BD SENSORS
pressure measurement

DS 200

Electronic Pressure Switch with Analogue Output

- piezoresistive stainless steel sensor
- 1 analogue output and up to 2 switching outputs
- display and housing rotatable
- nominal pressure ranges
  from 0 ... 40 mbar
  up to 0 ... 600 bar

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

- precise pressure transmitter
- intelligent pressure switch
- digital display unit.

Areas of application of the DS 200 range from pneumatics to hydraulics. It is suitable for a large variety of control applications – precise and stable in the long term.

The DS 200 can be used with any gases or liquids compatible with stainless steel and the O-ring material FKM.

The system pressure is shown on the 4-digit LED display. In addition the display supports programming the DS 200 using the foil keys. The software has several functions such as access protection, configuration of the display and the switching outputs, etc.

Set and reset points are freely configurable in the range 0 to 100 % of the nominal pressure.

Display and housing of the DS 200 are rotatable, so that the position of the display can be adapted to unusual installation positions.

Functions

- configuration of display, including
  - current value
  - decimal point
- switching outputs adjustable, including
  - switch on / switch off points
  - hysteresis / window mode
  - switch on / switch off delay
- special functions / administration
  - access protection
  - min. / max. value memory

CE Ex

DS 200
Electronic Pressure Switch

TÜV CERT DIN EN ISO 9001

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Input pressure range [1]

Nominal pressure gauge	[bar]	-1 ... 0	0.04	0.06	0.1	0.16	0.25	0.4	0.6	1	1.6	2.5	4	6	10	16	25	40
Nominal pressure abs.	[bar]				0.1	0.16	0.25	0.4	0.6	1	1.6	2.5	4	6	10	16	25	40
Permissible overpressure	[bar]	3	0.2	0.2	0.5	0.5	1	1	3	3	6	6	20	20	20	60	60	100

Nominal pressure gauge [2]	[bar]	60	100	160	250	400	600
Nominal pressure abs.	[bar]	60	100	160	250	400	600
Permissible overpressure	[bar]	140	340	340	600	600	1000

Output signal / Supply

Analogue output			
Standard	2-wire: 4 ... 20 mA / V_S = 18 ... 41 V_{DC}	Ex-protection:	V_S = 20 ... 28 V_{DC}
Optional	3-wire: 0 ... 10 V / V_S = 15 ... 36 V_{DC}	4 ... 20 mA / V_S = 19 ... 30 V_{DC} (on request)	
Accuracy [3]	standard: ≤ ± 0.35 % FSO (BFSL: ≤ ± 0.175 % FSO) nominal pressure ≤ 0.4 bar: ≤ ± 0.5 % FSO (BFSL: ≤ ± 0.25 % FSO) option (nominal pressure > 0.4 bar): ≤ ± 0.25 % FSO (BFSL: ≤ ± 0.125 % FSO)		
Permissible load	current 2-wire : $R_{max} = [(V_S - V_{S\,min}) / 0.02]\ \Omega$ voltage 3-wire : R_{min} = 10 kΩ		
Switching output			
Number, type	1 or 2 independent PNP outputs		
Switching performance	standard: contact rating max. 125 mA, short-circuit resistant option Ex-protection: max. switching current: 1 SP: 70 mA; 2 SP: Σ 70 mA (sum of SP1 + SP2) max. permissible inductivity per switching output: 4.7 mH		
Accuracy of switching points	standard: ≤ ± 0.35 % FSO (BFSL: ≤ ± 0.175 % FSO) nominal pressure ≤ 0.4 bar: ≤ ± 0.5 % FSO (BFSL: ≤ ± 0.25 % FSO) option (nominal pressure > 0.4 bar): ≤ ± 0.25 % FSO (BFSL: ≤ ± 0.125 % FSO)		
Repeatability	≤ ± 0.1 % FSO		
Switching frequency	max. 10 Hz		
Switching cycles	> 100 x 10^6		
Delay time	0 ... 100 s		

Thermal errors (Offset and Span)

Nominal pressure P_N	[bar]	-1 ... 0	≤ 0.1	≤ 0.25	≤ 0.4	≤ 1.0	> 1.0
Tolerance band	[% FSO]	≤ ± 0.75	≤ ± 2	≤ ± 1.5	≤ ± 1	≤ ± 1	≤ ± 0.75
TC, average	[% FSO / 10 K]	± 0.07	± 0.3	± 0,2	± 0.14	± 0.1	± 0.07
in compensated range	[°C]	0 ... 70	0 ... 50			0 ... 70	

Electrical protection

Insulation resistance	> 100 MΩ
Short-circuit protection	permanent
Reverse polarity protection	no damage, but also no function
Electromagnetic compatibility	emission and immunity according to EN 61326
Option Ex-protection AX11-DS 200	II (1) 2 G EEx ia IIC T4 (only with 4 ... 20 mA / 2-wire) safety technical maximum values: V_i = 28 V, ΣI_i = 93 mA, ΣP_i = 660 mW

Display

Type	4-digit, red LED display, digit height 7 mm, digit width 4.85 mm (angle 10°)
Range	-1999 ... +9999
Accuracy	0.1 % ± 1 digit

[1] welded version not possible with pressure ranges ≤ 0.16 bar and > 25 bar

[2] measurement starts with ambient pressure

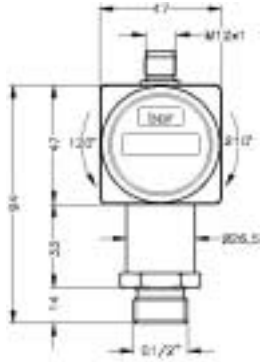
[3] accuracy according to IEC 60770 – limit point adjustment (non-linearity, hysteresis, repeatability)

