



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 | 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 |

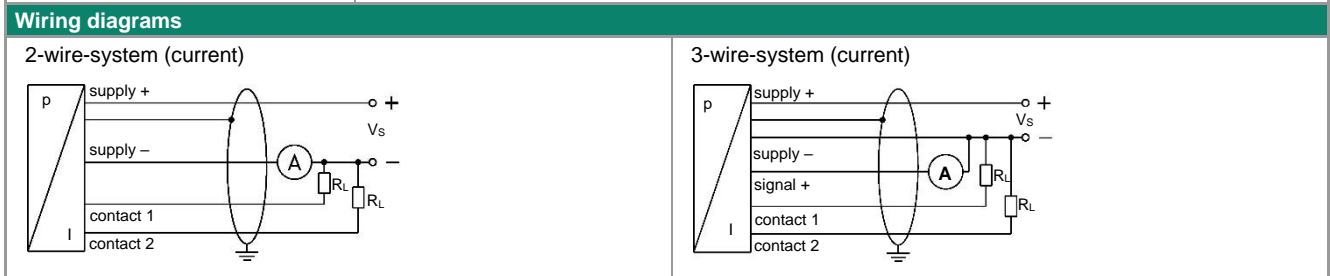
| Mechanical stability | |
|------------------------------|---|
| Vibration (DIN EN 60068-2-6) | G 1/2": 20 g RMS (25 ... 2000 Hz) others except G 1/2": 10 g RMS (25 ... 2000 Hz) |
| Shock (DIN EN 60068-2-27) | G 1/2": 500 g / 1 msec others except G 1/2": 100 g / 1 msec |

| 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 |

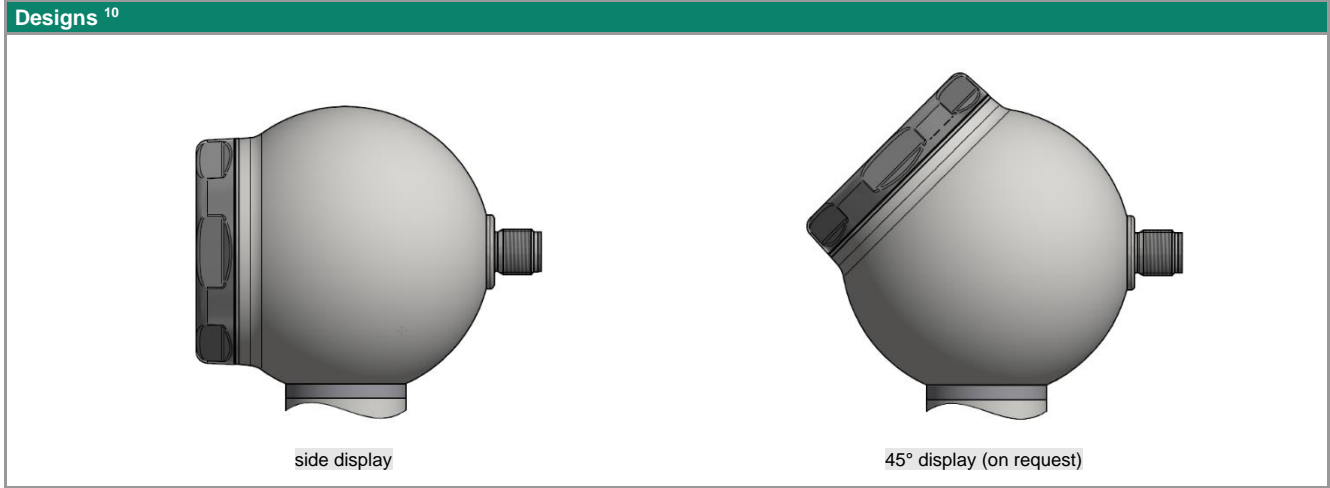
| Materials | |
|--------------------|--|
| Pressure port | inch thread: stainless steel 1.4404 (316 L) G1" cone, Clamp, dairy pipe, Varivent®: stainless steel 1.4435 (316 L) |
| Diaphragm | stainless steel 1.4435 (316L) |
| Housing / cap | stainless steel 1.4301 (304) |
| Viewing glass | laminated safety 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 |

| 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 |



| 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 | |



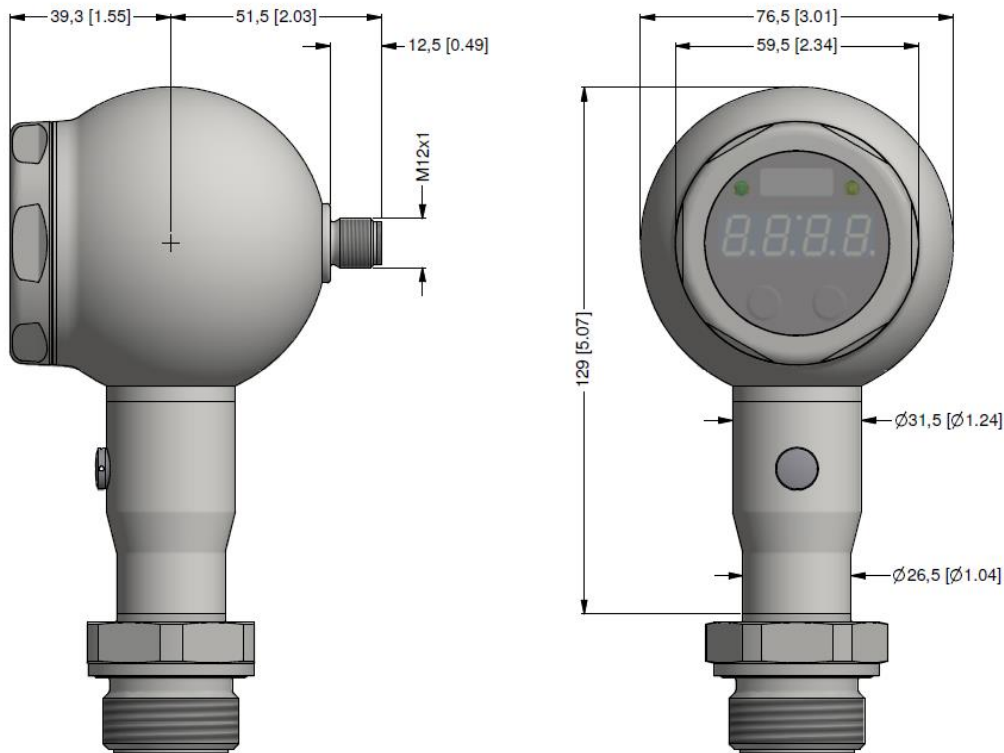
¹⁰ all designs in horizontal rotatable housing as standard

