

Differential pressure gauge with switch contacts

For the process industry, all-metal media chamber

Models DPGS43.100, DPGS43.160

WIKA data sheet PV 27.05



for further approvals see page 9

switchGAUGE

Applications

- Control and regulation of processes
- Monitoring of plants and switching of circuits
- For measuring points with increased differential overpressure
- Filter and pump monitoring
- Level measurement on closed vessels

Special features

- Differential pressure measuring ranges from 0 ... 16 mbar
- High working pressure (static pressure) and high overload safety up to 40 bar
- 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



Differential pressure gauge model DPGS43.100 with switch contact model 831.2

Description

Wherever the process pressure has to be indicated locally and, at the same time, circuits need to be switched, the model DPGS43.1x0 switchGAUGE finds its use.

Switch contacts (electrical alarm contacts) make or break circuits dependent upon the pointer position of the pressure gauge. 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 differential 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 DPGS43.100, DPGS43.160 | |
|--|---|
| Version | Process connections lower mount or lateral (option), highly corrosion-resistant solid metal design, measuring cell protected against unauthorised access. Overload resistance per EN 837-3 |
| Nominal size in mm | <ul style="list-style-type: none"> ■ 100 ■ 160 |
| Accuracy class | 1.6 Option: 1.0 on request |
| Scale ranges | 0 ... 16 mbar to 0 ... 250 mbar 0 ... 400 mbar to 0 ... 40 bar other units (e.g. psi, kPa) available or all other equivalent vacuum or combined pressure and vacuum ranges |
| Scale | Single scale Option: <ul style="list-style-type: none"> ■ Dual scale ■ Scale layout (e.g. linear pressure or square root incrementation) |
| Zero point setting | Without Option: Zero point adjustment appliance |
| Pressure limitation | |
| 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 |
| Overpressure safety and max. working pressure (static pressure) | see table on page 3 |
| Connection location | Lower mount (radial) Option: lateral (right, left, front or back) |
| Process connection | <ul style="list-style-type: none"> ■ G ¼ B female ■ G ½ B male ■ ½ NPT male Other process connections via female or male threads on request |
| Restrictor | Without Option: Restrictor in the pressure port |
| Permissible temperature ¹⁾ | |
| Medium | -20 ... +100 °C Option: Medium temperature > 100 °C on request |
| Ambient | -20 ... +60 °C (with window from polycarbonate max. 80 °C) |
| Temperature effect | When the temperature of the measuring system deviates from the reference temperature (+20 °C): max. ±0.5 %/10 K of full scale value |
| Case | <ul style="list-style-type: none"> ■ Version S1 per EN 837: With blow-out device in case back ■ Safety version S3 per EN 837: With solid baffle wall (Solidfront) and blow-out back |
| Case filling | Without Option: With case filling |
| Venting of the media chamber | With scale ranges ≤ 0.25 bar Option: With scale ranges ≥ 0.4 bar |

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.

Models DPGS43.100, DPGS43.160

Wetted materials

| | |
|---------------------------------------|--|
| Media chamber with process connection | Stainless steel 316Ti (1.4571) Lower mount 2 x G ¼ female |
| Pressure elements | ≤ 0.25 bar: Stainless steel 316L > 0.25 bar: NiCr alloy (Inconel) |
| Venting of the media chamber | Stainless steel 316Ti (1.4571) for scale ranges ≤ 0.25 bar Option: with scale ranges ≥ 0.4 bar |
| Bellows | Stainless steel 316Ti (1.4571) |

Non-wetted materials

| | |
|--|--|
| Movement | Brass |
| Dial | Aluminium, white, black lettering |
| Pointer | Aluminium, black |
| Case | Stainless steel, with blow-out device |
| Window | Laminated safety glass |
| Ring | Bayonet ring, stainless steel |
| Ingress protection per IEC/EN 60529 | IP54 ¹⁾ Option: IP65 with liquid filling |
| Installation | according to affixed symbols: ⊕ high pressure, ⊖ low pressure |
| Mounting | <ul style="list-style-type: none"> ■ Rigid measuring lines ■ Mounting holes in measuring flange Option: <ul style="list-style-type: none"> ■ Panel 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 |

