

# Bourdon tube pressure switch

## Ex protection EEx-d, IP 65, compact design

### Model BA1



WIKA data sheet PV 32.22



#### Applications

- Pressure monitoring and direct switching of electrical loads
- For gaseous and liquid, aggressive and highly viscous or contaminated media, also in aggressive ambience
- Process industry: chemical/petro-chemical, on- and offshore, technical gases, environmental technology, machine building and general plant construction, water treatment, pharmaceutical industry
- Ignition protection type GAS Ex-d DUST Ex-tD Gr. II Cat. 2 GD

#### Special features

- Case flameproof enclosure
- Ingress protection IP 65, NEMA 4
- Ambient temperature -40 ... +85 °C
- 1 or 2 independent switch points, high contact rating up to 15 A / AC 220 V
- Setting ranges from 40 to 600 bar, max. test pressure up to 720 bar

#### Description

These high-quality pressure switches have been specifically developed for safety-critical applications. High quality and product manufacturing to ISO 9001:2000 ensures 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 parts materials are from stainless steel as standard. Each switch family is available in IP 65, Ex-ia or Ex-d versions (Ex-ia see model BWX, data sheet PV 32.20).



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In order to ensure as flexible operation as possible, the pressure switches are equipped with micro switches, which make it possible to switch an electrical load of up to 15 A / AC 220 V directly. For smaller contact ratings, such as for PLC applications, argon gas filled micro switches with gold-plated contacts can be selected as an option.

By using a bourdon tube measuring system, the model BA1 pressure switch is extremely robust and guarantees optimal operating characteristics.

## Standard version

### Case

Aluminium, epoxy resin coated,  
due to anti-twist device secured against unauthorised  
intervention

### Ingress protection

IP 65 per EN 60529 / IEC 529

### Permissible temperature

Ambient: -40 ... +85 °C

### Process connection

Stainless steel, lower mount (LM)  
¼ NPT (female)

### Measuring system

Bourdon tube, stainless steel

### Wetted parts

Stainless steel 316

## Switch contacts

one or two SPDT (change-over) micro switches selectable,  
DPDT function through two SPDT  
micro switches with simultaneous  
triggering within 0.2 % of span, in the  
following variants:

Code	Switch
U	1 x SPDT
D	2 x SPDT

Code	Design	Electrical rating (resistive load) <sup>2)</sup>	
		AC	DC
<b>Fixed switch hysteresis</b>			
1	<b>Silver contacts</b>	<u>15 A, 220 V</u>	<u>2 A, 24 V</u> 0.5 A, 125 V 0.25 A, 220 V
2	<b>Gold-plated contacts</b>	<u>1 A, 125 V</u>	<u>0.5 A, 24 V</u>
3	<b>Silver contacts</b> inert gas filled T <sub>amb</sub> : -30 ... +70 °C	<u>15 A, 220 V</u>	<u>2 A, 24 V</u> 0.5 A, 220 V
4	<b>Gold-plated contacts</b> inert gas filled T <sub>amb</sub> : -30 ... +70 °C	<u>1 A, 125 V</u>	<u>0.5 A, 24 V</u>
<b>Adjustable switch hysteresis</b>			
5	<b>Silver contacts <sup>1)</sup></b>	<u>20 A, 220 V</u>	<u>2 A, 24 V</u> 0.5 A, 220 V

1) Max. 1 switch contact

2) Only the underlined data are shown on the product label

### Repeatability

≤ 0.5 % of span

### Note

If the switch point is below 10 % of the span, the pressure  
switch should be mounted vibration-free in order to avoid any  
accidental switching.

## Setting ranges, max. test pressure, max. switch hysteresis

Setting range in bar	Max. test pressure in bar	Max. switch hysteresis		
		1 switch contact	2 switch contacts	1 switch contact with settable hysteresis
-1 ... +1.5	4.5	0.15 bar	0.30 bar	0.35 ... 1.1 bar
-1 ... +5	12	0.20 bar	0.30 bar	0.55 ... 1.7 bar
-1 ... +15	30	0.30 bar	0.40 bar	1.4 ... 3.1 bar
0 ... 2.5	4.5	0.15 bar	0.30 bar	0.35 ... 1.1 bar
0 ... 6	12	0.20 bar	0.30 bar	0.55 ... 1.7 bar
0 ... 16	30	0.30 bar	0.40 bar	1.4 ... 3.1 bar
0 ... 40	75	0.55 bar	0.65 bar	2.1 ... 6 bar
0 ... 100	160	2 bar	2 bar	6 ... 17 bar
0 ... 160	210	3 bar	3 bar	13 ... 35 bar
0 ... 250	330	5 bar	5 bar	21 ... 65 bar
0 ... 400	480	8 bar	8 bar	26 ... 93 bar
0 ... 600	720	12 bar	12 bar	40 ... 115 bar

## Switch points

The switch points can be set to your requirements, free-of-charge.

Please specify:

Switch point, switching direction for each contact (e.g. switch point 1: 0.5 bar, falling, switch point 2: 3 bar, rising)

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

After unscrewing the case cover, **switch point adjustment** can be made using the adjustment screw. The switch point is settable within the entire measuring range with **the following general rule:**

- Define the value  $A = 2 \times \text{repeatability} + \text{switch hysteresis}$
- If the pressure is rising, the switch point should be set between (min. + value A) up to max. of the setting range.
- If the pressure is falling, the switch point should be set between min. up to (max. - value A) of the setting range.