DS 400P

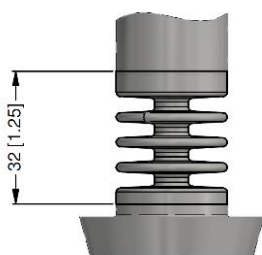
Electronic Pressure Switch

Technical Data

Dimensions (mm / in)

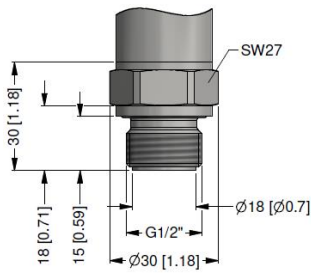


Cooling element up to 300 °C ⁷ (optionally)

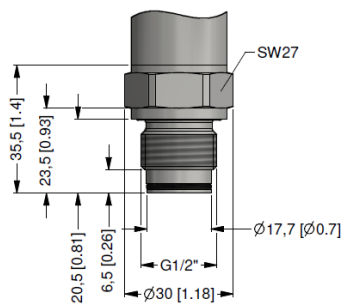


⁷ max. temperature depends on the used sealing material, type of seal and installation

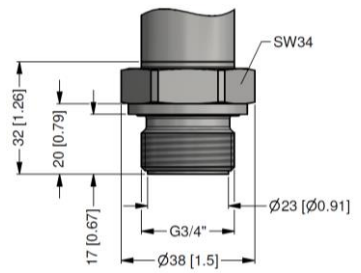
Mechanical connections (dimensions mm / in)



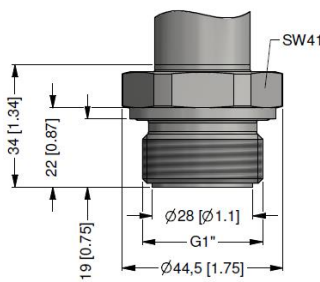
G1/2" flush DIN 3852
p_N ≥ 1 bar



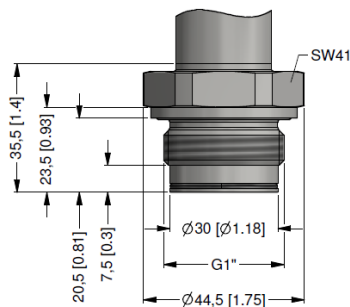
G1/2" flush with radial o-ring
p_N ≥ 1 bar



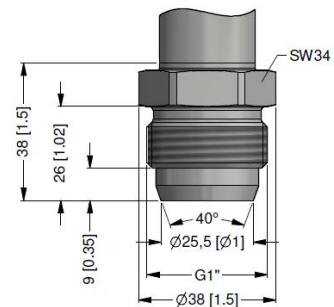
G3/4" flush DIN 3852



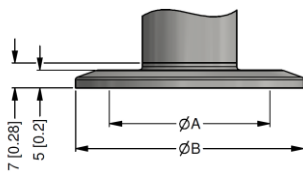
G1" flush DIN 3852



G1" flush with radial o-ring

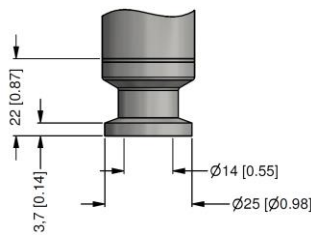


G1" cone

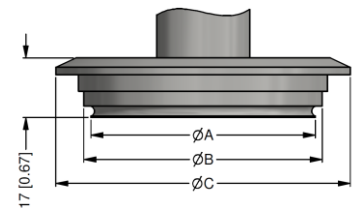


| dimensions in mm [in] | | | |
|-----------------------|-------------|-------------|-----------|
| size | DN 25 | DN 32 | DN 50 |
| A | 23.0 [0.91] | 23.0 [0.91] | 45 [1.77] |
| B | 50.5 [1.99] | 50.5 [1.99] | 64 [2.52] |
| p _N [bar] | 0.25 ... 16 | ≤ 16 | ≤ 16 |

Clamp (DIN 32676)

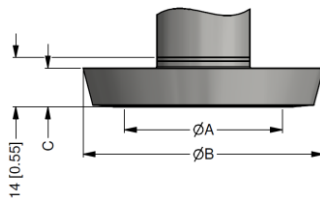


Clamp 3/4" (DIN 32676)
4 bar ≤ p_N ≤ 8 bar



| 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 ≤ 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 [2.20] | 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

