



# 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		P <sub>N</sub> ≥ 1 bar: unlimited vacuum resistance; P <sub>N</sub> < 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 <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>	standard: P <sub>N</sub> < 0.4 bar: ≤ ± 0.5 % FSO P <sub>N</sub> ≥ 0.4 bar: ≤ ± 0.35 % FSO option: P <sub>N</sub> ≥ 0.4 bar: ≤ ± 0.25 % FSO
Repeatability	≤ ± 0.1 % 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>Smin</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>Smin</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: < 3 sec
3-wire voltage signal without analogue output	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
Accuracy <sup>3</sup>	standard: P <sub>N</sub> < 0.4 bar: ≤ ± 0.5 % FSO; P <sub>N</sub> ≥ 0.4 bar: ≤ ± 0.35 % FSO option: P <sub>N</sub> ≥ 0.4 bar: ≤ ± 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 <sub>N</sub>	[bar]	-1 ... 0	< 0.40	≥ 0.40
Tolerance band	[% FSO]	≤ ± 0.75	≤ ± 1	≤ ± 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<sub>N</sub> ≤ 40 bar

<b>Explosion protection (only for 4 ... 20 mA / 2-wire)</b>	
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

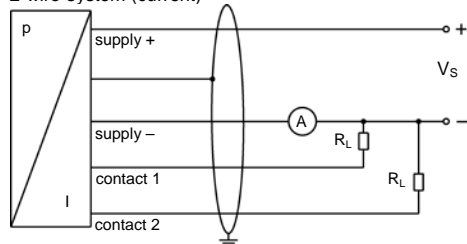
<b>Miscellaneous</b>	
Display	4-digit, red 7-segment-LED display, digit height 7 mm, range of indication -1999 ... +9999; accuracy 0.1 % $\pm$ 1 digit; digital damping 0.3 ... 30 sec (programmable); measured value update 0.0 ... 10 sec (programmable)
Current consumption (without contacts)	2-wire signal 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 x 10 <sup>6</sup> 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> 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  $P_N \leq 1 \text{ bar}$ .

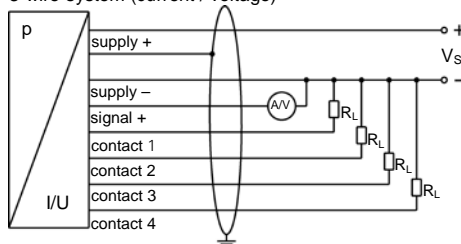
<sup>8</sup> This directive is only valid for devices with maximum permissible overpressure > 200 bar

### Wiring diagrams

2-wire-system (current)



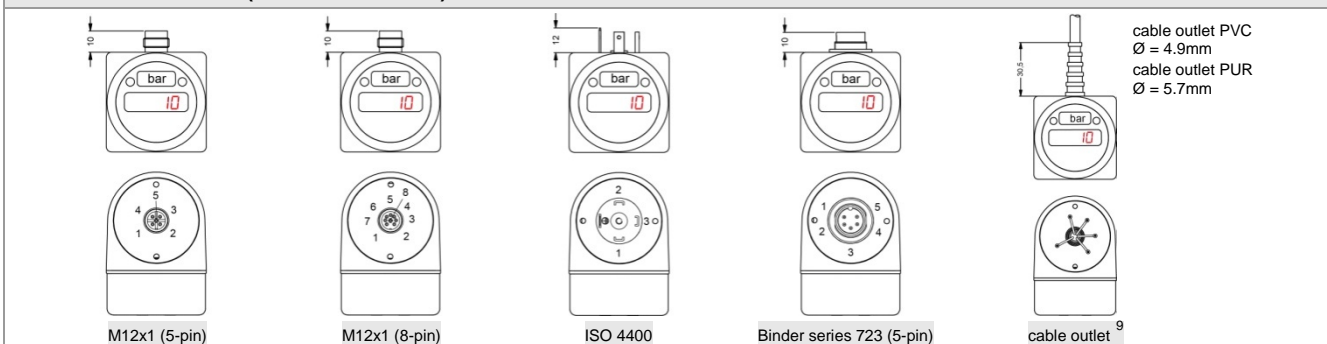
3-wire-system (current / voltage)



