BD|SENSORS
pressure measurement

DS 200

Electronic Pressure Switch

Stainless Steel Sensor

accuracy according to IEC 60770:
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. 4 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] / abs.	[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: 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

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: < 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; P_N ≥ 0.4 bar: ≤ ± 0.35 %FSO option: P_N ≥ 0.4 bar: ≤ ± 0.25 % FSO		

[3] accuracy according to IEC 60770 – 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			
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	10 g RMS (25 ... 2000 Hz)	according to DIN EN 60068-2-6
Shock	500 g / 1 msec	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; 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 (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 [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

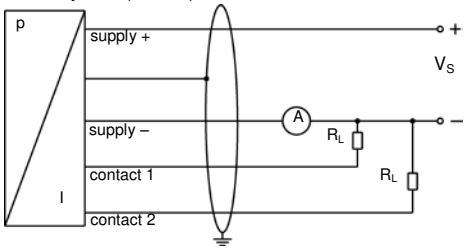
[6] the real switching current in the application depends on the power supply unit

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 x 10^6 cycles
CE-conformity	EMC Directive: 2004/108/EC Pressure Equipment Directive: 97/23/EC (module A) [8]

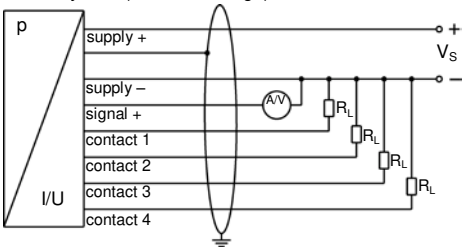
[7] Pressure switches are calibrated in a vertical position with the pressure connection down. If this position is changed on installation there can be slight deviation in the zero point for pressure ranges P_N ≤ 1 bar.
[8] This directive is only valid for devices with maximum permissible overpressure > 200 bar

Wiring diagrams

2-wire-system (current)



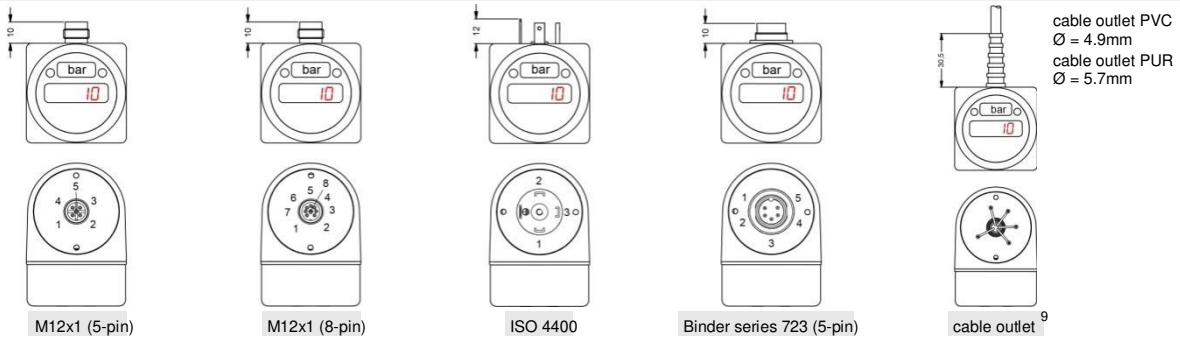
3-wire-system (current / voltage)



Pin configuration

Electrical connection	M12x1 plastic (5-pin)	M12x1 metal (5-pin)	M12x1 plastic (8-pin)	ISO 4400	Binder series 723 (5-pin)	cable colours (DIN 47100)
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 contact	plug housing/ pressure port	ye/gn (yellow/green)

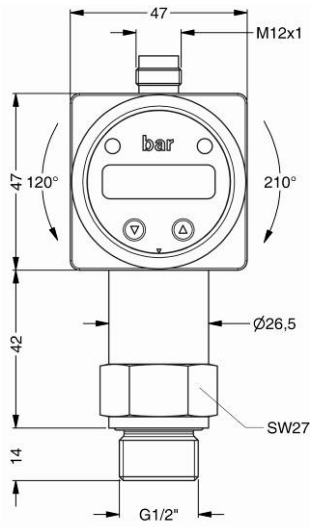
Electrical connections (dimensions in mm)

