BD SENSORS®
pressure measurement

XMP i

Precision Pressure Transmitter for the Process Industry with HART®-Communication and SIL2 (optionally)

Stainless Steel Sensor

accuracy according to EN IEC 62828-2:
0.1 % span

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 10:1
- two chamber aluminium die cast case or stainless field housing
- internal or flush welded diaphragm
- HART®-communication
- explosion protection, intrinsic safety(ia)

Optional versions

- explosion protection, flameproof equipment (d)
- SIL 2 according to IEC 61508
- 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

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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

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

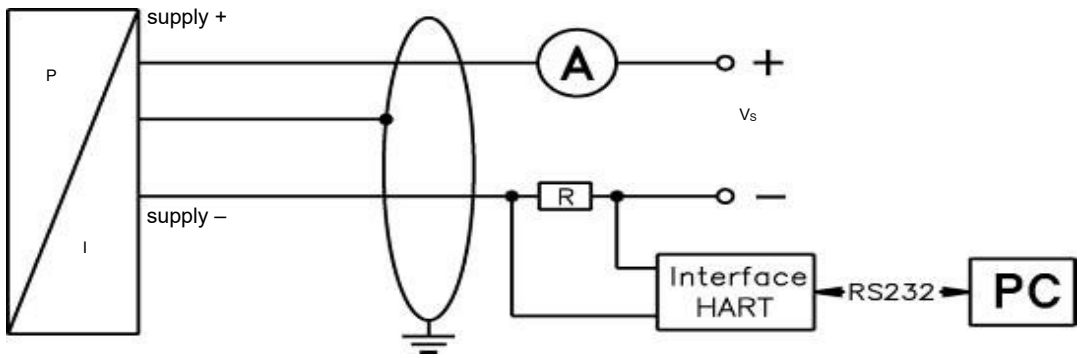
Output signal / Supply		
2-wire: 4 ... 20 mA With explosion protection	standard: intrinsic safety (ia) with HART®-communication options: flameproof equipment (d) with HART®-communication SIL2 / intrinsic safety (ia) with HART®-communication SIL2 / flameproof equipment (d) with HART®-communication	V_S = 12 ... 28 V_{DC} V_S = 13 ... 28 V_{DC} V_S = 12 ... 28 V_{DC} V_S = 13 ... 28 V_{DC}
Current consumption	max. 25 mA	
Performance		
Accuracy [3] performance after turn-down (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	$R_{max} = [(V_S - V_{S\,min}) / 0.02\ A]\ \Omega$	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 % 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 up to 10:1
[3] accuracy according to EN IEC 62828-2– limit point adjustment (non-linearity, hysteresis, repeatability)		
Thermal errors / 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	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 [7]	filling fluid silicon 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 % span / tolerance band span ≤ ± 0.6 % span* *[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).* *[7] max. temperature depends on the used sealing material, type of seal and installation*		
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 for process connections	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	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 (recommended for medium temperatures ≤ 200 °C) option: FFKM (recommended for medium temperatures < 260 °C; (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		
Approvals AX2-XMP i AX2-XMP I (with SIL2)	**Intrinsic safety** IBExU05ATEX1105 X (with SIL2: IBExU 05 ATEX1105 X)	
	stainless steel field housing: zone 0: II 1G Ex ia IIC T4 Ga zone 20: II 1D Ex ia IIIC T85 °C Da U_i = 28 V, I_i = 98 mA, P_i = 680 mW, C_i = 0 nF, L_i = 0 µH, C_{GND} = 27 nF	aluminium die cast case: zone 0/1: II 1/2G Ex ia IIB T4 Ga/Gb zone 20: II 1D Ex ia IIIC T85 °C Da U_i = 28 V, I_i = 98 mA, P_i = 680 mW, C_i = 0 nF, L_i = 0 µH, C_{GND} = 33 nF
Approvals AX7-XMP i/AX7- XMP I (SIL2)	**flameproof enclosure** with aluminium die cast case IBExU12ATEX1073 X (with SIL2: IBExU 12 ATEX1073 X)/ zone 1: II 2G Ex db 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		
Option SIL 2 version	according to IEC 61508	
Safety Integrity Level	SIL2	
EHEDG certificate Type EL Class I	EHEDG 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	
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)	
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 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) [8]	
ATEX Directive	2014/34/EU	

