BD|SENSORS
pressure measurement

DS 200P

Electronic Pressure Switch

Pressure Ports and Process Connections with Flush Welded Stainless Steel Diaphragm

accuracy according to IEC 60770:
standard: 0.35 % FSO
option: 0.25 % FSO

Nominal pressure

from 0 ... 100 mbar up to 0 ... 40 bar

Contacts

1, 2 or 4 independent PNP contacts, freely configurable

Analogue output

2-wire: 4 ... 20 mA
3-wire: 4 … 20 mA / 0 … 10 V
others on request

Special characteristics

- indication of measured values on a 4-digit LED display
- rotable and configurable display module
- configurable contacts (switch on / switch off points, hysteresis / window mode, switch on / switch off delay)

Optional versions

- IS-version
  Ex ia = intrinsically safe for gases
- customer specific versions

The electronic pressure switch DS 200P is the successful combination of

- intelligent pressure switch
- digital display

and is suitable for the usage with viscous and pasty media.

As standard the DS 200P offers a PNP contact and a rotatable display module with 4-digit LED display. Optional versions like e.g. an intrinsically safe version, max. four contacts and an analogue output complete the profile.

Preferred areas of use are

Food industry

Pharmacy

74-06

BD SENSORS GmbH
BD-Sensors-Straße 1
D - 95199 Thierstein

Tel.: +49 (0) 92 35 / 98 11- 0
Fax: +49 (0) 92 35 / 98 11- 11

www.bdsensors.com
info@bdsensors.de

Input pressure range[1]																
Nominal pressure gauge	[bar]	-1 ... 0	0.10	0.16	0.25	0.40	0.60	1	1.6	2.5	4	6	10	16	25	40
Nominal pressure abs.	[bar]	-	-	-	-	0.40	0.60	1	1.6	2.5	4	6	10	16	25	40
Overpressure	[bar]	5	0.5	1	1	2	5	5	10	10	20	40	40	80	80	105
Burst pressure ≥	[bar]	7.5	1.5	1.5	1.5	3	7.5	7.5	15	15	25	50	50	120	120	210
Vacuum resistance		P_N ≥ 1 bar: unlimited vacuum resistance											P_N < 1 bar: on request			

[1] *consider the pressure resistance of fitting and clamps*

Contact [2]	
Standard	1 PNP contact
Options	2 independent PNP contacts 4 independent PNP contacts (possible with M12x1, 8-pin for 4 ... 20 mA/3-wire; 0 ... 10 V/3-wire on request)
Max. switching current	4 ... 20 mA / 2- and 3-wire: contact rating 125 mA, short-circuit resistant; $V_{Switch} = V_S$ - 2V 0 ... 10 V / 3-wire: contact rating 125 mA, short-circuit resistant
Accuracy of contacts [3]	standard: P_N < 0.4 bar: ≤ ± 0.5 % FSO P_N ≥ 0.4 bar: ≤ ± 0.35 % FSO option: P_N ≥ 0.4 bar: ≤ ± 0.25 % FSO
Repeatability	≤ ± 0.1 % FSO
Switching frequency	max. 10 Hz
Switching cycles	> 100 x 10^6
Delay time	0 ... 100 sec

[2] *max. 1 contact for 2-wire current signal with plug ISO 4400 as well as 2-wire current signal with IS-protection*
no contact possible with 3-wire in combination with plug ISO 4400
[3] *accuracy according to IEC 60770 – limit point adjustment (non-linearity, hysteresis, repeatability)*

Analogue output (optionally) / Supply	
2-wire current signal	4 ... 20 mA / V_S = 13 ... 36 V_{DC} permissible load: $R_{max} = [(V_S - V_{S\,min}) / 0.02\ A]\ \Omega$ response time: < 10 msec
2-wire current signal with IS-protection	4 ... 20 mA / V_S = 15 ... 28 V_{DC} permissible load: $R_{max} = [(V_S - V_{S\,min}) / 0.02\ A]\ \Omega$ response time: < 10 msec
3-wire current signal	4 ... 20 mA / V_S = 19 ... 30 V_{DC} adjustable (turn-down of span 1:5) [4] permissible load: R_{max} = 500 Ω response time: < 0.5 sec
3-wire voltage signal	0 … 10 V / V_S = 15 ... 36 V_{DC} permissible load: R_{min} = 10 kΩ response time: < 10 msec
Without analogue output	V_S = 15 ... 36 V_{DC}
Accuracy [3]	standard: P_N < 0.4 bar: ≤ ± 0.5 % FSO P_N ≥ 0.4 bar: ≤ ± 0.35 % FSO option: P_N ≥ 0.4 bar: ≤ ± 0.25 % FSO

