

Absolute pressure gauge with switch contacts

For the process industry, NS 100 and 160

Models 532.52, 532.53 and 532.54

WIKA data sheet PV 25.02



for further approvals see page 9

switchGAUGE

Applications

- Control and regulation of processes
- Monitoring of plants and switching of circuits
- Pressure measurement independent of fluctuations in the atmospheric pressure
- Monitoring of vacuum pumps, packaging machines and condensation pressures, determination of vapour pressure in liquids

Special features

- High overload safety, long service life due to metal media chamber sealing
- Media chamber protected against unauthorised access
- Also available with liquid-filled case for high dynamic pressure loads or vibrations
- 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 532.5x 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.



Absolute pressure gauge model 532.53 with switch contact model 831.21

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.

Specifications

Models 532.52, 532.53 and 532.54		
Design	Mechanical absolute pressure gauge per DIN 16002	
Nominal size in mm	<ul style="list-style-type: none"> ■ 100 ■ 160 	
Accuracy class	1.6 (model 532.53) Option: <ul style="list-style-type: none"> ■ 1.0 (model 532.52) ¹⁾ ■ 2.5 (model 532.54) The measurement accuracy is ensured for ambient pressure fluctuations between 955 and 1,065 mbar (min. and max. of atmospheric pressure)	
Scale ranges	0 ... 25 mbar ²⁾ to 0 ... 25 bar absolute pressure [0 ... 0.36 psi to 0 ... 3,600 psi absolute pressure]	
Scale	Single scale Option: Dual scale	
Pressure limitation		
Steady	Full scale value	
Fluctuating	0.9 x full scale value	
Overload safety	10 x full scale value, max. 25 bar absolute pressure, min. 1 bar absolute pressure Option: 20 x full scale value, max. 25 bar absolute pressure, min. 1 bar absolute pressure	
Process connection with lower measuring flange	<ul style="list-style-type: none"> ■ G ½ B ■ ½ NPT ■ ½ NPT female ■ Open connecting flange DN 25 PN 25 per EN 1092-1, form B ■ Open connecting flange DN 25 PN 25, DIN 2501, form D per DIN 2526 ■ Small flange for vacuum applications DN 10 ■ Small flange for vacuum applications DN 16 Further threaded connections and open connecting flanges on request	
Permissible temperature ²⁾		
Medium	+100 °C [+212 °F] maximum Option: +200 °C [+392 °F] maximum	
Ambient	-20 ... +60 °C [-4 ... 140 °F] Option: -40 ... +60 °C (silicone oil filling) ¹⁾	
Temperature effect	When the temperature of the measuring system deviates from the reference temperature (+20 °C): max. ±0.8 %/10 K of full scale value	
Case	Version S1 per EN 837: With blow-out device in case back Option: Safety version S3 per EN 837: With solid baffle wall (Solidfront) and blow-out back (models 532.32, 532.33, 532.34) Instruments with liquid filling with compensating valve to vent case	
Case filling	Without Option: With silicone oil M50 case filling, ingress protection IP65 (models 533.52, 533.53, 533.54)	
Wetted materials		
Diaphragm element (pressure element)	≤ 0.25 bar: Stainless steel 316Ti > 0.25 bar: NiCr alloy (Inconel)	Option: Wetted parts from Monel (models 56x.3x, 56x.5x) ¹⁾
Media chamber with process connection	Stainless steel 316L	

1) Application test required

2) Accuracy class 2.5 (model 532.54) for scale range 0 ... 25 mbar

3) 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 532.52, 532.53 and 532.54

Non-wetted materials	
Case, movement, bayonet ring	Stainless steel
Dial	Aluminium, white, black lettering
Instrument pointer	Aluminium, black
Set pointer	Aluminium, red
Window	Laminated safety glass
Ingress protection per IEC/EN 60529	IP54 Option: IP65
Mounting	Rigid measuring lines Option: ■ Panel or surface mounting flange ■ Instrument mounting bracket for wall or pipe mounting
Electrical connection	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 ² For dimensions see page 10 others on request

