



# DS 400

## Intelligent Electronic Pressure Switch Stainless Steel

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 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 and dust
- ▶ welded pressure sensor
- ▶ 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 globe housing. Additional optional versions like e.g. an intrinsically safe version, a second contact and an analogue output complete the profile.

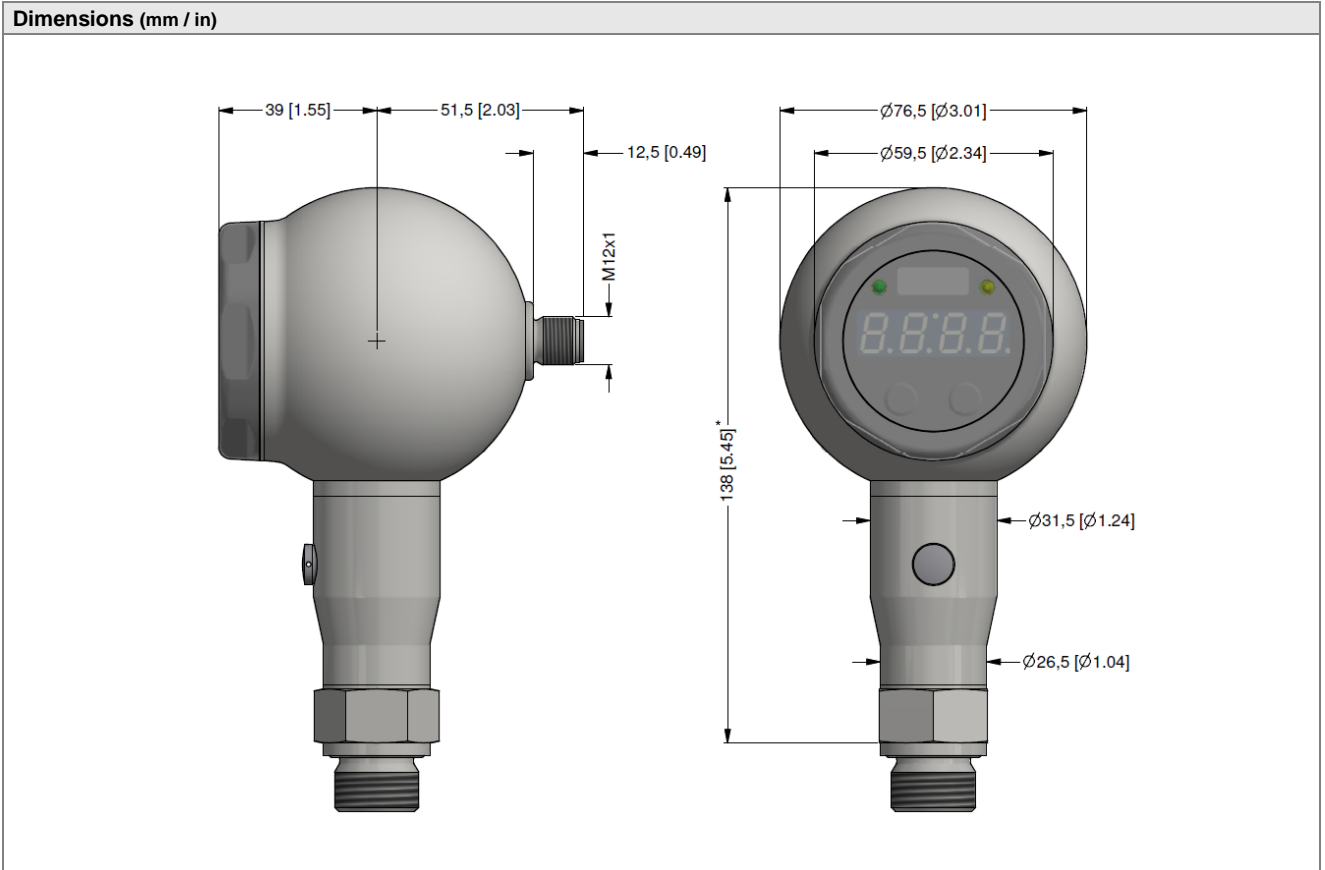
### Preferred areas of use are

-  Plant and machine engineering
-  Heating and air conditioning
-  Environmental engineering  
(water – sewage – recycling)

