DS 200

Electronic Pressure Switch

Stainless Steel Sensor

accuracy according to IEC 61298-2:
standard: 0.35 % FSO
option: 0.25 % FSO

Nominal pressure

from 0 ... 100 mbar up to 0 ... 600 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
- rotatable and configurable display module

Optional versions

- **IS-version**
  Ex ia = intrinsically safe for gases
- pressure sensor welded
- customer specific versions

The electronic pressure switch DS 200 is the successful combination of

- intelligent pressure switch
- digital display

and has been specially designed for numerous applications in various industrial sectors.

As standard the DS 200 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

- Plant and machine engineering
- Heating and air conditioning
- Environmental engineering (water – sewage – recycling)

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Input pressure range											
Nominal pressure gauge[1] [bar]	-1…0	0.10	0.16	0.25	0.40	0.60	1	1.6	2.5	4	6
Nominal pressure abs. [bar]	-	-	-	-	0.40	0.60	1	1.6	2.5	4	6
Level gauge [1] [mH_2O]	-	1	1.6	2.5	4	6	10	16	25	40	60
Overpressure [bar]	5	0.5	1	1	2	5	5	10	10	20	40
Burst pressure ≥ [bar]	7.5	1.5	1.5	1.5	3	7.5	7.5	15	15	25	50

Nominal pressure gauge [1] / absolute [bar]	10	16	25	40	60	100	160	250	400	600
Level gauge [1] [mH_2O]	100	160	250	400	600	-	-	-	-	-
Overpressure [bar]	40	80	80	105	210	210	600	1000	1000	1000
Burst pressure ≥ [bar]	50	120	120	210	420	420	1000	1250	1250	1250
Vacuum resistance	p_N ≥ 1 bar: unlimited vacuum resistance; p_N < 1 bar: on request									
[1] from 60 bar: measurement starts with ambient pressure										

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: 0 ... 10 V / 3-wire:	contact rating 125 mA, short-circuit resistant; $V_{switch} = V_S - 2V$ contact rating 125 mA, short-circuit resistant	
Accuracy of contacts [3]	standard: p_N < 0.4 bar: ≤ ± 0.5 % FSO option: p_N ≥ 0.4 bar: ≤ ± 0.25 % FSO	p_N ≥ 0.4 bar: ≤ ± 0.35 % 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*			
Analogue output (optionally) / Supply			
2-wire current signal	4 ... 20 mA / V_S = 13 ... 36 V_{DC} response time: < 10 msec	permissible load: $R_{max} = [(V_S - V_{S\,min}) / 0.02\ A]\ \Omega$	
2-wire current signal with IS-protection	4 ... 20 mA / V_S = 15 ... 28 V_{DC} response time: < 10 msec	permissible load: $R_{max} = [(V_S - V_{S\,min}) / 0.02\ A]\ \Omega$	
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: < 3 sec
3-wire voltage signal	0 … 10 V / V_S = 15 ... 36 V_{DC}	permissible load: R_{min} = 10 kΩ	response time: < 3 msec
without analogue output	V_S = 15 ... 36 V_{DC}		
Accuracy [3]	standard: p_N < 0.4 bar: ≤ ± 0.5 % FSO; option: p_N ≥ 0.4 bar: ≤ ± 0.25 % FSO	p_N ≥ 0.4 bar: ≤ ± 0.35 %FSO	
[3] accuracy according to IEC 61298-2 – limit point adjustment (non-linearity, hysteresis, repeatability) *[4] with turn-down of span the analogue signal is adjusted automatically to the new measuring range*			

Thermal effects (offset and span)			
Nominal pressure p_N [bar]	-1 … 0	< 0.40	≥ 0.40
Tolerance band [% FSO]	≤ ± 0.75	≤ ± 1	≤ ± 0.75
in compensated range [°C]	-20 ... 85	0 ... 70	-20 … 85

