BD|SENSORS
pressure measurement

XMP i

Precision Pressure Transmitter for the Process Industry with HART®-Communication

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
- IS-version: Ex ia = intrinsically safe for gases and dusts

Optional versions

- IS-version: Ex d = flameproof enclosure
- 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 a two chamber 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

- material mill test report 3.1 according EN 10204
- test report 2.2 to EN 10204

74-06

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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			
Standard 2-wire: 4 ... 20 mA	IS-intrinsically safe version with HART®-communication		V_S = 12 ... 28 V_{DC}
Option 2-wire: 4 ... 20 mA	IS version flameproof enclosure with HART®-communication		V_S = 13 … 28 V_{DC}
Current consumption	max. 25 mA		
Performance			
Accuracy [3]	≤ ± 0.1 % FSO		
performance after turn-down (TD)			
- TD ≤ 1:5	no change of accuracy		
- TD > 1:5	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 300°C	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

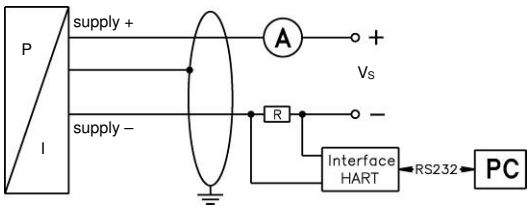
[4] an optional cooling element can influence thermal effects for offset and span depending on installation position and filling conditions
[5] for flange- and DRD-version: tolerance band offset ≤ ± 1.6 % FSO / tolerance band span ≤ ± 0.6 % FSO
[6] max. temperature of the medium for nominal pressure gauge > 0 bar: 150 °C for 60 minutes with a max. environmental temperature of 50 °C (without cooling element).

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 option: FFKM (min. permissible temperature from -15 °C, possible for nominal pressure ranges P_N ≤ 100 bar); others on request option: welded version for pressure ports according to EN 837 with P_N between 1 and 40 bar DRD and flange: none, not included in the scope of delivery
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	
Approval AX12-XMP i	IBExU 05 ATEX 1106 X stainless steel field housing: zone 0 / 20: II 1G Ex ia IIC T4 Ga / II 1D Ex ia IIIC T85 °C Da aluminium die cast case: zone 1 / 20: II 1/2G Ex ia IIB T4 Ga/Gb / 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
Approval AX17-XMP i (flameproof enclosure)	IBExU 12 ATEX 1045 X aluminium die cast case: zone 1: II 2G Ex d 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: -40 ... 70 °C (intrinsically safe version); -20 ... 70 °C (flameproof enclosure)
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
Miscellaneous	
Display (optionally)	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
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)
Weight	min. 400 g (depending on housing and mechanical connection)
Operational life	> 100 x 10^6 pressure cycles
CE-conformity	EMC Directive: 2014/30/EU Pressure Equipment Directive: 2014/68/EU (module A) [7]
ATEX Directive	2014/34/EU

[7] This directive is only valid for devices with maximum permissible overpressure > 200 bar

Wiring diagram

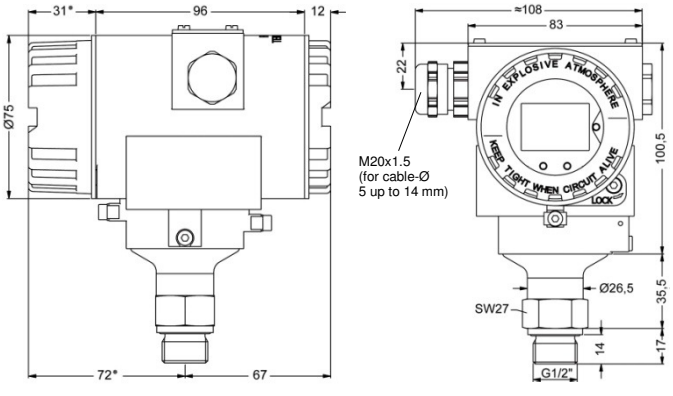


Pin configuration

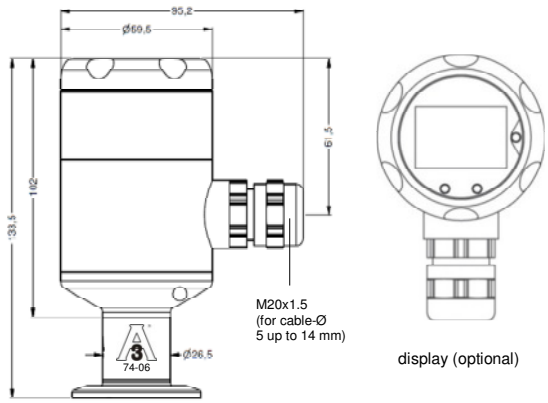
Electrical connections	**aluminium die cast case:** terminal clamps (clamp section: 2.5 mm²)	**stainless steel field housing:** terminal clamps (clamp section: 1.5 mm²)
Supply + Supply – Test	IN+ IN- Test	IN+ IN- -
Shield	⏚	⏚

