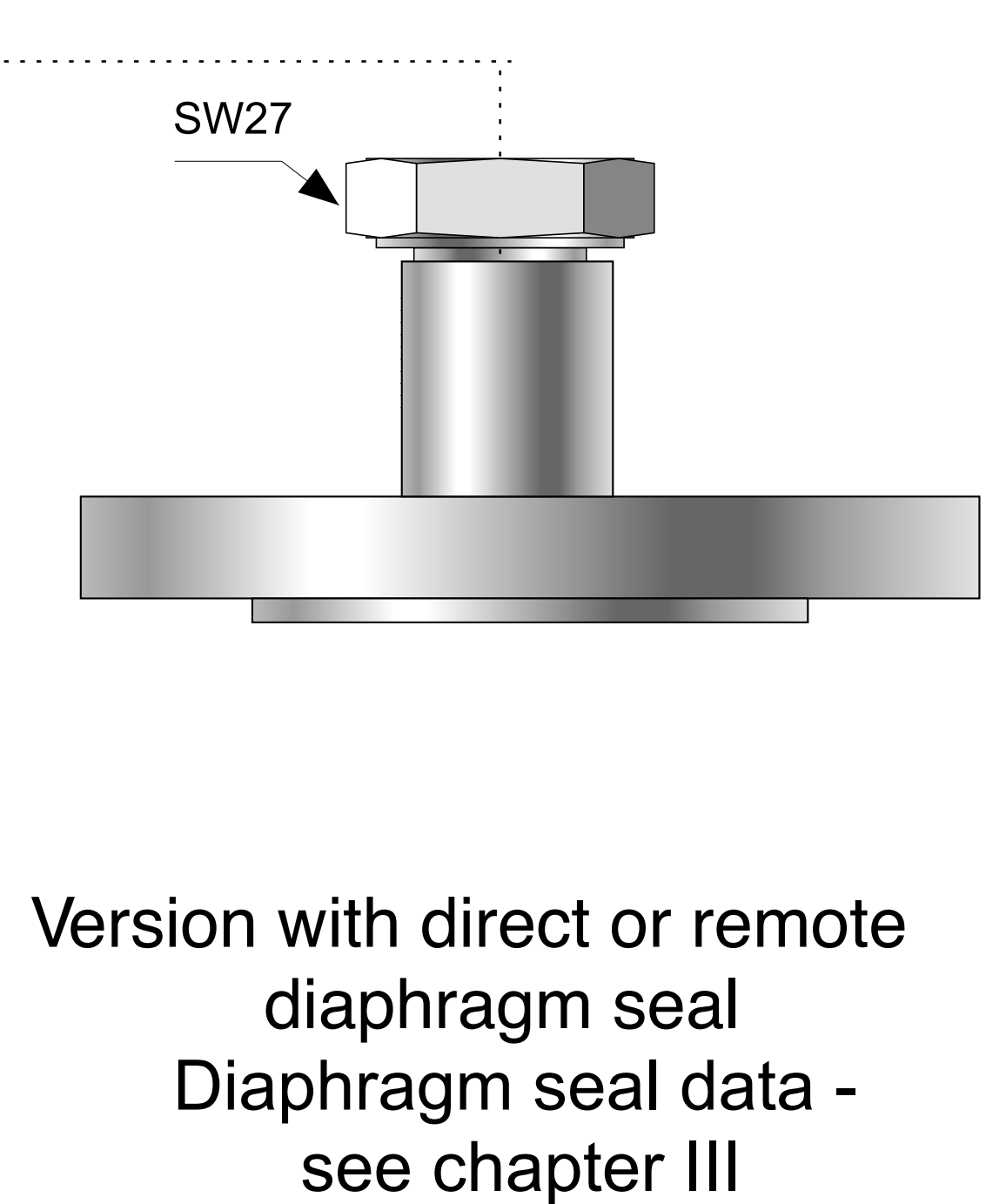
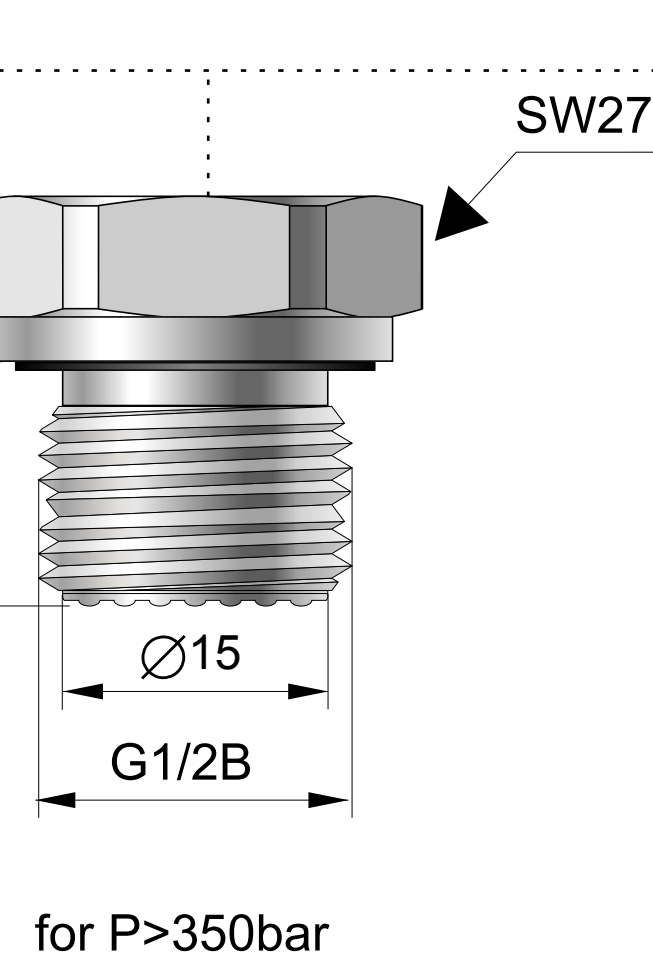
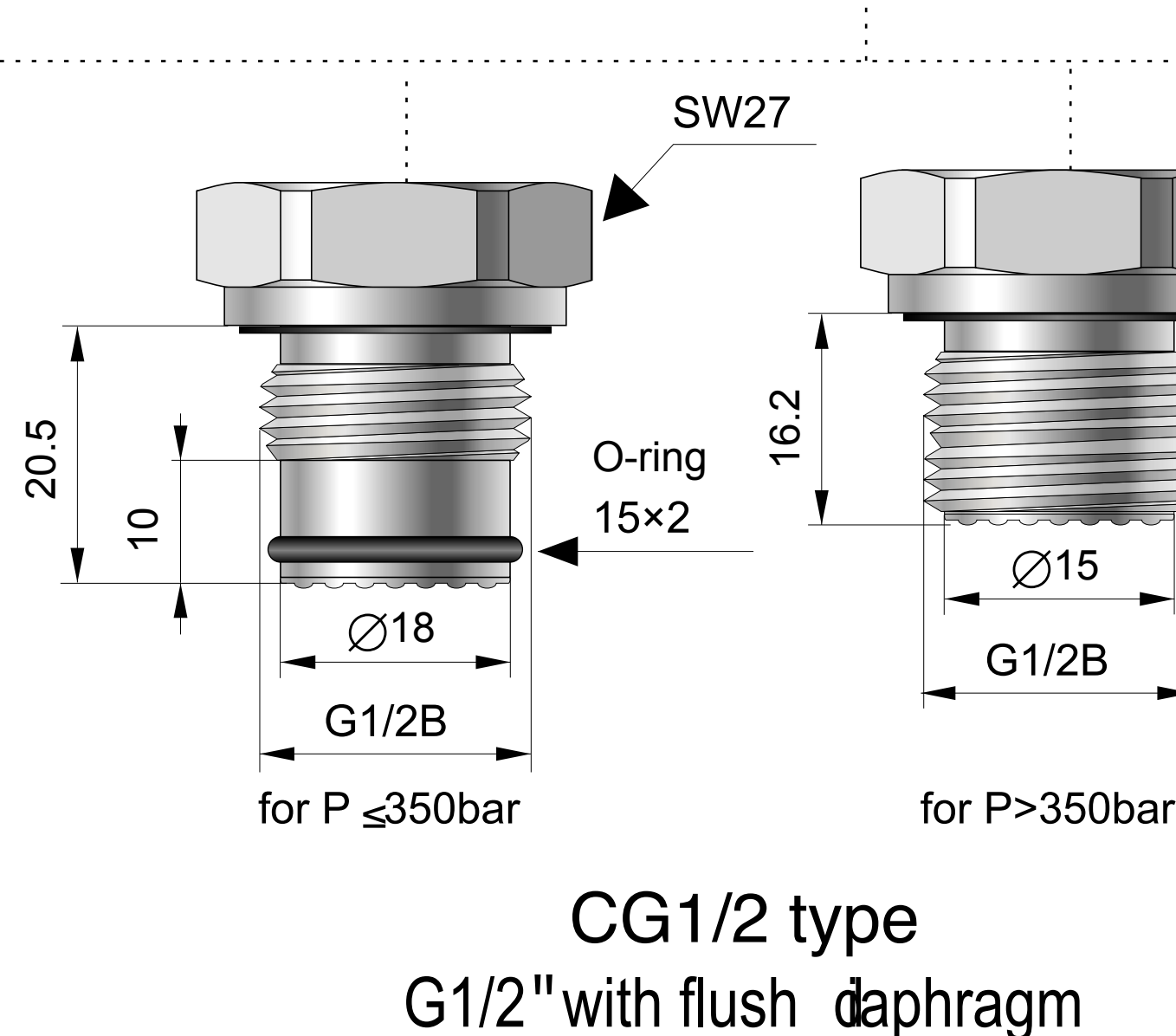
