

# Electronic pressure switch with display for sanitary applications

## Model PSA-31

WIKA data sheet PE 81.85



### Applications

- Food and beverage industry
- Pharmaceutical industry
- Filling and packaging machinery
- Sanitary applications

### Special features

- Easily-readable, robust display
- Intuitive and fast setup
- Easy and flexible mounting configurations



Pressure switch model PSA-31

## Description

### Award-winning in design and functionality

The successful design and the excellent functionality of the WIKA switch family were already confirmed by winning the "iF product design award 2009" for the PSD-30 pressure switch.

The robust LED display has been designed using 9 mm high characters (the largest possible) and with a slight incline in order to make reading the pressure as easy as possible from a long way off. A 14-segment display has been used, since it represents text very well.

The 3-key operation makes simple, intuitive menu navigation possible, with no need for additional assistance. The menu navigation is designed in accordance with the latest VDMA standard. The VDMA standard for fluid sensors (24574-1, part 1 - pressure switches) has the aim of simplifying the use of pressure switches by standardising menu navigation and display.

The control keys have been designed as large as possible and are arranged ergonomically to ensure fast and easy adjustments. Operation without any additional assistance is made easier through the tactile feedback.

### Customised installation

The installation of the PSA-31 can be flexibly adapted to the individual mounting situation. Due to the almost unlimited rotation of the display and case by more than 300°, the display can be adjusted independently of the electrical connection. The display can thus always be aligned to face the operator, and the M12 x 1 connection positioned to suit the desired cable routing.

### High quality

During development of the WIKA switch family a high value was placed on a robust design and the selection of appropriate materials suited to machine building applications. For this reason the case and the threaded connection of the electrical connector are made from stainless steel. Overwinding or tearing off the connector is therefore virtually impossible.

## Measuring ranges

| Relative pressure |          |           |                        |          |           |           |           |           |
|-------------------|----------|-----------|------------------------|----------|-----------|-----------|-----------|-----------|
| bar               | 0 ... 1  | 0 ... 1.6 | 0 ... 2.5              | 0 ... 4  | 0 ... 6   | 0 ... 10  | 0 ... 16  | 0 ... 25  |
| psi               | 0 ... 15 | 0 ... 25  | 0 ... 30 <sup>1)</sup> | 0 ... 50 | 0 ... 100 | 0 ... 160 | 0 ... 200 | 0 ... 300 |

| Absolute pressure |          |           |                        |          |           |           |           |           |
|-------------------|----------|-----------|------------------------|----------|-----------|-----------|-----------|-----------|
| bar               | 0 ... 1  | 0 ... 1.6 | 0 ... 2.5              | 0 ... 4  | 0 ... 6   | 0 ... 10  | 0 ... 16  | 0 ... 25  |
| psi               | 0 ... 15 | 0 ... 25  | 0 ... 30 <sup>1)</sup> | 0 ... 50 | 0 ... 100 | 0 ... 160 | 0 ... 200 | 0 ... 300 |

| Vacuum and +/- measuring range |             |               |               |                |                |                |                |  |
|--------------------------------|-------------|---------------|---------------|----------------|----------------|----------------|----------------|--|
| bar                            | -1 ... 0    | -1 ... +1.5   | -1 ... +3     | -1 ... +5      | -1 ... +9      | -1 ... +15     | -1 ... +24     |  |
| psi                            | -14.5 ... 0 | -14.5 ... +30 | -14.5 ... +50 | -14.5 ... +100 | -14.5 ... +160 | -14.5 ... +200 | -14.5 ... +300 |  |

The given measuring ranges are also available in kg/cm<sup>2</sup> and MPa.

### Overpressure limit

2 times

## Display

14-segment LED, red, 4-digit, 9 mm character size

Display can be turned electronically through 180°

### Update

100, 200, 500, 1000 ms (adjustable)

## Output signal

| Switching output 1 | Switching output 2 | Analogue signal |
|--------------------|--------------------|-----------------|
| PNP                | -                  | 4 ... 20 mA     |
| PNP                | -                  | DC 0 ... 10 V   |
| PNP                | PNP                | 4 ... 20 mA     |
| PNP                | PNP                | DC 0 ... 10 V   |

Alternatively also available with an NPN instead of a PNP switching output.  
With the IO-Link option, switching output 1 is always PNP.

