

# Ultra High Purity Pressure Switch Model WUS-10, Single End

WIKA Data Sheet PE 87.04

## Applications

- Semiconductor and flat panel industry
- Microelectronics engineering
- Gas distribution systems  
(Gas panels, bulk-gas supply)
- Ultra high purity water supply

## Special Features

- Thin-film sensor
- Excellent long-term stability
- Fast switch time
- No span adjustment required
- Ingress protection IP 65

## Description

### Quick and precise

Quick response time and high precision are the features of the redeveloped intelligent pressure switch series WUS-1X. Up to two switching outputs (NPN open collector), which are absolutely independent of each other, may be digitally configured with its high-class microprocessor. Moreover, the switching characteristics (normally open / normally closed functionality) within the switching hysteresis is explicitly definable; an extremely important feature of pressure switches in measuring and control engineering. The user is thus provided with a precise instrument with excellent switching functionality.

### Stable switching point

In order to enable stable switching characteristics of pressure switches, it is possible to program an individually varying hysteresis span. For pressure switches of the WUS-1X series it is recommended to set a hysteresis of 1%.

### Reliable

Thin-film sensors produced by WIKA have ensured high accuracy, long-term stability and repeatability in industrial pressure measurement instrumentation for decades.



Fig. Pressure Switch WUS-10

Special thin-film sensors made of Elgiloy® have been developed in order to meet the particular requirements of the ultra pure media industry.

By hermetically welding the thin-film sensor, a total separation of medium has been reached, as well as a long-term high impermeability which is required by the user.

### Versatile

The modular design makes it possible to configure a high number of variants in order to comply with the manifold requirements of UHP applications. All wetted parts are electropolished using state-of-the art equipment prior to the final assembly.

The integrated potentiometer enables adjustment of the zero point up to 5% of the full scale value. No adjustment of the span is required.

The high ingress protection (NEMA-4) allows operation even under the most difficult conditions.

