



# 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)



Input pressure range												
Nominal pressure gauge <sup>1</sup>	[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 <sup>1</sup>	[mH <sub>2</sub> O]	-	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 <sup>1</sup> / abs.	[bar]	10	16	25	40	60	100	160	250	400	600
Level gauge <sup>1</sup>	[mH <sub>2</sub> O]	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  $\geq P_N \geq 1$  bar: unlimited vacuum resistance;  $P_N < 1$  bar: on request

<sup>1</sup> from 60 bar: measurement starts with ambient pressure

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; $V_{switch} = V_S - 2V$ 0 ... 10 V / 3-wire: contact rating 125 mA, short-circuit resistant
Accuracy of contacts <sup>3</sup>	standard: $P_N < 0.4$ bar: $\leq \pm 0.5$ % FSO $P_N \geq 0.4$ bar: $\leq \pm 0.35$ % FSO option: $P_N \geq 0.4$ bar: $\leq \pm 0.25$ % FSO
Repeatability	$\leq \pm 0.1$ % FSO
Switching frequency	max. 10 Hz
Switching cycles	$> 100 \times 10^6$
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 / $V_S = 13 \dots 36 V_{DC}$ permissible load: $R_{max} = [(V_S - V_{Smin}) / 0.02 A] \Omega$ response time: < 10 msec
2-wire current signal with IS-protection	4 ... 20 mA / $V_S = 15 \dots 28 V_{DC}$ permissible load: $R_{max} = [(V_S - V_{Smin}) / 0.02 A] \Omega$ response time: < 10 msec
3-wire current signal	4 ... 20 mA / $V_S = 19 \dots 30 V_{DC}$ adjustable (turn-down of span 1:5) <sup>4</sup> permissible load: $R_{max} = 500 \Omega$ response time: < 3 sec
3-wire voltage signal without analogue output	0 ... 10 V / $V_S = 15 \dots 36 V_{DC}$ permissible load: $R_{min} = 10 k\Omega$ response time: < 3 msec
Accuracy <sup>3</sup>	standard: $P_N < 0.4$ bar: $\leq \pm 0.5$ % FSO; $P_N \geq 0.4$ bar: $\leq \pm 0.35$ % FSO option: $P_N \geq 0.4$ bar: $\leq \pm 0.25$ % 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)				
Nominal pressure $P_N$	[bar]	-1 ... 0	< 0.40	$\geq 0.40$
Tolerance band	[% FSO]	$\leq \pm 0.75$	$\leq \pm 1$	$\leq \pm 0.75$
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

