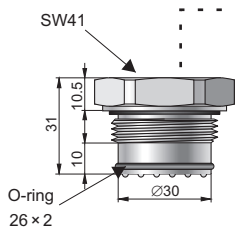
GP type
G1/2", $\varnothing 12$ hole
P type
M20x1.5, $\varnothing 12$ hole



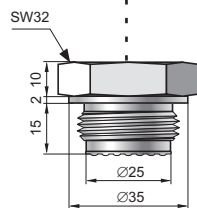
G1/4"



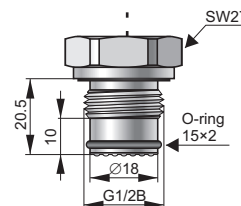
1/2" NPT F type
internal thread 1/2-14NPT



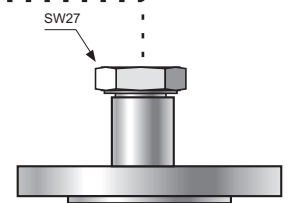
CG1 type
G1" with flush diaphragm



CM30x2 type
M30x2 with flush diaphragm



CG1/2 type
G1/2" with flush diaphragm



Version with direct or remount mount diaphragm seal.
Diaphragm seal data -see chapter III

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 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 the 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.

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 (1MPa)	100:1	1200 bar (120 MPa)
2	0..300 bar (0..30 MPa)	3 bar (300 kPa)	100:1	450 bar (45 MPa)
3	0..160 bar (0..16 MPa)	1,6 bar (160 kPa)	100:1	450 bar (45 MPa)
4	0...70 bar (0..7 MPa)	0.7 bar (70 kPa)	100:1	140 bar (14 MPa)
5	0...25 bar (0..2.5 MPa)	0.25 bar (25 kPa)	100:1	50 bar (5 MPa)
6	0...7 bar (0..0.7 MPa)	0.07 bar (7 kPa)	100:1	14 bar (1.4 MPa)
7	-1...7 bar (-100...700kPa)	0,07bar (7 kPa)	114:1	14 bar (1.4 MPa)
8	0...2 bar (0..200 kPa)	100 mbar (10 kPa)	20:1	4 bar (400 kPa)
9	0...1 bar (0..100 kPa)	50 mbar (5 kPa)	20:1	2 bar (200 kPa)
10	-0.5...0.5 bar (-50...50 kPa)	50 mbar (5 kPa)	20:1	2 bar (200 kPa)
11	0...0.25 bar (0..25 kPa)	25 mbar (2.5 kPa)	10:1	1 bar (100 kPa)
12	-100...100 mbar* (-10...10 kPa)	20 mbar (2 kPa)	10:1	1 bar (100 kPa)
13	-15...70 mbar* (-1.5...7 kPa)	5 mbar (0.5 kPa)	17:1	0.5 bar (50 kPa)
14	0...1.3 bar abs (0..130 kPa abs)	100 mbar abs (10 kPa abs)	13:1	2 bar (200 kPa)
15	0...7 bar abs (0..0,7 MPa abs)	100 bar abs (10 kPa abs)	70:1	14 bar (1.4 MPa)
16	0...25 bar abs (0..2.5 MPa abs)	0.25 bar abs (25 kPa abs)	100:1	50 bar (5 MPa)
17	0...70 bar abs (0..7 MPa abs)	0.7 bar abs (70 kPa abs)	100:1	140 bar (14 MPa)

*only for transmitters without diaphragm seal

**overpressure limit can be different for version according to PED norm N° 97/23/EC

Measurement of lower pressure ranges, possible using transmitter APR-2000GALW with GP process connection (page II/ 12).

Technical data

Metrological parameters

Accuracy	≤ ±0.1% of calibrated range
Long-term stability (for the basic range)	≤ accuracy for 3 years
Thermal error	< ±0.08% (FSO) / 10°C (0.1% for ranges 12, 13) max. ±0.25% (FSO) in the whole compensation range (0.4% for ranges 12, 13)
Thermal compensation range	-25...80°C -40...80°C – special version
Time Constant	300 ms
Additional electronic damping	0...60 s
Error due to supply voltage changes	0.002% (FSO) / V

Electrical parameters

Power supply	7.5...55 V DC (Ex 7.5...28 V)
Output signal	4...20 mA, two wire transmission
Load resistance	$R[\Omega] \leq \frac{U_{sp}[V] - 7,5V}{0,02A} \cdot 0,85$
Resistance required for communication	240...1100 Ω

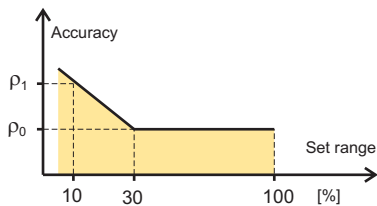
Materials

Wetted parts and diaphragms:	316Lss, Hastelloy C 276, Au
Casing:	304ss
	Optional: 316ss

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 the 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

