

Differential pressure switch Model DPS40, DELTA-switch

WIKA data sheet PV 27.21



Applications

Monitoring and control of filters, compressors and pumps for:

- Boilers and pressure vessels
- Drinking and cooling-water treatment plants
- Pressure-boosting and pumping stations
- Heating technology
- Fire-extinguishing systems

Special features

- With one or two adjustable micro switches
- Shatterproof window and robust aluminium or stainless steel measuring chamber for increased requirements
- Optionally with approvals for hazardous areas
- High ingress protection, IP65, for outdoor use and processes with high condensation
- Low measuring range from 0 ... 250 mbar

Description

The differential pressure gauges of the DELTA-line product family are primarily used for the monitoring and control of low differential pressures where there are high requirements in terms of one-sided overload and static pressure.

Typical markets for these products are the process heating technology, the heating, ventilation and air-conditioning industries, the water/wastewater industry, and machine building and plant construction. For these, the main function of the measuring instruments is the monitoring and control of filters, compressors and pumps.

Wherever circuits need to be switched safely dependent on a defined differential pressure, the DELTA-switch finds its use. As the pressure passes above or below a defined set point, the switching operation is triggered.



Fig. left: With aluminium measuring chamber

Fig. right: With stainless steel measuring chamber

The switch point is accessible from the front and can be set in the range of 10 ... 100 % of the end value of the measuring range by means of an assistant scale.

The robust instrument with a shatterproof window achieves high durability, even under harsh ambient conditions. This ensures that there is no danger from the instrument and it is resistant to external mechanical impacts.

The measuring chamber, depending on the requirement and application, can be made from aluminium or stainless steel. Through the increased stability, the stainless steel measuring chamber is also suitable for gaseous media.

Design and operating principle

Pressures p_1 and p_2 act on the media chambers \oplus and \ominus , which are separated by an elastic diaphragm (1).

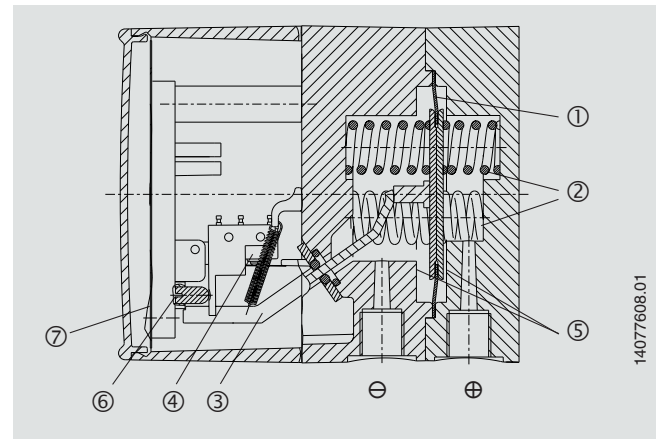
The differential pressure ($\Delta p = p_1 - p_2$) leads to an axial deflection of the diaphragm against the measuring range springs (2).

The deflection, which is proportional to the differential pressure, is transmitted to the leaf springs of the micro switches (4) in the switch enclosure via a pressure-tight and low-friction rocker arm (3).

Overload safety is provided by metal bolsters (5) resting against the elastic diaphragm.

The adjustment of the switch point is made by the adjustment screws accessible from the front (6). The assistant scales (7) simplify the setting of the switch point.

Illustration of the principle



Mounting according to affixed symbols:
 \oplus high pressure, \ominus low pressure

Mounting:

- Rigid measuring line
- Wall mounting with available mounting links

Specifications

Basic information	
Nominal size	Ø 100 mm
Window	Plastic, with plug screw for switch point setting
Case version	Display case, aluminium, EN AC-Al Si9Cu3(Fe); black painted → Measuring chamber, see table "Measuring element"

Measuring element	
Type of measuring element	Measuring chamber with diaphragm and media chambers \oplus and \ominus
Material	
Measuring chamber	<ul style="list-style-type: none"> ■ Aluminium, EN AC-Al Si9Cu3(Fe), black painted ■ Stainless steel 1.4571
Diaphragm, sealings	<ul style="list-style-type: none"> ■ FPM/FKM ■ NBR

