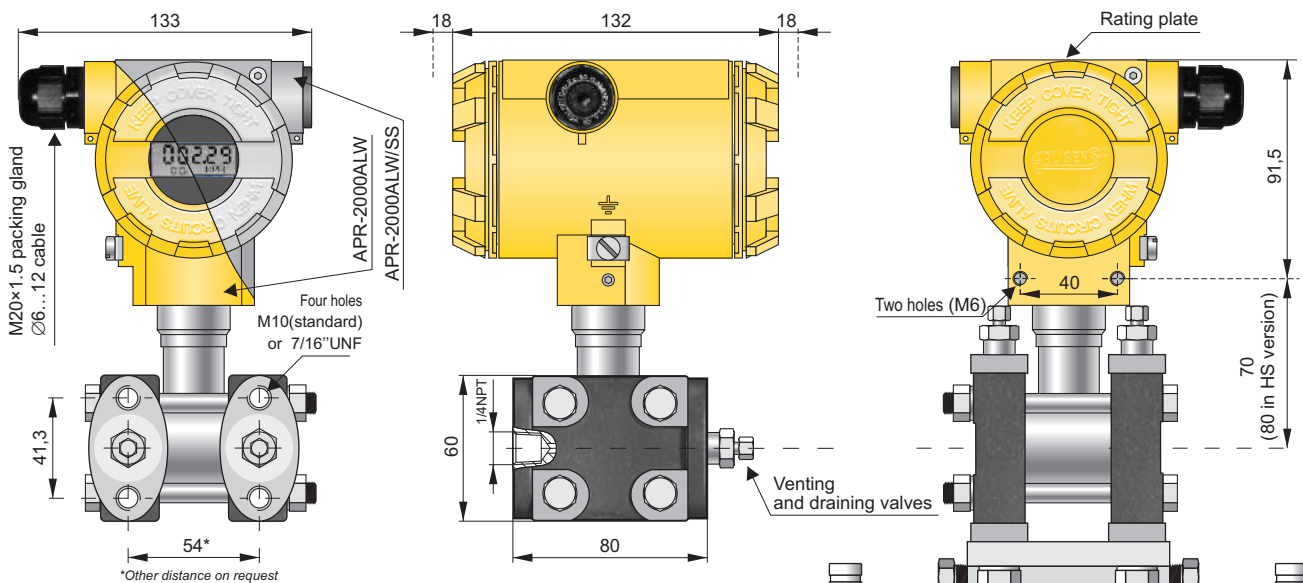


# SMART DIFFERENTIAL PRESSURE TRANSMITTER APR-2000ALW



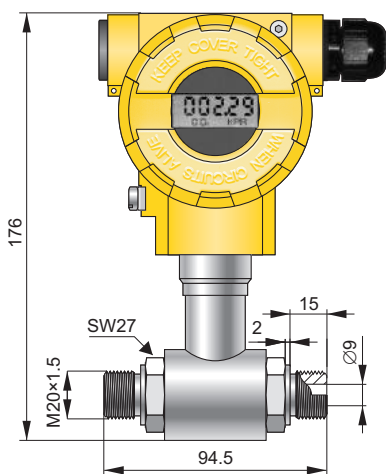
- ✓ 4...20 mA, 0...20 mA or 0...5 mA output signal + HART protocol
- ✓ Display with backlight
- ✓ SIL 2 certificate
- ✓ Intrinsic safety certificate (ATEX, IECEx)
- ✓ Explosion proof certificate (ATEX, IECEx)
- ✓ PED Conformity (97/23/EC)
- ✓ Programmable zero range, shift, characteristic and damping ratio with local panel keys
- ✓ Static pressure limit up to 420bar
- ✓ Accuracy 0,075% (0,05% on request)
- ✓ Marine certificate – DNV, BV
- ✓ Gold plated diaphragms
- ✓ Wetted parts material Hastelloy C276

now  
**5 years warranty**

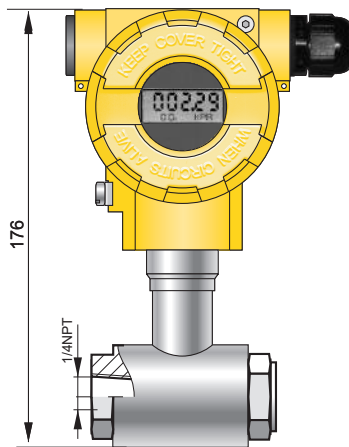


Transmitter **APR-2000ALW** – version with **type C** process connection to be mounted together with a valve manifold

