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 % span

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 10:1
- ▸ 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 200 °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 200 °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.

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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		
**for 0 … 1 bar abs. or -1 … 0 bar gauge max.temperature 70°C*							

Output signal / Supply		
2-wire: 4 ... 20 mA	standard: analogue signal options: intrinsic safety (ia) intrinsic safety (ia) with HART®-communication SIL2 SIL2 / intrinsic safety (ia) SIL2 / intrinsic safety (ia) with HART® communication	V_S = 12 … 30 V_{DC} V_S = 12 … 28 V_{DC} V_S = 12 … 28 V_{DC} V_S = 12 … 30 V_{DC} V_S = 12 … 28 V_{DC} V_S = 12 … 28 V_{DC}
Current consumption	max. 25 mA	
Performance		
Accuracy [3] performance after turndown (TD) - TD ≤ 5:1 - TD > 5:1	≤ ± 0.1 % span no change of accuracy the accuracy is calculated as follows: ≤ 0.1 + 0.015 x (turn-down - 5) % span e.g. turn-down 9: ≤ 0.1 + 0.015 x (9 - 5) % span = 0.16 % span	
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 % span / 10 V permissible load: 0.05 % span / kΩ	
Long term stability	≤ ± (0.1 x turn-down) % span / 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 % span turn-down of span: max. 10:1	
[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 % span 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 200°C	filling fluid silicon oil overpressure: -40 … 200 °C vacuum pressure: -40 ... 70 °C filling fluid food compatible oil overpressure: -10 ... 200 °C vacuum pressure: -10 ... 70 °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 % span / tolerance band span ≤ ± 0.6 % span* *[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		

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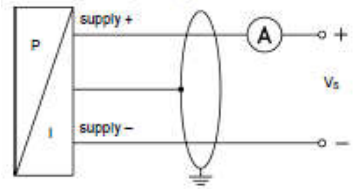
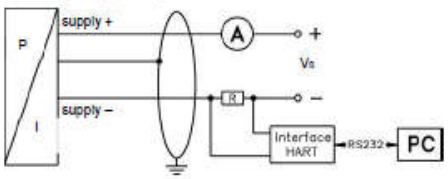
Approval AX2-x | act i	IBExU05ATEX1106 X (with SIL2: IBExU 05 ATEX1105 X) zone 0: II 1G Ex ia IIC T4 Ga zone 1: II 1D Ex ia IIIC T85 °C Da
Safety technical maximum values	U_i = 28 V, I_i = 98 mA, P_i = 680 mW, C_i = 0 nF, L_i = 0 µH, C_{GND} = 33 nF, the supply connections have an inner capacity of max. 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)
Surface roughness	pressure port $R_a < 0.8$ µm (media wetted parts) diaphragm $R_a < 0.15$ µm weld seam $R_a < 0.8$ µm
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)



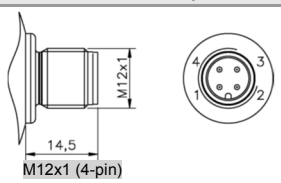
2-wire-system (current) HART®



Pin configuration

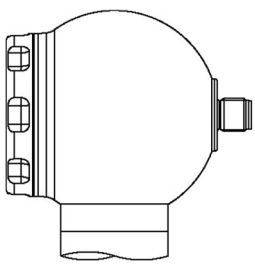
Electrical connections	M12x1 (4-pin), metal	cable colours (DIN 47100)
Supply + Supply –	1 3	wh (white) bn (brown)
Shield	plug housing	ye/gn (yellow / green)

Electrical connections (dimensions in mm))

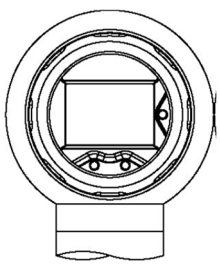


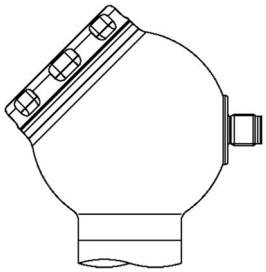
M12x1 (4-pin)

Designs [7]



