



# DS 201

## Electronic Pressure Switch

Ceramic Sensor

accuracy according to IEC 60770:  
0.5 % FSO

### Nominal pressure

from 0 ... 400 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 port PVDF
- ▶ customer specific versions



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. The DS 201 is available with flush pressure ports for viscous, pasty and highly contaminated media.

As standard the DS 201 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
-  Environmental Engineering  
(water – sewage – recycling)



Input pressure range <sup>1</sup>																			
Nominal pressure gauge [bar]	-1...0	0.4	0.6	1	1.6	2.5	4	6	10	16	25	40	60	100	160	250	400	600	
Nominal pressure abs. [bar]	-	-	0.6	1	1.6	2.5	4	6	10	16	25	40	60	100	160	250	400	600	
Level gauge [mH <sub>2</sub> O]	-	4	6	10	16	25	40	60	100	160	250	400	600	-	-	-	-	-	
Overpressure [bar]	4	1	2	2	4	4	10	10	20	40	40	100	100	200	400	400	600	800	
Burst pressure ≥ [bar]	7	2	4	4	5	5	12	12	25	50	50	120	120	250	500	500	650	880	
Vacuum resistance	P <sub>N</sub> ≥ 1 bar: unlimited vacuum resistance P <sub>N</sub> < 1 bar: on request																		

<sup>1</sup> PVDF pressure port possible for nominal pressure ranges up to 60 bar

Contact <sup>2</sup>	
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 <sub>Switch</sub> = V <sub>S</sub> - 2V 0 ... 10 V / 3-wire: contact rating 125 mA, short-circuit resistant
Accuracy of contacts <sup>3</sup>	≤ ± 0.5 % FSO
Repeatability	≤ ± 0.2 % FSO
Switching frequency	max. 10 Hz
Switching cycles	> 100 x 10 <sup>6</sup>
Delay time	0 ... 100 sec

<sup>2</sup> 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 <sub>S</sub> = 13 ... 36 V <sub>DC</sub> permissible load: R <sub>max</sub> = [(V <sub>S</sub> - V <sub>S min</sub> ) / 0.02 A] Ω response time: < 10 msec
2-wire current signal with IS-protection	4 ... 20 mA / V <sub>S</sub> = 15 ... 28 V <sub>DC</sub> permissible load: R <sub>max</sub> = [(V <sub>S</sub> - V <sub>S min</sub> ) / 0.02 A] Ω response time: < 10 msec
3-wire current signal	4 ... 20 mA / V <sub>S</sub> = 19 ... 30 V <sub>DC</sub> adjustable (turn-down of span 1:5) <sup>4</sup> permissible load: R <sub>max</sub> = 500 Ω response time: < 0,5 sec
3-wire voltage signal	0 ... 10 V / V <sub>S</sub> = 15 ... 36 V <sub>DC</sub> permissible load: R <sub>min</sub> = 10 kΩ response time: < 3 msec
Without analogue output	V <sub>S</sub> = 15 ... 36 V <sub>DC</sub>
Accuracy <sup>3</sup>	≤ ± 0.5 % FSO

<sup>3</sup> accuracy according to IEC 60770 – limit point adjustment (non-linearity, hysteresis, repeatability)

<sup>4</sup> with turn-down of span the analogue signal is adjusted automatically to the new measuring range

Thermal effects (Offset and Span) / Permissible temperatures	
Thermal error	≤ ± 0.2 % FSO / 10 K
in compensated range	-25 ... 85 °C
Permissible temperatures <sup>5</sup>	medium: -40 ... 125 °C electronics / environment: -40 ... 85 °C storage: -40 ... 100 °C

<sup>5</sup> for pressure port of PVDF the minimum permissible temperature is -30 °C

