

Bourdon tube pressure gauge with switch contacts Models PGS23.1x0, stainless steel version

WIKAL data sheet PV 22.02



for further approvals
see page 14

switchGAUGE

Applications

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

Special features

- High reliability and long service life
- Up to 4 switch contacts per instrument
- Also available with liquid-filled case for high dynamic pressure loads or vibrations
- Gauges with inductive contacts for use in hazardous areas with ATEX approval
- Gauges with electronic contact for PLC applications
- Gauges in safety version S3 ()



Bourdon tube pressure gauge 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 are to be made or broken, the model PGS23.1x0 switchGAUGE can be used.

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

For further information on the different switch contacts please see data sheet AC 08.01.

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 gauges without liquid filling
and gauges with silicone oil filling
Medium: +200 °C maximum without liquid filling
+100 °C maximum with liquid filling

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 (LM) or lower back mount (LBM)
G 1/2 B (male), 22 mm flats

Pressure element

Stainless steel 316L
< 100 bar: C-type
≥ 100 bar: 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

Bezel ring

Bayonet ring, stainless steel

Electrical connection

Cable socket

Ingress protection

IP 54 per EN 60529 / IEC 60529

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
- Up to two change-over contacts per measuring instrument

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

Options

- Other process connection
- Sealings (model 910.17, see data sheet AC 09.08)
- Ingress protection IP 65 or IP 66
- Assembly on diaphragm seals, see product review diaphragm seals
- Measuring system Monel
- Liquid filling (observe: With safety version only lower mount)
- 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)

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

Legend:

S1 = Standard version, with blow-out device (per EN 837)
S3 = Safety version, solid baffle wall (per EN 837)

Rated 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

¹⁾ 4 contacts on request

²⁾ Applies only to dry gauges. With filled gauges the switching power is reduced
 $P_{\text{max}} = 20 \text{ W/VA}$

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

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, solid baffle wall (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			Type 2			Type 3			Type 4		
	T ₆	T ₅	T _{4-T1}	T ₆	T ₅	T _{4-T1}	T ₆	T ₅	T _{4-T1}	T ₆	T ₅	T _{4-T1}
	U _i = 16 V I _i = 25 mA P _i = 34 mW			U _i = 16 V I _i = 25 mA P _i = 64 mW			U _i = 16 V I _i = 52 mA P _i = 169 mW			U _i = 16 V I _i = 76 mA P _i = 242 mW		
SJ2-N												
SJ2-SN	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-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)

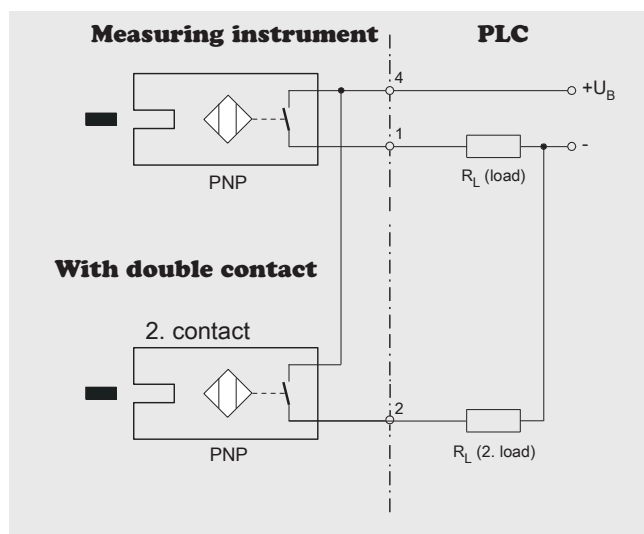
S3 = Safety version, solid baffle wall (per EN 837)

Characteristics

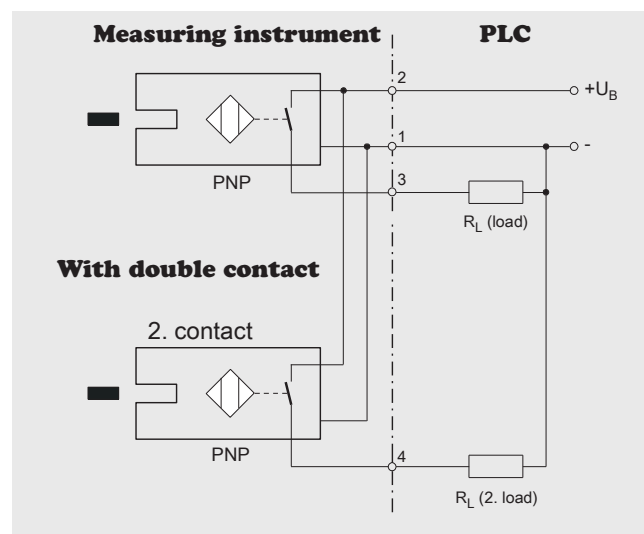
Contact version	Normally open, normally closed
Type of output	PNP transistor
Operating voltage	DC 10 ... 30 V
Residual ripple	max. 10 %
No-load current	≤ 10 mA
Switching current	≤ 100 mA
Residual current	≤ 100 μA
Voltage drop (with $I_{max.}$)	≤ 0.7 V
Reverse polarity protection	conditional U_B (the 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

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

2-wire system (standard)



