

# Bourdon tube pressure gauge with switch contacts

## For the process industry, NS 63

### Model PGS23.063



for further approvals see  
page 8

**switchGAUGE**

#### Applications

- Control and regulation of processes
- Monitoring of plants and switching of circuits
- For gaseous and liquid aggressive media that are not highly viscous or crystallising, also in aggressive environments
- Chemical industry, petrochemical industry, power plants, mining, on-/offshore, environmental technology, machine building and general plant construction

#### Special features

- Up to 2 switch contacts per instrument
- Instruments with inductive contacts for use in hazardous areas
- Instruments with electronic contact for PLC applications
- Safety version S3 per EN 837



**Model PGS23.063 with switch contact model 830 E.21**

#### Description

Wherever the process pressure has to be indicated locally and, at the same time, circuits need to be switched, the model PGS23.063 switchGAUGE finds its use.

Switch contacts (electrical alarm contacts) make or break circuits dependent upon the pointer position of the indicating measuring instruments. 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.

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 837-1) 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

Standard version	
Nominal size in mm	63
Accuracy class	1.6
Scale ranges	0 ... 4 bar [0 ... 58 psi] to 0 ... 400 bar [0 ... 5,802 psi] other units (e.g. psi, kPa) available or all other equivalent vacuum or combined pressure and vacuum ranges
Scale	Single scale Option: Dual scale
<b>Pressure limitation</b>	
Steady	3/4 x full scale value
Fluctuating	2/3 x full scale value
Short time	Full scale value
Connection location	<ul style="list-style-type: none"> <li>■ Lower mount (radial)</li> <li>■ Lower back mount</li> </ul>
Process connection	<ul style="list-style-type: none"> <li>■ G ¼ B</li> <li>■ G ½ B</li> <li>■ ¼ NPT</li> <li>■ ½ NPT</li> </ul> others on request
<b>Permissible temperature <sup>1)</sup></b>	
Medium	+100 °C [+212 °F] maximum
Ambient	-20 ... +60 °C [-4 ... 140 °F]
Temperature effect	When the temperature of the measuring system deviates from the reference temperature (+20 °C): max. ±0.4 %/10 K of full scale value
Case	Safety version S3 per EN 837: With solid baffle wall (Solidfront) and blow-out back
Case filling	Without
<b>Wetted materials</b>	
Process connection, pressure element	Stainless steel 316L, option: Monel (model PGS26)
<b>Non-wetted materials</b>	
Case, movement, bayonet ring	Stainless steel
Dial	Aluminium, white, black lettering
Instrument pointer	Aluminium, black
Set pointer	Aluminium, red
Window	Polycarbonate Option: Laminated safety glass 2)
Ingress protection per IEC/EN 60529	IP54
Electrical connection	Cable length 2 m, facing downwards and to the right Material: PVC others on request

1) For hazardous areas, the permissible temperature of the contact model 831 will exclusively apply (see page 5). 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.

2) For instruments for hazardous areas with contact model 831

## 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 2 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 2 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 2 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
- Maximum of one switch contact (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 and 851.3: Change-over; one contact breaks and one 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 $\Omega$ )
- Contact adjustment key fixed
- Connector (instead of cable)

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

Measuring span	Max. number of contacts	Switching current range I
≥ 4 bar	2	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
<b>Rated operating voltage</b> $U_{\text{eff}}$	≤ 250 V	≤ 250 V
<b>Rated operating current</b> Switch-on current Switch-off current Continuous current	≤ 0.5 A ≤ 0.5 A ≤ 0.3 A	≤ 0.5 A ≤ 0.5 A ≤ 0.3 A
<b>Switching power</b>	≤ 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
<b>DC 220 V / AC 230 V</b>	100 mA	120 mA	65 mA	65 mA	90 mA	40 mA
<b>DC 110 V / AC 110 V</b>	200 mA	240 mA	130 mA	130 mA	180 mA	85 mA
<b>DC 48 V / AC 48 V</b>	300 mA	450 mA	200 mA	190 mA	330 mA	130 mA
<b>DC 24 V / AC 24 V</b>	400 mA	600 mA	250 mA	250 mA	450 mA	150 mA

## Specifications for instruments with inductive contact model 831

Measuring span	Max. number of contacts
≥ 4 bar	2

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

### Setting of contacts to identical set point

Versions with 2 contacts can be set to an identical set point.

