STORKSOLUTIONS

DS 400P

Intelligent Electronic Pressure Switch Stainless Steel

Pressure Ports and Process Connections with Flush Welded Stainless Steel Diaphragm

accuracy according to IEC 61298-2:
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
- rotable 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 rotable 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

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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	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: $R_{max} = [(V_S - V_{S\,min}) / 0.02\ A]\ \Omega$ response time: < 10 msec
2-wire current signal with IS-protection	4 ... 20 mA / V_S = 15 ... 28 V_{DC} permissible load: $R_{max} = [(V_S - V_{S\,min}) / 0.02\ A]\ \Omega$ 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 61298-2 – 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]			
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 $p_{abs} \leq 1$ 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	20 g RMS / 10 ... 2000 Hz 10 g RMS / 10 ... 2000 Hz	according to DIN EN 60068-2-6 according to DIN EN 60068-2-6 (with cooling element)
Shock	500 g / 1 msec half sine	according to DIN EN 60068-2-27

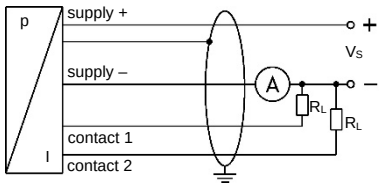
Filling fluids	
Standard	silicone oil
Optional	food compatible oil according to 21CFR178.3570 (Mobil SHC Cibus 32; Category Code: H1; NSF Registration No.: 141500) others on request

Materials		
Pressure port	inch thread: G1" cone, Clamp, diary pipe, Varivent®:	stainless steel 1.4404 (316 L) 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	

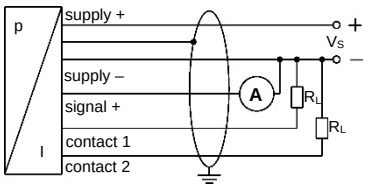
Explosion protection (only for 4 ... 20 mA / 2-wire)	
Approval AX14-DS 400P	IBExU 06 ATEX 1050 X zone 0: II 1G Ex ia IIC T4 Ga zone 20: II 1D Ex ia IIIC T135 °C Da
Safety technical maximum values	U_i = 28 V, I_i = 93 mA, P_i = 660 mW, C ≈ 0 nF, L_i ≈ 0 µH
Max. switching current [9]	70 mA
Permissible 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	
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
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 ≤ 4 bar have to be specified in the order)
Surface roughness	pressure port R_a < 0.8 µm (media wetted parts) diaphragm R_a < 0.15 µm weld seam R_a < 0.8 µm
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)



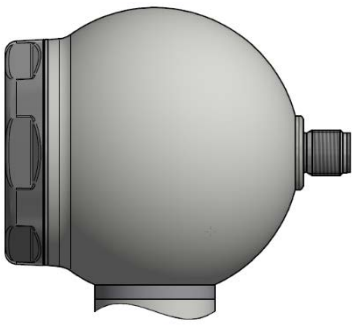
3-wire-system (current)



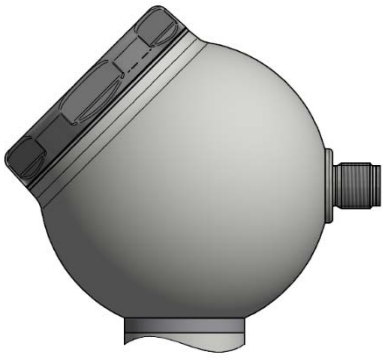
Pin configuration

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]