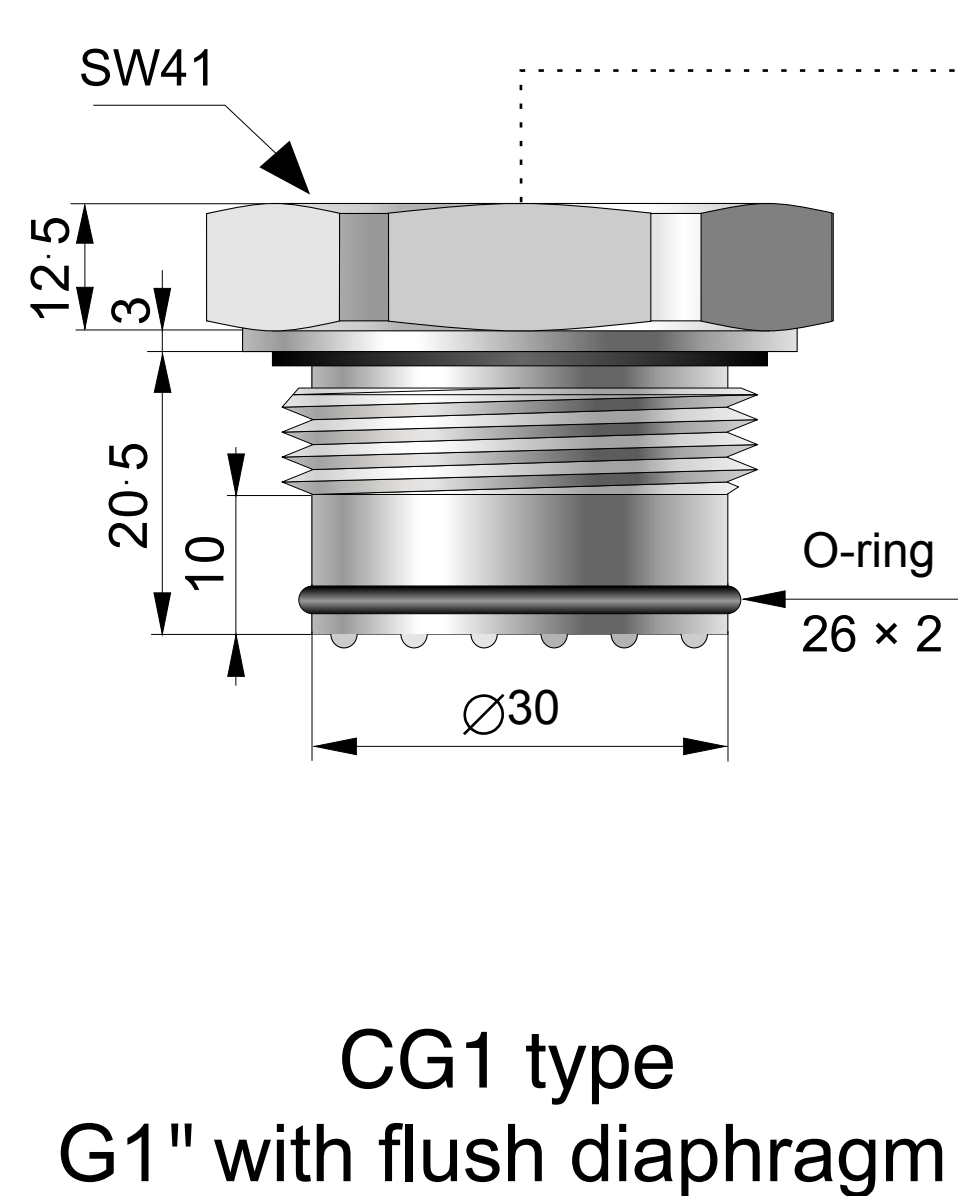
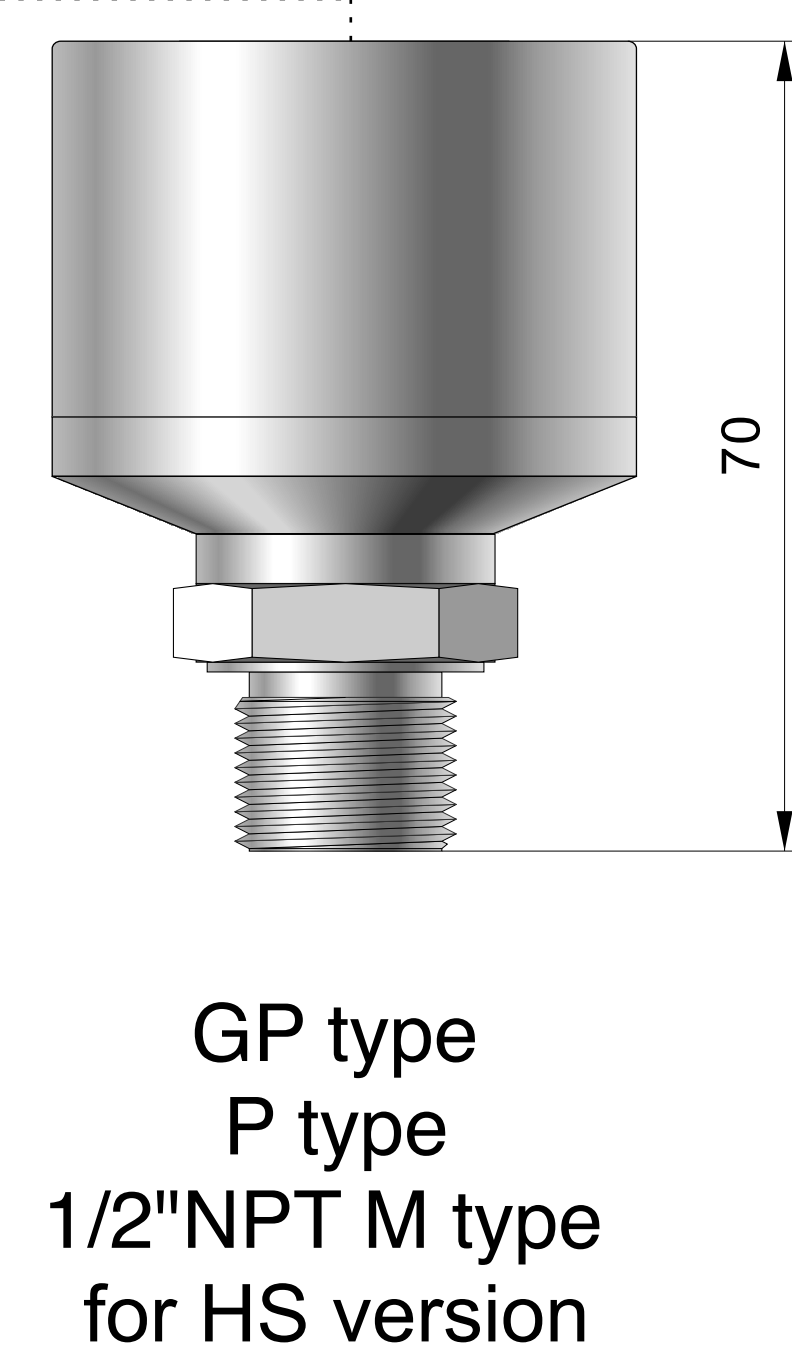
