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

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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			

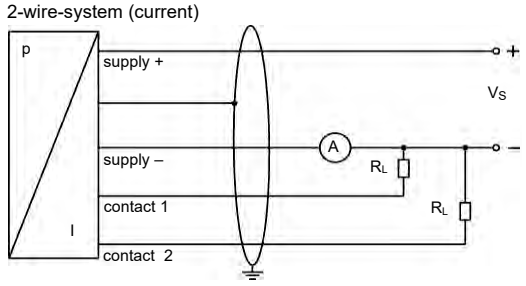
Permissible temperatures		
Filling fluid	silicone oil	food compatible oil
Medium [6]	-40 ... 125 °C	-10 ... 125 °C
Medium with cooling element [7]	overpressure: -40 ... 300 °C vacuum: -40 ... 150 °C [8]	overpressure: -10 ... 250 °C vacuum: -10 ... 150 °C [8]
Electronics / environment	-40 ... 85 °C	
Storage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

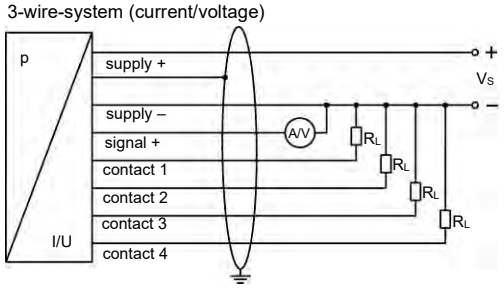
Materials	
Pressure port	inch thread: stainless steel 1.4404 (316 L) G1" cone, Clamp, diary pipe, Varivent®: stainless steel 1.4435 (316 L)
Housing	stainless steel 1.4404 (316 L)
Display housing	PA 6.6, Polycarbonate
Seals (media wetted)	standard: FKM (recommended for medium temperatures ≤ 200 °C) option: 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 voltage: approx. 45 mA 3-wire signal output current: approx. 45 mA + signal current
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

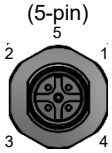
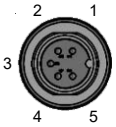
2-wire-system (current)



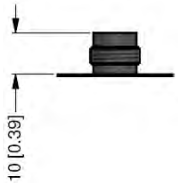
3-wire-system (current/voltage)



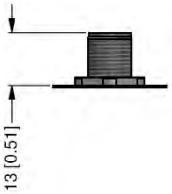
Pin configuration

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)

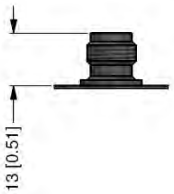
Electrical connections (dimensions mm / in)



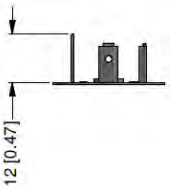
M12x1 plastic
(5-pin)



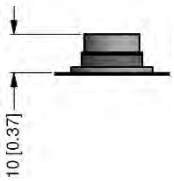
M12x1 metal
(5-pin)



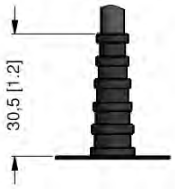
M12x1 plastic
(8-pin)



ISO 4400



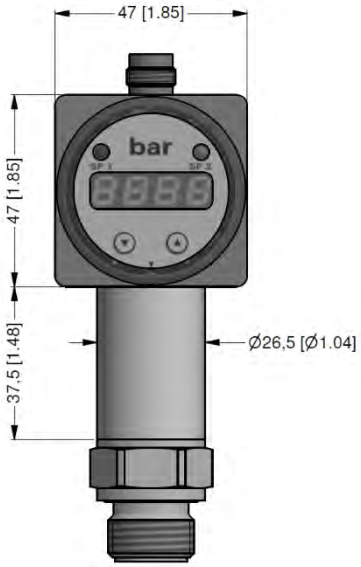
Binder series 723
(5-pin)

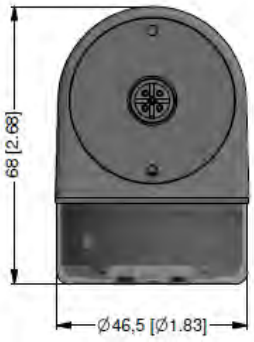


cable outlet [10]

[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)*

Dimensions (mm / in)





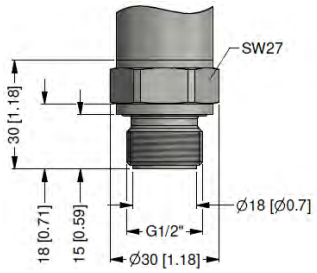
top view

rotatability of display module

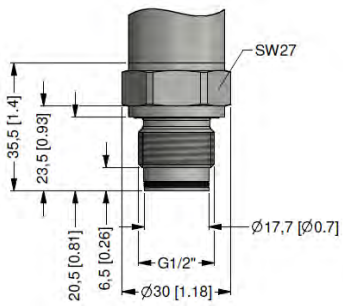
Cooling element up to 300 °C [7] (optionally)

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

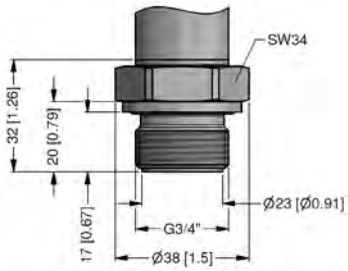
Mechanical connection (dimensions mm / in)



