SensaCo Ltd.

XMP i

Precision Pressure Transmitter for the Process Industry with HART®-Communication and SIL2 (optionally)

Stainless Steel Sensor

accuracy according to IEC 60770:
0.1 % FSO

Nominal pressure

from 0 ... 400 mbar up to 0 ... 600 bar

Output signals

2-wire: 4 ... 20 mA
others on request

Special characteristics

- turn-down 1:10
- two chamber aluminium die cast case or stainless field housing
- internal or flush welded diaphragm
- HART®-communication
- explosion protection intrinsic safety (ia)

Optional versions

- explosion protection flameproof equipment (d)
- SIL2 - version according to IEC 61508 / IEC 61511
- integrated display and operating module
- special materials as Hastelloy® and Tantalum
- cooling element for media temperatures up to 300 °C

The process pressure transmitter XMP i has been especially designed for the process industry as well as food and pharmaceutical industry (version stainless steel field housing) and measures vacuum, gauge and absolute pressure ranges of gases, steam, fluids up to 600 bar.

Different process connections such as threads and flanges with an internal or flush welded diaphragm are available and can be combined with a cooling element for media temperatures up to 300 °C. The transmitter is as a standard equipped with HART®-communication; the customer can choose between an aluminium die cast case or a stainless field housing.

Preferred areas of use are

Oil and gas industry / chemical and petrochemical industry

Food / pharmaceutical industry

Material and test certificates

- Inspection certificate 3.1 according to EN 10204
- Test report 2.2 according to EN 10204

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Pressure ranges [1]												
Nominal pressure gauge / abs. [2]	[bar]	0.4	1	2	4	10	20	40	100	200	400	600
Overpressure	[bar]	2	5	10	20	40	80	105	210	600	1000	1000
Burst pressure ≥	[bar]	3	7.5	15	25	50	120	210	420	1000	1250	1250

[1] on customer request we adjust the devices within the turn-down-possibility by software to the required pressure ranges
[2] absolute pressure possible from 1 bar

Vacuum ranges						
Nominal pressure gauge	[bar]	-0.4 … 0.4	-1 … 1	-1 … 2	-1 … 4	-1 … 10
Overpressure	[bar]	2	5	10	20	40
Burst pressure ≥	[bar]	3	7.5	15	25	50

