BD|SENSORS
pressure measurement

x|act i

Precision Pressure Transmitter for Food Industry, Pharmacy and Biotechnology with SIL2 (optionally)

Stainless Steel Sensor

accuracy according to IEC 60770:
0.1 % FSO

Nominal pressure

from 0 ... 400 mbar up to 0 ... 40 bar

Output signals

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

Special characteristics

- turn-down 1:10
- hygienic version
- flush welded diaphragm
- several process connections (G1" cone, Clamp, dairy pipe, etc.)
- integrated display and operating module

Optional versions

- explosion protection intrinsic safety (ia)
- SIL2 -version according to IEC 61508 / IEC 61511
- HART®-communication
- cooling element for media temperatures up to 300 °C

The precise pressure transmitter x|act i has been especially designed for the food industry, pharmacy and biotechnology and measures vacuum, gauge and absolute pressure of gases, steam and fluids up to 40 bar.

Several process connections e.g. thread or hygienic versions like Varivent®, dairy pipe and Clamp with a flush welded diaphragm are available, which can be combined with a cooling element for media temperatures up to 300 °C. The robust stainless steel globe housing has a high ingress protection IP 67 and all characteristics for a residue-free and antibacterial cleaning.

Preferred areas of use are

Food industry

Pharmacy

Material and test certificates

- material mill test report according to DIN EN 10204-3.1.
- specific test report according to DIN EN 10204-2.2.

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

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

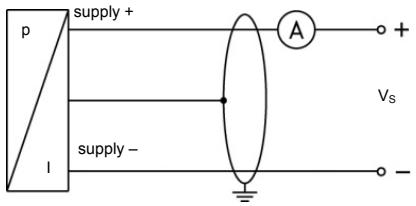
Vacuum ranges						
Nominal pressure gauge	[bar]	-0.4 … 0.4	-1 … 1	-1 … 2	-1 … 4	-1 … 10
Overpressure	[bar]	2	5	10	20	40
Burst pressure	[bar]	3	7.5	15	25	50

Output signal / Supply			
2-wire: 4 ... 20 mA	standard:	analogue signal	V_S = 12 … 30 V_{DC}
	options:	intrinsic safety (ia)	V_S = 12 … 28 V_{DC}
		intrinsic safety (ia) with HART®-communication	V_S = 12 … 28 V_{DC}
		SIL2	V_S = 12 … 30 V_{DC}
		SIL2 / intrinsic safety (ia)	V_S = 12 … 28 V_{DC}
		SIL2 / intrinsic safety (ia) with HART® communication	V_S = 12 … 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 x turn-down) % 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: max. 1:10
[3] accuracy according to IEC 60770 – limit point adjustment (non-linearity, hysteresis, repeatability)			
Thermal effects (Offset and Span) / 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	
	environment:	-20 ... 70 °C	
	storage:	-30 ... 80 °C	
Permissible temperature medium for cooling element 300°C	filling fluid silicone oil	overpressure: -40 … 300 °C	vacuum pressure: -40 ... 150 °C
	filling fluid food compatible oil	overpressure: -10 ... 250 °C	vacuum 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-, Varivent-, DRD-version: tolerance band offset ≤ ± 1.6 % FSO / tolerance band span ≤ ± 0.6 % FSO* *[6] for vacuum ranges and absolute pressure the max. medium temperature is 70 °C;* *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	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 (316 L)		
Housing	stainless steel 1.4301 (304)		
Viewing glass	laminated safety glass		
Seals (media wetted)	none, not included in the scope of delivery		
Diaphragm	standard: stainless steel 1.4435 (316 L) options: Hastelloy® C-276 (2.4819); tantalum (possible from 1 bar on) on request		
Media wetted parts	pressure port, diaphragm, seals (if existing)		

