



DS 400P

Intelligent Electronic Pressure Switch Stainless Steel

Pressure ports and process connections with flush welded stainless steel diaphragm

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

Nominal pressure

from 0 ... 100 mbar up to 0 ... 40 bar

Contacts

1 or 2 independent PNP contacts,
freely configurable

Analogue output

2-wire: 4 ... 20 mA

3-wire: 4 ... 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
- ▶ configurable contacts (switch on / switch off points, hysteresis / window mode, switch on / switch off delay)
- ▶ hygienical version

Optional versions

- ▶ **IS-version**
Ex ia = intrinsically safe for gases
- ▶ customer specific versions

The electronic pressure switch DS 400P is the successful combination of

- ▶ intelligent pressure switch
- ▶ digital display

and has been developed for process industry; especially for food industry and pharmacy.

As standard the DS 400P offers a PNP contact and a rotatable display module with 4-digit LED display.

Optional versions like e.g. an intrinsically safe version, max. 2 contacts and an analogue output complete the profile.

Preferred areas of use are



Food Industry



Pharmacy

Material and test certificates

- ▶ material test report according to DIN EN 10204-3.1.
- ▶ specific test report according to DIN EN 10204-2.2.



Input pressure range ¹																									
Nominal pressure gauge / abs.	[bar]	-1 ... 0	0.1	0.16	0.25	0.4	0.6	1	1.6	2.5	4	6	10	16	25	40									
Overpressure	[bar]	5	0.5	1	1	2	5	5	10	10	20	40	40	80	80	105									
Burst pressure \geq	[bar]	7.5	1.5	1.5	1.5	3	7.5	7.5	15	15	25	50	50	120	120	210									
Vacuum resistance		P _N \geq 1 bar: unlimited vacuum resistance								P _N < 1 bar: on request															
¹ consider the pressure resistance of fitting and clamps																									
Contact ²																									
Number, type		standard: 1 PNP contact								option: 2 independent PNP contacts															
Max. switching current		4 ... 20 mA / 2- and 3-wire:				0 ... 10 V / 3-wire:				contact rating 125 mA, short-circuit resistant; V _{switch} = V _S - 2V contact rating 500 mA, short-circuit resistant															
Accuracy of contacts ³		standard: nominal pressure < 0.4 bar: $\leq \pm 0.5$ % FSO nominal pressure \geq 0.4 bar: $\leq \pm 0.35$ % FSO option 1: nominal pressure \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 x 10 ⁶																							
Delay time		0 ... 100 sec																							
² 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 _{S min}) / 0.02 A] Ω response time: < 10 msec																							
2-wire current signal with IS-protection		4 ... 20 mA / V _S = 13 ... 28 V _{DC} permissible load: R _{max} = [(V _S - V _{S min}) / 0.02 A] Ω 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) ⁴ permissible load: R _{max} = 500 Ω 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) ⁴ permissible load: R _{min} = 10 k Ω response time: < 30 msec																							
Without analogue output		V _S = 15 ... 36 V _{DC}																							
Accuracy ³		standard: nominal pressure < 0.4 bar: $\leq \pm 0.5$ % FSO nominal pressure \geq 0.4 bar: $\leq \pm 0.35$ % FSO option 1: nominal pressure \geq 0.4 bar: $\leq \pm 0.25$ % FSO																							
³ accuracy according to IEC 60770 – limit point adjustment (non-linearity, hysteresis, repeatability)																									
⁴ with turn-down of span the analogue signal is adjusted automatically to the new measuring range																									
Thermal errors (offset and span) ⁵ / Permissible temperatures																									
Nominal pressure P _N	[bar]	-1 ... 0								< 0.40				\geq 0.40											
Tolerance band	[% FSO]	$\leq \pm 0.75$								$\leq \pm 1.5$				$\leq \pm 0.75$											
in compensated range	[°C]	-20 ... 85								0 ... 50				-20 ... 85											
Permissible temperatures ⁶		medium: -40 ... 125 °C for filling fluid silicon oil -10 ... 125 °C for filling fluid food compatible oil electronics / environment: -40 ... 85 °C storage: -40 ... 100 °C																							
Permissible temperature medium for cooling element 300°C		filling fluid silicon oil				overpressure: -40 ... 300 °C				vacuum: -40 ... 150 °C ⁷				filling fluid food compatible oil				overpressure: -10 ... 250 °C				vacuum: -10 ... 150 °C			
⁵ an optional cooling element can influence thermal effects for offset and span depending on installation position and filling conditions																									
⁶ max. temperature of the medium for nominal pressure gauge > 0 bar: 150 °C for 60 minutes with a max. environmental temperature of 50 °C																									
⁷ also for P _{abs} \leq 1 bar																									
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 (DIN EN 60068-2-6)		G 1/2": 20 g RMS (25 ... 2000 Hz)				others except G 1/2":				10 g RMS (25 ... 2000 Hz)															
Shock (DIN EN 60068-2-27)		G 1/2":				500 g / 1 msec				others except G 1/2":				100 g / 1 msec											
Filling fluids																									
Standard		Silicon oil																							
Optional		food compatible oil (with FDA approval) (Mobil DTE FM 32; Category Code: H1; NSF Registration No.: 130662)											others on request												
Materials																									
Pressure port / Housing		stainless steel 1.4404 (316 L)								others on request															
Viewing glass		laminated safety glass																							
Seals		standard: FKM (recommended for medium temperatures \leq 200 °C) option: FFKM (recommended for medium temperatures > 200 °C)											others on request												
Diaphragm		stainless steel 1.4435 (316L)																							
Media wetted parts		pressure port, seals, diaphragm																							