Mechanical stability	
Vibration	10 g RMS (20 ... 2000 Hz)
Shock	100 g / 11 ms

Permissible temperatures	
Medium	-25 ... 125 °C
Electronics / environment	-25 ... 85 °C
Storage	-40 ... 85 °C

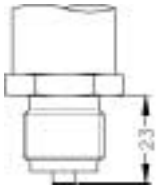
Mechanical connection

Standard

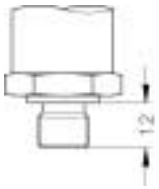


G1/2" DIN 3852
M20 x 1.5

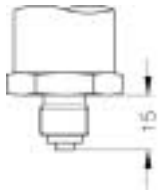
Optional



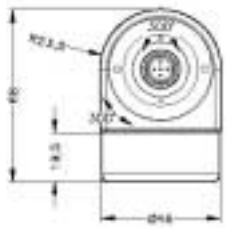
G1/2" EN 837
M20 x 1.5



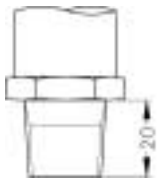
G1/4" DIN 3852
M10 x 1
M12 x 1
M12 x 1.5



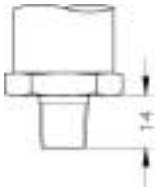
G1/4" EN 837



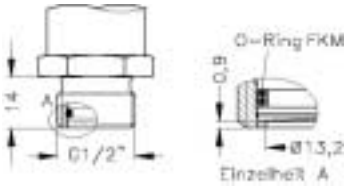
G1/2" DIN 3852
M20 x 1.5



1/2" NPT



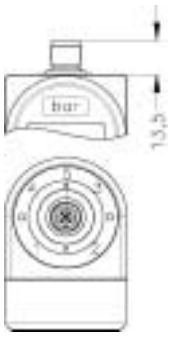
1/4" NPT



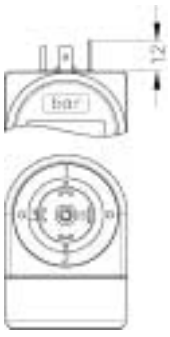
G1/2" flush (DIN 3852)

⇨ With pressure ranges P_N > 40 bar total length increases by 14 mm!
⇨ Ex-protection: total length increases by 26.5 mm!

Electrical connection



M12x1 5-pin



DIN 43650 [4]

Cable gland [5]

[4] with connector DIN 43650 and output 4 ... 20 mA / 2-wire only max. 1 switching output possible; with 0 ... 10 V / 3-wire no switching output possible
[5] different cable types and lengths available; standard: 2 m PVC cable (without ventilation tube), optionally cable with ventilation tube

Materials

Pressure port	stainless steel 1.4571 (316Ti)
Housing	stainless steel 1.4301 (304)
Display housing	PA 6.6, Polycarbonate
Seals (media wetted)	standard: $P_N \leq 40$ bar: FKM $P_N > 40$ bar: NBR optional: welded version [6] others on request
Diaphragm	stainless steel 1.4435 (316L)
Media wetted parts	pressure port, seals, diaphragm

Miscellaneous

Current consumption (without switching outputs)	signal output current: max. 25 mA signal output voltage: max. 7 mA
Weight	ca. 160 ... 250 g
Installation position	any [7]
Operational life	> 100 x 10^6 cycles

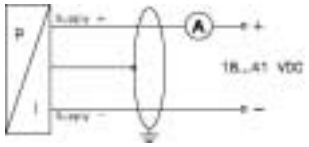
Pin configuration

Electrical connection		M12x1 plastic (5-pin)	M12x1 metal (5-pin)	DIN 43650	cable colours (DIN 47100)
2-wire-system	Supply +	1	1	1	white
	Supply –	3	3	2	brown
	Switching output 1	4	4	3	grey
	Switching output 2	5	5	-	pink
	Ground	via pressure port	plug housing	ground contact	cable shield
3-wire-system	Supply+	1	1	1	white
	Supply –	3	3	2	brown
	Signal +	2	2	3	green
	Switching output 1	4	4	-	grey
	Switching output 2	5	5	-	pink
	Ground	via pressure port	plug housing	ground contact	cable shield

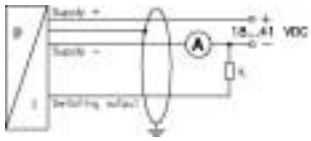
Wiring diagrams

2-wire-system (current) (for Ex-protection supply is V_S = 20 ... 28 V_{DC})

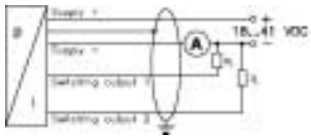
without switching output



1 switching output

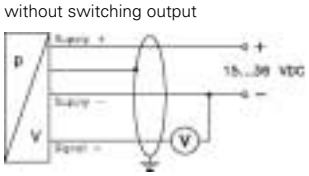


2 switching outputs

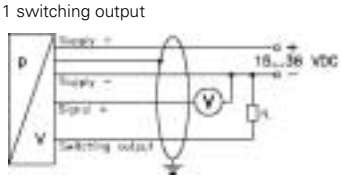


3-wire-system (current)

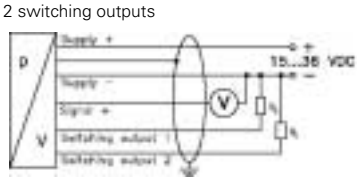
without switching output



1 switching output



2 switching outputs



[6] welded version only with pressure ports according to EN 837; welded version not available with pressure ranges ≤ 0.16 bar and > 25 bar

[7] Pressure transmitters are calibrated in a vertical position with the pressure connection down. If this position is changed on installation there can be slight deviations in the zero point for pressure ranges P_N < 1 bar.