



# DS 200 P

## Electronic Pressure Switch with Flush Process Connection

- ▶ piezoresistive pressure sensor
- ▶ up to 4 independent contacts, configurable
- ▶ optional:
  - analogue output
  - Ex-protection (for 2-wire)
  - cooling element up to 300 °C
- ▶ nominal pressure ranges from 0 ... 100 mbar up to 0 ... 40 bar

### Description

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

- ▶ intelligent pressure switch
- ▶ digital display

and is suitable for the usage with viscous and pasty media which are compatible with stainless steel 1.4435 (316L) and the sealing material. The DS 200 P has a flush diaphragm and can be delivered with inch thread, as well as with different process connections like clamp or dairy pipe. For use with higher media temperature the DS 200 P can optionally be supplied with a cooling element.

### 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

- ▶ foodstuff industry
- ▶ pharmacy
- ▶ chemical industry

- ▶ 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 200 P**  
Electronic Pressure Switch



# DS 200 P

## Electronic Pressure Switch

## Technical Data

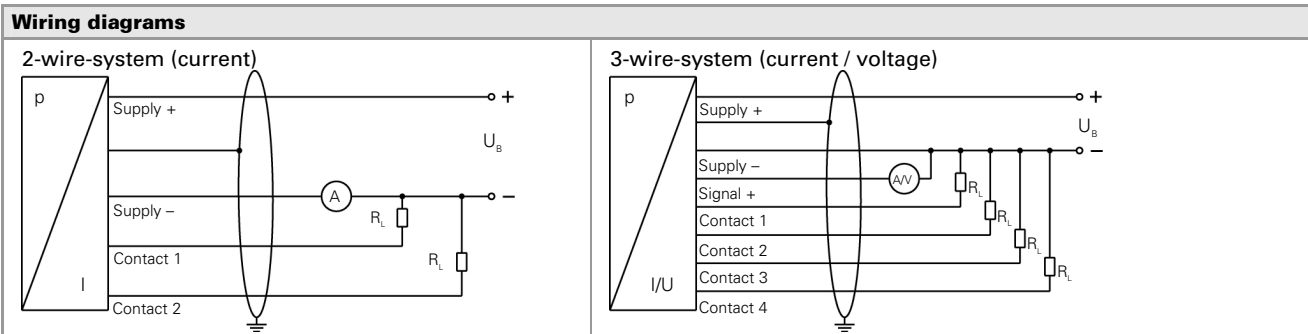
<b>Input pressure range</b>																	
Nominal pressure gauge [bar]	-1 ... 0	0.1	0.16	0.25	0.4	0.6	1	1.6	2.5	4	6	10	16	25	40		
Nominal pressure abs. [bar]	-	-	-	-	-	0.6	1	1.6	2.5	4	6	10	16	25	40		
Level [bar]	3	1	1	1	1	3	3	6	6	20	20	60	60	60	100		
<b>Contact <sup>1</sup></b>																	
Standard	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; $V_{\text{Switch}} = V_s - 2V$ 0 ... 10 V / 3-wire: contact rating 500 mA, short-circuit resistant																
Accuracy of contacts									IEC 60770				BFSL				
	standard: nominal pressure > 0.4 bar:								$\leq \pm 0.35\%$ FSO				$\leq \pm 0.175\%$ FSO				
	option: nominal pressure > 0.4 bar:								$\leq \pm 0.25\%$ FSO				$\leq \pm 0.125\%$ FSO				
Repeatability	$\leq \pm 0.1\%$ FSO																
Switching frequency	max. 10 Hz																
Switching cycles	$> 100 \times 10^5$																
Delay time	0 ... 100 s																
<sup>1</sup> 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																	
<b>Analogue output (optionally) / Supply</b>																	
2-wire current signal	4 ... 20 mA / $V_s = 18 \dots 41 V_{\text{DC}}$ permissible load: $R_{\text{max}} = [(V_s - V_{s\text{min}}) / 0.02] \Omega$										response time: < 10 ms						
2-wire current signal with Ex-protection	4 ... 20 mA / $V_s = 17 \dots 28 V_{\text{DC}}$ permissible load: $R_{\text{max}} = [(V_s - V_{s\text{min}}) / 0.02] \Omega$										response time: < 10 ms						
3-wire current signal	4 ... 20 mA / $V_s = 19 \dots 30 V_{\text{DC}}$ adjustable (turn-down of span 1:5) <sup>2</sup> permissible load: $R_{\text{max}} = 500 \Omega$										response time: < 1 s						