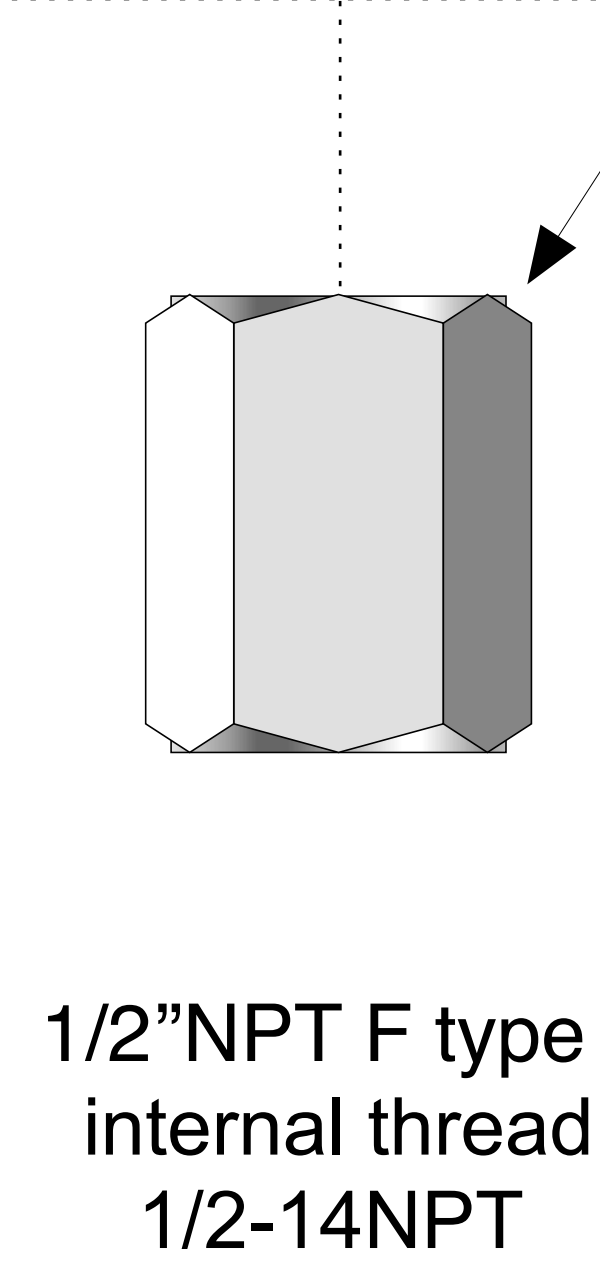
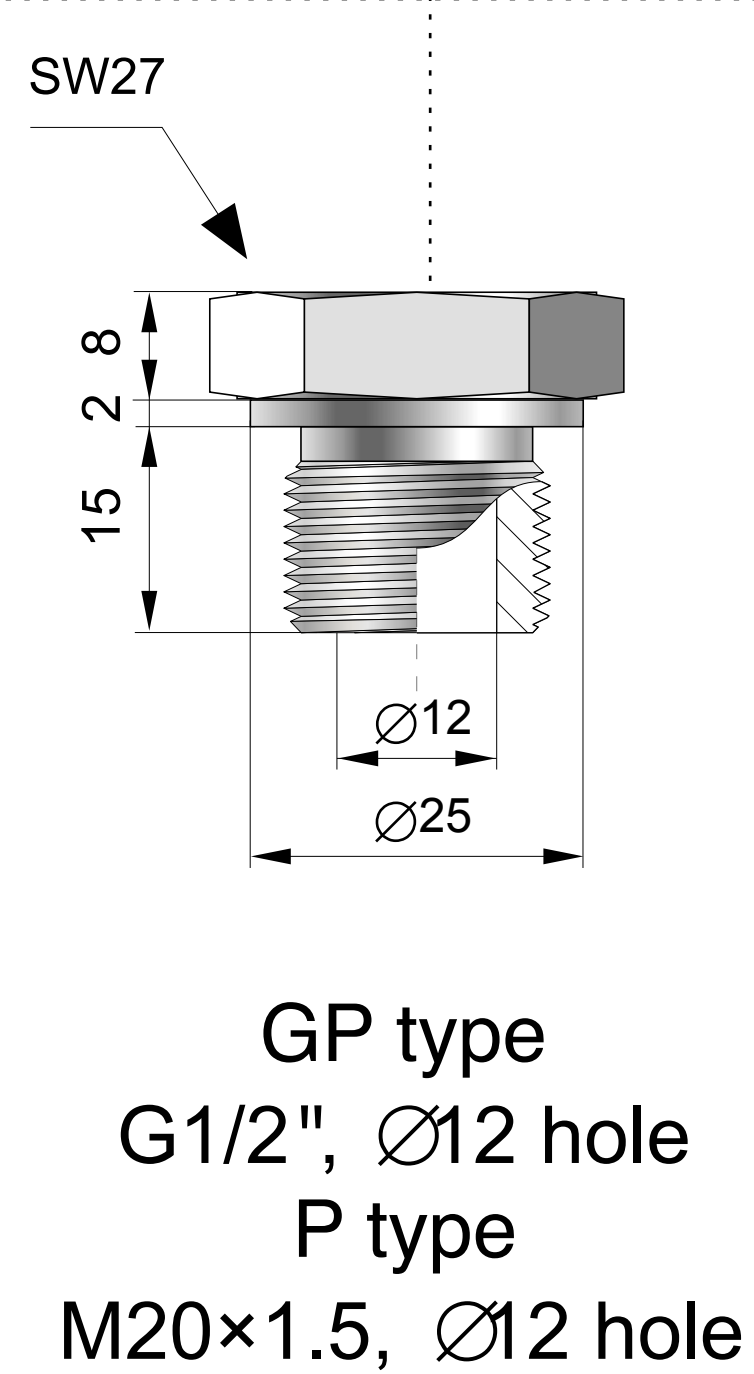
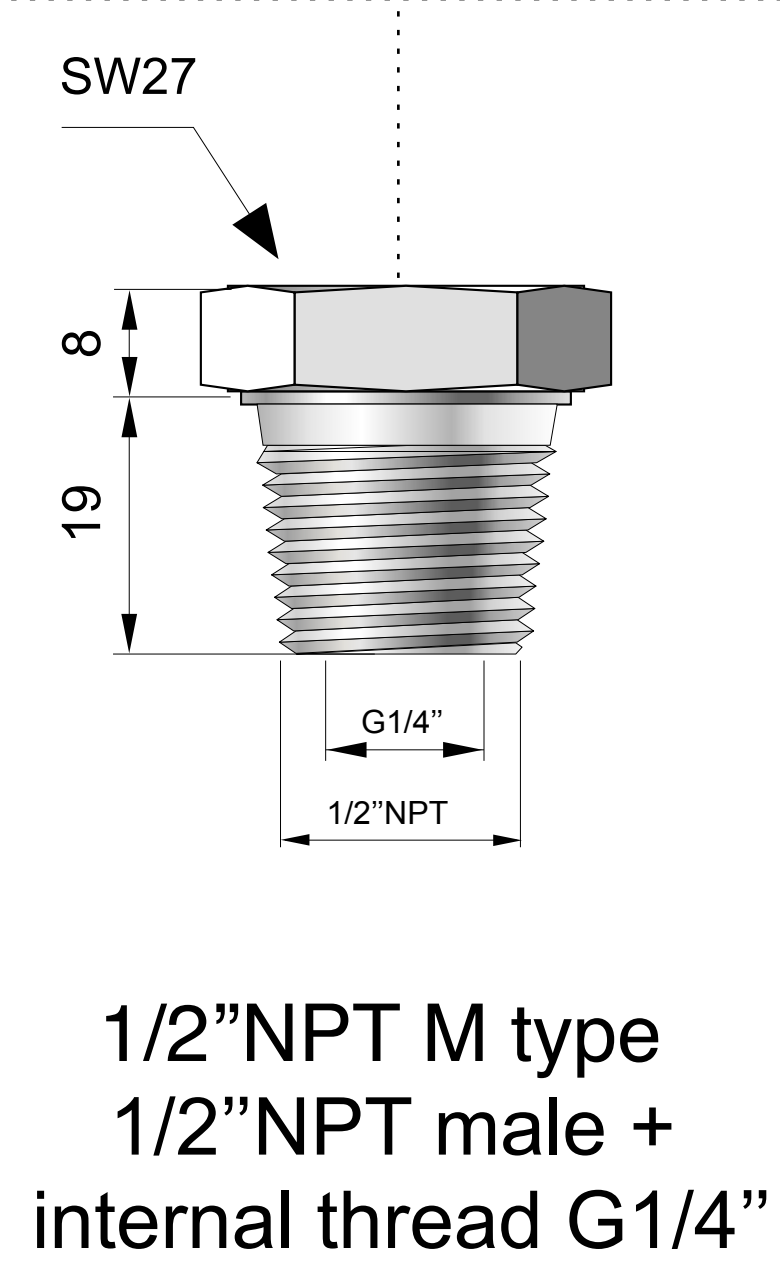