3-wire system



Specifications, reed switch model 851

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

Switching power P_{max} 60 W / 60 VA
 Switching current 1 A

Legend:
 S1 = Standard version, with blow-out device (per EN 837)
 S3 = Safety version, solid baffle wall (per EN 837)

¹⁾ Case version S3 with NS 100

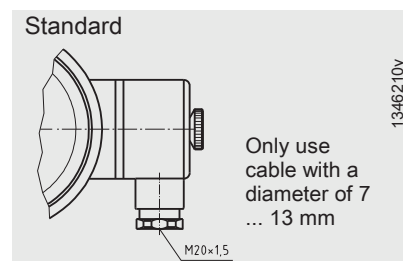
Characteristics	
Contact version	Change-over contact
Type of contact	bistable
Max. switching voltage	AC/DC 250 V
Min. switching voltage	not required
Switching current	AC/DC 1 A
Min. switching current	not required
Transport current	AC/DC 2 A
cos ϕ	1
Switching power	60 W/ VA
Contact resistance (static)	100 m Ω
Insulation resistance	10 ⁹ 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.

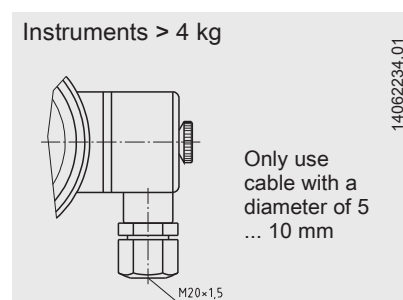
Electrical standard connections

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

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



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



For instruments with 3 or more contacts and also for
 special contacts, electrical connection on request