Side display



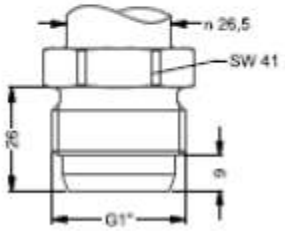


45° dispayj

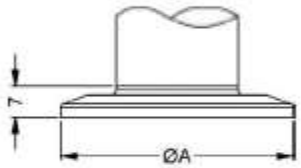
[7] *all designs in combination with G1" cone in horizontal rotatable housing as standard; other mech. connections in rotatable housing on request*

Rozměry (v mm)

G1" cone

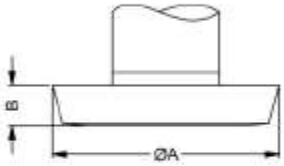


Clamp (DIN 32676)



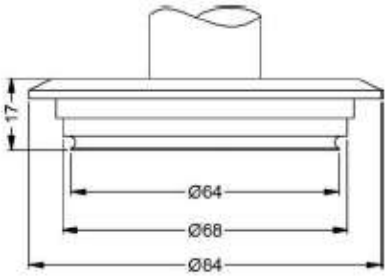
dimensions in mm				
size	¾"	DN 25	DN 32	DN 50
A	25	50.5	50.5	64
P_N [bar]	≥ 4 ≤ 8	≥ ,025 ≤ 16	≤ 16	≤ 16

Dairy pipe [8] (DIN 11851)



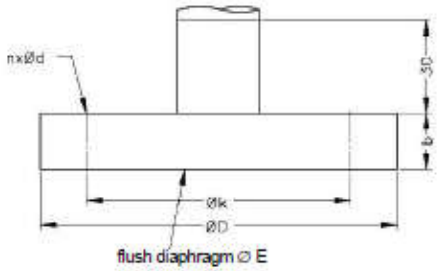
dimensions in mm			
size	DN 25	DN 40	DN 50
A	44	56	68.5
B	10	10	11
P_N [bar]	≥ ,025 ≤ 40	≥ ,025 ≤ 40	≥ ,025 ≤ 25

Varivent®



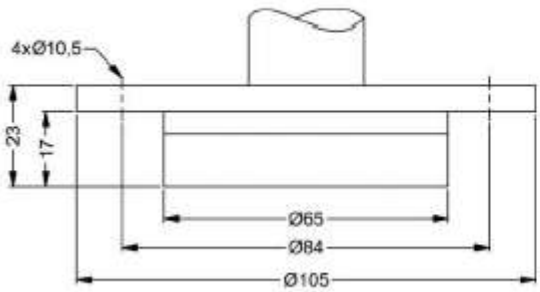
DN 40/50
P_N ≤ 10 bar

Flange (DIN 2501)



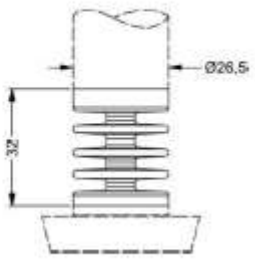
dimensions in mm			
size	DN25	DN50	DN80
D	115	165	200
E	30	89	89
k	85	125	160
b	18	20	20
n	4	4	8
d	14	18	18
PN	≤ 40 bar	≤ 40 bar	≤ 16 bar

DRD [8]



P_N ≤ 25 bar

Cooling element



temperature range	200°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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Ordering code x|act i