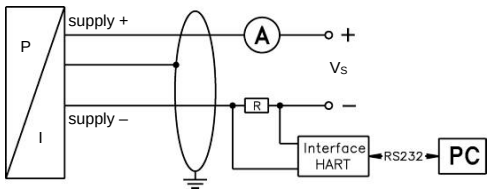
Output signal / Supply		
2-wire: 4 ... 20 mA with explosion protection	standard: intrinsic safety (ia) with HART®-communication options: flameproof equipment (d) with HART®-communication SIL2 / intrinsic safety (ia) with HART®-communication SIL2 / flameproof equipment (d) with HART®-communication	V_S = 12 ... 28 V_{DC} V_S = 13 ... 28 V_{DC} V_S = 12 ... 28 V_{DC} V_S = 13 ... 28 V_{DC}
Current consumption	max. 25 mA	
Performance		
Accuracy [3] performance after turn-down (TD) - TD ≤ 1:5 - TD > 1:5	≤ ± 0.1 % FSO no change of accuracy the accuracy is calculated as follows: ≤ 0.1 + 0.015 x (turn-down - 5) % FSO e.g. turn-down 9: ≤ 0.1 + 0.015 x (9 - 5) % FSO = 0.16 % FSO	
Permissible load	$R_{max} = [(V_S - V_{S\,min}) / 0.02\ A]\ \Omega$	load during HART® communication: R_{min} = 250 Ω
Influence effects	supply: 0.05 % FSO / 10 V	permissible load: 0.05 % FSO / kΩ
Long term stability	≤ ± 0.1 % FSO / year at reference conditions	
Response time	100 msec – without consideration of electronic damping	measuring rate 10/sec
Adjustability	electronic damping: 0 … 100 sec	offset 0 ... 90 % FSO — turn-down of span up to 1:10
[3] accuracy according to IEC 60770 – limit point adjustment (non-linearity, hysteresis, repeatability)		
Thermal errors / Permissible temperatures		
Tolerance band [4, 5]	≤ 0.2 % FSO x turn-down (in compensated range -20 … 85 °C)	
Permissible temperatures [6]	medium: -40 ... 125 °C for filling fluid silicone oil -10 ... 125 °C for filling fluid food compatible oil	without display: environment: -40 ... 80 °C; storage: -40 ... 80 °C with display: environment: -20 ... 70 °C; storage: -30 ... 80 °C
Permissible temperature medium for cooling element [7]	filling fluid silicone oil	overpressure: -40 … 300 °C — low pressure: -40 … 150 °C
	filling fluid food compatible oil	overpressure: -10 … 250 °C — low pressure: -10 … 150 °C
[4] an optional cooling element can influence thermal effects for offset and span depending on installation position and filling conditions *[5] for flange- and DRD-version: tolerance band offset ≤ ± 1.6 % FSO / tolerance band span ≤ ± 0.6 % FSO* *[6] max. temperature of the medium for nominal pressure gauge > 0 bar: 150 °C for 60 minutes with a max. environmental temperature of 50 °C (without cooling element).* *[7] max. temperature depends on the used sealing material, type of seal and installation*		
Electrical protection		
Short-circuit protection	permanent	
Reverse polarity protection	no damage, but also no function	
Electromagnetic compatibility	emission and immunity according to EN 61326	
Mechanical stability		
Vibration	5 g RMS (25 ... 2000 Hz)	according to DIN EN 60068-2-6
Shock	100 g / 11 msec	according to DIN EN 60068-2-27
Filling fluids		
Standard	silicone oil	
Options for process connections	food compatible oil according to 21CFR178.3570 (Mobil SHC Cibus 32; Category Code: H1; NSF Registration No.: 141500) Halocarbon and others on request	
Materials		
Pressure port	stainless steel 1.4435 (316L)	
Housing	aluminium die cast, powder-coated or stainless steel 1.4404 (316L)	
Cable gland	brass, nickel plated	
Viewing glass	laminated safety glass	
Seals (media wetted)	thread: standard: FKM (recommended for medium temperatures ≤ 200 °C) options: FFKM (recommended for medium temperatures < 260 °C; min. permissible temperature from -15 °C, possible for p_N ≤ 100 bar); others on request welded version for pressure ports EN 837 with p_N between 1 and 40 bar DRD and flange: none, not included in the scope of delivery Clamp, Varivent®: none	
Diaphragm	standard: stainless steel 1.4435 (316 L) options for process connections: Hastelloy® C-276 (2.4819); tantalum (possible from 1 bar) on request	
Media wetted parts	pressure port, seal, diaphragm	

Explosion protection		
Approvals AX12-XMP i AX2-XMP i (with SIL2)	**intrinsic safety** IBExU 05 ATEX 1106 X (with SIL2: IBExU 05 ATEX1105 X)	
	stainless steel field housing: zone 0: II 1G Ex ia IIC T4 Ga zone 20: II 1D Ex ia IIIC T85 °C Da safety technical maximum values: U_i = 28 V, I_i = 98 mA, P_i = 680 mW, C_i = 0 nF, L_i = 0 µH, C_{GND} = 27 nF	aluminium die cast case: zone 0/1: II 1/2G Ex ia IIB T4 Ga/Gb zone 20: II 1D Ex ia IIIC T85 °C Da safety technical maximum values: U_i = 28 V, I_i = 98 mA, P_i = 680 mW, C_i = 0 nF, L_i = 0 µH, C_{GND} = 33 nF
Approvals AX17-XMP i AX7-XMP i (with SIL2)	**flameproof enclosure** with aluminium die cast case IBExU 12 ATEX 1045 X (with SIL2: IBExU 12 ATEX1073 X) zone 1: II 2G Ex db IIC T5 Gb	
Permissible temperatures for environment	in zone 0: -20 ... 60 °C with p_{atm} 0.8 bar up to 1.1 bar zone 1 or higher: intrinsic safety: -40 ... 70 °C / flameproof enclosure: -20 ... 70 °C	
Connecting cables (by factory)	capacitance: signal line/shield also signal line/signal line: 160 pF/m inductance: signal line/shield also signal line/signal line: 1 µH/m	
Options		
SIL2-version	according to IEC 61508 / IEC 61511	
Display	LC-display, visible range 32.5 x 22.5 mm; 5-digit 7-segment main display, digit height 8 mm, range of indication ±9999; 8-digit 14-segment additional display, digit height 5 mm; 52-segement bargraph; accuracy 0.1% ± 1 digit	
Miscellaneous		
EHEDG certificate Type EL Class I	EHEDG conformity is only ensured in combination with an approved seal. This is e.g. for - Clamp (C61, C62, C63): T-ring-seal from Combifit International B.V. - Varivent® (P41): EPDM-O-ring which is FDA-listed	
Ingress protection	IP 67	
Installation position	any (standard calibration in a vertical position with the pressure port connection down; differing installation position have to be specified in the order)	
Surface roughness	pressure port R_a < 0.8 µm (media wetted parts) diaphragm R_a < 0.15 µm weld seam R_a < 0.8 µm	
Weight	min. 400 g (depending on housing and mechanical connection)	
Operational life	100 million load cycles	
CE-conformity	EMC Directive: 2014/30/EU Pressure Equipment Directive: 2014/68/EU (module A) [8]	
ATEX Directive	2014/34/EU	

