



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.

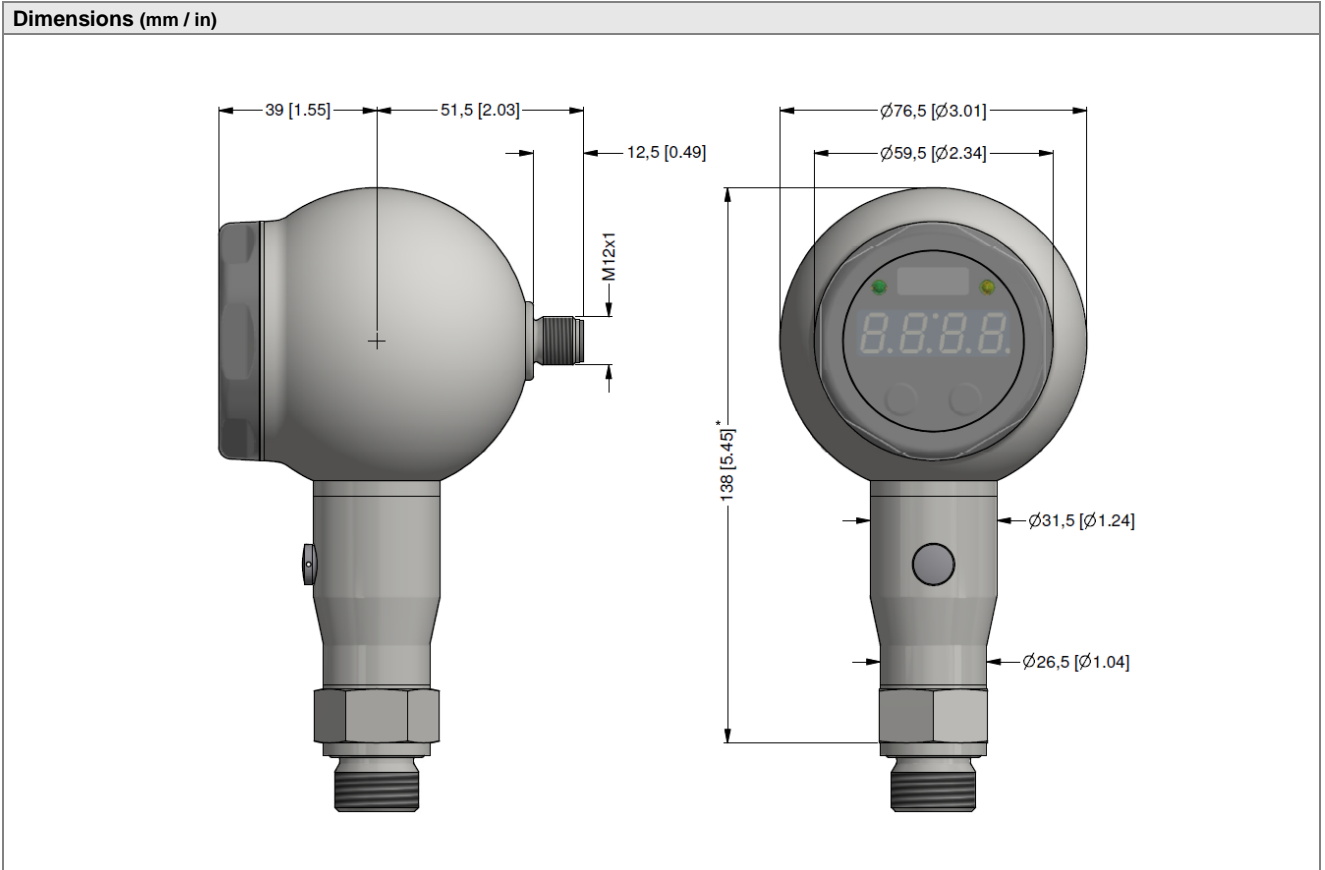
Preferred areas of use are

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

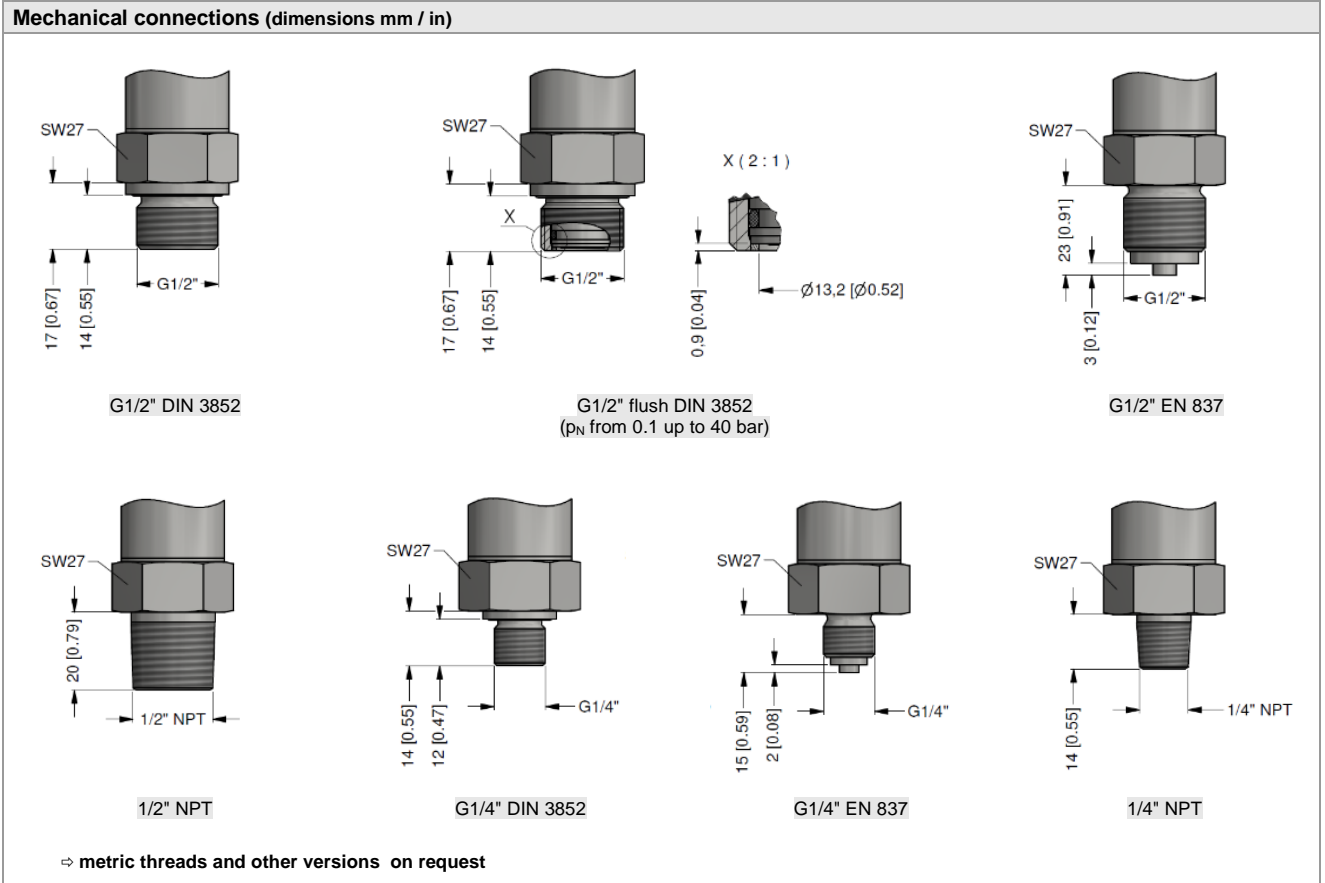


Input pressure range														
Nominal pressure gauge	[bar]	-1 ... 0	0.10	0.16	0.25	0.40	0.60	1	1.6	2.5	4	6		
Nominal pressure absolute	[bar]	-	-	-	-	0.40	0.60	1	1.6	2.5	4	6		
Overpressure	[bar]	5	0.5	1	1	2	5	5	10	10	20	40		
Burst pressure	[bar]	7.5	1.5	1.5	1.5	3	7.5	7.5	15	15	25	50		
Nominal pressure 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 _N ≥ 1 bar: unlimited vacuum resistance						p _N < 1 bar: on request						
Contact ¹														
Number, type		standard: 1 PNP contact option: 2 independent PNP contacts												
Max. switching current		contact rating 125 mA, short-circuit resistant; V _{switch} = V _S - 2V												
Accuracy of contacts ²		≤ ± 0.25 % FSO												
Repeatability		≤ ± 0.1 % FSO												
Switching frequency		2-wire: max. 10 Hz 3-wire: 50 Hz												
Switching cycles		> 100 x 10 ⁶												
Delay time		0 ... 100 sec												
¹ with IS-protection max. 1 contact possible														
Analogue output (optionally) / Supply														
2-wire current signal		4 ... 20 mA / V _S = 13 ... 36 V _{DC} permissible load: R _{max} = [(V _S - V _{Smin}) / 0.02 A] Ω						response time: < 10 msec						
2-wire current signal with IS-protection		4 ... 20 mA / V _S = 15 ... 28 V _{DC} permissible load: R _{max} = [(V _S - V _{Smin}) / 0.02 A] Ω						response time: < 10 msec						
