

# 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

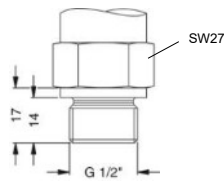
- ▶ Inspection certificate 3.1 according to EN 10204
- ▶ Test report 2.2 according to EN 10204



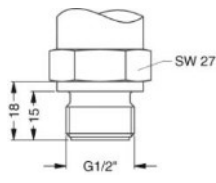
Pressure ranges <sup>1</sup>												
Nominal pressure gauge / abs. <sup>2</sup>	[bar]	0.4	1	2	4	10	20	40	100	200	400	600
Overpressure	[bar]	2	5	10	20	40	80	105	210	600	1000	1000
Burst pressure ≥	[bar]	3	7.5	15	25	50	120	210	420	1000	1250	1250
<sup>1</sup> on customer request we adjust the devices within the turn-down-possibility by software to the required pressure ranges												
<sup>2</sup> 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 <sub>S</sub> = 12 ... 28 V <sub>DC</sub>		
		options:	flameproof equipment (d) with HART®-communication							V <sub>S</sub> = 13 ... 28 V <sub>DC</sub>		
			SIL2 / intrinsic safety (ia) with HART®-communication							V <sub>S</sub> = 12 ... 28 V <sub>DC</sub>		
			SIL2 / flameproof equipment (d) with HART®-communication							V <sub>S</sub> = 13 ... 28 V <sub>DC</sub>		
Current consumption		max. 25 mA										
Performance												
Accuracy <sup>3</sup>		≤ ± 0.1 % FSO										
performance after turn-down (TD)		no change of accuracy										
- TD ≤ 1:5		the accuracy is calculated as follows: ≤ 0.1 + 0.015 x (turn-down - 5) % FSO										
- TD > 1:5		e.g. turn-down 9: ≤ 0.1 + 0.015 x (9 - 5) % FSO = 0.16 % FSO										
Permissible load		R <sub>max</sub> = [(V <sub>S</sub> - V <sub>S min</sub> ) / 0.02 A] Ω							load during HART® communication: R <sub>min</sub> = 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				
<sup>3</sup> accuracy according to IEC 60770 – limit point adjustment (non-linearity, hysteresis, repeatability)												
Thermal errors / Permissible temperatures												
Tolerance band <sup>4,5</sup>		≤ 0.2 % FSO x turn-down (in compensated range -20 ... 85 °C)										
Permissible temperatures <sup>6</sup>		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 <sup>7</sup>		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				
<sup>4</sup> an optional cooling element can influence thermal effects for offset and span depending on installation position and filling conditions												
<sup>5</sup> for flange- and DRD-version: tolerance band offset ≤ ± 1.6 % FSO / tolerance band span ≤ ± 0.6 % FSO												
<sup>6</sup> 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).												
<sup>7</sup> 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 <sub>N</sub> ≤ 100 bar); others on request welded version for pressure ports EN 837 with p <sub>N</sub> 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										

<b>Explosion protection</b>			
Approvals AX12-XMP i AX2-XMP i (with SIL2)	<b>intrinsic safety</b> 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: $U_i = 28\text{ V}$ , $I_i = 98\text{ mA}$ , $P_i = 680\text{ mW}$ , $C_i = 0\text{ nF}$ , $L_i = 0\text{ }\mu\text{H}$ , $C_{\text{GND}} = 27\text{ nF}$	IBExU 05 ATEX 1106 X (with SIL2: IBExU 05 ATEX1105 X) 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: $U_i = 28\text{ V}$ , $I_i = 98\text{ mA}$ , $P_i = 680\text{ mW}$ , $C_i = 0\text{ nF}$ , $L_i = 0\text{ }\mu\text{H}$ , $C_{\text{GND}} = 33\text{ nF}$	
Approvals AX17-XMP i AX7-XMP i (with SIL2)	<b>flameproof enclosure</b> 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 $p_{\text{atm}}$ 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 $\mu\text{H}/\text{m}$		
<b>Options</b>			
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 $\pm 9999$ ; 8-digit 14-segment additional display, digit height 5 mm; 52-segment bargraph; accuracy 0.1% $\pm$ 1 digit		
<b>Miscellaneous</b>			
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) <sup>8</sup>		
ATEX Directive	2014/34/EU		
<sup>8</sup> this directive is only valid for devices with maximum permissible overpressure > 200 bar			
<b>Wiring diagram / pin configuration</b>			
2-wire-system (current) and HART® - communication	Electrical connections	<b>aluminium case</b> clamp section 2.5 mm <sup>2</sup>	<b>stainless steel field housing</b> clamp section 1.5 mm <sup>2</sup>
	Supply + Supply - Test (HART) Shield	IN+ IN- Test ⊕	IN+ IN- - ⊕
<b>Housing designs<sup>9</sup> (dimensions in mm)</b>			
<b>aluminium die cast case</b>		<b>stainless steel field housing</b>	
* 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			
<sup>9</sup> aluminium case is horizontally rotatable as standard			

