

# Differential pressure gauge with switch contacts

## For the process industry

### Models DPGS43HP.1x0, high overload safety up to 40, 100, 250 or 400 bar

WIKA data sheet PV 27.13



for further approvals  
see page 9

**switchGAUGE**

## Applications

- Control and regulation of processes
- Monitoring of plants and switching of circuits
- For measuring locations with a high differential pressure overload and/or high working pressures (static pressures), also in aggressive environments
- Easy-to-read, analogue on-site display needing no external power
- Pump monitoring and control, filter monitoring, level measurement on closed vessels

## Special features

- Differential pressure measuring ranges from 0 ... 60 mbar
- High working pressure (static pressure) and high overload safety, selectable up to 40, 100, 250 or 400 bar
- Measuring cell liquid dampening against rapid pressure changes
- Instruments with inductive contacts for use in hazardous areas
- Instruments with switch contact for PLC applications

## Description

Wherever the process pressure has to be indicated locally and, at the same time, circuits need to be switched, the model DPGS43HP.1x0 switchGAUGE finds its use.

Switch contacts (electrical alarm contacts) make or break circuits dependent upon the pointer position of the indicating measuring instruments. The switch contacts are adjustable over the full extent of the scale range (see DIN 16085), and are mounted predominantly below the dial, though also partly on top of the dial. The instrument pointer (actual value pointer) moves freely across the entire scale range, independent of the setting.

The set pointer can be adjusted using a removable adjustment key in the window.



**Differential pressure gauge model DPGS43HP.100 with switch contact model 821.21**

Switch contacts consisting of several contacts can also be set to a single set point. Contact actuation is made when the actual value pointer travels beyond or below the desired set point.

The pressure gauge is manufactured in accordance with DIN 16085 and fulfils all requirements of the relevant standards (EN 837-3) and regulations for the on-site display of the working pressure of pressure vessels. As switch contacts, magnetic snap-action contacts, reed switches, inductive contacts and electronic contacts are available. Inductive contacts can be used in hazardous areas. For triggering programmable logic controllers (PLC), electronic contacts and reed switches can be used.

## Specifications

Models DPGS43HP.100 and DPGS43HP.160	
<b>Version</b>	Highest overload safety either side, pressure ratings PN 40, 100, 250 or 400, system fill fluid of the measuring cell acts as the dampening of the display. Overload resistance per EN 837-3.
<b>Nominal size in mm</b>	<ul style="list-style-type: none"> <li>■ 100</li> <li>■ 160</li> </ul>
<b>Accuracy class</b>	1.6 Option: 1.0 on request, (Monel version: 2.5)
<b>Scale ranges</b>	Instruments with PN 40 and 100: <ul style="list-style-type: none"> <li>■ 0 ... 60 mbar to 0 ... 160 mbar (measuring cell □ 140)</li> <li>■ 0 ... 0.25 bar to 0 ... 40 bar (measuring cell □ 82)</li> </ul> Instruments with PN 250: <ul style="list-style-type: none"> <li>■ 0 ... 60 mbar to 0 ... 250 mbar (measuring cell □ 140)</li> <li>■ 0 ... 0.4 bar to 0 ... 40 bar (measuring cell □ 82)</li> </ul> Instruments with PN 400: 0 ... 0.4 bar to 0 ... 40 bar (measuring cell □ 86) Dimensions of measuring cell from page 11 other units (e.g. psi, kPa) available or all other equivalent vacuum or combined pressure and vacuum ranges
<b>Scale</b>	Single scale Option: <ul style="list-style-type: none"> <li>■ Dual scale</li> <li>■ Scale layout (e.g. linear pressure or square root incrementation)</li> </ul>
<b>Zero point setting</b>	By means of adjustment appliance
<b>Pressure limitation</b>	
Steady	Full scale value
Fluctuating	0.9 x full scale value Observe the recommendations for the use of mechanical pressure measuring systems in accordance with EN 837-2
<b>Overpressure safety and max. working pressure (static pressure)</b>	Either side max. 40, 100, 250 or 400 bar
<b>Connection location</b>	Lower mount (radial) Option: <ul style="list-style-type: none"> <li>■ Back mount</li> <li>■ Connection at 12 o'clock</li> </ul>
<b>Process connection</b>	<ul style="list-style-type: none"> <li>■ G ½ B female</li> <li>■ G ½ B male</li> <li>■ ½ NPT male</li> <li>■ Differential process connection per EN 61518</li> </ul> Other process connections via female or male threads on request
<b>Permissible temperature <sup>1)</sup></b>	
Medium	-20 ... +100 °C Option: Medium temperature > 100 °C on request
Ambient	-20 ... +60 °C Option: Ambient temperature -40 ... +60 °C (silicone oil filling)
<b>Temperature effect</b>	When the temperature of the measuring system deviates from the reference temperature (+20 °C): max. ±0.5 %/10 K of full scale value
<b>Case filling</b>	Without Option: With case filling