### Example:

Setting range: 0 ... 1 bar with one switch contact

Repeatability: 1 % of 1 bar = 10 mbar

Switch hysteresis = 15 mbar (see table setting ranges)

Value  $A = 2 \times 10 \text{ mbar} + 15 \text{ mbar} = 35 \text{ mbar}$

If the pressure is rising, the switch point should be set between 35 mbar up to 1 bar.

If the pressure is falling, the switch point should be set between 0 up to 965 mbar.

For optimal performance we suggest the switch point lies between 25 % and 75 % of the setting range.

## Electrical connection

1/2 NPT female, cable connection using internal terminal block, ground connection using internal and external screw, max. ground cable cross-section 4 mm<sup>2</sup>

### Pressure switch certified per:

- Pressure equipment directive 97/23/EC (PED, annex 1, category IV, safety accessories, module B + D)
- Low voltage directive 73/23 EEC and 93/68 EEC

## Dielectric strength

Safety class I (EN 61298-2: 1997-06)

## Mounting

Direct or wall mounting

Preferred connection location of the process connection should be below. Alternatively the instrument can be installed so that access to internals is from front of the enclosure and the electrical connection is placed on side.

## Weight

approx. 2.4 kg

## Options

- Other process connection, also with adapter
- Electrical connection 3/4 NPT, G 1/2 or M20 x 1.5 (female)
- Cable gland on request
- 2" pipe-mounting kit (with clamping element)
- Version for off-shore <sup>3)</sup> or tropicalised application <sup>3)</sup>
- Version for applications to NACE <sup>3)</sup>
- Version for ammonia applications <sup>3)</sup>
- Oil and grease free version for oxygen applications
- Permissible ambient temperature -60 ... +85 °C
- Accessories:
  - Pressure gauge valves model 910.11, see data sheet AC 09.02
  - Barstock valves model 910.81, see data sheet AC 09.18

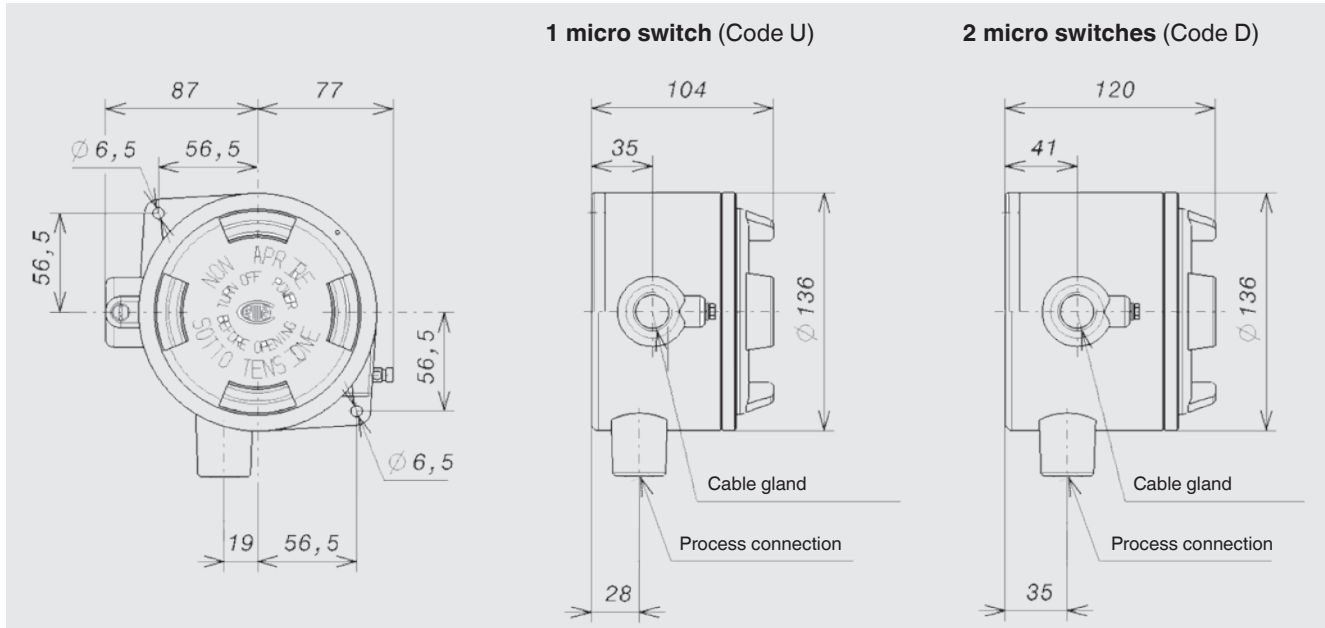
<sup>3)</sup> Inert gas filled contacts required

<sup>4)</sup> Max. 1 switch contact

## Approvals and certificates

- SIL 2 version <sup>3)</sup> <sup>4)</sup>
- GOST-R certificate
- Test certificate \*CA\* (confirmation of the switching accuracy)
- Test report \*CP\* (3-time listing of the switch point, requires switch point specification)
- Material certificate 3.1 per EN 10204

## Dimensions in mm



### Ordering information

Model / Switch contacts with version / Setting range / Process connection / Electrical connection / Switch point(s) / Switching direction(s) / Options

Example: BA1 - U1 - 0/40 bar - 1/4"NPT-F - 1/2"NPT-F

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