

Bourdon tube pressure gauge with switch contacts

For the process industry, NS 100 and 160

Models PGS23.100 and PGS23.160

WIKA data sheet PV 22.02



for further approvals see page 7

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 4 switch contacts per instrument
- Also available with case filling for high dynamic pressure loads or vibrations
- Instruments with inductive contacts for use in hazardous areas with ATEX approval
- Instruments with electronic contact for PLC applications
- Instruments optionally available in safety version S3 (S)



Model PGS23.100 with switch contact model 831.1

Description

Wherever the process pressure has to be indicated locally and, at the same time, circuits need to be switched, the model PGS23.1x0 switchGAUGE finds its use.

Switch contacts (electrical switch contacts) make or break an electric control circuit dependent upon the pointer position of the indicating measuring instrument. 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.

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 – for requirements to ATEX – or electronic contacts for triggering a PLC are available.

Standard version

Nominal size in mm

100, 160

Accuracy class

1.0

Scale ranges

0 ... 0.6 to 0 ... 1,600 bar

or all other equivalent vacuum or combined pressure and vacuum ranges

Pressure limitation

Steady: Full scale value

Fluctuating: 0.9 x full scale value

Short time: 1.3 x full scale value

Permissible temperature

Ambient: -20 ... +60 °C for unfilled instruments or instruments with silicone oil filling

Medium: +200 °C maximum with unfilled instruments
+100 °C maximum with filled instruments

Temperature effect

When the temperature of the measuring system deviates from the reference temperature (+20 °C): max. $\pm 0.4 \%$ /10 K of full scale value

Process connection

Stainless steel 316L

Lower mount (radial) or lower back mount

G ½ B (male), SW 22

Pressure element

Stainless steel 316L

C-type or helical type

Movement

Stainless steel

Dial

Aluminium, white, black lettering

Pointer

Instrument pointer: Aluminium, black

Set pointer: Red

Case

Stainless steel

■ Standard version (S1): With blow-out device in case back (per EN 837)

or

■ Safety version (S3): With solid baffle wall (Solidfront) and blow-out back (per EN 837), hermetically sealed, with internal pressure compensation

Window

Laminated safety glass

Ring

Bayonet ring, stainless steel

Electrical connection

Cable terminal box

Ingress protection per IEC/EN 60529

IP54

Options

- Other process connection
- Sealings (model 910.17, see data sheet AC 09.08)
- Ingress protection IP65 or IP66
- Diaphragm seal assembly
- Measuring system Monel
- Case filling (for safety version only possible with lower mount (radial))
- Inductive contacts also in safety version (SN, S1N)
- Dual scale
- Panel mounting flange, polished stainless steel
- Surface mounting flange, stainless steel
- Surface mounting lugs on the back, stainless steel (safety version)

Special versions

- Contacts with separate circuits
- Change-over contacts (break or make simultaneously at the set point)
- Contacts fixed
- Contacts coupled
- Contacts with parallel resistance 47 kΩ and 100 kΩ for cable break monitoring
- Contacts self-cleaning (only with NS 160)
- Contact adjustment lock leaded
- Contact adjustment key fixed
- Connector (instead of cable or cable socket)
- Special contact material platinum-iridium alloy and gold-silver alloy

Switch contacts

Magnetic snap-action contact model 821

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

Inductive contact model 831

- Long service life due to non-contact sensor
- Additional control unit required (model 904.xx)
- With corresponding control unit suitable for use in zone 1 / 21 (2 GD) hazardous areas
- Low influence on the indication accuracy
- Fail-safe switching at high switching frequency
- Insensitive to corrosion
- 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 power supply required
- Direct switching up to 250 V, 1 A
- Also suitable for direct triggering of a programmable logic controller (PLC)
- Free from wear as without contact
- NS 100: Maximum two change-over contacts per measuring instrument NS 160: Maximum 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 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

Specifications, magnetic snap-action contact model 821

Measuring span	Nominal size	Case version	Max. number of contacts	Switching current I
≤ 1.0 bar	100, 160	S1, S3	1	0.02 ... 0.3 A
> 1.0 bar	100, 160	S1, S3	1	0.02 ... 0.6 A
1.6 bar	100, 160	S1, S3	2	0.02 ... 0.3 A
> 1.6 bar	100, 160	S1, S3	2	0.02 ... 0.6 A
2.5 bar	100, 160	S1	3 ¹⁾	0.02 ... 0.3 A
> 2.5 bar	100, 160	S1	3 ¹⁾	0.02 ... 0.6 A
2.5 bar	100	S3	3 ¹⁾	0.02 ... 0.3 A
> 2.5 bar	100	S3	3 ¹⁾	0.02 ... 0.6 A
4.0 bar	100	S3	3 ¹⁾	0.02 ... 0.3 A
> 4.0 bar	100	S3	3 ¹⁾	0.02 ... 0.6 A

1) 4 contacts on request

2) Valid only for unfilled instruments. With filled instruments the switching power is reduced $P_{max} = 20 \text{ W/VA}$

Legend:

S1 = Standard version, with blow-out device (per EN 837)

S3 = Safety version, Solidfront (per EN 837)

Rated operating voltage U_{eff} 24 ... 250 V

Switching power P_{max} ²⁾ 30 W / 50 VA

The adjustment range of the contacts is 0 ... 100 % of the scale, recommended 10 ... 90 %.