## Specifications

## Model WUS-10

|  |                 |   |     |     |     |     |     |      |      |      |      |      |
|--|-----------------|---|-----|-----|-----|-----|-----|------|------|------|------|------|
| Pressure ranges  | bar             | 4   | 7   | 10  | 16  | 25  | 40  | 60   | 100  | 160  | 250  | 400  |
|  | psi             | 60  | 100 | 160 | 250 | 300 | 500 | 1000 | 1500 | 2000 | 3000 | 5000 |
| Over pressure safety <sup>1)</sup>                         | bar             | 8   | 14  | 20  | 32  | 50  | 80  | 120  | 200  | 320  | 500  | 500  |
| Burst pressure <sup>1)</sup>                               | bar             | 40  | 70  | 100 | 160 | 250 | 400 | 550  | 720  | 720  | 720  | 720  |
|  |                 | Other pressure ranges and pressure units (e.g. MPa, kg/cm <sup>2</sup> ) on request |     |     |     |     |     |      |      |      |      |      |
| Measuring principle  |                 | Thin-film sensor  |     |     |     |     |     |      |      |      |      |      |
| Materials  |                 |   |     |     |     |     |     |      |      |      |      |      |
| ■ Wetted parts   |                 | Elgiloy® (Sensor); 316L VIM/VAR (Pressure connection)                               |     |     |     |     |     |      |      |      |      |      |
| ■ Case   |                 | Stainless steel   |     |     |     |     |     |      |      |      |      |      |
| Surface finish   |                 | Electropolished, typical Ra ≤ 0.18 µm (RA 7); max. ≤ Ra 0.25 µm (RA 10)             |     |     |     |     |     |      |      |      |      |      |
| Dead volume  | mm <sup>3</sup> | < 1500  |     |     |     |     |     |      |      |      |      |      |
| Permissible Medium   |                 | Liquid / Gas / Vapour   |     |     |     |     |     |      |      |      |      |      |
| Power supply U <sub>B</sub>                                | V DC            | 10 < U <sub>B</sub> ≤ 30  |     |     |     |     |     |      |      |      |      |      |
| Switch points  |                 |   |     |     |     |     |     |      |      |      |      |      |
| ■ Number   |                 | 2   |     |     |     |     |     |      |      |      |      |      |
| ■ Function   |                 | Normally open / Normally closed (NPN open collector)                                |     |     |     |     |     |      |      |      |      |      |
| ■ Accuracy <sup>*)</sup>                                   | % of span       | ≤ 0.5 (≤ 0.25 BFSL) for pressure ranges ≥ 0 bar                                     |     |     |     |     |     |      |      |      |      |      |
|  | % of span       | ≤ 1.5 (≤ 0.75 BFSL) for pressure ranges ≤ 0 bar (Vacuum)                            |     |     |     |     |     |      |      |      |      |      |
| ■ Max. switching current                                   | mA              | 300 (None-inductive); not protected against short circuit                           |     |     |     |     |     |      |      |      |      |      |
| ■ Response time (switch time)                              | ms              | < 10  |     |     |     |     |     |      |      |      |      |      |
| ■ Adjustment (switch points)                               | % of span       | 1 ... 99  |     |     |     |     |     |      |      |      |      |      |
| ■ Switch hysteresis <sup>2)/3)</sup>                       | % of span       | 0.5 ... 5 (if not specified, the hysteresis is 1 % of span)                         |     |     |     |     |     |      |      |      |      |      |
| Boot Time  | s               | 1   |     |     |     |     |     |      |      |      |      |      |
| Linearity  | % of span       | ≤ 0.2 **)   |     |     |     |     |     |      |      |      |      |      |
| Hysteresis   | % of span       | ≤ 0.03  |     |     |     |     |     |      |      |      |      |      |
| Reproduceability   | % of span       | ≤ 0.15  |     |     |     |     |     |      |      |      |      |      |
| Repeatability  | % of span       | ≤ 0.05  |     |     |     |     |     |      |      |      |      |      |
| 1-year stability   | % of span       | ≤ 0.2 (at reference conditions)   |     |     |     |     |     |      |      |      |      |      |
| Influence of the power supply                              | VDC             | < 0.1 % / 10 K  |     |     |     |     |     |      |      |      |      |      |
| Permissible temperature range                              |                 |   |     |     |     |     |     |      |      |      |      |      |
| ■ Medium   | °C              | -40 ... +100  |     |     |     |     |     |      |      |      |      |      |
| ■ Ambient  | °C              | -20 ... +85   |     |     |     |     |     |      |      |      |      |      |
| ■ Storage  | °C              | -40 ... +100  |     |     |     |     |     |      |      |      |      |      |
| ■ Compensated  | °C              | -20 ... +80   |     |     |     |     |     |      |      |      |      |      |
| Temperature coefficients in compensated temperature range: |                 |   |     |     |     |     |     |      |      |      |      |      |
| ■ mean TC of zero  | % of span       | ≤ 0.3 / 10 K  |     |     |     |     |     |      |      |      |      |      |
| ■ mean TC of range   | % of span       | ≤ 0.15 / 10 K   |     |     |     |     |     |      |      |      |      |      |
| CE -conformity   |                 | Interference emission and compatibility see EN 61 326                               |     |     |     |     |     |      |      |      |      |      |
| Shock resistance   | g               | 500 according to IEC 770 (mechanical shock)   |     |     |     |     |     |      |      |      |      |      |
| Vibration resistance                                       | g               | 10 according to IEC 770 (vibration under resonance)                                 |     |     |     |     |     |      |      |      |      |      |
| Wiring protection  |                 | Protected against polarity crossing   |     |     |     |     |     |      |      |      |      |      |
| Ingress protection   |                 |   |     |     |     |     |     |      |      |      |      |      |
| IEC 60529 / EN 60529                                       |                 | IP 65 (NEMA 4)  |     |     |     |     |     |      |      |      |      |      |
| Weight   | kg              | Approx. 0.1   |     |     |     |     |     |      |      |      |      |      |

1) 1 bar = 14.50 psi

2) Ex factory calibrated

3) If the pressure of the pressure switch should lie within the switch hysteresis during first power up or after power loss, a definite on/off-state can be defined.