### Zero offset adjustment

maximum 3 % of span

### Analogue signal

Current output load: ≤ 0.5 kΩ

Voltage output load: > 10 kΩ

Settling time: 3 ms

### Switching output

Switch point 1 and switch point 2 are individually adjustable

Normally-open and normally-closed function: freely adjustable

Window and hysteresis function: freely adjustable

Switching voltage: Power supply - 1 V

Switching current: maximum 250 mA

maximum 100 mA with IO-Link option

Settling time: ≤ 10 ms

## Voltage supply

### Power supply

DC 15 ... 35 V

### Current consumption

maximum 100 mA

### Total current consumption

maximum 600 mA incl. switching current

maximum 500 mA incl. switching current (with IO-Link option)

## Accuracy

### Analogue signal

≤ ± 1.0 % of span

Including non-linearity, hysteresis, zero-point and full scale deviations (corresponds to measured error per IEC 61298-2). Calibrated in vertical mounting position with process connection facing downwards.

### Non-linearity

≤ ± 0.5 % of span BFSL (per IEC 61298-2)

### Adjustment accuracy of the switch points

≤ ± 0.5 % of span

### Display

≤ ± 1.0 % of span ± 1 digit

### Long-term drift

≤ ± 0.2 % of span (per IEC 61298-2)

### Temperature coefficients depending on the process connection

#### Clamp DIN 32676, DN 32

##### Typical temperature coefficient of zero point

- 0 ... 20 °C 0.75 % of span / 10 K
- 20 ... 80 °C 0.45 % of span / 10 K

##### Typical temperature coefficient of span

- 0 ... 80 °C 0.1 % of span / 10 K

#### All other process connections

##### Typical temperature coefficient of zero point

- 0 ... 20 °C 0.7 % of span / 10 K
- 20 ... 80 °C 0.2 % of span / 10 K

##### Typical temperature coefficient of span

- 0 ... 80 °C 0.1 % of span / 10 K

## Reference conditions

Temperature: 15 ... 25 °C  
Atmospheric pressure: 950 ... 1050 mbar  
Humidity: 45 ... 75 % relative  
Nominal position: Process connection lower mount  
Power supply: DC 24 V  
Load: see "Output signal"

## Operating conditions

### Temperatures and humidity

Ambient temperature: -20 ... +80 °C  
Storage temperature: -20 ... +80 °C  
Rated temperature range: 0 ... 80 °C  
Permissible humidity: 45 ... 75 % relative

### Ingress protection

IP 65 and IP 67

The stated ingress protection (per IEC 60529) only applies when plugged in using mating connectors that have the appropriate ingress protection.

### Medium temperature depending on the process connection

- G1 hygienic  
-20 ... +125 °C (+150 °C possible for up to 60 minutes)
- All other process connections  
-20 ... +100 °C (+135 °C possible for up to 60 minutes)

### Vibration resistance

10 g (IEC 60068-2-27, vibration under resonance)

### Shock resistance

50 g (per IEC 60068-2-6, mechanical shock)

## Process connections

| Standard  | Thread                      |
|---|-----------------------------|
| Hygienic  | G 1, flush <sup>1) 2)</sup> |
| Grooved union nut DIN 11851 with conical coupling <sup>3)</sup> | DN 40<br>DN 50              |
| Tri-clamp   | 1 1/2"<br>2"                |
| Clamp DIN 32676   | DN 32<br>DN 40<br>DN 50     |

1) Sealing from EPDM or FKM

2) Suitable for WIKA adapter system model 910.61; see data sheet AC 09.20

3) For a 3-A conform connection of process connections with milk thread fittings per DIN 11851, profile sealings from SKS Komponenten BV or Kieselmann GmbH have to be used.

Other connections on request.