4.5.2021

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Pressure							
Gauge	5 1 1						
Absolute	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					
Design							
Stainless steel ball housing - side display (IP 67)			K H				
Stainless steel ball housing - 45° display (IP 67)			K 4				
Output							
4 … 20 mA / 2-wire				1			
Intrinsic safety Ex ia 4 … 20 mA / 2-wire				E			
HART® - Intrinsic safety Ex ia 4…20 mA / 2 wire				I			
SIL2, 4 … 20 mA / 2-wire				1S			
SIL2, Intrinsic safety 4 … 20 mA / 2-wire				ES			
SIL2, HART® - Intrinsic safety 4 … 20 mA / 2-wire				IS			
Customer				9			
Accuracy							
0,1 % - standard range					1		
0,1 % - standard range including Calibration Certificate					P		
0,1 % - customer range					I		
0,1 % - customer range including Calibration Certificate					H		
Customer					9		
Electrical connection							
Connector M12 x 1, 4-pin (IP 67) - metal						M 1 0	
Customer						9 9 9	
Mechanical connection							
G 1/2" DIN 3852							1 0 0
G 1/2" EN 837							2 0 0
G 1/4" DIN 3852							3 0 0
M 20 x 1,5 DIN 3852							5 0 0
M 20 x 1,5 EN 837							8 0 0
G 1/2" DIN 3852 - open port							H 0 0
1/2" NPT							N 0 0
G 1/2" DIN 3852 flush (P_N > 2,5 bar) (only with seals)							Z 0 0
M 20 x 1,5 DIN 3852 flush (P_N > 2,5 bar) (only with seals)							D 0 4
G 3/4" DIN 3852 flush (P_N > 0,6 bar) (only with seals)							Z 3 0
G 1" DIN 3852 flush (P_N > 0,25 bar) (only with seals)							Z 3 1
G 1 1/2" DIN 3852 flush (only with seals)							Z 3 3
G 2" DIN 3852 flush							Z 3 4
G 1" DIN 3852 flush 2x O ring (P_N > 0,25 bar)							Z 3 7
G 1/2" DIN 3852 flush 2x O ring (P_N > 1 bar)							Z 6 1
G1" flush cone seal (P_N > 0,25 bar) (without seals)							K 3 1
1/8" NPT (without seals, monel pressure port, tantal membrane)							Z 9 2
1" NPT flush (P_N > 0,25 bar)							N 5 4
Clamp DN 1" (DN 25) (P_N > 0,6 bar) (without seals)							C 6 1
Clamp DN 1 1/2" (DN 32) (P_N > 0,4 bar) (without seals)							C 6 2
Clamp DN 2" (DN 50) (P_N > 0,25 bar) (without seals)							C 6 3
DIN 11851 DN 25 (P_N > 0,6 bar) (without seals)[2]							M 7 3
DIN 11851 DN 40 (P_N > 0,4 bar) (without seals)[2]							M 7 5
DIN 11851 DN 50 (P_N > 0,25 bar) (without seals)[2]							M 7 6
"sandwich" DN 25 (without seals)							S 6 1
"sandwich" DN 50 (without seals)							S 7 6
"sandwich" DIN 2501 DN 80 (without seals)							S 8 0
M 22 x 1,5 DIN 3852 flush (P_N > 2,5 bar) (only with seals)							D 1 5
Flange DN 25/PN 40 DIN 2501 (without seals)							F 2 0
Flange DN 40/PN 40 DIN 2501 (without seals)							F 2 2
Flange DN 50/PN 40 DIN 2501 (without seals)							F 2 3
Flange DN 80/PN 16 DIN 2501 (without seals)							F 1 4
Flange DN 100/PN 16 DIN 2501 (without seals)							F 2 5
Varivent® DN 40/50 (without seals)							P 4 1

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Customer							9	9	9
Diaphragm									
Stainless steel 1.4435 (316 L)						1			
Hastelloy ® C-276 (2.4819)						H			
Tantalum[3]						T			
Customer						9			
Seals - wetted media (only for inch thread)									
Without seals (Clamp, dairy pipe DIN, sandwich, flange, varivent)					0				
Viton (FKM)					1				
EPDM					3				
FFKM (for media temperature ≤ 200 °C)					7				
Customer					9				
Filling Fluids									
Silicone oil				1					
Food compatible oil (temperature max. 150°C)				2					
Halocarbon				C					
Customer				9					
Special version									
Standard							0	0	0
With cooling element from 125°C up to 150°C							1	5	0
With cooling element from 150°C up to 200°C (P_N ≤ 70 bar max. 200°C permanent)							2	0	0
Customer							9	9	9

3.1 Material Certificate for Membrane and Mechanical Connection

Settings in temperature different from basic 20°C (+/- 10°C, max. 70 bar and 200°C)

0,-…without additional charge

On request...in accordance with the producer

!!! When you make an order it is necessary to fill the questionnaire for transmitters with separators !!!

Surcharges for calibration are not subject to any discounts. Subject to change.

This document contains the specification for ordering the product; detailed technical parameters of the product and its possible variants are given in the data sheet.

BD SENSORS reserves the right to change sensor specifications without further notice.

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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