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

Wiring diagram

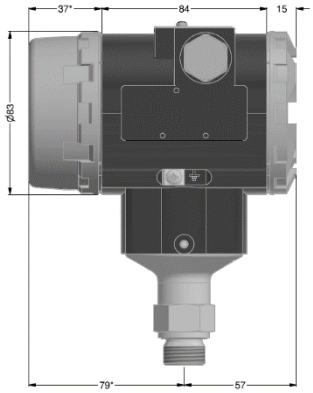


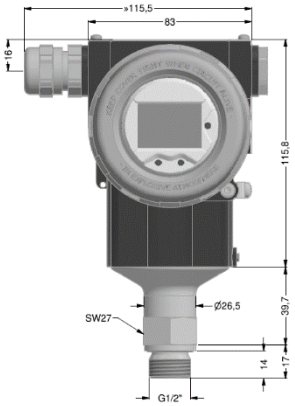
Pin configuration

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	⏚	⏚

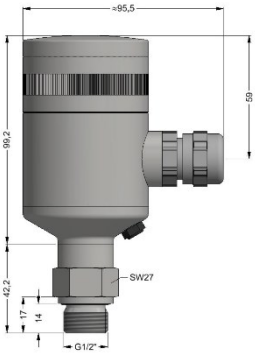
Housing designs [9] (dimensions in mm)

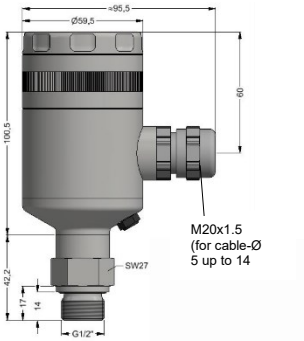
aluminium die cast case with display

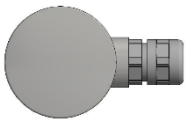


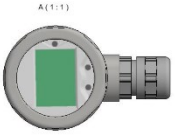


stainless steel field housing





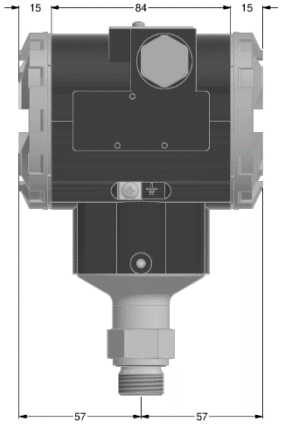


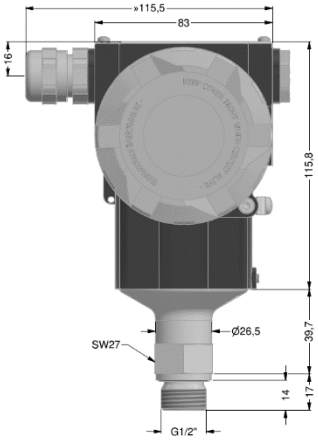


[9] *aluminium case is horizontally rotatable as standard*

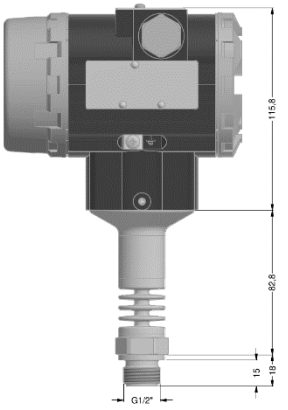
Housing designs [9] (dimensions in mm)

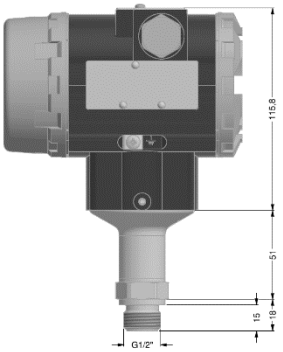
aluminium die cast case without display





option with cooling element and without

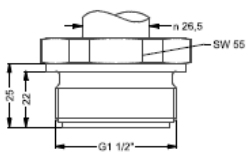




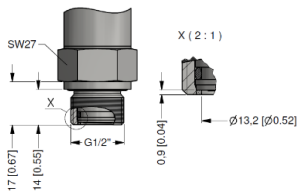
⇨ for nominal pressure P_N > 400 bar increases the length of devices by 3 mm

[9] *aluminium case is horizontally rotatable as standard*

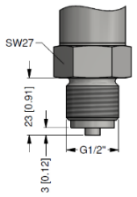
Standard pressure ports (dimensions in mm)



