

# Differential pressure switch

## Stainless steel switch enclosure

### Models DW, DW10

WIKA data sheet PV 35.42



## 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
- Filter and level monitoring

### Special features

- No power supply needed for switching of electrical loads
- Robust switch enclosure from aluminium alloy or stainless steel 316L, IP66, NEMA 4X
- Setting ranges from 0 ... 16 mbar to 0 ... 40 bar with high static and high one-sided pressure up to 160 bar
- Ex ia version available
- 1 or 2 independent set points, SPDT or DPDT, high switching power up to AC 250 V, 20 A



**Fig. left: Differential pressure switch for medium/high setting ranges, model DW**

**Fig. right: Differential pressure switch for low setting ranges, model DW10**

### 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.

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.

All wetted materials are from stainless steel as a standard. For applications with special requirements on the wetted parts, a version with Monel® is available.

By using a diaphragm measuring system, the model DC differential pressure switch is extremely robust and guarantees optimal operating characteristics and the highest measuring performances, with repeatability lower than 1 % of span.

The process connection with a centre distance of 54 mm lower mount allows an easy and comfortable mounting of a standard valve manifold.

## Standard version

### Model DW

Double diaphragm with transmission shaft, without sealing elements

### Model DW10

Single diaphragm with transmission shaft, without sealing elements

For clean gas or non-condensing vapour only.

### Switch enclosure

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

### Ingress protection

IP66 per EN/IEC 60529, NEMA 4X

### 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 0.5 % of the span.

### Permissible temperature

Ambient  $T_{amb}$ : -30 ... +85 °C  
Medium  $T_M$ : -30 ... +85 °C

### 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 optional Ex ia versions)

Maximum values	
Voltage $U_i$	DC 30 V
Current $I_i$	100 mA
Power $P_i$	0.75 W
Internal capacitance $C_i$	0 $\mu$ F
Internal inductance $L_i$	0 mH

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

≤ 1 % 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.

### Please specify:

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

Set point 1: 3 bar, falling, set point 2: 6 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 span.

### Example

Setting range: 0 ... 10 bar with one switch contact

Repeatability: 1 % of 10 bar = 0.1 bar

Dead band: (see table setting ranges)

2 x repeatability + dead band = 2 x 0.1 bar + 0.3 bar = 0.5 bar

Rising pressure: Adjust set point between 0.5 ... 10 bar.

Falling pressure: Adjust set point between 0 ... 9.5 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, M20 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 grounding cable connection to the protective conductor screws use max. 2.5 mm<sup>2</sup> for the internal screw and max. 4 mm<sup>2</sup> for the external screw.

### Dielectric strength

Safety class I (IEC 61298-2: 2008)

### Wetted parts

Setting range	Stainless steel version		NACE version <sup>1)</sup>		Monel version			
	Diaphragm	Process connection	Diaphragm	Process connection	Diaphragm	Process connection		
16 mbar	AISI 316	AISI 316L	-	-	-			
25 mbar								
40 mbar								
60 mbar								
160 mbar								
250 mbar			Monel® 400	AISI 316L	-	-	Monel® 400	
400 mbar								
600 mbar								
1 bar								
2.5 bar								
4 bar	AISI 304							
6 bar								
10 bar								
16 bar	Inconel® 718		Inconel® 718		-			
25 bar								
40 bar								

1) NACE compliant to MR 0175, ISO 15156 and MR 0103

Sealing material for all versions: NBR

### Mounting

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

### Weight

- Model DW: approx. 6.2 kg
- Model DW10: approx. 8.2 kg

## Setting range, model DW

$\Delta p$ -cell	Setting range	Fixed dead band for contact version		Adjustable dead band for contact version	Static / One-sided pressure
	in bar	1 contact UN, US, UO, UG in mbar	2 contacts DN, DS, DO, DG in mbar	1 contact UR in mbar	in bar
L	0 ... 0.16	≤ 6	≤ 6	25 ... 60	≤ 40, ≤ 100 or ≤ 160
	0 ... 0.25	≤ 8	≤ 8	30 ... 80	
-	0 ... 0.4	≤ 20	≤ 20	45 ... 120	
	0 ... 0.6	≤ 25	≤ 25	80 ... 200	
	0 ... 1	≤ 40	≤ 40	100 ... 270	
	0 ... 2.5	≤ 70	≤ 70	260 ... 700	
	0 ... 4	≤ 120	≤ 120	450 ... 1,150	
	0 ... 6	≤ 180	≤ 180	600 ... 1,600	
	0 ... 10	≤ 300	≤ 300	1,100 ... 2,800	
	0 ... 16	≤ 480	≤ 480	1,600 ... 3,500	
0 ... 25	≤ 700	≤ 700	2,500 ... 5,500		
V	0 ... 40	≤ 1,200	≤ 1,200	on request	

