

# 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 packing machinery

#### 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 conforms to 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.

### IO-Link

With the optional output signal in accordance with the IO-Link communication standard, the PSA-31 allows a fast integration into modern automation systems. IO-Link offers an even faster installation, parameterisation and higher functionality of the PSA-31.

## Measuring ranges

Gauge 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

1.7 times for gauge pressure measuring range 160 psi

## Display

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

Display can be turned electronically through 180°

Update (adjustable): 100, 200, 500 or 1,000 ms

## Output signals

Switching output		Analogue signal
SP1	SP2	
PNP	-	4 ... 20 mA (3-wire)
PNP	-	DC 0 ... 10 V (3-wire)
PNP	PNP	4 ... 20 mA (3-wire)
PNP	PNP	DC 0 ... 10 V (3-wire)

Optionally also available with an NPN instead of a PNP switching output

### IO-Link, revision 1.0 (option)

IO-Link is optionally available for all output signals.

With the IO-Link option, switching output SP1 is always PNP

### Zero offset adjustment

max. 3 % of span

### Switching thresholds

Switch point 1 and switch point 2 are individually adjustable

### Switching functions

Normally open, normally closed, window, hysteresis

Freely adjustable

### Switching voltage

Power supply - 1 V

### Switching current

- without IO-Link: max. 250 mA
- with IO-Link: SP1 max. 100 mA  
SP2 max. 250 mA

### Settling time

Analogue signal: 3 ms

Switching output: ≤ 10 ms

### Load

Analogue signal 4 ... 20 mA: ≤ 0.5 kΩ

Analogue signal DC 0 ... 10 V: > 10 kΩ

### Service life

100 million switching cycles

## Voltage supply

### Power supply

DC 15 ... 35 V

### Current consumption

Switching outputs with

- Analogue signal 4 ... 20 mA: 70 mA
- Analogue signal DC 0 ... 10 V: 45 mA

IO-Link option causes a deviating current consumption

### Total current consumption

- without IO-Link: max. 600 mA including switching current
- with IO-Link: max. 450 mA including switching current

## Accuracy data

### Accuracy, analogue signal

$\leq \pm 1.0$  % of span

Including non-linearity, hysteresis, zero offset and end value deviation (corresponds to measured error per IEC 61298-2). Calibrated in vertical mounting position with process connection facing downwards.

Non-linearity:  $\leq \pm 0.5$  % of span (BFSL, IEC 61298-2)

Long-term drift:  $\leq \pm 0.2$  % of span (IEC 61298-2)

### Accuracy, switching output

Switch point accuracy:  $\leq \pm 1$  % of span

Adjustment accuracy:  $\leq \pm 0.5$  % of span

### Display

$\leq \pm 1.0$  % of span  $\pm 1$  digit

### Typical temperature coefficient of zero point

- Clamp DIN 32676, DN 32
  - 0 ... 20 °C: 0.75 % of span/10 K
  - 20 ... 80 °C: 0.45 % of span/10 K
- All other process connections
  - 0 ... 20 °C: 0.7 % of span/10 K
  - 20 ... 80 °C: 0.2 % of span/10 K

### Typical temperature coefficient of span

All process connections

0 ... 80 °C: 0.1 % of span/10 K

## Reference conditions

Temperature: 15 ... 25 °C

Atmospheric pressure: 950 ... 1,050 mbar

Humidity: 45 ... 75 % r. h.

Nominal position: Process connection lower mount (LM)

Power supply: DC 24 V

Load: see "Output signals"

## Operating conditions

### Permissible temperature ranges

Ambient: -20 ... +80 °C

Storage: -20 ... +80 °C

Rated temperature range: 0 ... 80 °C

### 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)

### Humidity

45 ... 75 % r. h.

### Vibration resistance

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

### Shock resistance

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

### 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.

### Mounting position

any

## Process connections

### Available connections

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

## Electrical connections

### Connections

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

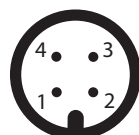
1) Only for version with two switching outputs and additional analogue signal

### Electrical safety

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

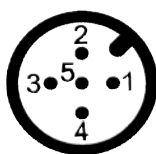
### Connection diagram

#### Circular connector M12 x 1 (4-pin)



U <sub>+</sub>	1
U <sub>-</sub>	3
S <sub>+</sub>	2
SP1	4

#### Circular connector M12 x 1 (5-pin)



U <sub>+</sub>	1
U <sub>-</sub>	3
S <sub>+</sub>	5
SP1	4
SP2	2

#### Legend:

U<sub>+</sub> Positive power supply  
 U<sub>-</sub> Negative power supply  
 S<sub>+</sub> Analogue output  
 SP1 Switching output 1  
 SP2 Switching output 2

## 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

KN 92 medicinal white mineral oil, FDA conform per CFR 172.878 and 21 CFR 178.3620(a); conform to USP, EP and JP

## CE conformity

### EMC directive

2004/108/EC, EN 61326 emission (group 1, class B) and interference immunity (industrial application)

### RoHS conformity

2011/65/EU

## Approvals

- GOST-R, import certificate, Russia
- EHEDG, food, Germany
- 3-A, food, USA

This instrument is 3-A marked based on a third party verification for conformance to the 3-A standard 74-06.