<sup>1)</sup> For hazardous areas, the permissible temperature of the contact model 831 will exclusively apply (see page 6). These must not be exceeded at the instrument either (for details see operating instructions). If necessary, measures for cooling (e.g. syphon, instrumentation valve, etc.) have to be taken.

Models DPGS43HP.100 and DPGS43HP.160	
<b>Venting of the media chambers</b>	<ul style="list-style-type: none"> <li>■ Instruments with PN 40 and 100: For scale ranges <math>\leq 0.16</math> bar (option for scale ranges <math>\geq 0.25</math> bar)</li> <li>■ Instruments with PN 250 and 400: Standard for scale ranges <math>\leq 0.25</math> bar (option for scale ranges <math>\geq 0.4</math> bar)</li> </ul> Option: Venting of the media chambers for scale ranges $\geq 0.25$ bar or $\geq 0.4$ bar
<b>System fill fluid of measuring cell</b>	Silicone oil Option: Measuring cell filling with special medium, e.g. for use in oxygen applications Others on request
<b>Wetted materials</b>	
Measuring flanges with process connection	Stainless steel 316L
Pressure elements	<ul style="list-style-type: none"> <li>■ <math>\leq 0.25</math> bar: Stainless steel 1.4571</li> <li>■ <math>&gt; 0.25</math> bar: NiCr alloy (Inconel)</li> </ul>
Measuring cell	Chrome steel
Venting of the media chambers	Stainless steel 316L
Sealings	FPM/FKM
<b>Non-wetted materials</b>	
Flange connecting screws	<ul style="list-style-type: none"> <li>■ PN 40 / 100: Stainless steel</li> <li>■ PN 250 / 400: Steel, corrosion-protected</li> </ul>
Case, movement, bayonet ring	Stainless steel
Dial	Aluminium, white, black lettering
Pointer	Aluminium, black
Window	Laminated safety glass
<b>Ingress protection per IEC/EN 60529</b>	IP54 <sup>1)</sup> Option: IP65 with liquid filling
<b>Installation</b>	According to affixed symbols: $\oplus$ high pressure, $\ominus$ low pressure
<b>Mounting</b>	<ul style="list-style-type: none"> <li>■ Rigid measuring lines</li> <li>■ Drilled mounting holes at the back of the measuring cell</li> </ul> Option: <ul style="list-style-type: none"> <li>■ Panel mounting flange</li> <li>■ Instrument mounting bracket for wall or pipe mounting</li> </ul>
<b>Electrical connection</b>	Cable socket PA 6, black Per VDE 0110 insulation group C/250 V Cable gland M20 x 1.5 Strain relief 6 screw terminals + PE for conductor cross-section 2.5 mm <sup>2</sup> For dimensions see page 10 others on request

1) Ingress protection IP54 with safety version and lower back mount.

## Other versions

Wetted parts made of special material (Monel, PTFE lining)

## Switch contacts

### Magnetic snap-action contact model 821

- No control unit and no supply voltage required
- Direct switching up to 250 V, 1 A
- Up to 4 switch contacts per measuring instrument

### Inductive contact model 831

- Suitable for use in hazardous areas with corresponding control unit (model 904.xx)
- Long service life due to non-contact sensor
- Low influence on the indication accuracy
- Fail-safe switching at high switching frequency
- Insensitive to corrosion
- Also available in safety version
- Up to 3 switch contacts per measuring instrument

### Electronic contact model 830 E

- For direct triggering of a programmable logic controller (PLC)
- 2-wire system (option: 3-wire system)
- Long service life due to non-contact sensor
- Low influence on the indication accuracy
- Fail-safe switching at high switching frequency
- Insensitive to corrosion
- Up to 3 switch contacts per measuring instrument