Other available setting ranges:

- -40 ... +120 mbar, -60 ... +190 mbar, -200 ... +200 mbar, -300 ... +300 mbar, -500 ... +500 mbar
- -1.25 ... +1.25 bar, -2 ... +2 bar, -3 ... +3 bar, -5 ... +5 bar, -8 ... +8 bar, -12.5 ... +12.5 bar

## Setting range, model DW10 <sup>1)</sup>

$\Delta p$ -cell	Setting range	Fixed dead band for contact version		Adjustable dead band for contact version	Static / One-sided pressure
	in mbar	1 contact UN, US, UO, UG in mbar	2 contacts DN, DS, DO, DG in mbar	1 contact UR in mbar	in bar
-	0 ... 16	≤ 1.2	≤ 1.6	-	≤ 10 <sup>2)</sup>
	0 ... 25	≤ 1.2	≤ 1.6	4 ... 10	≤ 10
	0 ... 40	≤ 1.6	≤ 2.2	5 ... 14	
	0 ... 60	≤ 2.5	≤ 3.0	6 ... 18	

1) For clean gas or non-condensing vapour only

2) One-sided pressure 2 bar

## Other Versions




- Ex ia version
- Cleaned for oxygen service
- Drying of wetted parts
- Offshore version <sup>3)</sup>
- NACE compliant to MR 0175, ISO 15156 and MR 0103 <sup>3)</sup>
- Wetted parts from Monel®

3) WIKA recommends argon gas-filled contact versions

## Assembly

- Valve manifold for differential pressure measuring instruments, models IV30, IV31 and IV50 und IV51 see data sheet AC 09.23
- Diaphragm seals, see website
- Differential pressure gauge


## Approvals

Logo	Description	Country
	<b>EU declaration of conformity</b> <ul style="list-style-type: none"> <li>■ Pressure equipment directive</li> <li>■ Low voltage directive</li> <li>■ RoHS directive</li> <li>■ ATEX directive <sup>1)</sup> (option)               <ul style="list-style-type: none"> <li>I M 1</li> <li>II 1 GD</li> </ul> </li> </ul>	European Community
	<b>IECEx <sup>1)</sup> (option)</b> <ul style="list-style-type: none"> <li>Ex ia I Ma</li> <li>Ex ia IIC T6/T4 <sup>2)</sup> Ga</li> <li>Ex ia IIIC T85/T135 <sup>2)</sup> Da</li> </ul>	IECEx member states
	<b>EAC (option)</b> Hazardous areas	Eurasian Economic Community
	<b>Ex-Ukraine (option)</b> Hazardous areas	Ukraine
	<b>CCC (option)</b> Hazardous areas	China
	<b>KOSHA (option)</b> 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