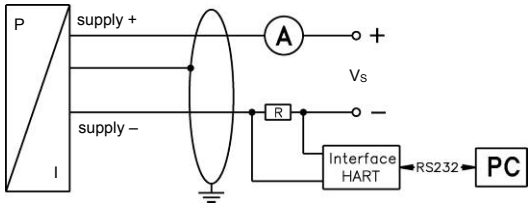
Explosion protection	
Approvals AX12-x|act i AX2 - x|act i (with SIL2)	IBExU 05 ATEX 1106 X (with SIL2: IBExU 05 ATEX1105 X) zone 0: II 1G Ex ia IIC T4 Ga zone 20: II 1D Ex ia IIIC T85 °C Da
Safety technical maximum values	U_i = 28 V, I_i = 98 mA, P_i = 680 mW, C_i = 0 nF, L_i = 0 µH, the supply connections have an inner capacity of max. 27 nF to the housing
Permissible temperatures for environment	in zone 0: -20 ... 60 °C with p_{atm} 0.8 bar up to 1.1 bar in zone 1 or higher: -40 ... 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
Option	
SIL2-version	according to IEC 61508 / IEC 61511
Miscellaneous	
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
Ingress protection	IP 67
Installation position	any (standard calibration in a vertical position with the pressure port connection down; differing installation position for $P_N \leq 2$ bar have to be specified in the order)
Weight	min. 400 g (depending on mechanical connection)
Operational life	100 million load cycles
CE-conformity	EMC Directive: 2014/30/EU
ATEX Directive	2014/34/EU

Wiring diagrams

2-wire-system (current)

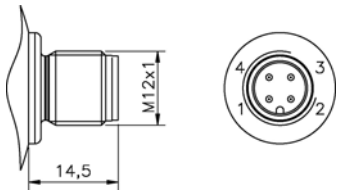


2-wire-system (current) HART® - communication



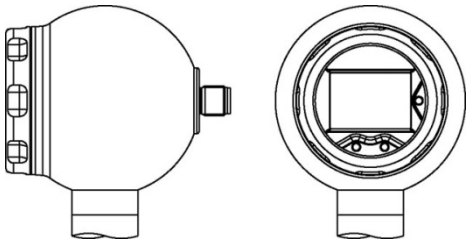
Pin configuration	
Electrical connections	M12x1 (4-pin), metal
Supply + Supply –	1 3
Shield	plug housing

Electrical connections (dimensions in mm)

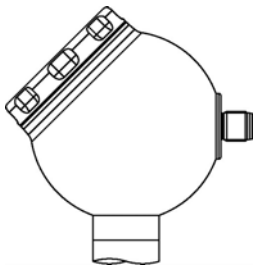


M12x1 (4-pin)

Designs [7]



side display

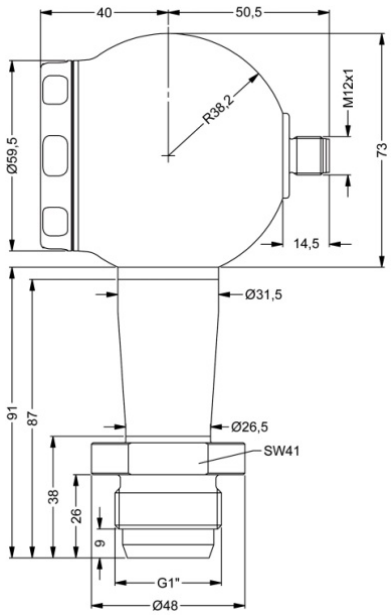


45° display

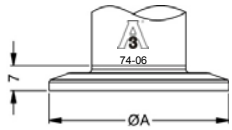
[7] *all designs in combination with G1" cone in horizontal rotatable housing as standard; other mech. connections in rotatable housing on request*

Dimensions (in mm)

G1" cone

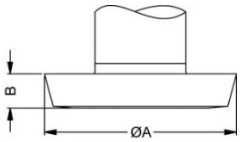


Clamp (DIN 32676)



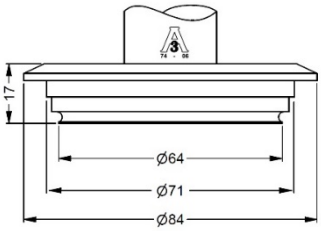
dimensions in mm				
size	3/4"	DN 25	DN 32	DN 50
A	25	50.5	50.5	64
P_N [bar]	≥ 4 ≤ 8	≥ 0,25 ≤ 16	≤ 16	≤ 16

dairy pipe [8] (DIN 11851)



