



# x | act i

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

Stainless Steel Sensor

accuracy according to EN IEC 62828-2:  
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 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.



Pressure ranges <sup>1</sup>							
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
<i><sup>1</sup> higher pressure ranges on request; on demand we adjust the devices within the turn-down-possibility by software on the required pressure ranges</i>							
<i><sup>2</sup> absolute pressure possible from 1 bar</i>							
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		
<i>*for 0 ... 1 bar abs. or -1 ... 0 bar gauge max.temperature 70°C</i>							

Output signal / Supply	
2-wire: 4 ... 20 mA	standard: analogue signal $V_S = 12 \dots 30 \text{ V}_{DC}$ options: intrinsic safety (ia) $V_S = 12 \dots 28 \text{ V}_{DC}$ intrinsic safety (ia) with HART®-communication $V_S = 12 \dots 28 \text{ V}_{DC}$ SIL2 $V_S = 12 \dots 30 \text{ V}_{DC}$ SIL2 / intrinsic safety (ia) $V_S = 12 \dots 28 \text{ V}_{DC}$ SIL2 / intrinsic safety (ia) with HART® communication $V_S = 12 \dots 28 \text{ V}_{DC}$
Current consumption	max. 25 mA

Performance	
Accuracy <sup>3</sup> 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	$R_{max} = [(V_S - V_{S \text{ min}}) / 0.02 \text{ A}] \Omega$ load during HART® communication: $R_{min} = 250 \Omega$
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

Thermal effects (Offset and Span) / Permissible temperatures	
Tolerance band <sup>4,5</sup>	≤ ± 0.2 % span x Turn-Down
in compensated range	-20 ... 85 °C
Permissible temperatures	medium <sup>6</sup> : -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 <sup>7</sup>	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
<i><sup>4</sup> an optional cooling element can influence thermal effects for offset and span depending on installation position and filling conditions</i>	
<i><sup>5</sup> for flange-, Varivent-, DRD-version: tolerance band offset ≤ ± 1.6 % span / tolerance band span ≤ ± 0.6 % span</i>	
<i><sup>6</sup> for vacuum ranges and absolute pressure the max. medium temperature is 70 °C;</i>	
<i>max. temperature of the medium for nominal pressure gauge &gt; 0 bar: 150 °C for 60 minutes with a max. environmental temperature of 50 °C (without cooling element).</i>	
<i><sup>7</sup> max. temperature depends on the used sealing material, type of seal and installation</i>	

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

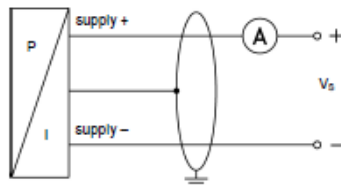
Materials	
Pressure port	G1" cone, Varivent., dairy pipe und clamp: stainless steel 1.4435 (316 L) DRD and flange: stainless steel 1.4404 (316L)
Housing	stainless steel 1.4301 (304)
Viewing glass	laminated safety glass
Seals (media wetted)	none, not included in the scope of delivery
Diaphragm	Standard: 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	

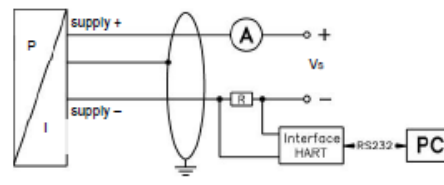
Approval AX2-x  act i	IBExU05ATEX1106 X (with SIL2: IBExU 05 ATEX1105 X) zone 0: II 1G Ex ia IIC T4 Ga zone 1: II 1D Ex ia IIIC T85 °C Da
Safety technical maximum values	$U_i = 28\text{ V}$ , $I_i = 98\text{ mA}$ , $P_i = 680\text{ mW}$ , $C_i = 0\text{ nF}$ , $L_i = 0\text{ }\mu\text{H}$ , $C_{\text{GND}} = 33\text{ nF}$ , 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 $p_{\text{atm}}$ 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 $\mu\text{H}/\text{m}$
<b>Miscellaneous</b>	
Option SIL 2 version	according to IEC 61508
Safety Integrity Level	SIL2
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 - dairy pipe (M73, M75, M76): ASEPTO-STAR k-flex upgrade seal by Kieselmann GmbH
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-segement bargraph; accuracy 0.1% $\pm$ 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 $P_N \leq 2\text{ bar}$ 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 mechanical connection)
Operational life	$> 100 \times 10^6$ pressure cycles
CE-conformity	EMC Directive: 2014/30/EU
ATEX Directive	2014/34/EU

