

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



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)	≤ ± 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] Ω 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:	without display: environment: -40 ... 80 °C storage: -40 ... 80 °C
	-40 ... 125 °C for filling fluid silicone oil -10 ... 125 °C for filling fluid food compatible oil	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 IExU 05 ATEX 1106 X (with SIL2: IExU 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: $U_i = 28\text{ V}$, $I_i = 98\text{ mA}$, $P_i = 680\text{ mW}$, $C_i = 0\text{ nF}$, $L_i = 0\text{ }\mu\text{H}$, $C_{\text{GND}} = 27\text{ nF}$
Approvals AX17-XMP i AX7-XMP i (with SIL2)	flameproof enclosure with aluminium die cast case IExU 12 ATEX 1045 X (with SIL2: IExU 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 $\mu\text{H}/\text{m}$
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-segment bargraph; accuracy 0.1% \pm 1 digit
Miscellaneous	
EHDG certificate Type EL Class I	EHDG 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 $R_a < 0.8\text{ }\mu\text{m}$ (media wetted parts) diaphragm $R_a < 0.15\text{ }\mu\text{m}$ weld seam $R_a < 0.8\text{ }\mu\text{m}$
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

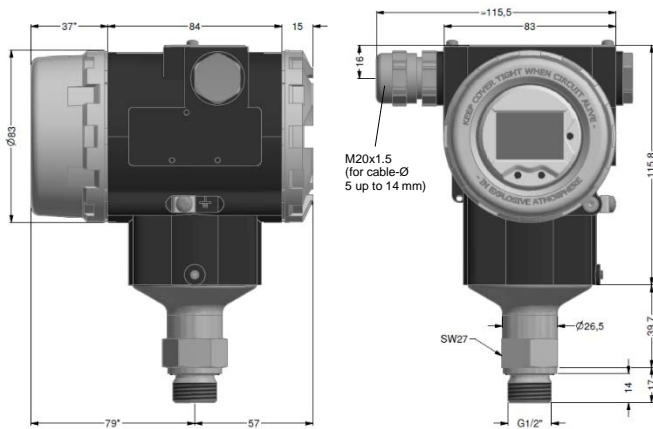
⁸ this directive is only valid for devices with maximum permissible overpressure > 200 bar

Wiring diagram / pin configuration

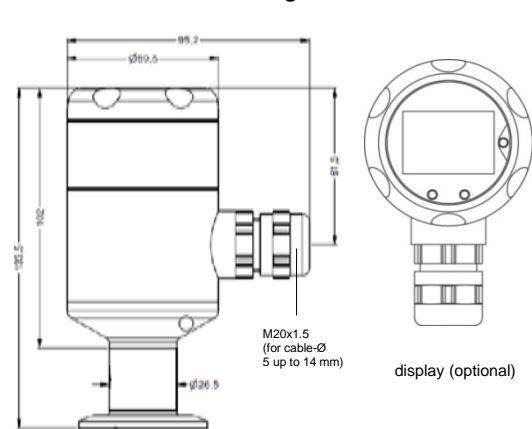
<p>2-wire-system (current) and HART® - communication</p>	Electrical connections	aluminium case	stainless steel field housing
		clamp section 2.5 mm ²	clamp section 1.5 mm ²
	Supply +	IN+	IN+
	Supply -	IN-	IN-
Test (HART)	Test	-	
Shield	⊕	⊕	

Housing designs ⁹ (dimensions in mm)

aluminium die cast case



stainless steel field housing

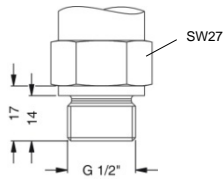


* without display and operating module marked dimensions decrease by 22 mm (with aluminium case)

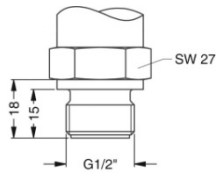
⇒ for nominal pressure $p_N > 400\text{ bar}$ increases the length of devices by 39 mm