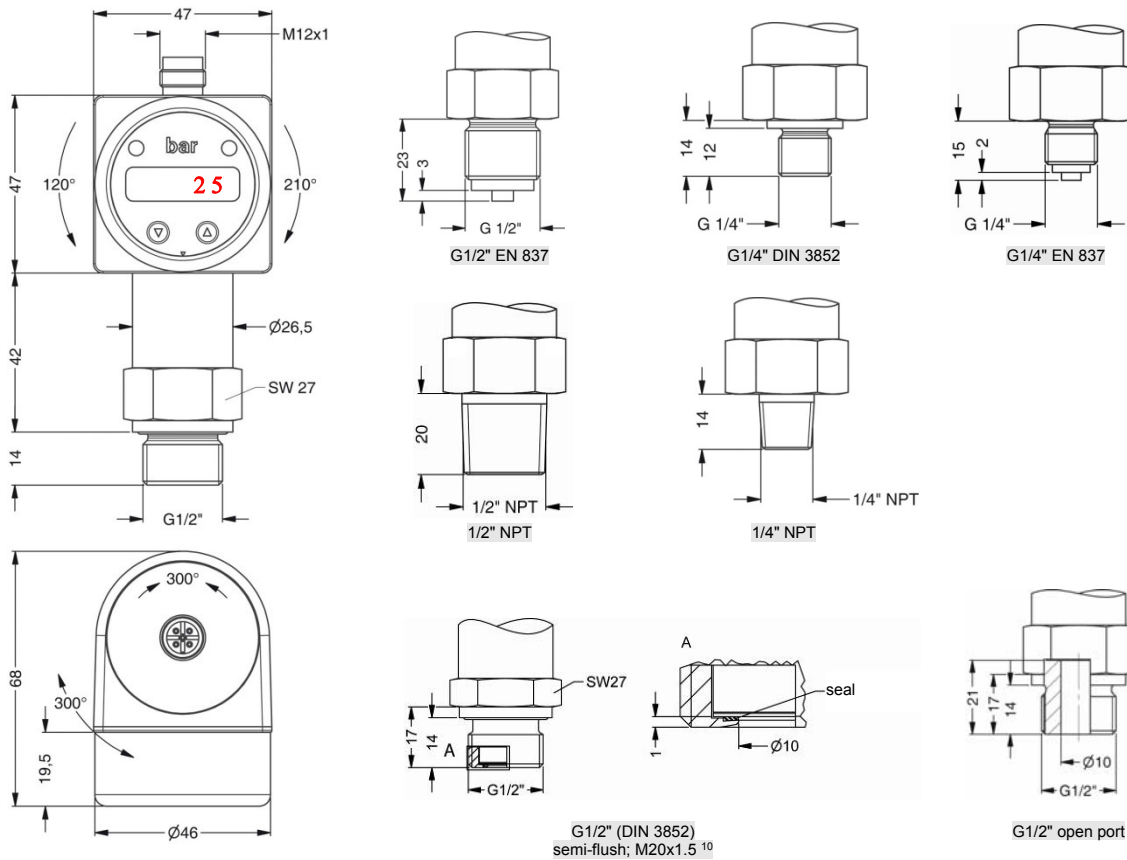
Electrical protection	
Short-circuit protection	permanent
Reverse polarity protection	no damage, but also no function
Electromagnetic compatibility	emission and immunity according to EN 61326

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 / housing	Standard:	pressure port	housing
	Option for G1/2" open port (up to 60 bar): Options for G3/4" flush (0.6 bar ≤ P <sub>N</sub> ≤ 25 bar):	stainless steel 1.4404 PVDF PVDF	stainless steel 1.4404 stainless steel 1.4404 PVDF
Display housing	PA 6.6, polycarbonate		
Seals (media wetted)	standard: FKM option: EPDM (P <sub>N</sub> ≤ 160 bar) others on request		
Diaphragm	ceramics Al <sub>2</sub> O <sub>3</sub> 96 %		
Media wetted parts	pressure port, seals, diaphragm		

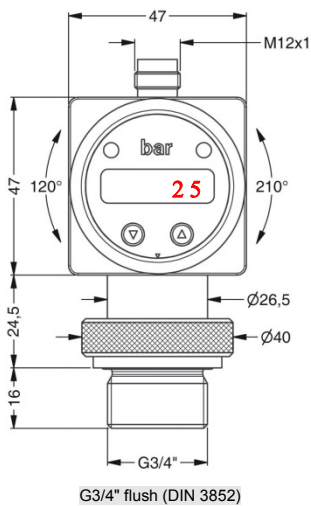
Explosion protection (only for 4 ... 20 mA / 2-wire)						
Approval AX14-DS 201	IBExU 06 ATEX 1050 X zone 1: II 2G Ex ia IIC T4 Gb (connector) / II 2G Ex ia IIB T4 Gb (cable)					
Safety tech. maximum values	$U_i = 28\text{ V}$ , $I_i = 93\text{ mA}$ , $P_i = 660\text{ mW}$ , $C \approx 0\text{ nF}$ , $L_i \approx 0\text{ }\mu\text{H}$					
Max. switching current <sup>6</sup>	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 $\mu\text{H}/\text{m}$					
<sup>6</sup> 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 % $\pm$ 1 digit; digital damping 0.3 ... 30 sec (programmable); measured value update 0.0 ... 10 sec (programmable)					
Option oxygen application <sup>7</sup>	for $P_N \leq 25\text{ bar}$ : O-ring in FKM Vi 567 (with BAM-approval); permissible maximum values are 25 bar / 150° 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	$> 100 \times 10^6$ cycles					
CE-conformity	EMC Directive: 2014/30/EU			Pressure Equipment Directive: 2014/68/EU (module A) <sup>8</sup>		
ATEX Directive	2014/34/EU					
<sup>7</sup> not possible with flush pressure ports						
<sup>8</sup> This directive is only valid for devices with maximum permissible overpressure $> 200\text{ bar}$						
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 (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	-	-	bu (blue)
Contact 4	-	-	7	-	-	rd (red)
Shield	via pressure port	plug housing/pressure port	via pressure port	ground contact	plug housing/pressure port	gnye (green-yellow)
Electrical connections (dimensions in mm)						
M12x1 (5-pin)	M12x1 (8-pin)	ISO 4400	Binder series 723 (5-pin)	cable outlet PVC $\varnothing = 4.9\text{ mm}$ cable outlet PUR $\varnothing = 5.7\text{ mm}$		
<sup>9</sup> 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)						