Accuracy specifications	
Repeatability	≤ 1.6 % of measuring span
Temperature error	On deviation from the reference conditions at the measuring system: Max. ±0.8 %/10 K of end value of measuring range
Reference conditions	
Ambient temperature	+20 °C [+68 °F]

Differential pressure measuring ranges

Measuring range	
mbar	psi
0 ... 250	0 ... 15
0 ... 400	0 ... 25
0 ... 600	0 ... 40
0 ... 1,000	0 ... 60
bar	kg/cm²
0 ... 0.25	0 ... 0.25
0 ... 0.4	0 ... 0.4
0 ... 0.6	0 ... 0.6
0 ... 1	0 ... 1
0 ... 1.6	0 ... 1.6
0 ... 2.5	0 ... 2.5
0 ... 4	0 ... 4
0 ... 6	0 ... 6
0 ... 10	0 ... 10
kPa	MPa
-12.5 ... +12.5	0 ... 0.025
0 ... 25	0 ... 0.04
0 ... 40	0 ... 0.06
0 ... 60	0 ... 0.1
0 ... 100	0 ... 0.16
0 ... 160	0 ... 0.25
0 ... 250	0 ... 0.4
0 ... 400	0 ... 0.6
0 ... 600	0 ... 1
0 ... 1,000	

Further information on: Measuring ranges

Type of pressure	Differential pressure
Special measuring ranges	Other measuring ranges on request
Unit	<ul style="list-style-type: none"> ■ bar ■ psi ■ mbar ■ kg/cm² ■ MPa ■ kPa

Process connections	
Standard	<ul style="list-style-type: none"> ■ EN 837 ■ DIN EN ISO 8434-1
Size	
EN 837	<ul style="list-style-type: none"> ■ 2 x G ¼, female thread, centre distance 26 mm ■ 2 x G ¼ B, male thread, centre distance 26 mm
DIN EN ISO 8434-1	<ul style="list-style-type: none"> ■ 2 x compression fitting with ferrule for pipe Ø 6 mm ■ 2 x compression fitting with ferrule for pipe Ø 8 mm ■ 2 x compression fitting with ferrule for pipe Ø 10 mm
Materials (wetted)	
Measuring chamber	<ul style="list-style-type: none"> ■ Aluminium, Al Si9Cu3(Fe), black painted ■ Stainless steel 1.4571
Process connection	<ul style="list-style-type: none"> ■ Identical to measuring chamber (only 2 x G ¼ female thread) ■ Copper alloy ■ Stainless steel ■ Steel (only compression fittings with ferrule)
Diaphragm, sealings	<ul style="list-style-type: none"> ■ FPM/FKM ■ NBR

Output signal	
Connection method	Micro switch
Number of switches	<ul style="list-style-type: none"> ■ Single contact, contact model 850.3 ■ Double contact, contact model 850.3.3
Switching function	Change-over contact
Switch point setting	From the outside at assistant scale by means of adjustment screw(s)
Setting range	From 10 % to 100 % of measuring range
Switch hysteresis	<ul style="list-style-type: none"> ■ Max. 2.5 % of end value of measuring range ■ Max. 5 % of end value of measuring range

Electrical connections	
Connection type	<ul style="list-style-type: none"> ■ Cable gland M20 x 1.5, with 1 m cable, flying leads ■ Cable socket ■ Angular connector
Pin assignment	→ See drawings from page 6





Operating conditions	
Medium temperature	-10 ... +90 °C [14 ... 194 °F]
Ambient temperature	
Non-Ex instruments	-10 ... +70 °C [14 ... 150 °F]
Ex instruments	-10 ... +60 °C [14 ... 140 °F]
Storage temperature	-20 ... +60 °C [-4 ... +140 °F]
Pressure limitation	
Steady	End value of measuring range
Fluctuating	0.9 x end value of measuring range
Overload safety	Max. 25 bar On one, both and alternatingly on the ⊕ and ⊖ sides
Ingress protection per IEC/EN 60529	IP65