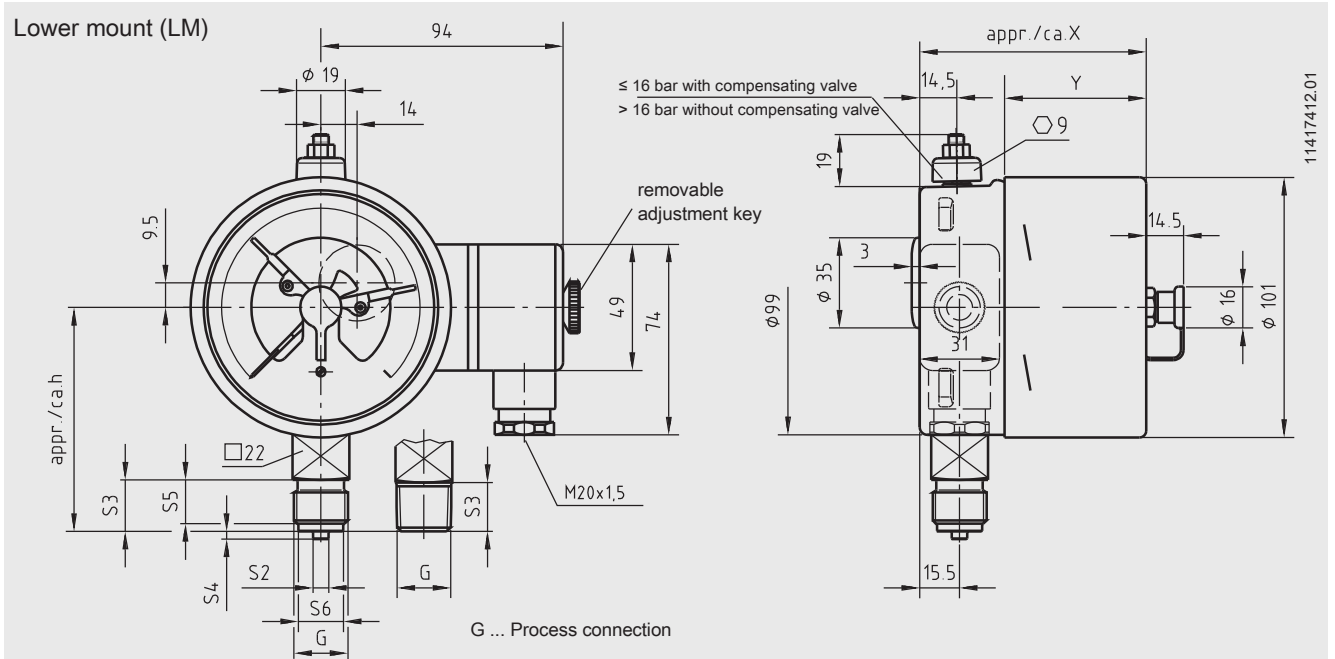
Option

Other electrical connections on request

¹⁾ Applies to all contacts

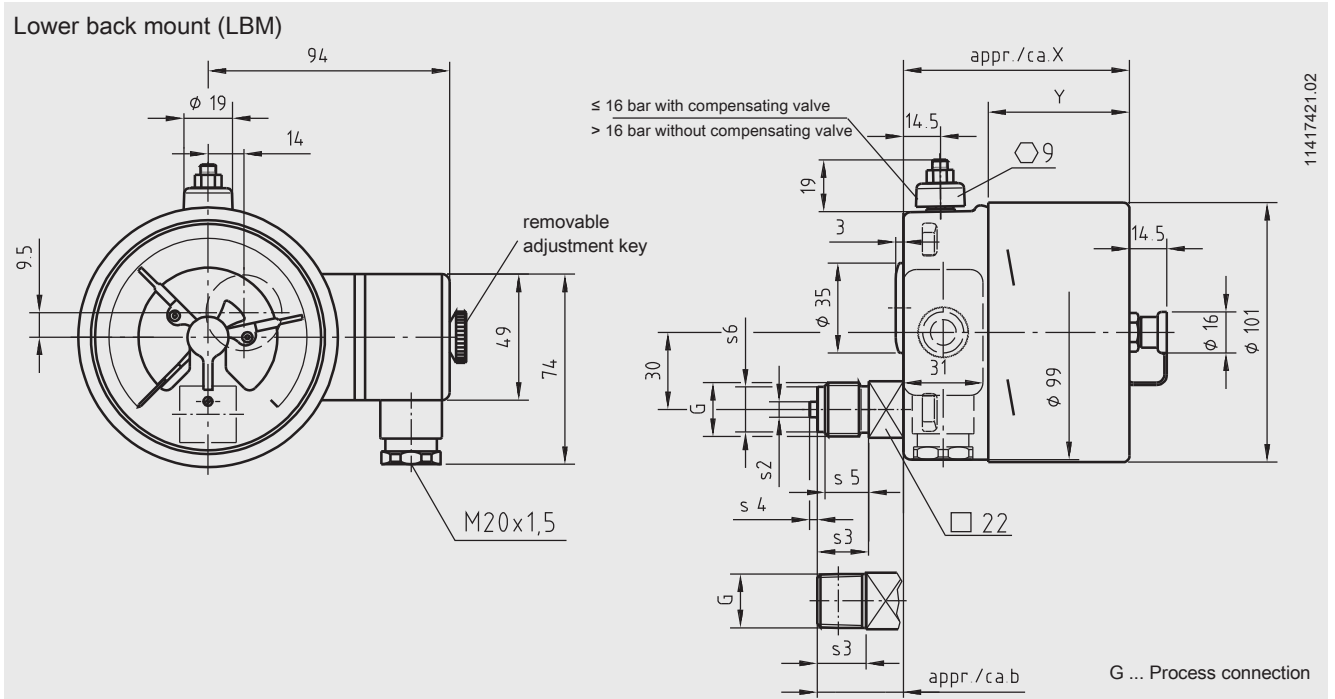
Dimensions in mm

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	-	-	-

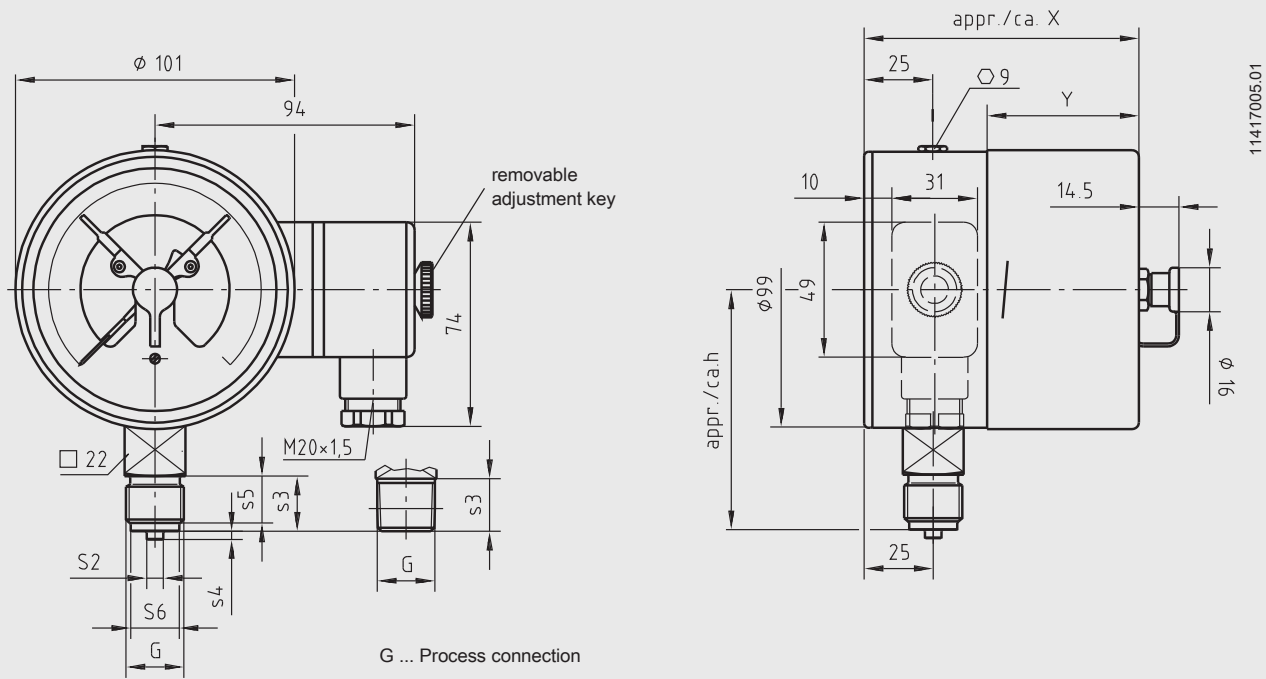


Type of contact	Dimensions in mm	
	X	Y
Single or double contact	88	55
Double (change-over) contact	113	80
Triple contact	96	63
Quadruple contact	113	80