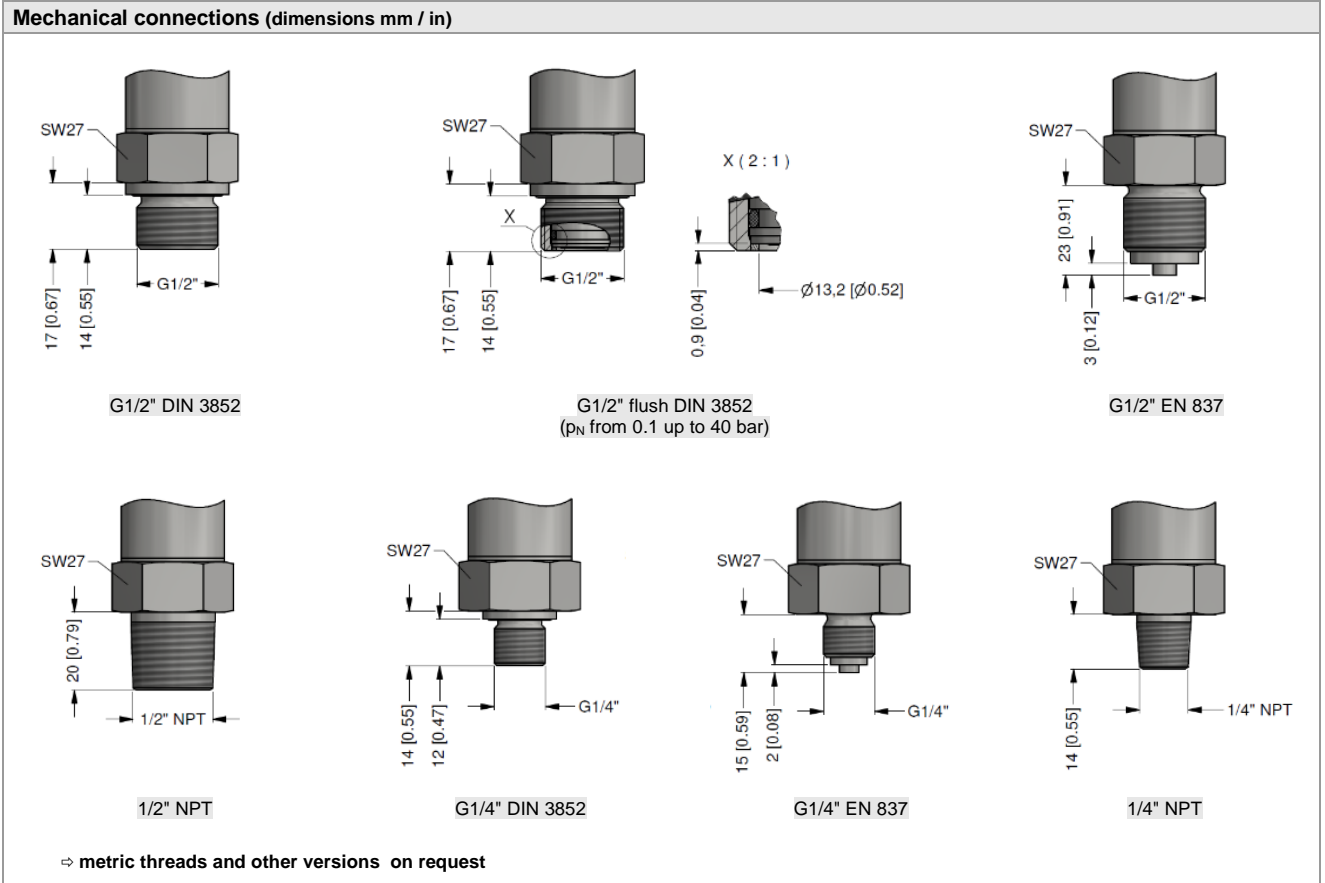


Input pressure range														
Nominal pressure gauge	[bar]	-1 ... 0	0.10	0.16	0.25	0.40	0.60	1	1.6	2.5	4	6		
Nominal pressure absolute	[bar]	-	-	-	-	0.40	0.60	1	1.6	2.5	4	6		
Overpressure	[bar]	5	0.5	1	1	2	5	5	10	10	20	40		
Burst pressure	[bar]	7.5	1.5	1.5	1.5	3	7.5	7.5	15	15	25	50		
Nominal pressure gauge / absolute	[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						
Contact <sup>1</sup>														
Number, type		standard: 1 PNP contact option: 2 independent PNP contacts												
Max. switching current		contact rating 125 mA, short-circuit resistant; V <sub>switch</sub> = V <sub>S</sub> - 2V												
Accuracy of contacts <sup>2</sup>		≤ ± 0.25 % FSO												
Repeatability		≤ ± 0.1 % FSO												
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														
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> = 24 V <sub>DC</sub> ± 10 % adjustable (turn-down of span 1:5) <sup>3</sup> permissible load: R <sub>max</sub> = 500 Ω						response time: < 30 msec						
Without analogue output		V <sub>S</sub> = 15 ... 36 V <sub>DC</sub>												
Accuracy <sup>2</sup>		standard: nominal pressure < 0.4 bar: ≤ ± 0.50 % FSO nominal pressure ≥ 0.4 bar: ≤ ± 0.35 % FSO option: nominal pressure ≥ 0.4 bar: ≤ ± 0.25 % FSO												
<sup>2</sup> accuracy according to IEC 60770 – 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														
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														
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 (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 on request: welded version <sup>4</sup> and others								
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 and NPT; 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 400	IBExU 06 ATEX 1050 X zone 0: II 1G Ex ia IIC T4 Ga zone 20: II 1D Ex ia IIIC T135 °C Da	
Safety techn. maximum values	$U_i = 28 \text{ V}$ , $I_i = 93 \text{ mA}$ , $P_i = 660 \text{ mW}$ , $C_i \approx 0 \text{ pF}$ , $L_i \approx 0 \text{ }\mu\text{H}$	
Max. switching current <sup>5</sup>	70 mA	
Permissible temperatures for environment	in zone 0: -20 ... 60 °C with $p_{\text{atm}}$ 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 % $\pm$ 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. 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 $p_N \leq 1 \text{ bar}$ .		