### Available contact versions

- 831
- 831-SN, safety version <sup>1)</sup>

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

### Permissible temperature ranges

Contact version	T6	T5 ... T1	T95°C	T135°C
831	-20 ... +60 °C	-20 ... +70 °C	-20 ... +70 °C	-
831-SN	-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	Max. number of contacts	Ex version
904.28 KFA6 - SR2 - Ex1.W	1	yes
904.29 KFA6 - SR2 - Ex2.W	2	yes
904.30 KHA6 - SH - Ex1	1	yes - safety equipment
904.33 KFD2 - SH - Ex1	1	yes - safety equipment
904.25 MSR 010-I	1	no
904.26 MSR 020-I	2	no
904.27 MSR 011-I	Two-point control	no

# Specifications for instruments with electronic contact model 830 E

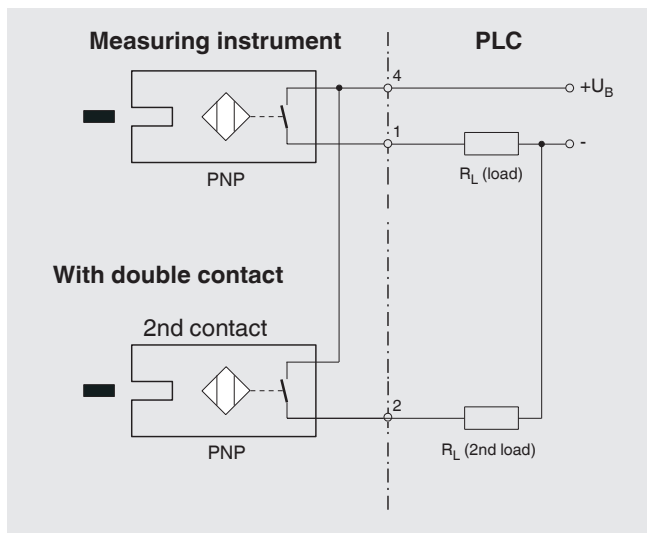
Measuring span	Max. number of contacts
≥ 4 bar	2

## Setting of contacts to identical set point

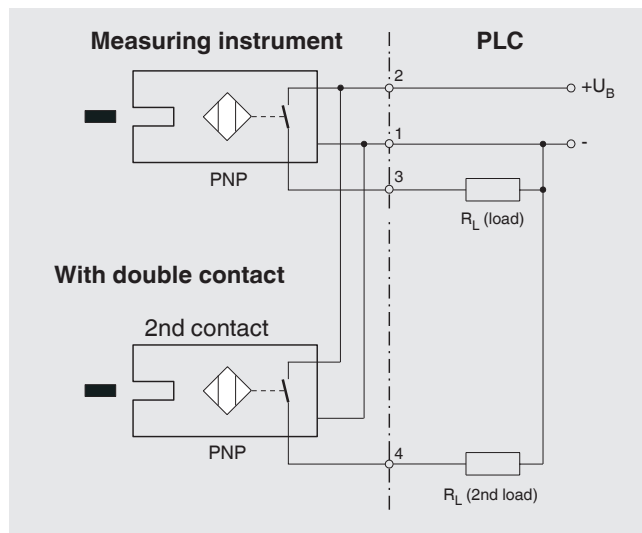
Versions with 2 contacts can be set to an identical set point.

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 <sub>max.</sub> )	≤ 0.7 V
Reverse polarity protection	Conditional U <sub>B</sub> (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

### 2-wire system (standard)



### 3-wire system



## Specifications for instruments with reed switch model 851

Measuring span	Max. number of contacts
≥ 4 bar	1







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 $\varphi$	1
Switching power	60 W/ VA
Contact resistance (static)	100 m $\Omega$
Insulation resistance	10 <sup>9</sup> $\Omega$
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.
- 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>■ Pressure equipment directive</li> <li>■ Low voltage directive</li> <li>■ RoHS directive</li> <li>■ ATEX directive (option) <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 T95°C/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 T95°C/T135°C Db]</li> </ul>	International
	<b>EAC (option)</b> <ul style="list-style-type: none"> <li>■ EMC directive</li> <li>■ Pressure equipment directive</li> <li>■ Low voltage directive</li> <li>■ Hazardous areas <sup>1)</sup></li> </ul>	Eurasian Economic Community
-	<b>MTSCHS (option)</b> Permission for commissioning	Kazakhstan
	<b>UkrSEPRO (option)</b> Metrology, measurement technology	Ukraine
	<b>Uzstandard (option)</b> Metrology, measurement technology	Uzbekistan

