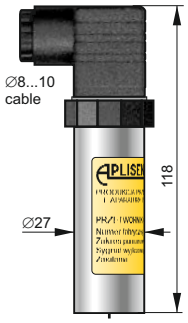
SMART PRESSURE TRANSMITTER
PCE-28.SMART

HART COMMUNICATION PROTOCOL

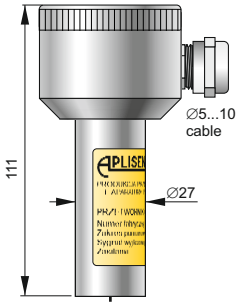
- ✓ **4…20 mA output signal + HART protocol**
- ✓ **Safety version SIL2**
- ✓ **Intrinsic safety certificate (ATEX, IECEx)**
- ✓ **Accuracy 0,1% (special version 0,075%)**
- ✓ **Marine certificate – DNV, BV**

SIL2 version now available

PD type
PD316 type
IP65

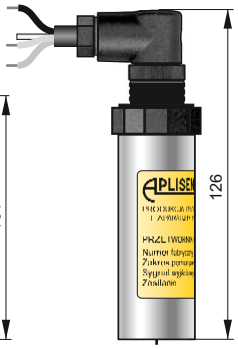


PZ type
IP66

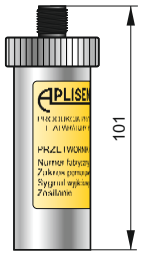


PM12 type
IP65

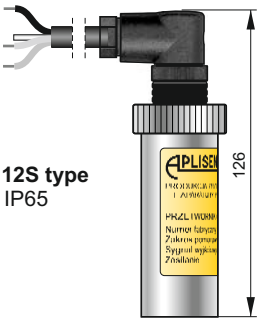
PM12K type
IP67



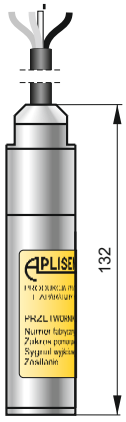
PKD type
IP67



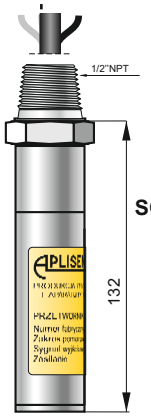
PM12S type
IP65



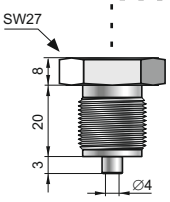
PM12SK type
IP67



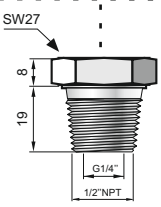
SG type
IP68



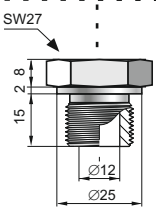
SGM type
IP68



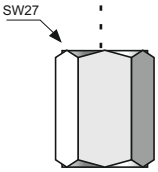
G1/2 type
G1/2″, ∅4 hole
M type
M20×1.5, ∅4 hole



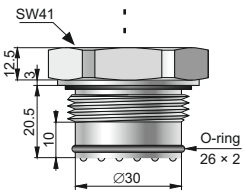
1/2"NPT type
1/2"NPT male +
internal thread G1/4"



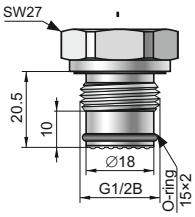
GP type
G1/2″, ∅12 hole
P type
M20×1.5, ∅12 hole



1/2"NPT F type
internal thread 1/2-14NPT
(adapter)
1/4"NPT F type
internal thread 1/4-18NPT

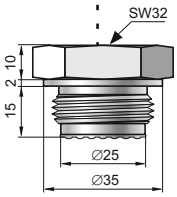


CG1 type
G1″ with flush
diaphragm

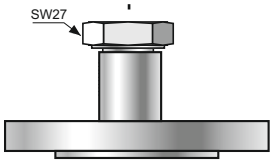


CG1/2 type
G1/2″ with
flush diaphragm

for P≤350bar



CM30×2 type
M30×2 with flush
diaphragm



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

Application

PCE-28.SMART pressure transmitter is applicable to the measurement of the pressure, underpressure and 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.

Communication

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 converter and Raport 2 configuration software.

(*) .eddl files available on www.aplisens.com.