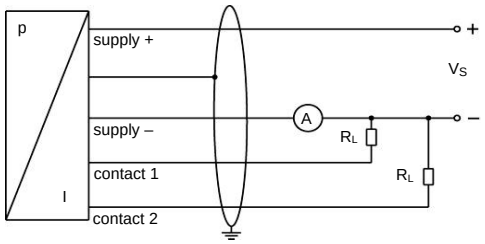
Permissible temperatures			
Medium	-40 ... 125 °C		
Electronics / environment	-40 ... 85 °C		
Storage	-40 ... 100 °C		
Electrical protection			
Short-circuit protection	permanent		
Reverse polarity protection	no damage, but also no function		
Electromagnetic compatibility	emission and immunity according to EN 61326		
Mechanical stability			
Vibration	20 g RMS / 10 ... 2000 Hz	according to DIN EN 60068-2-6	
Shock	500 g / 1 msec half sine	according to DIN EN 60068-2-27	
Materials			
Pressure port	stainless steel 1.4404 (316 L)		
Housing	stainless steel 1.4404 (316 L)		
Display housing	PA 6.6, polycarbonate		
Seals (media wetted)	standard: FKM	option: welded version [5]	others on request
Diaphragm	stainless steel 1.4435 (316 L)		
Media wetted parts	pressure port, seals, diaphragm		
[5] welded version only for pressure ports according to EN 837 and NPT; possible for nominal pressure ranges p_N ≤ 40 bar			

Explosion protection (only for 4 … 20 mA / 2-wire)	
Approval AX14-DS 200	IBExU 06 ATEX 1050 X zone 1: II 2G Ex ia IIC T4 Gb
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 [6]	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
[6] the real switching current in the application depends on the power supply unit	

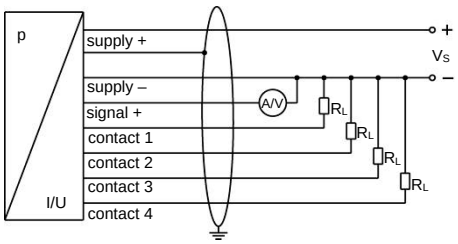
Miscellaneous	
Display	4-digit, red 7-segment-LED display digit height 7 mm range of indication -1999 ... +9999 accuracy 0.1 % ± 1 digit digital damping 0.3 … 30 sec (programmable); measured value update 0.0 … 10 sec (programmable)
Current consumption (without contacts)	2-wire signal output current: 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 [7]
Weight	min. 160 g (depending on mechanical connection)
Operational life	100 million load cycles
CE-conformity	EMC Directive: 2014/30/EU Pressure Equipment Directive: 2014/68/EU (module A) [8]
ATEX Directive	2014/34/EU
[7] Pressure switches are calibrated in a vertical position with the pressure connection down. If this position is changed on installation there can be slight deviation in the zero point for pressure ranges p_N ≤ 1 bar. *[8] This directive is only valid for devices with maximum permissible overpressure > 200 bar*	

Wiring diagrams

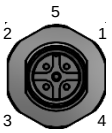
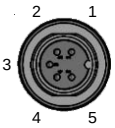
2-wire-system (current)



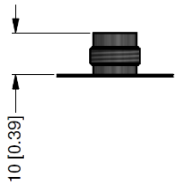
3-wire-system (current/voltage)



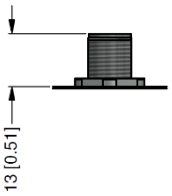
Pin configuration

Electrical connection	M12x1 plastic (5-pin)	M12x1 metal (5-pin)	M12x1 plastic (8-pin)	ISO 4400	Binder series 723 (5-pin)
					
Supply +	1	1	1	1	1
Supply –	3	3	3	2	3
Signal + (only 3-wire)	2	2	2	3	2
Contact 1	4	4	4	3	4
Contact 2	5	5	5	-	5
Contact 3	-	-	6	-	-
Contact 4	-	-	7	-	-
Shield	via pressure port	plug housing/ pressure port	via pressure port	ground contact ⏚	plug housing/ pressure port

