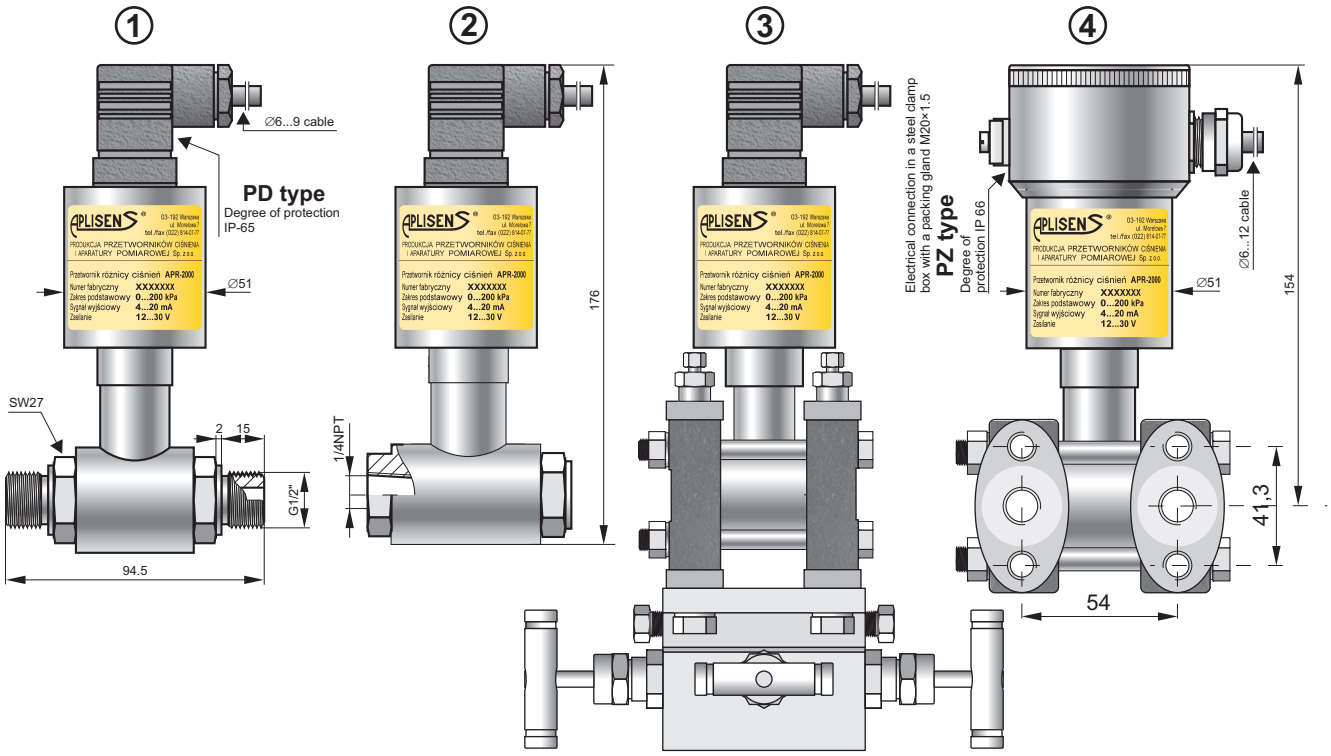
SMART DIFFERENTIAL PRESSURE TRANSMITTER APRE-2000

- ✓ **4…20 mA output signal + HART protocol**
- ✓ **ATEX Intrinsic safety**
- ✓ **Static pressure limit up to 320 bar**
- ✓ **Accuracy 0.1%**
- ✓ **Wetted parts material 316L**



1) Transmitter **APRE-2000PD** version with **GP type** process connection; **2)** Transmitter **APRE-2000PD** version with **PN type** process connection; **3)** Transmitter **APRE-2000PD** – version with **type CH** process connection rotated 90°; **4)** Transmitter **APRE-2000PD** – version with **type C** process connection

Application and construction

The APRE-2000 transmitter is applicable to the measurement of differential pressure of gases, vapors and liquids. The active element is a piezoresistant silicon sensor separated from the medium by separating diaphragms and a specially selected type of manometric fluid. The special design of the active sensing element ensures that it is able to withstand pressure surges and overloads of up to 250 or 320 bar. Electronics in the casing with a degree of protection IP65, IP66.