## Electrical connections

### Connections

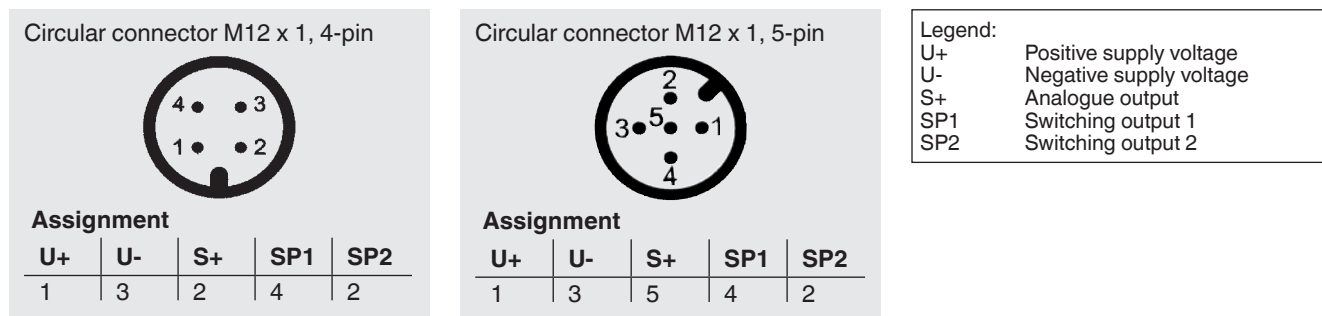
- Circular connector M12 x 1, 4-pin
- Circular connector M12 x 1, 5-pin <sup>1)</sup>

1) Only for version with two switching outputs and analogue signal

### Electrical safety

Overvoltage protection: DC 40 V  
Short-circuit resistance: S+ / SP1 / SP2 vs. U-  
Reverse polarity protection: U+ vs. U-  
Insulation voltage: DC 500 V

### Connection diagram



## Materials

### Wetted parts

Process connection: Stainless steel 1.4435 / 316L

### Non-wetted parts

Case: Stainless steel 304  
Keyboard: TPE-E  
Display window: PC  
Display head: PC+ABS-Blend

### Pressure transmission medium

KN59 Neobee® M-20, FDA conform

## Approvals, directives and certificates

### Certificates

3-A (74-03)

This instrument is 3-A marked based on a third party verification for conformance to the 3-A standard 74-03.

### CE conformity

- This instrument is a pressure accessory as defined by the 97/23/EC pressure equipment directive.
- EMC directive 2004/108/EC, EN 61326 emission (group 1, class B) and interference immunity (industrial application)

### RoHS conformity

Yes

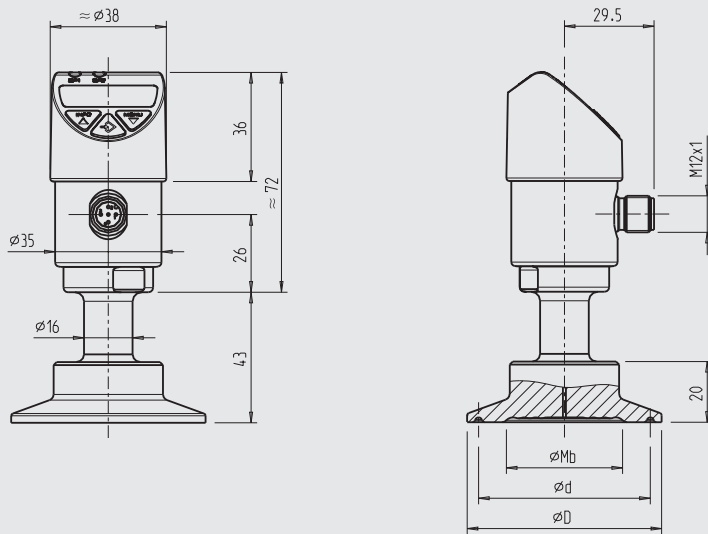
### Available documentation and certificates

- Material certificate per EN 10204-3.1
  - Confirmation of the class and indication accuracy
  - FDA conformity
  - Manufacturer's declaration regarding EU regulation 1935/2004 EC
- Others on request