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

Overload safety and max. working pressure

| Scale ranges | Overload safety in bar either side max. | | Max. working pressure in bar (static pressure) | |
|----------------------------|---|--------|--|-----------------|
| | Standard | Option | Standard | Option |
| 0 ... 16 to 0 ... 40 mbar | 2.5 | - | 2.5 | 6 ²⁾ |
| 0 ... 60 to 0 ... 250 mbar | 2.5 | 6 | 6 | 10 |
| 0 ... 400 mbar | 4 | 40 | 25 | 40 |
| 0 ... 0.6 bar | 6 | 40 | 25 | 40 |
| 0 ... 1 bar | 10 | 40 | 25 | 40 |
| 0 ... 1.6 bar | 16 | 40 | 25 | 40 |
| 0 ... 2.5 to 0 ... 25 bar | 25 | 40 | 25 | 40 |

2) Accuracy class 2.5

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

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

Specifications for instruments with magnetic snap-action contact model 821

| Measuring span | Nominal size | Max. number of contacts | Switching current range I | Switch version ¹⁾ |
|----------------|--------------|-------------------------|---------------------------|------------------------------|
| ≤ 1.0 bar | 100, 160 | 1 | 0.02 ... 0.3 A | L |
| > 1.0 bar | 100, 160 | 1 | 0.02 ... 0.6 A | S |
| ≤ 1.6 bar | 100, 160 | 2 | 0.02 ... 0.3 A | L |
| > 1.6 bar | 100, 160 | 2 | 0.02 ... 0.6 A | S |
| ≤ 4.0 bar | 100 | 4 | 0.02 ... 0.3 A | L |
| > 4.0 bar | 100 | 4 | 0.02 ... 0.6 A | S |
| ≤ 2.5 bar | 160 | 4 | 0.02 ... 0.3 A | L |
| > 2.5 bar | 160 | 4 | 0.02 ... 0.6 A | S |

1) Design of the contact coil: Version "L" = light-weight, version "S" = heavy

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 | |
| | Switch version "S" | Switch version "L" | Switch version "S" | Switch version "L" |
| Rated operating voltage U_{eff} | ≤ 250 V | | ≤ 250 V | |
| Rated operating current | | | | |
| Switch-on current | ≤ 1.0 A | ≤ 0.5 A | ≤ 1.0 A | ≤ 0.5 A |
| Switch-off current | ≤ 1.0 A | ≤ 0.5 A | ≤ 1.0 A | ≤ 0.5 A |
| Continuous current | ≤ 0.6 A | ≤ 0.3 A | ≤ 0.6 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 | 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 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 | 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)

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 |
|----------------|--------------|-------------------------|
| ≥ 16 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 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 (option) 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 ¹⁾ | 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 |
|  | UkrSEPRO (option) Metrology, measurement technology | Ukraine |
|  | Ex Ukraine (option) ¹⁾ Hazardous areas | Ukraine |
|  | Uzstandard (option) Metrology, measurement technology | Uzbekistan |
|  | NEPSI (option) ¹⁾ Hazardous areas | 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

