



# **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 rotable 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)



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## Electronic Pressure Switch

III ESSIII PIANIIP												
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 gauge	[bar]	-1 0	- 0.10	-	-	0.40	0.60	1	1.6	2.5	4	6
Overpressure	[bar]	5	0.5	1	1	2	5	5	1.0	10	20	40
Burst pressure	[bar]		1.5	1.5	1.5	3	7.5	7.5	15	15	25	50
buist plessure	[bai]	7.5	1.5	1.5	1.5	<u> </u>	1.5	1.5	13	13	25	30
Nominal pressure		10	16	25	40	60	,	100	160	250	400	600
gauge / absolute	[bar]	10	16	25	40	60	,	100	160	250	400	600
Overpressure	[bar]	40	80	80	105	21	0	210	600	1000	1000	1000
Burst pressure	[bar]	50	120	120	210	42	0	420	1000	1250	1250	1250
Vacuum resistance	$p_N \ge 1$ bar: unlimited vacuum resistance $p_N < 1$ bar: on request											
0111												
Contact <sup>1</sup>												
Number, type		: 1 PNP		ONID I	1 -							
NA	option:		pendent I				1/ 01	,				
Max. switching current				mA, sho	rt-circuit	resistant;	V <sub>switch</sub> =	V <sub>S</sub> – 2V				
Accuracy of contacts <sup>2</sup>	≤ ± 0.25											
Repeatability	≤ ± 0.1 %											
Switching frequency		2-wire:	max. 1	10 Hz								
Switching cycles	3-wire: > 100 x	50 Hz										
	0 100 x											
Delay time  1 with IS-protection max. 1 conta		360										
<b>'</b>												
Analogue output (optional	iy) / Su				.,							
2-wire current signal				: 13 36			10					•
		-		$R_{\text{max}} = [(\$		) / 0.02 A	JΩ			response	time: < 1	0 msec
2-wire current signal with				: 15 28		\	10				C	0
IS-protection		permissi	bie load:	$R_{\text{max}} = [(\$	/ <sub>S</sub> - V <sub>S min</sub>	) / 0.02 A	(] (2		4 - 5 \ 3	response	time: < 1	u msec
3-wire current signal				24 V <sub>DC</sub> ±		justable (	turn-ao	wn or sp	an 1:5)°	rooponoo	timo: -2	0 maga
Without analogue autout		V <sub>S</sub> = 15.		$R_{\text{max}} = 50$	0 22					response	time: < 3	o msec
Without analogue output  Accuracy <sup>2</sup>		-			ro . 0 1 h	0" / 1 (	) FO 0/ F	-00				
Accuracy		standard		ai pressu al pressu								
		option:	nomina	al pressu	re ≥ 0.4 b	ar: ≤±(	).25 % F	SO				
<sup>2</sup> accuracy according to IEC 607	70 – lim	option:		al pressu n-linearity,				SO				
<sup>2</sup> accuracy according to IEC 607 <sup>3</sup> with turn-down of span the ana		it point adju	stment (no	n-linearity,	hysteresis	, repeatab	oility)	SO				
	logue si	it point adju gnal is adju	stment (no	n-linearity,	hysteresis	, repeatab	oility)	SO				
<sup>3</sup> with turn-down of span the ana	logue si	it point adju gnal is adju	stment (no	n-linearity, natically to	hysteresis	, repeatab	oility)				≥ 0.40	
<sup>3</sup> with turn-down of span the ana Thermal effects (offset and Nominal pressure p <sub>N</sub>	logue si l <b>span</b> )	it point adju gnal is adju	stment (no sted autom	n-linearity, natically to	hysteresis	, repeatab	oility) ange				≥ 0.40 ≤ ± 0.75	
$^3$ with turn-down of span the ana Thermal effects (offset and Nominal pressure $p_N$ Tolerance band [%]	logue si d <b>span)</b> [bar]	it point adju gnal is adju	stment (no sted auton -1	n-linearity, natically to 0 75	hysteresis	, repeatab	oility) ange < 0.40			5		
<sup>3</sup> with turn-down of span the and  Thermal effects (offset and Nominal pressure p <sub>N</sub> Tolerance band [% In compensated range	logue si l span) [bar] FSO]	it point adju gnal is adju	stment (no sted auton -1 ≤ ± 0.	n-linearity, natically to 0 75	hysteresis	, repeatab	oility) ange < 0.40 ≤ ± 1			5	± 0.75	
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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					
	zone 20: II 1D Ex ia IIIC T135 °C Da					
Safety techn. maximum values	$U_i = 28 \text{ V}, I_i = 93 \text{ mA}, P_i = 660 \text{ mW}, C_i \approx 0 \text{ pF}, L_i \approx 0  \mu\text{H}$					
Max. switching current 5	70 mA					
Permissible temperatures for	in zone 0: -20 60 °C with p <sub>atm</sub> 0.8 bar up to 1.1 bar					
environment	in zone 1 or higher: -25 70 °C					
<sup>5</sup> the real switching current in the appli	cation 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 % ± 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					
(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					

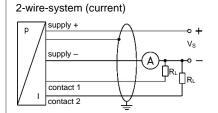
<sup>6</sup> Pressure switches are calibrated in a vertical position with the pressure connection down. If this position is changed on installation there can be slight deviation in the zero point for pressure ranges p<sub>N</sub> ≤ 1 bar.

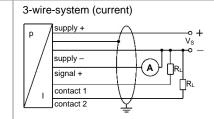
7 This directive is only valid for devices with maximum permissible overpressure > 200 bar.