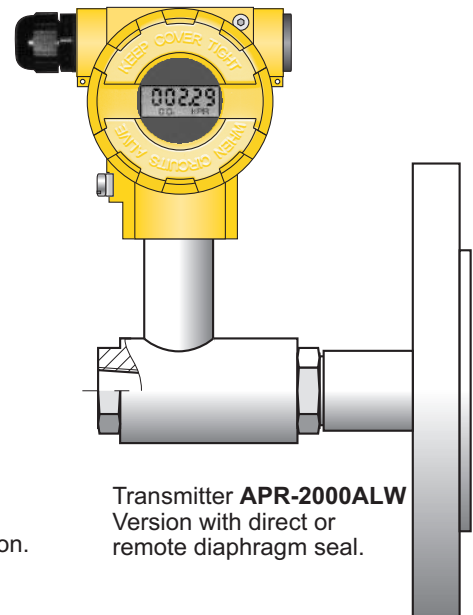
Version with process connection rotated 90°



Transmitter **APR-2000ALW**  
Version with **P** type process connection.



Transmitter **APR-2000ALW**  
Version with **PN** type process connection.



Transmitter **APR-2000ALW**  
Version with direct or remote diaphragm seal.

## Application and construction

The APR-2000ALW transmitter is applicable to the measurement of differential pressure of gases, vapours 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 250/320/420 bar. The casing is made of aluminium alloy cast or 316SS stainless steel, degree of protection IP66/IP67. The design of the casing enables the use of a local display, rotation of the display, rotation of the casing by 0–340° relative to the sensor, and a choice of cable direction.

## 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.

(\*) .eddl files available on [www.aplisens.com](http://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 with **P** or **PN** type process connection is not heavy, so can be installed without additional mounting bracket on application. For fitting in any desired position we recommend an universal Aplisens mounting bracket for 2" pipe (AL mounting bracket, see page IV/ 5). 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 (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 (page IV/ 5). When the special process connections are required for the measurement of specific media levels 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 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 / 420 bar (250 bar for PED version) P-type: 40 bar (for range no. 1: 70bar)
2	0...16 bar *	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 *	50 mbar (5k Pa)	20:1	
5	0...0,25 bar *	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	
9	-25...25 mbar * (-2,5...2,5 kPa)	2 mbar (0,2 kPa)	25:1	
10	-7...7 mbar ** (-700...700 Pa)	1 mbar (0,1 kPa)	14:1	

\* available also in HS version

\*\* available only in HS version

HS version with Exd certificate available from Q3/2016

## Technical data

### Metrological parameters

**Accuracy**  $\leq \pm 0,075\%$  of the calibrated range  
( $\leq \pm 0,1\%$  for range no. 10)

Special version:  $\leq \pm 0,05\%$  of the calibrated range

**Long term stability**  $\leq$  accuracy for 3 years  
(for the nominal measuring range)  $\leq 2 \times$  accuracy for 5 years

HS version:  $\leq$  accuracy for 6 years

**Thermal error**  $< \pm 0,05\%$  (FSO) / 10°C for ranges no. 1 - 9  
 $< \pm 0,08\%$  (FSO) / 10°C for ranges no. 10  
max.  $\pm 0,25\%$  (FSO) in the whole compensation range  
special version for ranges no 1-9:

$\leq \pm 0,03\%$  (FSO) / 10°C

max.  $\pm 0,1\%$  (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, 9

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

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

0,01% (FSO) / 10 bar for ranges no. 2, 8 in HS version

0,02% (FSO) / 10 bar for range no. 10

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

**Response time** 16...480ms (programmable)

**Additional electronic damping** 0...60 s

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

### Electrical parameters

**Power supply:**

10...55 VDC / Exia: 10,5...30 VDC / Exd: 13,5(10,5)...45 VDC

SIL2: 15...45 VDC / SIL2 Exia: 16...28 VDC

APR-2000ALE: 12...36 VDC

**Additional voltage drop**

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

APR-2000ALE: 0...20 / 0...5 / 4...20 mA

**Load resistance** (for standard version)

$$R[\Omega] \leq \frac{U_{sup}[V] - 10V}{0,0225A}$$

**Resistance required for communication**

min. 240  $\Omega$

### Materials

**Wetted parts**

type P, PN process connection: SS316L

type P(H) process connection: SS316L or Hastelloy C276

type C process connection: SS316L

**Diaphragms**

SS316L, Hastelloy C 276, Au

**Casing**

Aluminium

Option: SS316

Material of window: polycarbonate glass, hardened glass

### Materials

**Wetted parts**  
SS316L

type P, PN process connection:

type P(H) process connection: SS316L or Hastelloy C276

type C process connection: SS316L

**Diaphragms**

SS316L, Hastelloy C 276, Au

**Casing**

Aluminium

Option: SS316

Material of window: polycarbonate glass, hardened glass

### Operating conditions

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

special version -40...85°C

Exia version -25...80°C

Exd version -25...75°C

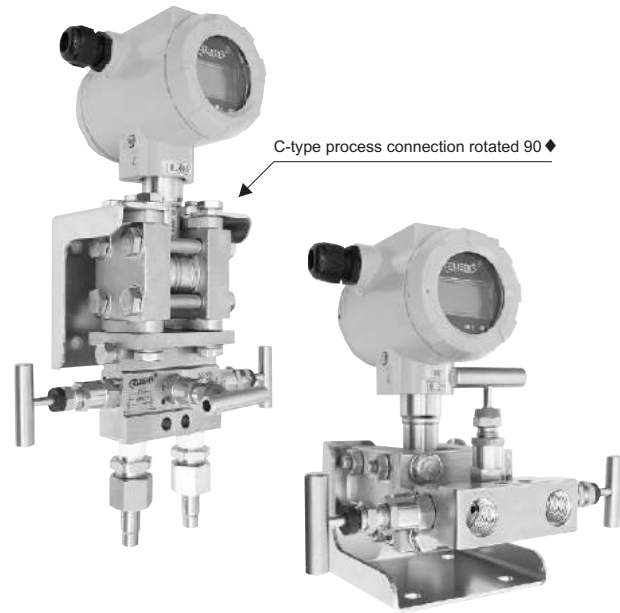
**Medium temperature range**

-25...120°C

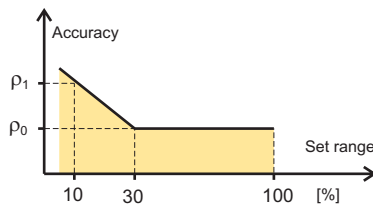
over 120°C – measurement with use an impulse line or diaphragm seals

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



### Accuracy depending on the set range



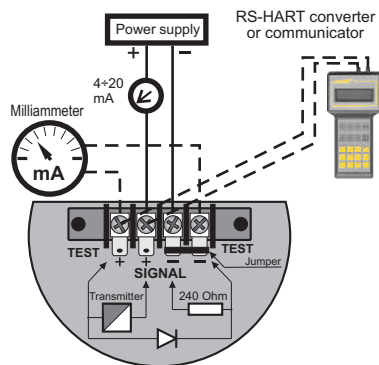
$p_0$  – error for nominal measuring range (0...100% FSO)

