



# DS 400

## Intelligent Electronic Pressure Switch Stainless Steel

Stainless Steel Sensor

accuracy according to EN IEC 62828-2:  
standard: 0.35 % span  
option: 0.25 % span

### Nominal pressure

from 0 ... 100 mbar up to 0 ... 600 bar

### Contacts

1 or 2 independent PNP contacts,  
freely configurable

### Analogue output

2-wire: 4 ... 20 mA  
3-wire: 4 ... 20 mA  
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 400 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 400 offers a PNP contact and a display module, which is mounted rotatable in the ball housing. Additional optional versions like e.g. an intrinsically safe version, a second contact 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)



<b>Input pressure range</b>														
Nominal pressure gauge	[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		
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 / abs.	[bar]	10	16	25	40	60	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						
<b>Contact <sup>1</sup></b>														
Number, type		standard: 1 PNP contact						option: 2 independent PNP contacts						
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						
Accuracy of contacts <sup>2</sup>		≤ ± 0.25 % span												
Repeatability		≤ ± 0.1 % span												
Switching frequency		2-wire: max. 10 Hz					/ 3-wire: 50 Hz							
Switching cycles		> 100 x 10 <sup>6</sup>												
Delay time		0 ... 100 sec												
<sup>1</sup> with IS-protection max. 1 contact possible														
<b>Analogue output (optionally) / Supply</b>														
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> = 24 V <sub>DC</sub> ± 10 % adjustable (turn-down of span 5:1) <sup>3</sup>						permissible load: R <sub>max</sub> = 500 Ω			response time: < 30 msec			
Accuracy <sup>2</sup>		standard: nominal pressure < 0.4 bar: ≤ ± 0,5 % span nominal pressure ≥ 0.4 bar: ≤ ± 0,35 % span option: nominal pressure ≥ 0.4 bar: ≤ ± 0,25 % span												
<sup>2</sup> accuracy according to EN IEC 62828-2- limit point adjustment (non-linearity, hysteresis, repeatability)														
<sup>3</sup> with turn-down of span the analogue signal is adjusted automatically to the new measuring range														
<b>Thermal effects (Offset and Span)</b>														
Nominal pressure P <sub>N</sub>	[bar]	-1 ... 0				< 0.40				≥ 0.40				
Tolerance band	[% span]	≤ ± 0.75				≤ ± 1				≤ ± 0.75				
in compensated range	[°C]	-20 ... 85				0 ... 70				-20 ... 85				
<b>Permissible temperatures</b>														
Permissible temperatures		medium: -40 ... 125 °C				electronics / environment: -40 ... 85 °C				storage: -40 ... 100 °C				
<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		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								
<b>Materials</b>														
Pressure port		stainless steel 1.4404 (316L)												
Housing		stainless steel 1.4301 (304)												
Housing cap		standard: plastic HDPE						for option IS-protection: stainless steel 1.4301 (304)						
Viewing glass		laminated safety glass												
Seals (media wetted)		standard: FKM						option: NBR; welded version <sup>4</sup> on request			others on request			
Diaphragm		stainless steel 1.4435 (316 L)												
Media wetted parts		pressure port, seals, diaphragm												
<sup>4</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 AX4-DS 400		IBExU06ATEX1049 X zone 0: II 1G Ex ia IIC T4 Ga zone 20: II 1D Ex ia IIC T135°C Da												
Safety techn. maximum values		U <sub>i</sub> = 28 V, I <sub>i</sub> = 93 mA, P <sub>i</sub> = 660 mW, C <sub>i</sub> ≈ 0 pF, L <sub>i</sub> ≈ 0 μH												
Max. switching current <sup>5</sup>		70 mA												
Permissible temperatures for environment		in zone 0: -20 ... 60 °C				with p <sub>atm</sub> 0.8 bar up to 1.1 bar				in zone 1 or higher: -25 ... 70 °C				
<sup>5</sup> the real switching current in the application depends on the power supply unit														
<b>Miscellaneous</b>														
Display		4-digit, 7-segment-LED display, visible range 37.2 x 11 mm; digit height 10 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		2-wire signal output current: max. 25 mA												

# DS 400

Electronic Pressure Switch

Technical Data

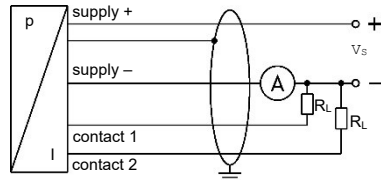
(without contacts)	3-wire signal output current: approx. 30 mA + signal current	
Ingress protection	IP 67	
Installation position	any <sup>6</sup>	
Weight	approx. 400 g	
Operational life	100 million load cycles	
CE-conformity	EMC Directive: 2014/30/EU	Pressure Equipment Directive: 2014/68/EU (module A) <sup>7</sup>
ATEX Directive	2014/34/EU	

<sup>6</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  $P_N \pm 1$  bar.