Contact material (standard): AgNi gold-plated

Specifications, inductive contact model 831

Measuring span	Nominal size	Case version	Max. number of contacts
0.6 bar	100, 160	S1	1
0.6 bar	160	S3	1
1.0 bar	100, 160	S1	2
1.0 bar	100	S3	1
1.0 bar	160	S3	2
≥ 1.6 bar	100, 160	S1, S3	3

Legend:

S1 = Standard version, with blow-out device (per EN 837)

S3 = Safety version, Solidfront (per EN 837)

The adjustment range of the contacts is 0 ... 100 % of the scale, recommended 10 ... 90 %.

Available contact versions

Model SJ2-N

Model SJ2-SN (safety version)

Model SJ2-S1N (safety version, inverted signal)

Maximum permissible surface temperature of the inductive contacts

Contact version Model	Type 1 Ui = 16 V Ii = 25 mA Pi = 34 mW			Type 2 Ui = 16 V Ii = 25 mA Pi = 64 mW			Type 3 Ui = 16 V Ii = 52 mA Pi = 169 mW			Type 4 Ui = 16 V Ii = 76 mA Pi = 242 mW		
	T6	T5	T4-T1	T6	T5	T4-T1	T6	T5	T4-T1	T6	T5	T4-T1
SJ2-N	56 °C	68 °C	96 °C	49 °C	61 °C	89 °C	28 °C	40 °C	68 °C	13 °C	25 °C	53 °C
SJ2-SN												
SJ2-S1N												

Associated isolating amplifiers and control units

Model	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, electronic contact model 830 E

Measuring span	Nominal size	Case version	Max. number of contacts
0.6 bar	100, 160	S1	1
0.6 bar	160	S3	1
1.0 bar	100, 160	S1	2
1.0 bar	100	S3	1
1.0 bar	160	S3	2
≥ 1.6 bar	100, 160	S1, S3	2

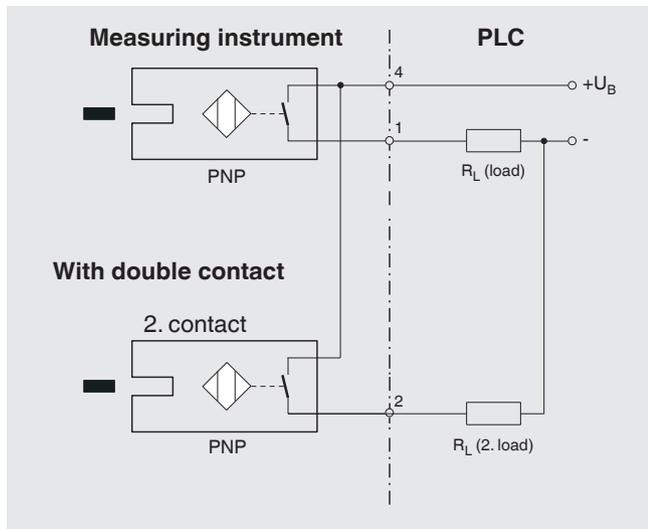
Legend:

S1 = Standard version, with blow-out device (per EN 837)

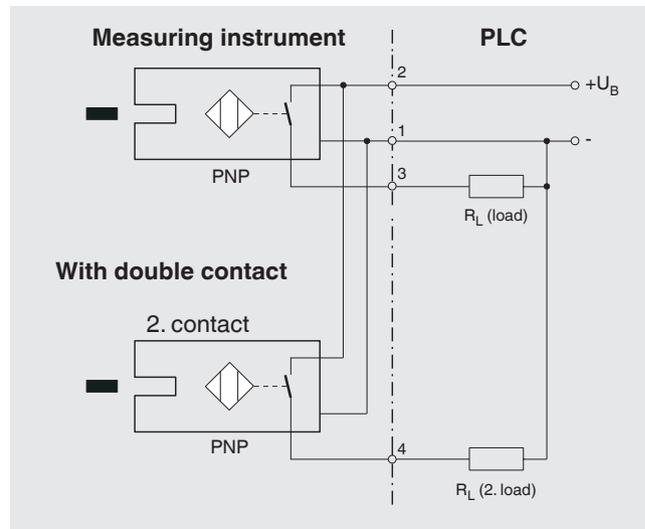
S3 = Safety version, Solidfront (per EN 837)

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 UB (the output 3 or 4 switch 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
Temperature	T_{amb} -20 ... +60 °C T_{med} -20 ... +200 °C

2-wire system (standard)



3-wire system



Specifications, reed switch model 851

Measuring span	Nominal size	Case version	Max. number of contacts
≥ 1.0 bar	100, 160	S1, S3 ¹⁾	1
≥ 1.6 bar	100, 160	S1, S3 ¹⁾	2

1) Case version S3 with NS 100

Legend:

S1 = Standard version, with blow-out device (per EN 837)

S3 = Safety version, Solidfront (per EN 837)

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

Switching current 1 A

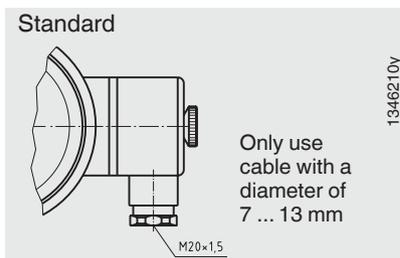
Characteristics	
Contact version	Change-over contact
Type of contact	bistable
Max. switching voltage	AC/DC 250 V
Min. switching voltage	not required
Switching current	AC/DC 1 A
Min. switching current	not required
Transport current	AC/DC 2 A
cos ϕ	1
Switching power	60 W/ VA
Contact resistance (static)	100 m Ω
Insulation resistance	109 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 adjustment 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.