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

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 Ω and 100 k Ω)
- Contact materials for contact model 821: Platinum-iridium alloy and gold-silver alloy

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

- Contacts fixed, without contact adjustment lock
- Contact adjustment lock leaded
- Contact adjustment key fixed
- Connector (instead of cable socket)

Specifications for instruments with magnetic snap-action contact model 821

Measuring span ¹⁾	Max. number of contacts	Switching current range I	Switch version ²⁾
≥ 25 mbar	2	0.02 ... 0.3 A	L
≥ 40 mbar	4	0.02 ... 0.3 A	L

1) Accuracy class 2.5 (model 532.54) for scale range 0 ... 25 mbar and for scale range 0 ... 40 mbar with 3 or 4 contacts

2) Design of the contact coil: Version "L" = light-weight

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	
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 ¹⁾	Max. number of contacts
≥ 25 mbar	3

1) Accuracy class 2.5 (model 532.54) for scale range 0 ... 25 mbar

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 ¹⁾
- 831-S1N, safety version ¹⁾, inverted signal

1) 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 ¹⁾	Max. number of contacts
≥ 25 mbar	3

1) Accuracy class 2.5 (model 532.54) for scale range 0 ... 25 mbar

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 ¹⁾	Case version	Max. number of contacts
≥ 25 mbar	S1, S3	2

1) Accuracy class 2.5 (model 532.54) for scale range 0 ... 25 mbar

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

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

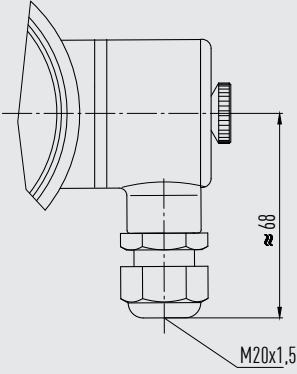
Accessories

- 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)

Dimensions in mm

Contact models: 831 and 830 E

Contact models: 821 and 851



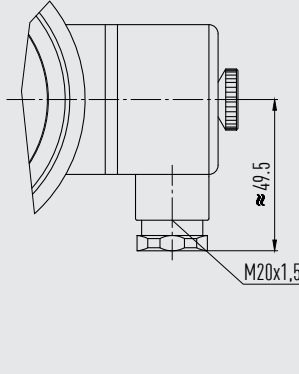
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Only use cable with a diameter of 5 ... 10 mm