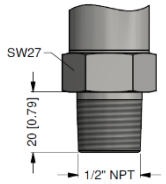
G1/2" DIN 3852



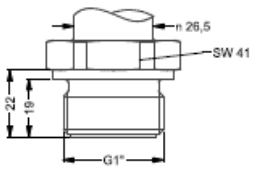
G1/2" flush (DIN 3852) [10]
1 bar ≤ P_N ≤ 40 bar



G1/2" EN 837
M20x1.5



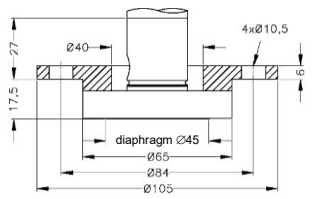
1/2" NPT



Inch thread (DIN 3852)
G1" flush (P_N ≤ 400 bar)

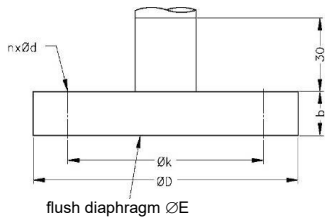
Process connections for low pressure- max. to 40 bar (dimensions in mm)

DRD [10]



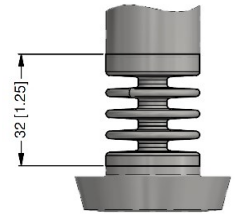
($P_N \leq 25$ bar)

Flange (DIN 2501)



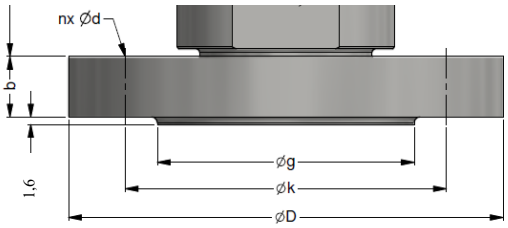
dimensions in mm			
size	DN25	DN50	DN80
D	115	165	200
E	30	89	89
k	85	125	160
b	18	20	20
n	4	4	8
d	14	18	18
PN [bar]	≤ 40	≤ 40	≤ 16

Cooling element [7]



temperature range	300° C

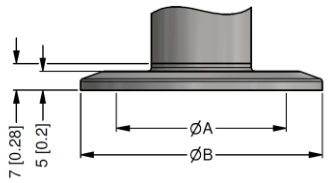
Flange (ANSI B16.5)



flush diaphragm ∅E

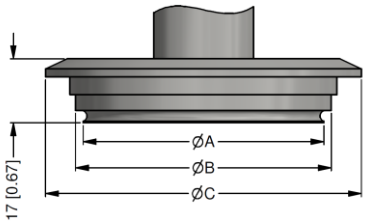
dimensions in mm		
size	2"/150 lbs	3"/150 lbs
D	152.4	190.5
E	86	89
g	91.9	127
k	120.7	152.4
b	19.1	23.9
n	4	4
d	19.1	19.1
PN [bar]	≤ 10	≤ 10

Clamp (DIN 32676)



dimensions in mm				
size	¾"	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)



$P_N \leq 25$ bar

[7] max. temperature depends on the used sealing material, type of seal and installation
[10] Mounting flange is included in the delivery (already pre-assembled)
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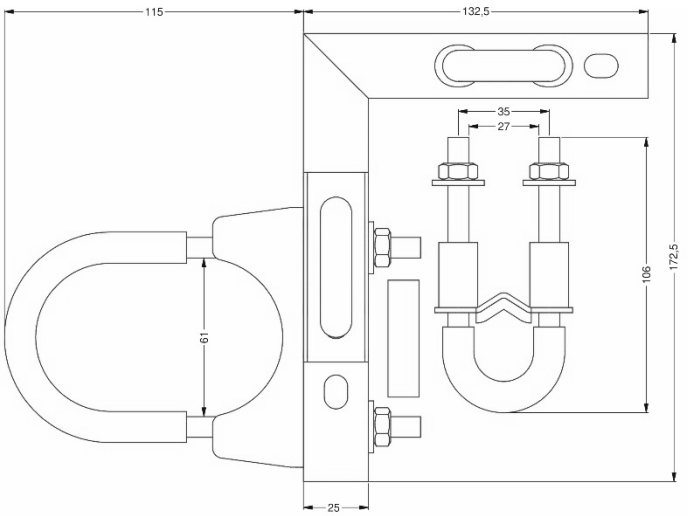
Windows® is a registered trade mark of Microsoft Corporation