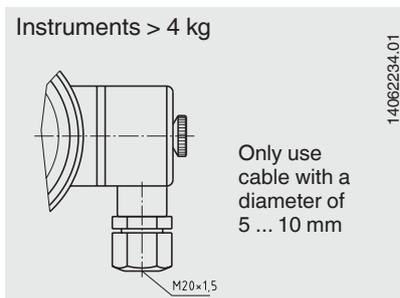
Electrical connection

For instruments with max. 2 switch contacts, front view:

- A Cable socket from PA 6, black
 Temperature resistance -40 ... +80 °C, per VDE 0110
 Insulation group C/250 V, M20 x 1.5 cable gland (facing downwards), strain relief, 6 screw terminals + PE for conductor cross-section 2.5 mm², fitted on the right-hand side of the case



- B Cable socket from PA 6, black
 Temperature resistance -40 ... +70 °C, per VDE 0110
 Insulation group C/250 V, M20 x 1.5 cable gland (facing downwards), strain relief, 4 mantle terminals + PE for conductor cross-section 1.5 mm², fitted on the right-hand side of the case



For instruments with 3 or more contacts, electrical connection on request

Other electrical connections on request

Approvals

Logo	Description	Country
	EU declaration of conformity <ul style="list-style-type: none"> ■ EMC directive ■ Pressure equipment directive ■ Low voltage directive ■ RoHS directive ■ ATEX directive (option) 	European Union
	EAC <ul style="list-style-type: none"> ■ EMC directive ■ Pressure equipment directive ■ Low voltage directive ■ Hazardous areas 	Eurasian Economic Community
-	MTSCHS Permission for commissioning	Kazakhstan
	UkrSEPRO Metrology, measurement technology	Ukraine
	Uzstandard Metrology, measurement technology	Uzbekistan

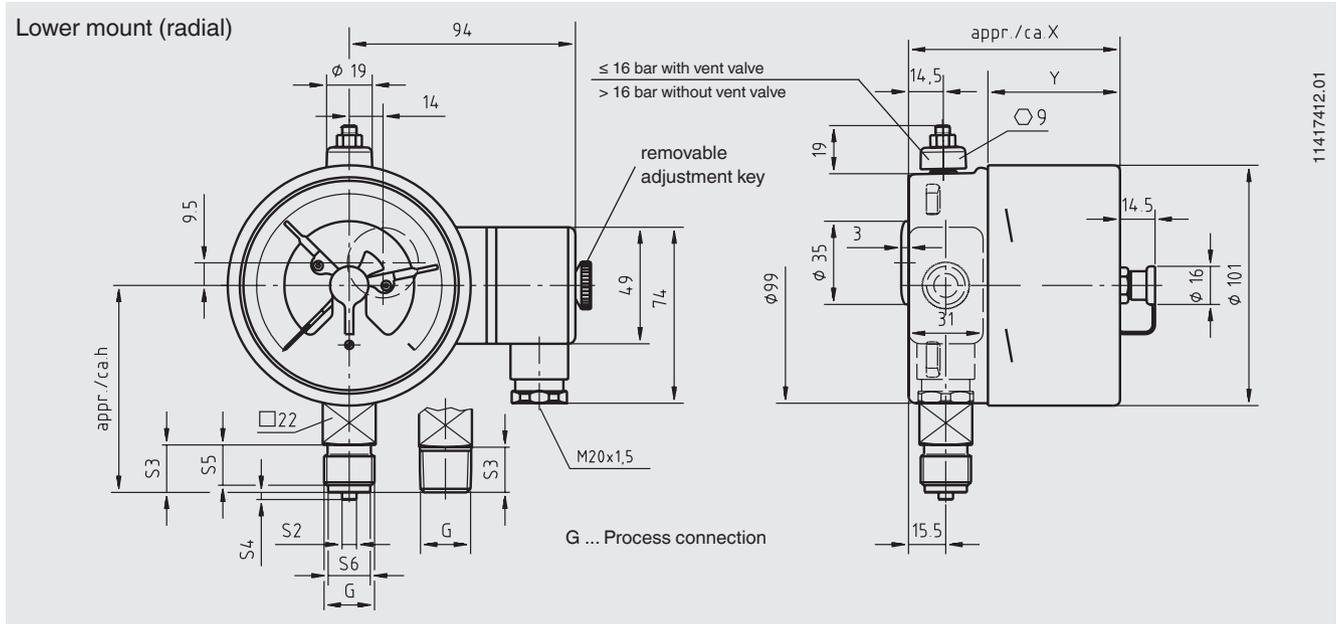
Certificates (option)