[4] *with turn-down of span the analogue signal is adjusted automatically to the new measuring range*

Thermal errors (Offset and Span) [5] **/ Permissible temperatures**			
Nominal pressure P_N [bar]	-1 … 0	< 0.40	≥ 0.40
Tolerance band [% FSO]	≤ ± 0.75	≤ ± 1.5	≤ ± 0.75
in compensated range [°C]	-20 ... 85	0 ... 50	-20 ... 85
Permissible temperatures [6]	medium: -40 ... 125 °C for filling fluid silicone oil -10 ... 125 °C for filling fluid food compatible oil electronics / environment: -40 ... 85 °C storage: -40 ... 100 °C		
Permissible temperature medium for cooling element 300°C	filling fluid silicone oil overpressure: -40 … 300 °C vacuum: -40 ... 150 °C [7]		
	filling fluid food compatible oil overpressure: -10 ... 250 °C vacuum: -10 ... 150 °C		

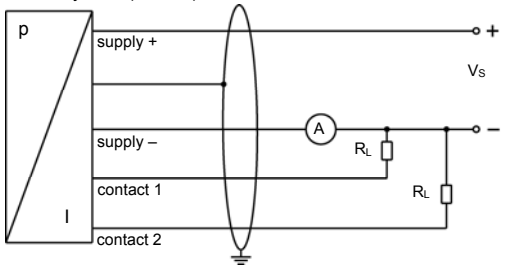
[5] *an optional cooling element can influence thermal effects for offset and span depending on installation position and filling conditions.*
[6] *max. temperature of the medium for nominal pressure gauge > 0 bar: 150 °C for 60 minutes with a max. environmental temperature of 50 °C*
[7] *also for $P_{abs} \leq 1$ bar*

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)
Materials	
Pressure port	stainless steel 1.4435 (316 L) others on request
Housing	stainless steel 1.4404 (316 L)
Display housing	PA 6.6, Polycarbonate
Seals (media wetted)	standard: FKM (recommended for medium temperatures ≤ 200 °C) option: FFKM (recommended for medium temperatures > 200 °C) clamp, dairy pipe, Varivent®: without
Diaphragm	standard: stainless steel 1.4435 (316 L) option: Hastelloy® C-276 (2.4819); Tantalum on request
Media wetted parts	pressure port, seals, diaphragm

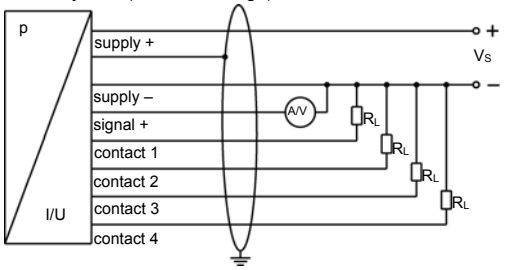
Explosion protection (only for 4 … 20 mA / 2-wire)	
Approval AX14-DS 200P	IBExU06ATEX1050 X zone 1: II 2G Ex ia IIC T4 Gb (connector) / II 2G Ex ia IIB T4 Gb (cable)
Safety technical maximum values	U_i = 28 V, I_i = 93 mA, P_i = 660 mW, C ≈ 0 nF, L_i ≈ 0 µH
Max. switching current [8]	70 mA
Permissible temperatures for environment	-25 ... 70 °C
Connecting cables (by factory)	cable capacitance: signal line/shield also signal line/signal line: 100 pF/m cable inductance: signal line/shield also signal line/signal line: 1 µH/m
[8] the real switching current in the application depends on the power supply unit	
Miscellaneous	
Display	4-digit, red 7-segment-LED display, digit height 7 mm, range of indication -1999 ... +9999; accuracy 0.1 % ± 1 digit; digital damping 0.3 … 30 sec (programmable); measured value update 0.0 … 10 sec (programmable)
Current consumption (without contacts)	2-wire signal output current: max. 25 mA 3-wire signal output current: approx. 45 mA + signal current 3-wire signal output voltage: approx. 45 mA
Ingress protection	IP 65
Installation position	any (standard calibration in a vertical position with the pressure port connection down; different installation position for P_N ≤ 2 bar have to be specified in the order)
Weight	approx. 160 ... 250 g
Operational life	100 million load cycles
CE-conformity	EMC Directive: 2014/30/EU
ATEX Directive	2014/34/EU