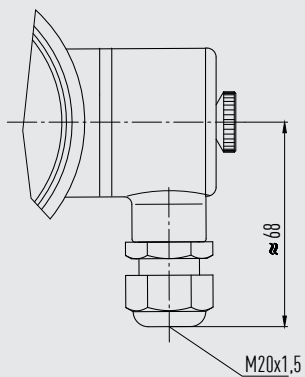
Accessories

- 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

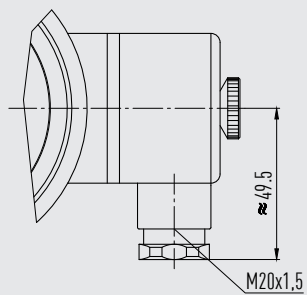
Contact models: 821 and 851



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

Contact models: 831 and 830 E

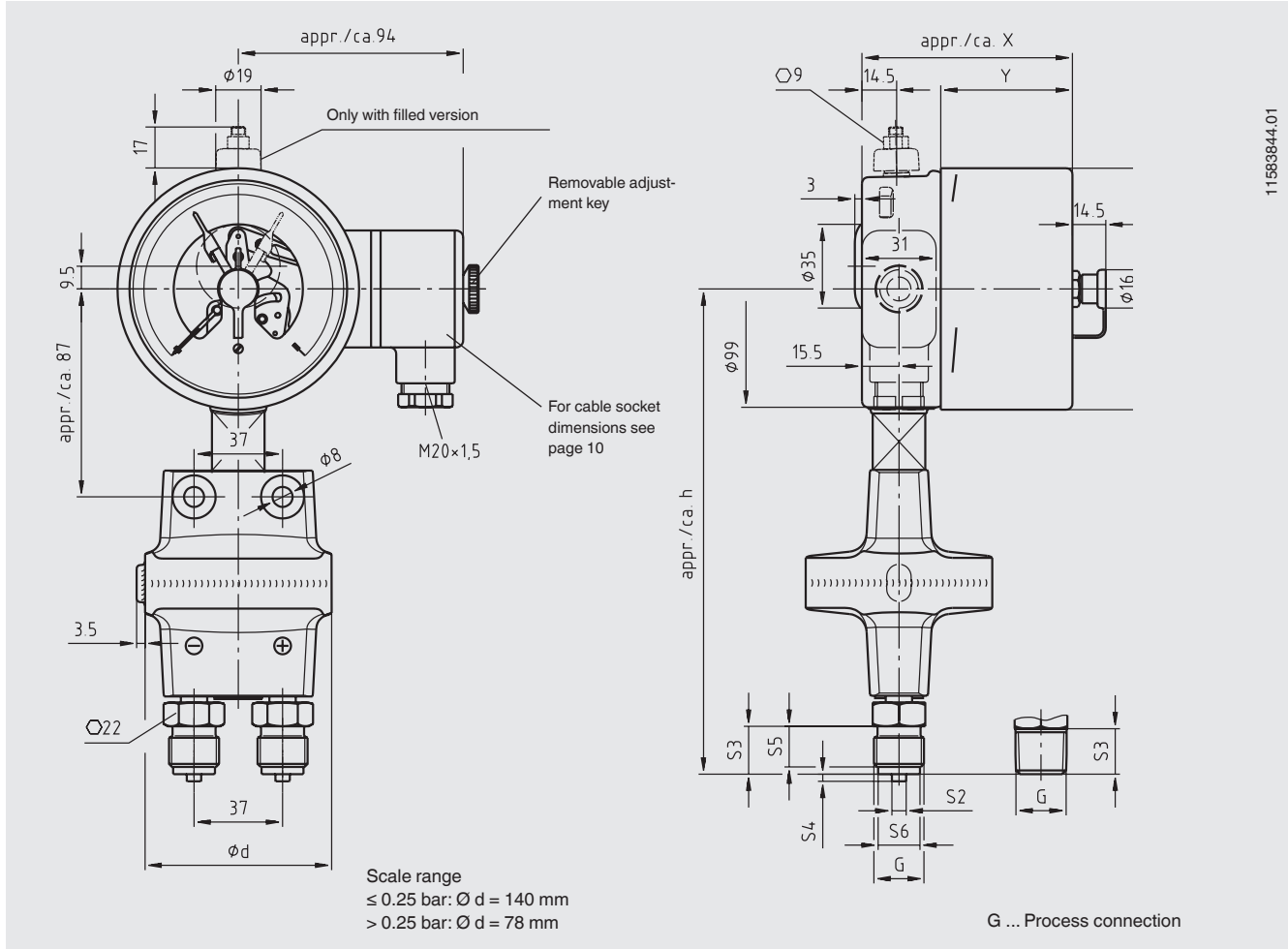


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Only use cable with a diameter of 7 ... 13 mm