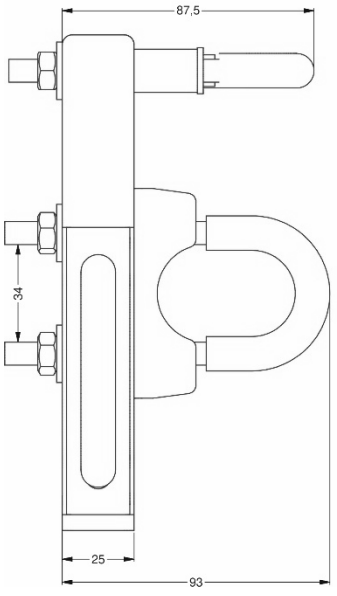
Accessories for aluminium cast (not a part of delivery)

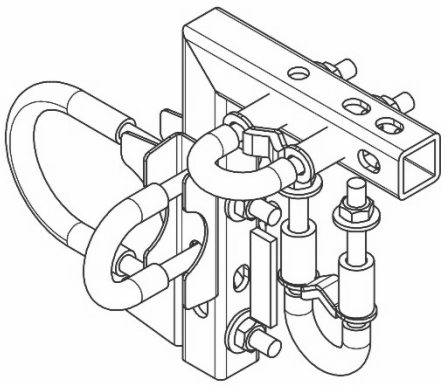
Electrical connection Ex i (standard)		Electrical connection Ex d (flameproof enclosure)	
Ordering type	**Ordering code**	**Ordering type**	**Ordering code**
plug thread M20x1.5	1001871	plug thread M20x1.5	1001438
cable gland thread M20x1,5	1001460	cable gland thread M20x1,5	1001870

Universal holder	
Weight	cca 1 kg
Material	0308 (E235)
Surface finish	BIS UltraProtect 1000
Ordering code	5020043

Dimensions (in mm)







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

CIS 150-RS232

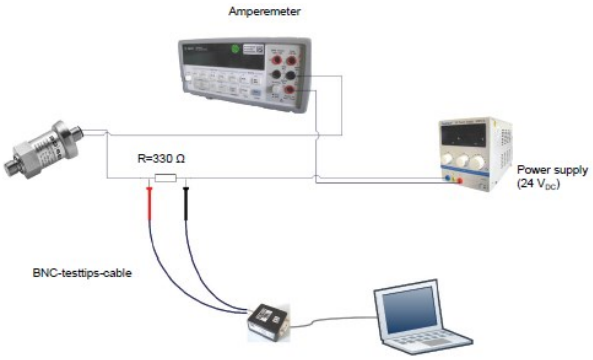
CIS 150-USB

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

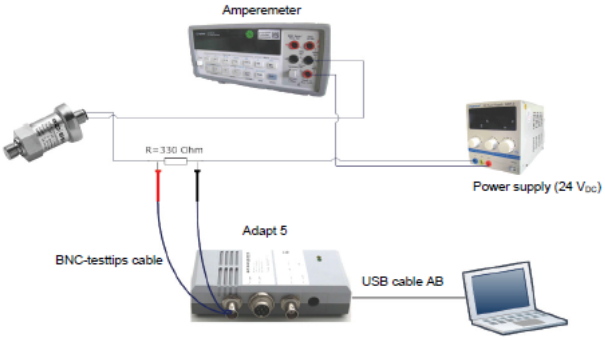
Please read the operating manual carefully before installing and starting up the programming kit.

Wiring diagrams

CIS 150-RS232:



CIS 150-USB interface:



Ordering codes

Version:	**Ordering code:**
HART(R) modem with RS232 connection cable for PC	**CIS 150-RS232**
Adapt 5 with USB connection cable for PC	**CIS 150-USB**

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Ord. Code XMP i

23.08.2024

XMP i [ ][ ][ ] - [ ][ ][ ][ ] - [ ][ ] - [ ][ ] - [ ][ ][ ] - [ ][ ][ ] - [ ] - [ ] - [ ] - [ ][ ][ ]