### Reed switch model 851

- No control unit and no supply voltage required
- Direct switching up to 250 V, 1 A
- For direct triggering of a programmable logic controller (PLC)
- Free from wear as without contact
- NS 100: Up to two change-over contacts per measuring instrument;  
NS 160: Up to one change-over contact per measuring instrument (switching voltages AC < 50 V and DC < 75 V, switch contact not adjustable from outside)

### Switching function

The switching function of the switch is indicated by index 1, 2 or 3

Model 8xx.1: Normally open (clockwise pointer motion)

Model 8xx.2: Normally closed (clockwise pointer motion)

Models 821.3 Change-over; one contact breaks and one and 851.3: contact makes simultaneously when pointer reaches set point

For further information on switch contacts, see data sheet AC 08.01

## Other versions

- Contact model 821 with separate circuits
- Contact model 821 as change-over contact (break or make simultaneously at the set point)
- Contact model 821 with cable break monitoring (parallel resistance 47 k $\Omega$  and 100 k $\Omega$ )
- Contacts fixed, without contact adjustment lock
- Contact adjustment lock leaded
- Contact adjustment key fixed

## Specifications for instruments with magnetic snap-action contact model 821

Measuring span	Nominal size	Max. number of contacts	Switching current range I
≤ 60 mbar	100, 160	2	0.02 ... 0.3 A
> 100 mbar	100, 160	4	0.02 ... 0.3 A

The recommended setting range of the contacts is 25 ... 75 % of the scale (0 ... 100 % on request).

Contact material (standard): Silver-nickel, gold-plated

### Setting the contacts

The recommended minimum clearance between 2 contacts is 20 % of the measuring span.

The switch hysteresis is 2 ... 5 % (typical).

Characteristics	Unfilled instruments	Filled instruments
	Resistive load	Resistive load
Rated operating voltage $U_{eff}$	≤ 250 V	≤ 250 V
Rated operating current		
Switch-on current	≤ 0.5 A	≤ 0.5 A
Switch-off current	≤ 0.5 A	≤ 0.5 A
Continuous current	≤ 0.3 A	≤ 0.3 A
Switching power	≤ 30 W / ≤ 50 VA	≤ 20 W / ≤ 20 VA

### Recommended contact load with resistive and inductive loads

Operating voltage	Unfilled instruments			Filled instruments		
	Resistive load		Inductive load	Resistive load		Inductive load
	Direct current	Alter-nating current	cos φ > 0.7	Direct current	Alter-nating current	cos φ > 0.7
DC 220 V / AC 230 V	100 mA	120 mA	65 mA	65 mA	90 mA	40 mA
DC 110 V / AC 110 V	200 mA	240 mA	130 mA	130 mA	180 mA	85 mA
DC 48 V / AC 48 V	300 mA	450 mA	200 mA	190 mA	330 mA	130 mA
DC 24 V / AC 24 V	400 mA	600 mA	250 mA	250 mA	450 mA	150 mA

## Specifications for instruments with inductive contact model 831

Measuring span	Nominal size	Max. number of contacts
≤ 60 mbar	100, 160	2
> 100 mbar	100, 160	3

The recommended setting range of the contacts is 10 ... 90 % of the scale (0 ... 100 % on request).

### Setting of contacts to identical set point

Up to 2 contacts can be set to an identical set point. For a version with 3 contacts this is not possible. The left (no. 1) or right (no. 3) contact may not be set to the same set point as the other 2 contacts. The required displacement is approx. 30°, optionally to the right or to the left.

### Available contact versions

- 831-N
- 831-SN, safety version <sup>1)</sup>
- 831-S1N, safety version <sup>1)</sup>, inverted signal

<sup>1)</sup> only operate with a corresponding isolating amplifier (model 904.3x)

### Permissible temperature ranges

T6	T5 ... T1	T135°C
-20 ... +60 °C	-20 ... +70 °C	-20 ... +70 °C

For further information on hazardous areas, see operating instructions.