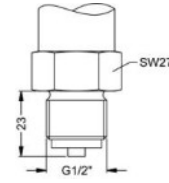
**Standard pressure ports (dimensions in mm)**



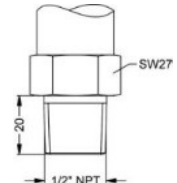
G1/2" DIN 3852



G1/2" flush (DIN 3852)  
1 bar ≤ p<sub>N</sub> ≤ 40 bar



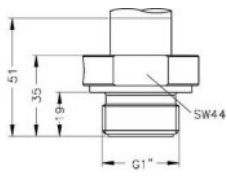
G1/2" EN 837  
M20x1.5



1/2" NPT

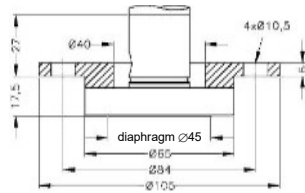
**Process connections (dimensions in mm)**

**Inch thread (DIN 3852)**



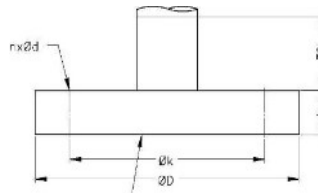
G1" flush  
p<sub>N</sub> ≤ 400 bar

**DRD<sup>10</sup>**



p<sub>N</sub> ≤ 25 bar

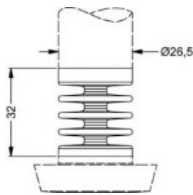
**Flange (DIN 2501)**



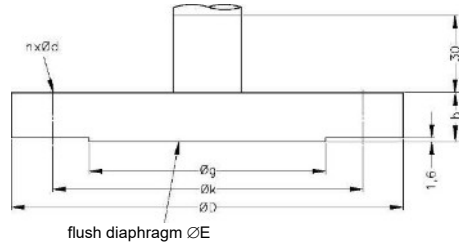
flush diaphragm ØE

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 <sub>N</sub> [bar]	≤ 40	≤ 40	≤ 16

**Cooling element up to 300 °C<sup>7</sup>**



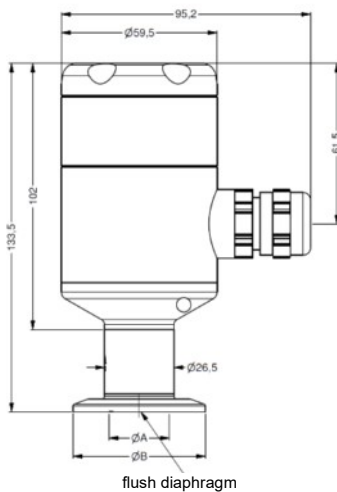
**Flange (ANSI B16.5)**



flush diaphragm ØE

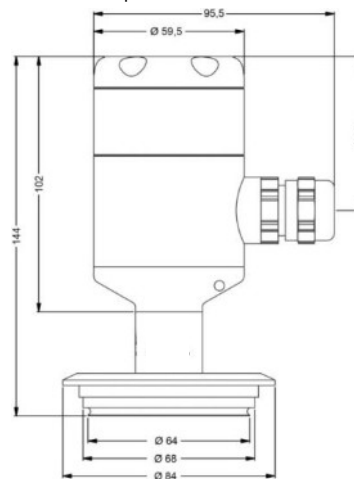
dimensions in mm		
size	2"/150 lbs	3"/150 lbs
D	152.4	190.5
E	86	89
g	91.9	127
k	120.7	152.4
b	19.1	23.9
n	4	4
d	19.1	19.1
p <sub>N</sub> [bar]	≤ 10	≤ 10