Explosion protection (only for 4 ... 20 mA / 2-wire)		
Approval AX14-DS 400P	IBExU 06 ATEX 1050 X Zone 0: II 1G Ex ia IIC T4 Ga (connector) / II 1G Ex ia IIB T4 Ga (cable)	
Safety technical maximum values	$U_i = 28 \text{ V}$, $I_i = 93 \text{ mA}$, $P_i = 660 \text{ mW}$, $C \approx 0 \text{ nF}$, $L_i \approx 0 \text{ }\mu\text{H}$	
Max. switching current ⁸	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: -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 $\mu\text{H}/\text{m}$	
⁸ 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 (standard calibration in a vertical position with the pressure port connection down; differing installation position for $P_N \leq 4 \text{ bar}$ have to be specified in the order)	
Weight	min. 500 g (depending on mechanical connection)	
Operational life	> 100 x 10 ⁸ cycles	
CE-conformity	EMC Directive: 2004/108/EC	
Wiring diagrams		
2-wire-system (current)	3-wire-system (current / voltage)	
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	gy (grey)
Contact 2	5	pk (pink)
Shield	plug housing / pressure port	ye/gn (yellow / green)
Designs ⁹		Electrical connections (dimensions in mm)
side display	45° display (others on request)	M12x1 (5-pin)
⁹ all designs in horizontal rotatable housing as standard		

