



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

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 and dusts
- ▶ 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. two contacts and an analogue output complete the profile.

Preferred areas of use are



Food industry



Pharmacy

Material and test certificates

- ▶ Inspection certificate 3.1 according to EN 10204
- ▶ Test report 2.2 according to EN 10204



Input pressure range ¹																
Nominal pressure gauge [bar]	-1 ... 0	0.1	0.16	0.25	0.4	0.6	1	1.6	2.5	4	6	10	16	25	40	
Nominal pressure absolute [bar]	-	-	-	-	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 ≥ [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 ≥ 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: contact rating 125 mA, short-circuit resistant; V _{switch} = V _S - 2V
Accuracy of contacts ³	standard: nominal pressure < 0.4 bar: ≤ ± 0.5 % FSO / nominal pressure ≥ 0.4 bar: ≤ ± 0.35 % FSO option: nominal pressure ≥ 0.4 bar: ≤ ± 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

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 _{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) ⁴ permissible load: R _{max} = 500 Ω response time: < 30 msec
Without analogue output	V _S = 15 ... 36 V _{DC}
Accuracy ³	standard: nominal pressure < 0.4 bar: ≤ ± 0.5 % FSO / nominal pressure ≥ 0.4 bar: ≤ ± 0.35 % FSO option: nominal pressure ≥ 0.4 bar: ≤ ± 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			
Nominal pressure p _N [bar]	-1 ... 0	< 0.40	≥ 0.40
Tolerance band [% FSO]	≤ ± 0.75	≤ ± 1.5	≤ ± 0.75
in compensated range [°C]	-20 ... 85	0 ... 50	-20 ... 85

⁵ an optional cooling element can influence thermal effects for offset and span depending on installation position and filling conditions

Permissible temperatures		
Filling fluid	silicone oil	food compatible oil
Medium ⁶	-40 ... 125 °C	-10 ... 125 °C
Medium with cooling element ⁷	overpressure: -40 ... 300 °C vacuum: -40 ... 150 °C ⁸	overpressure: -10 ... 250 °C vacuum: -10 ... 150 °C ⁸
Electronics / environment	-40 ... 85 °C	
Storage	-40 ... 100 °C	

⁶ max. temperature of the medium for overpressure > 0 bar: 150 °C for 60 minutes with a max. environmental temperature of 50 °C

⁷ max. temperature depends on the used sealing material, type of seal and installation

⁸ also for p_{abs} ≤ 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

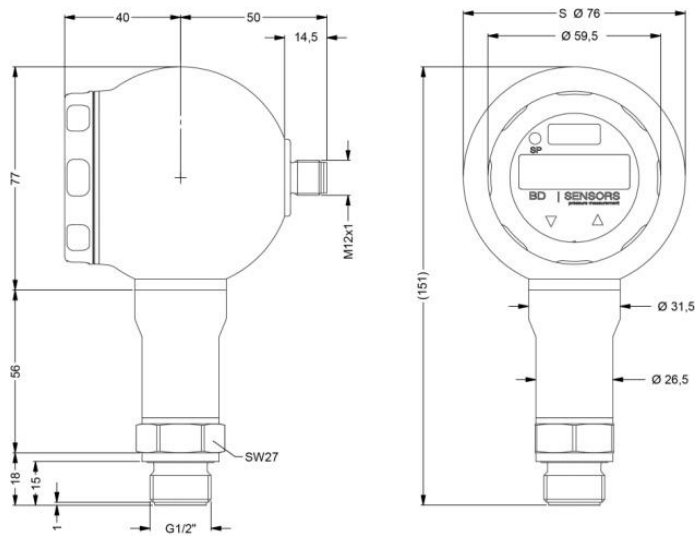
Filling fluids	
Standard	silicone oil
Optional	food compatible oil according to 21CFR178.3570 (Mobil SHC Cibus 32; Category Code: H1; NSF Registration No.: 141500) others on request