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

Installation

The transmitter is not heavy, so it can be installed 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. 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	1000 bar	(100 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	-1...70 bar	(-0,1...7 MPa)	0,71 bar	(71 kPa)	100:1	140 bar	(14 MPa)
7	0...25 bar	(0...2,5 MPa)	0,25 bar	(25 kPa)	100:1	50 bar	(5 MPa)
8	-1...25 bar	(-0,1...2,5 MPa)	0,26 bar	(26 kPa)	100:1	50 bar	(5 MPa)
9	0...7 bar	(0...0,7 MPa)	0,07 bar	(7 kPa)	100:1	14 bar	(1,4 MPa)
10	-1…7 bar	(-100…700 kPa)	0,07 bar	(7 kPa)	114:1	14 bar	(1,4 MPa)
11	-1…1,5 bar	(-100…150 kPa)	0,12 bar	(12 kPa)	20:1	4 bar	(400 kPa)
12	0...2 bar	(0...200 kPa)	100 mbar	(10 kPa)	20:1	4 bar	(400 kPa)
13	0...1 bar	(0...100 kPa)	50 mbar	(5 kPa)	20:1	2 bar	(200 kPa)
14	-0,5...0,5 bar	(-50...50 kPa)	50 mbar	(5 kPa)	20:1	2 bar	(200 kPa)
15	0...0,25 bar	(0...25 kPa)	25 mbar	(2,5 kPa)	10:1	1 bar	(100 kPa)
16	-100...100 mbar	(-10...10 kPa)	20 mbar	(2 kPa)	10:1	1 bar	(100 kPa)
17	-15...70 mbar *	(-1,5...7 kPa)	5 mbar	(0,5 kPa)	17:1	0,5 bar	(50 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)

* *only for tranmitters without diaphragm seal*

Technical data

Metrological parameters

Accuracy ≤ ±0,1% of calibrated range (special version ≤ ±0,075% 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 no. 16, 17)
max. ±0,25% (FSO) in the whole compensation range (0,4% for ranges 16, 17)

Thermal compensation range -25...80°C
-40...80°C – special version

Additional electronic damping 0...30 s

Error due to supply voltage changes 0.002% (FSO) / V

Electrical parameters

Power supply 7,5...55 V DC
Ex version 7,5...30 V DC
Safety version 10…30 V DC

Output signal 4...20 mA, two wire transmission

Load resistance $R[\Omega] \le \frac{U_{sup}[V] - 7{,}5V}{0{,}0225A}$

Resistance required for communication min. 240Ω

Materials

Wetted parts and diaphragms: 316Lss, Hastelloy C276, Au

*Gold plating is dedicated to measuring the pressure of hydrogen and gaseous media with hydrogen admixture for measurement ranges above 70 bar

Casing: 304ss
Optional: 316ss

Operating conditions

Operating temperature range (ambient temp.) -40...85°C
Exia version: -40…80°C
Safety version: -25…80°C

Medium temperature range -40...120°C

over 120°C – measurement with use an 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

Ordering procedure

Model	Code	Description
PCE-28.SMART		Smart pressure transmitter
Versions, certificates	/Safety	Functional Safety certificate according to: PN-EN 61508:2010 parts 1 ÷ 7, PN-EN 61511-1:2017 + PN-EN 61511-1:2017/A1:2018-03, PN-EN 62061:2008 + PN-EN 62061:2008/A1:2013-06 + PN-EN 62061:2008/A2:2016-01
	/Exia	II 1/2G Ex ia IIC T4/T5/T6 Ga/Gb II 1D Ex ia IIIC T105°C Da I M1 Ex ia I Ma Ex ia IIC T4/T5/T6 Ga/Gb **IECEx** Ex ia IIIC T105°C Da Ex ia I Ma For PM12, PKD version: II 1/2G Ex ia IIC T4/T5/T6 Ga/Gb **IECEx** Ex ia IIC T4/T5/T6 Ga/Gb
more than one option is available	/0,075%	Accuracy class 0,075%
	/MR	Marine certificate – DNV, BV
	/Tlen	For oxygen service (sensor filled with non-reactive fluid), only G1/2" connection
	/-40…+80°C	Extended thermal compensation range -40 ÷ 80°C
	/NACE	NACE MR-01-75 certificate (process connections: M, G1/2", P, GP and 1/2"NPTM)

Nominal measuring range		Range	Min. set range
	/0÷1000 bar	0÷1000 bar (0÷100 MPa)	10 bar (1 MPa)
	/0÷600 bar	0÷600 bar (0÷60 MPa)	6 bar (600 kPa)
	/0÷300 bar	0÷300 bar (0÷30 MPa)	3 bar (300 kPa)
	/0÷160 bar	0÷160 bar (0÷16 MPa)	1,6 bar (160 kPa)
	/0÷70 bar	0÷70 bar (0÷7 MPa)	0,7 bar (70 kPa)
	/-1÷70 bar	-1÷70 bar (-0,1÷7 MPa)	0,71 bar (71 kPa)
	/0÷25 bar	0÷25 bar (0÷2,5 MPa)	0,25 bar (25 kPa)
	/-1÷25 bar	-1÷25 bar (-0,1÷2,5 MPa)	0,26 bar (26 kPa)
	/0÷7 bar	0÷7 bar (0÷700 kPa)	0,07 bar (7 kPa)
	/-1÷7 bar	-1÷7 bar (-100÷700 kPa)	0,07 bar (7 kPa)
	/-1÷1,5 bar	-1÷1,5 bar (-100÷150 kPa)	120 mbar (12 kPa)
	/0÷2 bar	0÷2 bar (0÷200 kPa)	100 mbar (10 kPa)
	/0÷1 bar	0÷1 bar (0÷100 kPa)	50 mbar (5 kPa)
	/-0,5÷0,5 bar	-0,5÷0,5 bar (-50÷50k Pa)	50 mbar (5 kPa)
	/0÷0,25 bar	0÷0,25 bar (0÷25 kPa)	25 mbar (2,5 kPa)
	/-100÷100 mbar	-100÷100 mbar (-10÷10 kPa)	20 mbar (2 kPa)
	/-15÷70 mbar	-15÷70 mbar (-1,5÷7 kPa)	5 mbar (0,5 kPa)
	/0÷1,3 bar ABS	0÷1,3 bar ABS (0÷130 kPa ABS)	0,1 bar ABS (10 kPa ABS)
	/0÷7 bar ABS	0÷7 bar ABS (0÷700 kPa ABS)	0,1 bar ABS (10 kPa ABS)
	/0÷25 bar ABS	0÷25 ABS (0÷2,5 MPa ABS)	0,25 bar ABS (25 kPa ABS)
	/0÷70 bar ABS	0÷70 bar ABS (0÷7 MPa ABS)	0,7 bar ABS (70 kPa ABS)
	/0÷300 bar ABS	0÷300 bar ABS (0÷30 MPa ABS)	0,3 bar ABS (30 kPa ABS)