### Associated isolating amplifiers and control units

Model	Version	Ex version
904.28 KFA6 - SR2 - Ex1.W	1 contact	yes
904.29 KFA6 - SR2 - Ex2.W	2 contacts	yes
904.30 KHA6 - SH - Ex1	1 contact	yes - safety equipment
904.33 KFD2 - SH - Ex1	1 contact	yes - safety equipment
904.25 MSR 010-I	1 contact	no
904.26 MSR 020-I	2 contacts	no
904.27 MSR 011-I	Two-point control	no

## Specifications for instruments with electronic contact model 830 E

Measuring span	Nominal size	Max. number of contacts
≤ 60 mbar	100, 160	2
> 100 mbar	100, 160	3

The recommended setting range of the contacts is 10 ... 90 % of the scale (0 ... 100 % on request).

### Setting of contacts to identical set point

Up to 2 contacts can be set to an identical set point. For a version with 3 contacts this is not possible. The left (no. 1) or right (no. 3) contact may not be set to the same set point as the other 2 contacts. The required displacement is approx. 30°, optionally to the right or to the left.

Characteristics	
Contact version	Normally open, normally closed
Type of output	PNP transistor
Operating voltage	DC 10 ... 30 V
Residual ripple	max. 10 %
No-load current	≤ 10 mA
Switching current	≤ 100 mA
Residual current	≤ 100 µA
Voltage drop (with $I_{max.}$ )	≤ 0.7 V
Reverse polarity protection	Conditional $U_B$ (the switched output 3 or 4 must never be set directly to minus)
Anti-inductive protection	1 kV, 0.1 ms, 1 kΩ
Oscillator frequency	approx. 1,000 kHz
EMC	per EN 60947-5-2

## Specifications for instruments with reed switch model 851

Measuring span	Nominal size	Max. number of contacts
≥ 60 mbar	100, 160	2

Switching power  $P_{\max}$  60 W / 60 VA







Switching current 1 A

Characteristics	
Contact version	Change-over contact
Type of contact	Bistable
Max. switching voltage	AC/DC 250 V
Min. switching voltage	Not required
Switching current	AC/DC 1 A
Min. switching current	Not required
Transport current	AC/DC 2 A
cos φ	1
Switching power	60 W/VA
Contact resistance (static)	100 mΩ
Insulation resistance	10 <sup>9</sup> Ω
Breakdown voltage	DC 1,000 V
Switching time incl. contact chatter	4.5 ms
Contact material	Rhodium
Switch hysteresis	3 ... 5 %

- The limit values presented here must not be exceeded.
- When using two contacts, these cannot be set to the same point. Depending on the switching function, a minimum clearance of 15 ... 30° is required.
- The setting range of the contacts is 10 ... 90 % of the scale.
- The switching function can be set in manufacturing such that the reed contact will actuate exactly at the required switch point. For this, we need the switching direction to be specified on order.



## Approvals

Logo	Description	Country
	<b>EU declaration of conformity</b> <ul style="list-style-type: none"> <li>■ EMC directive</li> <li>■ Low voltage directive</li> <li>■ RoHS directive</li> <li>■ ATEX directive (directive) <sup>1)</sup></li> </ul> Hazardous areas <ul style="list-style-type: none"> <li>- Ex ia Gas [II 2G Ex ia IIC T6/T5/T4 Gb]</li> <li>Dust [II 2D Ex ia IIIB T135°C Db]</li> </ul>	European Union
	<b>IECEx (option) <sup>1)</sup></b> Hazardous areas <ul style="list-style-type: none"> <li>- Ex ia Gas [Ex ia IIC T6/T5/T4 Gb]</li> <li>Dust [Ex ia IIIB T135°C Db]</li> </ul>	International
	<b>EAC (option)</b> <ul style="list-style-type: none"> <li>■ EMC directive</li> <li>■ Low voltage directive</li> <li>■ Hazardous areas <sup>1)</sup></li> </ul>	Eurasian Economic Community
	<b>GOST (option)</b> Metrology, measurement technology	Russia
-	<b>MTSCHS (option)</b> Permission for commissioning	Kazakhstan
	<b>Ex Ukraine (option) <sup>1)</sup></b> Hazardous areas	Ukraine
	<b>NEPSI (option) <sup>1)</sup></b> Hazardous areas	China
-	<b>CRN</b> Safety (e.g. electr. safety, overpressure, ...)	Canada