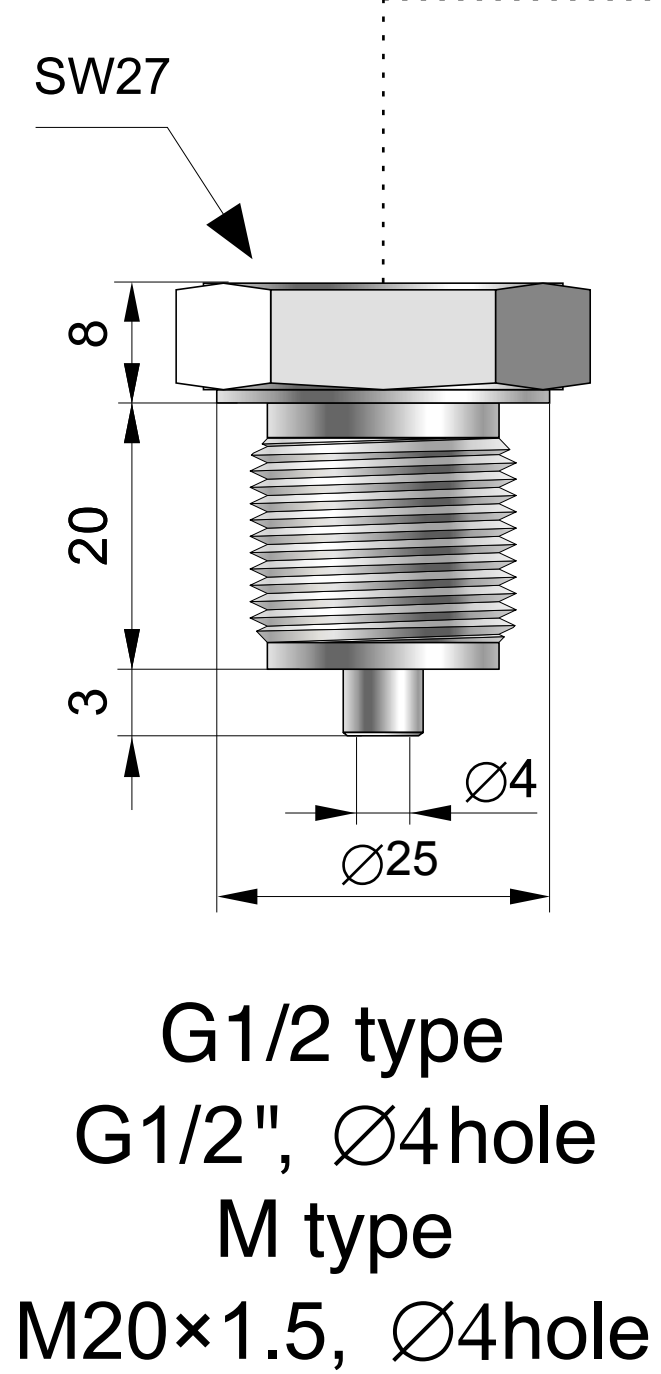
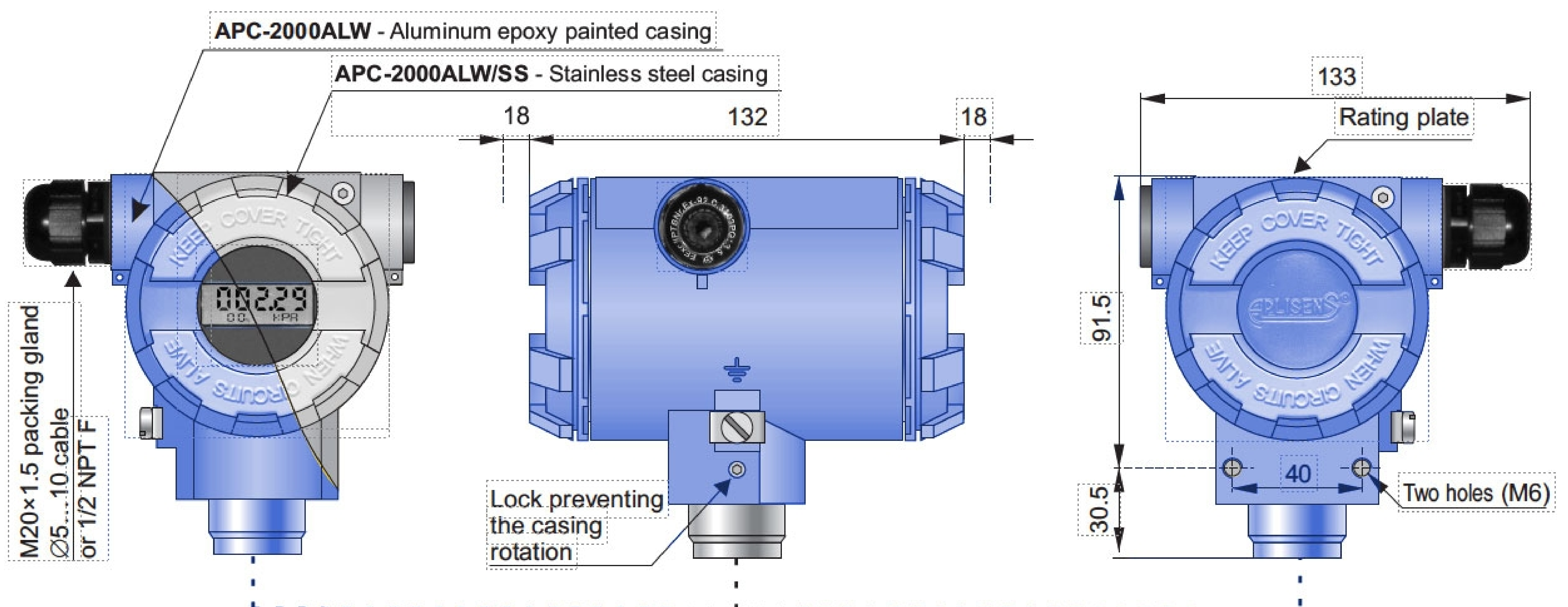