Materials	
Pressure port	stainless steel 1.4435 (316 L)
Diaphragm	stainless steel 1.4435 (316L)
Housing / cap	stainless steel 1.4301 (304)
Viewing glass	laminated safety glass
Seals	standard: FKM (recommended for medium temperatures ≤ 200 °C) option: FFKM (recommended for medium temperatures < 260 °C) others on request Clamp, dairy pipe, Varivent [®] : without
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 zone 20: II 1D Ex ia IIIC T135 °C Da	
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 ⁹	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	
⁹ the real switching current in the application depends on the power supply unit		
Miscellaneous		
EHDG certificate Type EL Class I	EHDG conformity is only ensured in combination with an approved seal. This is e.g. for - Clamp (C61, C62, C63): T-ring-seal from Combifit International B.V. - Varivent® (P41): EPDM-O-ring which is FDA-listed - dairy pipe (M73, M75, M76): ASEPTO-STAR k-flex upgrade seal by Kieselmann GmbH	
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 (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 (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)	
Surface roughness	pressure port $R_a < 0.8 \text{ }\mu\text{m}$ (media wetted parts) diaphragm $R_a < 0.15 \text{ }\mu\text{m}$ weld seam $R_a < 0.8 \text{ }\mu\text{m}$	
Weight	min. 500 g (depending on mechanical connection)	
Operational life	100 million load cycles	
CE-conformity	EMC Directive: 2014/30/EU	
ATEX Directive	2014/34/EU	
Wiring diagrams		
2-wire-system (current)	3-wire-system (current)	
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 ¹⁰	Electrical connection (dimensions in mm)	
side display	45° display (others on request)	M12x1 (5-pin)
¹⁰ all designs in horizontal rotatable housing as standard		

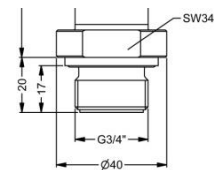
Mechanical connections (dimensions in mm)

Standard



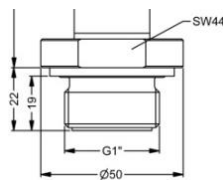
G1/2" flush DIN 3852
($p_N \geq 1$ bar)

Option

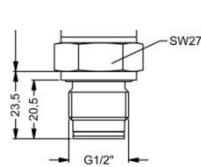


G 3/4" flush DIN 3852

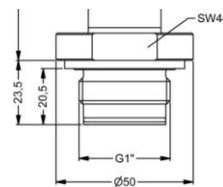
Option



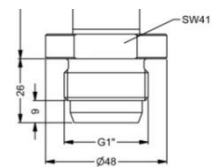
G1" flush DIN 3852



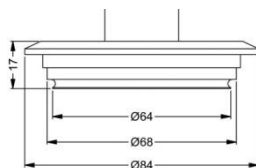
G1/2" flush
with radial o-ring



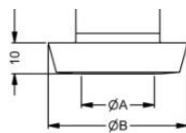
G1" flush
with radial o-ring ($p_N \leq 2$ bar)



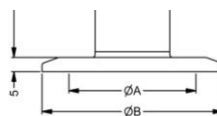
G1" cone



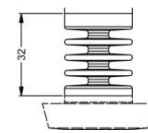
Varivent®
 $p_N \leq 25$ bar



dairy pipe (DIN 11851)



Clamp (DIN 32676)



cooling element up to 300 ° C ⁷

dimension in mm			
size	DN 25	DN 40	DN 50
A	23	32	45
B	44	56	68.5
p_N [bar]	≥ 0.25 ≤ 40	≥ 0.25 ≤ 40	≥ 0.25 ≤ 25

dimension in mm				
size	3/4"	DN 25	DN 32	DN 50
A	14	23	32	45
B	25	50.5	50.5	64
p_N [bar]	≥ 4 ≤ 8	≥ 0.25 ≤ 16	≤ 16	≤ 16

⇒ metric threads and other versions on request

⁷ max. temperature depends on the used sealing material, type of seal and installation