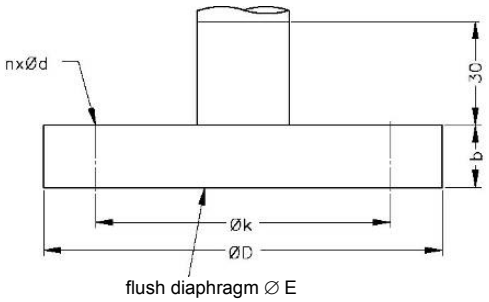
dimensions in mm			
size	DN 25	DN 40	DN 50
A	44	56	68,5
B	10	10	11
P_N [bar]	≥ 0.25 ≤ 40	≥ 0.25 ≤ 40	≥ 0.25 ≤ 25

Varivent®



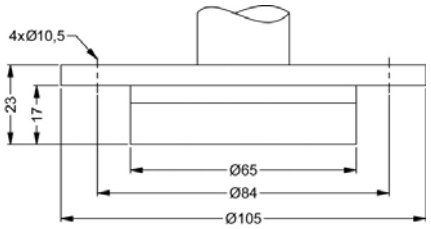
DN40/50
P_N ≤ 25 bar

flange (DIN 2501)

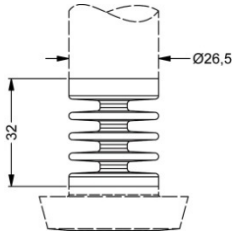


dimensions in mm			
size	DN 25	DN 50	DN 80
D	115	165	200
E	30	89	89
k	85	125	160
b	18	20	20
n	4	4	8
d	14	18	18
P_N [bar]	≤ 40	≤ 40	≤ 16

DRD [8] (for P_N ≤ 25 bar)



cooling element 300 °C



[8] cup nut resp. mounting flange is included in the delivery (already pre-assembled)

HART® is a registered trade mark of HART Communication Foundation; Hastelloy® is a trademark of Haynes International Inc.; Varivent® is a trademark of GEA Tuchenhagen GmbH; Windows® is a registered trade mark of Microsoft Corporation

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BD|SENSORS pressure measurement

Ordering code x|act i

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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	
-0.4 … 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		
side display	K H	
45° display	K 4	
Output		
4 … 20 mA / 2-wire	1	
intrinsic safety (ia) 4 … 20 mA / 2-wire	E	
intrinsic safety (ia) 4 … 20 mA / 2-wire with HART®-communication	I	
SIL2: 4 … 20 mA / 2-wire	1S	
SIL2: intrinsic safety (ia) 4 … 20 mA / 2-wire	ES	
SIL2: intrinsic safety (ia) 4 … 20 mA / 2-wire with HART®-communication	IS	
customer	9	consult
Accuracy		
0.1 % FSO	1	
Electrical connection		
male plug M12x1 (4-pin), metal	M 1 0	
customer	9 9 9	consult
Mechanical connection		
G1" cone	K 3 1	
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	
dairy pipe DN 25 (DIN 11851) [2]	M 7 3	
dairy pipe DN 40 (DIN 11851) [2]	M 7 5	
dairy pipe DN 50 (DIN 11851) [2]	M 7 6	
Varivent® DN 40/50 / 3A	P 4 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	
DRD Ø 65 mm [2]	D R D	
Diaphragm		
stainless steel 1.4435 (316L)	1	
Hastelloy® C-276 (2.4819)	H	
tantalum [3]	T	consult
Seals		
without	0	
Filling fluids		
silicone oil	1	
food compatible oil (FDA) / 3A	2	
Halocarbon	C	consult
customer	9	consult
Special version		
standard	0 0 0	
with cooling element up to 300°C / 3A	2 0 0	
customer	9 9 9	consult

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

[1] absolute pressure possible from 1 bar

[2] cup nut resp. mounting flange is included in the delivery (already pre-assembled)

[3] tantalum diaphragm possible with nominal pressure ranges from 1 bar

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01.04.2020

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