≈ 68

M20x1,5

Contact models: 831 and 830 E



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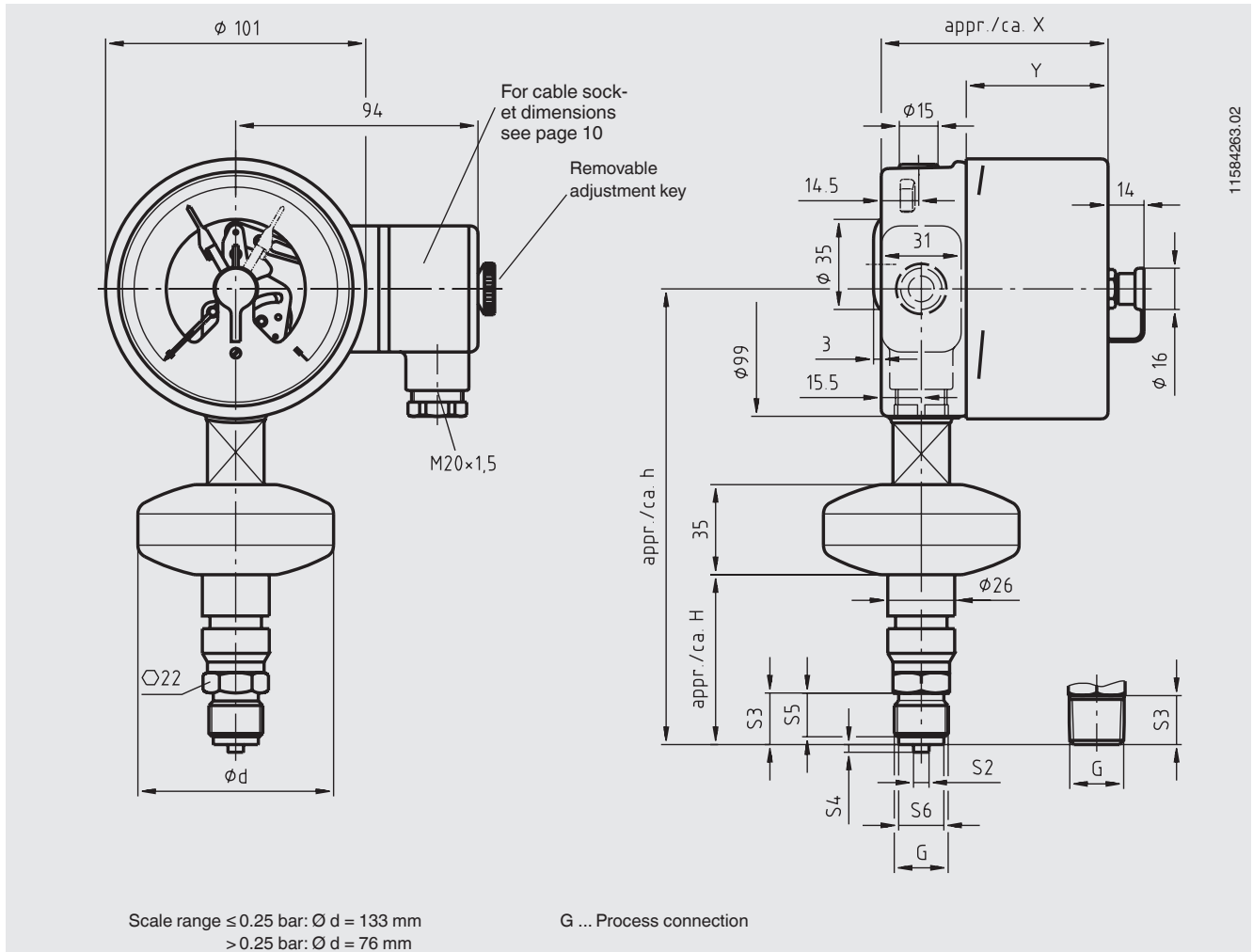
Only use cable with a diameter of 7 ... 13 mm