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

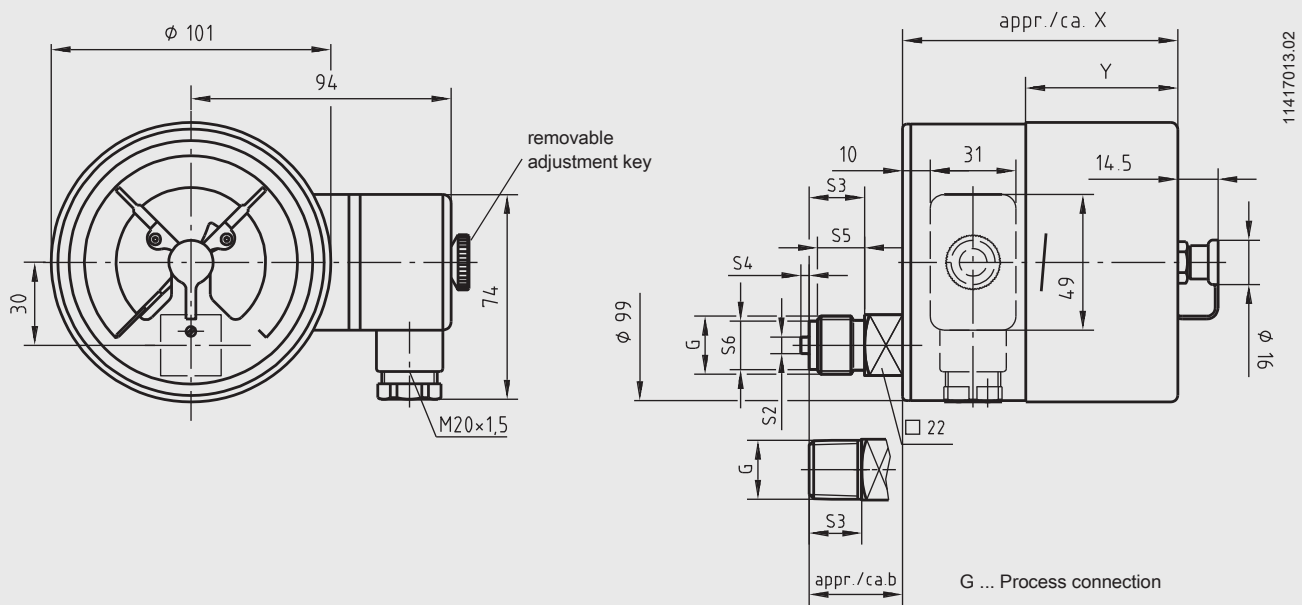
Lower mount (LM)



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 ±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	-	-	-

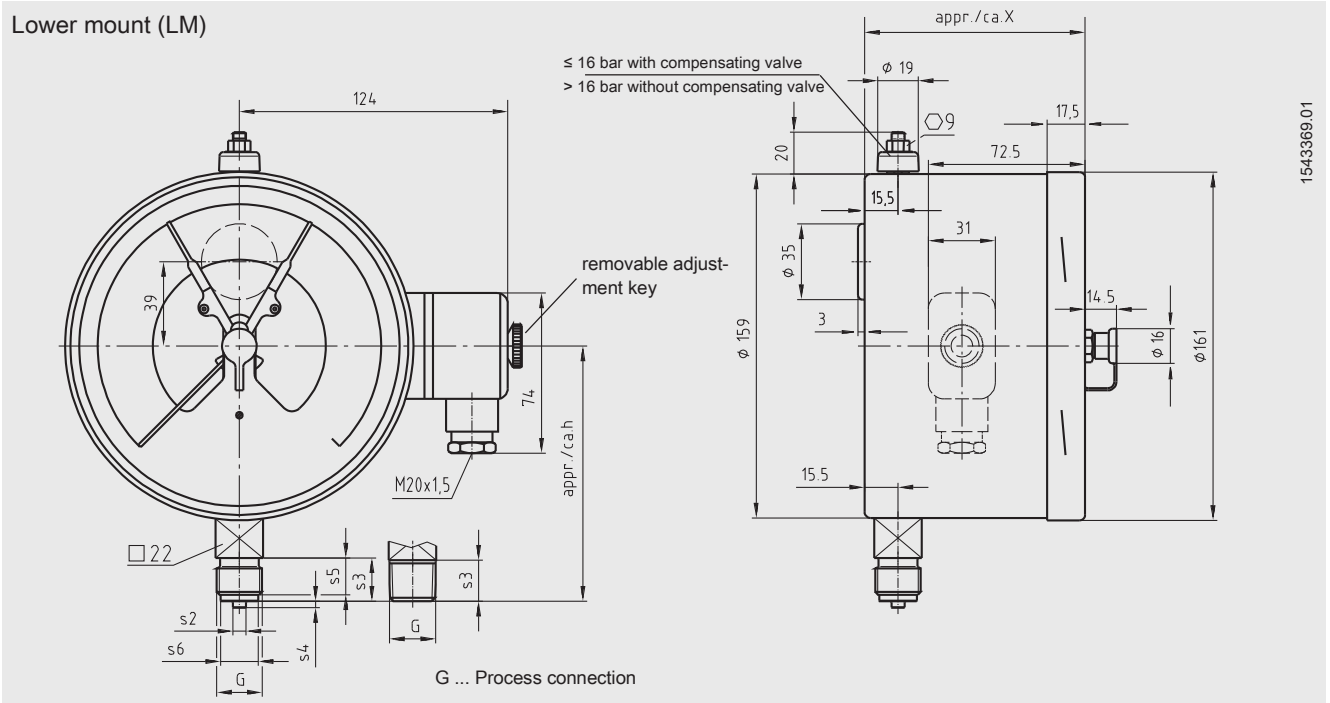
Lower back mount (LBM)