- 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

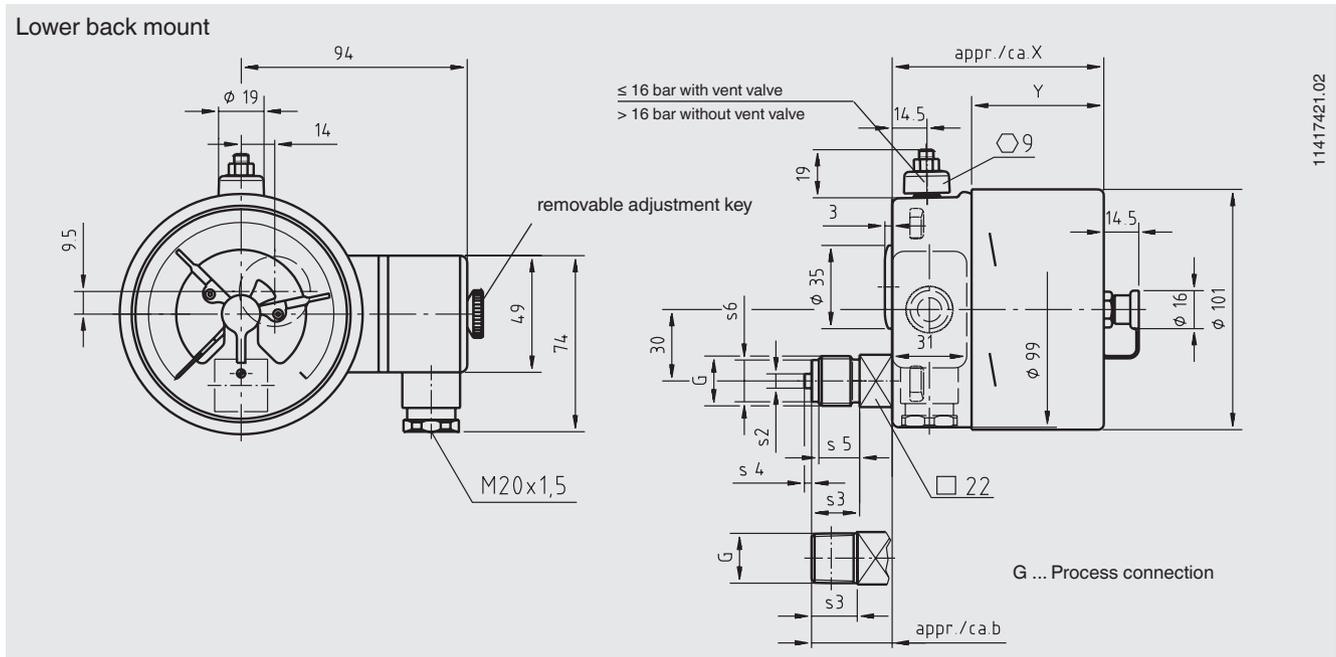
Dimensions in mm

switchGAUGE model PGS23.100 with switch contact model 821, 831 or 830 E



Type of contact	Dimensions in mm	
	X	Y
Single or double contact	88	55
Double (change-over) contact	113	80
Triple contact	96	63
Quadruple contact	113	80

Process connection	Dimensions in mm					
	h ±1	S2	S3	S4	S5	S6
G ½ B	87	6	20	3	17	17.5
G ¼ B	80	5	13	2	11	9.5
G ⅜ B	83	5.5	16	3	13	13
½ NPT	86	-	19	-	-	-

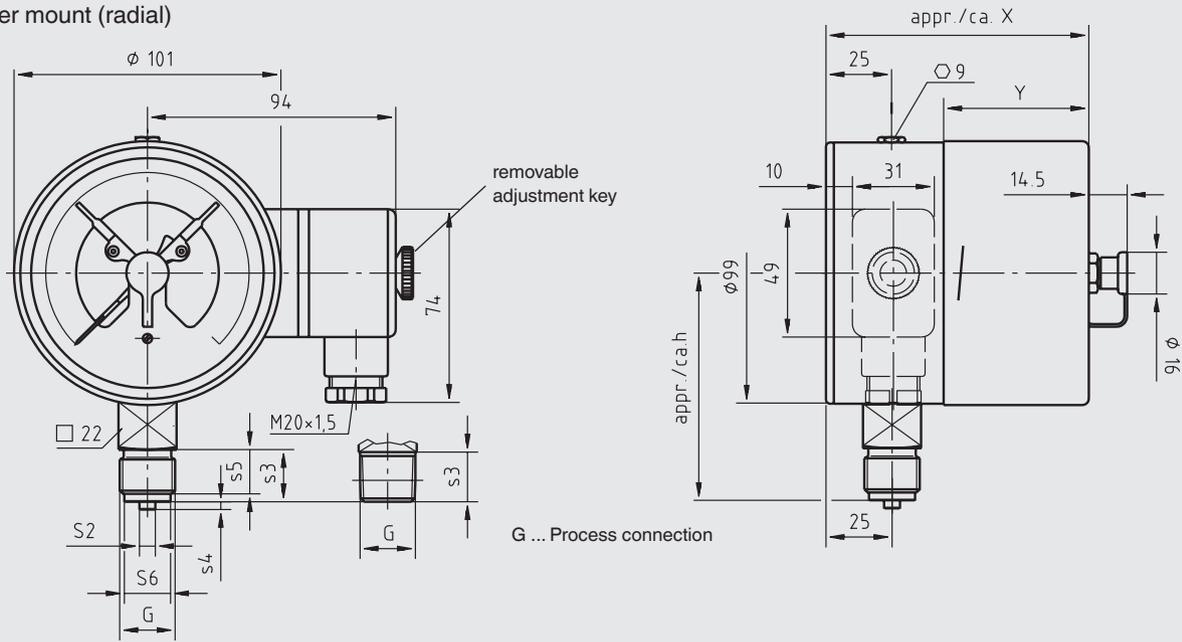


Type of contact	Dimensions in mm	
	X	Y
Single or double contact	88	55
Double (change-over) contact	113	80
Triple contact	96	63
Quadruple contact	113	80

Process connection	Dimensions in mm					
	b	S2	S3	S4	S5	S6
G ½ B	33.5	6	20	3	17	17.5
G ¼ B	26.5	5	13	2	11	9.5
G ⅜ B	29.5	5.5	16	3	14	13
½ NPT	32.5	-	19	-	-	-

switchGAUGE model PGS23.100 (safety version) with switch contact model 821, 831 or 830 E

Lower mount (radial)