≈ 49.5

M20x1,5

Dimensions in mm

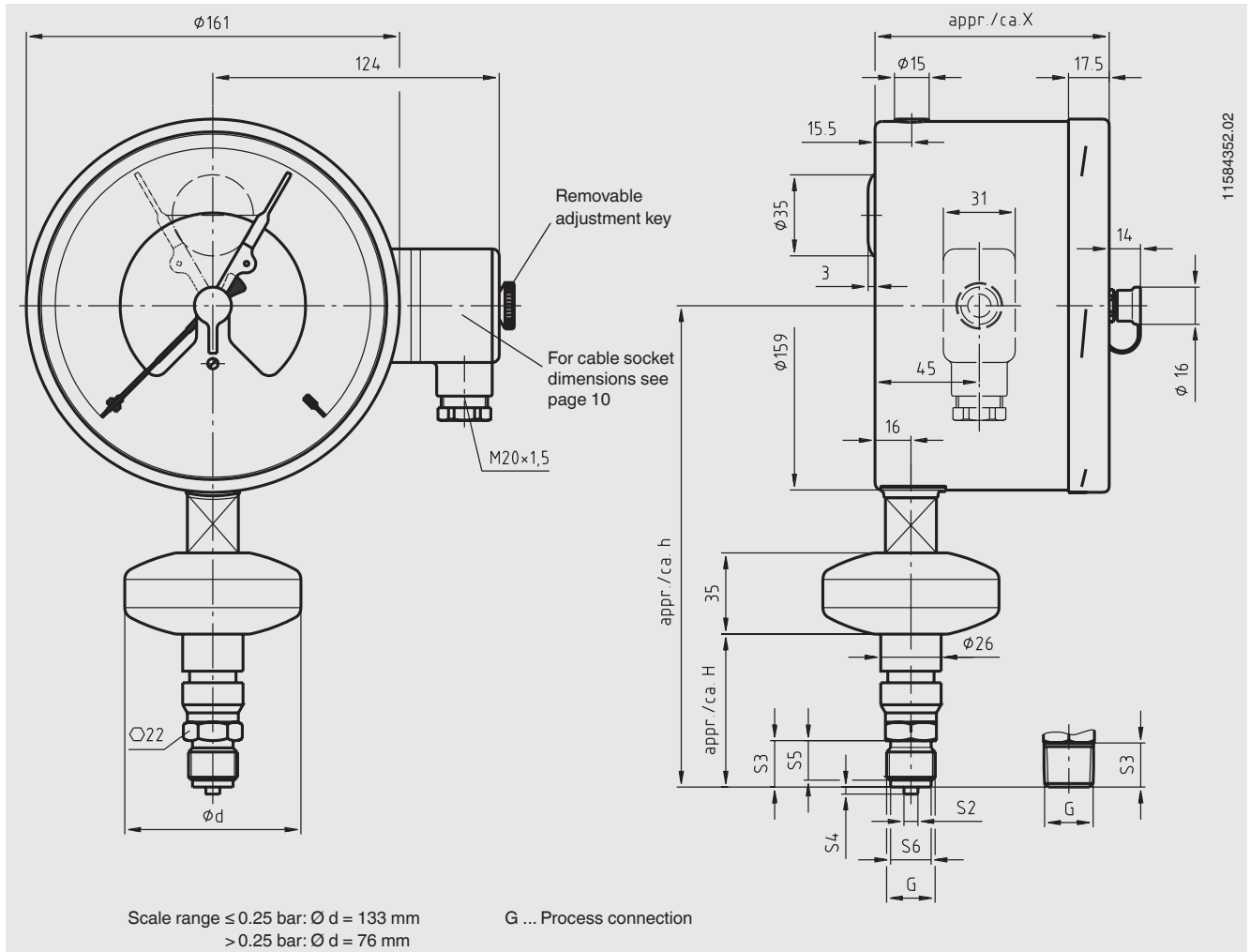
switchGAUGE model 532.53.100 with switch contact model 821, 831 or 830 E



Process connection	Dimensions in mm						
	$h \pm 1$	H	S2	S3	S4	S5	S6
G ½ B	177	66	6	20	3	17	17.5
½ NPT	176	65	-	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