SMART PRESSURE TRANSMITTER APC-2000ALW



- ✓ 4...20 mA output signal + HART 5 / HART 7 protocol (special version: 0...20 mA or 0...5 mA output signal + HART 5 protocol)
- ✓ Display with backlight
- ✓ Programmable range, zero shift, characteristic and damping ratio with local panel keys
- ✓ Safety version SIL2/SIL3
- ✓ Intrinsic safety certificate ATEX, IECEx, FM (USA, Canada)
- ✓ Explosion proof certificate ATEX, IECEx, FM (USA, Canada)
- ✓ Marine certificate – DNV, BV
- ✓ Accuracy 0,075% (0,05%, 0,04% on request)
- ✓ Gold plated diaphragm (Au)
- ✓ MID (Measuring Instruments Directive) – certificate acc. to 2004/22/WE directive and OIML R140:2007 recommendations.

up to 5 years
warranty



Application and construction

Smart pressure transmitters are 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. 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 0-360° relative to the sensor, and choice of cable direction.

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 Report 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 can be installed directly on the installation. An universal mounting bracket is provided to transmitter fitting on 2 pipe (the AL mounting bracket, see page IV/5). 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)****		
	IWC	PSI	BAR	IWC	PSI	BAR		IWC	PSI	BAR
1		0...14,500 psi	0...1000 bar		145 psi	10 bar	100:01:00		17,400 psi	1200 bar
2		0...8,700 psi	0...600 bar		87 psi	6 bar	100:01:00		17,400 psi	1000 bar
3		0...4,350 psi **	0...300 bar **		45 psi	3 bar	100:01:00		6,500 psi	450 bar
4		0...2,320 psi **	0...160 bar **	637.1 iwc	23 psi	1,6 bar	100:01:00		6,500 psi	450 bar
5		0...1,000 **	0...70 bar **	277 iwc	10 psi	0,7 bar	100:01:00		2,000 psi	140 bar
6		-15...1,000 psi **	-1...70 bar **	277 iwc	10 psi	0,71 bar	100:01:00		2,000 psi	140 bar
7		0...360 psi **	0...25 bar **	99.72 iwc	3.6 psi	0,25 bar	100:01:00		725 psi	50 bar
8		-15...360 psi **	-1...25 bar **	99.72 iwc	3.6 psi	0,26 bar	100:01:00		725 psi	50 bar
9		0...100 psi **	0...7 bar **	27.7 iwc	1 psi	0,07 bar	100:01:00		200 psi	14 bar
10		-15...100 **	-1...7 bar **	27.7 iwc	1 psi	0,08 bar	100:01:00		200 psi	14 bar
11	-415.5...602.475 iwc	-15...21.75 psi **	-1...1,5 bar **	47.09 iwc	1.70 psi	0,12 bar	20:01		60 psi	4 bar
12	0...831 iwc	0...30 psi **	0...2 bar **	8.31 iwc	0.30 psi	100 mbar	20:01		60 psi	4 bar
13	0...415.5 iwc	0...15 psi **	0...1 bar **	41.55 iwc	1.50 psi	50 mbar	20:01	831 iwc	30 psi	2 bar
14	-207.75...200.825 iwc	-7.25...7.25 psi **	-0,5...0,5 bar **	20.775 iwc	0.75 psi	50 mbar	20:01	831 iwc	30 psi	2 bar
15	0...96.95 iwc	0...3.5 **	0...0,25 bar **	9.695 iwc	0.35 psi	25 mbar	10:01	415.5 iwc	15 psi	1 bar
16	-41.55...41.55 iwc	-1.5...1.5 psi **	-100...100 mbar **	8.31 iwc	0.30 psi	20 mbar	10:01	415.5 iwc	15 psi	1 bar
17	-6.925...27.7 iwc	-0.25...1 psi */**	-15...70 mbar */**	1.939 iwc	0.07 psi	5 mbar	17:01	200.825 iwc	7.25 psi	0,5 bar
18	-9.695...9.695 iwc	-0.35...0.35 psi */***	-25...25 mbar */***	0.831 iwc	0.03 psi	2 mbar	25:01:00	200.825 iwc	7.25 psi	0,5 bar
19	-2.77...2.77 iwc	-0.1...0.1 psi */***	-7...7 mbar */***	0.4155 iwc	0.015 psi	1 mbar	14:01	200.825 iwc	7.25 psi	0,5 bar
20		0...20 psia	0...1,3 bar abs	41.55 iwc	1.50 psia	100 mbar abs	13:01	831 iwc	30 psi	2 bar
21		0...100 psia	0...7 bar abs	41.55 iwc	1.50 psia	100 mbar abs	70:01:00		200 psi	14 bar
22		0...360 psia	0...25 bar abs	99.72 iwc	3.6 psia	0,25 bar abs	100:01:00		725 psi	50 bar
23		0...1,000 psi	0...70 bar abs	277 iwc	10 psia	0,7 bar abs	10:01		2,000 psi	140 bar
24		0...4,350 psi	0...300 bar abs	1246.5 iwc	45 psia	3 bar abs	100:01:00		6,500 psi	450 bar