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					
	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	-	-	-

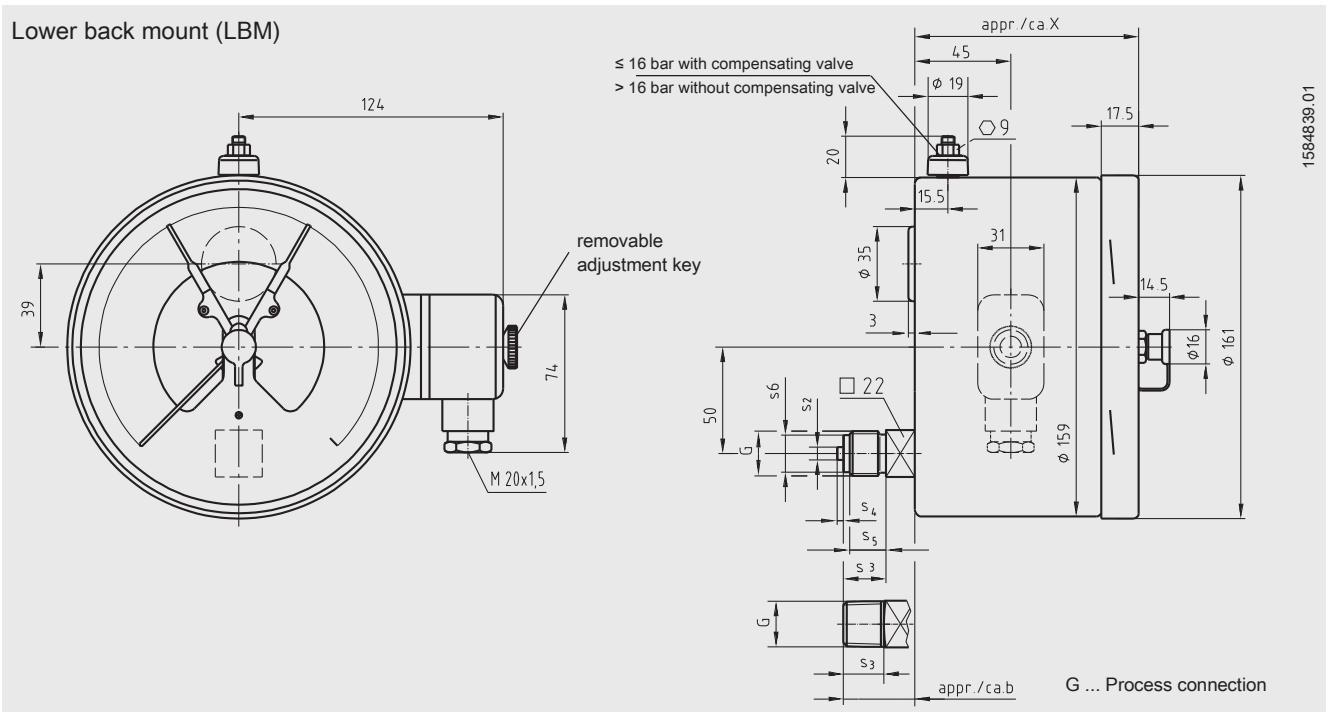
switchGAUGE model PGS23.160 with switch contact model 821, 831 or 830 E