3-wire voltage signal	0 ... 10 V / $V_s = 15 \dots 36 V_{\text{DC}}$										permissible load: $R_{\text{min}} = 10 \text{ k}\Omega$				response time: < 10 ms		
Without analogue output	$V_s = 15 \dots 36 V_{\text{DC}}$																
Accuracy									IEC 60770 <sup>3</sup>				BFSL				
	standard: nominal pressure > 0.4 bar:								$\leq \pm 0.35\%$ FSO				$\leq \pm 0.175\%$ FSO				
	option: nominal pressure > 0.4 bar:								$\leq \pm 0.25\%$ FSO				$\leq \pm 0.125\%$ FSO				
<sup>2</sup> with turn-down of span the analogue signal is adjusted automatically to the new measuring range																	
<sup>3</sup> accuracy according to IEC 60770 – limit point adjustment (non-linearity, hysteresis, repeatability)																	
<b>Thermal errors (offset and span) <sup>4</sup> / Permissible temperatures</b>																	
Nominal pressure $P_N$ [bar]	-1 ... 0	$\leq 0.1$			$\leq 0.25$			$\leq 0.4$			$\leq 1$			$> 1$			
Tolerance band [% FSO]	$\leq \pm 0.75$		$\leq \pm 2$			$\leq \pm 1.5$			$\leq \pm 1$			$\leq \pm 1$			$\leq \pm 0.75$		
TC, average [% FSO / 10 K]	$\pm 0.12$		$\pm 0.4$			$\pm 0.3$			$\pm 0.2$			$\pm 0.15$			$\pm 0.12$		
in compensated range [°C]	0 ... 70				0 ... 50						0 ... 70						
Permissible temperatures	medium: -25 ... 125 °C <sup>5</sup>						electronics / environment: -25 ... 85 °C						storage: -40 ... 85 °C				
<sup>4</sup> an optional cooling element can influence thermal effects for offset and span depending on installation position and filling conditions																	
<sup>5</sup> for vacuum ranges and nominal pressure abs. the max. medium temperature is 70 °C; with optional cooling element its maximum permissible temperature is valid																	
<b>Electrical protection</b>																	
Short-circuit protection	permanent																
Reverse polarity protection	no damage, but also no function																
Electromagnetic compatibility	emission and immunity according to EN 61326																
<b>Mechanical stability</b>																	
Vibration	5 g RMS (20 ... 2000 Hz)																
Shock	100 g / 11 msec																
<b>Filling fluids</b>																	
Standard	silicon oil																
Optional	food compatible oil (with FDA approval) / Halocarbon and others on request																
<b>Materials</b>																	
Pressure port	stainless steel 1.4435 (316L)																
Housing	stainless steel 1.4301 (304)																
Display housing	PA 6.6, Polycarbonate																
Seals (media wetted)	inch thread: standard: FKM (recommended for medium temperatures $\leq 200$ °C) optionally: FFKM (recommended for medium temperatures $> 200$ °C) others on request clamp and dairy pipe: without																
Diaphragm	stainless steel 1.4435 (316L)																
Media wetted parts	pressure port, seals, diaphragm																

