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

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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]			
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

[5] an optional cooling element can influence thermal effects for offset and span depending on installation position and filling conditions

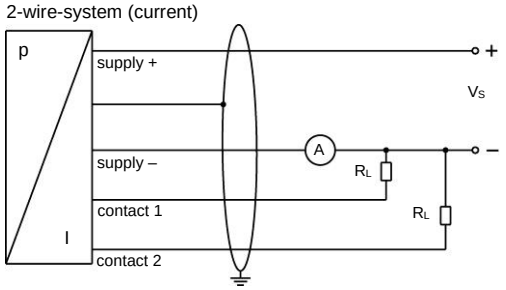
Permissible temperatures		
Filling fluid	silicone oil	food compatible oil
Medium [6]	-40 ... 125 °C	-10 ... 125 °C
Medium with cooling element [7]	overpressure: -40 ... 300 °C vacuum: -40 ... 150 °C [8]	overpressure: -10 ... 250 °C vacuum: -10 ... 150 °C [8]
Electronics / environment	-40 ... 85 °C	
Storage	-40 ... 100 °C	

[6] max. temperature of the medium for overpressure > 0 bar: 150 °C for 60 minutes with a max. environmental temperature of 50 °C
[7] max. temperature depends on the used sealing material, type of seal and installation
[8] also for $p_{abs} \leq 1$ bar

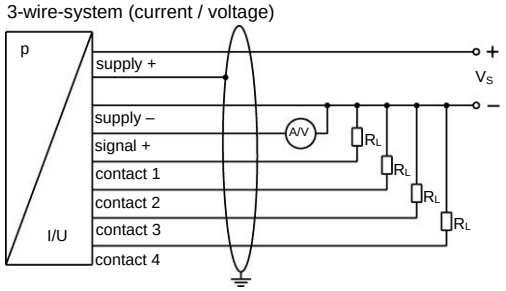
Electrical protection	
Short-circuit protection	permanent
Reverse polarity protection	no damage, but also no function
Electromagnetic compatibility	emission and immunity according to EN 61326
Mechanical stability	
Vibration	5 g RMS (25 ... 2000 Hz) according to DIN EN 60068-2-6
Shock	100 g / 11 msec 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 < 260 °C) others on request 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 [9]	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
[9] *the real switching current in the application depends on the power supply unit*	
Miscellaneous	
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 - dairy pipe (M73, M75, M76): ASEPTO-STAR k-flex upgrade seal by Kieselmann GmbH
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)
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	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)

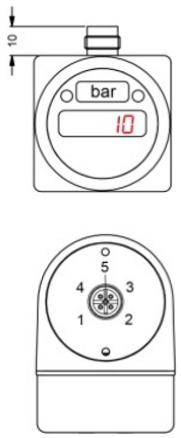


3-wire-system (current / voltage)

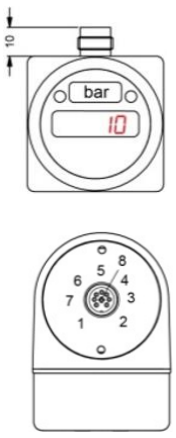


Pin configuration						
Electrical connection	M12x1 plastic (5-pin)	M12x1 metal (5-pin)	M12x1 plastic (8-pin)	ISO 4400	Binder series 723 (5-pin)	cable colours (IEC 60757)
Supply +	1	1	1	1	1	WH (white)
Supply –	3	3	3	2	3	BN (brown)
Signal + (only 3-wire)	2	2	2	3	2	GN (green)
Contact 1	4	4	4	3	4	GY (grey)
Contact 2	5	5	5	-	5	PK (pink)
Contact 3	-	-	6	-	-	-
Contact 4	-	-	7	-	-	-
Shield	via pressure port	plug housing/ pressure port	via pressure port	ground contact ⏚	plug housing/ pressure port	GNYE (green-yellow)

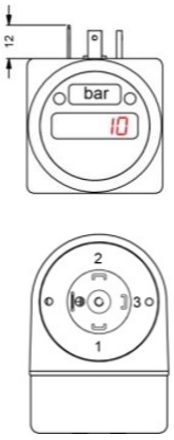
Electrical connections (dimensions in mm)



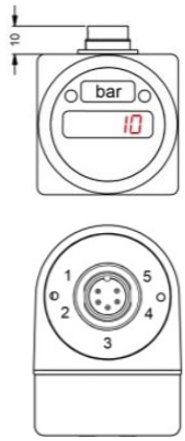
M12x1 (5-pin)



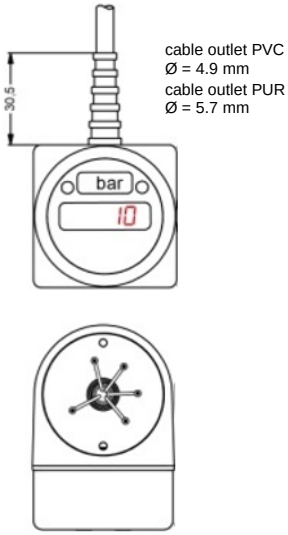
M12x1 (8-pin)