Dimensions in mm

switchGAUGE model DPGS43.100 with switch contact model 821, 831 or 830 E

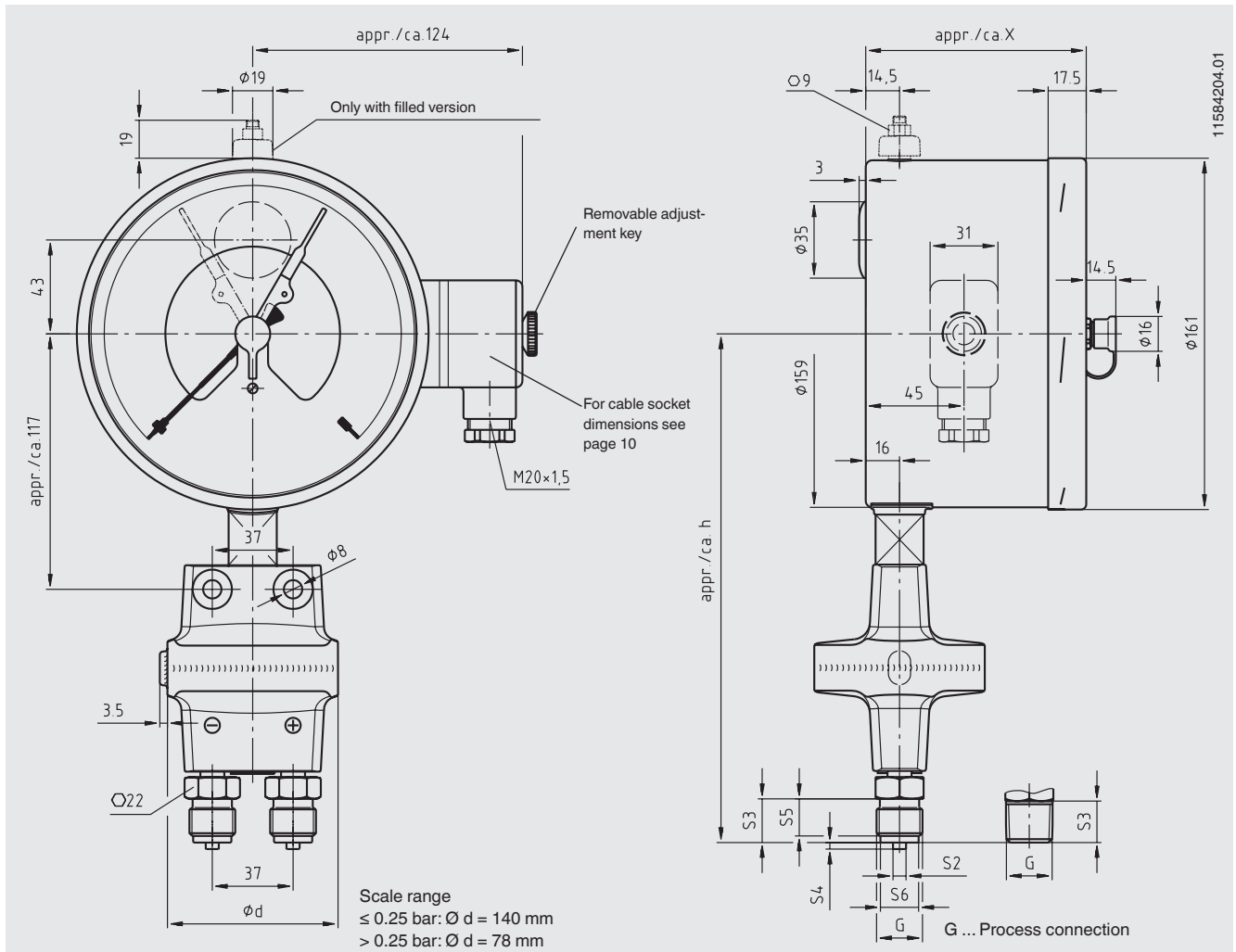


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| Type of contact | Dimensions in mm | |
|------------------------------|------------------|----|
| | X | Y |
| Single or double contact | 88 | 55 |
| Double (change-over) contact | 113 | 80 |
| Triple contact | 96 | 63 |
| Quadruple contact | 113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

| Process connection | Dimensions in mm | | | | | |
|--------------------|------------------|----|----|----|----|------|
| | $h \pm 1$ | S2 | S3 | S4 | S5 | S6 |
| G 1/2 B | 203 | 6 | 20 | 3 | 17 | 17.5 |
| 1/2 NPT | 201 | - | 19 | - | - | - |