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

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

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	-	-	-

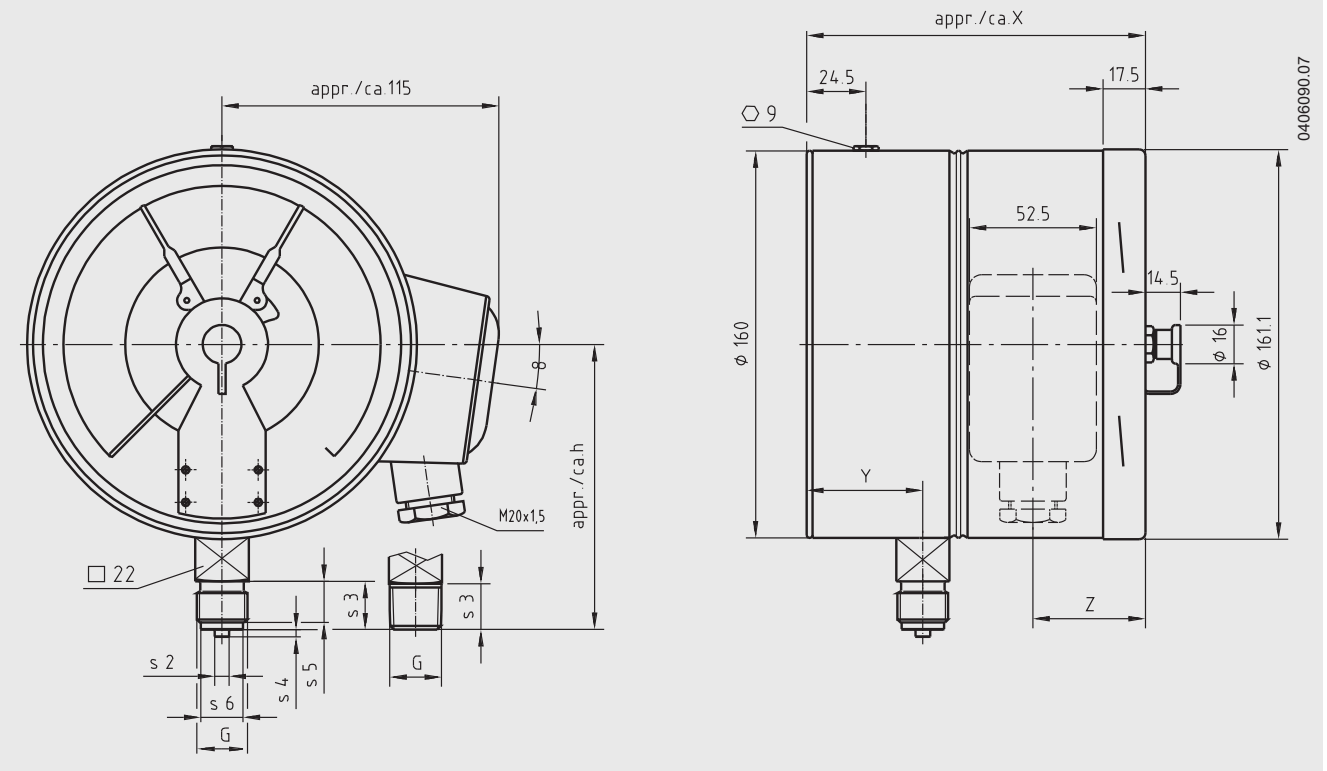


Type of contact	Dimensions in mm X
Single, double or triple contact	105
Quadruple contact	119

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 ⅜ 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 (LM)

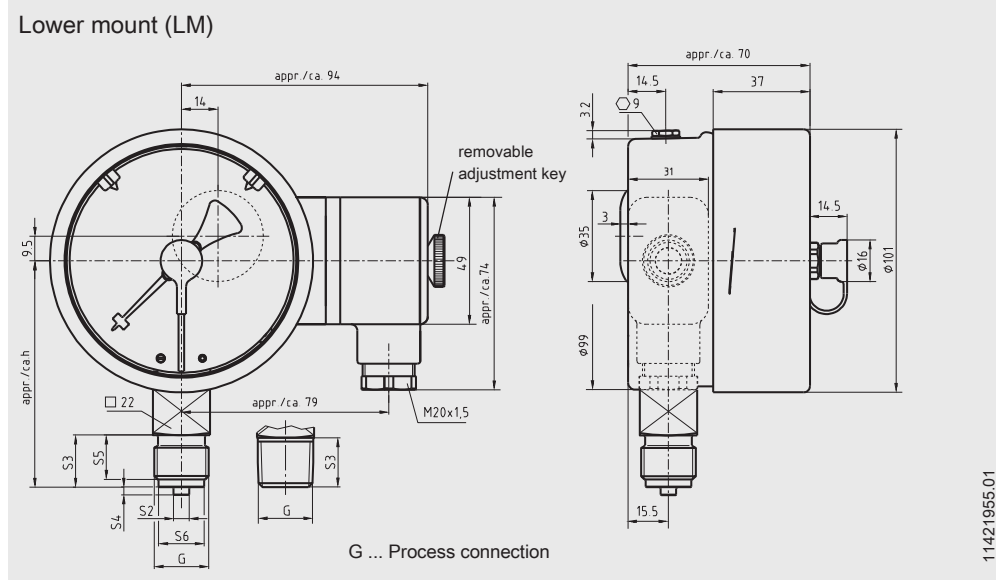


Type of contact	Dimensions in mm		
	X	Y	Z
Single or double contact	141	30.5 ¹⁾	48
Triple contact	153.5	30.5 ¹⁾	60.5