## 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

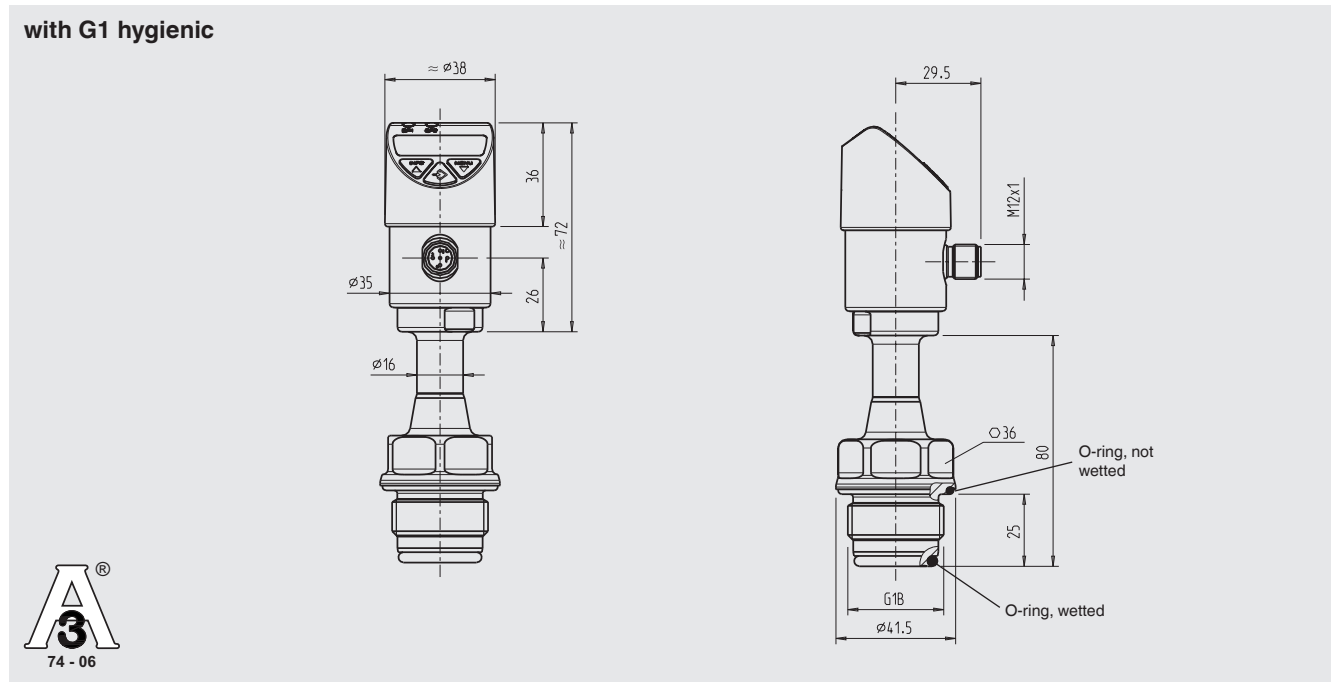
Others on request

Approvals and certificates, see website

# Process connections and dimensions in mm

## Pressure switch

with G1 hygienic

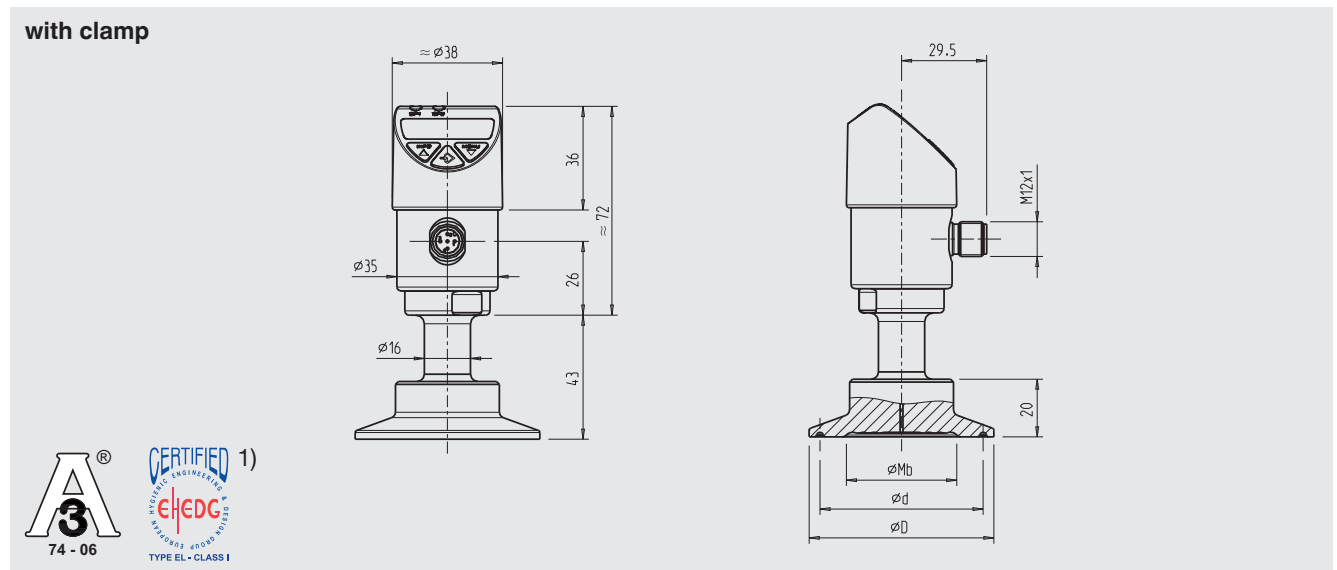


Sealing from EPDM or FKM

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

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

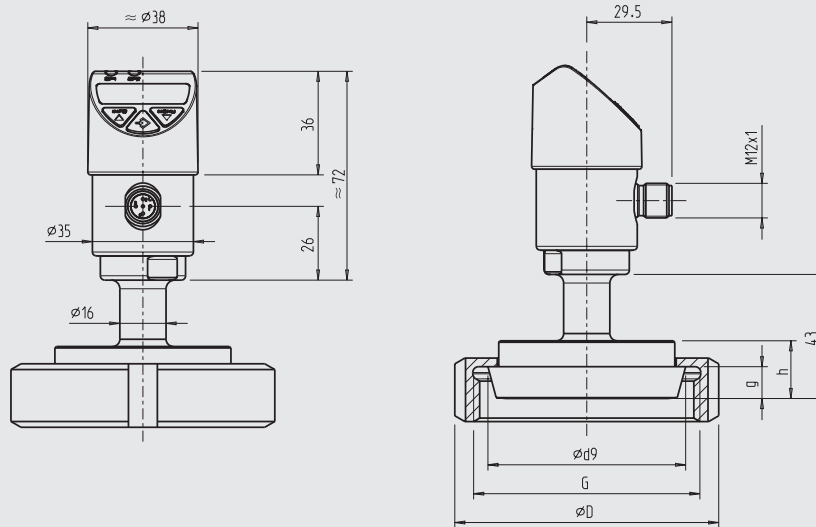
with clamp



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

1) EHEDG conformity with clamp connection only in combination with a Kalrez® stainless steel gasket from Dupont de Nemours or with a T-ring seal from Combifit International B.V.

with grooved union nut DIN 11851



**Design**

**Dimensions in mm**

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

1) 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.

2) EHEDG conformity with connection per DIN 11851 only in combination with ASEPTO-STAR k-flex upgrade, sealing from Kieselmann GmbH.

Other process connections available on request.

**Accessories and spare parts**

**Sealings for G1 hygienic, wetted**

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

**Sealings for G1 hygienic, not wetted**

Dimensions: 35 x 2.5 mm

Material	Colour	Temperature range	Conformity to	Order no.
EPDM 70	black	-40 ... +145 °C	-	14023833

## Connectors with moulded cable

	Description	Temperature range	Cable diameter	Order no.