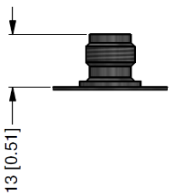
Electrical connections (dimensions mm / in)



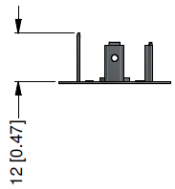
M12x1 plastic
(5-pin)



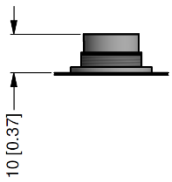
M12x1 metal
(5-pin)



M12x1 plastic
(8-pin)

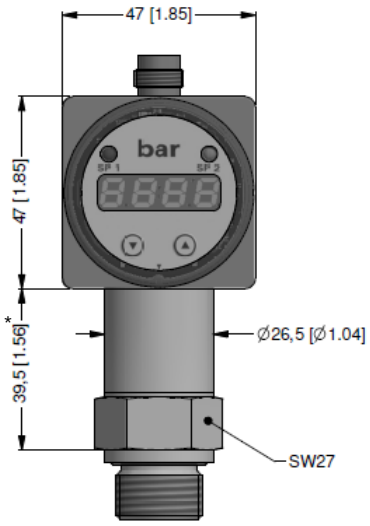


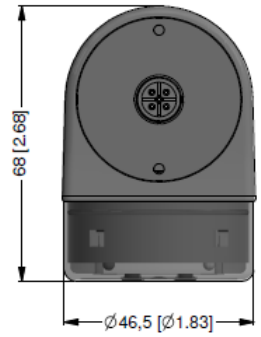
ISO 4400



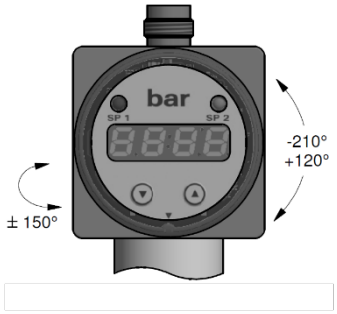
Binder series 723
(5-pin)

Dimensions (mm / in)



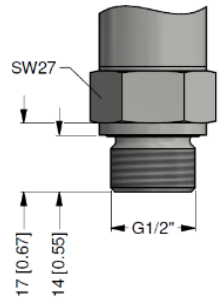


rotatability of display module

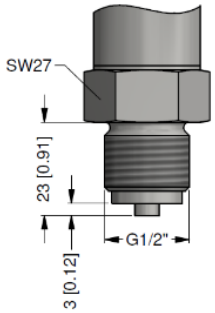


* for nominal pressure p_N > 400 bar increases the length of device by 19 mm (without explosion protection) or by 39 mm (with explosion protection)

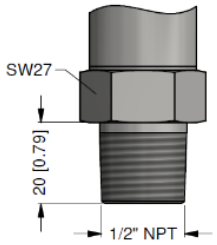
Mechanical connection (dimensions mm / in)