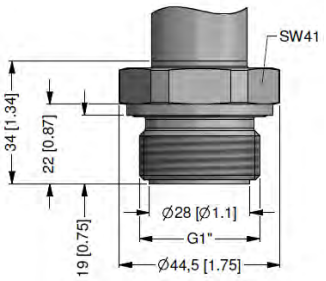
G1/2" flush DIN 3852
$p_N \geq 1$ bar



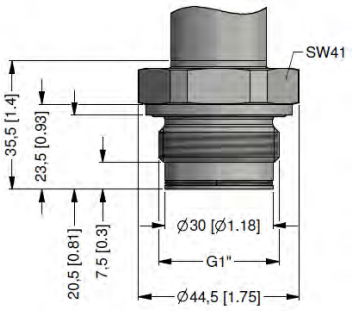
G1/2" flush with radial o-ring
$p_N \geq 1$ bar



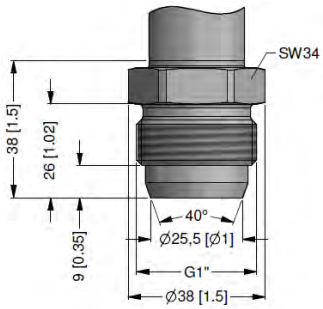
G3/4" flush DIN 3852



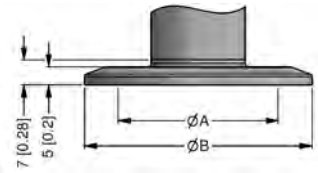
G1" flush DIN 3852



G1" flush with radial o-ring

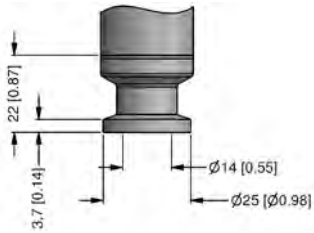


G1" cone

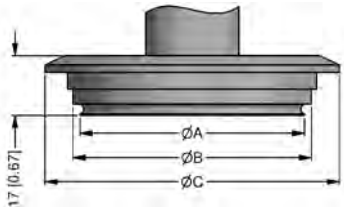


dimensions in mm [in]			
size	DN 25	DN 32	DN 50
A	23.0 [0.91]	23.0 [0.91]	45 [1.77]
B	50.5 [1.99]	50.5 [1.99]	64 [2.52]
p_N [bar]	0.25 ... 16	≤ 16	≤ 16

Clamp (DIN 32676)

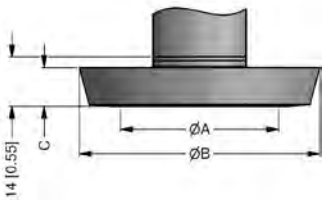


Clamp 3/4″ (DIN 32676)
4 bar ≤ p_N ≤ 8 bar



dimensions in mm [in]	
size	DN 40/50
A	64 [2.52]
B	68 [2.68]
C	84 [3.31]

Varivent® DN 40/50
$p_N \leq 25$ bar



dimensions in mm [in]			
size	DN 25	DN 40	DN 50
A	23 [0.91]	32 [1.26]	45 [1.77]
B	44 [1.73]	56 [1.20]	68.5 [2.70]
C	10 [0.39]	10 [0.39]	11 [0.43]
p_N [bar]	≤ 40	≤ 40	≤ 25

diary pipe (DIN 11851)

⇨ **SIL- and SIL-Ex version: total length increases by 26.5 mm!**

⇨ **metric threads and other versions on request**

Varivent® is a brand name of GEA Tuchenhagen GmbH, Hastelloy® is a brand name of Haynes International Inc.

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Ordering code DS 200P

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Pressure			
gauge	785		
absolute	786		
Input	**[bar]**		
0.10	1000		
0.16	1600		
0.25	2500		
0.40	4000		
0.60	6000		
1.0	1001		
1.6	1601		
2.5	2501		
4.0	4001		
6.0	6001		
10	1002		
16	1602		
25	2502		
40	4002		
-1 … 0	X102		
customer	9999		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	consult
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			N01
male plug M12x1 (8-pin) / plastic [3]			M50
male plug M12x1 (5-pin) / metal			N11
male and female plug ISO 4400 [2]			100
male plug Binder series 723 (5-pin)			204
cable outlet with PVC cable [4]			TA0
customer			999 consult
Mechanical connection			
G1/2" with flush welded diaphragm (DIN 3852) for p_n ≥ 1 bar	Z00		
G3/4" with flush welded diaphragm (DIN 3852)	ZS0		
G1" with flush welded diaphragm (DIN 3852)	ZS1		
G1" DIN 3852 with rad. o-ring and flush diaphragm	ZS7		
G1/2" DIN 3852 with rad. o-ring and flush diaphragm (for p_n ≥ 1 bar)	Z61		
G 1" cone	KS1		
Clamp DN 25 / 1" (DIN 32676) / 3A [5]	C61		
Clamp DN 32 / 1 1/2" (DIN 32676) / 3A [5]	C62		
Clamp DN 50 / 2" (DIN 32676) / 3A [5]	C63		
Clamp 3/4" (DIN 32676) / 3A [5]	C69		
dairy pipe DN 25 (DIN 11851) [6]	M73		
dairy pipe DN 40 (DIN 11851) [6]	M75		
dairy pipe DN 50 (DIN 11851) [5,6]	M76		
Varivent® DN 40/50 / 3A [5]	P41		
customer	999		consult
Diaphragm			
stainless steel 1.4435 (316L)		1	
tantalum		T	consult
Hastelloy® C-276 (2.4819)		H	consult
customer		9	consult
Seal			
for Clamp, dairy pipe, Varivent®: without		0	
for inch thread: FKM		1	
FFKM		7	
customer		9	consult
Filling fluid			
silicone oil		1	
food compatible oil (FDA) / 3A		2	
customer		9	consult
Special version			
standard			000
with cooling element up to 300°C / 3A			200
customer			999 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] possible nominal pressure ranges according to data sheet
[6] 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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