



DS 201

Electronic Pressure Switch with Ceramic Sensor



- ▶ up to 4 independent contacts, configurable
- ▶ optional:
 - analogue output
 - Ex-protection (for 2-wire)
 - oxygen application
 - flush pressure port
- ▶ nominal pressure ranges from 0 ... 600 mbar up to 0 ... 600 bar

The electronic pressure switch DS 201 is the successful combination of

- ▶ intelligent pressure switch
- ▶ digital display

and has been specially designed for universal usage in industry applications; with flush diaphragm the DS 201 is suitable for the usage in viscous, pasty or highly contaminated media. As standard the DS 201 offers a PNP contact; optionally, depending on the version, the device could be equipped with max. four contacts as well as an analogue output. For aggressive media additionally the device could be equipped with a pressure port in PVDF or PVC.

Operation

The rotatable display module shows the system pressure and allows programming. The configuration is menu controlled and easy to handle without previous knowledge.

Applications

- ▶ environmental engineering
- ▶ chemical and pharmaceutical industries
- ▶ oxygen applications

- ▶ indication of measured values on a 4-digit LED display
- ▶ rotatable and configurable display module
- ▶ configurable contacts (switch on / switch off points, hysteresis / window mode, switch on / switch off delay)
- ▶ option analogue output:
 - 4 ... 20 mA / 2-wire **Ex-protection optionally**
 - 4 ... 20 mA / 3-wire **with turn-down 1:5**
 - 0 ... 10 V / 3-wire
- ▶ special functions (access protection, min. / max. value memory)
- ▶ industrial standard in view of accuracy, thermal behaviour and long term stability

Characteristics



DS 201
Electronic Pressure Switch

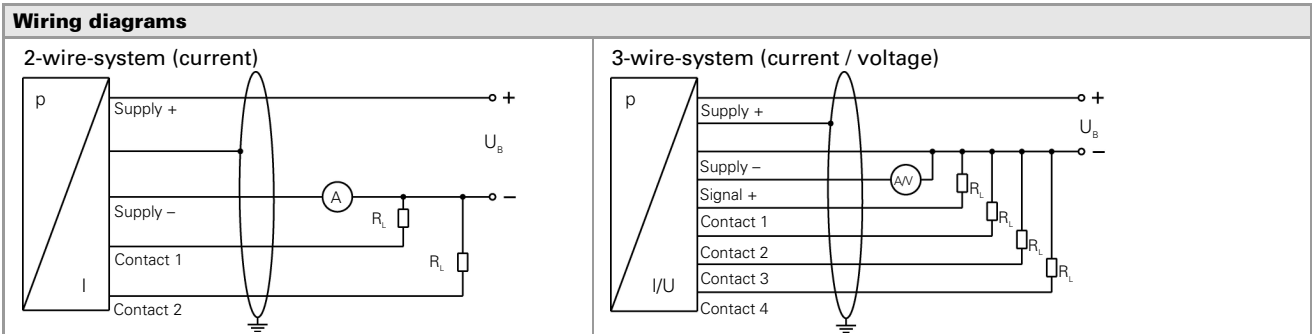
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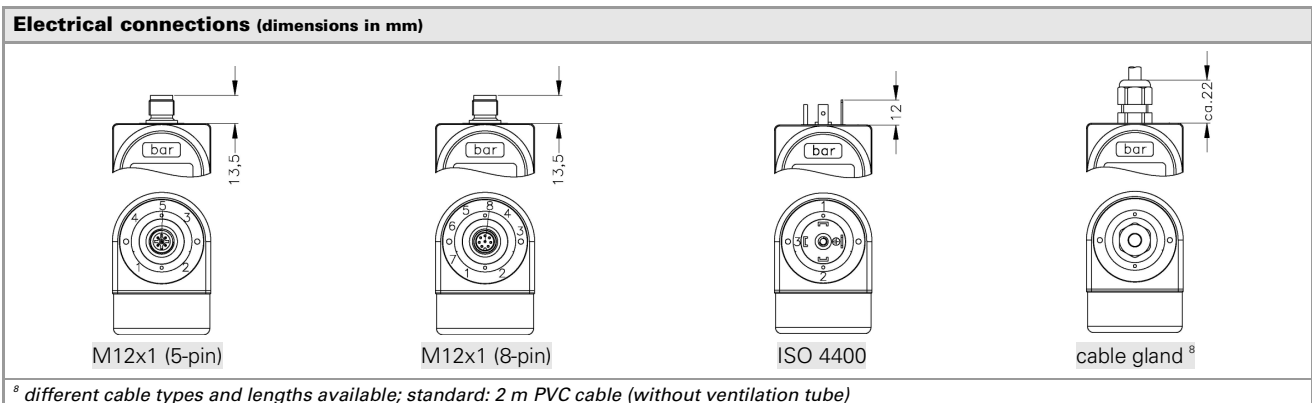
Technical Data