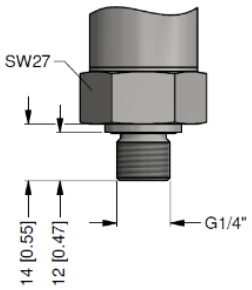
G1/2" DIN 3852



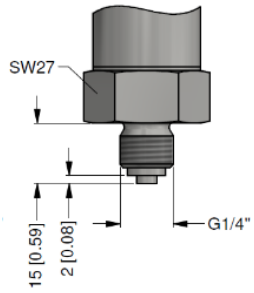
G1/2" EN 837



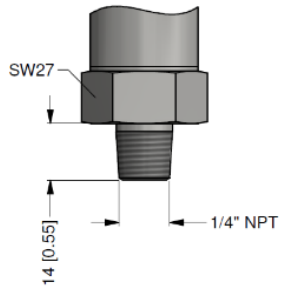
1/2" NPT



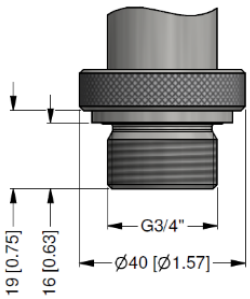
G1/4" DIN 3852



G1/4" EN 837

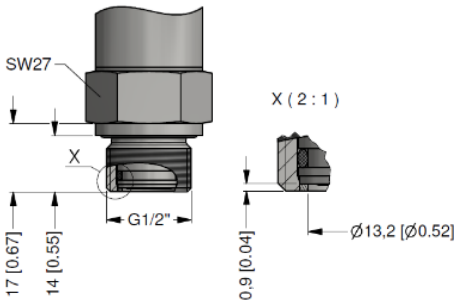


1/4" NPT



G3/4" flush DIN 3852
(0.1 bar ≤ p_N ≤ 40 bar)

length of device: 87.5 mm (without plug)



G1/2" flush DIN 3852
(0.1 bar ≤ p_N ≤ 40 bar)

length of device: 103 mm (without plug)

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

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Ordering code DS 200

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Pressure		
gauge in bar [1]	7 8 0	
gauge in mH_2O [1]	7 8 H	
absolute in bar [2]	7 8 1	

Input [mH_2O]	[bar]		
1.0	0.10 [2]	1 0 0 0	
1.6	0.16 [2]	1 6 0 0	
2.5	0.25 [2]	2 5 0 0	
4.0	0.40	4 0 0 0	
6.0	0.60	6 0 0 0	
10	1.0	1 0 0 1	
16	1.6	1 6 0 1	
25	2.5	2 5 0 1	
40	4.0	4 0 0 1	
60	6.0	6 0 0 1	
100	10	1 0 0 2	
160	16	1 6 0 2	
250	25	2 5 0 2	
400	40	4 0 0 2	
600	60	6 0 0 2	
	100	1 0 0 3	
	160	1 6 0 3	
	250	2 5 0 3	
	400	4 0 0 3	
	600	6 0 0 3	
	-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	7J	
intrinsic safety 4 … 20 mA / 2-wire [3]	E	
customer	9	consult

Contact		
1 contact [3, 4]	1	
2 contacts [3, 4]	2	
4 contacts [5]	4	consult

Accuracy			
standard for p_N > 0.4 bar:	0.35 % FSO	3	
standard for $p_N \leq$ 0.4 bar:	0.50 % FSO	5	
option for $p_N \geq$ 0.4 bar:	0.25 % FSO	2	
	customer	9	consult

Electrical connection		
male plug M12x1 (5-pin) / plastic version	N 0 1	
male plug M12x1 (8-pin) / plastic version [5]	M 5 0	
male plug M12x1 (5-pin) / metal version	N 1 1	
male and female plug ISO 4400 [4]	1 0 0	
male plug Binder series 723 (5-pin)	2 0 4	
customer	9 9 9	consult

Mechanical connection		
G1/2" DIN 3852	1 0 0	
G1/2" EN 837	2 0 0	
G1/4" DIN 3852	3 0 0	
G1/4" EN 837	4 0 0	
G1/2" DIN 3852 with flush sensor [6]	F 0 0	
G3/4" DIN 3852 with flush sensor [6]	K 0 0	
1/2" NPT	N 0 0	
1/4" NPT	N 4 0	
customer	9 9 9	consult

Seal		
FKM	1	
without (welded version) [7]	2	
customer	9	consult

Special version		
standard	0 0 0	
customer	9 9 9	consult

[1] from 60 bar: measurement starts with ambient pressure
[2] absolute pressure possible from 0.4 bar
[3] with IS version max. 1 contact is possible
[4] with connector ISO 4400 and output 2-wire version only max. 1 contact possible; with 3-wire version no contact possible
[5] 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
[6] not possible for nominal pressure p_N > 40 bar; for G3/4" flush nominal pressure abs. on request
[7] welded version only with pressure ports according to EN 837 and NPT; possible for nominal pressure ranges $p_N \leq$ 40 bar

19.06.2024

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