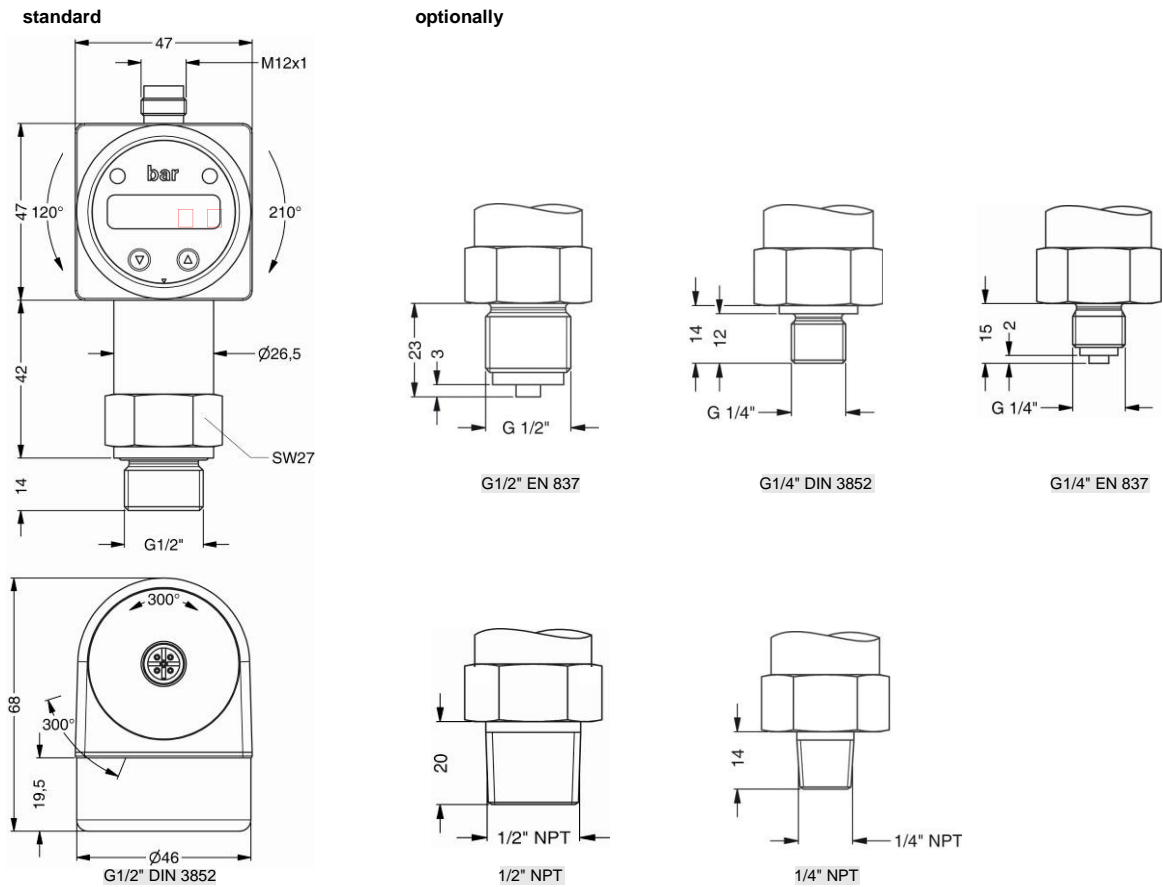
Mechanical stability	
Vibration	10 g RMS (25 ... 2000 Hz) according to DIN EN 60068-2-6
Shock	500 g / 1 msec according to DIN EN 60068-2-27

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 <sup>5</sup> others on request
Diaphragm	stainless steel 1.4435 (316 L)
Media wetted parts	pressure port, seals, diaphragm

<sup>5</sup> welded version only for pressure ports according to EN 837; possible for nominal pressure ranges  $P_N \leq 40$  bar

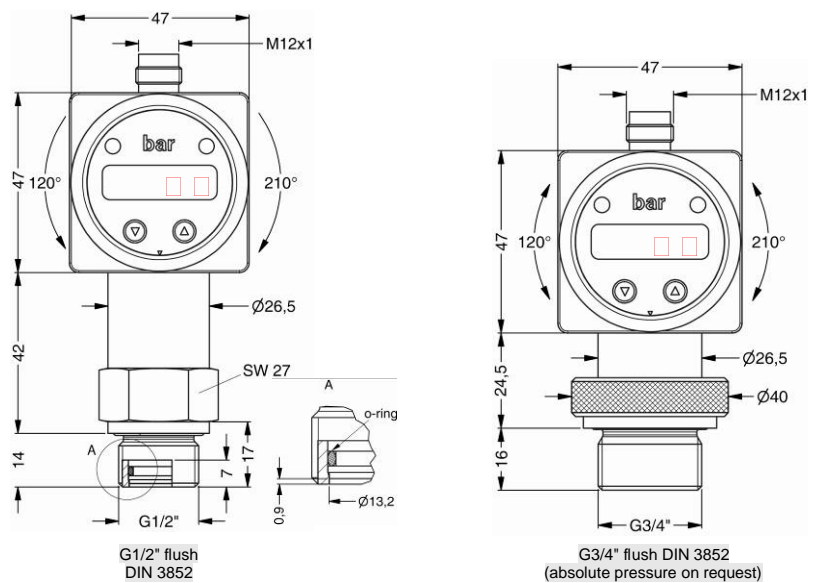
Explosion protection (only for 4 ... 20 mA / 2-wire)						
Approval AX14-DS 200	IBExU 06 ATEX 1050 X zone 1: II 2G Ex ia IIC T4 Gb (connector) / II 2G Ex ia IIB T4 Gb (cable)					
Safety technical maximum values	$U_i = 28 \text{ V}$ , $I_i = 93 \text{ mA}$ , $P_i = 660 \text{ mW}$ , $C \approx 0 \text{ nF}$ , $L_i \approx 0 \text{ }\mu\text{H}$					
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)					
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	min. 160 g (depending on mechanical connection)					
Operational life	$> 100 \times 10^6$ cycles					
CE-conformity	EMC Directive: 2004/108/EC		Pressure Equipment Directive: 97/23/EC (module A) <sup>8</sup>			
<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 $P_N \leq 1 \text{ bar}$ .						
<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 (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)						
					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; standard: 2 m PVC cable (without ventilation tube, permissible temperature: -5 ... 70 °C)	