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 with the HART/USB converter and Aplisens RAPORT 2 configuration software.

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

The data interchange with the transmitter enables user to:

- ♦ identify the transmitter;
- ♦ configure the output parameters:
  - – measurement units and values of the start and end-points of the measuring 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 model pressure.

Installation

The transmitter with **P type** process connection is not heavy, so it can be fitted directly onto impulse lines. For fitting in any desired position on a ∅25 pipe an Aplisens mounting bracket (**Fi 25 mounting bracket**, see page IV/ 5) is recommended.

The version with **C type** process connections can be fitted directly to a 3- or 5-valve manifold. We recommend factory-mounted transmitters with VM type valve manifold (see page IV/ 2). A transmitter without a valve manifold can be fitted in any position on a 2″ pipe or on a wall using the **C-2″ mounting bracket** (see page IV/ 5).

When the special process connections are required for the level measurement of media in closed tanks (e.g. in the sugar and chemical industries) the transmitter is fitted with an Aplisens diaphragm seal. Sets of differential pressure transmitters with diaphragm seals are described in detail presented in the further part of the catalogue.

Measuring ranges

No.	Nominal measuring range (FSO)		Minimum set range		Rangeability	Overpressure limit/ static pressure limit
1	0...70 bar	(0...7 MPa)	7 bar	(700 kPa)	10:1	C-type: 250 / 320 bar (250 bar for PED version) GP-type: 40 bar (for range no. 1: 70bar)
2	0...16 bar	(0...1,6 MPa)	1,6 bar	(160 kPa)	10:1	
3	0...2,5 bar	(0...250 kPa)	0,2 bar	(20 kPa)	12,5:1	
4	0...1 bar	(0...100 kPa)	50 mbar	(5k Pa)	20:1	
5	0...0,25 bar	(0...25 kPa)	10 mbar	(1k Pa)	25:1	
6	-0,5...0,5 bar	(-50...50 kPa)	0,1 bar	(10 kPa)	10:1	
7	-100…100 mbar	(-10…10 kPa)	10 mbar	(1 kPa)	20:1	
8	-5...70 mbar	(-0,5...7 kPa)	4 mbar	(0,4 kPa)	18:1	

Technical data

Metrological parameters

Accuracy ≤ ±0,1% of calibrated range

Long term stability ≤ accuracy for 3 years

(for the nominal measuring range) ≤ 2 x accuracy for 5 years

Thermal error < ±0,08% (FSO) / 10°C

max. ±0,3% (FSO) in the whole compensation range

Thermal compensation range -25…80°C

Zero shift error for static pressure

0,01% (FSO) / 10 bar for ranges no. 3, 4, 5, 6, 7

0,03% (FSO) / 10 bar for range no. 8

0,06% (FSO) / 10 bar for ranges no. 1, 2

Zeroing the transmitter in conditions of static pressure can eliminate this error.

Additional electronic damping 0…30 s

Error due to supply voltage changes 0,002% (FSO) / V

Electrical parameters

Power supply

7,5...55 VDC (Ex ia 7,5...30 VDC)

Output signal 4...20 mA + HART

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

Resistance required for communication min. 240 Ω

Materials

Wetted parts SS316L

Diaphragms SS316L

Casing SS304

Operating conditions

Operating temperature range (ambient temp.) -25...85°C

Exi a version -25…80°C

Medium temperature range -25...120°C

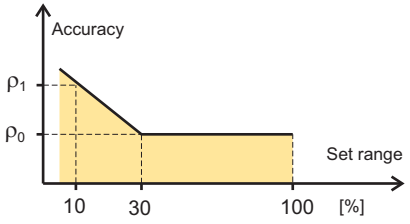
PED version -25...100°C

over 120°C – measurement with use an impulse line or diaphragm seals

up to 100°C – version for 413bar static pressure

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 range 30...100% FSO

ρ_1 – error for range 10% FSO

$\rho_1 = 2 \times \rho_0$

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

Ordering procedure

Model	Code	Description
APRE-2000		Smart differential pressure transmitter
Casing, output signal, electrical connection	/PD	Housing IP65 with DIN EN 175301-803 connector, without display, output 4-20mA + Hart
	/PZ	304SS housing, IP66, without display, output 4-20mA + Hart
Versions, certificates more than one option is available	/Exia	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
	/Tlen	For oxygen service (sensor filled with Fluorolube fluid)
	/320 bar	Static pressure 320 bar, only for C process connection
	/NACE	NACE MR-01-75 certificate (only process connections type C)

