Gas Density Monitor (GDM) with Integrated Gas Density Transmitter Model 233.52.100 TI

Applications

- Gas density monitoring of closed SF_6 tanks
- For indoor and outdoor installation in SF_6-gas-isolated switching units

Special Features

Modified bourdon tube pressure gauge with integrated Gas Density Transmitter inside the case

- Local readout with alarm contacts
- Remote readout (output 4 … 20 mA, 2-wire system), measuring ranges from 0 ... 10 g/liter to 0 ... 80 g/liter
- High EMI performance, CE-conformity
- Hermetically sealed, therefore no influence by atmospheric pressure fluctuation and differences in altitude

Gas Density Monitor (GDM) with Integrated Gas Density Transmitter, Model 233.52.100 TI

Description - Gas Density Transmitter

Model 233.52.100 TI features a Gas Density Transmitter integrated into the back of the case. It functions fully as a standard GD-10 Gas Density Transmitter, however, the combination allows for both instruments to obtain a density reading through a single connection to the tank.

The gas density transmitter is electrically compensated following the non-linear behavior of SF_6-gas according to the virial equation. This provides the highest accuracy and best temperature compensation possible since SF_6 is a real gas functioning according to real gas law equations. Only a gas density transmitter can take this into account.

The gas density transmitter picks up the pressure and temperature of the SF_6-gas contained in the device (tank). The current gas density is ascertained from both variables by means of an electronic evaluation system. Thermal induced pressure changes are dynamically compensated and do not affect the output signal.
The gas density transmitter generates a density proportional, standardized signal of 4 ... 20 mA.

Recalibration of the zero signal is not necessary due to the high long-term stability of the gas density transmitter. The hermetically-sealed measuring cell guarantees high long-term leak tightness. It is welded closed to prevent leaks and remain independent of atmospheric pressure fluctuations and variations of the mounting height.

The EMI properties of the transmitter are tested according to IEC 61000-4-2 thru IEC 61000-4-6 and guarantee a safe pick-up of the signal which is especially suited to conditions prevailing in high-voltage switching units.

Description - Gas Density Monitor

Nominal size
100 mm dial size with transmitter integrated into special deeper case

Accuracy (relating to the measuring span)
Accuracy of ± 1% at +20 °C/68 °F (± 0.37%/10 °K must be added as the temperature deviates from +20 °C/68 °F)
- Reference diagram KALI-Chemie AG
- Calibration pressure is used as reference isochore

Scale ranges
All standard ranges and +/- ranges with a measuring span of min. 1.6 bar und max. 25 bar (SF_6 gas pressure at +20 °C)

Calibration pressure P_E
As ordering specifications

Permissible temperatures
Ambient: -20 ... +60 °C (gas phase)
Storage: -50 ... +60 °C

Alarm contacts / Contact rating
- Max. 3 magnetic snap-action contacts, to make or break, with galvanic isolation, switching points non-adjustable and secured
- Contact rating: 20 W / 20 VA, max. 1 A
- Material of contacts: 80 % Ag / 20 % Ni, gold-plated

Switching accuracy in temperature range -20 ... +60 °C
If switching point is equal P_E: as measuring span,
If switching point is not equal P_E:
Moved parallel to calibration pressure

High-voltage test
2 kV, 50 Hz, 1 s (wiring versus case)

Electrical connection
Cable box with cable gland M20 x 1.5
Connection cross-section max. 2.5 mm²

Pressure connection
Stainless steel,
Lower mount (LM) only, spigot Ø 6 x 5, similar to EN 837,
G ½ B (male), 22 mm flats

Pressure element
Stainless steel, welded
Gas tight: leakage rate ≤ $1 \cdot 10^{-8}$ mbar · l / s
Test method: spectrometry of helium mass

Movement
Stainless steel
Bimetal link (temperature compensation)

Dial
Aluminium, red-green-yellow section as ordering specifications

Pointer
Aluminium, black

Case
Stainless steel with silicone oil or dry nitrogen filling
Gas tight: leakage rate ≤ $1 \cdot 10^{-5}$ mbar · l / s

