



# DS 400

## Intelligent Electronic Pressure Switch Stainless Steel

### Stainless Steel Sensor

accuracy according to IEC 60770:  
standard: 0.35 % FSO  
option: 0.25 % FSO

Electronic Pressure Switch

#### **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: 0 ... 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 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)

DS 400

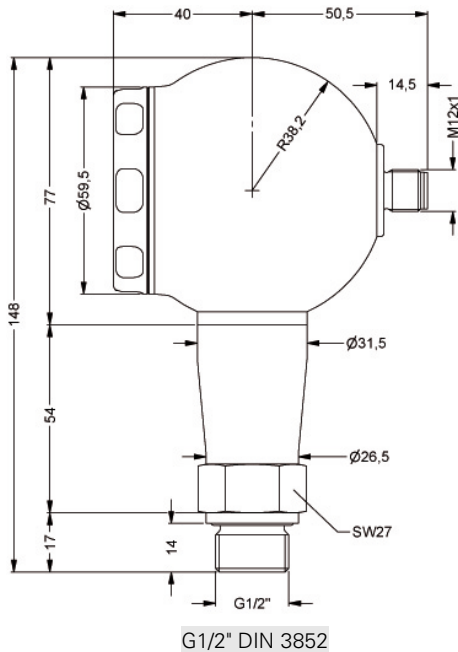


Input pressure range													
Nominal pressure gauge / abs.	[bar]	-1 ... 0	0.10	0.16	0.25	0.40	0.60	1	1.6	2.5	4	6	
Overpressure	[bar]	5	0.5	1	1	2	5	5	10	10	20	40	
Burst pressure	[bar]	7.5	1.5	1.5	1.5	3	7.5	7.5	15	15	25	50	
Nominal pressure gauge / abs.	[bar]	10	16	25	40	60	100	160	250	400	600		
Overpressure	[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		$P_N \geq 1$ bar: unlimited vacuum resistance $P_N < 1$ bar: on request											
Contact <sup>1</sup>													
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; $V_{switch} = V_S - 2V$ 0 ... 10 V / 3-wire: contact rating 500 mA, short-circuit resistant											
Accuracy of contacts <sup>2</sup>		Standard: Nenndruck < 0,4 bar: $\leq \pm 0,5$ % FSO; Nenndruck $\geq 0,4$ bar: $\leq \pm 0,35$ % FSO Option: Nenndruck $\geq 0,4$ bar: $\leq \pm 0,25$ % FSO											
Repeatability		$\leq \pm 0.1$ % FSO											
Switching frequency		2-wire: max. 10 Hz 3-wire: 50 Hz											
Switching cycles		$> 100 \times 10^6$											
Delay time		0 ... 100 sec											
<sup>1</sup> with IS-protection max. 1 contact possible													
<sup>2</sup> accuracy according to IEC 60770 – limit point adjustment (non-linearity, hysteresis, repeatability)													
Analogue output (optionally) / Supply													
2-wire current signal		4 ... 20 mA / $V_S = 13 \dots 36 V_{DC}$ permissible load: $R_{max} = [(V_S - V_{Smin}) / 0.02] \Omega$ response time: < 10 msec											
2-wire current signal with IS-protection		4 ... 20 mA / $V_S = 13 \dots 28 V_{DC}$ permissible load: $R_{max} = [(V_S - V_{Smin}) / 0.02] \Omega$ response time: < 10 msec											
3-wire current signal		4 ... 20 mA / $V_S = 24 V_{DC} \pm 10$ % adjustable (turn-down of span 1:5) <sup>3</sup> permissible load: $R_{max} = 500 \Omega$ response time: < 30 msec											
3-wire voltage signal		0 ... 10 V / $V_S = 24 V_{DC} \pm 10$ % adjustable (turn-down of span 1:5) <sup>3</sup> permissible load: $R_{min} = 10 k\Omega$ response time: < 30 msec											
Without analogue output		$V_S = 15 \dots 36 V_{DC}$											
Accuracy <sup>2</sup>		$\leq \pm 0.25$ % FSO											
<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 $P_N$	[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 (316L)											
Housing		stainless steel 1.4404 (316L)											
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 $P_N \leq 40$ bar													