Approvals

Approvals included in the scope of delivery

Logo	Description	Country
	EU declaration of conformity	European Union
	<ul style="list-style-type: none"> ■ Pressure equipment directive ■ Low voltage directive ■ RoHS directive 	

Optional approvals

Logo	Description	Country
	EU declaration of conformity	European Union
	ATEX directive Hazardous areas Gas II 2G Ex ia IIC T4/T5/T6 Gb Dust II 2D Ex ia IIIB T135°C Db	
	IECEX Hazardous areas	International
	EAC <ul style="list-style-type: none"> ■ EMC directive ■ Low voltage directive ■ Hazardous areas 	Eurasian Economic Community
	Ex Ukraine Hazardous areas	Ukraine

Certificates (option)

Certificates	
Certificates	<ul style="list-style-type: none"> ■ 2.2 test report per EN 10204 (e.g. state-of-the-art manufacturing, indication accuracy) ■ 3.1 inspection certificate per EN 10204 (e.g. indication accuracy)
Recommended recalibration interval	1 year (dependent on conditions of use)

→ Approvals and certificates, see website

Safety-relevant characteristic values (explosion-protected version)

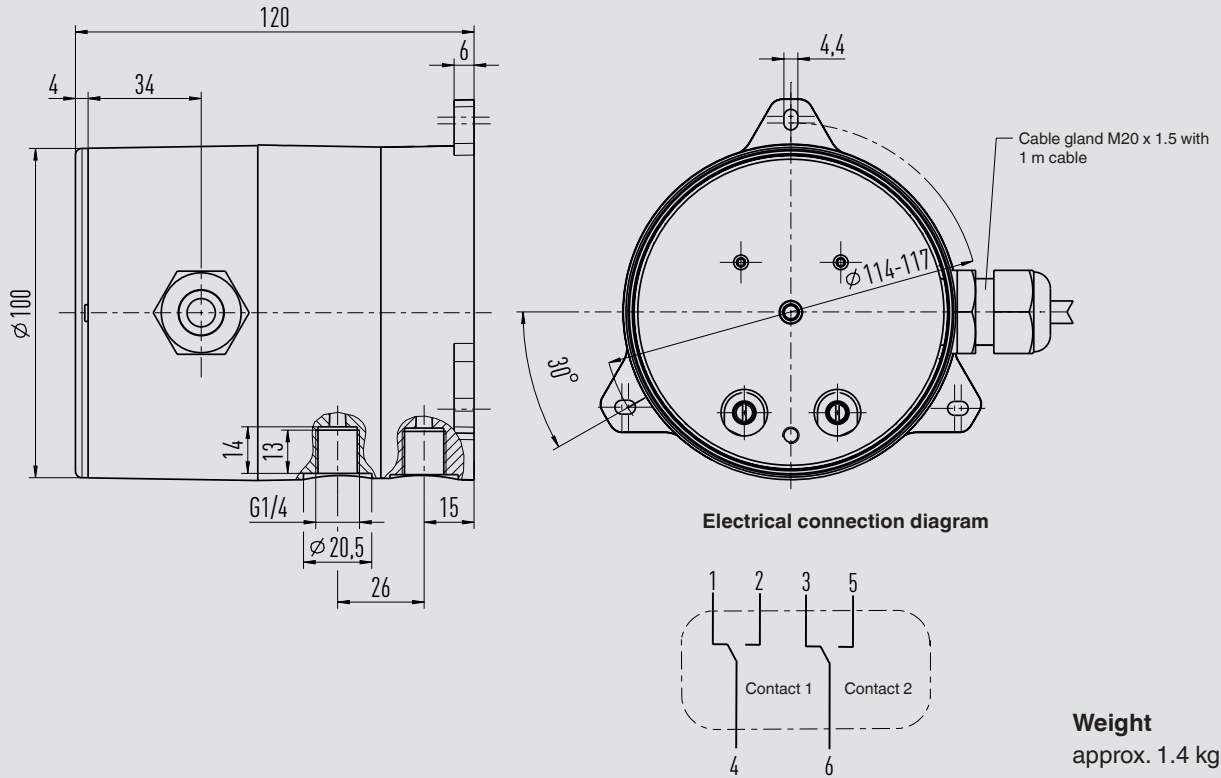
Safety-related characteristic values (Ex)	
Terminals	
Switch A	"1" / "4" / "2"
Switch B	"3" / "6" / "5"
Maximum voltage U_i	DC 30 V
Maximum current I_i	100 mA
Maximum power P_i (gas)	1 W
Maximum power P_i (dust)	
$T_a \leq +40 \text{ °C}$	$\leq 750 \text{ mW}$
$T_a \leq +60 \text{ °C}$	$\leq 650 \text{ mW}$
Effective internal capacitance C_i	Negligible
Effective internal inductance L_i	Negligible

