

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							V _S = 12 ... 28 V _{DC}		
		options:	flameproof equipment (d) with HART®-communication							V _S = 13 ... 28 V _{DC}		
			SIL2 / intrinsic safety (ia) with HART®-communication							V _S = 12 ... 28 V _{DC}		
			SIL2 / flameproof equipment (d) with HART®-communication							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		
		-40 ... 125 °C for filling fluid silicone oil					storage:			-40 ... 80 °C		
		-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 IIC T85 °C Da safety technical maximum values: $U_i = 28\text{ V}$, $I_i = 98\text{ mA}$, $P_i = 680\text{ mW}$, $C_i = 0\text{ nF}$, $L_i = 0\text{ }\mu\text{H}$, $C_{\text{GND}} = 27\text{ nF}$ aluminium die cast case: zone 0/1: II 1/2G Ex ia IIB T4 Ga/Gb zone 20: II 1D Ex ia IIC T85 °C Da safety technical maximum values: $U_i = 28\text{ V}$, $I_i = 98\text{ mA}$, $P_i = 680\text{ mW}$, $C_i = 0\text{ nF}$, $L_i = 0\text{ }\mu\text{H}$, $C_{\text{GND}} = 33\text{ nF}$
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	
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 $R_a < 0.8\text{ }\mu\text{m}$ (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

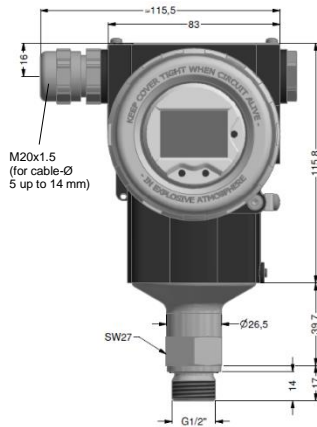
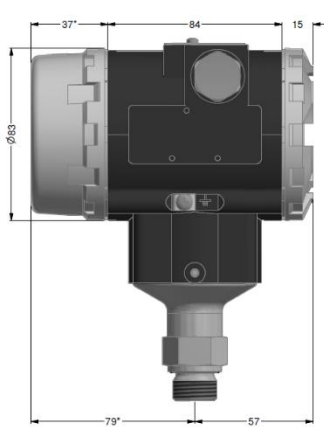
⁸ this directive is only valid for devices with maximum permissible overpressure > 200 bar

Wiring diagram / pin configuration

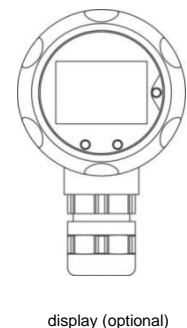
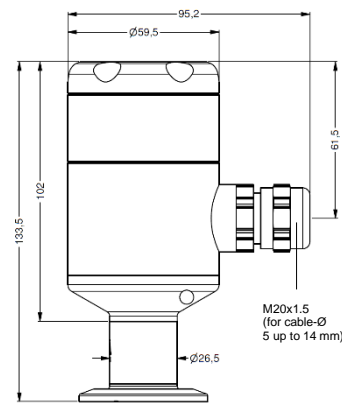
2-wire-system (current) and HART® - communication 	Electrical connections	aluminium case	stainless steel field housing
		clamp section 2.5 mm ²	clamp section 1.5 mm ²
	Supply +	IN+	IN+
	Supply -	IN-	IN-
Test (HART)	Test	-	
Shield	⊕	⊕	

Housing designs ⁹ (dimensions in mm)

aluminium die cast case



stainless steel field housing

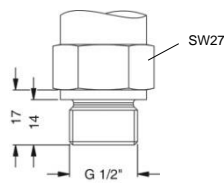


* without display and operating module marked dimensions decrease by 22 mm (with aluminium case)

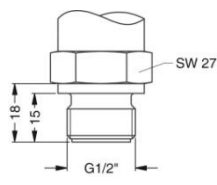
⇒ for nominal pressure $p_N > 400\text{ bar}$ increases the length of devices by 39 mm

⁹ aluminium case is horizontally rotatable as standard

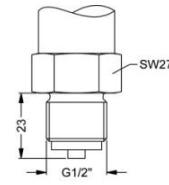
Standard pressure ports (dimensions in mm)



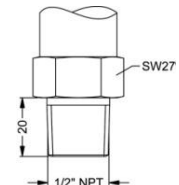
G1/2" DIN 3852



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



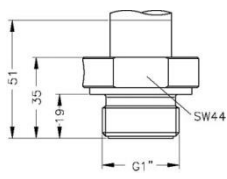
G1/2" EN 837
M20x1.5



1/2" NPT

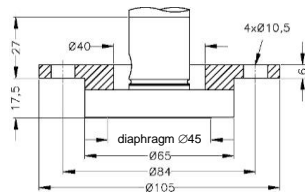
Process connections (dimensions in mm)

Inch thread (DIN 3852)



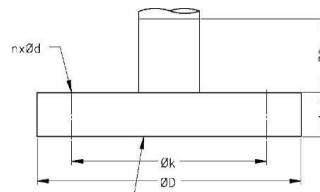
G1" flush
p_N ≤ 400 bar

DRD¹⁰



p_N ≤ 25 bar

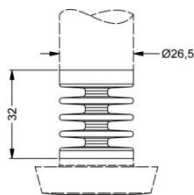
Flange (DIN 2501)