2014/34/EU

#### Wiring diagrams

CE-conformity ATEX Directive





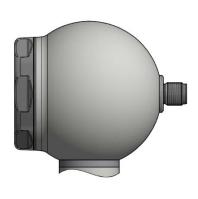
EMC Directive: 2014/30/EU Pressure Equipment Directive: 2014/68/EU (module A) 7

#### 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



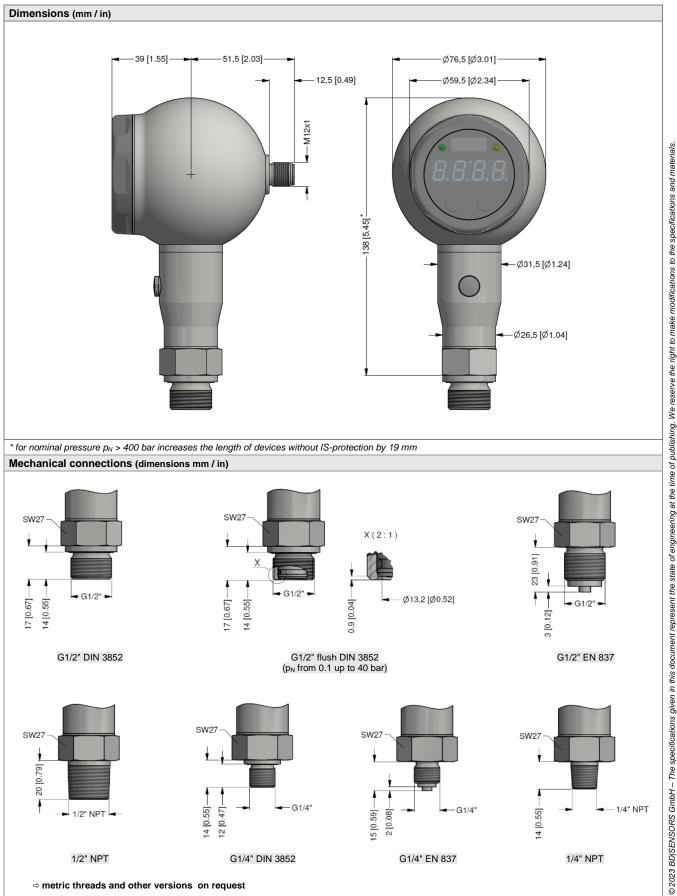
#### Designs 8





side display 45° display (on request)

<sup>&</sup>lt;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

#### Mechanical connections (dimensions mm / in) SW27 X(2:1) 23 [0.91] 17 [0.67] +G1/2" **→** Ø13,2 [Ø0.52] 17 [0.67] — 14 [0.55] 14 [0.55]— -G1/2" 0,9 [0.04] 3 [0.12]-G1/2" flush DIN 3852 (p<sub>N</sub> from 0.1 up to 40 bar) G1/2" DIN 3852 G1/2" EN 837 SW27 SW27 SW27 20 [0.79] 14 [0.55] -G1/4" 1/4" NPT 12 [0.47]--G1/4" 14 [0.55] 15 [0.59] ► 1/2" NPT -2 [0.08] G1/4" DIN 3852 G1/4" EN 837 1/2" NPT 1/4" NPT

DS400\_E\_010223



#### Ordering code DS 400 **DS 400** Pressure A 0 A 1 gauge absolute 2 Input [bar] 0 0 0 0.10 1 0 0 0 0.16 6 5 0 0.25 0 0 0.40 4 0 0 0 0 0 0 0 1 0.60 6 1.0 0 1 0 1 6 5 0 1.6 2 25 0 1 0 1 4.0 6 6.0 0 0 2 10 6 0 2 5 0 2 0 0 2 0 0 2 16 25 2 4 40 60 6 100 0 0 3 6 0 3 5 0 3 0 0 3 160 250 2 400 4 0 0 3 1 0 2 600 6 -1 ... 0 2 9 9 9 customer consult side display 45° display consult Analogue output without 0 4 ... 20 mA / 2-wire 4 ... 20 mA / 3-wire, adjustable 7J intrinsic safety 4 $\dots$ 20 mA / 2-wire $^3$ Ε customer 9 consult Contact 1 contact 2 contacts 3 standard for p<sub>N</sub> ≥ 0.4 bar 0.35 % 3 standard for p<sub>N</sub>< 0.4 bar 0.50 % 5 option for $p_N \ge 0.4$ bar 0.25 % 2 customer 9 consult Electrical connection male plug M12x1 (5-pin) / N 1 1 metal version 9 9 9 customer consult Mechanical connection G1/2" DIN 3852 1 0 0 2 0 0 G1/2" EN 837 G1/4" DIN 3852 3 0 0 G1/4" EN 837 4 0 0 BD|SENSORS GmbH - The specifications given in this document represent the G1/2" DIN 3852 with F 0 0 flush sensor 4 0 0 1/2" NPT Ν 1/4" NPT 4 0 9 9 Ν customer consult FKM without (welded version) 2 consult customer 9 consult Special version 0 0 0 9 9 9 standard customer consult

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and materials

right to make modifications to the

reserve the

of publishing. We

time

of engineering at the

state

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

<sup>&</sup>lt;sup>2</sup> absolute pressure possible from 0.4 bar

<sup>&</sup>lt;sup>3</sup> with IS version max. 1 contact is possible

<sup>&</sup>lt;sup>4</sup> only possible for nominal pressure ranges p<sub>N</sub> ≤ 40 bar

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