### Wiring diagrams

2-wire-system (current)



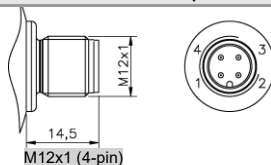
2-wire-system (current) HART®



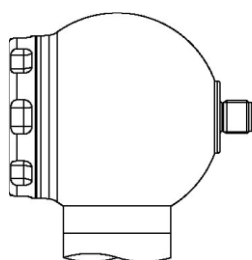
### Pin configuration

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

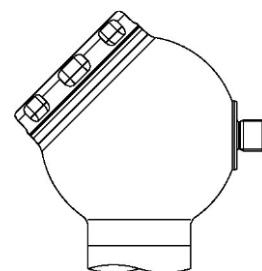
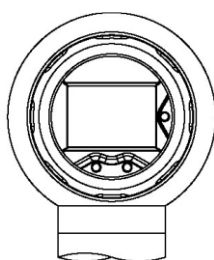
### Electrical connections (dimensions in mm)



### Designs 8



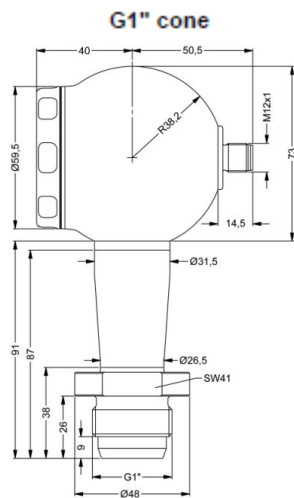
Side display



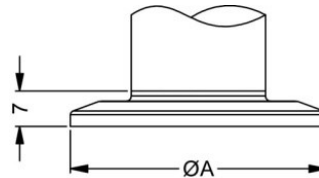
45° display

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

**Rozměry (v mm)**

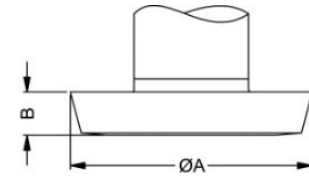


**Clamp (DIN 32676)**



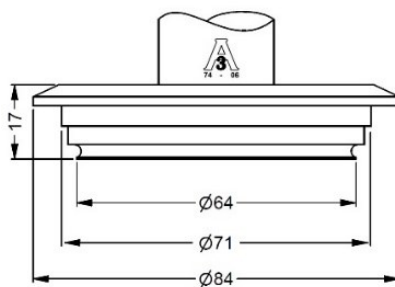
dimensions in mm				
size	3/4"	DN 25	DN 32	DN 50
A	25	50.5	50.5	64
P <sub>N</sub> [bar]	≥ 4 ≤ 8	≥ .025 ≤ 16	≤ 16	≤ 16

**Dairy pipe<sup>9</sup> (DIN 11851)**



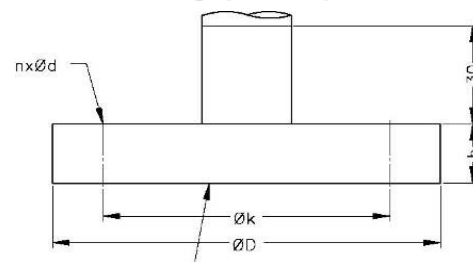
dimensions in mm			
size	DN 25	DN 40	DN 50
A	44	56	68.5
B	10	10	11
P <sub>N</sub> [bar]	≥ .025 ≤ 40	≥ .025 ≤ 40	≥ .025 ≤ 25

**Varivent<sup>®</sup>**



DN 40/50  
P<sub>N</sub> ≤ 10 bar

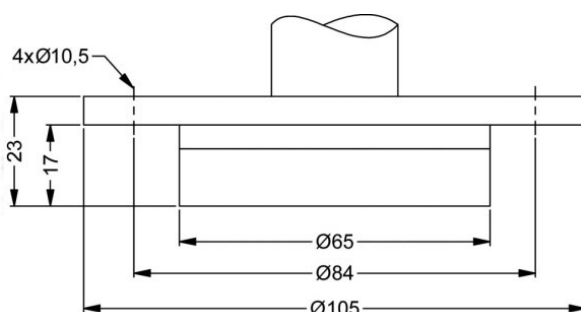
**Flange (DIN 2501)**



flush diaphragm Ø E

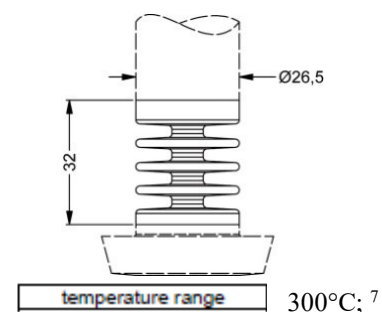
dimensions in mm			
size	DN 25	DN 50	DN 80
D	115	165	200
E	30	89	89
k	85	125	160
b	18	20	20
n	4	4	8
d	14	18	18
p <sub>N</sub> [bar]	≤ 40	≤ 40	≤ 16