<sup>1)</sup> Only for instruments with model 831 and not for instruments with PTFE lining

## Certificates (option)

- 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)

Approvals and certificates, see website

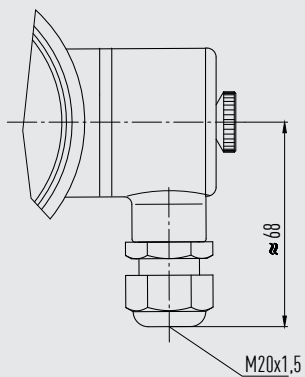
## Accessories

- Instrument mounting bracket for wall or pipe mounting
- Panel mounting flange, polished stainless steel
- Instrument mounting bracket for wall or pipe mounting, lacquered steel or stainless steel
- Sealings (model 910.17, see data sheet AC 09.08)
- Valves (models IV3x/IV5x, see data sheet AC 09.23)
- Diaphragm seal

## Dimensions in mm

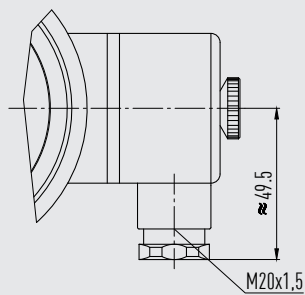
### Cable socket

Contact models: 821 and 851



Only use cable with a diameter of 5 ... 10 mm

Contact models: 831 and 830 E

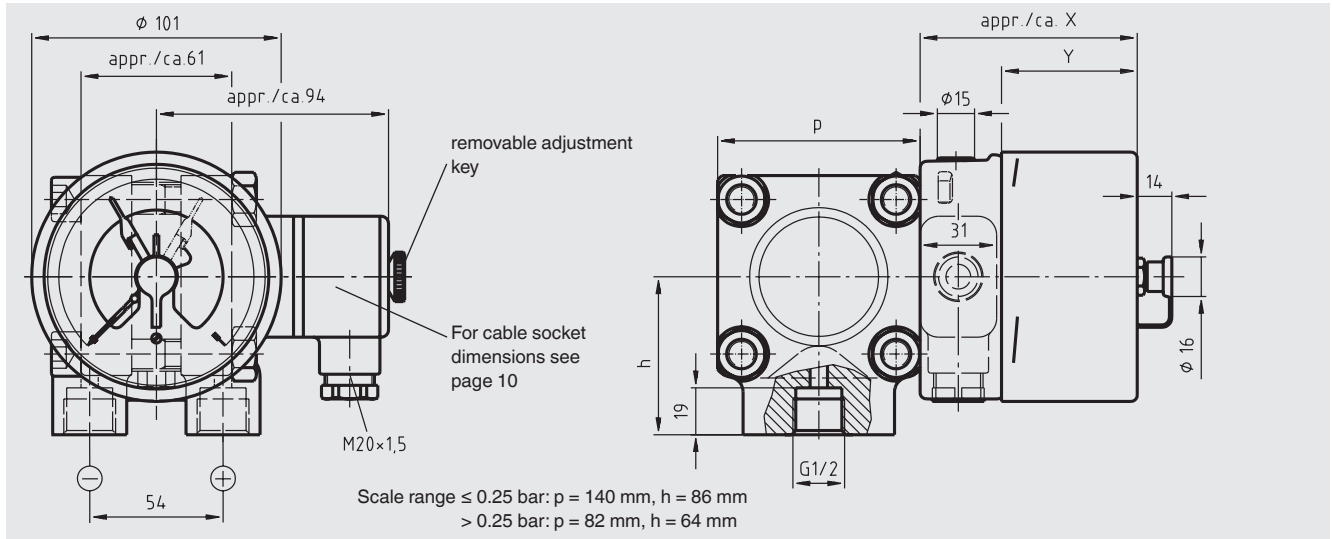


Only use cable with a diameter of 7 ... 13 mm

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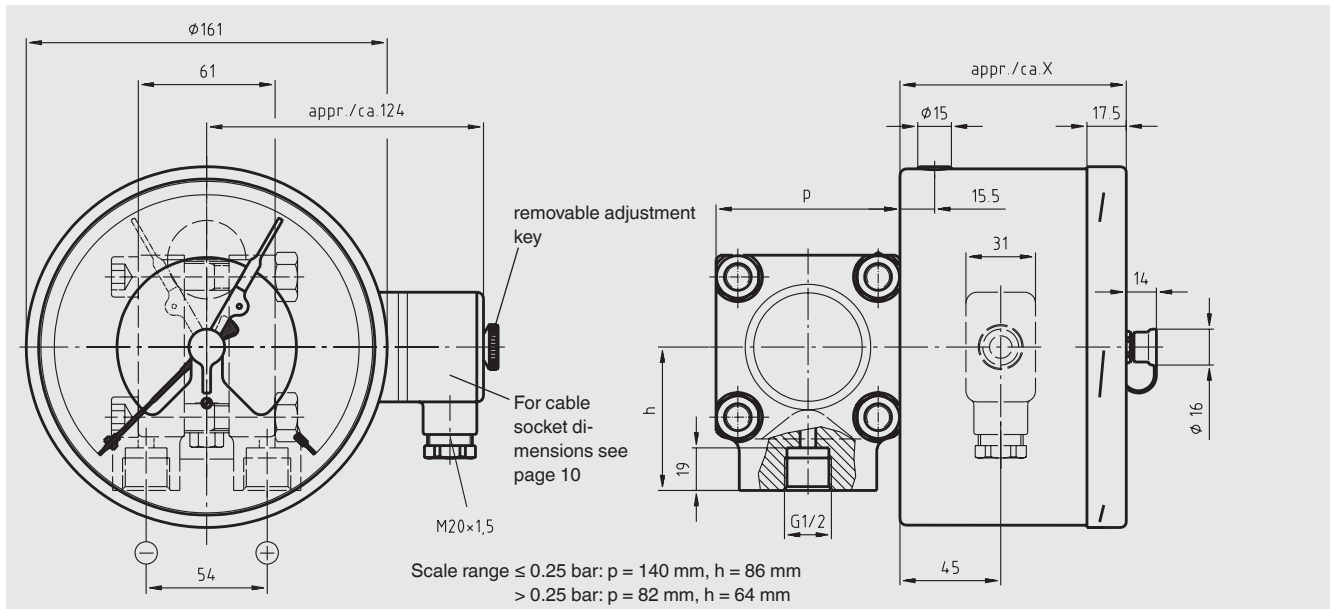
## Dimensions in mm

switchGAUGE model DPGS43HP.100 with switch contact model 821, 831 or 830 E



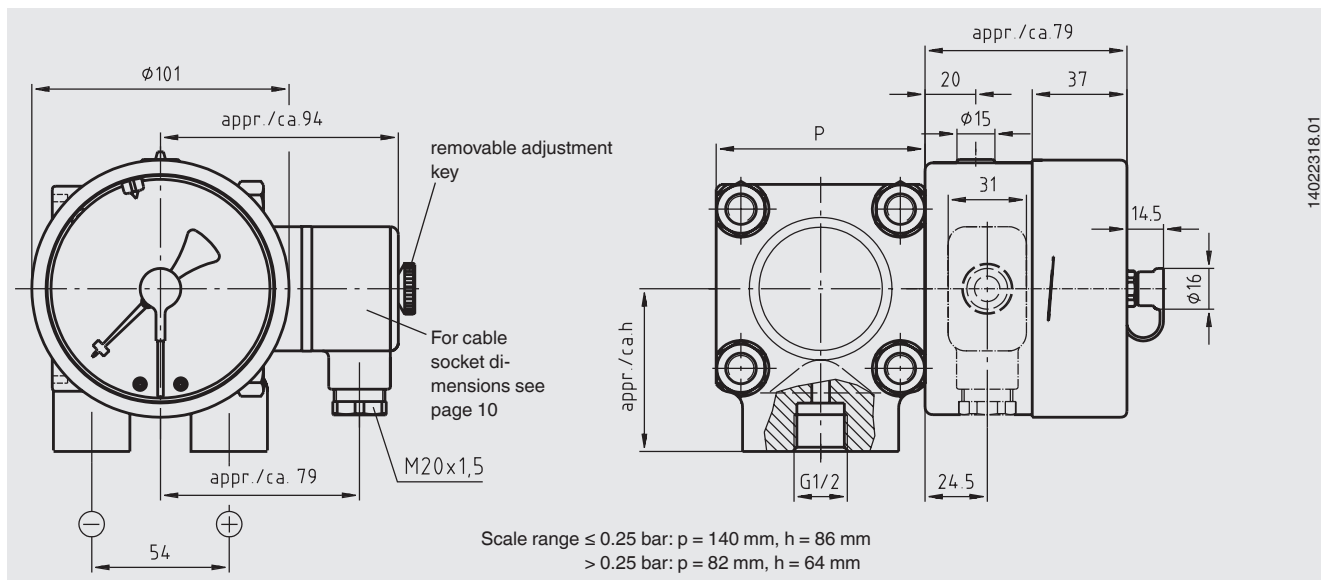
Type of contact	Dimensions in mm	
	X	Y
Single or double contact	97	55
Double (change-over) contact	122	80
Triple contact	105	63
Quadruple contact	122	80