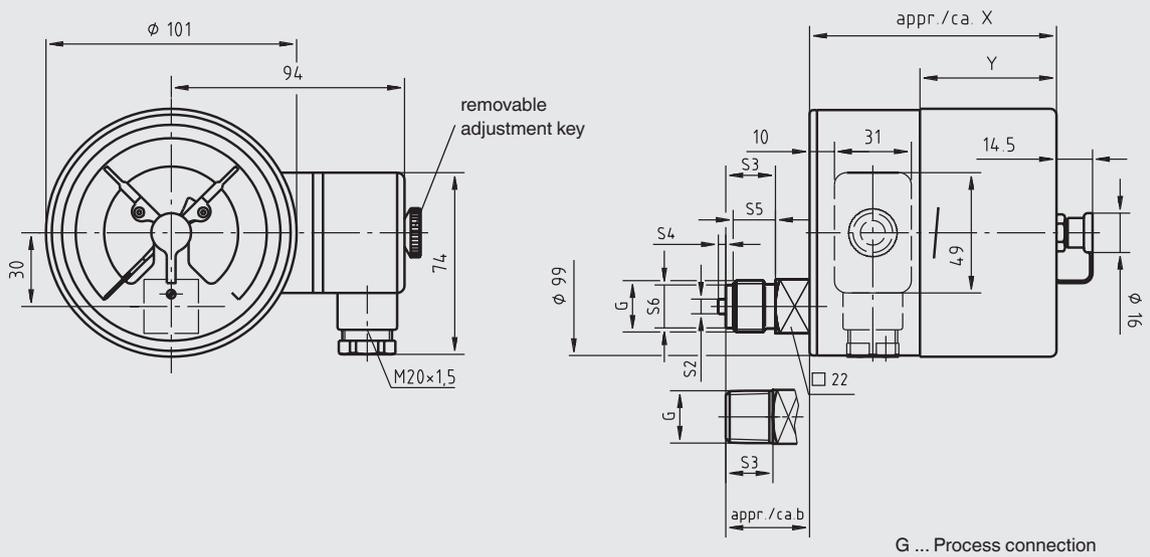


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Type of contact	Dimensions in mm	
	X	Y
Single or double contact	97	55
Double (change-over) contact	122	80
Triple contact	105	63
Quadruple contact	122	80

Process connection	Dimensions in mm					
	$h \pm 1$	S2	S3	S4	S5	S6
G 1/2 B	87	6	20	3	17	17.5
G 1/4 B	80	5	13	2	11	9.5
G 3/8 B	83	5.5	16	3	14	13
1/2 NPT	86	-	19	-	-	-

Lower back mount

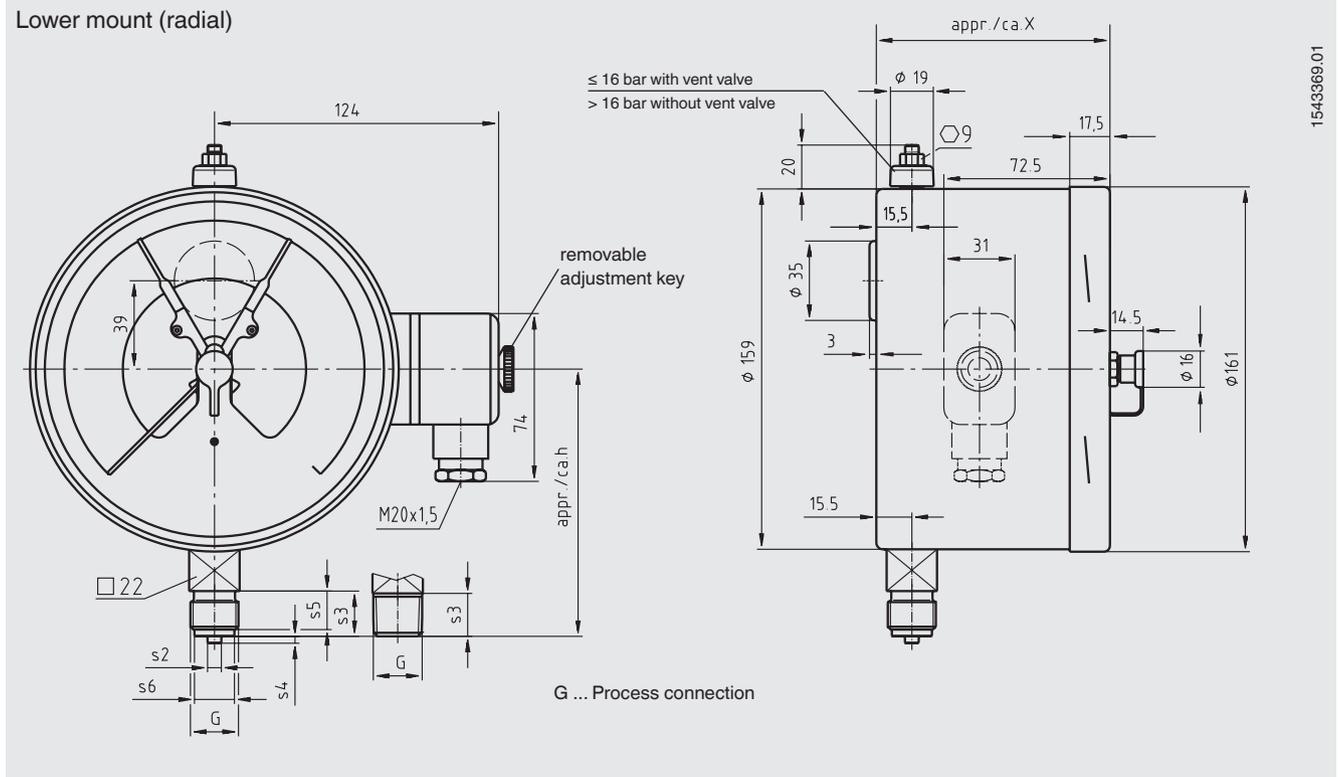


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Type of contact	Dimensions in mm	
	X	Y
Single or double contact	97	55
Double (change-over) contact	122	80
Triple contact	105	63