$p_1$  – error for range 0...10% FSO

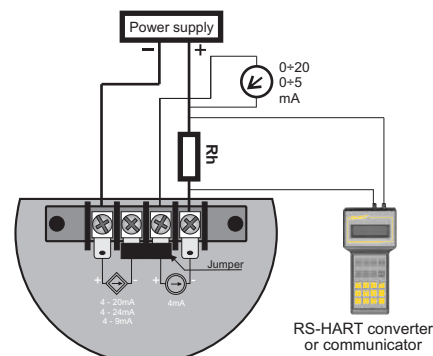
$p_1 = 2 \times p_0$

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

### Electrical diagrams for transmitters



Version: **APR-2000ALW**  
output signal: 4-20mA



Version: **APR-2000ALE**  
with 0...5 or 0...20mA output signal

## Ordering procedure

Model	Code	Description																						
APR-2000		Smart differential pressure transmitter																						
Casing, output signal	/ALW.....	Aluminum housing, IP66 with display, output 4-20mA + Hart																						
	/ALE.....	Aluminum housing, IP66 with display, 0-20mA, 0-5mA + Hart Exia and Exd version not available																						
	/ALW/SS.....	Stainless steel housing, IP66, with display, output 4-20mA + Hart																						
Versions, certificates	/Exia.....	<div style="display: flex; justify-content: space-between;"> <span>II 1/2G Ex ia IIC T4/T5 Ga/Gb</span> <span>IECEX Ex ia IIC T4/T5 Ga/Gb</span> </div>																						
	/Exia (Da).....	<div style="display: flex; justify-content: space-between;"> <span>II 1/2G Ex ia IIC T4/T5 Ga/Gb</span> <span>II 1 D Ex ia IIIC T105°C Da</span> </div> <div style="display: flex; justify-content: space-between;"> <span>I M1 Ex ia I Ma (version with SS housing)</span> <span>IECEX Ex ia IIC T4/T5 Ga/Gb</span> </div> <div style="display: flex; justify-content: space-between;"> <span>Ex ia IIIC T105°C Da</span> <span>IECEX Ex ia IIIC T105°C Da</span> </div> <div style="display: flex; justify-content: space-between;"> <span>Ex ia I Ma (version with SS housing)</span> </div>																						
	/Exd.....	<div style="display: flex; justify-content: space-between;"> <span>II 1/2G Ex ia/db IIC T5/T6 Ga/Gb</span> <span>II 1/2D Ex ia/t IIIC T85°C/T100°C Da/Db</span> </div> <div style="display: flex; justify-content: space-between;"> <span>I M2 Ex db ia I Mb (version with SS housing)</span> <span>IECEX Ex ia/db IIC T5/T6 Ga/Gb</span> </div> <div style="display: flex; justify-content: space-between;"> <span>Ex ia/t IIIC T85°C/T100°C Da/Db</span> <span>IECEX Ex db ia I Mb (version with SS housing)</span> </div>																						
	/Exd (2G).....	<div style="display: flex; justify-content: space-between;"> <span>II 2G Ex ia/db IIC T6/T5 Gb</span> <span>II 2D Ex ia/t IIIC T85°C/T100°C Db</span> </div> <div style="display: flex; justify-content: space-between;"> <span>Ex ia/db IIC T6/T5 Gb</span> <span>IECEX Ex ia/t IIIC T85°C/T100°C Db</span> </div>																						
	/SA.....	Surge arrester for Exia version																						
	/Safety.....	SIL2 - Functional Safety certificate according to PN-EN 61508-1:2010; PN-EN 61508-2:2010; PN-EN 61508-3:2010; PN-EN 61511-1:2007; PN-EN 62061:2008+A1 European Pressure Equipment Directive N° 97/23/EC, category IV																						
	/PED.....	Ultra stable version (only ranges no. 2, 4+10)																						
	/HS.....	Accuracy ≤ ±0,05%																						
	/0,05%.....	Marine certificate – DNV, BV																						
	/MR.....	For oxygen service (sensor filled with Fluorolube fluid)																						
/Tlen.....	Static pressure 320 bar, only for C process connection, not available in PED version																							
/320 bar.....	Static pressure 420 bar, only for C process connection, not available in PED version																							
/420 bar.....	Protection class IP67																							