	Straight version, cut to length, 4-pin, 2 m PUR cable, UL listed, IP 67	-20 ... +80 °C	4.5 mm	14086880
	Straight version, cut to length, 4-pin, 5 m PUR cable, UL listed, IP 67	-20 ... +80 °C	4.5 mm	14086883
	Straight version, cut to length, 4-pin, 10 m PUR cable, UL listed, IP 67	-20 ... +80 °C	4.5 mm	14086884
	Straight version, cut to length, 5-pin, 2 m PUR cable, UL listed, IP 67	-20 ... +80 °C	5.5 mm	14086886
	Straight version, cut to length, 5-pin, 5 m PUR cable, UL listed, IP 67	-20 ... +80 °C	5.5 mm	14086887
	Straight version, cut to length, 5-pin, 10 m PUR cable, UL listed, IP 67	-20 ... +80 °C	5.5 mm	14086888
	Angled version, cut to length, 4-pin, 2 m PUR cable, UL listed, IP 67	-20 ... +80 °C	4.5 mm	14086889
	Angled version, cut to length, 4-pin, 5 m PUR cable, UL listed, IP 67	-20 ... +80 °C	4.5 mm	14086891
	Angled version, cut to length, 4-pin, 10 m PUR cable, UL listed, IP 67	-20 ... +80 °C	4.5 mm	14086892
	Angled version, cut to length, 5-pin, 2 m PUR cable, UL listed, IP 67	-20 ... +80 °C	5.5 mm	14086893
	Angled version, cut to length, 5-pin, 5 m PUR cable, UL listed, IP 67	-20 ... +80 °C	5.5 mm	14086894
	Angled version, cut to length, 5-pin, 10 m PUR cable, UL listed, IP 67	-20 ... +80 °C	5.5 mm	14086896

### Ordering information

Model / Measuring range / Number of switching outputs / Type of switching output / Analogue signal / Process connection / Certificates / Accessories and spare parts

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