Process connection	Dimensions in mm					
	b	S2	S3	S4	S5	S6
G 1/2 B	33.5	6	20	3	17	17.5
G 1/4 B	26.5	5	13	2	11	9.5
G 3/8 B	29.5	5.5	16	3	14	13
1/2 NPT	32.5	-	19	-	-	-

switchGAUGE model PGS23.160 with switch contact model 821, 831 or 830 E

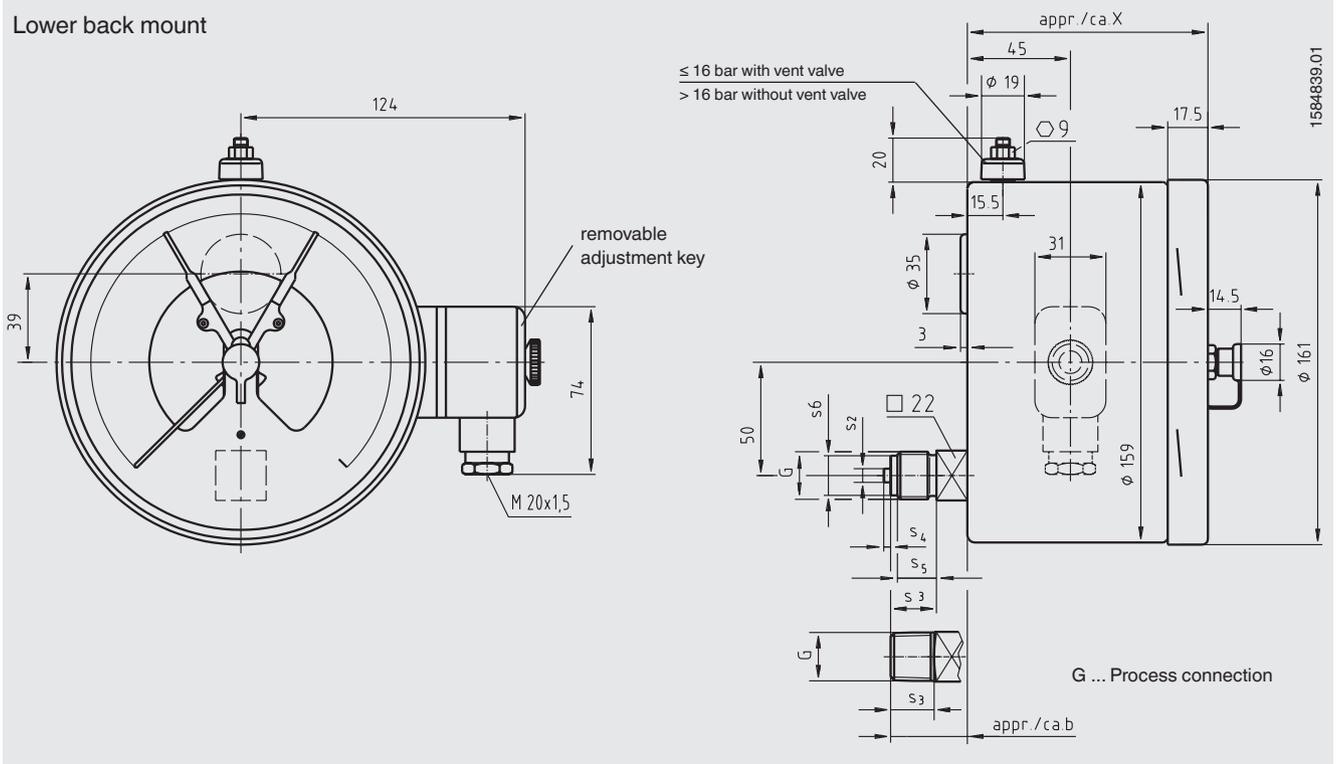


Type of contact	Dimensions in mm
	X
Single, double or triple contact	102 ¹⁾
Double (change-over) contact, quadruple contact	116 ¹⁾

Process connection	Dimensions in mm					
	h ±1	S2	S3	S4	S5	S6
G ½ B	118	6	20	3	17	17.5
G ¼ B	111	5	13	2	11	9.5
G ¾ B	114	5.5	16	3	14	13
½ NPT	117	-	19	-	-	-