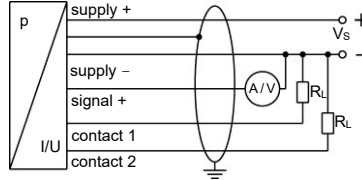
<sup>7</sup> This directive is only valid for devices with maximum permissible overpressure > 200 bar

### Wiring diagrams

2-wire-system (current)



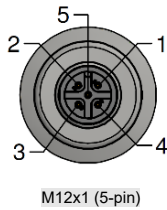
3-wire-system (current / voltage)



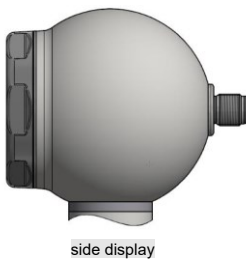
### Pin configuration

Electrical connection	M12x1 metal (5-pin)
Supply +	1
Supply -	3
Signal + (only 3-wire)	2
Contact 1	4
Contact 2	5
Shield	plug housing / pressure port

### Electrical connection (dimensions in mm)



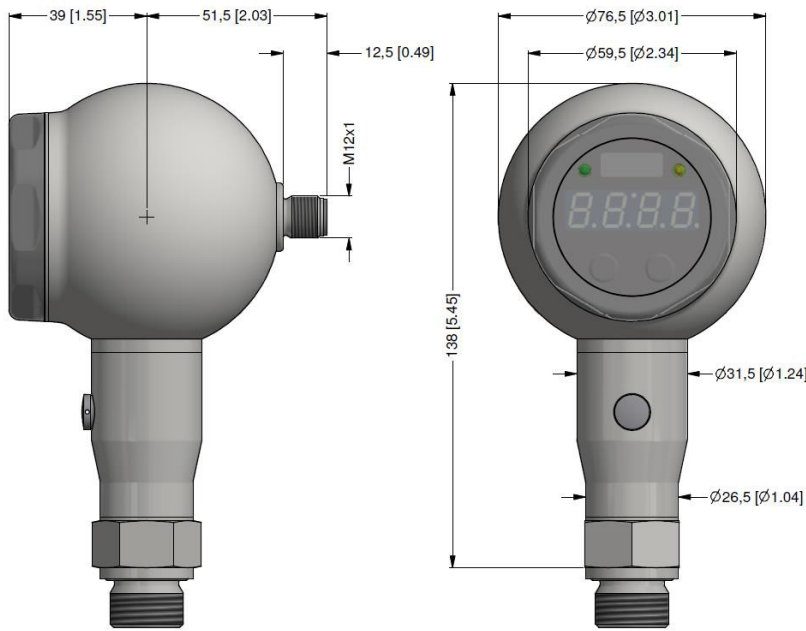
### Designs<sup>8</sup>



<sup>8</sup> all designs in horizontal rotatable housing as standard

**Mechanical connections (dimensions in mm)**

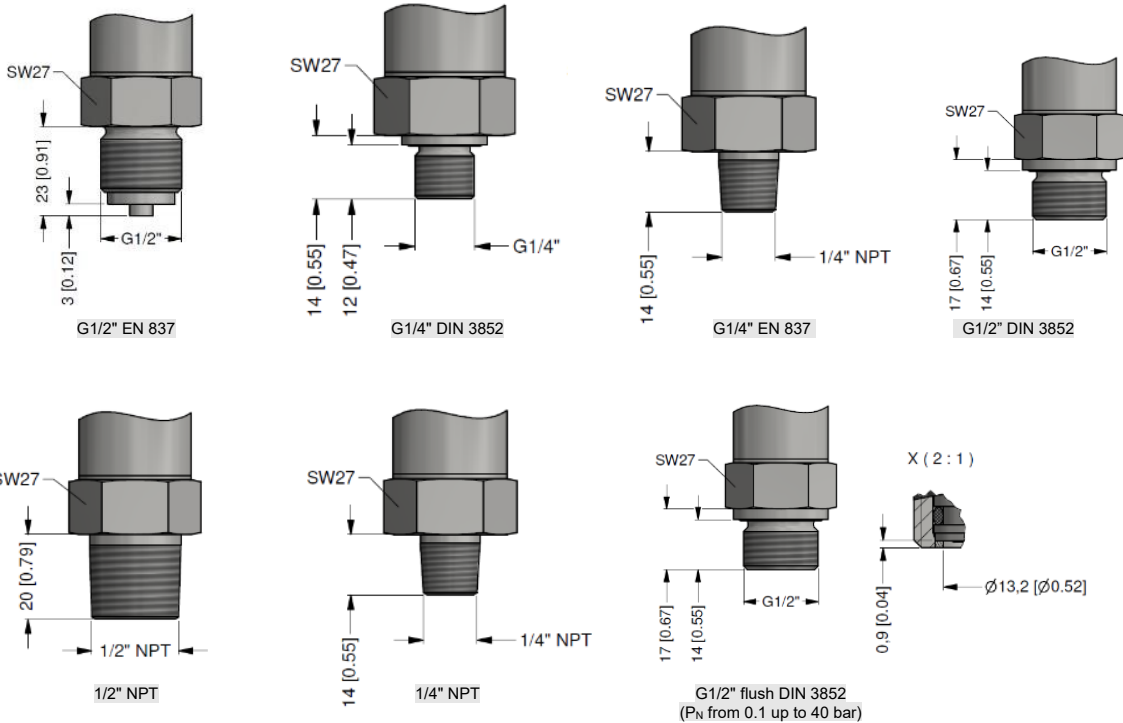
**standard**



G1/2" DIN 3852

⇒ for nominal pressure  $P_N > 400$  bar increases the length of devices without IS-vesion by 19 mm and of devices with IS-version by 39 mm

**optionally**



⇒ metric threads and other versions on request

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

## Ordering code DS 400

15.05.2024

DS 400

Pressure	
Gauge <sup>1</sup>	7 A 0
Absolut <sup>2</sup>	7 A 1
Input [bar]	
0 ... 0,1 <sup>2</sup>	1 0 0 0
0 ... 0,16 <sup>2</sup>	1 6 0 0
0 ... 0,25 <sup>2</sup>	2 5 0 0
0 ... 0,40	4 0 0 0
0 ... 0,60	6 0 0 0
0 ... 1	1 0 0 1
0 ... 1,6	1 6 0 1
0 ... 2,5	2 5 0 1
0 ... 4	4 0 0 1
0 ... 6	6 0 0 1
0 ... 10	1 0 0 2
0 ... 16	1 6 0 2
0 ... 25	2 5 0 2
0 ... 40	4 0 0 2
0 ... 60	6 0 0 2
0 ... 100	1 0 0 3
0 ... 160	1 6 0 3
0 ... 250	2 5 0 3
0 ... 400	4 0 0 3
0 ... 600	6 0 0 3
-1 ... 0	X 1 0 2
Customer	9 9 9 9
Customer underpressure	X X X X
Design	
Stainless steel globe housing (side display)	K H
Stainless steel globe housing (45° display)	K 4
Output	
4 ... 20 mA / 2-wire	1