* transmitters not available with diaphragm seal; explosion proof version - available only Exd (2G)

** transmitters available in HS version

*** transmitters available only in HS version

**** overpressure limit can be different for version according to 2014/68/EU PED

Technical data

Metrological parameters

Accuracy	≤ ±0,075% of the calibrated range (≤ ±0,1% for range no. 19)
Special version:	≤ ±0,05% of the calibrated range (≤ ±0,04%, ≤ ±0,025% on request)
Long-term stability (for the nominal measuring range)	≤ accuracy for 3 years or ≤ 2 x accuracy for 5 years
HS version (ranges 3÷15):	≤ accuracy for 6 years or ≤ 2 x accuracy for 10 years
Thermal error	< ±0,05% (FSO) / 10°C (0,1% for ranges no. 16÷19) max. ±0.25% (FSO) in the whole compensation range (0,4% for ranges no. 16÷19)
Thermal compensation range	-25...80°C Special version: -40...80°C
Additional electronic damping	0...60 s
Error due to supply voltage changes	0,002% (FSO) / V

Electrical parameters

Version	Power supply
standard	10...55 VDC
Exia	10.5...30 VDC
IS	11.5...30 VDC
Exd, XP	13.5...55 VDC
Exia/Exd, IS/XP	11,5...30 VDC / 11,5...55 VDC
Safety, Safety Exd, Safety XP	11,5...36 VDC
Safety Exia, Safety IS	11,5...30 VDC
Safety Exia/Exd, Safety IS/XP	11,5...30 VDC / 11,5...36 VDC
MID Exia	13.5...28 VDC
MID Exd	13.5...45 VDC

Output signal	4...20 mA + HART
Load resistance (for standard version)	$R[\Omega] \leq \frac{U_{sup}[V] - 10V}{0.0225 A}$
Resistance required for communication	min. 240 Ω

Materials

Wetted parts and diaphragms: 316Lss, Hastelloy C 276, Au
 Casing: Aluminum, 316SS
 Material of window: hardened glass

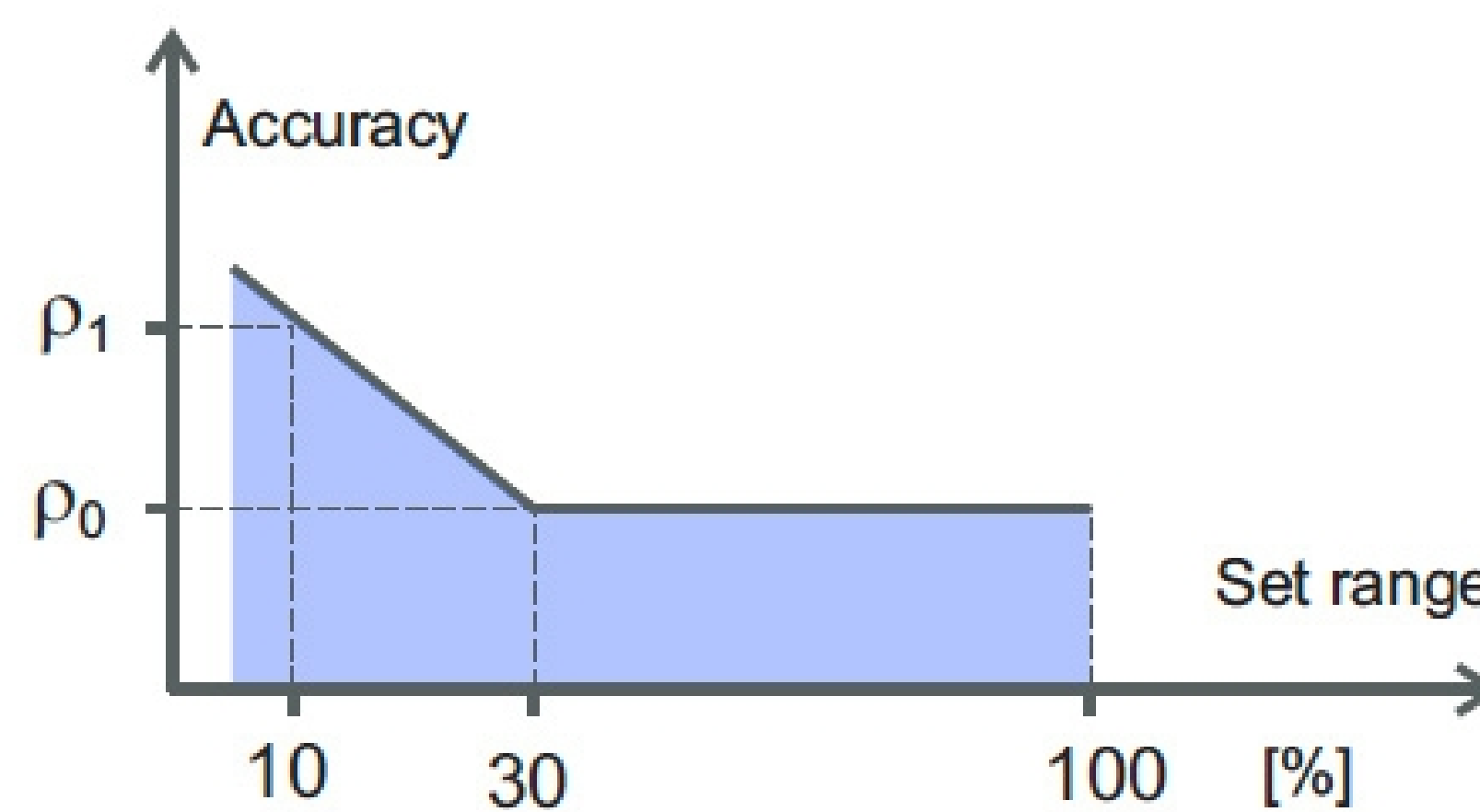
Operating conditions

Operating temperature range (ambient temp.) -40...85°C
 Exia, IS version -40...80°C
 Exd, XP version -40...75°C
 Medium temperature range -40...120°C
 Safety: -40...85°C
 PED: -40...100°C

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

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

SMART PRESSURE TRANSMITTER APC-2000ALW version with MID

Application

Smart pressure transmitter APC-2000ALW MID is applicable to the measurement of the pressure and absolute pressure in application designed according to directive 2004/22/EC (MID), harmonized standard PN-EN12405-1:2005 + A2:2010 and recommendation OIML R140:2007. Device subcomponent suitable for custody transfer measurement of gas with MID approval. Mechanical construction and installation of the transmitter enclosure shall comply with the transmitter APC-2000ALW are described on page I/ 3 of catalogue. Pressure transmitters APC-2000ALW MID are produced only with nominal ranges according to the table. Transmitter due to factory blockade of transmitter's configuration cannot be configurable by user. Electrical connection of the transmitter is according to drawing on page I/ 3. Available are only terminals SIGNAL + and SIGNAL -.