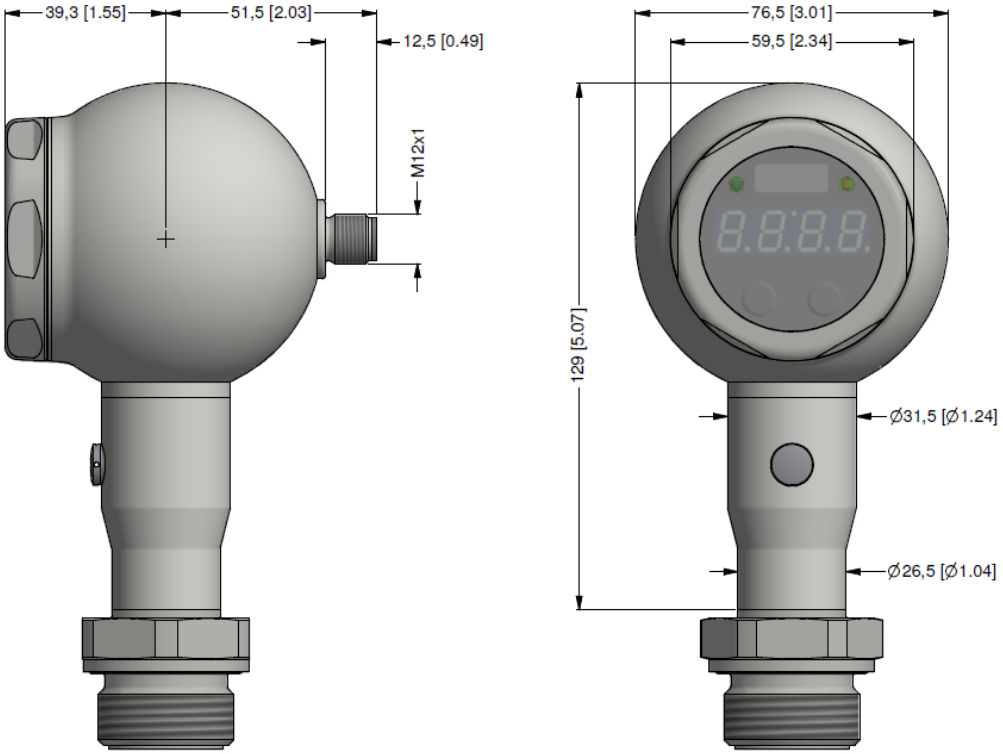
side display



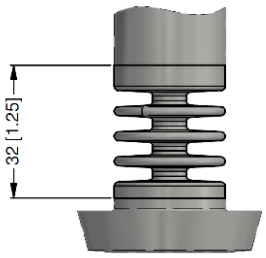
45° display (on request)

[10] all designs in horizontal rotatable housing as standard

Dimensions (mm / in)

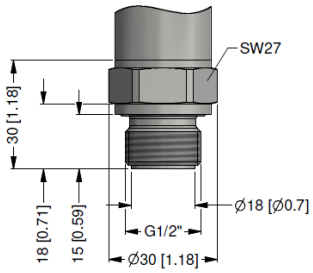


Cooling element up to 300 °C [7] (optionally)

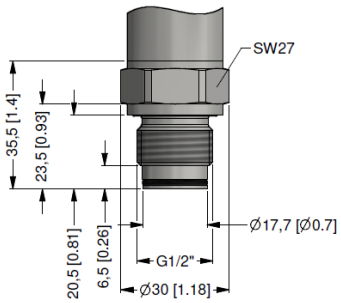


[7] *max. temperature depends on the used sealing material, type of seal and installation*

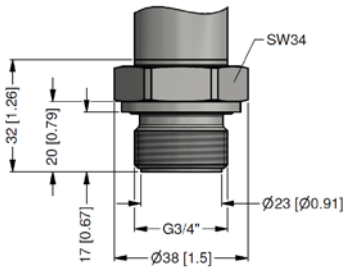
Mechanical connections (dimensions mm / in)



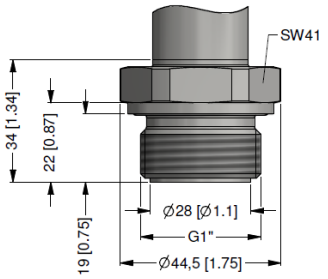
G1/2" flush DIN 3852
$p_N \geq 1$ bar



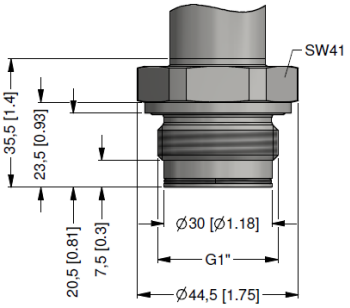
G1/2" flush with radial o-ring
$p_N \geq 1$ bar