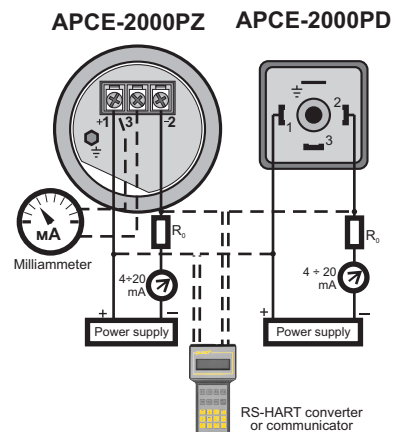
Accuracy depending on the set range



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

ρ_1 – error for range 0...10% FSO

Electrical diagram



Ordering Procedure

Model	Code	Description	
APCE-2000		Smart pressure transmitter.	
Casing, output signal, electrical connection	⇒ PD.....	Housing IP65 with DIN43650 connector, without display, output 4–20mA +Hart.	
	PZ.....	304SS housing, IP66, without display, output 4–20mA + Hart packing gland M20x1,5	
	PZ/316ss.....	316SS housing, IP66, without display, output 4-20mA + Hart	
Versions, certificates*	/EExia.....	Ex II 1/2G Exia IIC T4/T5/T6 Ga/Gb and I M1 Exia I Ma, II 1D Ex ia IIIC T110°C Da	
	/PED.....	European Pressure Equipment Directive N° 97/23/EC, category IV	
	/Tlen.....	For oxygen service (sensor filled with Fluorolube fluid, only M and G1/2 Process connection)	
	/-60...+50C.....	Extended thermal compensation range -60 - 50°C	
*) more than one option is available	/-40...+80C.....	Extended thermal compensation range -40 - 80°C	
Nominal measuring range		Range	Min. set range
	/0+1000bar.....	0+1000bar (0+100MPa)	10bar (1MPa)
	/0+300bar.....	0+300bar (0+30MPa)	3bar (300kPa)
	/0+160bar**.....	0+160bar (0+16MPa)	1,6 bar (160kPa)
	/0+70bar.....	0+70bar (0+7MPa)	0,7bar (70kPa)
	/0+25bar.....	0+.25bar (0+2,5MPa)	0,25bar (25kPa)
	/0+7bar.....	0+7bar (0+700kPa)	0,07bar(7kPa)
	/0+2bar.....	0+2bar (0+200kPa)	100mbar (10kPa)
	/0+1bar.....	0+1bar (0+100kPa)	50mbar (5kPa)
	/0+0,25bar.....	0+0,25bar (0+25kPa)	25mbar (2,5kPa)
	/-0,5+ 0,5bar.....	-0,5+0,5bar (-50+50kPa)	50mbar (5kPa)
	/-1+6bar.....	-1+6bar (-100+600kPa)	300mbar (30kPa)
	/-100+100mbar.....	-100+100mbar (-10+10kPa)	20mbar (2kPa)
	/-15+70mbar.....	-15+70mbar (-1,5+7kPa)	5mbar (0,5kPa)
	/0+1.3bar ABS.....	0+1.3bar absolute pressure (0+130kPa abs)	100mbar abs (10kPa abs)
	/0+7barABS.....	0+7bar absolute pressure (0+700kPa abs)	0,07bar abs (7kPa abs)
/0+25barABS.....	0+25bar absolute pressure (0+2.5MPa abs)	0,25bar abs (25kPa abs)	
/0+70bar ABS.....	0+70bar absolute pressure (0+7MPa abs)	0,7bar abs (70kPa abs)	
** non-standard ranges available on request			
Measuring set range	/...⇒... [required units]	Start and end of calibrated range in relation to 4mA and 20mA output	
Process connections	⇒ /M.....	Thread M20x1,5 (male) with Ø4hole, wetted parts SS316L	
	/M.(Au).....	Thread M20x1,5 (male) with Ø4hole, gold plated diaphragm (range no. 1, 2, 3, 4)	
	/G1/2.....	Thread G1/2" (male) with Ø4hole, wetted parts SS316L	
	/G1/2"(Au).....	Thread G1/2" (male) with Ø4hole, gold plated diaphragm (range no. 1, 2, 3, 4)	
	/G1/4".....	Thread G1/4" (male), wetted parts SS316L (Pressure limits: min. 10mbar / max. 350bar)	
	/P.....	Thread M20x1,5 (male) with Ø12hole, wetted parts SS316L	
	/P. (Hastelloy).....	Thread M20x1,5 (male) with Ø12hole, wetted parts Hastelloy C 276	
	/GP.....	Thread G1/2" (male) with Ø12hole, wetted parts SS316L	
	/GP (Hastelloy).....	Thread G1/2" (male) with Ø12hole, 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)	
	/CG1/2".....	Thread G1/2" with flush diaphragm, wetted parts SS316L (Pressure limits: min. 2,5bar / max. 600bar)	
/1/2"NPT M.....	Thread ½"NPT Male, wetted parts SS316L		
/1/2"NPT F.....	Thread M20x1,5 with adapter to ½"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 process connection G3/4" or M22x1.5	

The most typical specification is marked by "⇒" mark.

Example : Pressure transmitter, output 4..20mA + HART, version EExia, nominal measuring range 0..7bar, calibrated range 0..6bar, process connection M20x1,5, electrical connection DIN43650 connector.

APCE-2000PD/EExia/0..7bar/0..6bar/M