Pressure																													
Gauge	5	1	1																										
Absolute[1]	5	1	2																										
Input [bar]																													
0 … 0,4 bar[1]				4	0	0	0																						
0 … 1,0 bar				1	0	0	1																						
0 … 2,0 bar				2	0	0	1																						
0 … 4,0 bar				4	0	0	1																						
0 … 10 bar				1	0	0	2																						
0 … 20 bar				2	0	0	2																						
0 … 40 bar				4	0	0	2																						
0 … 100 bar				1	0	0	3																						
0 … 200 bar				2	0	0	3																						
0 … 400 bar				4	0	0	3																						
0 … 600 bar				6	0	0	3																						
-0,4 … 0,4 bar				S	4	0	0																						
-1 … 1 bar				S	1	0	2																						
-1 … 2 bar				V	2	0	2																						
-1 … 4 bar				V	4	0	2																						
-1 … 10 bar				V	1	0	3																						
Customer				9	9	9	9																						
Design																													
Aluminium housing - with display (IP 67)								A	0																				
Aluminium housing - without display (IP 67)								A	N																				
Stainless steel field housing - with display (IP 67)								F	V																				
Stainless steel field housing - without display (IP 67)								F	N																				
Output																													
HART® - 4 … 20 mA / 2-wire										H																			
HART® - Intrinsic safety Ex ia 4 … 20 mA / 2-wire										I																			
HART® - Flameproof equipment Ex d 4 … 20 mA / 2-wire (only with A0, AN)[2]										G																			
SIL2, HART® - 4 … 20 mA / 2-wire										HS																			
SIL2, HART® - Intrinsic safety 4 … 20 mA / 2-wire										IS																			
SIL2, HART® - Flameproof equipment 4 … 20 mA / 2-wire (only with A0, AN)[2]										GS																			
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																													
Terminal clamp - Aluminium housing												A	K	0															
Terminal clamp - Stainless Steel field housing												8	8	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												
1/2" NPT															N	0	0												
G 1/2" DIN 3852 - open port															H	0	0												
G 1/2" DIN 3852 flush (P_N > 2,5 bar) (only with seals)[3]															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												
G 3/4" DIN 3852 flush 2x O ring (P_N > 1 bar)															Z	6	6												
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 3/4" (4 bar < P_N < 8 bar) (without seals)															C	6	8												
Clamp DN 1" (DN 25) (0,4 bar < P_N < 16 bar) (without seals)															C	6	1												
Clamp DN 1 1/2" (DN 32) (0,4 bar < P_N < 16 bar) (without seals)															C	6	2												
Clamp DN 2" (DN 50) (0,4 bar < P_N < 16 bar) (without seals)															C	6	3												
DIN 11851 DN 25 (P_N > 0,6 bar) (without seals)															M	7	3												
DIN 11851 DN 40 (P_N > 0,4 bar) (without seals)															M	7	5												
DIN 11851 DN 50 (P_N > 0,25 bar) (without seals)															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							
Customer	9	9	9							
Diaphragm										
Stainless steel 1.4435 (316 L)				1						
Hastelloy ® C-276 (2.4819)[4]				H						
Tantalum[4,5]				T						
Customer				9						
Seals (included only in thread type connections)										
Without seals (Clamp, dairy pipe DIN, sandwich, flange, varivent)					0					
Viton (FKM)					1					
EPDM					3					
FFKM (for media temperature ≥ 200 °C)[6]					7					
Without seals - welded (only with EN 837) [7,8]					2					
Customer					9					
Filling Fluids										
Silicone oil						1				
Food compatible oil (temperature max. 150 °C)[4]						2				
Halocarbon[4]						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 300 °C (P_N ≤ 70 bar max. 200 °C permanent)[4]							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)	
Diaphragm Seal	
The price of the mechanical connection from above	
Capillary tube (price for 1m)	
Flange with integral extended diaphragm	
The price of the mechanical connection form above	
Extension length up to 100 mm	
Extension length between 100 - 200 mm	
Accessories for Aluminium housing **Electrical connection Ex ia (standard)**	
Blind flange Ex ia (M20x1,5 thread)	1001871
Cable gland Ex ia (M20x1,5 thread)	1001460
Electrical connection Ex D (standard)	
Blind flange Ex D (M20x1,5 thread)	1001438
Cable gland Ex D (M20x1,5 thread)	1001870
Mounting Bracket	
Universal holder (for pipes ⌀ ≤ 26,5 mm)	5020043
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 only possible in combination with aluminium die cast case
3 only possible for P_N ≥ 1 bar up to 40 bar
4 only possible with process connections
5 tantal diaphragm possible with nominal pressure ranges from 1 bar
6 min. permissible temperature from -15 °C, possible for nominal pressure ranges P_N ≤ 100 bar
7 only for PN ≤ 40 bar
8 welded version only with pressure ports according to EN 837