1) Plus 14 mm with pressure ranges ≥ 0 ... 100 bar

Lower back mount

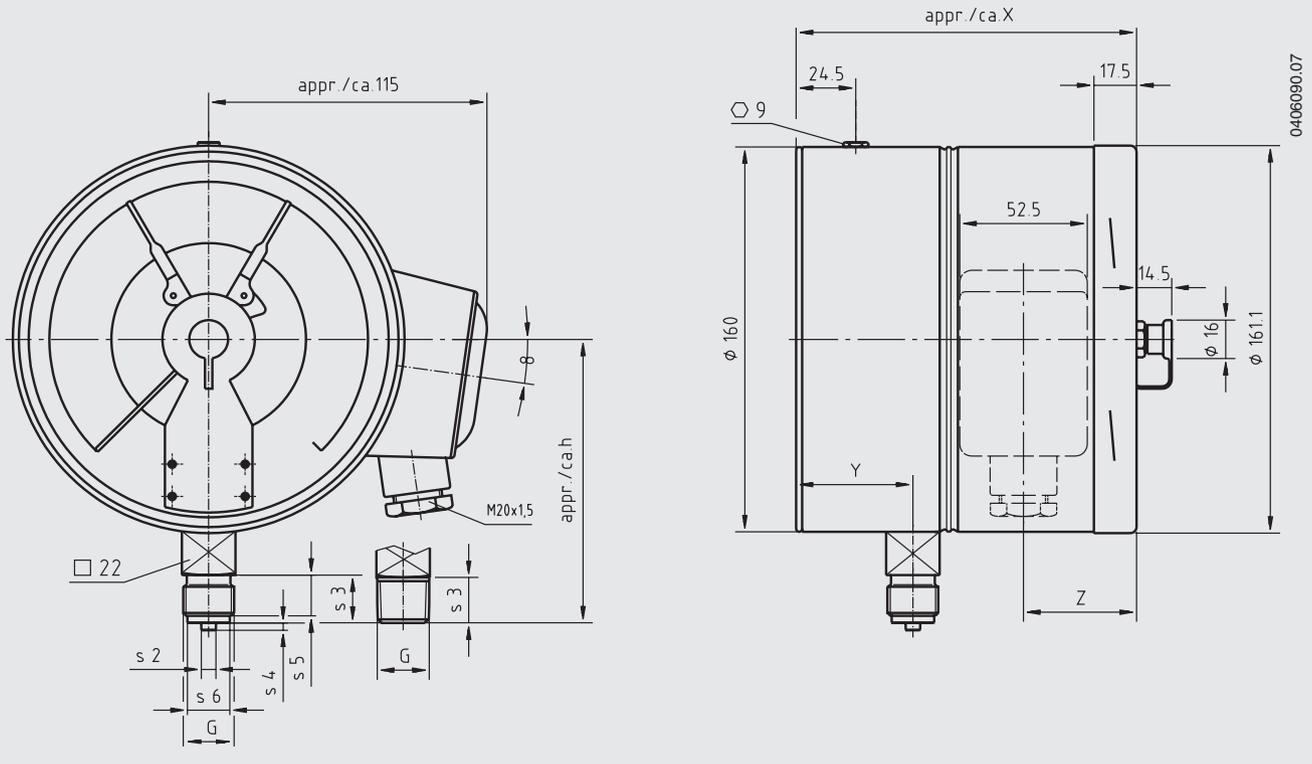


Type of contact	Dimensions in mm
	X
Single, double or triple contact	105
Double (change-over) contact, quadruple contact	119

Process connection	Dimensions in mm					
	b	S2	S3	S4	S5	S6
G ½ B	33.5	6	20	3	17	17.5
G ¼ B	26.5	5	13	2	11	9.5
G ¾ B	29.5	5.5	16	3	14	13
½ NPT	32.5	-	19	-	-	-

switchGAUGE model PGS23.160 (safety version) with switch contact model 821, 831 or 830 E

Lower mount (radial)



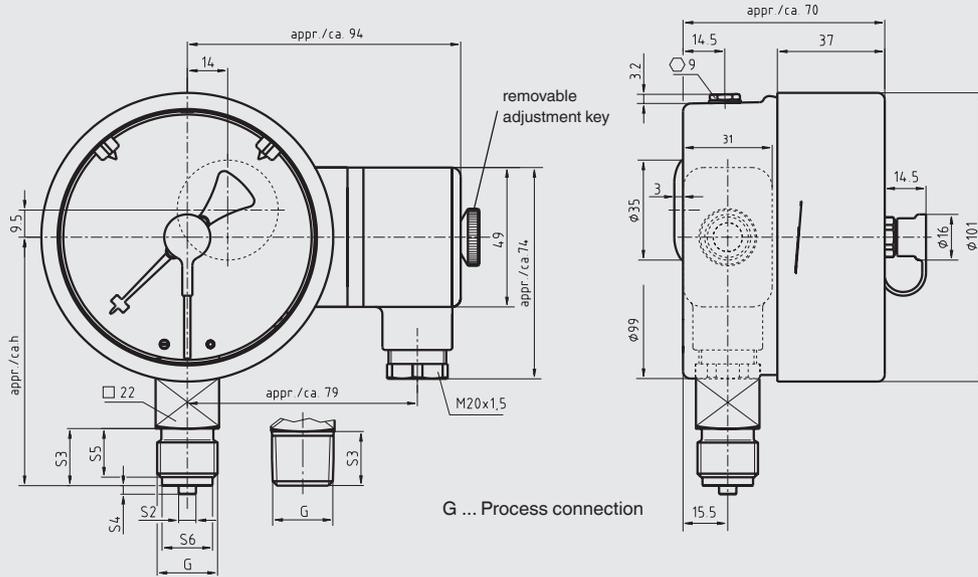
Type of contact	Dimensions in mm		
	X	Y	Z
Single or double contact	141	30.5 ¹⁾	48
Triple contact	153.5	30.5 ¹⁾	60.5

Process connection	Dimensions in mm					
	h ±1	S2	S3	S4	S5	S6
G ½ B	118	6	20	3	17	17.5
½ NPT	117	-	19	-	-	-
M20 x 1.5	118	6	20	3	17	17.5