⁹ aluminium case is horizontally rotatable as standard

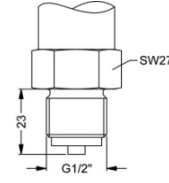
Standard pressure ports (dimensions in mm)



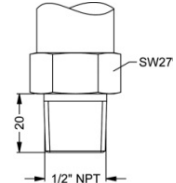
G1/2" DIN 3852



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



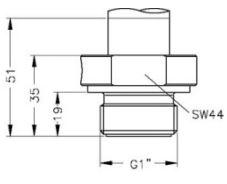
G1/2" EN 837
M20x1.5



1/2" NPT

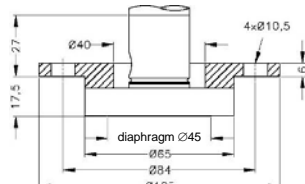
Process connections (dimensions in mm)

Inch thread (DIN 3852)



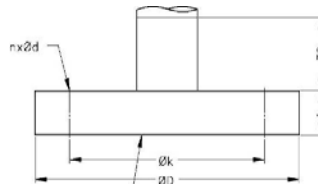
G1" flush
p_N ≤ 400 bar

DRD¹⁰



p_N ≤ 25 bar

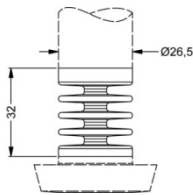
Flange (DIN 2501)



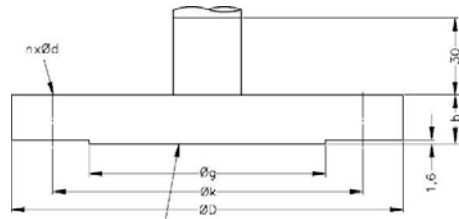
flush diaphragm ØE

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 °C⁷



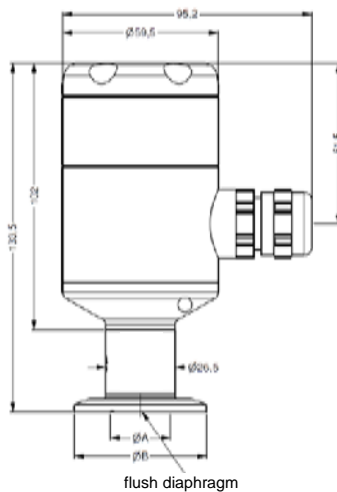
Flange (ANSI B16.5)



flush diaphragm ØE

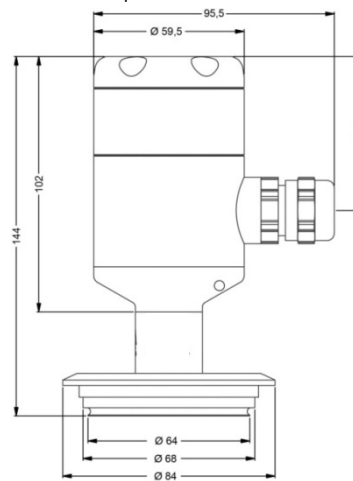
dimensions in mm		
size	2"/150 lbs	3"/150 lbs
D	152.4	190.5
E	86	89
g	91.9	127
k	120.7	152.4
b	19.1	23.9
n	4	4
d	19.1	19.1
p _N [bar]	≤ 10	≤ 10

Clamp (DIN 32676)



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)

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Windows® is a registered trademark of Microsoft Corporation

Ordering code XMP i

XMP i

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Special version			
standard		0	0
with cooling element up to 300 °C ⁶		2	0
special compensation -40 ... +60 °C ¹⁰		0	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 27/150 lbs and 37/150 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

HART[®] is a registered trade mark of HART Communication Foundation; Hastelloy[®] is a brand name of Haynes International Inc.
 Varivent[®] is a brand name of GEA Tuchenhausen GmbH

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