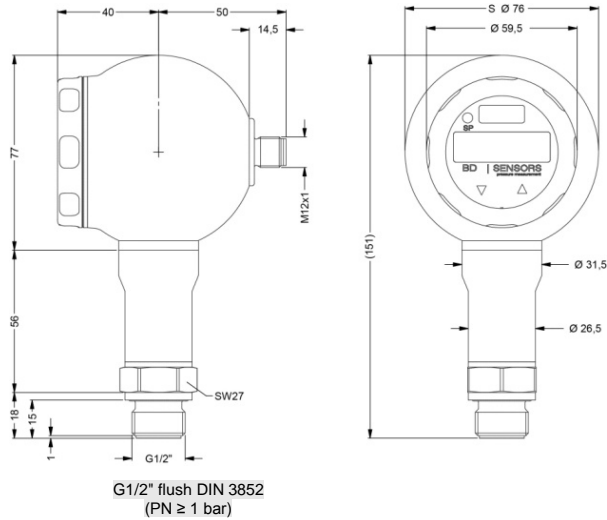
DS 400P

Electronic Pressure Switch

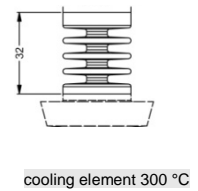
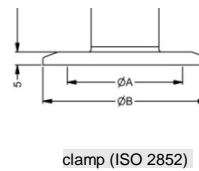
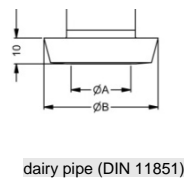
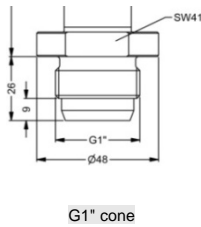
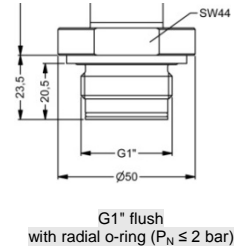
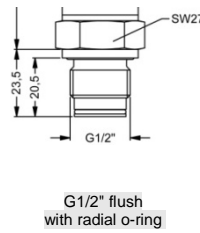
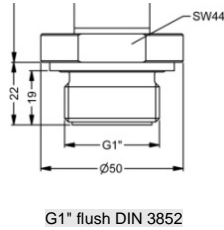
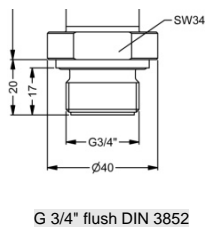
Technical Data

Mechanical connections (dimensions in mm)

Standard



Option



dimension in mm			
size	DN 25	DN 40	DN 50
A	23	32	45
B	44	56	68.5
PN	≤ 40	≤ 40	≤ 25

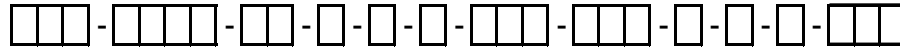
dimension in mm			
size	DN 25	DN 38	DN 51
A	23	32	45
B	50.5	50.5	64
PN	≤ 16	≤ 16	≤ 16

⇒ metric threads and other versions on request

This datasheet contains product specification, properties are not guaranteed. Subject to change without notice.

Ordering code DS 400P

DS 400P



Pressure																																
	gauge	7 A 5																														
	absolute ¹	7 A 6																														
Input																																
	[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																										
	-1 ... 0		X	1	0	2																										
	customer		9	9	9	9																										
Design																																
	Stainless steel globe housing (side display)		K	H																												
	Stainless steel globe housing (45° display)		K	4																												
Analogue output																																
	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 ²		E																													
	customer		9																													
Contact																																
	1 contact		1																													
	2 contacts ²		2																													
Accuracy																																
	standard for P _N ≥ 0,4 bar	0.35 %	3																													
	standard for P _N < 0,4 bar	0.5 %	5																													
	option for P _N ≥ 0,4 bar	0.25 %	2																													
	customer		9																													
Electrical connection																																
	Male plug M12x1 (5-pin) / metal version													N	1	1																
	customer													9	9	9																
Mechanical connection																																
	G1/2" with flush welded diaphragm (DIN 3852) ³													Z	0	0																
	G3/4" with flush welded diaphragm (DIN 3852)													Z	3	0																
	G1" with flush welded diaphragm (DIN 3852)													Z	3	1																
	G1" DIN 3852 with rad. o-ring and flush diaphragm ⁴													Z	5	7																
	G1/2" DIN 3852 with rad. o-ring and flush diaphragm													Z	6	1																
	G 1" cone													K	3	1																
	Clamp DN 25 (ISO 2852)													C	6	1																
	Clamp DN 38 (ISO 2852)													C	6	2																
	Clamp DN 51 (ISO 2852)													C	6	3																
	Dairy pipe DN 25 (DIN 11851) ⁵													M	7	3																
	Dairy pipe DN 40 (DIN 11851) ⁵													M	7	5																
	Dairy pipe DN 50 (DIN 11851) ⁵													M	7	6																
	customer													9	9	9																
Diaphragm																																
	Stainless steel 1.4435 (316L)		1																													
	customer		9																													
Seals																																
	for clamp or dairy pipe:	none	0																													
	for inch thread:	FKM	1																													
		FFKM	7																													
	customer		9																													
Filling Fluids																																
	Silicon oil		1																													
	food compatible oil		2																													
	customer		9																													
Special version																																
	standard		0 0 0																													
	with cooling element up to 300°C		2 0 0																													
	customer		9 9 9																													

¹ absolute pressure possible from 1 bar

² with Ex version max. 1 contact is possible

³ only possible for nominal pressure ranges P_N ≥ 1 bar

⁴ only possible for nominal pressure ranges P_N ≤ 2 bar

⁵ The cup nut for dairy pipe has to be mounted by production of pressure transmitter. The cup nut has to be ordered as separate position.