1) Plus 17 mm with pressure ranges ≤ 0 ... 60 bar

switchGAUGE model PGS23.100 with switch contact model 851.3 or 851.33

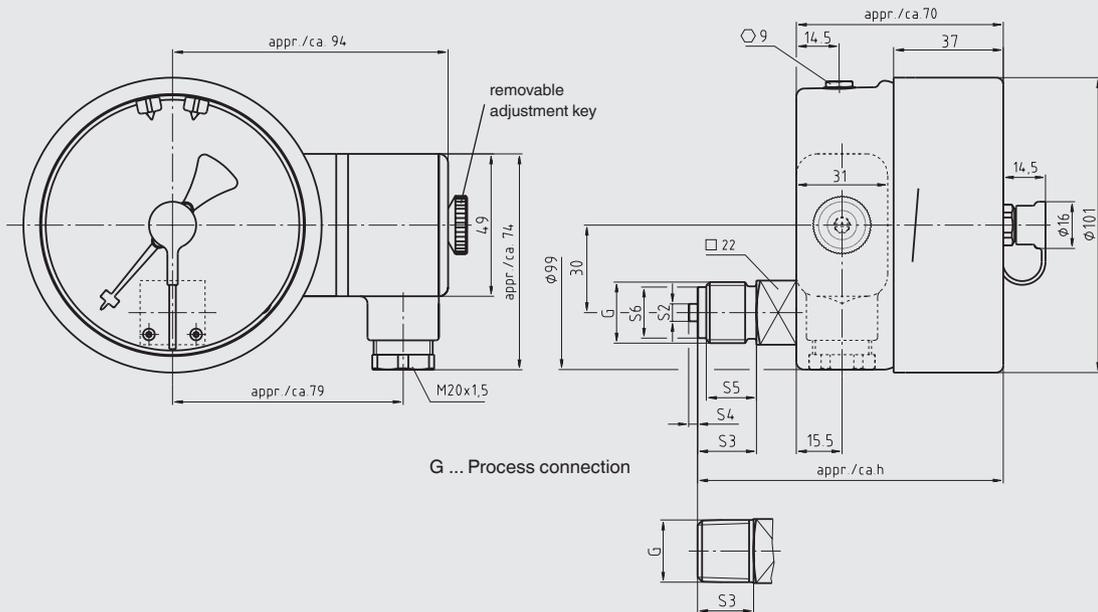
Lower mount (radial)



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Process connection	Dimensions in mm					
	h ±1	S2	S3	S4	S5	S6
G ½ B	87	6	20	3	17	17.5
G ¼ B	80	5	13	2	11	9.5
G ¾ B	83	5.5	16	3	14	13
½ NPT	86	-	19	-	-	-

Lower back mount

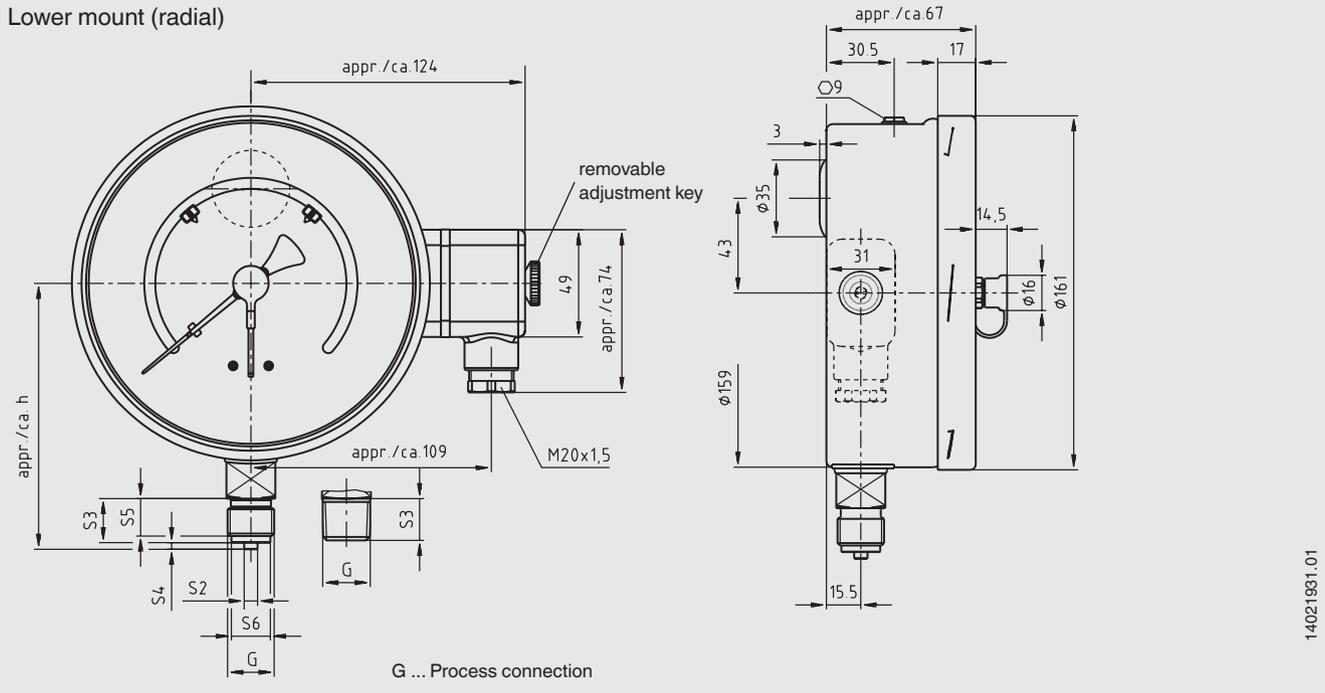


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Process connection	Dimensions in mm					
	h ±1	S2	S3	S4	S5	S6
G ½ B	103	6	20	3	17	17.5
G ¼ B	96	5	13	2	11	9.5
G ¾ B	99	5.5	16	3	14	13
½ NPT	102	-	19	-	-	-

switchGAUGE model PGS23.160 with switch contact model 851.3 or 851.33

Lower mount (radial)



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Process connection	Dimensions in mm					
	h ±1	S2	S3	S4	S5	S6
G ½ B	118	6	20	3	17	17.5
G ¼ B	111	5	13	2	11	9.5
G ⅜ B	114	5.5	16	3	14	13
½ NPT	117	-	19	-	-	-