Configuration according to request	/[required settings]	Set range, units, transfer function, damping etc.
Casing, electrical connection	/PD	304SS housing. IP65 with DIN EN 175301-803 connector
	/PD316	316LSS housing, IP65 with DIN EN 175301-803 connector
	/PZ	304SS housing, IP66, packing gland M20x1,5
	/PM12	304SS housing, IP65 with thread M12x1 (without cable and connector)
	/PM12K	304SS housing, IP67 with thread M12x1 and connector with cable (3 m in standard)
	/PM12S	304SS housing, IP65 with thread M12x1 (without cable and connector), stainless steel version
	/PM12SK	304SS housing, IP67 with thread M12x1 and connector with cable (3 m in standard), stainless steel version
	/PKD	304SS housing, IP67 cable electrical connection (3 m in standard)
	/SG	316LSS housing, IP68, cable electrical connection (3 m in standard)
	/SGM	316LSS housing, IP68, cable electrical connection (3 m in standard)
Process connections	/M	Thread M20x1,5 (male) with ∅4 hole, wetted parts SS316L
	/G1/2	Thread G1/2'' (male) with ∅4 hole, wetted parts SS316L
	/G1/2(Au)	Thread G1/2'' (male) with ∅4 hole, gold plated diaphragm (range no. 1, 2, 3, 4, 5)
	/G1/4	Thread G1/4'' (male), wetted parts SS316L (Pressure limits: min 1bar / max. 400bar)
	/P	Thread M20x1,5 (male) with ∅12 hole, wetted parts SS316L — Not available with range no. 1, 2
	/GP	Thread G1/2'' (male) with ∅12 hole, wetted parts SS316L — Not available with range no. 1, 2
	/GP(Hastelloy)	Thread G1/2'' (male) with ∅12 hole, wetted parts Hastelloy C 276 — Not available with range no. 1, 2
	/CM30x2	Thread M30x2 with flush diaphragm, wetted parts SS316L (Pressure limits: min. 0,25bar / max. 70bar)
	/CM30x2(Hastelloy)	Thread M30x2 with flush diaphragm, wetted parts Hastelloy C 276 (Pressure limits: min. 0,25bar / max. 70bar)
	/CG1"	Thread G1'' with flush diaphragm, wetted parts SS316L (Pressure limits: min. 0,1bar / max. 70bar) (Max medium temperature continu-ous/instantaneous 100/130°C)
	/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. 350bar) (Max medium temperature continu-ous/instantaneous 100/130°C)
	/1/2"NPTM	Thread 1/2''NPT Male, G1/4" Female, wetted parts SS316L (Pressure limits: 1/2"NPT Male max. 690bar, G1/4" Female max. 1000bar)
	/1/2"NPTF	Thread G1/2" or M20x1,5 with adapter to 1/2"NPT Female, wetted parts SS316L (Pressure limits: max. 690bar)
	/1/4"NPTF	Thread 1/4''NPT Female, wetted parts SS316L (Pressure limits: min 10bar / max. 690bar)
	/code of diaphragm seal	Diaphragm seal (see chapter of diaphragm seals)
Accessories	/MT	Stainless Steel Tag plate mounted on wire
	/PT	TAG sticker on transmitter's body
	/PC	Mounting bracket PC type for for fitting on a wall
	/PCR	Mounting bracket PC type for for fitting on a 2" pipe
Other specification	/	Description of required parameters

Example: Pressure transmitter, output 4...20mA + HART, version Exia, nominal measuring range 0...7bar, calibrated range 0…6bar, process connection 1/2"NPT male, electrical connection DIN EN 175301-803 connector.

PCE-28.SMART/Exia/0..7bar/0..6bar/PD/1/2"NPTM