

# Differential pressure gauge with microswitches With integrated working pressure indication (DELTA-comb) Model DPGS40

WIKA data sheet PV 27.20



for further approvals  
see page 6

**DELTA-comb**

## 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 microswitches
- 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



**Fig. left: With aluminium measuring chamber**

**Fig. right: With stainless steel measuring chamber**

## 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.

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 two easily readable, mechanical on-site displays need no power supply and enable the simultaneous reading of the working and the differential pressure. Furthermore, this saves on an additional measuring and sealing point, reducing additional expense for piping and mounting.

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.

Functionality

The display case (1) is connected directly with the measuring chamber (2) and the process connections integrated in it.

Pressures p1 and p2 act on the media chambers ⊕ and ⊖, which are separated by an elastic diaphragm (3).

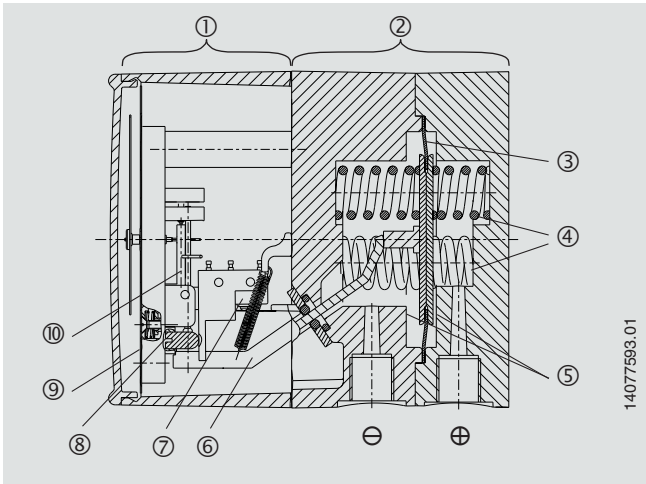
The differential pressure ( $\Delta p = p_1 - p_2$ ) leads to an axial deflection of the diaphragm against the measuring range springs (4).

The deflection, which is proportional to the differential pressure, is transmitted to the movement (10) in the indicator case and to the leaf springs of the microswitches (7) via a pressure-tight and low friction rocker arm (6).

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

With versions without Ex approval, the adjustment of the switch point is made by the adjustment screws accessible from the front (8). The assistant scales (9) simplify the setting of the switch point.

For versions with Ex approval, the switch point setting is made at the factory and cannot be carried out subsequently.



Overview of versions

Measuring chamber material		Working pressure indication		Ex approval
Aluminium	Stainless steel	Without	Ø 22 mm	
x		x		Option
x			x	Option
	x	x		Option

→ For information on approvals, see page 6

Specifications

Basic information	
Nominal size	
Differential pressure display	Ø 100 mm
Working pressure indication	■ Without ■ Ø 22 mm
Window	
Non-Ex version	Plastic, with plug screw for switch point setting
Ex version	Plastic (switch point setting can only be carried out at the factory)
Case version	
Display case, aluminium, EN AC-Al Si9Cu3(Fe); black painted	
→ Measuring chamber, see table "Measuring element"	

Measuring element	
Type of measuring element	
Differential pressure display	Measuring chamber with diaphragm and media chambers $\oplus$ and $\ominus$
Working pressure indication	<div> <div></div> Without         </div> <div> <div></div> Bourdon tube         </div>
Material	
Measuring chamber	<div> <div></div> Aluminium, EN AC–Al Si9Cu3(Fe), black painted         </div> <div> <div></div> Stainless steel 1.4571         </div>
Diaphragm, sealings	<div> <div></div> FPM/FKM         </div> <div> <div></div> NBR         </div>
Bourdon tube (working pressure indication)	Copper alloy

Accuracy specifications	
Accuracy class	
Differential pressure display	<div> <div></div> 2.5         </div> <div> <div></div> 1.6 (only selectable for scale ranges from 0 ... 1 bar to 0 ... 10 bar)         </div>
Working pressure indication	4
Repeatability	$\leq 1.6$ % of measuring span
Temperature error	On deviation from the reference conditions at the measuring system: Max. $\pm 0.8$ %/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/cm <sup>2</sup>
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

Measuring range	
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	

### Scale ranges for working pressure

Scale range
bar
0 ... 10
0 ... 16
0 ... 25

Further details on: Measuring ranges	
Type of pressure	Differential pressure
Special measuring ranges	Other measuring ranges on request
Unit	<ul style="list-style-type: none"> <li>■ bar</li> <li>■ psi</li> <li>■ mbar</li> <li>■ kg/cm<sup>2</sup></li> <li>■ MPa</li> <li>■ kPa</li> </ul>