3-wire current signal		4 ... 20 mA / V _S = 24 V _{DC} ± 10 % adjustable (turn-down of span 1:5) ³ permissible load: R _{max} = 500 Ω						response time: < 30 msec						
Without analogue output		V _S = 15 ... 36 V _{DC}												
Accuracy ²		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												
² accuracy according to IEC 60770 – limit point adjustment (non-linearity, hysteresis, repeatability)														
³ 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				≥ 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 ⁴ and others							
Diaphragm		stainless steel 1.4435 (316 L)												
Media wetted parts		pressure port, seals, diaphragm												
⁴ welded version only for pressure ports according to EN 837 D Q G 1 3 7; possible ranges p _N ≤ 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 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 ⁵	70 mA	
Permissible temperatures for environment	in zone 0: -20 ... 60 °C with p_{atm} 0.8 bar up to 1.1 bar in zone 1 or higher: -25 ... 70 °C	
⁵ 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	
Ingress protection	IP 67	
Installation position	any ⁶	
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) ⁷	
ATEX Directive	2014/34/EU	
⁶ 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 $p_N \leq 1 \text{ bar}$.		
⁷ This directive is only valid for devices with maximum permissible overpressure > 200 bar.		
Wiring diagrams		
<p>2-wire-system (current)</p>	<p>3-wire-system (current)</p>	
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)	
⁸ 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

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Pressure																					
	gauge ¹	7	A	0																	
	absolute ²	7	A	1																	
Input [bar]																					
	0.10 ²	1	0	0	0																
	0.16 ²	1	6	0	0																
	0.25 ²	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
Design																					
	side display					K	H														
	45° display					K	4														consult
Analogue output																					
	without																				0
	4 ... 20 mA / 2-wire																				1
	4 ... 20 mA / 3-wire, adjustable																				7J
	intrinsic safety 4 ... 20 mA / 2-wire ³																				E
	customer																				9
																					consult
Contact																					
	1 contact																				1
	2 contacts ³																				2
Accuracy																					
	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
Electrical connection																					
	male plug M12x1 (5-pin) / metal version																				N 1 1
	customer																				9 9 9
																					consult
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 ⁴																				F 0 0
	1/2" NPT																				N 0 0
	1/4" NPT																				N 4 0
	customer																				9 9 9
																					consult
Seal																					
	FKM																				1
	without (welded version) ⁵																				2
	customer																				9
																					consult
Special version																					
	standard																				0 0 0
	customer																				9 9 9
																					consult

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 and NPT; possible for nominal pressure ranges $p_N \leq 40$ bar