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)
- SIL 2 according to IEC 61508
- 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.

74-06

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Pressure ranges [1]								
Nominal pressure gauge / abs.	[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								

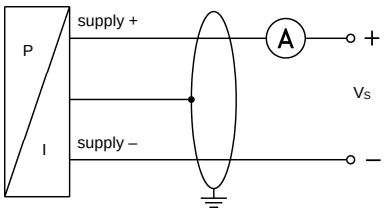
Vacuum ranges						
Nominal pressure gauge	[bar]	-0.4 … 0.4	-1 … 1	-1 … 2	-1 … 4	-1 … 10
Overpressure	[bar]	2	5	10	20	40
Burst pressure	[bar]	3	7,5	15	25	50

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	≤ ± 0.1 % FSO	
- TD > 1:5	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 silicon 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 silicon 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	silicon oil	
Options	food compatible oil with 21CFR178.3570 approval (Mobil SHC Cibus 32; Category Code: H1; NSF Registration No.: 141500); Halocarbon and others on request	
Materials		
Pressure port	G1" cone, Varivent®, dairy pipe und clamp:	stainless steel 1.4435 (316 L)
	DRD and flange:	stainless steel 1.4404 (316L)
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); Tantal (possible from 1 bar on) on request	
Media wetted parts	pressure port, diaphragm, seals (if existing)	

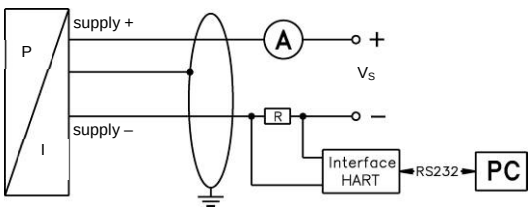
Explosion protection	
Approval AX2-x|act i	IBExU05ATEX1106 X (with SIL2: IBExU 05 ATEX1105 X) zone 0: II 1G Ex ia IIC T4 Ga zone 1: II 1D Ex ia IIIC T85 °C Da
Safety technical maximum values	U_i = 28 V, I_i = 98 mA, P_i = 680 mW, C_i = 0 nF, L_i = 0 µH, C_{GND} = 27 nF, the supply connections have an 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
Miscellaneous	
Option SIL 2 version	according to IEC 61508
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 x 10^6 pressure cycles
CE-conformity	EMC Directive: 2014/30/EU
ATEX Directive	2014/34/EU

Wiring diagrams

2-wire-system (current)

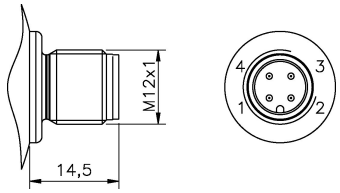


2-wire-system (current) HART®



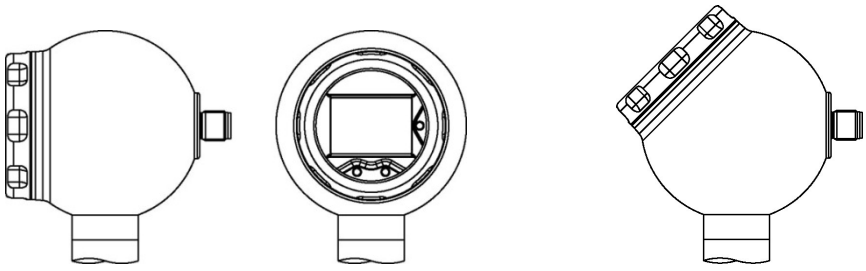
Pin configuration		
Electrical connections	M12x1 (4-pin), metal	cable colours (DIN 47100)
Supply + Supply –	1 3	wh (white) bn (brown)
Shield	plug housing	ye/gn (yellow / green)

Electrical connections (dimensions in mm)



M12x1 (4-pin)

Designs [7]

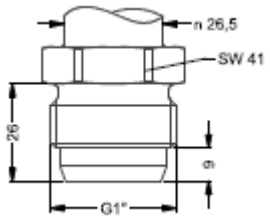


side display 45° display

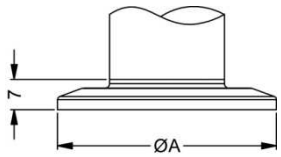
[7] *all designs in combination with G1" cone in horizontal rotatable housing as standard; other mech. connections in rotatable housing on request*

Dimensions (in mm)

G1" cone

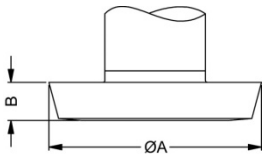


Clamp (DIN 32676)



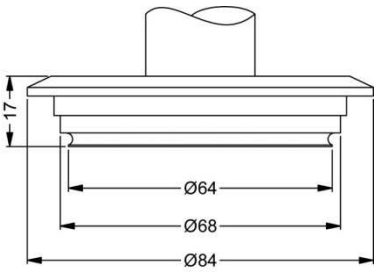
dimensions in mm				
size	¾"	DN 25	DN 32	DN 50
A	25	50.5	50.5	64
P_N [bar]	≥ 4 ≤ 8	≥ ,025 ≤ 16	≤ 16	≤ 16

Dairy pipe [8] (DIN 11851)



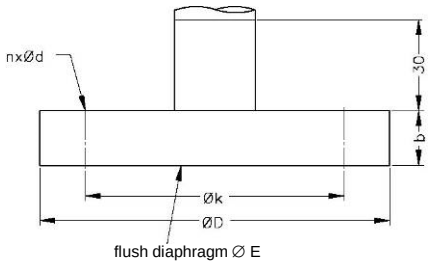
dimensions in mm			
size	DN 25	DN 40	DN 50
A	44	56	68.5
B	10	10	11
P_N [bar]	≥ ,025 ≤ 40	≥ ,025 ≤ 40	≥ ,025 ≤ 25

Varivent®



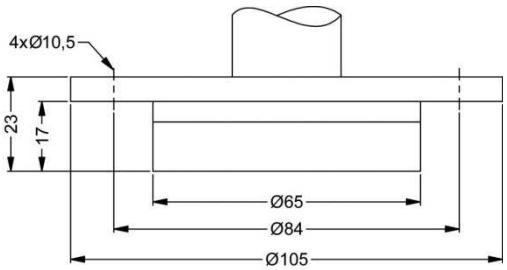
DN 40/50
P_N ≤ 10 bar

Flange (DIN 2501)



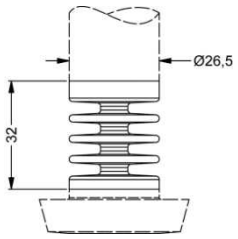
dimensions in mm			
size	DN25	DN50	DN80
D	115	165	200
E	30	89	89
k	85	125	160
b	18	20	20
n	4	4	8
d	14	18	18
PN	≤ 40 bar	≤ 40 bar	≤ 16 bar

DRD [8]



P_N ≤ 25 bar

Cooling element



temperature range	300 °C

[8] cup nut resp. mounting flange is included in the delivery (already pre-assembled)
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Varivent® is a trademark of GEA Tuchenhagen GmbH; Windows® is a registered trade mark of Microsoft Corporation

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