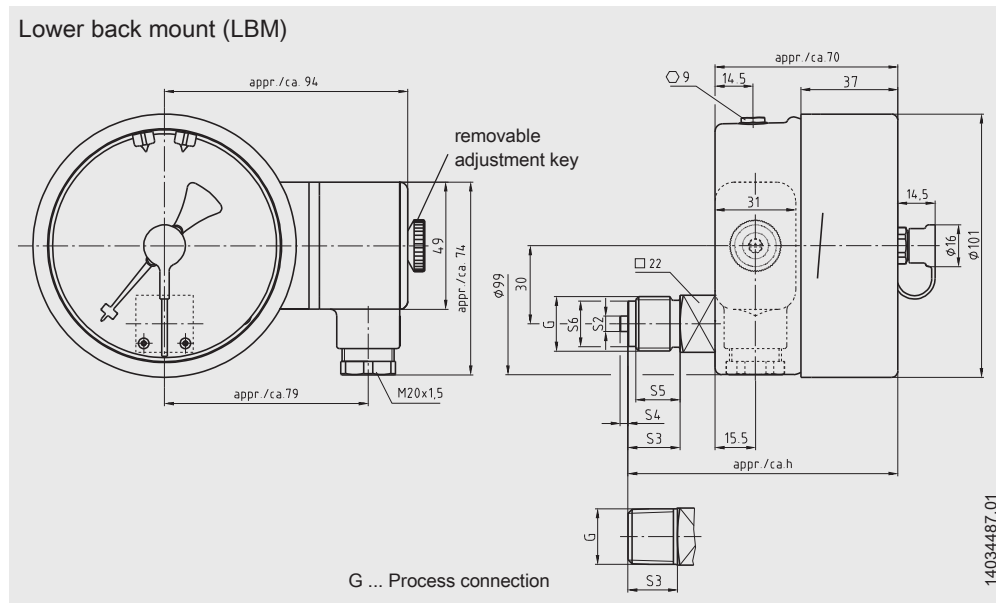
1) Plus 17 mm with pressure ranges ≤ 0 ... 60 bar

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

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



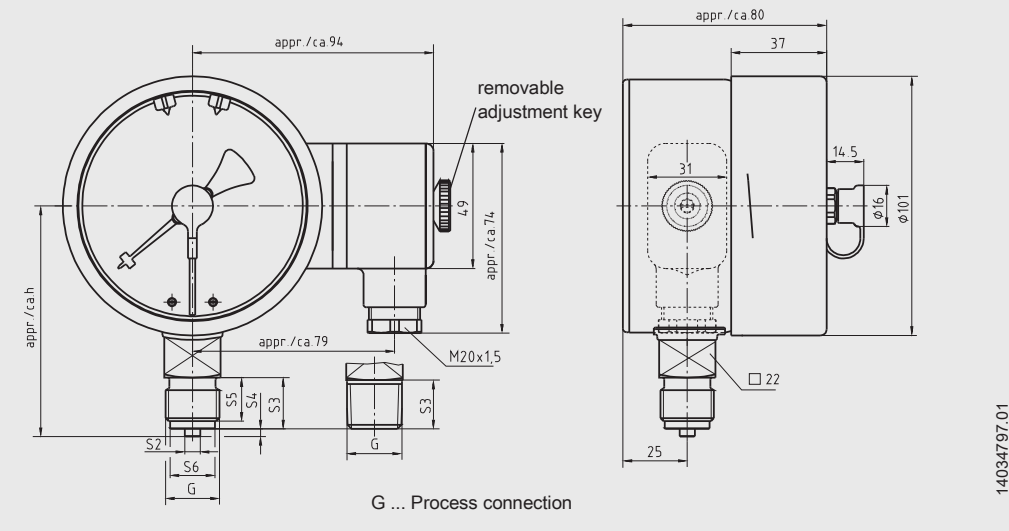
Process connection	Dimensions in mm					
	h ±1	S2	S3	S4	S5	S6
G ½ B	87	6	20	3	17	17.5
G ¼ B	80	5	13	2	11	9.5
G ⅜ B	83	5.5	16	3	13	13
½ NPT	86	-	19	-	-	-



Process connection	Dimensions in mm					
	h	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 ⅜ B	99	5.5	16	3	14	13
½ NPT	102	-	19	-	-	-

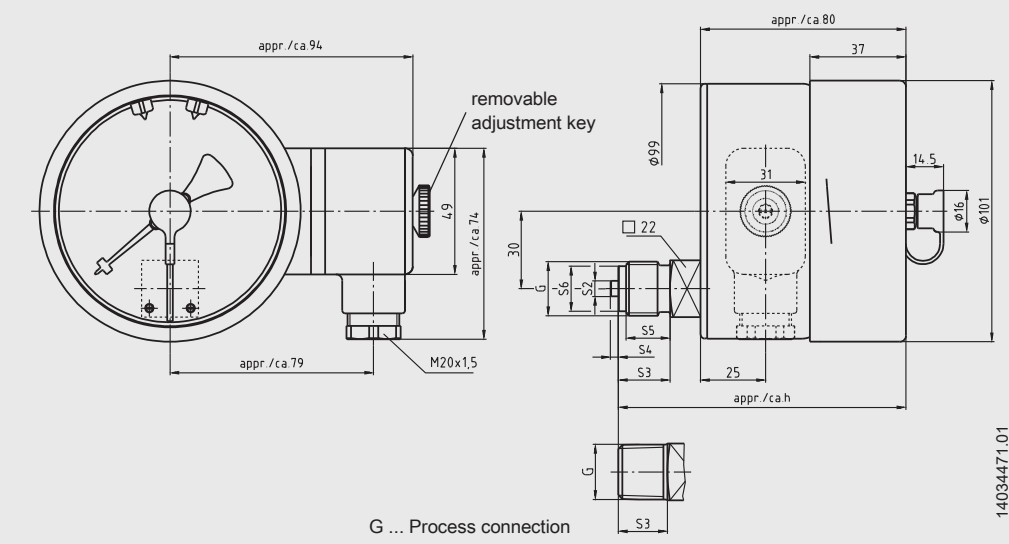
switchGAUGE model PGS23.100 (safety version) with switch contact model 851.3 or 851.33

Lower mount (LM)