# DS 200 P

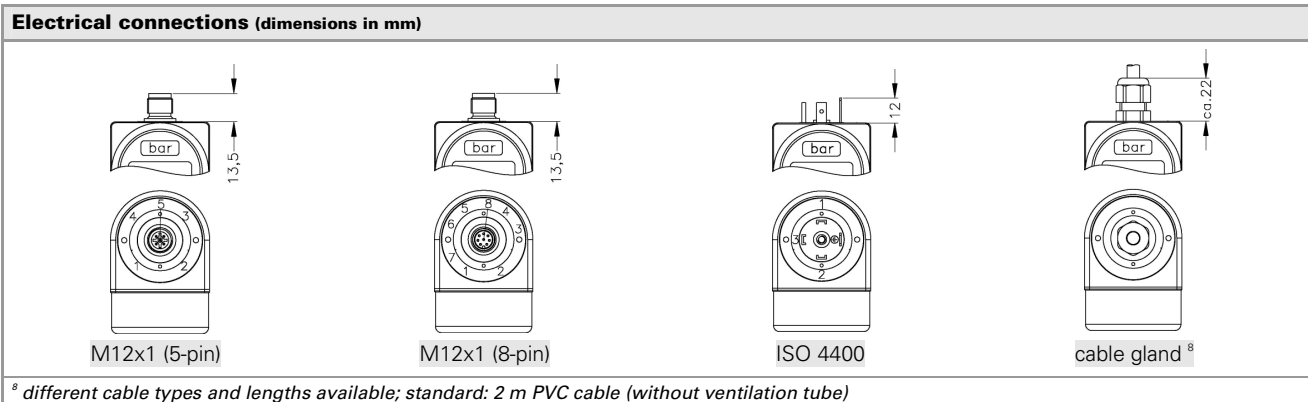
## Electronic Pressure Switch

## Technical Data

<b>Explosion protection (for 2-wire current signal with Ex-protection)</b>	
Approval AX11-DS 200 P	zone (0) 1: II (1) 2 G Ex ia IIC T4
Safety technical maximum values	$U_i = 28 \text{ V}$ , $I_i = 93 \text{ mA}$ , $P_i = 660 \text{ mW}$
Max. switching current <sup>6</sup>	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
<sup>6</sup> the real switching current in the application depends on the power supply unit	
<b>Miscellaneous</b>	
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 <sup>7</sup>
Weight	approx. 160 ... 250 g
Operational life	> 100 x 10 <sup>6</sup> cycles
<sup>7</sup> 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 ≤ 1 bar. Therefore installation position has to be given in this case.	



<b>Pin configuration</b>					
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)



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

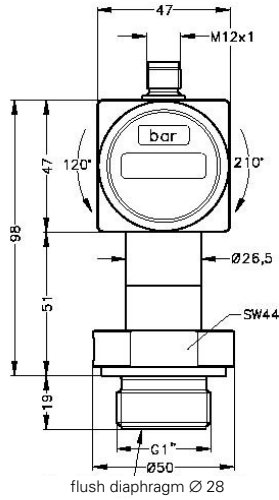
# DS 200 P

## Electronic Pressure Switch

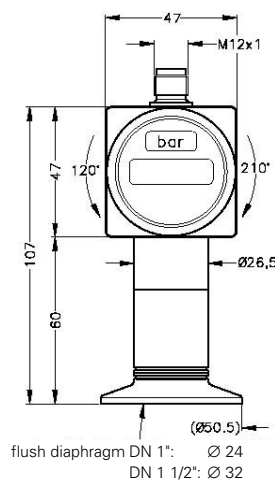
## Technical Data

### Mechanical connections (dimensions in mm)

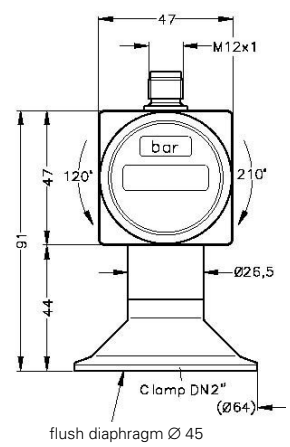
#### Inch thread (DIN 3852)



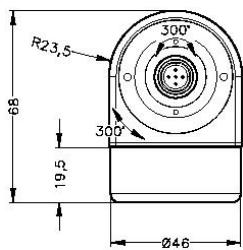
#### Clamp (ISO 2852)



DN 1" or DN 1 1/2"