4 ... 20 mA / 3-wire (adjustable)	7
Intrinsic safety Ex ia 4 ... 20 mA / 2-wire (max. 1 switch. contact) <sup>3</sup>	E
Customer	9
Contact	
1 switching contact (version 3-wire only with 5-pin connector)	1
2 switching contacts (only with 5-pin connector) <sup>3</sup>	2
Accuracy	
0,5 % (P <sub>N</sub> ≤ 0,4 bar)	5
0,35 % (P <sub>N</sub> > 0,4 bar)	3
0,25 % (P <sub>N</sub> > 0,4 bar)	2
Customer	9
Electrical connection	
Connector M12 x 1, 5-pin (IP 67) - metal	N 1 1
Customer	9 9 9
Mechanical connection	
G 1/2" DIN 3852	1 0 0
G 1/2" EN 837	2 0 0
G 1/4" DIN 3852	3 0 0
G 1/4" EN 837	4 0 0
G 1/2 " DIN 3852 with flush sensor <sup>4</sup>	F 0 0
1/2" NPT	N 0 0
1/4" NPT	N 4 0
Customer	9 9 9
Seals	
Viton (FKM) (P <sub>N</sub> ≤ 40 bar)	1
Without seals - welded (only with EN 837) <sup>5</sup> (P <sub>N</sub> ≤ 40 bar)	2
Customer	9
Special version	



Standard	0	0	0
Customer	9	9	9

0,-...without additional charge

On request...in accordance with the producer

Surcharges for calibration are not subject to any discounts. Subject to change.

This document contains the specification for ordering the product; detailed technical parameters of the product and its possible variants are given in the data sheet. BD SENSORS reserves the right to change sensor specifications without further notice.

1 from 60 bar: measurement starts with ambient pressure

2 absolute pressure possible from 0.4 bar

3 with IS version max. 1 contact is possible

4 only possible for nominal pressure ranges  $p_N \leq 40$  bar

5 welded version only with pressure ports according to EN 837; possible for nominal pressure ranges  $p_N \leq 40$  bar



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The company BD SENSORS s.r.o. is certified by TÜV SÜD Czech according to the standard ISO 9001.