**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 <sub>N</sub> [bar]	≥ 4 ≤ 8	≥ 0.25 ≤ 16	≤ 16	≤ 16

**Varivent® (DN 40/50)  
p<sub>N</sub> ≤ 25 bar**



<sup>7</sup> max. temperature depends on the used sealing material, type of seal and installation

<sup>10</sup> 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.

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## Ordering code XMP i

XMP i

<b>Pressure</b>							
	gauge	5 1 1					
	absolute <sup>1</sup>	5 1 2					
<b>Input</b>							
	[bar]						
	0 ... 0.4 <sup>1</sup>		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		5 4 0 0				
	-1 ... 1		5 1 0 2				
	-1 ... 2		5 2 0 2				
	-1 ... 4		5 4 0 2				
	-1 ... 10		5 1 0 3				
	customer		9 9 9 9				consult
<b>Design</b>							
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
<b>Output</b>							
	intrinsic safety (ia)						
	4 ... 20 mA / 2-wire				I		
	with HART <sup>®</sup> -communication						
	flameproof equipment (d)						
	4 ... 20 mA / 2-wire				G		
	with HART <sup>®</sup> -communication						
SIL2:	intrinsic safety (ia)						
	4 ... 20 mA / 2-wire				IS		
	with HART <sup>®</sup> -communication						
	flameproof equipment (d)						
	4 ... 20 mA / 2-wire				GS		
	with HART <sup>®</sup> -communication						
	customer				9		consult
<b>Accuracy</b>							
	0.1 % FSO				1		
<b>Electrical connection</b>							
	terminal clamp alu housing				A K 0		
	terminal clamp field housing				8 8 0		
	customer				9 9 9		consult
<b>Mechanical connection</b>							
<b>Standard pressure connections</b>							
	G1/2" DIN 3852				1 0 0		
	G1/2" with flush				Z 0 0		
	welded diaphragm (DIN 3852)						
	G1/2" EN 837				2 0 0		
	1/2" NPT				N 0 0		
<b>Process connections (up to 40 bar)</b>							
	G1" with flush welded						
	diaphragm (DIN 3852)				Z 3 1		
	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)				F 3 2		
	flange DN 3" / 150 lbs (ANSI B16.5) <sup>4</sup>				F 3 3		
	DRD Ø 65 mm <sup>5</sup>				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		
<b>Diaphragm</b>							
	stainless steel 1.4435 (316L)				1		
	Hastello <sup>®</sup> 6				H		
	Tantalum <sup>®</sup> 7				T		consult
<b>Seals</b>							
<b>Inch thread:</b>							
	FKM				1		
	FFKM <sup>8</sup>				7		
EN 837:	without (welded version)				2		
DRD, flange:	without				0		
<b>Filling fluids</b>							
	silicone oil				1		
	food compatible oil				2		
	Halocarbor <sup>®</sup>				C		consult
	customer				9		consult

## Ordering code XMP i

XMP i

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Special version	standard	0 0 0
	with cooling element up to 300 °C <sup>6</sup>	2 0 0
	special compensation -40 ... +60 °C <sup>10</sup>	0 2 2

<sup>Δ</sup> if setting range shall be different from nominal range please specify in your order

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

HART<sup>®</sup> is a registered trade mark of HART Communication Foundation; Hastelloy<sup>®</sup> is a brand name of Haynes International Inc.  
 Varivent<sup>®</sup> is a brand name of GEA Tuchenhausen GmbH

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