Wiring diagrams

2-wire-system (current)



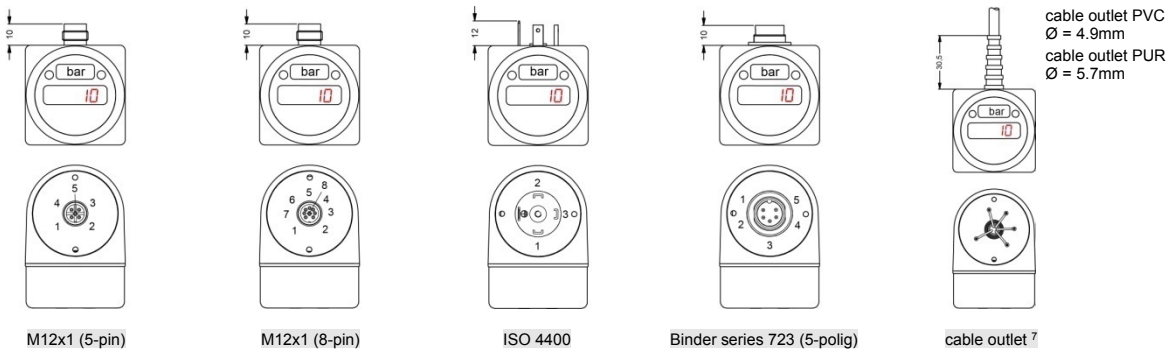
3-wire-system (current / voltage)



Pin configuration

Electrical connection	M12x1 plastic (5-pin)	M12x1 metal (5-pin)	M12x1 plastic (8-pin)	ISO 4400	Binder series 723 (5-pin)	cable colours (IEC 60757)
Supply +	1	1	1	1	1	wh (white)
Supply –	3	3	3	2	3	bn (brown)
Signal + (only 3-wire)	2	2	2	3	2	gn (green)
Contact 1	4	4	4	3	4	gy (grey)
Contact 2	5	5	5	-	5	pk (pink)
Contact 3	-	-	6	-	-	bu (blue)
Contact 4	-	-	7	-	-	rd (red)
Shield	via pressure port	plug housing/ pressure port	via pressure port	ground con-tact	plug housing/ pressure port	gnye (green-yellow)

Electrical connections (dimensions in mm)

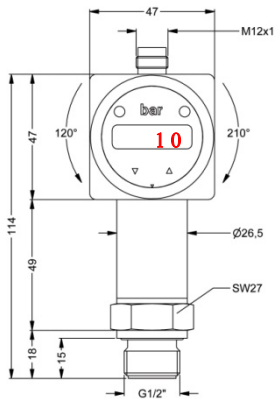


M12x1 (5-pin) | M12x1 (8-pin) | ISO 4400 | Binder series 723 (5-polig) | cable outlet [7]

[7] different cable types and lengths available, permissible temperature depends on kind of cable;
standard: 2 m PVC cable (without ventilation tube, permissible temperature: -5 ... 70°C)

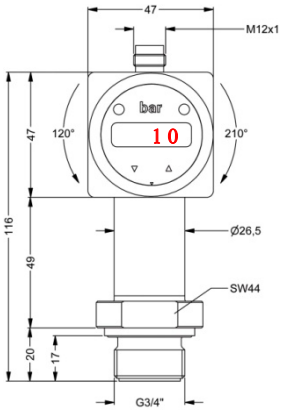
Mechanical connections (dimensions in mm)