Explosion protection (only for 4 ... 20 mA / 2-wire)		
Approval AX14-DS 400	IBExU 06 ATEX 1050 X Zone 0: II 1G Ex ia IIC T4 Ga (connector) / II 1G Ex ia IIB T4 Ga (cable)	
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: -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>5</sup> the real switching current in the application depends on the power supply unit		
Miscellaneous		
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 3-wire signal output voltage: approx. 30 mA	
Ingress protection	IP 67	
Installation position	any <sup>6</sup>	
Weight	approx. 400 g	
Operational life	> 100 x 10 <sup>6</sup> cycles	
CE-conformity	EMC Directive: 2004/108/EC	Pressure Equipment Directive: 97/23/EC (module A) <sup>7</sup>
<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		
Wiring diagrams		
<div style="display: flex; justify-content: space-around;"> <div style="text-align: center;"> <p>2-wire-system (current)</p> </div> <div style="text-align: center;"> <p>3-wire-system (current / voltage)</p> </div> </div>		
Pin configuration		
Electrical connection	M12x1 metal (5-pin)	cable colours (DIN 47100)
Supply +	1	wh (white)
Supply -	3	bn (brown)
Signal + (only 3-wire)	2	gn (green)
Contact 1	4	gr (grey)
Contact 2	5	pn (pink)
Shield	plug housing / pressure port	gn/ye (green / yellow)
Electrical connection (dimensions in mm)		
<p>M12x1 (5-pin)</p>		
Designs <sup>8</sup>		
<p>side display                      45° display (on request)</p>		
<sup>8</sup> all designs in horizontal rotatable housing as standard		

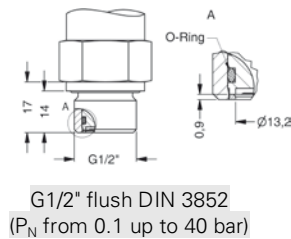
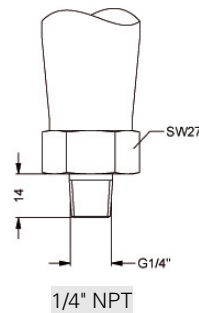
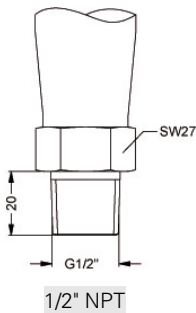
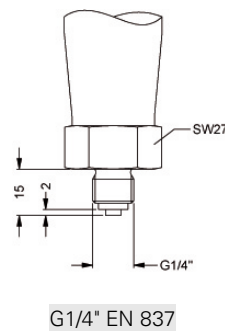
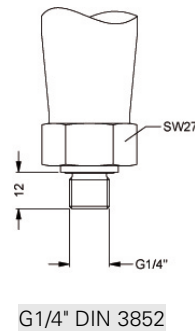
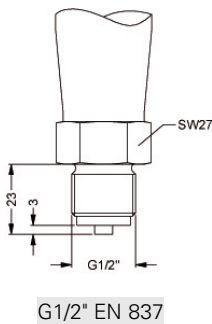
### Mechanical connections (dimensions in mm)

#### standard



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

**DS 400**

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<b>Pressure</b>										
	gauge <sup>1</sup>	7	A	0						
	absolute	7	A	1						
<b>Input</b>										
	[bar]									
	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					
	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>										
	Stainless steel globe housing (side display)					K	H			
	Stainless steel globe housing (45° display)					K	4			consult
<b>Analogue output</b>										
	without								0	
	4 ... 20 mA / 2-wire								1	
	0 ... 10 V / 3-wire, adjustable								3	
	4 ... 20 mA / 3-wire, adjustable								7	
	Intrinsic safety 4 ... 20 mA / 2-wire <sup>2</sup>								E	
	customer								9	consult
<b>Contact</b>										
	1 contact								1	
	2 contacts <sup>2</sup>								2	
<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 1 for P <sub>N</sub> ≥ 0.4 bar	0.25 %							2	
	customer								9	consult
<b>Electrical connection</b>										
	Male plug M12x1 (5-pin) / metal version							N	1	0
	customer							9	9	9
<b>Mechanical connection</b>										
	G1/2" DIN 3852								1	0
	G1/2" EN 837								2	0
	G1/4" DIN 3852								3	0
	G1/4" EN 837								4	0
	G1/2" DIN 3852 with flush sensor <sup>3</sup>								F	0
	1/2" NPT								N	0
	1/4" NPT								N	4
	customer								9	9
<b>Seals</b>										
	FKM								1	
	without (welded version) <sup>4</sup>								2	
	NBR								5	
	customer								9	consult
<b>Special version</b>										
	standard								0	0
	customer								9	9

<sup>1</sup> from 60 bar: measurement starts with ambient pressure  
<sup>2</sup> with Ex version max. 1 contact is possible  
<sup>3</sup> only possible for nominal pressure ranges P<sub>N</sub> ≤ 40 bar  
<sup>4</sup> welded version only with pressure ports according to EN 837; possible for nominal pressure ranges P<sub>N</sub> ≤ 40 bar