**Mechanical connections (dimensions in mm)**



↪ metric threads and others on request

optionally for  $P_N$  from 0.6 up to 60 bar gauge



<sup>10</sup> possible for nominal pressure ranges  $P_N \leq 40$  bar

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## Ordering code DS 201

DS 201		□	□	□	-	□	□	□	-	□	□	□	-	□	□	□	-	□	□	□	-	□	□	□
<b>Pressure</b>																								
gauge in bar		7	8	2																				
gauge in mH <sub>2</sub> O		7	8	E																				
absolute in bar		7	8	3																				
<b>Input</b>																								
[mH <sub>2</sub> O]		[bar]																						
4	0.4	4	0	0	0																			
6	0.6	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																			
<b>Analogue output</b>																								
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						E																		
customer						9																		
<b>Contact</b>																								
1 contact						1																		
2 contacts						2																		
4 contacts						4																		
<b>Accuracy</b>																								
0.5 %						5																		
customer						9																		
<b>Electrical connection</b>																								
Male plug M12x1 (5-pin) / plastic version						N	0	1																
Male plug M12x1 (8-pin) / plastic version						M	5	0																
Male plug M12x1 (5-pin) / metal version						N	1	1																
Male and female plug ISO 4400						1	0	0																
Male plug Binder series 723 (5-pin)						2	0	4																
Cable outlet incl. cable						T	A	0																
customer						9	9	9																
<b>Mechanical connection</b>																								
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						F	0	0																
G3/4" DIN 3852 with flush sensor						K	0	0																
G1/2" DIN 3852 open pressure port						H	0	0																
1/2" NPT						N	0	0																
1/4" NPT						N	4	0																
customer						9	9	9																
<b>Seals</b>																								
FKM						1																		
EPDM						3																		
customer						9																		
<b>Pressure port</b>																								
Stainless steel 1.4404 (316L)						1																		
PVDF						B																		
customer						9																		
<b>Diaphragm</b>																								
Ceramics Al <sub>2</sub> O <sub>3</sub> 96%						2																		
customer						9																		
<b>Special version</b>																								
standard						0	0	0																
oxygen application						0	0	7																
customer						9	9	9																

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<sup>1</sup> with Ex version max. 1 contact possible  
<sup>2</sup> with connector ISO 4400 and output 2-wire version only max. 1 contact possible; with 3-wire version no contact possible  
<sup>3</sup> 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  
<sup>4</sup> standard: 2 m PVC cable without ventilation tube (permissible temperature: -5 ... 70 °C), others on request  
<sup>5</sup> possible for nominal pressure ranges P<sub>N</sub> ≥ 0.6 bar up to P<sub>N</sub> ≤ 25 bar gauge, absolute on request  
<sup>6</sup> possible for nominal pressure ranges P<sub>N</sub> ≥ 0.6 bar up to P<sub>N</sub> ≤ 60 bar gauge  
<sup>7</sup> possible for nominal pressure ranges P<sub>N</sub> ≤ 160 bar  
<sup>8</sup> PVDF only with G1/2" DIN 3852 open pressure port (up to 60 bar) and G3/4" DIN 3852 with flush sensor (0.6 bar ≤ P<sub>N</sub> ≤ 25 bar), (min. permissible temperature -30°C)  
<sup>9</sup> oxygen application with FKM-seal up to 25 bar possible, flush version on request