switchGAUGE model DPGS43HP.160 with switch contact model 821, 831 or 830 E

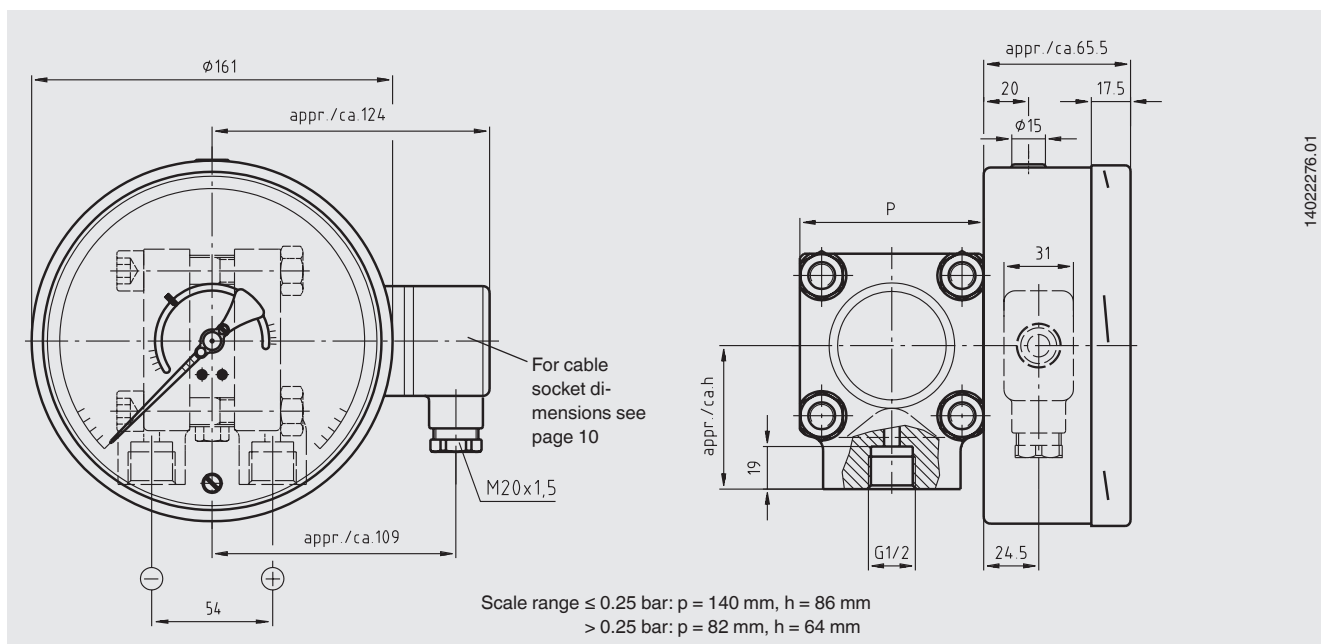


Type of contact	Dimensions in mm	
	X	
Single or double contact	102	
Double (change-over) contact	116	
Triple contact	102	
Quadruple contact	116	

switchGAUGE model DPGS43HP.100 with switch contact model 851.3 or 851.33



switchGAUGE model DPGS43HP.160 with switch contact model 851.3



Ordering information

Model / Nominal size / Type of contact / Contact version / Scale range / Scale version (linear pressure or square root incrementation) / Max. working pressure (static pressure) / Process connection / Connection location / Options

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