



DS 400P

Intelligent Electronic Pressure Switch Stainless Steel

Pressure ports and process connections with flush welded stainless steel diaphragm

accuracy according to EN IEC 62828-2:
standard: 0.35 % span
option: 0.25 % span

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)
- ▶ hygienic 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.



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 abs.* [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																								
*for 0 ... 1 bar abs. or -1 ... 0 bar gauge max. temperature 70 °C																								
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								0 ... 10 V / 3-wire (po dohodě): contact rating 125 mA, short-circuit resistant															
Accuracy of contacts ³	standard: nominal pressure < 0.4 bar: ≤ ± 0.5 % span nominal pressure ≥ 0.4 bar: ≤ ± 0.35 % span								option 1: nominal pressure ≥ 0.4 bar: ≤ ± 0.25 % span															
Repeatability	≤ ± 0.1 % span																							
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 5:1) ⁴								permissible load: R _{max} = 500 Ω								response time: < 30 msec							
3-wire voltage signal (po dohodě)	0 ... 10 V / V _S = 24 V _{DC} ± 10 % adjustable (turn-down of span 5:1) ⁴								permissible load: R _{min} = 10 kΩ								response time: < 30 msec							
Accuracy ³	standard: nominal pressure < 0.4 bar: ≤ ± 0.5 % span nominal pressure ≥ 0.4 bar: ≤ ± 0.35 % span								option 1: nominal pressure ≥ 0.4 bar: ≤ ± 0.25 % span															
³ accuracy according to EN IEC 62828-2— 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				≥ 0.40															
Tolerance band [% span]	≤ ± 0.75				≤ ± 1.5				≤ ± 0.75															
in compensated range [°C]	-20 ... 85				0 ... 50				-20 ... 85															
Permissible temperatures	medium ⁶ : -40 ... 125 °C for filling fluid silicon oil -10 ... 125 °C for filling fluid food compatible oil electronics / environment: -40 ... 85 °C																							
Permissible temperature medium for cooling element ⁷	filling fluid silicon oil				overpressure: -40 ... 300 °C				vacuum: -40 ... 150 °C ⁸				filling fluid food compatible oil				overpressure: -10 ... 250 °C				vacuum: -10 ... 150 °C ⁸			
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 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 (with FDA approval) (Mobil SHC Cibus 32; Category Code: H1; NSF Registration No.: 141500)												others on request											
Materials																								
Housing / cap	stainless steel 1.4301 (304)																							
Pressure port	inch thread: stainless steel 1.4404 (316 L)								G1" cone, Clamp, dairy pipe, Varivent®: stainless steel 1.4435 (316 L)															
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 and dairy pipe: without																							

Diaphragm	stainless steel 1.4435 (316L)
Media wetted parts	pressure port, seals, diaphragm

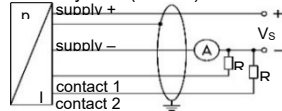
Explosion protection (only for 4 ... 20 mA / 2-wire)	
Approval AX4-DS 400P	IBExU06ATEX1049 X zone 0: II 2G Ex ia IIC T4 Ga (connector) / II 2G Ex ia IIB T4 Ga (cable) zone 20: II 1D Ex ia IIC T135°C Da
Safety technical max. values	$U_i = 28\text{ V}$, $I_i = 93\text{ mA}$, $P_i = 660\text{ mW}$, $C \approx 0\text{ nF}$, $L_i \approx 0\text{ }\mu\text{H}$
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
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 $\mu\text{H}/\text{m}$

⁹ the real switching current in the application depends on the power supply unit

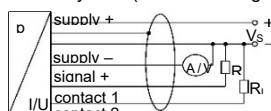
Miscellaneous	
Display	4-digit, 7-segment-LED display, visible range 37.2 x 11 mm; digit height 10 mm, range of indication -1999 ... +9999; accuracy 0.1% \pm 1 digit; digital damping 0.3 ... 30 sec (programmable); measured value update 0.0 ... 10 sec (programmable)
EHEDG certificate Type EL Class I	EHEDG 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
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)
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)