**DRD<sup>9</sup>**



P<sub>N</sub> ≤ 25 bar

**Cooling element**



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

<sup>9</sup> cup nut resp. mounting flange is included in the delivery (already pre-assembled); (for p<sub>N</sub> ≤ 25 bar)

HART<sup>®</sup> is a registered trade mark of HART Communication Foundation; Hastelloy<sup>®</sup> is a trademark of Haynes International Inc.;

Varivent<sup>®</sup> is a trademark of GEA Tuchenhausen GmbH; Windows<sup>®</sup> is a registered trade mark of Microsoft Corporation

**Programming kits for HART®-devices: CIS 150-RS232 and CIS 150-USB**

CIS 150-RS232



CIS 150-USB



Package contents

Programming software "Config 3.0" on CD  
operating manual

**CIS 150-RS232:**

HART® modem (MH-02 Manufacturer: JSP NOVÁ PAKA)  
connecting cable BNC-Testtip (for measuring device)  
9-pin connecting cable RS232 (for PC)

**CIS 150-USB:**

Adapt 5  
connecting cable BNC-Testtip (for measuring device)  
USB connecting cable – Type A to Type B – (for PC)

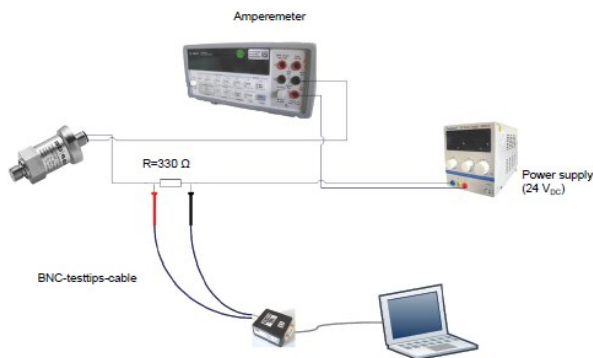
System requirement

For the installation of the software, a Windows® PC (95, 98, ME, 2000, NT, XP) with serial interface (RS 232) or USB-interface is required

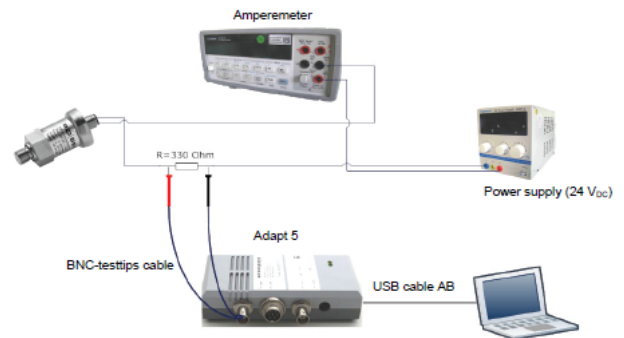
**Please read the operating manual carefully before installing and starting up the programming kit.**

