

# Bourdon tube pressure switch Stainless steel version Model BWX

WIKA data sheet PV 32.20



## Process Performance Series

### Applications

- Pressure monitoring and control of processes
- Safety-critical applications in general process instrumentation, especially in the chemical and petrochemical industries, oil and gas industries, power generation incl. nuclear power plants, water/wastewater industries, mining
- For gaseous, liquid and aggressive media, also in aggressive ambience

### Special features

- No power supply needed for switching of electrical loads
- Robust switch enclosure from 316L, IP 66, NEMA 4X
- Setting ranges from 0 ... 2.5 bar up to 0 ... 1,000 bar, vacuum ranges
- Ex ia version available
- 1 or 2 independent set points, SPDT or DPDT, high switching power up to AC 250 V, 20 A



Bourdon tube pressure switch model BWX

### Description

These high-quality pressure switches have been developed especially for safety-critical applications. The high quality of the products and manufacturing in accordance with ISO 9001 ensure reliable monitoring of your plant. In production, the switches are traced by quality assurance software at every step and subsequently are 100 % tested. All wetted materials are from stainless steel as a standard.

In order to ensure as flexible operation as possible, the pressure switches are fitted with micro switches, which enable the switching of an electrical load of up to AC 250 V, 20 A directly.

For lower switching power ratings, such as for PLC applications, argon gas-filled micro switches with gold-plated contacts can be selected as an option.

For applications with special requirements on the wetted parts, a version with Monel® is available.

By using a Bourdon tube measuring system, the model BWX pressure switch is extremely robust and guarantees optimal operating characteristics and the highest measuring performances with repeatability lower than 0.5 % of span.

## Standard version

### Switch enclosure

Stainless steel 316L, tamper-proof. Laser-engraved product label from stainless steel.

### Ingress protection

IP 66 per EN 60529 / IEC 60529, NEMA 4X

### Permissible temperature

Ambient  $T_{amb}$ : -40 ... +85 °C

Medium  $T_M$ : -40 ... +85 °C

### Switch contact

Micro switches with fixed dead band

- 1 x or 2 x SPDT (single pole double throw)
- 1 x DPDT (double pole double throw)

Micro switches with adjustable dead band

- 1 x SPDT (single pole double throw)

The DPDT function is realised with 2 simultaneously triggering SPDT micro switches within 0.2 % of the span.

| Contact version |   | Electrical rating (resistive load) |  | Suitable for Ex ia option |
|-----------------|---|------------------------------------|--|---------------------------|
|                 |   | AC                                 | DC                                     |                           |
| UN              | 1 x SPDT, silver  | 250 V, 15 A                        | 24 V, 2 A, 125 V, 0.5 A, 220 V, 0.25 A | No                        |
| US              | 1 x SPDT, silver, hermetically sealed, argon gas filling <sup>2)</sup>                  | 250 V, 15 A                        | 24 V, 2 A, 220 V, 0.5 A                | Yes                       |
| UO              | 1 x SPDT, gold-plated, hermetically sealed, argon gas filling <sup>2)</sup>             | 125 V, 1 A                         | 24 V, 0.5 A                            | Yes                       |
| UG              | 1 x SPDT, gold-plated   | 125 V, 1 A                         | 24 V, 0.5 A                            | No                        |
| UR              | 1 x SPDT, silver, adjustable dead band  | 250 V, 20 A                        | 24 V, 2 A, 220 V, 0.5 A                | Yes <sup>3)</sup>         |
| DN              | 2 x SPDT or 1 x DPDT, silver  | 250 V, 15 A                        | 24 V, 2 A, 125 V, 0.5 A, 220 V, 0.25 A | No                        |
| DS              | 2 x SPDT or 1 x DPDT, silver, hermetically sealed, argon gas filling <sup>2)</sup>      | 250 V, 15 A                        | 24 V, 2 A, 220 V, 0.5 A                | Yes                       |
| DO              | 2 x SPDT, or 1 x DPDT gold-plated, hermetically sealed, argon gas filling <sup>2)</sup> | 125 V, 1 A                         | 24 V, 0.5 A                            | Yes                       |
| DG              | 2 x SPDT or 1 x DPDT, gold-plated   | 125 V, 1 A                         | 24 V, 0.5 A                            | No                        |

<sup>2)</sup> Permissible ambient temperature range: -30 ... +70 °C

<sup>3)</sup> WIKA recommends argon gas-filled contact versions, use of adjustable dead band allowed

### Set point adjustment

The set point can be specified by the customer or factory set within the setting range. Subsequent adjustment of the set point on site is made using the adjustment screw, which is fastened to the switch and thus secured against loss.

### Repeatability of the set point

≤ 0.5 % of span

### Distance between set points

For versions with 2 x SPDT the distance between the set points must be > 5 % of the respective span.

### Ignition protection type (option)

- Ex ia I Ma (mines)
- Ex ia IIC T6/T4 <sup>1)</sup> Ga (gas)
- Ex ia IIIC T85/T135 <sup>1)</sup> Da (dust)

<sup>1)</sup> The temperature class is related to the ambient temperature range. See the type examination certificate for further details.