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


Output signal	
Connection method	Microswitch
Number of switches	<ul style="list-style-type: none"> <li>■ Single contact, contact model 850.3</li> <li>■ Double contact, contact model 850.3.3</li> </ul>
Switching function	Change-over contact
Switch point setting	From the outside at assistant scale by means of adjustment screw(s)
Non-Ex version	<ul style="list-style-type: none"> <li>■ From the outside at assistant scale by means of adjustment screw(s)</li> </ul>
Ex version	<ul style="list-style-type: none"> <li>■ Factory set (subsequent switch point setting cannot be carried out)</li> </ul>
Setting range	From 10 % to 100 % of measuring range
Switch hysteresis	<ul style="list-style-type: none"> <li>■ Max. 2.5 % of end value of measuring range</li> <li>■ Max. 5 % of end value of measuring range</li> </ul>

Electrical connections	
Connection type	<ul style="list-style-type: none"> <li>■ Cable gland M20 x 1.5 with 1 m cable, flying leads</li> <li>■ Cable socket</li> <li>■ Angular connector</li> </ul>
Pin assignment	→ See drawings from page 8










Operating conditions	
Medium temperature	-10 ... +90 °C [14 ... 194 °F]
Ambient temperature	
Non-Ex version	-10 ... +70 °C [14 ... 150 °F]
Ex version	-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 $\oplus$ and $\ominus$ sides
Ingress protection per IEC/EN 60529	IP65

## Approvals

### Approvals included in the scope of delivery

Logo	Description	Country
	<b>EU declaration of conformity</b>	European Union
	Pressure equipment directive	
	Low voltage directive	
	RoHS directive	
-	<b>CRN</b> Safety (e.g. electr. safety, overpressure, ...)	Canada

### Optional approvals

Logo	Description	Country
	<b>EU declaration of conformity</b>	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	
	<b>IECEx</b>	International
	Hazardous areas	
	Gas Ex ia IIC T4/T5/T6 Gb Dust Ex ia IIIB T135°C Db	
	<b>EAC</b> Hazardous areas	Eurasian Economic Community
	<b>UkrSEPRO</b> Metrology, measurement technology	Ukraine
	<b>Ex Ukraine</b> Hazardous areas	Ukraine
	<b>Uzstandard</b> Metrology, measurement technology	Uzbekistan
	<b>GOST</b> Metrology, measurement technology	Russia
	<b>KazInMetr</b> Metrology, measurement technology	Kazakhstan
-	<b>MTSCHS</b> Permission for commissioning	Kazakhstan
	<b>BelGIM</b> Metrology, measurement technology	Belarus

