



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 _{S min}) / 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 _{S min}) / 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 storage: -40 ... 100 °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 pine: without														

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

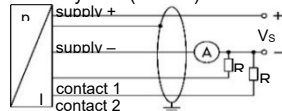
Explosion protection (only for 4 ... 20 mA / 2-wire)	
Approval AX4-DS 400P	IBExU06ATEX1049 X zone 0: II 2G Ex ia IIC T4 Ga (connector) / II 2G Ex ia IIB T4 Ga (cable) zone 20: II 1D Ex ia IIC T135°C Da
Safety technical max. values	$U_i = 28 \text{ V}$, $I_i = 93 \text{ mA}$, $P_i = 660 \text{ mW}$, $C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

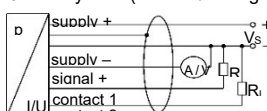
Miscellaneous	
Display	4-digit, 7-segment-LED display, visible range 37.2 x 11 mm; digit height 10 mm, range of indication -1999 ... +9999; accuracy 0.1% $\pm$ 1 digit; digital damping 0.3 ... 30 sec (programmable); measured value update 0.0 ... 10 sec (programmable)
EHEDG certificate Type EL Class I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



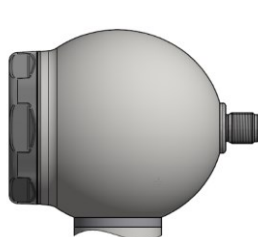
3-wire-system (current / voltage)



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



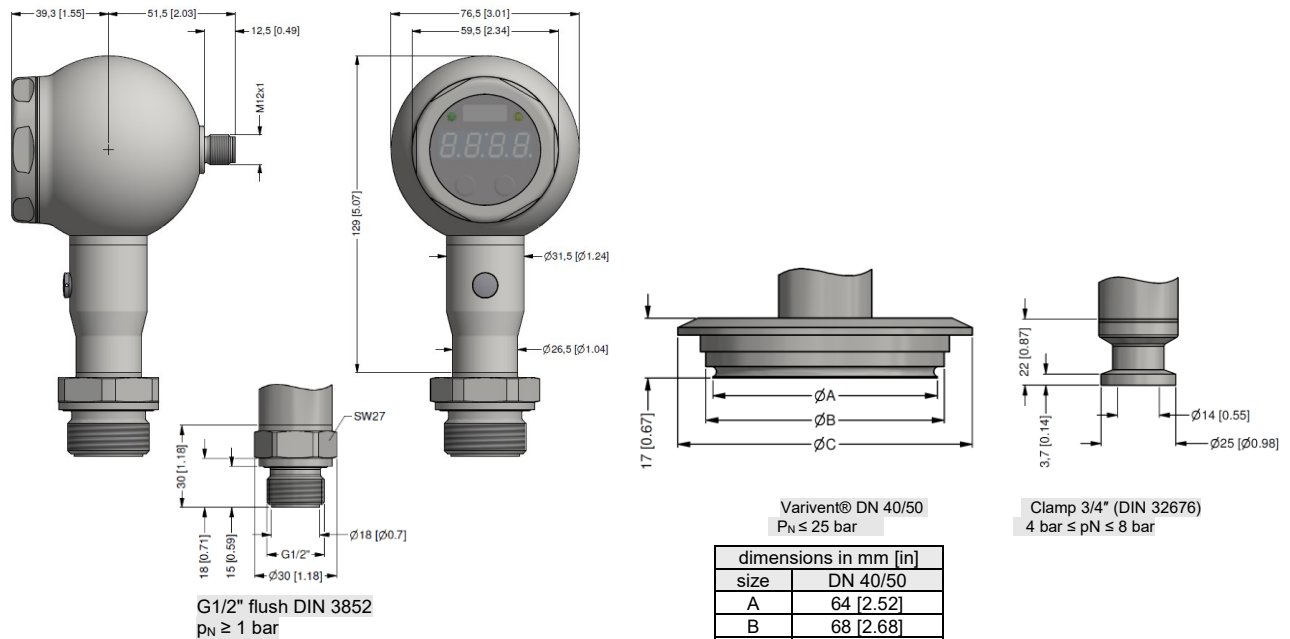
side display



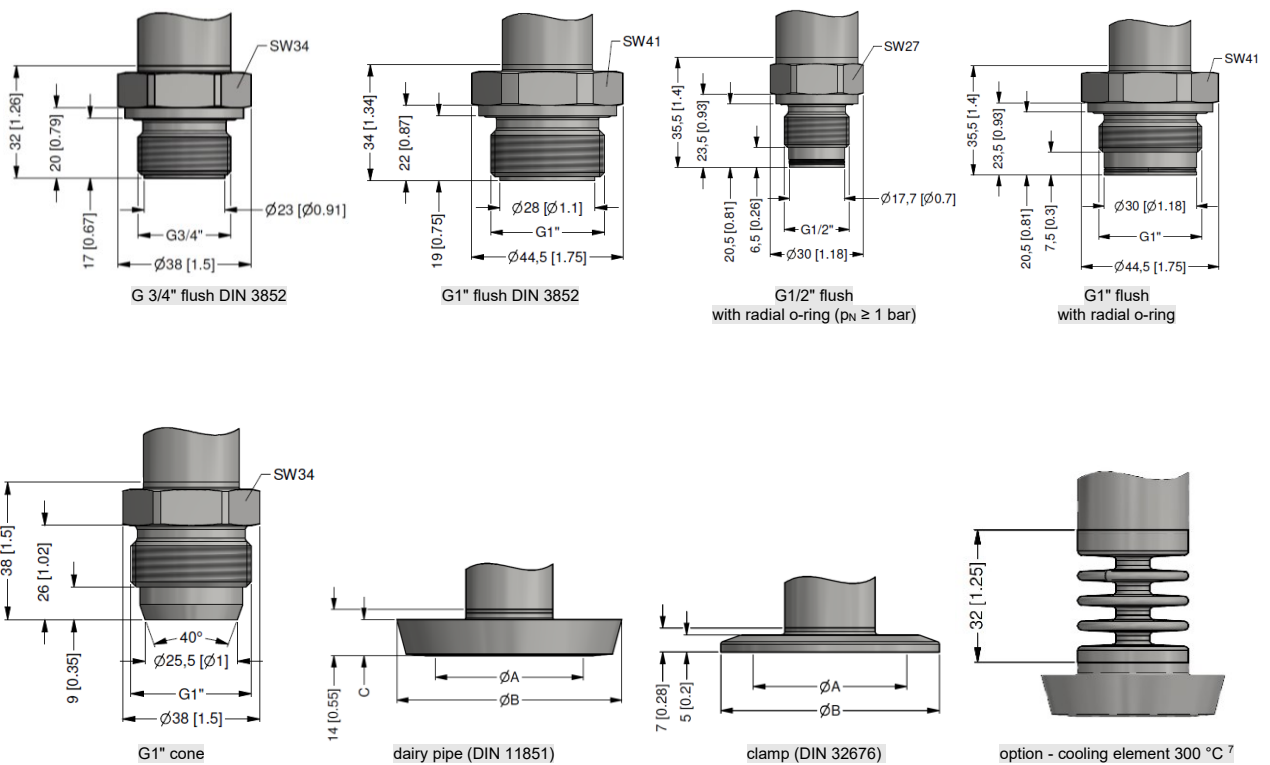
45° display (others on request)

¹⁰ all 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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The company BD SENSORS s.r.o. is certified by Bureau Veritas Czech according to the standard ISO 9001.