/IP67.....																								
Nominal measuring ranges	/0+70 bar.....	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 33%;">Range</th> <th style="width: 33%;">Min. set range</th> </tr> </thead> <tbody> <tr> <td>0+70 bar (0+7000 kPa)</td> <td>7 bar (700 kPa)</td> </tr> <tr> <td>0+16 bar (0+1600 kPa)</td> <td>1,6 bar (160 kPa)</td> </tr> <tr> <td>0+2,5 bar (0+250 kPa)</td> <td>0,2 bar (20 kPa)</td> </tr> <tr> <td>0+1 bar (0+100 kPa)</td> <td>50 mbar (5 kPa)</td> </tr> <tr> <td>0+0,25 bar (0+25 kPa)</td> <td>10 mbar (1 kPa)</td> </tr> <tr> <td>-0,5+0,5 bar (50+50 kPa)</td> <td>0,1 bar (10 kPa)</td> </tr> <tr> <td>-0,1+0,1 bar (-10+10 kPa)</td> <td>10 mbar (1 kPa)</td> </tr> <tr> <td>-5+70 mbar (0,5+7 kPa)</td> <td>4 mbar (0,4 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> </tbody> </table>	Range	Min. set range	0+70 bar (0+7000 kPa)	7 bar (700 kPa)	0+16 bar (0+1600 kPa)	1,6 bar (160 kPa)	0+2,5 bar (0+250 kPa)	0,2 bar (20 kPa)	0+1 bar (0+100 kPa)	50 mbar (5 kPa)	0+0,25 bar (0+25 kPa)	10 mbar (1 kPa)	-0,5+0,5 bar (50+50 kPa)	0,1 bar (10 kPa)	-0,1+0,1 bar (-10+10 kPa)	10 mbar (1 kPa)	-5+70 mbar (0,5+7 kPa)	4 mbar (0,4 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)
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/-25+25 mbar.....																								
/-7+7 mbar.....																								
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 SS316. Allows mounting with a valve manifold. Process connection of cover flange: M10 (option /C(7/16) - 7/16"UNF acc. to IEC 61518)																						
	/CR.....	C-type process connection rotated 90°																						
	/P.....	Thread M20x1,5 (male)																						
	/PN.....	Thread 1/4"NPT (female)																						
Process connection C available with NACE MR-01-75 certificate	/code of diaphragm seal.....	Diaphragm seal (see chapter of diaphragm seals) mounted on Hi side of transmitter, Lo side 1/4NPT Female																						
Material of diaphragms (refers only to C, CR, P, PN process connection)	(without marking).....	Diaphragms material SS316L																						
	/H.....	Diaphragms material Hastelloy C276 (/P and /PN – all wetted parts in Hastelloy C276 on request)																						
	/Au.....	Gold plated diaphragms (not available for transmitters in HS version)																						
Gasket (refers only to C, CR process connection)	(without marking).....	FPM Viton																						
	/NBR.....	NBR (for oxygen service)																						
	/PTFE.....	PTFE																						
Electrical connection	(without marking)	Packing gland M20x1,5																						
	/US.....	Thread 1/2"NPT Female																						
Accessories	/C-2".....	Mounting bracket for 2" pipe (to C process conn.), mat. zincd steel																						
	/C-2"(SS).....	Mounting bracket for 2" pipe (to C process conn.), mat. Stainless Steel																						
	/FI25.....	Mounting bracket for 2" pipe (to P process conn.), mat. Stainless Steel																						
	/RedSpaw P.....	Connector to weld impulse pipes dia. 12 and 14 mm, material 15HM(SO) or SS316(S). Only process connection P 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																						
	/ST.....	Stainless Steel plate fixed to the housing																						
	/MT.....	Stainless Steel Tag plate mounted on wire																						
Other specification	/.....	Description of required parameters (e.g. IP66/67)																						