Standard

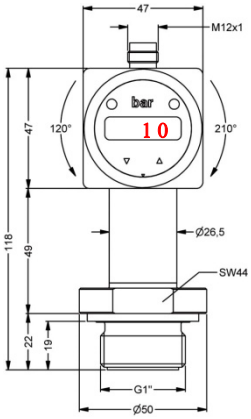


G1/2" flush
(P_N ≥ 1 bar)

Option

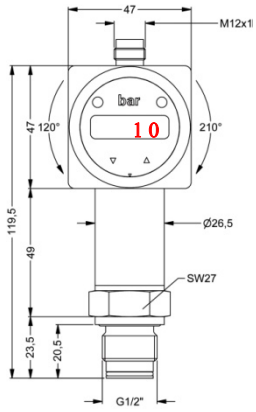


G3/4" flush

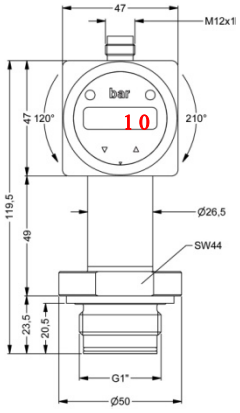


G1" flush

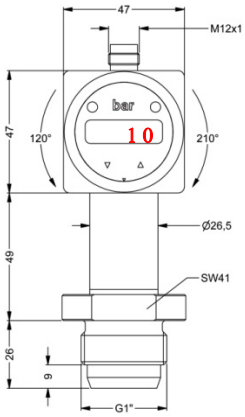
Option



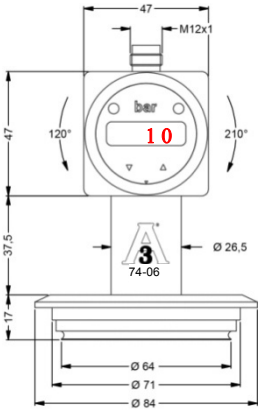
G1/2" flush with
radial o-ring (P_N ≥ 1 bar)



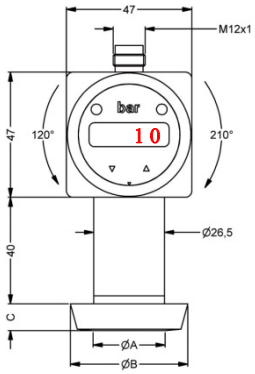
G1" flush with
radial o-ring (P_N ≤ 2 bar)



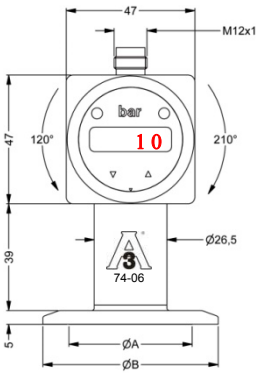
G1" cone



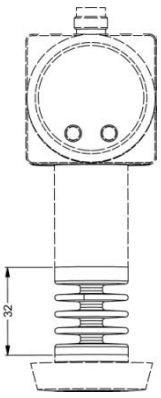
Varivent ®
P_N ≤ 25 bar



dairy pipe (DIN 11851)



clamp (DIN 32676)



cooling element 300 °C

dimensions in mm			
size	DN 25	DN 40	DN 50
A	23	32	45
B	44	56	68,5
C	10	10	11
P_N [bar]	≥ 0,25 ≤ 40	≥ 0,25 ≤ 40	≥ 0,25 ≤ 25

	dimensions in mm			
size	¾"	DN 25	DN 32	DN 50
A	14	23	32	45
B	25	50,5	50,5	64
P_N [bar]	≥ 4 ≤ 8	≥ 0,25 ≤ 16	≤ 16	≤ 16

⇨ **SIL- and SIL-Ex version: total length increases by 26.5 mm!**
⇨ **metric threads and other versions on request**

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Tel: +49 (0) 92 35 / 98 11- 0
Fax: +49 (0) 92 35 / 98 11- 11
www.bdsensors.com
info@bdsensors.de
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Ordering code DS 200P