## Certificates (option)

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

→ Approvals and certificates, see website

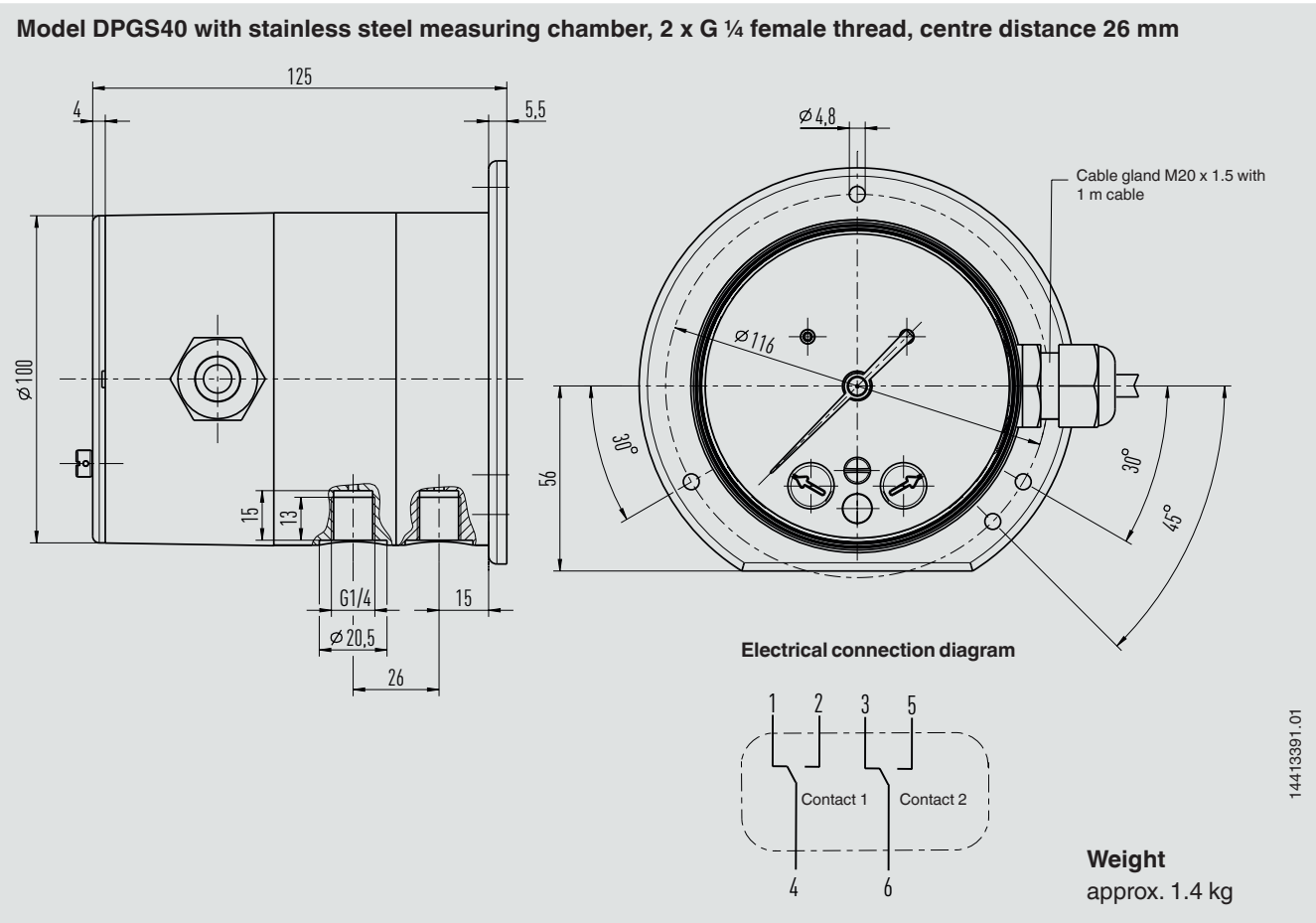
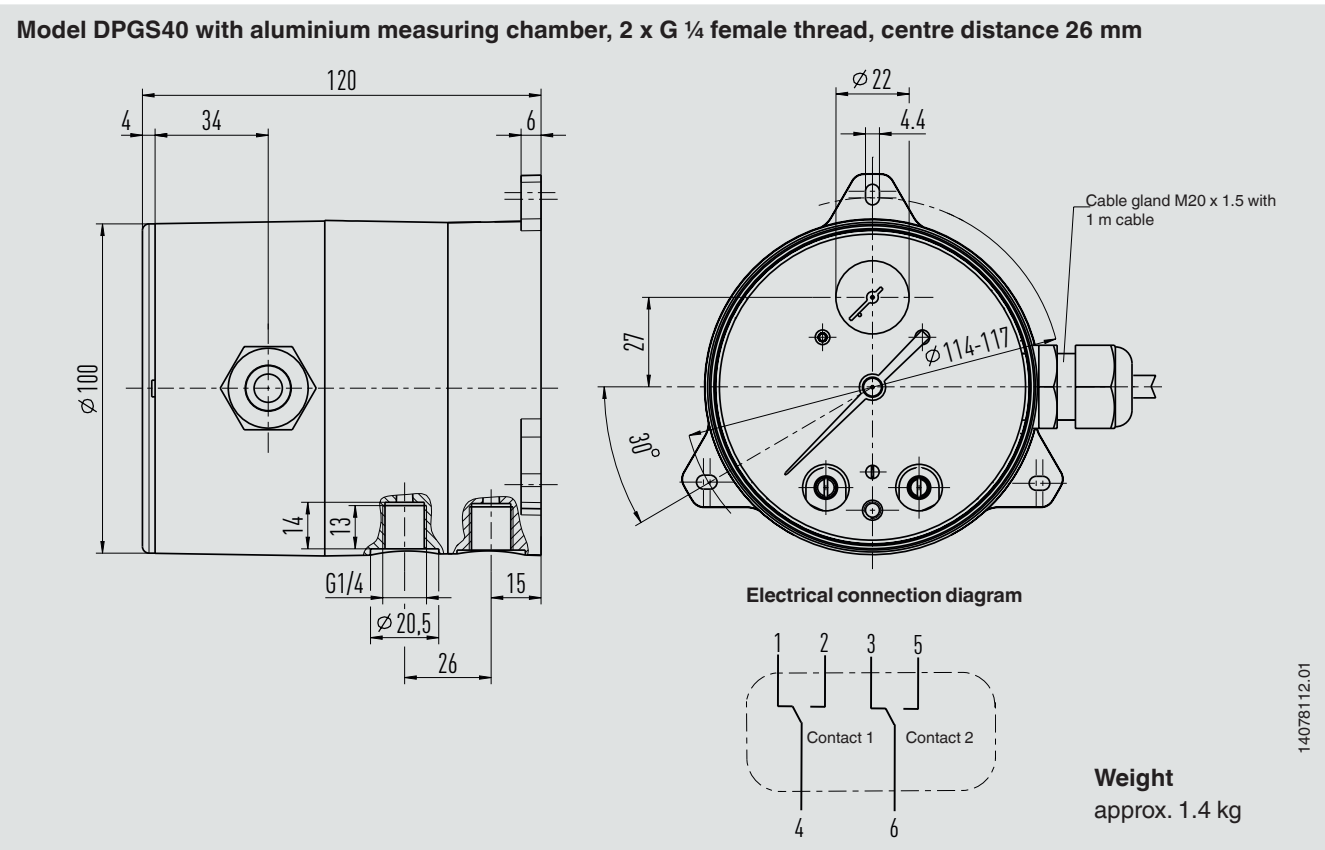
## Safety-relevant characteristic values (explosion-protected version)