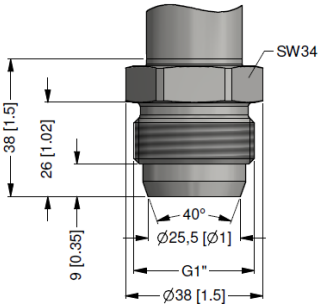
G3/4" flush DIN 3852



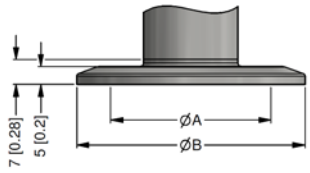
G1" flush DIN 3852



G1" flush with radial o-ring

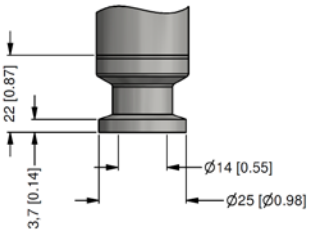


G1" cone

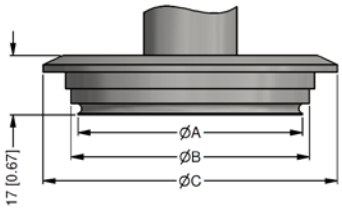


dimensions in mm [in]			
size	DN 25	DN 32	DN 50
A	23.0 [0.91]	23.0 [0.91]	45 [1.77]
B	50.5 [1.99]	50.5 [1.99]	64 [2.52]
p_N [bar]	0.25 ... 16	≤ 16	≤ 16

Clamp (DIN 32676)

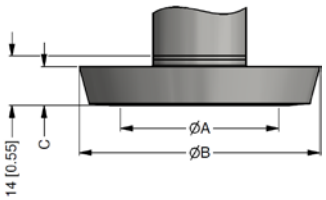


Clamp 3/4″ (DIN 32676)
4 bar ≤ p_N ≤ 8 bar



dimensions in mm [in]	
size	DN 40/50
A	64 [2.52]
B	68 [2.68]
C	84 [3.31]

Varivent® DN 40/50
$p_N \leq 25$ bar



dimensions in mm [in]			
size	DN 25	DN 40	DN 50
A	23 [0.91]	32 [1.26]	45 [1.77]
B	44 [1.73]	56 [1.20]	68,5 [2.70]
C	10 [0.39]	10 [0.39]	11 [0.43]
p_N [bar]	≤ 40	≤ 40	≤ 25

dairy pipe (DIN 11851)

⇨ **metric threads and other versions on request**

Ordering code DS 400P

DS 400P ☐☐☐ - ☐☐☐☐ - ☐☐ - ☐ - ☐ - ☐ - ☐☐☐ - ☐☐☐ - ☐ - ☐ - ☐ - ☐☐☐

	Code	
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	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 [2]	E	
customer	9	consult
Contact		
1 contact	1	
2 contacts [2]	2	
Accuracy		
standard for $p_N \geq 0,4$ bar: 0.35 % FSO	3	
standard for $p_N < 0,4$ bar: 0.50 % FSO	5	
option for $p_N \geq 0,4$ bar: 0.25 % FSO	2	
customer	9	consult
Electrical connection		
male plug M12x1 (5-pin) / metal	N 1 1	
customer	9 9 9	consult
Mechanical connection		
G1/2" with flush welded diaphragm (DIN 3852) [3]	Z 0 0	
G3/4" with flush welded diaphragm (DIN 3852)	Z S 0	
G1" with flush welded diaphragm (DIN 3852)	Z S 1	
G1" DIN 3852 with rad. o-ring and flush diaphragm	Z S 7	
G1/2" DIN 3852 with rad. o-ring and flush diaphragm [3]	Z 6 1	
G 1" cone	K S 1	
Clamp DN 25 (DIN 32676) / 3A [4]	C 6 1	
Clamp DN 32 (DIN 32676) / 3A [4]	C 6 2	
Clamp DN 50 (DIN 32676) / 3A [4]	C 6 3	
Clamp 3/4" (DIN 32676) / 3A [4]	C 6 9	
dairy pipe DN 25 (DIN 11851) [4,5]	M 7 3	
dairy pipe DN 40 (DIN 11851) [4,5]	M 7 5	
dairy pipe DN 50 (DIN 11851) [4,5]	M 7 6	
Varivent® DN 40/50 / 3A [4]	P 4 1	
customer	9 9 9	consult
Diaphragm		
stainless steel 1.4435 (316L)	1	
customer	9	consult
Seals		
for clamp, dairy pipe, Varivent®: none	0	
for inch thread: FKM	1	
FFKM	7	consult
customer	9	consult
Filling fluids		
silicone oil	1	
food compatible oil (FDA) / 3A	2	
customer	9	consult
Special version		
standard	0 0 0	
with cooling element up to 300°C / 3A	2 0 0	
customer	9 9 9	consult

[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] possible nominal pressure ranges according to data sheet
[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.
Varivent® is a brand name of GEA Tuchenhagen GmbH