DS 200P □□□ - □□□□ - □ - □ - □ - □□□ - □□□ - □ - □ - □ - □□□

Pressure																									
gauge				7	8	5																			
absolute				7	8	6																			
Input	**[bar]**																								
0.10							1	0	0	0															
0.16							1	6	0	0															
0.25							2	5	0	0															
0.40							4	0	0	0															
0.60							6	0	0	0															
1.0							1	0	0	1															
1.6							1	6	0	1															
2.5							2	5	0	1															
4.0							4	0	0	1															
6.0							6	0	0	1															
10							1	0	0	2															
16							1	6	0	2															
25							2	5	0	2															
40							4	0	0	2															
-1 … 0							X	1	0	2															
customer							9	9	9	9															consult
Analogue output																									
without											0														
4 … 20 mA / 2-wire											1														
0 … 10 V / 3-wire											3														
4 … 20 mA / 3-wire, adjustable											7														
Intrinsic safety 4 … 20 mA / 2-wire [1]											E														
customer											9														consult
Contact																									
1 contact [1, 2]												1													
2 contacts [1, 2]												2													
4 contacts [3]												4													
Accuracy																									
standard for P_N > 0,4 bar	0.35 %												3												
standard for $P_N \leq$ 0,4 bar	0.5 %												5												
option for $P_N \geq$ 0,4 bar	0.25 %												2												
customer													9												consult
Electrical connection																									
Male plug M12x1 (5-pin) / plastic														N	0	1									
Male plug M12x1 (8-pin) / plastic [3]														M	5	0									
Male plug M12x1 (5-pin) / metal														N	1	1									
Male and female plug ISO 4400 [2]														1	0	0									
Male plug Binder series 723 (5-pin)														2	0	4									
Cable outlet incl. cable [4]														T	A	0									
customer														9	9	9									consult
Mechanical connection																									
G1/2" with flush welded diaphragm (DIN 3852) for $p_n \geq 1$ bar																	Z	0	0						
G3/4" with flush welded diaphragm (DIN 3852)																	Z	3	0						
G1" with flush welded diaphragm (DIN 3852)																	Z	3	1						
G1" DIN 3852 with rad. o-ring and flush diaphragm (for $p_n \leq 2$ bar)																	Z	5	7						
G1/2" DIN 3852 with rad. o-ring and flush diaphragm (for $p_n \geq 1$ bar)																	Z	6	1						
G 1" 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) [5]																	M	7	3						
Dairy pipe DN 40 (DIN 11851) [5]																	M	7	5						
Dairy pipe DN 50 (DIN 11851) [5]																	M	7	6						
Varivent® DN 40/50 / 3A																	P	4	1						
customer																	9	9	9						consult
Diaphragm																									
Stainless steel 1.4435 (316L)																				1					
Tantalum																				T					consult
Hastelloy® C-276 (2.4819)																				H					
customer																				9					consult
Seals																									
for clamp, dairy pipe, Varivent®:	without																				0				
for inch thread:	FKM																				1				
	FFKM																				7				
customer																					9				consult
Filling Fluids																									
Silicone oil																						1			
food grade oil (FDA) / 3A																						2			
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

[1] with Ex version max. 1 contact is possible
[2] with connector ISO 4400 and output 2-wire version only max. 1 contact possible; with 3-wire version no contact possible
[3] 4 contacts and M12x1, 8-pin only possible in combination and together with 4 ... 20 mA/3-wire; 0 ... 10 V/3-wire on request
[4] standard: 2 m PVC cable without ventilation tube (permissible temperature: -5 … 70 °C), others on request
[5] The cup nut for dairy pipe has to be mounted by production of pressure transmitter. The cup nut has to be ordered as separate position.
Varivent® is a brand name of GEA Tuchenhagen GmbH. Hastelloy® is a brand name of Haynes International Inc.

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BD SENSORS GmbH
BD-Sensors-Straße 1
D - 95199 Thierstein

Tel.: +49 (0) 92 35 / 98 11- 0
Fax: +49 (0) 92 35 / 98 11- 11

www.bdsensors.com
info@bdsensors.de