<sup>7</sup> This directive is only valid for devices with maximum permissible overpressure > 200 bar.		
<b>Wiring diagrams</b>		
<b>2-wire-system (current)</b> 	<b>3-wire-system (current)</b> 	
<b>Pin configuration</b>		
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	
<b>Designs <sup>8</sup></b>		
side display	45° display (on request)	
<sup>8</sup> all designs in horizontal rotatable housing as standard		



\* for nominal pressure  $p_N > 400$  bar increases the length of devices without IS-protection by 19 mm



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## Ordering code DS 400

DS 400



<b>Pressure</b>											
gauge <sup>1</sup>	7	A	0								
absolute <sup>2</sup>	7	A	1								
<b>Input</b>											
[bar]											
0.10 <sup>2</sup>			1	0	0	0					
0.16 <sup>2</sup>			1	6	0	0					
0.25 <sup>2</sup>			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					
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>Design</b>											
side display							K	H			
45° display							K	4		consult	
<b>Analogue output</b>											
without									0		
4 ... 20 mA / 2-wire									1		
4 ... 20 mA / 3-wire, adjustable									7J		
intrinsic safety 4 ... 20 mA / 2-wire <sup>3</sup>									E		
customer									9	consult	
<b>Contact</b>											
1 contact									1		
2 contacts <sup>3</sup>									2		
<b>Accuracy</b>											
standard for $p_N \geq 0.4$ bar			0.35						3		
standard for $p_N < 0.4$ bar			0.50						5		
option for $p_N \geq 0.4$ bar			0.25						2		
customer									9	consult	
<b>Electrical connection</b>											
male plug M12x1 (5-pin) / metal version							N	1	1		
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>4</sup>							F	0	0		
1/2" NPT							N	0	0		
1/4" NPT							N	4	0		
customer							9	9	9	consult	
<b>Seal</b>											
FKM									1		
without (welded version) <sup>5</sup>									2	consult	
customer									9	consult	
<b>Special version</b>											
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 IS version max. 1 contact is possible

<sup>4</sup> only possible for nominal pressure ranges  $p_N \leq 40$  bar

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