**Mechanical connections (dimensions in mm)**



⇨ 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**



⇨ metric threads and other versions on request

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## Ordering code DS 200

DS 200

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<b>Pressure</b>										
	gauge in bar	<sup>1</sup>	7	8	0					
	gauge in mH <sub>2</sub> O	<sup>1</sup>	7	8	H					
	absolute in bar	<sup>2</sup>	7	8	1					
<b>Input</b>										
	[mH <sub>2</sub> O]	[bar]								
	1	0.10	<sup>2</sup>							
	1.6	0.16	<sup>2</sup>							
	2.5	0.25	<sup>2</sup>							
	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
<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	<sup>3</sup>			E					
	customer				9					consult
<b>Contact</b>										
	1 contact	<sup>3,4</sup>			1					
	2 contacts	<sup>3,4</sup>			2					
	4 contacts	<sup>5</sup>			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					consult
<b>Electrical connection</b>										
	Male plug M12x1 (5-pin) / plastic version				N	0	1			
	Male plug M12x1 (8-pin) / plastic version	<sup>5</sup>			M	5	0			
	Male plug M12x1 (5-pin) / metal version				N	1	1			
	Male and female plug ISO 4400	<sup>4</sup>			1	0	0			
	Male plug Binder series 723 (5-pin)				2	0	4			
	Cable outlet incl. cable	<sup>6</sup>			T	A	0			
	customer				9	9	9			consult
<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	<sup>7</sup>			F	0	0			
	G3/4" DIN 3852 with flush sensor	<sup>7</sup>			K	0	0			
	1/2" NPT				N	0	0			
	1/4" NPT				N	4	0			
	customer				9	9	9			consult
<b>Seals</b>										
	FKM				1					
	without (welded version)	<sup>8</sup>			2					
	customer				9					consult
<b>Special version</b>										
	standard				0	0	0			
	customer				9	9	9			consult
<b>Prices EXW Thierstein, excluding package</b>										

<sup>1</sup> from 60 bar: measurement starts with ambient pressure

<sup>2</sup> absolute pressure possible from 0.4 bar

<sup>3</sup> with Ex version max. 1 contact is possible

<sup>4</sup> with connector ISO 4400 and output 2-wire version only max. 1 contact possible; with 3-wire version no contact possible

<sup>5</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>6</sup> standard: 2 m PVC cable without ventilation tube, others on request

<sup>7</sup> not possible for nominal pressure P<sub>N</sub> > 40 bar; also not possible for vacuum ranges; for G3/4" flush nominal pressure abs. on request

<sup>8</sup> welded version only with pressure ports according to EN 837; possible for nominal pressure ranges P<sub>N</sub> ≤ 40 bar