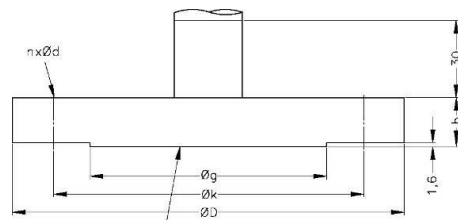
flush diaphragm ØE

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



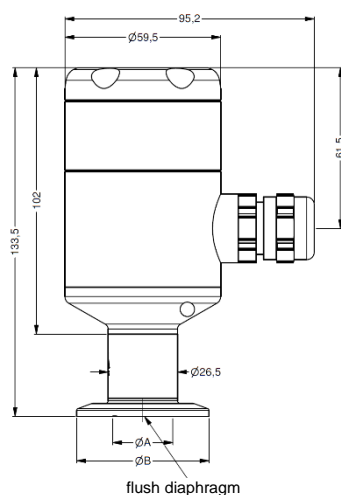
Flange (ANSI B16.5)



flush diaphragm ØE

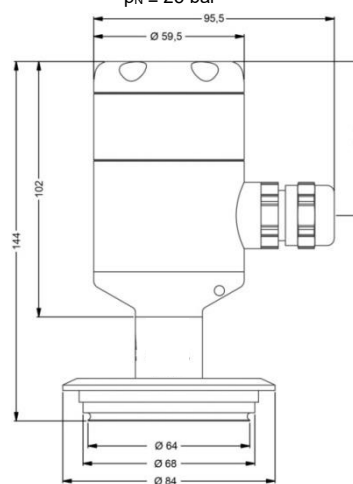
dimensions in mm		
size	2"/150 lbs	3"/150 lbs
D	152.4	190.5
E	86	89
g	91.9	127
k	120.7	152.4
b	19.1	23.9
n	4	4
d	19.1	19.1
p _N [bar]	≤ 10	≤ 10

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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Pressure									
	gauge	5	1	1					
	absolute	5	1	2					
Input									
	[bar] Δ								
	0 ... 0.4	1			4	0	0	0	
	0 ... 1				1	0	0	1	
	0 ... 2				2	0	0	1	
	0 ... 4				4	0	0	1	
	0 ... 10				1	0	0	2	
	0 ... 20				2	0	0	2	
	0 ... 40				4	0	0	2	
	0 ... 100				1	0	0	3	
	0 ... 200				2	0	0	3	
	0 ... 400				4	0	0	3	
	0 ... 600				6	0	0	3	
	-0.4 ... 0.4				S	4	0	0	
	-1 ... 1				S	1	0	2	
	-1 ... 2				V	2	0	2	
	-1 ... 4				V	4	0	2	
	-1 ... 10				V	1	0	3	
	customer				9	9	9	9	consult
Design									
Aluminium die cast case									
	with display				A	0			
	without display				A	N			
Stainless steel field housing									
	with display				F	V			
	without display				F	N			
	customer				9	9			consult
Output									
	intrinsic safety (ia)								
	4 ... 20 mA / 2-wire				I				
	with HART [®] -communication								
	flameproof equipment (d)								
	4 ... 20 mA / 2-wire				G				
	with HART [®] -communication	2							
SIL2:	intrinsic safety (ia)								
	4 ... 20 mA / 2-wire				IS				
	with HART [®] -communication								
SIL2:	flameproof equipment (d)								
	4 ... 20 mA / 2-wire				GS				
	with HART [®] -communication	2							
	customer				9				consult
Accuracy									
	0.1 % FSO							1	
Electrical connection									
	terminal clamp alu housing						A	K	0
	terminal clamp field housing						8	8	0
	customer						9	9	9
Mechanical connection									
Standard pressure connections									
	G1/2" DIN 3852						1	0	0
	G1/2" with flush	3					Z	0	0
	welded diaphragm (DIN 3852)								
	G1/2" EN 837						2	0	0
	1/2" NPT						N	0	0
Process connections (up to 40 bar)									
	G1" with flush welded						Z	3	1
	diaphragm (DIN 3852)								
	flange DN 25 / PN 40 (DIN 2501)						F	2	0
	flange DN 50 / PN 40 (DIN 2501)						F	2	3
	flange DN 80 / PN 16 (DIN 2501)						F	1	4
	flange DN 2" / 150 lbs (ANSI B16.5)	4					F	3	2
	flange DN 3" / 150 lbs (ANSI B16.5)	4					F	3	3
	DRD Ø 65 mm	5					D	R	D
	Clamp DN 25 / 1" (DIN 32676) / 3A						C	6	1
	Clamp DN 32 / 1 1/2" (DIN 32676) / 3A						C	6	2
	Clamp DN 50 / 2" (DIN 32676) / 3A						C	6	3
	Clamp 3/4" (DIN 32676) / 3A						C	6	9
	Varivent [®] DN 40/50 / 3A						P	4	1
Diaphragm									
	stainless steel 1.4435 (316L)								1
	Hastelloy [®]	6							H
	Tantalum	6,7							T
Seals									
Inch thread:									
	FKM								1
	FFKM	8							7
EN 837:	without (welded version)	9							2
DRD, flange:	without								0
Filling fluids									
	silicone oil								1
	food compatible oil	6							2
	Halocarbon	6							C
	customer								9
									consult
									consult

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 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

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 Varivent[®] is a brand name of GEA Tuchenhaden GmbH

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