1) Only for instruments with inductive contact model 831

## 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

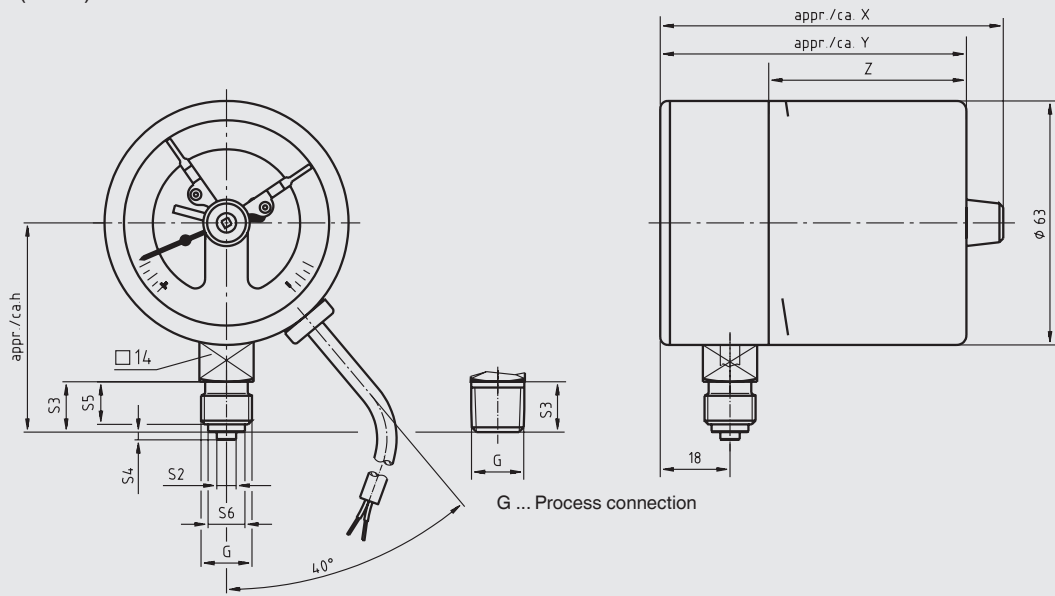
- Panel mounting flange, polished stainless steel
- Surface mounting flange, stainless steel
- Sealings (model 910.17, see data sheet AC 09.08)
- Valves (models IV20/IV21, see data sheet AC 09.19, and models IV10/IV11, see data sheet AC 09.22)
- Syphons (model 910.15, see data sheet AC 09.06)
- Overpressure protector (model 910.13, see data sheet AC 09.04)
- Cooling element (model 910.32, see data sheet AC 09.21)
- Diaphragm seal



# Dimensions in mm

switchGAUGE model PGS23.063 with switch contact model 821, 831 or 830 E

Lower mount (radial)