Window
Laminated safety glass

Bezel ring
Cam ring (bayonet type), stainless steel
secured with 3 welding spots

Ingress protection
IP 65 per EN 60 529 / IEC 529

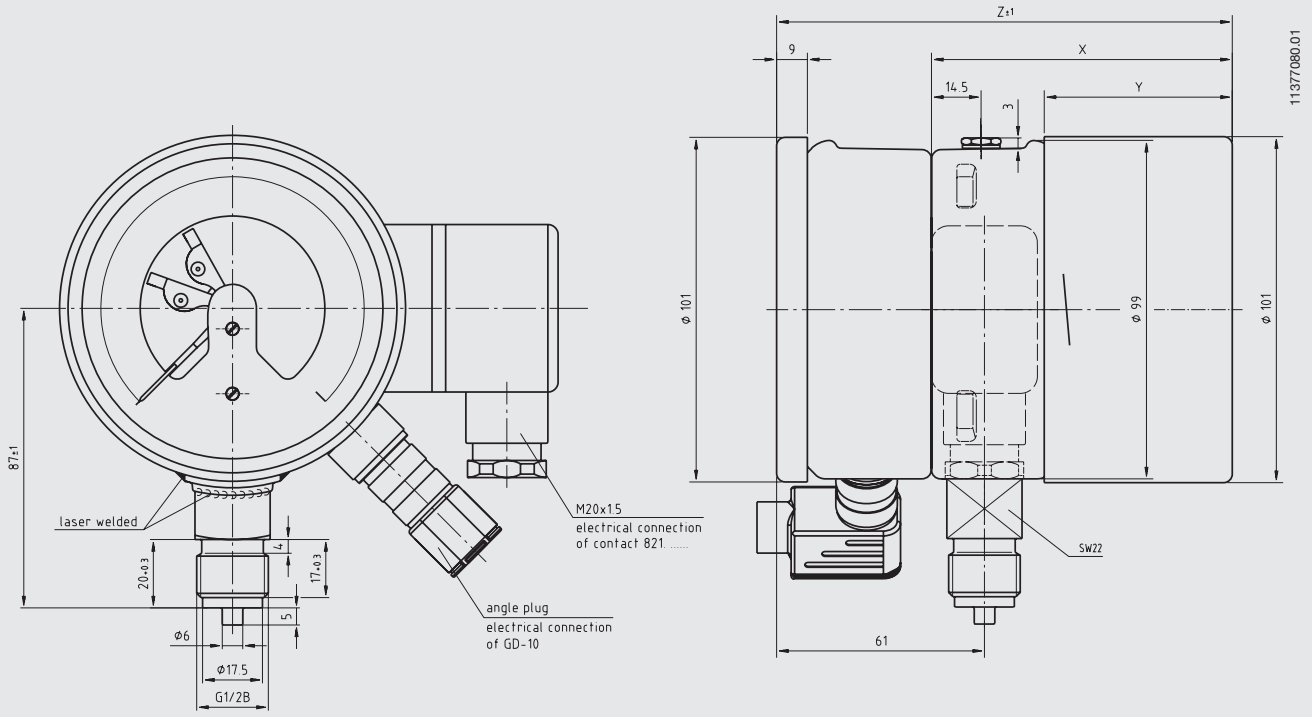
Weight
approx. 1.2 kg

Options - Gas Density Monitor

- 3 magnetic snap-action contacts, without galvanic
- Isolation, switching points are adjustable
- Acrylic glass window
- Pressure connection through flanges
- Pluggable cable box

Dimensions in mm

Standard version



kind of contact		X	Y	Z
double contact without seperate circuits without adjustable arms	821.xx	88	55	133
double contact with seperate circuits without adjustable arms	821.x.x	88	55	133
double contact with seperate circuits with adjustable arms	821.x.x	96	63	141
triple contact without seperate circuits without adjustable arms	821.xxx	96	63	141
triple contact with seperate circuits without adjustable arms	821.x.x.x	96	63	141
triple contact with seperate circuits with adjustable arms	821.x.x.x	113	80	158

Specifications for Gas Density Transmitter

Designed for **Sensing principle**		**pure SF_6-gas** **piezoresistive**					
Density ranges (Pressure ranges)	g/Litre bar $_{abs.}$ at 20 °C	10 1.64	16 2.59	25 3.97	40 6.16	60 8.87	80 11.33
Over pressure safety Burst pressure of sensor	bar $_{abs.}$ bar $_{abs.}$	14 17	14 17	14 17	29 35	29 35	67 80
Pressure reference Materials Wetted parts Case / terminal case Internal transmitting fluid		absolute pressure stainless steel stainless steel synthetic oil					
Power supply U_B Signal output and maximum load R_A	DC V	$10 < U_B \leq 30$ 4 ... 20 mA, 2-wire, $R_A \leq (U_B\text{-}10\ V) / 0.02\ A$ with R_A in Ohm and U_B in Volt					
Accuracy 1-year stability Nominal temperature Working temperature range Storage temperature	% of span % of span °C (°F) °C (°F) °C (°F)	-40 °C.: 3% / 20 °C.: 1% / 60 °C.: 2.3% (optimal accuracy point) -40 °C.: 4% / 20 °C.: 2% / 60 °C.: 3.3% (beginning and end of measuring range) ≤ 0.3 (at reference conditions) -40 ... +60 (-40 ... +140) [gas phase!] -40 ... +80 (-40 ... +176) [gas phase!] -40 ... +80 (-40 ... +176)					
CE - conformity High voltage strength Electro-magnetic immunity (EMI) / RFI per IEC 61000-4	 DC V	EN 61 326 750 (wiring versus case) IEC 61000-4-2 (ESD): test level 4 (8 kV) IEC 61000-4-3 (Field): test level 3 (10 V/m) IEC 61000-4-4 (Burst): test level X (+/-4 kV) IEC 61000-4-5 (Surge): test level 2 (+/-1 kV) IEC 61000-4-6 (Conducted RFI): test level 3 (10 V)					
Cable gland and Ingress protection per EN 60529 / IEC 529 Wiring protection		2-pin plug, IP 67 {L-junction box brass, nickel-plated, IP 67} {cable gland with flying lead 1.5 m; IP 68} Protected against reverse polarity and overvoltage					

Items in curved brackets { } are optional extras for additional price.

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