[8] *this directive is only valid for devices with maximum permissible overpressure > 200 bar*

Wiring diagram / pin configuration

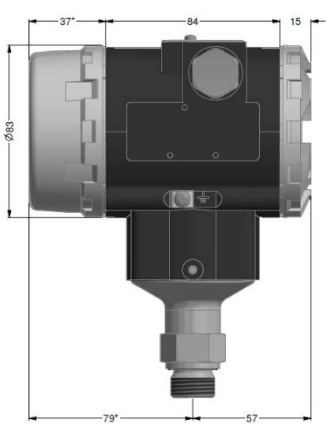
2-wire-system (current) and HART® - communication

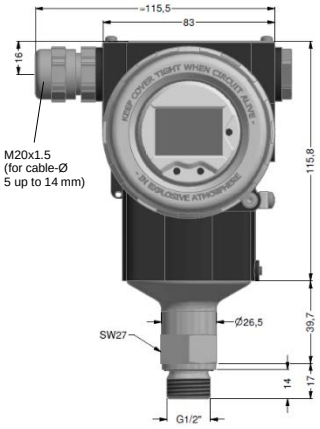


Electrical connections	aluminium case clamp section 2.5 mm²	stainless steel field housing clamp section 1.5 mm²
Supply +	IN+	IN+
Supply –	IN-	IN-
Test (HART)	Test	-
Shield	⏚	⏚

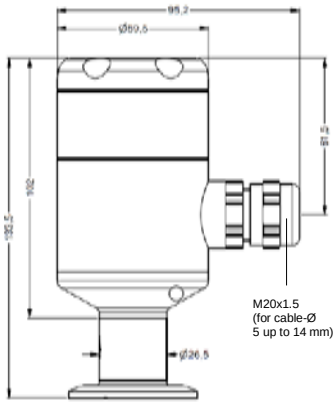
Housing designs [9] (dimensions in mm)

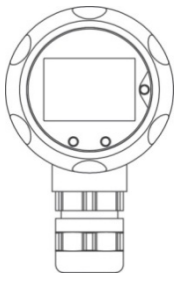
aluminium die cast case





stainless steel field housing





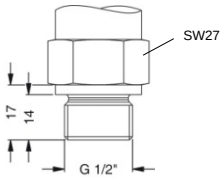
display (optional)

* without display and operating module marked dimensions decrease by 22 mm (with aluminium case)

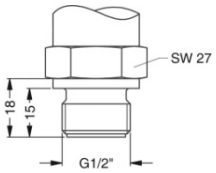
⇨ **for nominal pressure p_N > 400 bar increases the length of devices by 39 mm**

[9] *aluminium case is horizontally rotatable as standard*

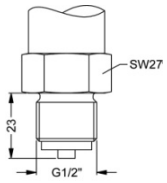
Standard pressure ports (dimensions in mm)