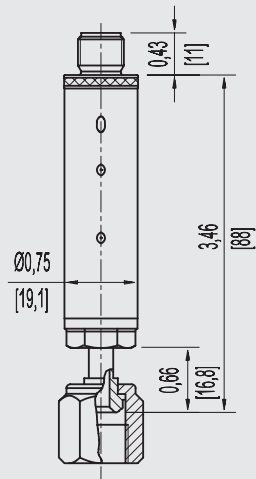
This definite on/off-state should be specified by the placement of the order.

\*) Calibrated in vertical mounting position (Accuracy ≤ 1 % (≤ 0.5 % BFSL) of span with pressure range 0 ... 4 bar or -1 ... 3 bar)

\*\*\*)Linearity ≤ 0.4 % of span with pressure range 0 ... 4 bar or -1 ... 3 bar.

## Dimensions in inch [mm]

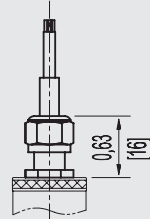
Circular connector  
M12x1, 4-pin  
Code: M4



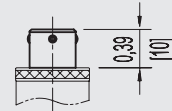
1/4" Swivel Female  
Face Seal,  
Code: W1

### Variants electrical connection

Flying leads  
Code: DI

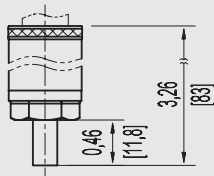


MIL-connector  
Code: O4

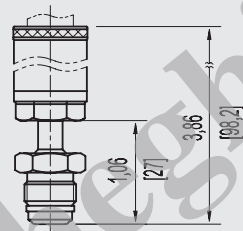


### Process connection variants

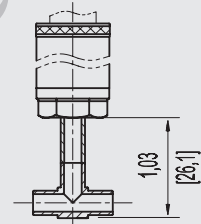
1/4" Weld stub  
Code: VN



1/4" Swivel Male Face Seal,  
Code: WH

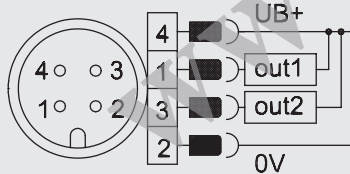


1/4" T-Connector, weld stub,  
Code: W1

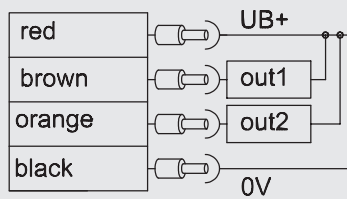


## Wiring details

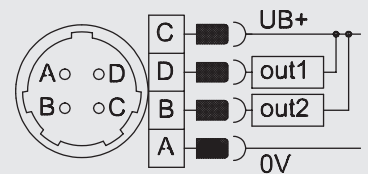
Circular connector M12x1,  
4-pin



Flying leads



MIL-connector,  
4-polig



## Order-Code for Typ WUS-10

## Further UHP-Pressure Switches

| Field No. | Code | Features                                     |
|-----------|------|--|
|           |      | <b>Pressure range</b>                        |
|           | BCH  | -1 bar ... 3 bar                             |
|           | BCT  | -1 bar ... 6 bar                             |
|           | BCL  | -1 bar ... 9 bar                             |
|           | BCP  | -1 bar ... 15 bar                            |
|           | BCQ  | -1 bar ... 25 bar                            |
|           | BCX  | -1 bar ... 40 bar                            |
|           | BCY  | -1 bar ... 60 bar                            |
|           | BC1  | -1 bar ... 100 bar                           |
|           | BC2  | -1 bar ... 160 bar                           |
|           | BC3  | -1 bar ... 250 bar                           |
|           | BBG  | 0 bar ... 4 bar                              |
|           | BEF  | 0 bar ... 7 bar                              |
|           | BBI  | 0 bar ... 10 bar                             |
|           | BBK  | 0 bar ... 16 bar                             |
|           | BBL  | 0 bar ... 25 bar                             |
|           | BBM  | 0 bar ... 40 bar                             |
|           | BBN  | 0 bar ... 60 bar                             |
|           | BBO  | 0 bar ... 100 bar                            |
|           | BBP  | 0 bar ... 160 bar                            |
|           | BBQ  | 0 bar ... 250 bar                            |
|           | BBS  | 0 bar ... 400 bar                            |
|           | PCE  | -30 inHg ... 45 psi                          |
|           | PCF  | -30 inHg ... 60 psi                          |
|           | PCH  | -30 inHg ... 100 psi                         |
|           | PCK  | -30 inHg ... 160 psi                         |
|           | PCI  | -30 inHg ... 250 psi                         |