Input pressure range ¹											
Nominal pressure gauge / abs. [bar]	-1...0	0.6	1	1.6	2.5	4	6	10	16		
Level gauge [mH ₂ O]	-	6	10	16	25	40	60	100	160		
Permissible overpressure [bar]	3	3	3	7	7	12	12	25	50		
Nominal pressure gauge / abs. [bar]	25	40	60	100	160	250	400	600			
Level gauge [mH ₂ O]	250	400	600	-	-	-	-	-	-		
Permissible overpressure [bar]	50	120	120	250	500	500	600	750			
¹ nominal pressure range abs. from 0.6 bar											
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 500 mA, short-circuit resistant										
Accuracy of contacts	IEC 60770: $\leq \pm 0.5\%$ FSO					BFSL: $\leq \pm 0.25\%$ FSO					
Repeatability	$\leq \pm 0.2\%$ FSO										
Switching frequency	max. 10 Hz										
Switching cycles	$> 100 \times 10^6$										
Delay time	0 ... 100 s										
² max. 1 contact for 2-wire current signal with plug ISO 4400 as well as 2-wire current signal with Ex-protection no contact possible with 3-wire voltage signal with plug ISO 4400											
Analogue output (optionally) / Supply											
2-wire current signal	4 ... 20 mA / $V_s = 18 \dots 41 V_{DC}$ permissible load: $R_{max} = [(V_s - V_{smin}) / 0.02] \Omega$ response time: < 10 ms										
2-wire current signal with Ex-protection	4 ... 20 mA / $V_s = 17 \dots 28 V_{DC}$ permissible load: $R_{max} = [(V_s - V_{smin}) / 0.02] \Omega$ response time: < 10 ms										
3-wire current signal	4 ... 20 mA / $V_s = 19 \dots 30 V_{DC}$ adjustable (turn-down of span 1:5) ³ permissible load: $R_{max} = 500 \Omega$ response time: < 1 s										
3-wire voltage signal	0 ... 10 V / $V_s = 15 \dots 36 V_{DC}$ permissible load: $R_{min} = 10 \text{ k}\Omega$ response time: < 10 ms										
Without analogue output	$V_s = 15 \dots 36 V_{DC}$										
Accuracy	IEC 60770 ⁴ : $\leq \pm 0.5\%$ FSO					BFSL: $\leq \pm 0.25\%$ FSO					
³ with turn-down of span the analogue signal is adjusted automatically to the new measuring range											
⁴ accuracy according to IEC 60770 – limit point adjustment (non-linearity, hysteresis, repeatability)											
Thermal errors (offset and span) / Permissible temperatures											
Thermal errors	$\leq \pm 0.2\%$ FS / 10 K in compensated range -25 ... 85 °C										
Permissible temperatures ⁵	medium: -25 ... 135 °C			electronics / environment: -25 ... 85 °C				storage: -40 ... 85 °C			
⁵ for pressure port of PVC the maximum permissible temperature is 50 °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	5 g RMS (20 ... 2000 Hz)										
Shock	100 g / 11 msec.										
Materials											
Pressure port / housing	Standard: Option for G1/2" open port (up to 60 bar): Options for G 3/4" flush (0.6 bar $\leq P_N \leq 25$ bar):					pressure port		housing			
						stainless steel 1.4571		stainless steel 1.4301			
	PVDF		PVDF								
	PVC grey		PVC grey								
Display housing	PA 6.6, polycarbonate										
Seals (media wetted)	$P_N < 100$ bar: FKM / $P_N \geq 100$ bar: NBR others on request										
Diaphragm	ceramics Al ₂ O ₃ 96 %										
Media wetted parts	pressure port, seals, diaphragm										

Explosion protection (for 2-wire current signal with Ex-protection)	
Approval AX11-DS 201	stainless steel pressure port: zone (0) 1: II (1) 2 G EEx ia IIC T4 plastic pressure port: zone 1: II 2 G EEx ia IIC T4
Safety tech. maximum values	$U_i = 28 \text{ V}$, $I_i = 93 \text{ mA}$, $P_i = 660 \text{ mW}$
Max. switching current ⁶	70 mA (max. permissible inductivity: 4.7 mH)
Permissible temperatures for environment	-20 ... 70 °C
Connecting cables (by factory)	cable capacitance: signal line/shield also signal line/signal line: 160 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)
Optionally oxygen application ⁷	for $P_N \leq 50 \text{ bar}$: O-ring in V747-75 (with BAM-approval); permissible maximum values are 40 bar / 130° C and 50 bar / 100° C for $P_N > 50 \text{ bar}$: O-ring in FKM 90 (approved by the scientific coal research institute in Ostrava – CZ) up to max. 215 bar / 95 °C
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
Weight	approx. 200 g
Operational life	> 100 x 10 ⁶ cycles
⁷ not possible with flush pressure ports	



Pin configuration					
Electrical connection	M12x1 plastic (5-pin)	M12x1 metal (5-pin)	M12x1 plastic (8-pin)	ISO 4400	cable colours (DIN 47100)
Supply +	1	1	1	1	white
Supply -	3	3	3	2	brown
Signal + (only 3-wire)	2	2	2	3	green
Contact 1	4	4	4	3	grey
Contact 2	5	5	5	-	pink
Contact 3	-	-	6	-	-
Contact 4	-	-	7	-	-
Ground	via pressure port	plug housing / pressure port	via pressure port	ground contact	yellow / green (shield)



⁸ different cable types and lengths available; standard: 2 m PVC cable (without ventilation tube)

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Technical Data

Mechanical connections (dimensions in mm)

G1/2" EN 837
 M20x1.5

G1/4" DIN 3852
 M10x1; M12x1; M12x1.5
 (from 0.6 up to 100 bar)

G1/4" EN 837

1/2" NPT

1/4" NPT

G1/2" DIN 3852
 M20x1.5

G1/2" flush (DIN 3852); M20x1.5 (from 0.6 up to 25 bar; nominal pressure range abs. on request)

G1/2" open port (DIN 3852); M20x1.5

⇒ Ex-protection: total length increases by 10 mm!

optionally for P_N from 0.6 up to 60 bar gauge

G3/4" flush (DIN 3852)⁹

⇒ PVC and PVDF versions are 3 mm (G3/4") longer!
 ⇒ Ex protection with G3/4": total length increases by 17.5 mm!

⁹ nominal pressure ranges > 25 bar with Ø 40 and spanner flat SW 34 (without knurled ring)

This data sheet contains product specification; properties are not guaranteed. Subject to change without notice.