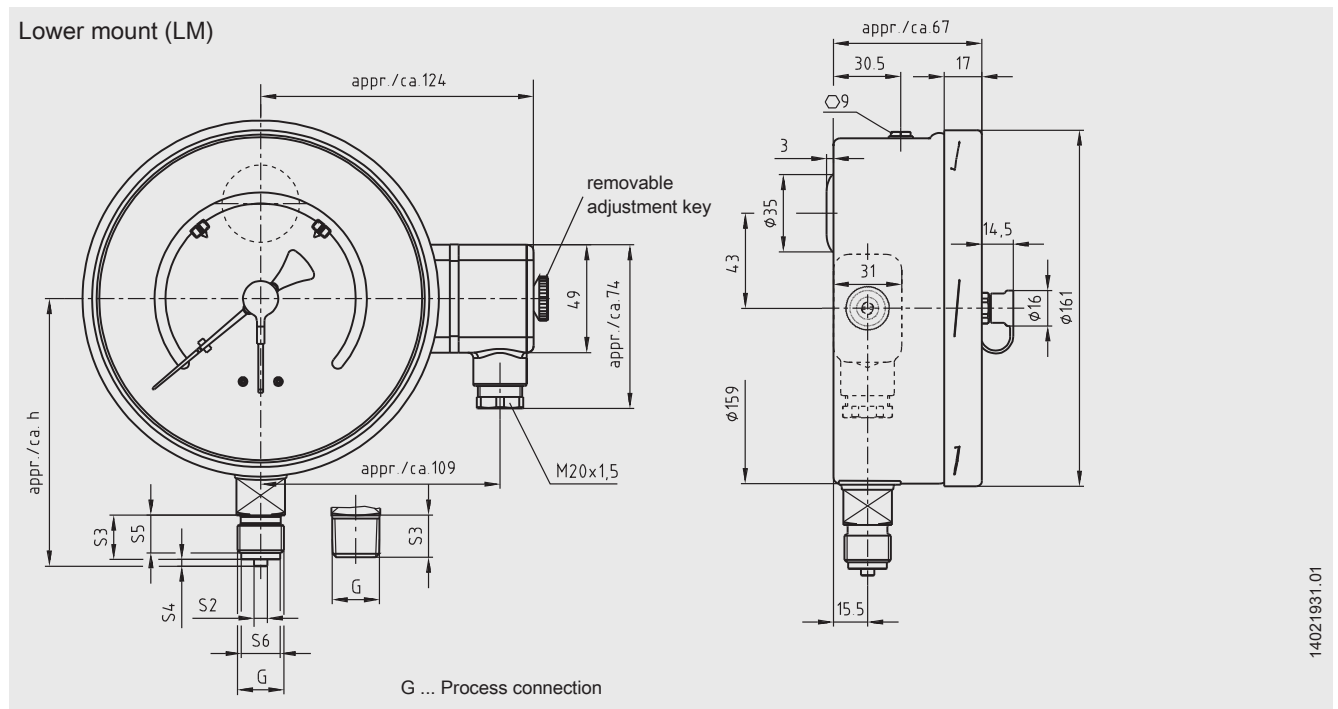
Process connection	Dimensions in mm	h ±1	S2	S3	S4	S5	S6
G ½ B		87	6	20	3	17	17.5
G ¼ B		80	5	13	2	11	9.5
G ⅜ B		83	5.5	16	3	13	13
½ NPT		86	-	19	-	-	-

Lower back mount (LBM)



Process connection	Dimensions in mm	h	S2	S3	S4	S5	S6
G ½ B		112	6	20	3	17	17.5
G ¼ B		105	5	13	2	11	9.5
G ⅜ B		108	5.5	16	3	14	13
½ NPT		111	-	19	-	-	-

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



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	-	-	-

CE conformity

Low voltage directive

2006/95/EC, EN 61010-1:2010

Pressure equipment directive

97/23/EC, PS \geq 200 bar, module A, pressure accessory, for instruments < 200 bar article 3.3 applies - sound engineering practice

EMC directive

2004/108/EC, EN 61326 emission (group 1, class B) and interference immunity (industrial application)

ATEX directive³⁾

94/9/EG, II 2 GD Ex ia IIC

Approvals

- **ATEX**, type approval for connection to hazardous zone^{3D}
- **EAC**, import certificate, customs union Russia/Belarus/Kazakhstan
- **GOST**, metrology/measurement technology, Russia
- **NEPSI**, ignition protection type "i" - intrinsic safety, China ³⁾
- **CRN**, safety (e.g. electr. safety, overpressure, ...), Canada

Instruments with special approvals on request, i.e.

- Pressure monitors with DVGW approval (DIN 3398/EN 1854)
- Pressure gauges with limit switches for intrinsically safe electrical systems

Certificates

- 2.2 test report per EN 10204 (e.g. state-of-the-art manufacturing, material proof, indication accuracy)
- 3.1 inspection certificate per EN 10204 (e.g. material proof for wetted metallic parts, indication accuracy)

1) Only for instruments with switch contacts model 821 and 851
2) Only for instruments with switch contacts model Typ 831
3) Option

Approvals and certificates, see website

Ordering information

Model / Nominal size / Type of contact and switching function / Scale range / Connection size / Connection location / Case / Options

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