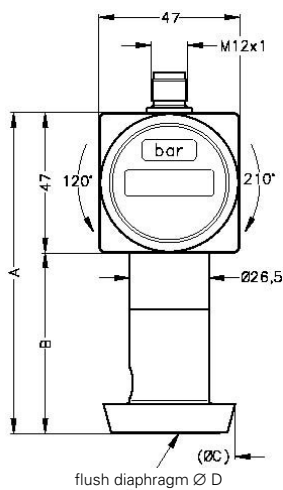


DN2"



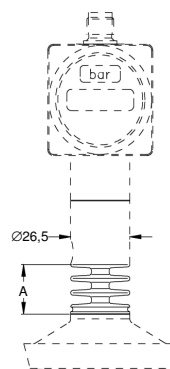
G1" flush

#### Dairy pipe (DIN 11851)



flush diaphragm Ø D

#### Cooling element



temperature range	150° C	300° C
size A	22	34
number of cooling fins	2	3

dimensions in mm			
size	DN 25	DN 40	DN 50
A	107	89	89
B	71	53	53
C	44	56	68,5
D	24	32	45

⇒ Ex-protection: total length increases by 20 mm!

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

**Ordering code DS 200P**

**DS 200P**

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<b>Pressure</b>									
gauge		7	8	5					
absolute	1, 2	7	8	6					
<b>Input [bar]</b>									
0,10		1	0	0	0				
0,16		1	6	0	0				
0,25		2	5	0	0				
0,40		4	0	0	0				
0,60		6	0	0	0				
1,0		1	0	0	1				
1,6		1	6	0	1				
2,5		2	5	0	1				
4,0		4	0	0	1				
6,0		6	0	0	1				
10		1	0	0	2				
16		1	6	0	2				
25		2	5	0	2				
40		4	0	0	2				
-1 ... 0	2	X	1	0	2				
customer		9	9	9	9				on request
<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	3				E				
customer					9				on request
<b>Contact</b>									
1 contact	3, 4				1				
2 contacts	3, 4				2				
4 contacts	5				4				
<b>Accuracy</b>									
standard for P <sub>N</sub> > 0,4 bar		0,35	%			3			
standard for P <sub>N</sub> ≤ 0,4 bar		0,5	%			5			
option for P <sub>N</sub> > 0,4 bar		0,25	%			2			
customer						9			on request
<b>Electrical connection</b>									
M12x1 (5-pin) / plastic version						N	0	0	
M12x1 (8-pin) / plastic version	5					M	5	0	
M12x1 (5-pin) / metal version						N	1	0	
Male and female plug ISO 4400	4					1	0	0	
Cable gland incl. cable	6					4	0	0	
customer						9	9	9	on request
<b>Mechanical connection</b>									
G1" with flush welded diaphragm (DIN 3852)						Z	3	1	
Clamp 1" (ISO 2852)						C	6	1	
Clamp 1 1/2" (ISO 2852)						C	6	2	
Clamp 2" (ISO 2852)						C	6	3	
Dairy pipe DN 25 (DIN 11851)	7					M	7	3	
Dairy pipe DN 40 (DIN 11851)	7					M	7	5	
Dairy pipe DN 50 (DIN 11851)	7					M	7	6	
customer						9	9	9	on request
<b>Diaphragm</b>									
Stainless steel 1.4435 (316L)								1	
customer								9	on request
<b>Seals</b>									
for clamp or dairy pipe:	keine							0	
for inch thread:	FKM							1	
	FFKM							7	on request
customer								9	on request
<b>Filling Fluids</b>									
Silicon oil								1	
food compatible oil	8							2	
Halocarbon								C	on request
customer								9	on request
<b>Special version</b>									
standard								0	0
with cooling element up to 150°C								1	5
with cooling element up to 300°C								2	0
customer								9	9

1 nominal pressure absolute not possible for P<sub>N</sub> < 0.6 bar  
 2 for vacuum and nominal pressure abs. the max. medium temperature is 70 °C  
 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 different cable types and lengths deliverable, standard: 2 m PVC cable without ventilation tube, optionally cable with ventilation tube  
 7 The cup nut for dairy pipe has to be mounted by production of pressure transmitter. The cup nut for dairy pipe has to be ordered as separate position.  
 8 Name of oil: Mobil DTE FM 32; Category Code: H1; NSF Registration No.: 130662

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