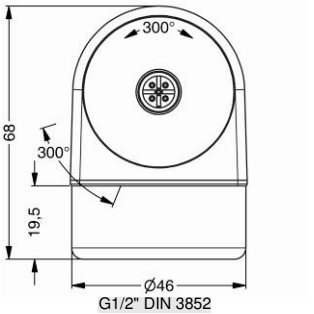


[9] different cable types and lengths available; standard: 2 m PVC cable (without ventilation tube, permissible temperature: -5 ... 70 °C)

Mechanical connections (dimensions in mm)

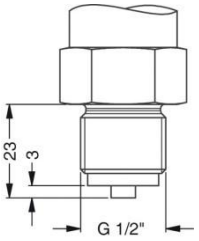
standard



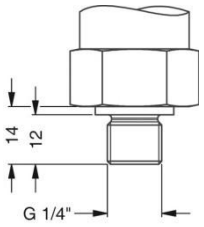


G1/2" DIN 3852

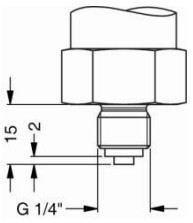
optionally



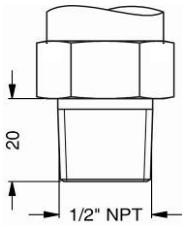
G1/2" EN 837



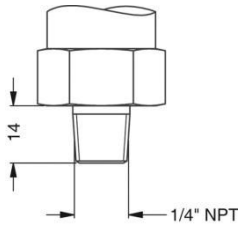
G1/4" DIN 3852



G1/4" EN 837



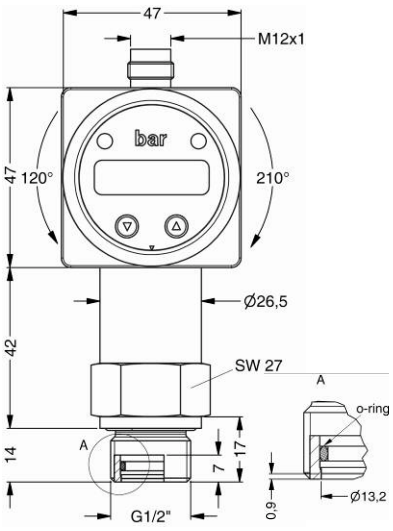
1/2" NPT



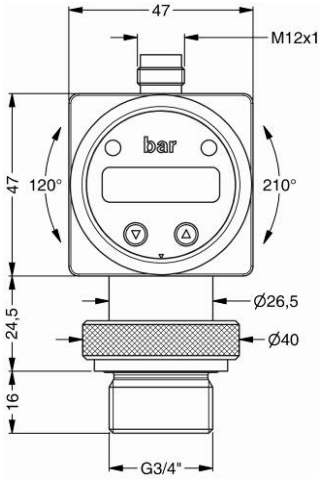
1/4" NPT

⇨ **for nominal pressure P_N > 400 bar increases the length of devices without IS-version by 19 mm and of devices with IS-version by 39 mm**

optionally for P_N from 0.1 up to 40 bar



G1/2" flush
DIN 3852



G3/4" flush DIN 3852
(absolute pressure on request)

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

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BD|SENSORS
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Ordering code DS 200

DS 200 ☐☐☐ - ☐☐☐☐ - ☐ - ☐ - ☐ - ☐☐☐ - ☐☐☐ - ☐ - ☐☐☐

			Code	
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	0.10 [2]		
	1.6	0.16 [2]		
	2.5	0.25 [2]		
	4	0.40	4 0 0 0	
	6	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			7	
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	
Accuracy				
standard for P_N > 0,4 bar		0.35 %	3	
standard for P_N ≤ 0,4 bar		0.5 %	5	
option for P_N ≥ 0,4 bar		0.25 %	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	
Cable outlet incl. cable [6]			T A 0	
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 [7]			F 0 0	
G3/4" DIN 3852 with flush sensor [7]			K 0 0	
1/2" NPT			N 0 0	
1/4" NPT			N 4 0	
customer			9 9 9	consult
Seals				
FKM			1	
without (welded version) [8]			2	
customer			9	consult
Special version				
standard			0 0 0	
customer			9 9 9	consult
Prices EXW Thierstein, excluding package				

[1] from 60 bar: measurement starts with ambient pressure
[2] absolute pressure possible from 0.4 bar
[3] with Ex 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] standard: 2 m PVC cable without ventilation tube, others on request
[7] not possible for nominal pressure P_N > 40 bar; also not possible for vacuum ranges; for G3/4" flush nominal pressure abs. on request
[8] welded version only with pressure ports according to EN 837; possible for nominal pressure ranges P_N ≤ 40 bar

04.03.2015