### Safety-related maximum values

(only for Ex ia version)

| Maximum values             |         |
|----------------------------|---------|
| Voltage $U_i$              | DC 30 V |
| Current $I_i$              | 100 mA  |
| Power $P_i$                | 0.75 W  |
| Internal capacitance $C_i$ | 0 μF    |
| Internal inductance $L_i$  | 0 mH    |

### Please specify:

Set point, switching direction for each contact, e.g.:

Set point 1: 30 bar, falling, set point 2: 60 bar, rising.

With two micro switches, the set points can be set independently of each other.

For optimal performance we suggest to adjust the set point between 25 ... 75 % of the setting range.

### Example:

Setting range: 0 ... 100 bar with one switch contact

Repeatability: 0.5 % of 100 bar = 0.5 bar

Dead band: 2.0 bar (see table setting ranges)

2 x repeatability + dead band = 2 x 0.5 bar + 2.0 bar = 3.0 bar

Rising pressure: Adjust set point between 3 ... 100 bar.

Falling pressure: Adjust set point between 0 ... 97 bar.

### Process connection

Stainless steel, lower mount (LM)

- ¼ NPT female (standard)
- ½ NPT, G ½ A, G ¼ A male via adapter
- ½ NPT, G ¼ female via adapter
- M20 x 1.5 male via adapter

### Electrical connection

- ½ NPT female (standard)
- ¾ NPT, M 20 x 1.5, G ½, G ¾ female
- Cable gland non-armoured, nickel-plated brass
- Cable gland non-armoured, stainless steel (AISI 304)
- Cable gland armoured, nickel-plated brass
- Cable gland armoured, stainless steel (AISI 304)
- MIL connector, 7-pin, DTL 5015

For cable connections to the internal terminal block use wire cross-sections between 0.5 ... 2.5 mm<sup>2</sup>.

For the internal and external grounding cable connection to the protective conductor screws use wire cross-sections ≤ 4 mm<sup>2</sup>.

### Dielectric strength

Safety class I (IEC 61298-2: 2008)

### Wetted parts

| Version   | Bourdon tube                     | Process connection        |
|---|----------------------------------|---------------------------|
| Standard  | Stainless steel AISI 316L        |                           |
| Setting range: 0 ... 1,000 bar                              | Stainless steel 17-4PH® (1.4542) | Stainless steel AISI 316L |
| NACE (option)<br>Setting range: 0 ... 40 to 0 ... 400 bar   | Monel® 400                       | Stainless steel AISI 316L |
| Monel® (option)<br>Setting range: 0 ... 40 to 0 ... 400 bar | Monel® 400                       |                           |

### Setting range

| Setting range<br>(=working range)<br>in bar | Proof pressure<br>in bar | Fixed dead band                        |   | Adjustable dead band       |
|---|--------------------------|--|---|----------------------------|
|   |                          | 1 contact,<br>UN, US, UO, UG<br>in bar | 2 contacts,<br>DN, DS, DO, DG<br>in bar | 1 contact,<br>UR<br>in bar |
| -1 ... +1.5                                 | 4.5                      | ≤ 0.15                                 | ≤ 0.30                                  | 0.35 ... 1.10              |
| -1 ... +5                                   | 12                       | ≤ 0.20                                 | ≤ 0.30                                  | 0.55 ... 1.70              |
| -1 ... +15                                  | 30                       | ≤ 0.30                                 | ≤ 0.40                                  | 1.40 ... 3.10              |
| 0 ... 2.5                                   | 4.5                      | ≤ 0.15                                 | ≤ 0.30                                  | 0.35 ... 1.10              |
| 0 ... 6                                     | 12                       | ≤ 0.20                                 | ≤ 0.30                                  | 0.55 ... 1.70              |
| 0 ... 16                                    | 30                       | ≤ 0.30                                 | ≤ 0.40                                  | 1.40 ... 3.10              |
| 0 ... 40                                    | 75                       | ≤ 0.60                                 | ≤ 0.70                                  | 2.10 ... 6.00              |
| 0 ... 100                                   | 160                      | ≤ 2                                    | ≤ 2                                     | 6 ... 17                   |
| 0 ... 160                                   | 210                      | ≤ 3                                    | ≤ 3                                     | 13 ... 35                  |
| 0 ... 250                                   | 330                      | ≤ 5                                    | ≤ 5                                     | 21 ... 65                  |
| 0 ... 400                                   | 480                      | ≤ 8                                    | ≤ 8                                     | 26 ... 93                  |
| 0 ... 600                                   | 720                      | ≤ 12                                   | ≤ 12                                    | 40 ... 115                 |
| 0 ... 1,000 <sup>1)</sup>                   | 1,200                    | ≤ 20                                   | ≤ 30                                    | 75 ... 190                 |

1) Wetted parts, bourdon tube: Stainless steel 17-4PH® (1.4542), process connection: Stainless steel AISI 316L

## Mounting

Direct or wall mounting

- Mounting fixture from stainless steel (AISI 304)
- Option: Mounting bracket for 2" pipe mounting

For mounting positions see drawing on page 5.