**Wiring diagrams**

**CIS 150-RS232:**



**CIS 150-USB interface:**



**Ordering codes**

**Version:**

**HART(R) modem with RS232 connection cable for PC**

**Adapt 5 with USB connection cable for PC**

**Ordering code:**

**CIS 150-RS232**

**CIS 150-USB**

*Windows® is a registered trade mark of Microsoft Corporation*

Ordering code x|act i

23.08.2024

x|act i

			-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<b>Pressure</b>																		
Gauge																		
Absolute																		
			5	1	1													
			5	1	2													
<b>Input [bar]</b>																		
0 ... 0,4 <sup>1</sup>																		
0 ... 1																		
0 ... 2																		
0 ... 4																		
0 ... 10																		
0 ... 20																		
0 ... 40																		
-0,4 ... 0,4																		
-1 ... 1																		
-1 ... 2																		
-1 ... 4																		
-1 ... 10																		
Customer																		
<b>Design</b>																		
Stainless steel ball housing - side display (IP 67)																		
Stainless steel ball housing - 45° display (IP 67)																		
<b>Output</b>																		
4 ... 20 mA / 2-wire																		
Intrinsic safety Ex ia 4 ... 20 mA / 2-wire																		
HART® - Intrinsic safety Ex ia 4...20 mA / 2 wire																		
SIL2, 4 ... 20 mA / 2-wire																		
SIL2, Intrinsic safety 4 ... 20 mA / 2-wire																		
SIL2, HART® - Intrinsic safety 4 ... 20 mA / 2-wire																		
Customer																		
<b>Accuracy</b>																		
0,1 % - standard range																		
0,1 % - standard range including Calibration Certificate																		
0,1 % - customer range																		
0,1 % - customer range including Calibration Certificate																		
Customer																		
<b>Electrical connection</b>																		
Connector M12 x 1, 4-pin (IP 67) - metal																		
Customer																		
<b>Mechanical connection</b>																		
G 1/2" DIN 3852																		
G 1/2" EN 837																		
G 1/4" DIN 3852																		
M 20 x 1,5 DIN 3852																		
M 20 x 1,5 EN 837																		
G 1/2" DIN 3852 - open port																		
1/2" NPT																		
G 1/2" DIN 3852 flush (P <sub>N</sub> > 2,5 bar) (only with seals)																		
M 20 x 1,5 DIN 3852 flush (P <sub>N</sub> > 2,5 bar) (only with seals)																		
G 3/4" DIN 3852 flush (P <sub>N</sub> > 0,6 bar) (only with seals)																		
G 1" DIN 3852 flush (P <sub>N</sub> > 0,25 bar) (only with seals)																		
G 1 1/2" DIN 3852 flush (only with seals)																		
G 2" DIN 3852 flush																		
G 1" DIN 3852 flush 2x O ring (P <sub>N</sub> > 0,25 bar)																		
G 1/2" DIN 3852 flush 2x O ring (P <sub>N</sub> > 1 bar)																		
G1" flush cone seal (P <sub>N</sub> > 0,25 bar) (without seals)																		
1/8" NPT (without seals, monel pressure port, tantal membrane)																		
1" NPT flush (P <sub>N</sub> > 0,25 bar)																		
Clamp DN 1" (DN 25) (P <sub>N</sub> > 0,6 bar) (without seals)																		
Clamp DN 1 1/2" (DN 32) (P <sub>N</sub> > 0,4 bar) (without seals)																		
Clamp DN 2" (DN 50) (P <sub>N</sub> > 0,25 bar) (without seals)																		
DIN 11851 DN 25 (P <sub>N</sub> > 0,6 bar) (without seals) <sup>2</sup>																		
DIN 11851 DN 40 (P <sub>N</sub> > 0,4 bar) (without seals) <sup>2</sup>																		
DIN 11851 DN 50 (P <sub>N</sub> > 0,25 bar) (without seals) <sup>2</sup>																		
"sandwich" DN 25 (without seals)																		
"sandwich" DN 50 (without seals)																		
"sandwich" DIN 2501 DN 80 (without seals)																		
M 22 x 1,5 DIN 3852 flush (P <sub>N</sub> > 2,5 bar) (only with seals)																		
Flange DN 25/PN 40 DIN 2501 (without seals)																		
Flange DN 40/PN 40 DIN 2501 (without seals)																		
Flange DN 50/PN 40 DIN 2501 (without seals)																		
Flange DN 80/PN 16 DIN 2501 (without seals)																		



Flange DN 100/PN 16 DIN 2501 (without seals)	F	2	5						
Varivent® DN 40/50 (without seals)	P	4	1						
Customer	9	9	9						
<b>Diaphragm</b>									
Stainless steel 1.4435 (316 L)								1	
Hastelloy® C-276 (2.4819)								H	
Tantalum <sup>3</sup>								T	
Customer								9	
<b>Seals - wetted media (only for inch thread)</b>									
Without seals (Clamp, dairy pipe DIN, sandwich, flange, varivent)								0	
Viton (FKM)								1	
EPDM								3	
FFKM (for media temperature ≥ 200 °C)								7	
Customer								9	
<b>Filling Fluids</b>									
Silicone oil								1	
Food compatible oil (temperature max. 150 °C)								2	
Halocarbon								C	
Customer								9	
<b>Special version</b>									
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 300 °C (P <sub>N</sub> ≤ 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)

### Accessories

HART® modem HM02 + USB including SW CONFIG

5031837

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