|           | PCM  | -30 inHg ... 300 psi                         |
|           | PCX  | -30 inHg ... 500 psi                         |
|           | PBE  | 0 psi ... 60 psi                             |
|           | PBF  | 0 psi ... 100 psi                            |
|           | PBG  | 0 psi ... 160 psi                            |
|           | PDG  | 0 psi ... 250 psi                            |
|           | PBI  | 0 psi ... 300 psi                            |
|           | PDI  | 0 psi ... 500 psi                            |
|           | PBN  | 0 psi ... 1000 psi                           |
|           | PBO  | 0 psi ... 1500 psi                           |
|           | PBP  | 0 psi ... 2000 psi                           |
|           | PBQ  | 0 psi ... 3000 psi                           |
|           | PBS  | 0 psi ... 5000 psi                           |
| 1         | ???  | other  |
|           |      | <b>Process connection</b>                    |
|           | VN   | 1/4" Weld Stub                               |
|           | WH   | 1/4" Swivel Male Face Seal                   |
|           | WI   | 1/4" Swivel Female Face Seal                 |
|           | WT   | T-connector                                  |
| 2         | ??   | other  |
|           |      | <b>Electrical connection</b>                 |
|           | M4   | 4-pin locking plug M12x1                     |
|           | DI   | flying lead, IP 65                           |
|           | O4   | 4-pin MIL-plug                               |
| 3         | ??   | other  |
|           |      | <b>Cable length</b>                          |
|           | Z    | without <i>always choose if plug version</i> |
|           | C    | 1.5 m  |
|           | E    | 3 m  |
| 4         | ?    | other  |

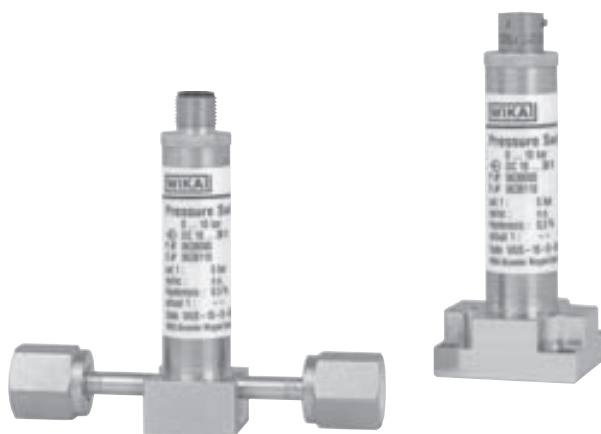


Fig. left Pressure Switch WUS-15  
Fig. right Pressure Switch WUS-16

### Order code:

|        |   |   |   |                                |   |                                |   |   |   |   |                                |                                |   |
|--------|---|---|---|--------------------------------|---|--------------------------------|---|---|---|---|--------------------------------|--------------------------------|---|
| WUS-10 | - | D | - | <input type="text" value="1"/> | - | <input type="text" value="2"/> | - | 7 | B | G | <input type="text" value="3"/> | <input type="text" value="4"/> | Z |
|--------|---|---|---|--------------------------------|---|--------------------------------|---|---|---|---|--------------------------------|--------------------------------|---|

Specifications and dimensions given in this leaflet represent the state of engineering at the time of printing. Modifications may take place and materials specified may be replaced by others without prior notice.



**WIKAL Alexander Wiegand GmbH & Co. KG**  
 Alexander-Wiegand-Straße 30  
 63911 Klingenberg/Germany  
 Telefon (+49) 93 72/132-0  
 Telefax (+49) 93 72/132-406  
 E-Mail support-tronic@wika.de  
 www.wika.de