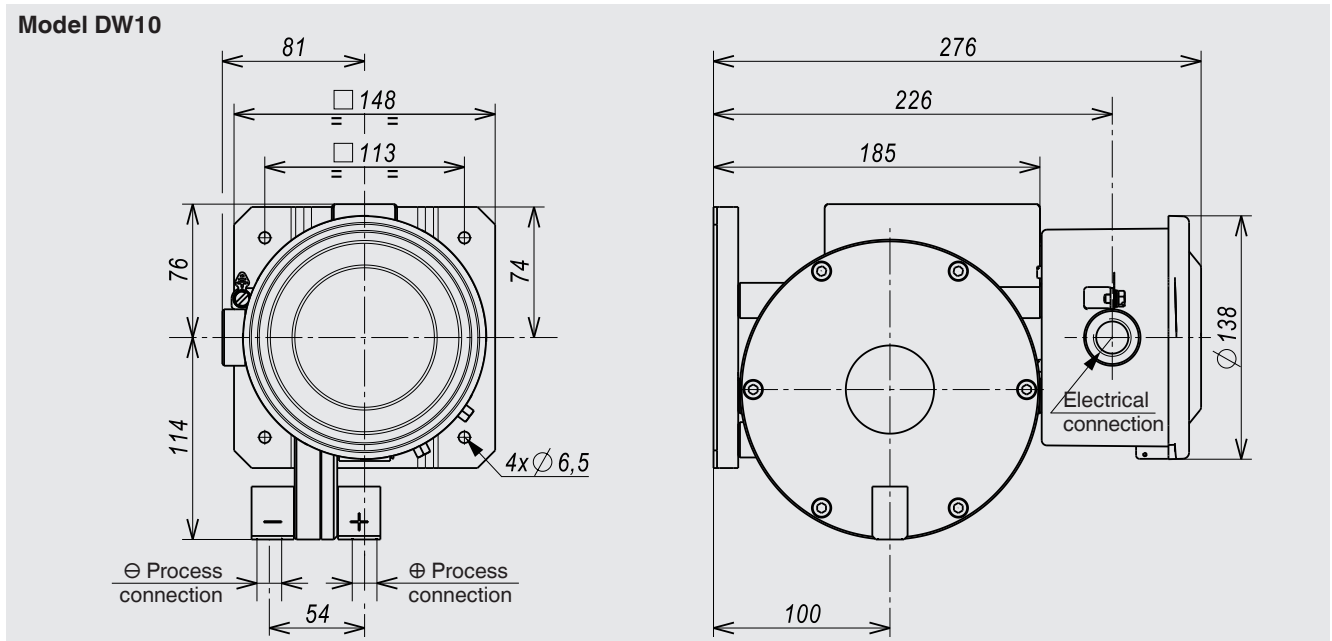
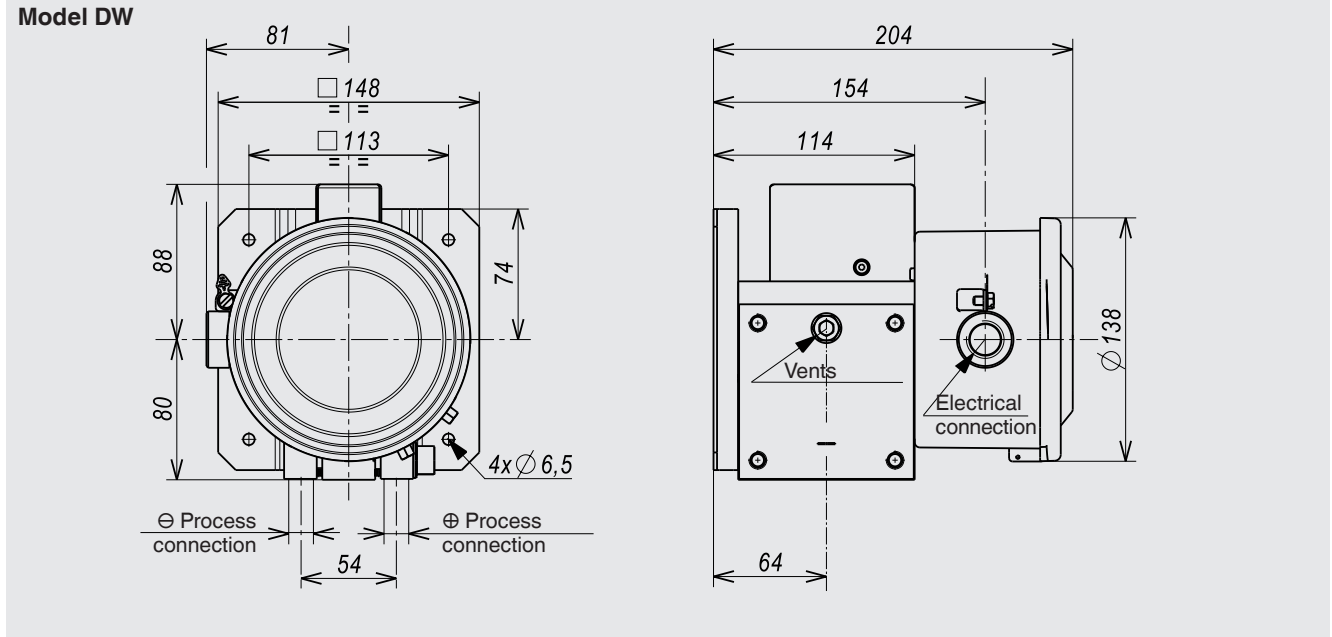
Logo	Description
	<b>SIL 2 rating (option)</b> , per IEC 61508 Functional safety Only available with contact version US or UO

## Certificates (option)

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

Approvals and certificates, see website

## Dimensions in mm



### Ordering information

Model /  $\Delta p$ -cell / Static - One-sided pressure / Contact version / Setting range / Process connection / Electrical connection / Options

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