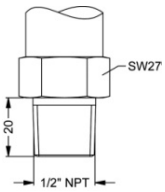
G1/2" DIN 3852



G1/2" flush (DIN 3852)
1 bar ≤ p_N ≤ 40 bar



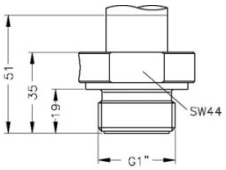
G1/2" EN 837
M20x1.5



1/2" NPT

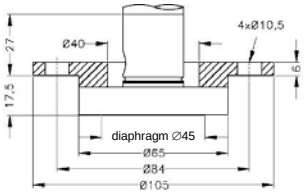
Process connections (dimensions in mm)

Inch thread (DIN 3852)



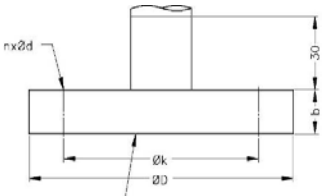
G1" flush
p_N ≤ 400 bar

DRD [10]



p_N ≤ 25 bar

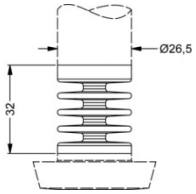
Flange (DIN 2501)



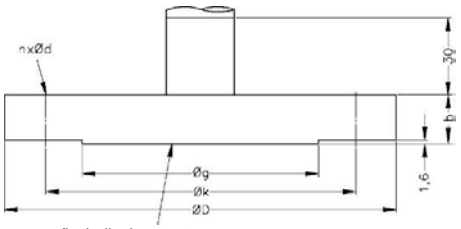
flush diaphragm ØE

dimensions in mm			
size	DN25	DN50	DN80
D	115	165	200
E	30	89	89
k	85	125	160
b	18	20	20
n	4	4	8
d	14	18	18
p_N [bar]	≤ 40	≤ 40	≤ 16

Cooling element up to 300 °C [7]



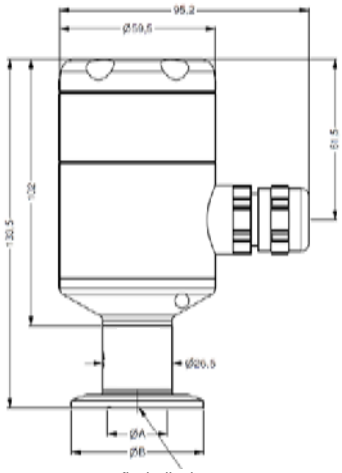
Flange (ANSI B16.5)



flush diaphragm ØE

dimensions in mm		
size	2"/150 lbs	3"/150 lbs
D	152.4	190.5
E	86	89
g	91.9	127
k	120.7	152.4
b	19.1	23.9
n	4	4
d	19.1	19.1
p_N [bar]	≤ 10	≤ 10

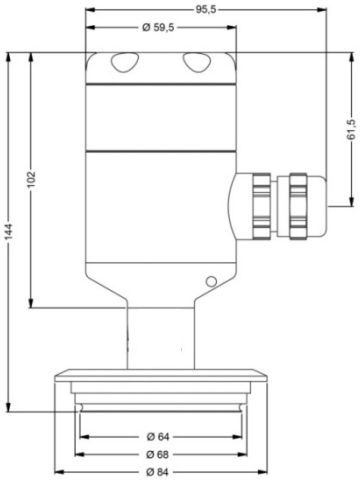
Clamp (DIN 32676)



flush diaphragm

dimensions in mm				
size	3/4"	DN25	DN32	DN50
A	14	23	32	45
B	25	50.5	50.5	64
p_N [bar]	≥ 4 ≤ 8	≥ 0.25 ≤ 16	≤ 16	≤ 16

Varivent® (DN 40/50)
p_N ≤ 25 bar



[7] *max. temperature depends on the used sealing material, type of seal and installation*
[10] *mounting flange is included in the delivery (already pre-assembled)*

HART® is a registered trademark of HART Communication Foundation; Hastelloy® is a brand name of Haynes International Inc.
Windows® is a registered trademark of Microsoft Corporation

