Gas Density Monitor (GDM) with Attached Gas Density Transmitter Model 233.52.100 TA

Applications
- Gas density monitoring of closed SF6 tanks
- For indoor and outdoor installation in SF6-gas-isolated switching units

Special Features
- Modified bourdon tube pressure gauge with Gas Density Transmitter attached to the outside connection of 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

Description - Gas Density Transmitter
Model 233.52.100 TA features a Gas Density Transmitter attached to the side of the Gas Density Monitor’s pressure connection. 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. WIKA transmitter GD-10 L (with L-plug connection) is shown in the drawing below, however GD-10 C (with attached cable) or GD-10 F (with robust field case) can also be used.

The gas density transmitter is electrically compensated following the non-linear behavior of SF6-gas according to the virial equation. This provides the highest accuracy and best temperature compensation possible since SF6 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 SF6-gas contained in the 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 (2-wire system) and measures ranges from 0 ... 10 g/liter to 0 ... 80 g/liter.

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 attached

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 (SF6 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, 10 μm gold-plated
- Alarm contacts with excellent long-term stability

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),
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 · 10⁻⁶ mbar · l / s
Test method: spectrometry of helium mass

Options - Gas Density Monitor

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

Standard version

[Diagram of a mechanical device with various dimensions labeled in mm]
## Specifications for Gas Density Transmitter

<table>
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<th>Designed for Sensing principle</th>
<th>pure SF₆-gas piezoresistive</th>
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<tr>
<td>Density ranges (Pressure ranges)</td>
<td>g/Litre barₐbs. at 20 °C</td>
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<tr>
<td>Over pressure safety</td>
<td>barₐbs.</td>
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<td>barₐbs.</td>
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<td>Pressure reference</td>
<td>absolute pressure</td>
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<tr>
<td>Materials</td>
<td>Wetted parts stainless steel</td>
</tr>
<tr>
<td>Case / terminal case stainless steel</td>
<td></td>
</tr>
<tr>
<td>Internal transmitting fluid synthetic oil</td>
<td></td>
</tr>
<tr>
<td>Power supply Uᵦ</td>
<td>DC V</td>
</tr>
<tr>
<td>Signal output and maximum load Rᵦ</td>
<td>4 ... 20 mA, 2-wire, Rᵦ ≤ (Uᵦ-10 V) / 0.02 A with Rᵦ in Ohm and Uᵦ in Volt</td>
</tr>
<tr>
<td>Accuracy</td>
<td>% of span</td>
</tr>
<tr>
<td>1-year stability</td>
<td>% of span</td>
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<tr>
<td>Nominal temperature</td>
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<td>EN 61326</td>
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<td>DC V</td>
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<td>Electro-magnetic immunity (EMI) / RFI per IEC 61000-4</td>
<td>IEC 61000-4-2 (ESD): test level 4 (8 kV)</td>
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<td>IEC 61000-4-3 (Field): test level 3 (10 V/m)</td>
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<td>IEC 61000-4-4 (Burst): test level X (+/-4 kV)</td>
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<td>IEC 61000-4-5 (Surge): test level 2 (+/-1 kV)</td>
</tr>
<tr>
<td></td>
<td>IEC 61000-4-6 (Conducted RFI): test level 3 (10 V)</td>
</tr>
<tr>
<td>Cable gland and Ingress protection per EN 60529 / IEC 529</td>
<td>2-pin plug, IP 67 [L-junction box brass, nickel-plated, IP 67]</td>
</tr>
<tr>
<td>[cable gland with flying lead 1.5 m; IP 68]</td>
<td></td>
</tr>
<tr>
<td>Wiring protection</td>
<td>Protected against reverse polarity and overvoltage</td>
</tr>
</tbody>
</table>

Items in curved brackets [ ] are optional extras for additional price.

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Modifications may take place and materials specified may be replaced by others without prior notice. Specifications and dimensions given in this leaflet represent the state of engineering at the time of printing.