Instruments with two micro switches

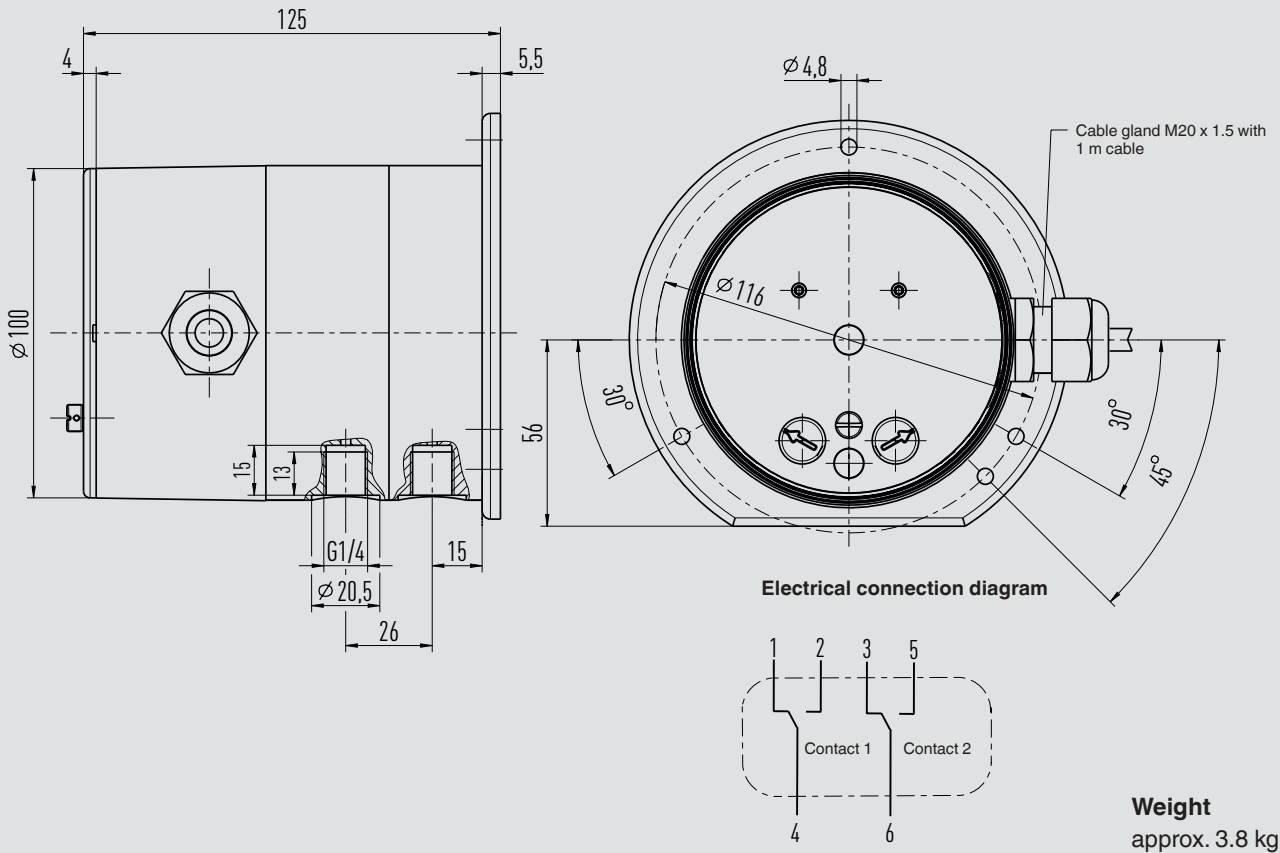
If more than one circuit is connected, all conditions for the separation of two intrinsically safe circuits must be observed.