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Ordering code XMP i

XMP i ☐☐☐-☐☐☐☐-☐☐-☐-☐-☐☐☐-☐☐☐-☐-☐-☐-☐☐☐

Section	Option	Code	Remark
Pressure			
	gauge	511	
	absolute [1]	512	
Input	[bar] ⚠		
	0 ... 0.4 [1]	4000	
	0 ... 1	1001	
	0 ... 2	2001	
	0 ... 4	4001	
	0 ... 10	1002	
	0 ... 20	2002	
	0 ... 40	4002	
	0 ... 100	1003	
	0 ... 200	2003	
	0 ... 400	4003	
	0 ... 600	6003	
	-0.4 ... 0.4	S400	
	-1 ... 1	S102	
	-1 ... 2	V202	
	-1 ... 4	V402	
	-1 ... 10	V103	
	customer	9999	consult
Design			
Aluminium die cast case			
	with display	A0	
	without display	AN	
Stainless steel field housing			
	with display	FV	
	without display	FN	
	customer	99	consult
Output			
	intrinsic safety (ia) 4 ... 20 mA / 2-wire with HART®-communication	I	
	flameproof equipment (d) 4 ... 20 mA / 2-wire with HART®-communication [2]	G	
SIL2:	intrinsic safety (ia) 4 ... 20 mA / 2-wire with HART®-communication	IS	
SIL2:	flameproof equipment (d) 4 ... 20 mA / 2-wire with HART®-communication [2]	GS	
	customer	9	consult
Accuracy			
	0.1 % FSO	1	
Electrical connection			
	terminal clamp alu housing	AK0	
	terminal clamp field housing	880	
	customer	999	consult
Mechanical connection			
Standard pressure connections			
	G1/2" DIN 3852	100	
	G1/2" with flush welded diaphragm (DIN 3852) [3]	Z00	
	G1/2" EN 837	200	
	1/2" NPT	N00	
Process connections (up to 40 bar)			
	G1" with flush welded diaphragm (DIN 3852)	ZS1	
	flange DN 25 / PN 40 (DIN 2501)	F20	
	flange DN 50 / PN 40 (DIN 2501)	F23	
	flange DN 80 / PN 16 (DIN 2501)	F14	
	flange DN 2" / 150 lbs (ANSI B16.5) [4]	F32	
	flange DN 3" / 150 lbs (ANSI B16.5) [4]	F33	
	DRD Ø 65 mm [5]	DRD	
	Clamp DN 25 / 1" (DIN 32676) / 3A	C61	
	Clamp DN 32 / 1 1/2" (DIN 32676) / 3A	C62	
	Clamp DN 50 / 2" (DIN 32676) / 3A	C63	
	Clamp 3/4" (DIN 32676) / 3A	C69	
	Varivent® DN 40/50 / 3A	P41	
Diaphragm			
	stainless steel 1.4435 (316L)	1	
	Hastelloy® [6]	H	consult
	Tantalum [6, 7]	T	consult
Seal			
Inch thread:			
	FKM	1	
	FFKM [8]	7	
EN 837:	without (welded version) [9]	2	
DRD, flange:	*without*	0	
Filling fluid			
	silicone oil	1	
	food compatible oil [6]	2	
	Halocarbon [6]	C	consult
	customer	9	consult

Ordering code XMP i

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Special version			
standard	0	0	0
with cooling element up to 300 °C [6]	2	0	0
special compensation -40 … +60 °C [10]	0	2	2

⚠ **if setting range shall be different from nominal range please specify in your order**

[1] absolute pressure possible from 1 bar
[2] only possible in combination with aluminium die cast case
[3] only possible for $p_N \geq 1$ bar up to 40 bar
[4] 2"/150 lbs and 3"/150 lbs possible for nominal pressure ranges $p_N \leq 10$ bar
[5] mounting flange is included in the delivery (already pre-assembled)
[6] only possible with process connections
[7] tantal diaphragm possible with nominal pressure ranges from 1 bar
[8] min. permissible temperature from -15 °C, possible for nominal pressure ranges $p_N \leq 100$ bar
[9] possible with pressure ranges between 1 bar and 40 bar
[10] option for version without display