Metrological parameters

Max. permissible error according to EN12405-1 (calculated in relation to the measured value)

- in reference conditions < 0,2%
 - nominal operating conditions < 0,5%
 special version < 0,3%
 Long-term stability < 0,5% / 5 years
 Operating temperature range -25...55°C
 Power supply Exia: 13,5...28 VDC
 Exd: 13,5...45 VDC

MID Parts Certificate No. 27/12



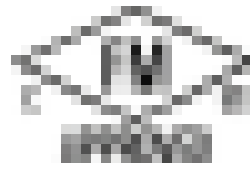



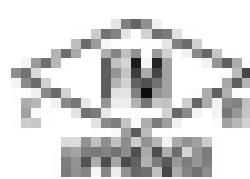
Measuring ranges

Nominal measuring range		Overpressure limit (without hysteresis)	
10+100 bar ABS	(1+10 MPa ABS)	450 bar	(45 MPa)
2+20 bar ABS	(0,2+2 MPa ABS)	50 bar	(5 MPa)
2+20 bar	(0,2+2 MPa)	50 bar	(5 MPa)
0,9+7 bar ABS	(0,09+0,7 MPa ABS)	14 bar	(1,4 MPa)
0,9+7 bar	(0,09+0,7 MPa)	14 bar	(1,4 MPa)

Ordering procedure of MID version

Model	Code	Description
APC-2000		Smart pressure transmitter
Casing, output signal	/ALW.....	Aluminum housing, IP66/IP67, with display, output 4-20mA + Hart
	/MID.....	MID – certificate acc. to 2004/22/EC directive and OIML R140:2007 recommendations
Versions, certificates	/Exia..... /Exd.....	II 1/2G Ex ia IIC T4/T5 Ga/Gb, II 1 D Ex ia IIIC T105°C Da II 1/2G Ex ia/db IIC T5/T6 Ga/Gb, II 1/2D Ex ia/tb IIIC T85°C /T100°C Da/Db
Nominal measuring range	/10+100 bar ABS /2+20 bar ABS /2+20 bar /0,9+7 bar ABS /0,9+7 bar	10+100 bar ABS (1+10 MPa ABS) with possibility of changing, min. range 10+70 bar ABS (1+7 MPa ABS) 2+20 bar ABS (0,2+2 MPa ABS) 2+20 bar (0,2+2 MPa) 0,9+7 bar ABS (0,09+0,7 MPa ABS) 0,9+7 bar (0,09+0,7 MPa)
Process connections	/M..... /G1/2..... /G1/2(Au)..... /P..... /GP..... /1/2"NPTM..... /1/2"NPTF.....	Thread M20x1,5 (male) with $\varnothing 4$ hole, wetted parts SS316L Thread G1/2" (male) with $\varnothing 4$ hole, wetted parts SS316L Thread G1/2" (male) with $\varnothing 4$ hole, gold plated diaphragm Thread M20x1,5 (male) with $\varnothing 12$ hole, wetted parts SS316L Thread G1/2" (male) with $\varnothing 12$ hole, wetted parts SS316L Thread 1/2"NPT Male, wetted parts SS316L Thread M20x1,5 with adapter to 1/2"NPT Female, wetted parts SS316L
Electrical connection	(without marking) /US.....	Packing gland M20x1,5 Thread 1/2"NPT Female
Accessories	/AL..... /AL(SS)..... /ST..... /MT.....	Mounting bracket type AL for 2" pipe, material zinc steel Mounting bracket type AL for 2" pipe, material stainless steel Stainless Steel plate riveted to the housing Stainless Steel Tag plate mounted on wire

Ordering procedure

Model	Code	Description
APC-2000		Smart pressure transmitter
Versions	/ALW.....	With display, output 4-20mA + Hart
	/ALW/Safety.....	With display, output 4-20mA + Hart 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
Certificates, options*	/SS.....	Stainless steel housing
	/Exia.....	 II 1/2G Ex ia IIC T4/T5 Ga/Gb IECEX Ex ia IIC T4/T5 Ga/Gb
	/Exia (Da).....	 II 1/2G Ex ia IIC T4/T5 Ga/Gb II 1D Ex ia IIIC T105°C Da I M1 Ex ia I Ma (version with SS housing) Ex ia IIC T4/T5 Ga/Gb IECEX Ex ia IIIC T105°C Da Ex ia I Ma (version with SS housing)
	/IS.....	 IS Class I, Div 1, Groups A, B, C, D T4 IS Class II, Div 1, Groups E, F, G T5 IS Class III, Div 1, T5 Zone 0 AEx/Ex ia IIC T4 Ga Zone 20 AEx/Ex ia IIIC T105°C Da
	/Exd.....	 II 1/2G Ex ia/db IIC T6/T5 Ga/Gb II 1/2D Ex ia/tb IIIC T105°C Da/Db I M2 Exd ia I Mb (version with SS housing) Ex ia/db IIC T6/T5 Ga/Gb IECEX Ex ia/tb IIIC T105°C Da/Db Ex db ia I Mb (version with SS housing) Packing gland available on request
	/Exd (2G).....	 II 2G Ex ia/db IIC T6/T5 Gb II 2D Ex ia/tb IIIC T105°C Db Ex ia/db IIC T6/T5 Gb IECEX Ex ia/tb IIIC T105°C Db Packing gland available on request
	/XP.....	 XP Class I, Div 1, Groups A, B, C, D T5 DIP Class II, Div 1, Groups E, F, G T5 DIP Class III, Div 1, T5 Zone 1 AEx db ia IIC T5 Gb Zone 21 AEx ia tb IIIC T105°C Db Packing gland available on request
	/XPC.....	 XP Class I, Div 1, Groups B, C, D T5 DIP Class II, Div 1, Groups E, F, G T5 DIP Class III, Div 1, T5 Zone 1 AEx/Ex db ia IIC T5 Gb Zone 21 AEx/Ex ia tb IIIC T105°C Db Packing gland available on request
	/Exia(Da)/Exd.....	Dual certification Exia(Da) and Exd
	/Exia(Da)/Exd(2G).....	Dual certification Exia(Da) and Exd(2G)
	/IS/XP.....	Dual certification IS and XP and for US
	/IS/XPC.....	Dual certification IS and XPC for US and Canada
	/SA.....	Surge arrester for Exia version
	/PED.....	PED category I
	/HS.....	Ultra stable version (only ranges no. 3+19, process connection: P, GP, 1/2"NPTM)
/0,05%.....	Accuracy ≤ ±0,05%	
/MR.....	Marine certificate – DNV, BV	
/Tlen.....	For oxygen service (sensor filled with Fluorolube fluid), only G1/2" connection	
/-40...80°C.....	Extended thermal compensation range -40 ÷ 80°C	
/IP67.....	Protection class IP67	
/NACE.....	NACE MR-01-75 certificate (process connections: M, G1/2", P, GP and 1/2"NPTM)	
/Hart 7.....	Communication protocol HART in revision 7	