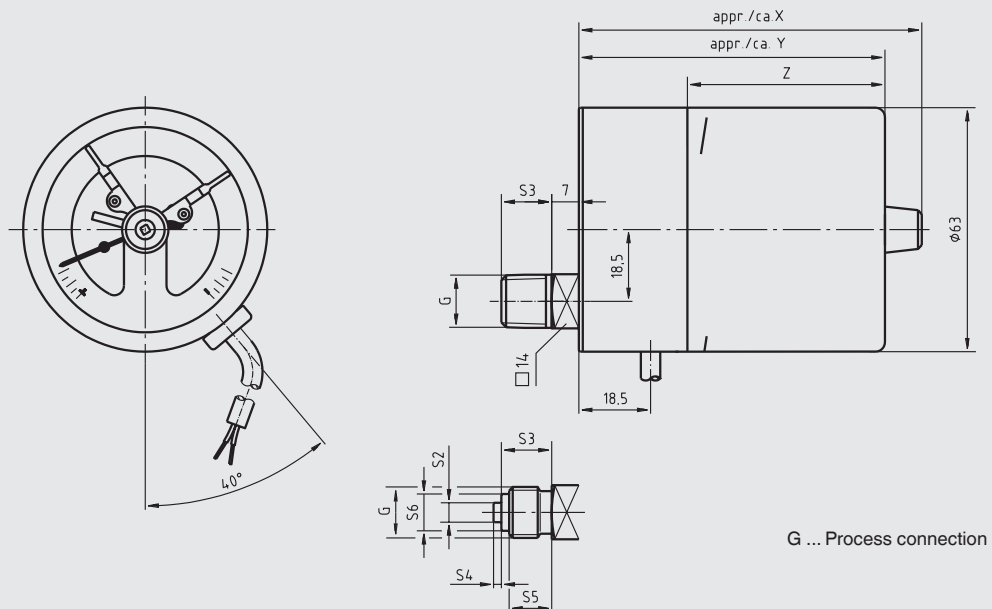


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Process connection	Dimensions in mm					
	h ±1	S2	S3	S4	S5	S6
G ¼ B	54	5	13	2	11	9.5
G ⅜ B	51	-	10	-	8	8
¼ NPT	54	-	13	-	-	-
⅜ NPT	51	-	10	-	-	-

Contact model, version	Dimensions in mm		
	X	Y	Z
821, single contact	73.5	64	36
821, double (change-over) contact	83.5	74	46
83x, single contact	83.5	74	46
83x, double contact	89	79.5	51.5

Lower back mount



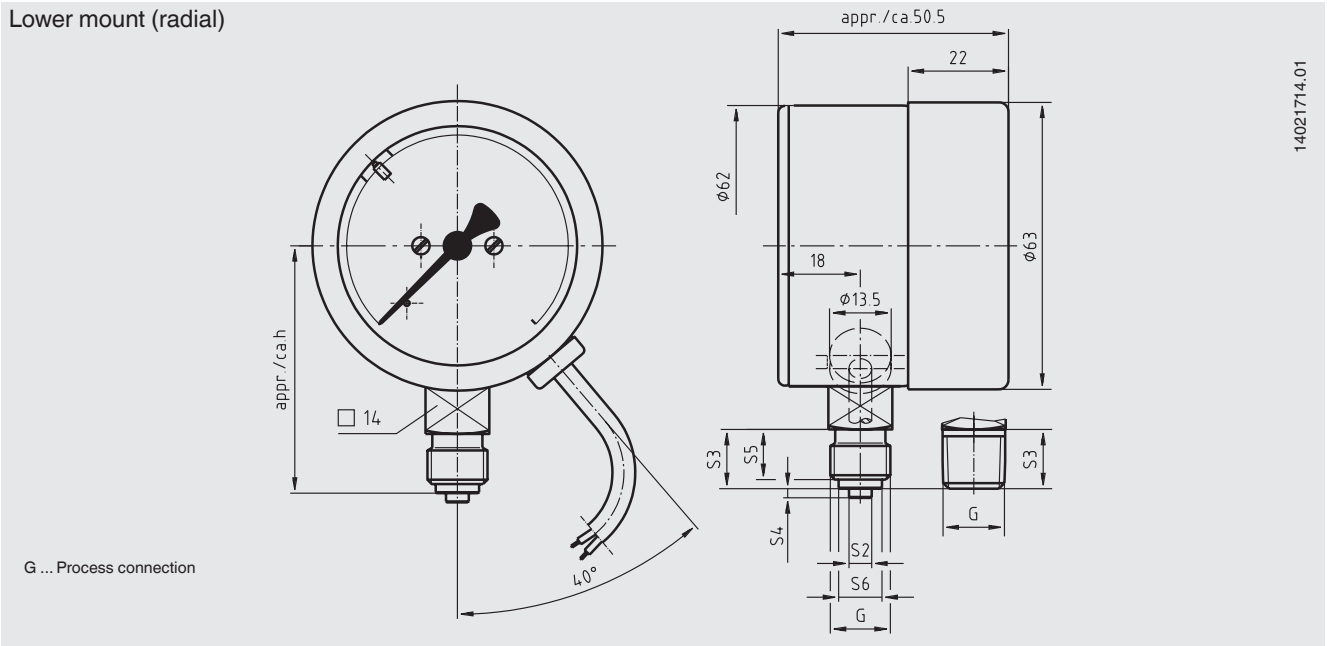
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Process connection	Dimensions in mm				
	S2	S3	S4	S5	S6
G ¼ B	5	13	2	11	9.5
G ⅜ B	-	10	-	8	8
¼ NPT	-	13	-	-	-
⅜ NPT	-	10	-	-	-