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

### Instruments with two microswitches

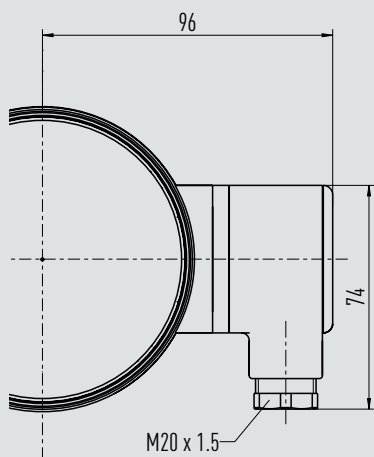
If more than one circuit is connected, all conditions for the separation of two intrinsically safe circuits must be observed.

# Dimensions in mm

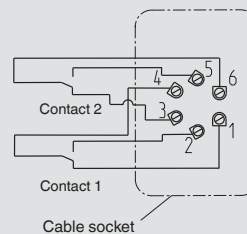




## With cable socket or angular connector



Electrical connection diagram



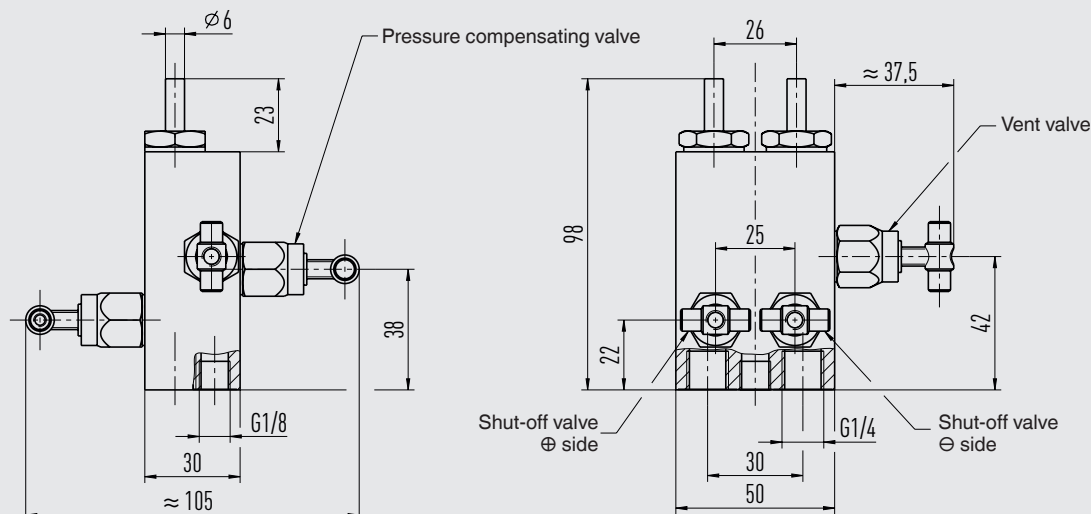
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## Accessories

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 10	2043559
		4-way valve block, brass → For dimensions see page 10	2043567
	-	Bite-type fittings for pipe diameters 6, 8 and 10 mm	On request

## Dimensions in mm

### 4-way valve block



2261821.01

## Ordering information

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

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