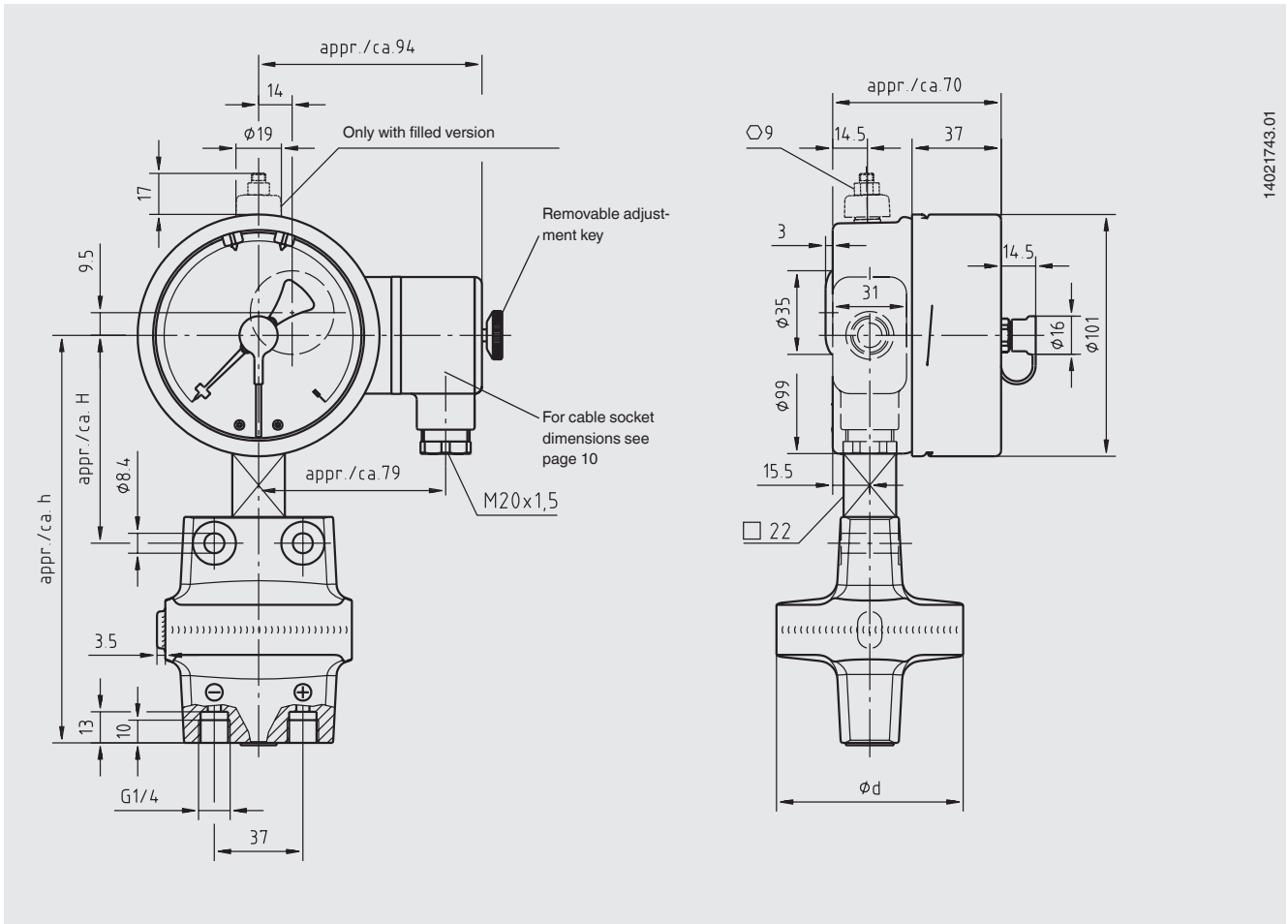
switchGAUGE model DPGS43.160 with switch contact model 821, 831 or 830 E



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

| Process connection | Dimensions in mm | | | | | |
|--------------------|------------------|----|----|----|----|------|
| | h ±1 | S2 | S3 | S4 | S5 | S6 |
| G ½ B | 233 | 6 | 20 | 3 | 17 | 17.5 |
| ½ NPT | 231 | - | 19 | - | - | - |