Contact model, version	Dimensions in mm		
	X	Y	Z
821, single contact	73.5	64	36
821, double (change-over) contact	83.5	74	46
83x, single contact	83.5	74	46
83x, double contact	89	79.5	51.5

switchGAUGE model PGS23.063 (safety version) with switch contact model 851.3

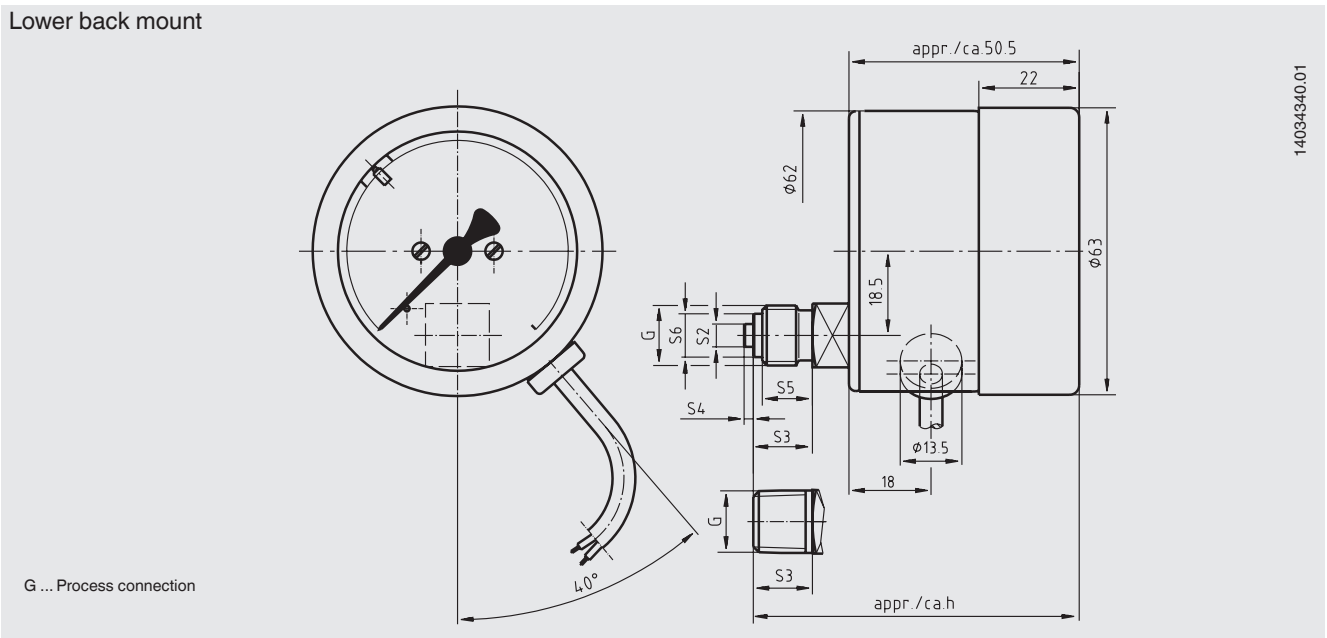
Lower mount (radial)



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Process connection	Dimensions in mm					
	h ±1	S2	S3	S4	S5	S6
G ¼ B	54	5	13	2	11	9.5
G ⅛ B	51	-	10	-	8	8
¼ NPT	54	-	13	-	-	-
⅛ NPT	51	-	10	-	-	-

Lower back mount



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Process connection	Dimensions in mm					
	h ±1	S2	S3	S4	S5	S6
G ¼ B	71.5	5	13	2	11	9.5
G ⅛ B	68.8	-	10	-	8	8
¼ NPT	71.5	-	13	-	-	-
⅛ NPT	68.8	-	10	-	-	-

### **Ordering information**

Model / Nominal size / Contact model / Contact version / Scale range / Connection location / Process connection / Options