## Dimensions in mm

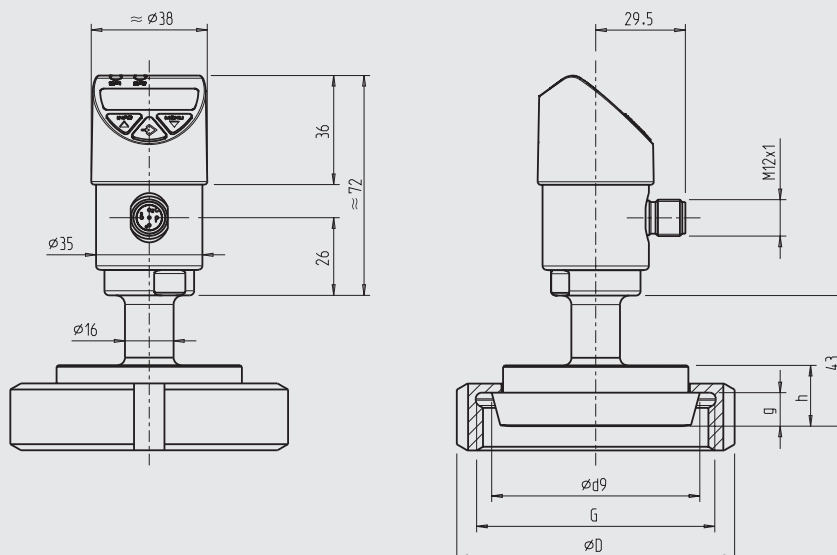
### Pressure switch

with clamp connection



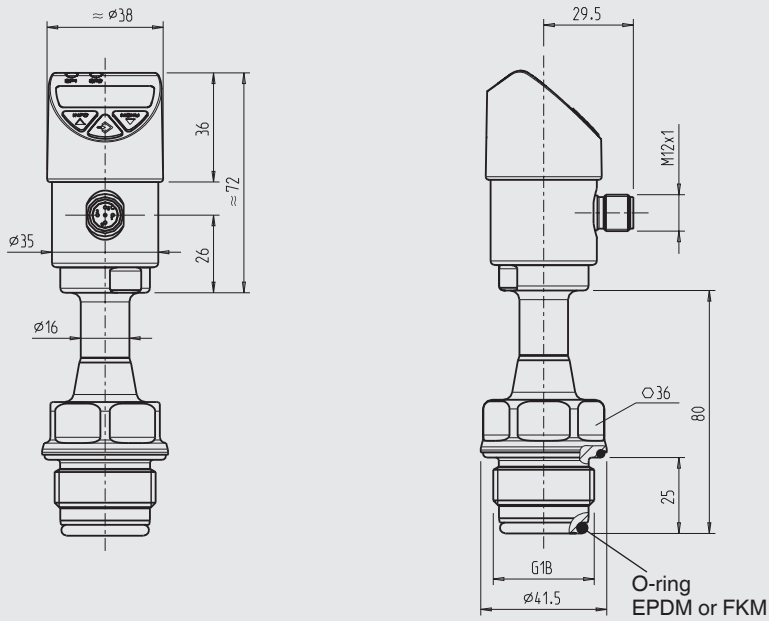
| Design    |        | Dimensions in mm |      |      |
|-----------|--------|------------------|------|------|
|           |        | ØMb              | Ød   | ØD   |
| DIN 32676 | DN 32  | 29               | 43.5 | 50.5 |
|           | DN 40  | 32               | 43.5 | 50.5 |
|           | DN 50  | 40               | 56.6 | 64   |
| Tri-clamp | 1 1/2" | 32               | 43.5 | 50.5 |
|           | 2"     | 40               | 56.6 | 64   |

with grooved union nut DIN 11851



| Design    |       | Dimensions in mm |             |    |    |    |
|-----------|-------|------------------|-------------|----|----|----|
|           |       | Ød9              | G           | ØD | g  | h  |
| DIN 11851 | DN 40 | 56               | Rd 65 x 1/6 | 78 | 10 | 20 |
|           | DN 50 | 68.5             | Rd 78 x 1/6 | 92 | 11 | 20 |

**with G1 hygienic connection**



For dimensions of the appropriate process adapters and welding sockets see data sheet AC 09.20

**Accessories and spare parts**

**Sealings for G1 hygienic**

Dimensions: 21.82 x 3.53 mm

| Material | Colour | Temperature range | Conformity to  | Order no. |
|----------|--------|-------------------|--|-----------|
| EPDM 70  | black  | -40 ... +145 °C   | FDA 21 CFR 177.2600, USP XXV class VI and 3-A (18-03) sanitary standards class 2 (max. 8 % milk fat) | 14004173  |
| FKM 75   | black  | -15 ... +200 °C   | FDA 21 CFR 177.2600, USP XXIII class VI and 3-A (18-03) sanitary standards class 1                   | 14004174  |

**Ordering information**

Model / Measuring range / Output signal / Process connection / Approvals / Documentation

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