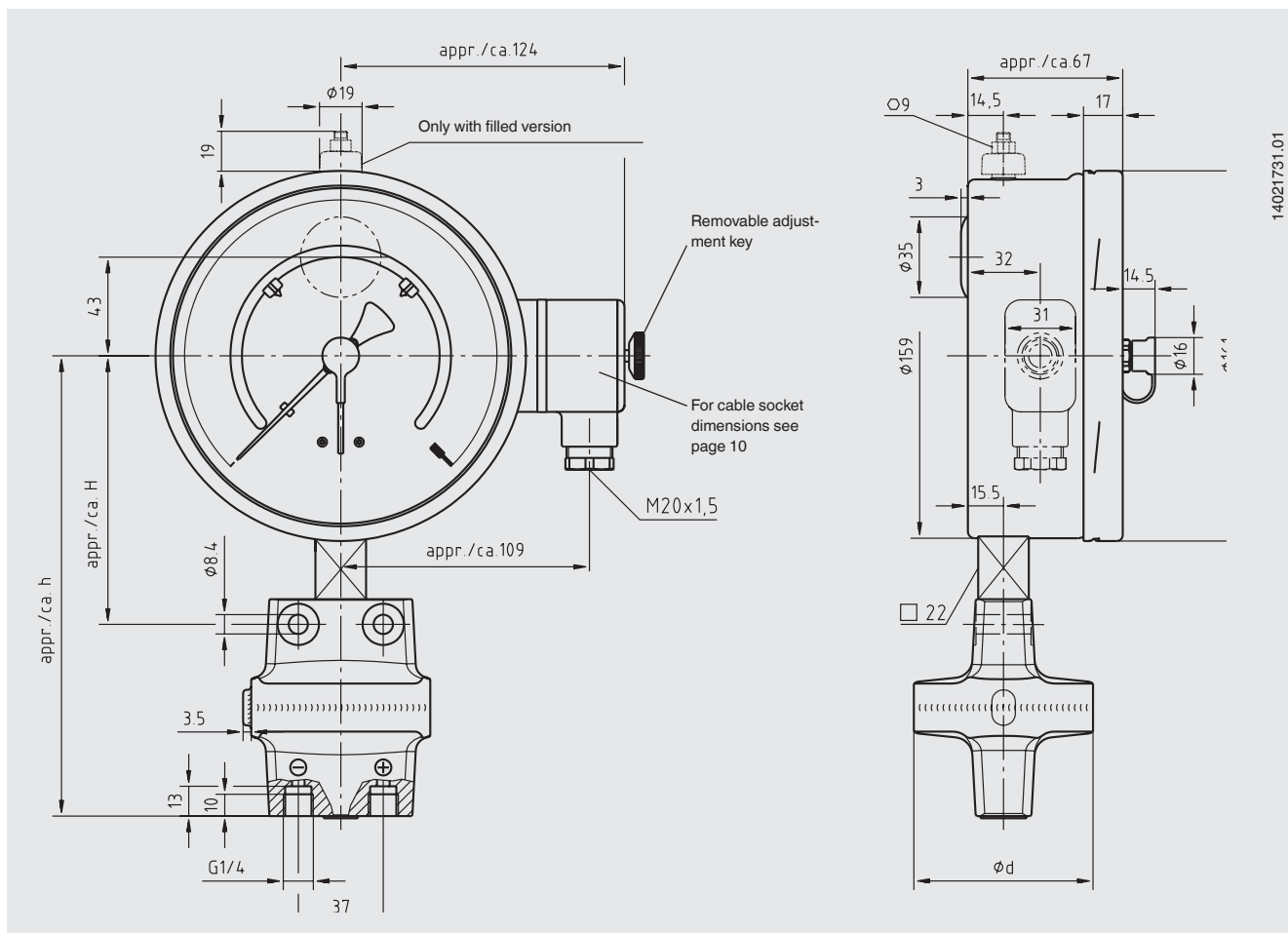
switchGAUGE model DPGS43.100 with switch contact model 851.3 or 851.33



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| Scale range | Dimensions in mm | | |
|-------------|------------------|------|------|
| | Ø d | h ±1 | H ±1 |
| ≤ 0.25 bar | 140 | 161 | 90 |
| > 0.25 bar | 78 | 171 | 87 |

switchGAUGE model DPGS43.160 with switch contact model 851.3 or 851.33



| Scale range | Dimensions in mm | | |
|-------------|------------------|------|------|
| | Ø d | h ±1 | H ±1 |
| ≤ 0.25 bar | 140 | 201 | 117 |
| > 0.25 bar | 78 | 190 | 120 |

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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