## Weight

approx. 2.0 kg

## Options

- Ex ia version
- Cleaned for oxygen service
- Drying of wetted parts
- Permissible ambient temperature -60 ... +85 °C <sup>1)</sup>
- Offshore version <sup>2)</sup>
- NACE compliant to MR 0175, ISO 15156 and MR 0103 <sup>2)</sup>
- Wetted parts from Monel®

1) Only available for contacts without hermetic sealing

2) WIKA recommends argon gas-filled contact versions

## Assembly (Option)

- Shut-off valve model 910.11, see data sheet AC 09.02
- Barstock valve model 910.81, see data sheet AC 09.18
- Diaphragm seals, see website

## Approvals

| Logo   | Description   | Country                     |
|--|---|-----------------------------|
|    | <b>EC declaration of conformity</b> <ul style="list-style-type: none"><li>■ Pressure equipment directive 97/23/EC<br/>PED, annex 1, category IV, safety accessories, module B + D</li><li>■ Low voltage directive 2006/95/EC, EN 60730-1</li><li>■ ATEX <sup>1)</sup> directive 94/9/EC; annex III, IV (option)<br/>I M 1<br/>II 1 GD</li></ul> | European Community          |
|  | <b>IECEX</b> <sup>1)</sup> per IEC 60079-0, IEC 60079-11, IEC 60079-26 (option)<br>Ex ia I Ma<br>Ex ia IIC T6/T4 <sup>2)</sup> Ga<br>Ex ia IIIC T85/T135 <sup>2)</sup> Da   | IECEX member states         |
|  | <b>EAC (option)</b><br>Hazardous areas (option)   | Eurasian Economic Community |
|  | <b>KOSHA (option)</b><br>Hazardous areas  | South Korea                 |

1) Double marking ATEX and IECEx on the same product label

2) The temperature class is related to the ambient temperature range

## Manufacturer's information and certifications

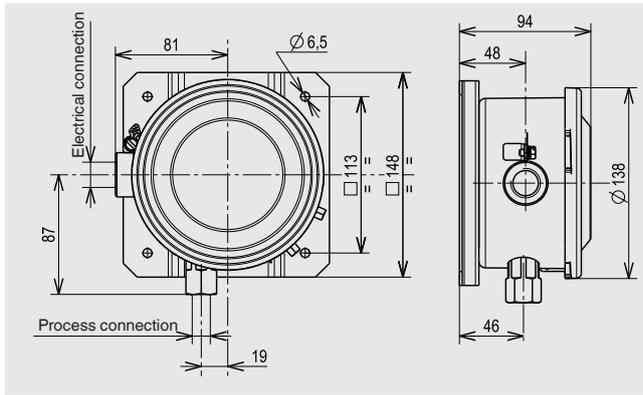
| Logo   | Description   |
|--|---|
|  | <b>SIL 2 rating (option)</b> , per IEC 61508<br>Functional safety<br>The electrical rating for DC applications is limited to 30 V ... 100 mA. |

## Certificates (option)

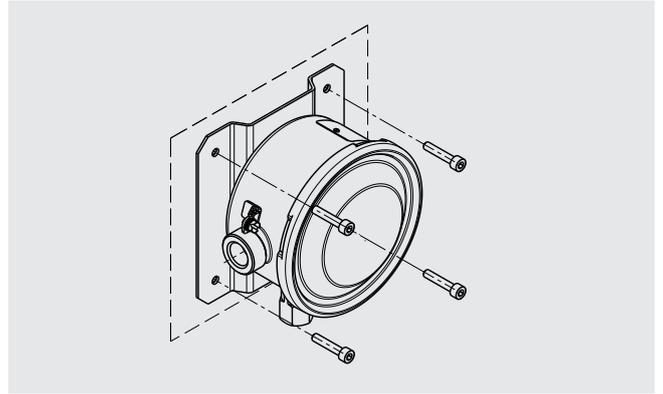
- 2.2 test report per EN 10204
- 3.1 inspection certificate per EN 10204

Approvals and certificates, see website

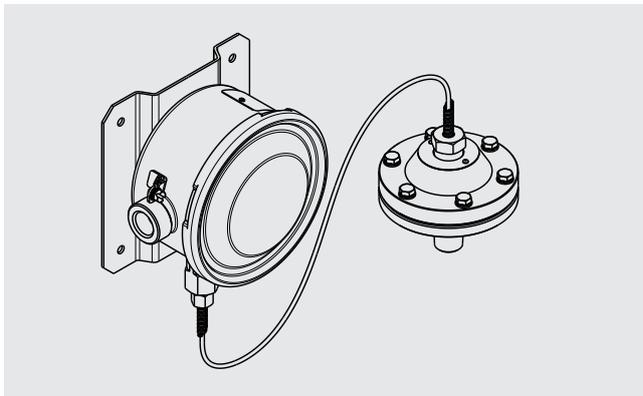
## Dimensions in mm



## Permissible mounting position



## Example of assembly with diaphragm seal



## Ordering information

Model / Unit / Setting range / Number of switches / Contact type / Process connection / Electrical connection / Wetted parts / Options

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