### Pin configuration

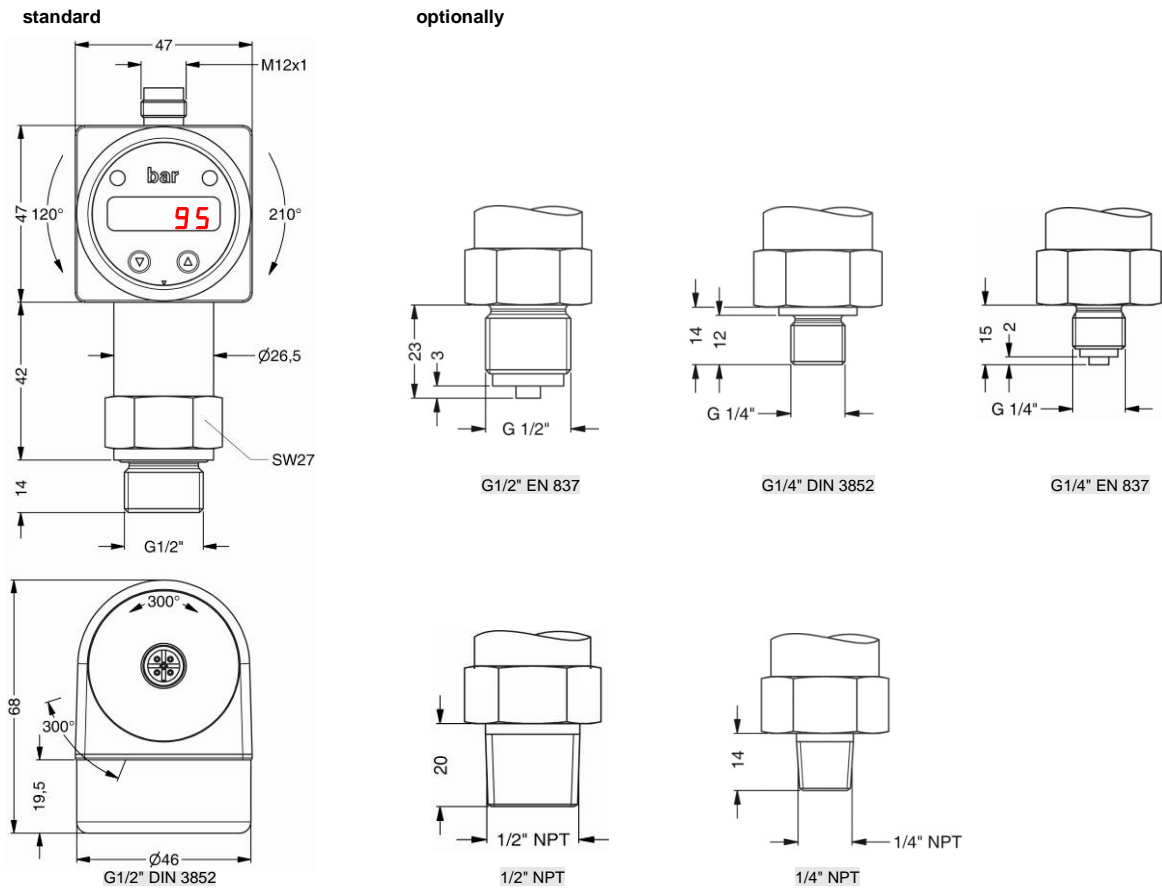
Electrical connection	M12x1 plastic (5-pin)	M12x1 metal (5-pin)	M12x1 plastic (8-pin)	ISO 4400	Binder series 723 (5-pin)	cable colours (IEC 60757)
Supply +	1	1	1	1	1	wh (white)
Supply -	3	3	3	2	3	bn (brown)
Signal + (only 3-wire)	2	2	2	3	2	gn (green)
Contact 1	4	4	4	3	4	gy (grey)
Contact 2	5	5	5	-	5	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)



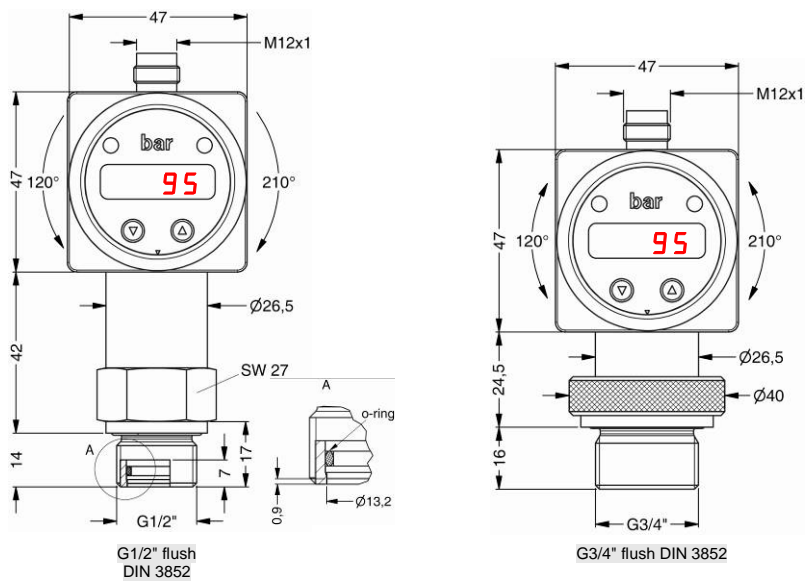
<sup>9</sup> different cable types and lengths available; standard: 2 m PVC cable (without ventilation tube, permissible temperature: -5 ... 70 °C)

**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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Pressure		gauge in bar <sup>1</sup>		7	8	0													
		gauge in mH <sub>2</sub> O		7	8	H													
		absolute in bar <sup>2</sup>		7	8	1													
Input	[mH <sub>2</sub> O]	[bar]																	
		1	0.10 <sup>2</sup>	1	0	0	0												
	1.6	0.16 <sup>2</sup>	1	6	0	0													
	2.5	0.25 <sup>2</sup>	2	5	0	0													
	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													
Analogue output		without		0															
		4 ... 20 mA / 2-wire		1															
		0 ... 10 V / 3-wire		3															
		4 ... 20 mA / 3-wire, adjustable		7J															
		Intrinsic safety 4 ... 20 mA / 2-wire <sup>3</sup>		E															
		customer		9															
Contact		1 contact <sup>3,4</sup>		1															
		2 contacts <sup>3,4</sup>		2															
		4 contacts <sup>5</sup>		4															
Accuracy		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															
Electrical connection		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															
Mechanical connection		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															
Seals		FKM without (welded version) <sup>8</sup>		1															
		customer		2															
				9															
Special version		standard		0 0 0															
		customer		9 9 9															

<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; 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

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