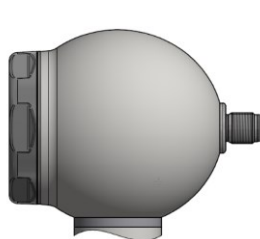
3-wire-system (current / voltage)



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



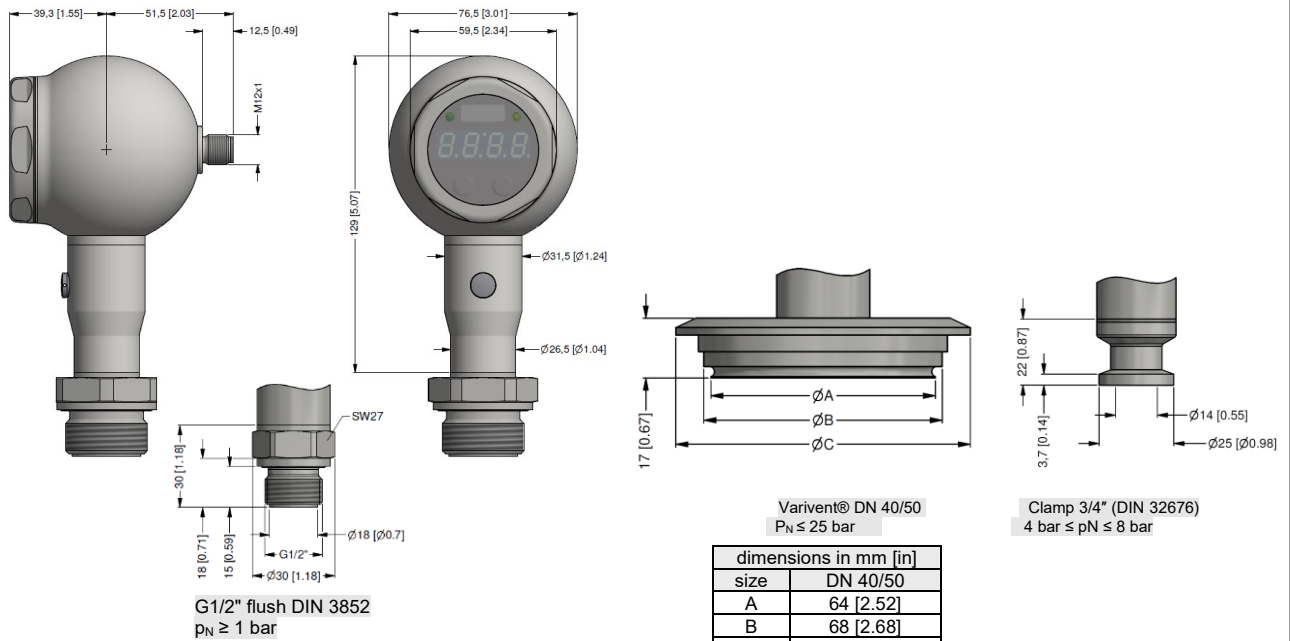
side display



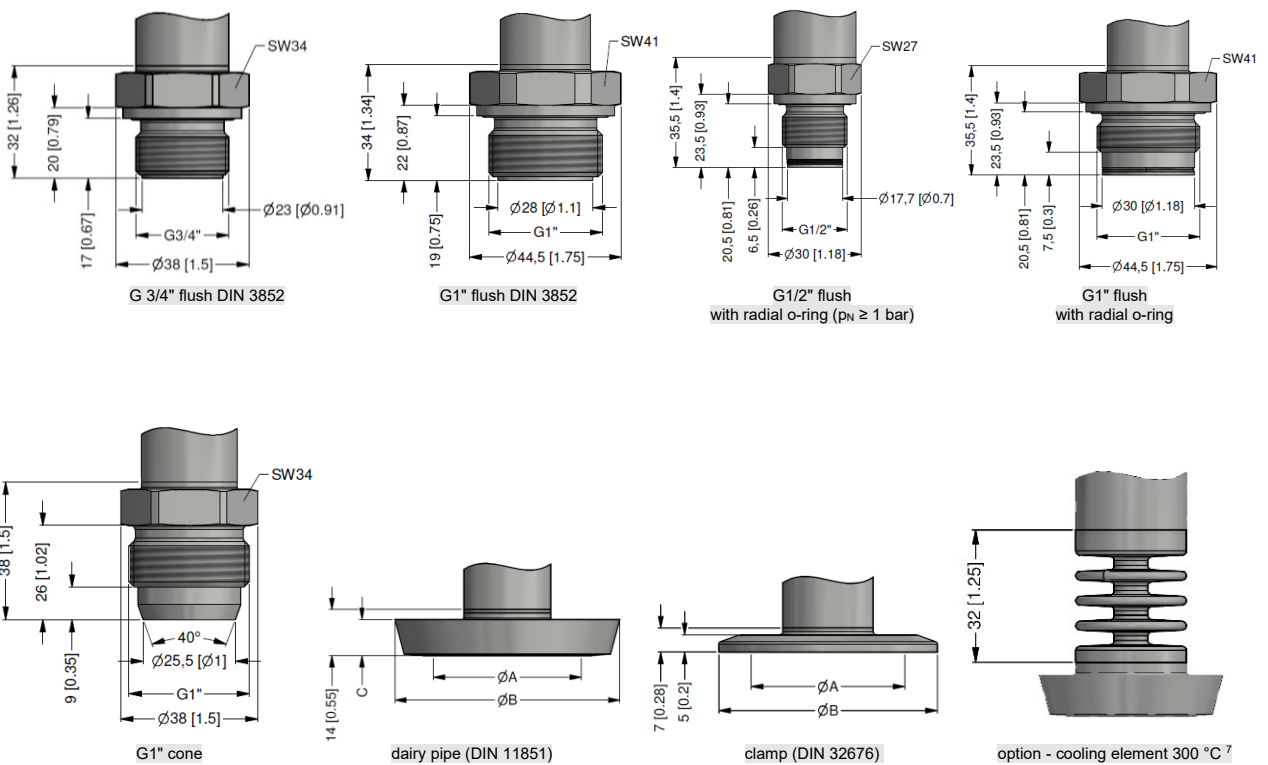
45° display (others on request)

¹⁰all designs in horizontal rotatable housing as standard

Mechanical connections (dimensions in mm)



Option



dimensions in mm			
size	DN 25	DN 40	DN 50
A	23	32	45
B	44	56	68,5
P_N [bar]	$\geq 0,25$ ≤ 40	$\geq 0,25$ ≤ 40	$\geq 0,25$ ≤ 25

dimensions 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	$\geq 0,25$ ≤ 16	≤ 16	≤ 16

⇒ metric threads and other versions on request; ⁷ max. temperature depends on the used sealing material, type of seal and installation

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

FFKM (for media temperature ≤ 200 °C)	7			
Customer	9			
Filling Fluids				
Silicone oil	1			
Food compatible oil (FDA) / 3A	2			
Customer	9			
Special version				
Standard		0	0	0
With cooling element up to 300 °C		2	0	0
Customer		9	9	9

0,-...without additional charge

On request...in accordance with the producer

Surcharges for calibration are not subject to any discounts. Subject to change.

This document contains the specification for ordering the product; detailed technical parameters of the product and its possible variants are given in the data sheet.

BD SENSORS reserves the right to change sensor specifications without further notice.

1 absolute pressure possible from 1 bar

2 with IS version max. 1 contact is possible

3 only possible for nominal pressure ranges $p_N \geq 1$ bar

4 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.



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