* more than one option is available

Sr no.	Range		Min. set range
1	/0÷27700 iwc	/0÷1000 bar.....	0÷27700 iwc 0÷1000 bar (0÷100 MPa) 277 iwc 10 bar (1 MPa)
2	/0÷16620 iwc	/0÷600 bar.....	0÷16620 iwc 0÷600 bar (0÷60 MPa) 166.2 iwc 6 bar (600 kPa)
3	/0÷8310 iwc	/0÷300 bar.....	0÷8310 iwc 0÷300 bar (0÷30 MPa) 83.1 iwc 3 bar (300 kPa)
4	/0÷4432 iwc	/0÷160 bar.....	0÷4432 iwc 0÷160 bar (0÷16 MPa) 44.32 iwc 1.6 bar (160 kPa)
5	/0÷1939 iwc	/0÷70 bar.....	0÷1939 iwc 0÷70 bar (0÷7 MPa) 19.39 iwc 0.7 bar (70 kPa)
6	/-27.7÷1939 iwc	/-1÷70 bar.....	-27.7÷1939 iwc -1÷70 bar (-0.1÷7 MPa) 19.667 iwc 0.71 bar (71 kPa)
7	/0÷692.5 iwc	/0÷25 bar.....	0÷692.5 iwc 0÷25 bar (0÷2.5 MPa) 6.925 iwc 0.25 bar (25 kPa)
8	/-27.7÷692.5 iwc	/-1÷25 bar.....	-27.7÷692.5 iwc -1÷25 bar (-0.1÷2.5 MPa) 7.202 iwc 0.26 bar (26 kPa)
9	/0÷193.9 iwc	/0÷7 bar.....	0÷193.9 iwc 0÷7 bar (0÷700 kPa) 1.939 iwc 0.07 bar (7 kPa)
10	/-27.7÷193.9 iwc	/-1÷7 bar.....	-27.7÷193.9 iwc -1÷7 bar (-100÷700 kPa) 1.939 iwc 0.07 bar (7 kPa)
11	/-27.7÷41.55 iwc	/-1÷1.5 bar.....	-27.7÷41.55 iwc -1÷1.5 bar (-100÷150 kPa) 120 mbar (12 kPa)
12	/0÷55.4 iwc	/0÷2 bar.....	0÷55.4 iwc 0÷2 bar (0÷200 kPa) 100 mbar (10 kPa)
13	/0÷27.7 iwc	/0÷1 bar.....	0÷27.7 iwc 0÷1 bar (0÷100 kPa) 50 mbar (5 kPa)
14	/-13.85÷13.85 iwc	/-0.5÷0.5 bar.....	-13.85÷13.85 iwc -0.5÷0.5 bar (-50÷50k Pa) 50 mbar (5 kPa)
15	/0÷6.925 iwc	/0÷0.25 bar.....	0÷6.925 iwc 0÷0.25 bar (0÷25 kPa) 25 mbar (2.5 kPa)
16	/-2770÷2770 iwc	/-100÷100 mbar.....	-2770÷2770 iwc -100÷100 mbar (-10÷10 kPa) 20 mbar (2 kPa)
17	/-415.5÷1939 iwc	/-15÷70 mbar.....	-415.5÷1939 iwc -15÷70 mbar (-1.5÷7 kPa) 5 mbar (0.5 kPa)
18	/-692.5÷692.5 iwc	/-25÷25 mbar.....	-692.5÷692.5 iwc -25÷25 mbar (-2.5÷2.5 kPa) 2 mbar (0.2 kPa)
19	/-193.9÷193.9 iwc	/-7÷7 mbar.....	-193.9÷193.9 iwc -7÷7 mbar (-0.7÷0.7 kPa) 1 mbar (0.1 kPa)
20	/0÷36.01 iwc	/0÷1.3 bar ABS.....	0÷36.01 iwc 0÷1.3 bar ABS (0÷130 kPa ABS) 2.77 iwc 0.1 bar ABS (10 kPa ABS)
21	/0÷193.9 iwc	/0÷7 bar ABS.....	0÷193.9 iwc 0÷7 bar ABS (0÷700 kPa ABS) 2.77 iwc 0.1 bar ABS (10 kPa ABS)
22	/0÷692.5 iwc	/0÷25 bar ABS.....	0÷692.5 iwc 0÷25 bar ABS (0÷2.5 MPa ABS) 6.925 iwc 0.25 bar ABS (25 kPa ABS)
23	/0÷1939 iwc	/0÷70 bar ABS.....	0÷1939 iwc 0÷70 bar ABS (0÷7 MPa ABS) 19.39 iwc 0.7 bar ABS (70 kPa ABS)
24	/0÷8310 iwc	/0÷300 bar ABS.....	0÷8310 iwc 0÷300 bar ABS (0÷30 MPa ABS) 8.31 iwc 0.3 bar ABS (30 kPa ABS)

Code		Description
Process connections	/M.....	Thread M20x1,5 (male) with Ø4 hole, wetted parts SS316L
	/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)
	/P.....	Thread M20x1,5 (male) with Ø12 hole, wetted parts SS316L
	/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
	/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)
	/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"NPTM(Hastelloy).....	Thread 1/2"NPT Male, G1/4" Female, wetted parts Hastelloy C 276 (Only nominal range 0...300bar)
	/1/2"NPTF.....	Thread G1/2" or M20x1,5 with adapter to 1/2"NPT Female, wetted parts SS316L (Pressure limits: max. 690bar)
/code of diaphragm seal.....	Diaphragm seal (see chapter of diaphragm seals)	
Electrical connection	(without marking)	Packing gland M20x1,5
	/US.....	Thread 1/2"NPT Female
Accessories	/AL.....	Mounting bracket type AL for 2" pipe, material zincd steel
	/AL(SS).....	Mounting bracket type AL for 2" pipe, material ss304
	/AL(SS316).....	Mounting bracket type AL for 2" pipe, material ss316
	/ST.....	Stainless Steel plate fixed to the housing
	/MT.....	Stainless Steel Tag plate mounted on wire

Not available with range no. 1, 2

Standard display configuration

	Std. version	Exia, Exia(Da)	IS	Exd	XP	Exia(Da)/Exd, IS/XP	Safety	MID
Backlight on	•	•		•				•
Backlight off			•		•	•	•	

Other configuration of display has to be marked upon placing order. User has no possibility of switching backlight on/off.

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 1/2"NPTF.

APC-2000ALW/Exia/0..7bar/0..6bar/PD/1/2"NPTM/US