Housing designs [8] (dimensions in mm)

aluminium die cast case



stainless steel field housing



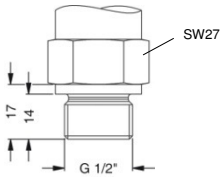
display (optional)

* without display and operating module marked dimensions decrease by 19 mm (with aluminium case)

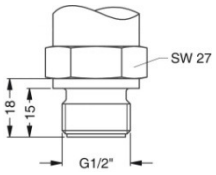
⇨ **for nominal pressure P_N > 400 bar increases the length of devices by 39 mm**

[8] aluminium case is horizontally rotatable as standard

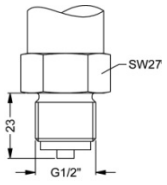
Standard pressure ports (dimensions in mm)



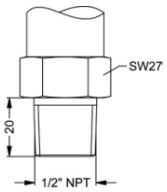
G1/2" DIN 3852



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



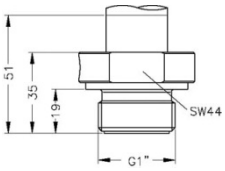
G1/2" EN 837
M20x1.5



1/2" NPT

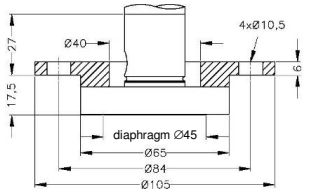
Process connections up to 40 bar (dimensions in mm)

Inch thread (DIN 3852)



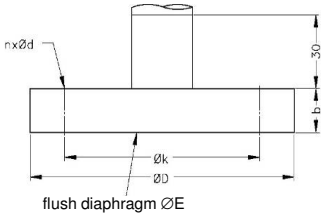
G1" flush
(P_N ≤ 400 bar)

DRD [9]



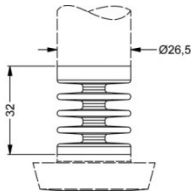
(P_N ≤ 25 bar)

Flange (DIN 2501)



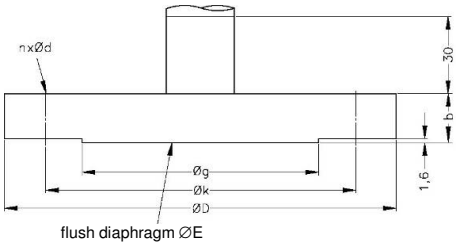
dimensions in mm			
size	DN25	DN50	DN80
D	115	165	200
E	30	89	89
k	85	125	160
b	18	20	20
n	4	4	8
d	14	18	18
P_N [bar]	≤ 40	≤ 40	≤ 16

Cooling element



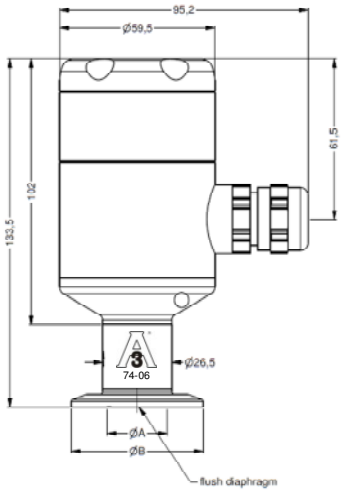
temperature range	300° C

Flange (ANSI B16.5)



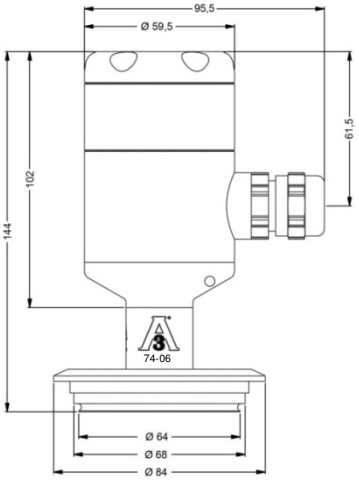
dimensions in mm		
size	2"/150 lbs	3"/150 lbs
D	152.4	190.5
E	86	89
g	91.9	127
k	120.7	152.4
b	19.1	23.9
n	4	4
d	19.1	19.1
P_N [bar]	≤ 10	≤ 10

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



[9] *mounting flange is included in the delivery (already pre-assembled)*

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Ordering code XMP i

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Option	Code	Note
Pressure		
gauge	5 1 1	
absolute [1]	5 1 2	
Input [bar] ⚠		
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 4 … 20 mA / 2-wire with HART®-communication	I	
intrinsic safety Ex d 4 … 20 mA / 2-wire (flameproof enclosure) with HART®-communication [2]	G	
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	consult
Mechanical connection		
Standard pressure connections		
G1/2" DIN 3852	1 0 0	
G1/2" with flush [3] welded diaphragm (DIN 3852)	Z 0 0	
G1/2" EN 837	2 0 0	
1/2" NPT	N 0 0	
Process connections (up to 40 bar)		
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	
Flansch DN 2" / 150 lbs (ANSI B16.5) [4]	F 3 2	
Flansch 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	consult
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 (FDA) / 3A [6]	2	
Halocarbon [6]	C	consult
customer	9	consult
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

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