Nominal measuring range		Range	Min. set range
	/0÷70 bar	0÷70 bar (0÷7000 kPa)	7 bar (700 kPa)
	/0÷16 bar	0÷16 bar (0÷1600 kPa)	1,6 bar (160 kPa)
	/0÷2,5 bar	0÷2,5 bar (0÷250 kP)	0,2 bar (20 kPa)
	/0÷1 bar	0÷1 bar (0÷100 kPa)	50 mbar (5 kPa)
	/0÷0,25 bar	0÷0,25 bar (0÷25 kPa)	10 mbar (1 kPa)
	/-0,5÷0,5 bar	-0,5÷0,5 bar (50÷50 kPa)	0,1 bar (10 kPa)
	/-0,1÷0,1 bar	-0,1÷0,1 bar (-10÷10 kPa)	10 mbar (1 kPa)
	/-5÷70 mbar	-5÷70 mbar (0,5÷7 kPa)	4 mbar (0,4 kPa)

Measuring set range	/…÷… [required units]	Calibrated range in relation to 4mA and 20mA output
Process connections	/C	Thread 1/4NPT F on the cover flanges cover flanges material SS316L. Allows mounting with a valve manifold. Process connection of cover flange: M10 (option /C(7/16) - 7/16"UNF acc. to IEC 61518), wetted parts material: SS316L
	/CH	C-type process connection rotated 90°
	/GP	Thread G1/2" (male), wetted parts material: SS316L
	/PN	Thread 1/4"NPT (female), wetted parts material: SS316L
	/code of diaphragm seal	Diaphragm seal (see chapter of diaphragm seals) mounted on Hi side of transmitter, Lo side 1/4NPT Female
Gasket (refers only to C, CH process connection)	(without marking)	FPM Viton
	/NBR	NBR
	/PTFE	PTFE
Accessories	/C-2"	Mounting bracket for 2" pipe (to C process conn.), mat. zinced steel
	/C-2"(SS)	Mounting bracket for 2" pipe (to C process conn.), mat. ss304
	/C-2"(SS316)	Mounting bracket for 2" pipe (to C process conn.), mat. ss316
	/C-2"B	Mounting bracket for 2" pipe (to C(7/16) process conn.), mat. zinced steel
	/C-2"B(SS)	Mounting bracket for 2" pipe (to C(7/16) process conn.), mat. ss304
	/C-2"B(SS316)	Mounting bracket for 2" pipe (to C(7/16) process conn.), mat. ss316
	/FI25	Mounting bracket for 1" pipe (to P process conn.), mat. Stainless Steel
	/RedSpaw GP	Connector to weld impulse pipes dia. 12 and 14 mm, material 15HM(SO) or SS316(S). Only process connection GP type
	/RedSpaw C	Connector to weld impulse pipes dia. 12 and 14 mm, material 15HM. Only process connection C type.
	/Red d/P 1/2''	Adapter for differential pressure transmitters with C type process connection, output thread 1/2NPT F. Material SS316L
Other specification	/...	Description of required parameters

Example 1: Differential pressure transmitter, output 4..20mA + HART, version Exia, static pressure 320bar, nominal measuring range 0..2bar, calibrated range 0..1,6bar, process connection C, stainless steel housing, mounting bracket for 2" pipe

APRE-2000PZ/Exia/320bar/0..2bar/0..1,6bar/C/C-2"

Example 2: Differential pressure transmitter, output 4..20mA + HART, nominal measuring range 0..1bar, calibrated range 0..1bar, process connection flange diaphragm seal DN80PN40 , electrical connection with DIN EN 175301-803 connector.

APRE-2000PD/0..1bar/0..1bar/S-P DN80PN40