Dimensions in mm

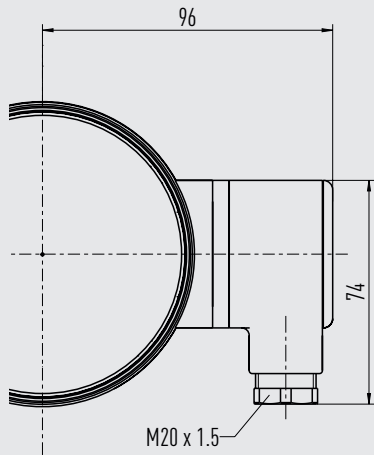
Model DPS40 with aluminium measuring chamber, 2 x G 1/4 female thread, centre distance 26 mm



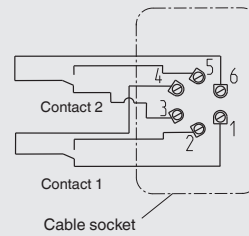
Model DPS40 with stainless steel measuring chamber, 2 x G 1/4 female thread, centre distance 26 mm



With cable socket or angular connector








Electrical connection diagram



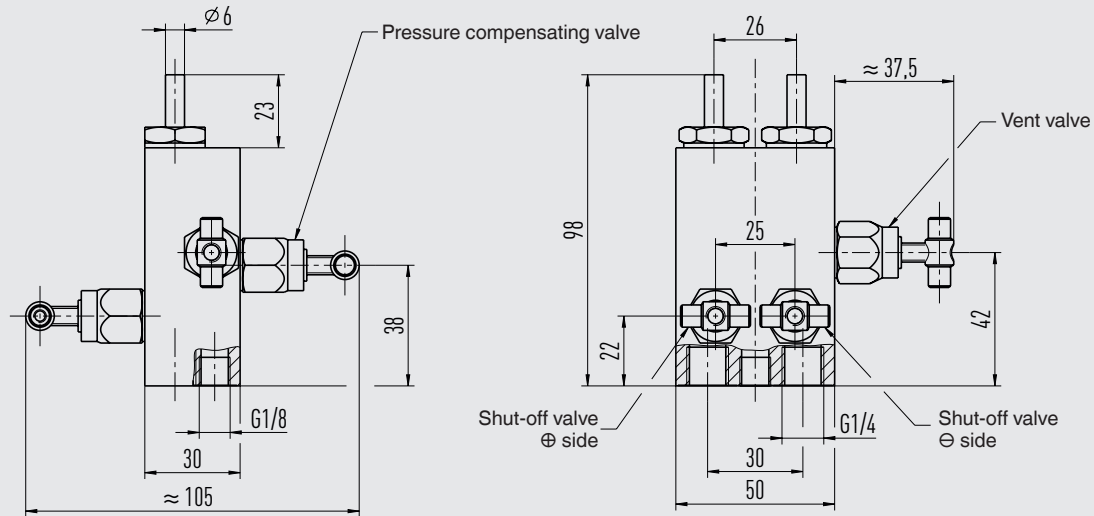
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Accessories and spare parts

Model	Description	Order number	
	-	Panel mounting flange, aluminium	14074004
	-	Panel mounting flange, stainless steel	14075088
	910.17	Sealings → see data sheet AC 09.08	-
	910.15	Syphons → see data sheet AC 09.06	-
	IV3x	4-way valve block, stainless steel → For dimensions see page 8	2043559
	-	4-way valve block, brass → For dimensions see page 8	2043567
	-	Compression fittings with ferrule or clamp ring for pipe diameters 6, 8 and 10 mm	On request

Dimensions in mm

4-way valve block



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Ordering information

Model / Scale range / Process connection / Material of separating diaphragm and sealings / Number of switches / Options

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