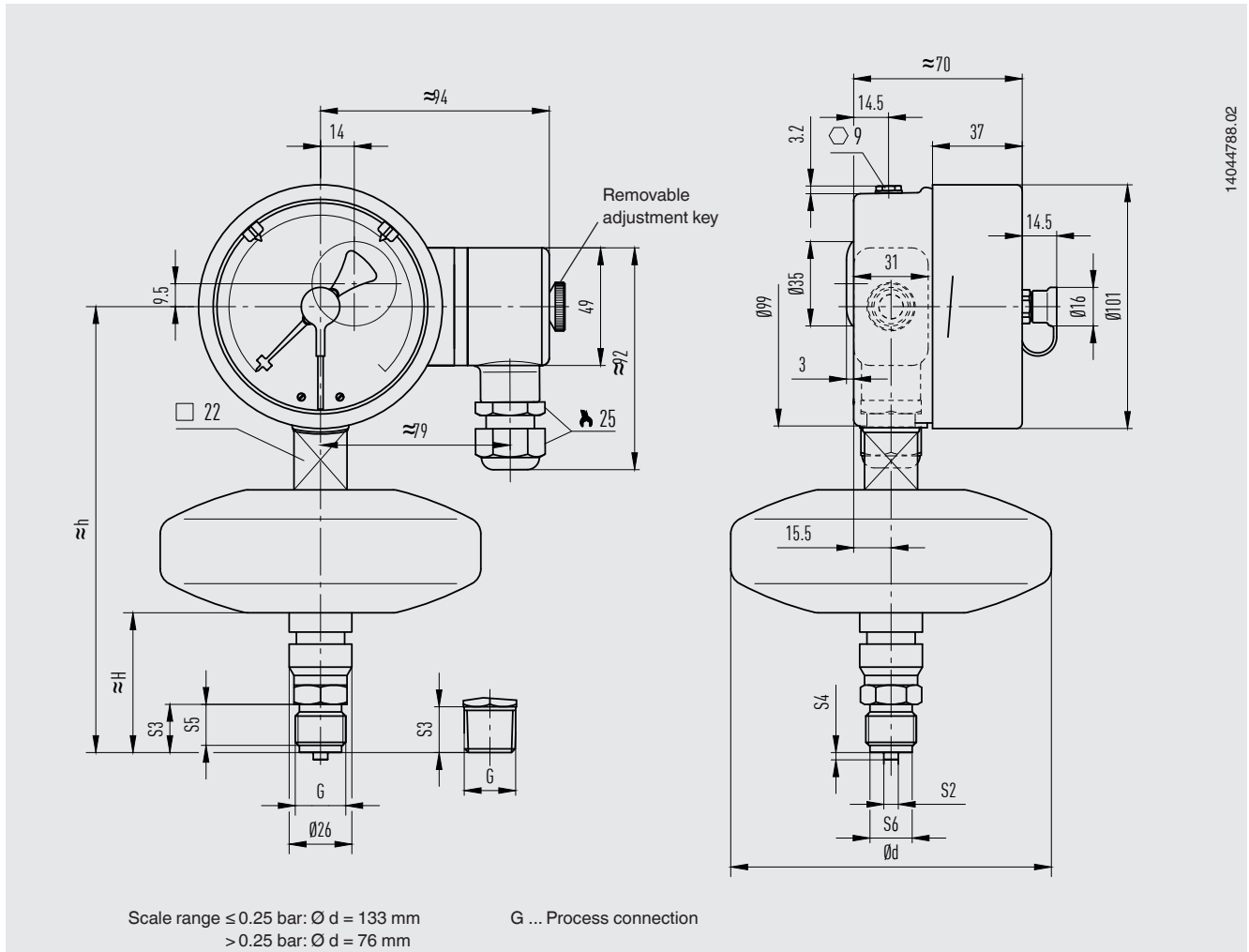
switchGAUGE model 532.53.160 with switch contact model 821, 831 or 830 E



Process connection	Dimensions in mm						
	$h \pm 1$	H	S2	S3	S4	S5	S6
G ½ B	207	66	6	20	3	17	17.5
½ NPT	206	65	-	19	-	-	-