ISO 4400



Binder series 723 (5-pin)

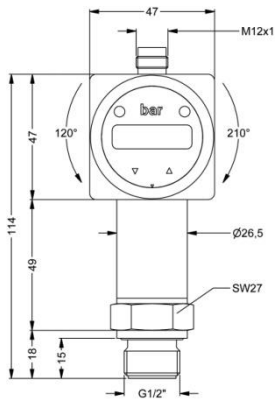


cable outlet [10]

[10] 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)

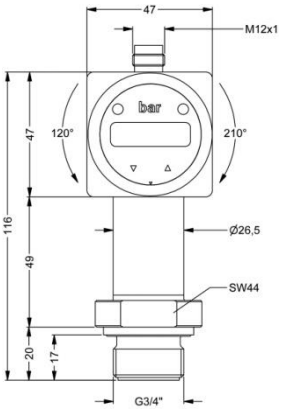
Mechanical connections (dimensions in mm)

Standard

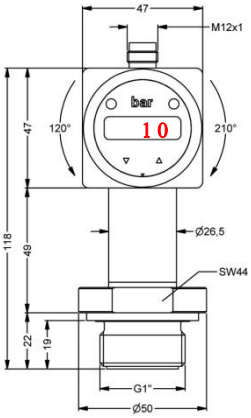


G1/2" flush
(p_N ≥ 1 bar)

Option

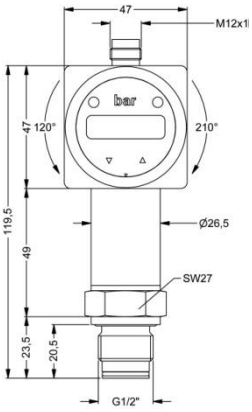


G3/4" flush

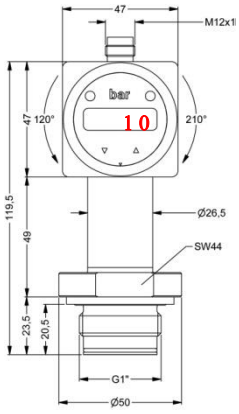


G1" flush

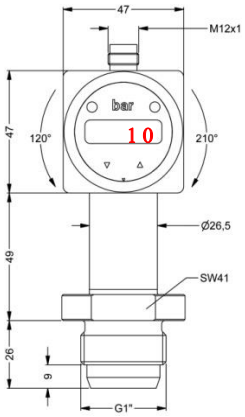
Option



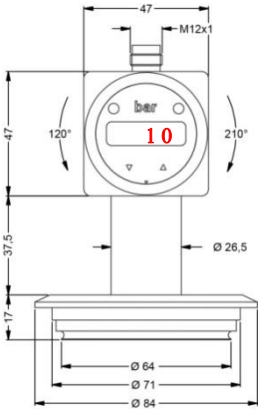
G1/2" flush with
radial o-ring (p_N ≥ 1 bar)



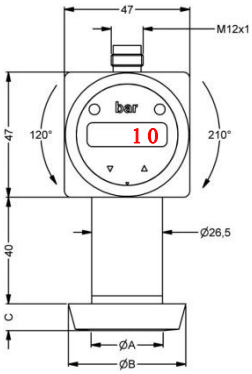
G1" flush with
radial o-ring (p_N ≤ 2 bar)



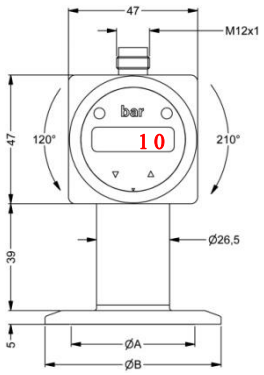
G1" cone



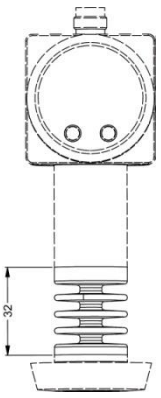
Varivent ®
p_N ≤ 25 bar



dairy pipe (DIN 11851)



clamp (DIN 32676)



cooling element up to 300 °C [7]

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	3/4"	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**

[7] *max. temperature depends on the used sealing material, type of seal and installation*

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Ordering code DS 200P

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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 % FSO										3														
standard for p_N ≤ 0,4 bar:	0.50 % FSO										5														
option for p_N ≥ 0,4 bar:	0.25 % FSO										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 with PVC cable [4]											T	A	0											
	customer											9	9	9											consult
Mechanical connection																									
	G1/2" with flush welded diaphragm (DIN 3852) for p_n ≥ 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 ≤ 2 bar)														Z	5	7								
	G1/2" DIN 3852 with rad. o-ring and flush diaphragm (for p_n ≥ 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 compatible 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 IS 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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