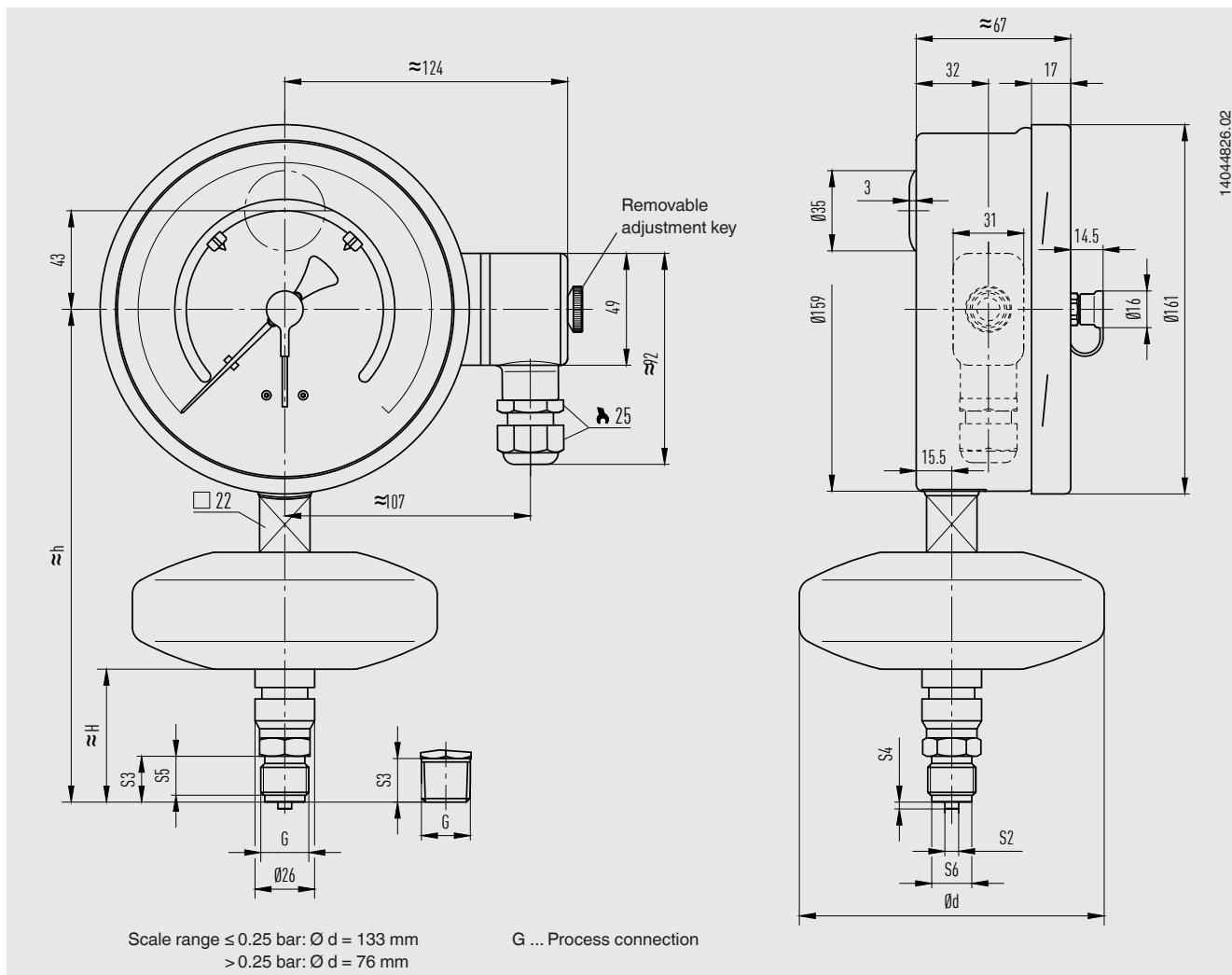
Type of contact	Dimensions in mm
	X
Single or double contact	102
Double (change-over) contact	116
Triple contact	102
Quadruple contact	116

switchGAUGE model 532.53.100 with switch contact model 851.3 or 851.33



Process connection	Dimensions in mm						
	$h \pm 1$	H	S2	S3	S4	S5	S6
G ½ B	185	58	6	20	3	17	17.5
½ NPT	184	57	-	19	-	-	-

switchGAUGE model 532.53.160 with switch contact model 851.3 or 851.33



Process connection	Dimensions in mm						
	$h \pm 1$	H	S2	S3	S4	S5	S6
G ½ B	215	58	6	20	3	17	17.5
½ NPT	214	57	-	19	-	-	-

Ordering information

Model / Nominal size / Type of contact and switching function / Scale range / Process connection / Options

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