Gas density monitor with reference chamber
Model GDM-RC-100

Applications
- High-voltage equipment
- Monitoring of SF₆ gas density of closed gas tanks
- Raising an alarm when defined limit values have been reached

Special features
- Accurate isochore, temperature-compensated switching and display over the entire temperature range
- Complete local display of the density and vacuum range on a 100-mm dial
- Increased plant safety through self-diagnostics
- Prepared for any alternative gases
- Very high long-term stability through welded reference gas volume

Gas density monitoring of electrical equipment
Gas density is a crucial operating parameter for high-voltage plants. If the required gas density is not present, safe operation of the plant cannot be guaranteed.
The gas density monitor model GDM-RC-100 warns reliably when the gas density, due to leakage, drops below the established values, even under extreme environmental conditions.

Operating principle
The model GDM-RC-100 works according to the reference gas principle. The reference gas enables accurate isochore switching and display over the entire temperature range. Temperature changes and atmospheric pressure variations do not affect the measurement.

Everything at a glance
As in the case of the gas density monitor model GDM-100, for the model GDM-RC-100, WIKA also relies on the proven principle of a readily legible display. The entire density and vacuum range can be displayed locally on only one dial with high accuracy. This increases safety during maintenance and service work on switchgear and simplifies implementation of this type of work.

Maximum plant safety through self-diagnostics
The welded reference chamber enables a very high long-term stability and eliminates drift. In the extremely unlikely case of leakage in the reference chamber, the plant operator is reliably warned by a switching signal of the instrument. The gas density monitor is maintenance-free.

Prepared for alternative gases
The model GDM-RC-100 can be used for any type of alternative gases and is capable of accurate isochore switching of these gases without any temperature effect.
**Specifications**

### General

<table>
<thead>
<tr>
<th>Measurement principle</th>
<th>Reference gas measurement</th>
</tr>
</thead>
</table>
| Measuring range       | ■ 0 ... 10 bar abs. at 20 °C SF₆ gas  
                         ■ 0 ... 12.5 bar abs. at 20 °C SF₆ gas |
| Nominal size of the optical display | 100 mm |
| Self-indication in case of malfunction | Integrated into the instrument, the switch contact is actuated in case of leakage in the reference chamber |
| Product label         | Lasered onto the reference chamber, maximum weather resistance |

### Accuracy

#### Switching accuracy

| -1 ... +5 bar at 20 °C | ■ ±70 mbar at calibration pressure at 20 °C, gaseous phase  
                         ■ ±100 mbar at calibration pressure at -30 ... +50 °C, gaseous phase |
| -1 ... +9 bar at 20 °C | ■ ±100 mbar at calibration pressure at 20 °C, gaseous phase  
                         ■ ±150 mbar at calibration pressure at -30 ... +50 °C, gaseous phase |
| -1 ... +11.5 bar at 20 °C | ■ ±150 mbar at calibration pressure at 20 °C, gaseous phase  
                           ■ ±200 mbar at calibration pressure at -30 ... +50 °C, gaseous phase |

#### Indication accuracy on numbered scale

| -1 ... +5 bar at 20 °C | ■ ±70 mbar at calibration pressure at 20 °C, gaseous phase  
                         ■ ±100 mbar at calibration pressure at -30 ... +50 °C, gaseous phase |
| -1 ... +9 bar at 20 °C | ■ ±100 mbar at calibration pressure at 20 °C, gaseous phase  
                         ■ ±150 mbar at calibration pressure at -30 ... +50 °C, gaseous phase |
| -1 ... +11.5 bar at 20 °C | ■ ±150 mbar at calibration pressure at 20 °C, gaseous phase  
                           ■ ±200 mbar at calibration pressure at -30 ... +50 °C, gaseous phase |

Calibration pressure established by means of reference isochore, generated by Prof. Bier

### Dial

#### Scale range on dial

| End of measuring range: 1.3 bar above the first switch point below the filling pressure  
| Numbering: Terminates 900 mbar above the first switch point below the filling pressure |

Extended measuring range (at least 4 bar below and 1.3 bar above the first switch point)

#### Scale

- Single scale (divided into sections of different colours)  
- Double scale (divided into sections of different colours)  
- Triple scale (divided into sections of different colours)

#### Material

Aluminium

### Switch contacts

#### Switch model

Micro switch

#### Electrical connection

<table>
<thead>
<tr>
<th>Electrical connection</th>
<th>12-pin TTI plug-in terminal</th>
</tr>
</thead>
</table>
| Wire cross-section    | ■ min. 0.25 mm²  
                         ■ max. 2.5 mm² |
| Grounding             | Grounding in cable socket available |

#### Quantity

- 1 micro switch  
- 2 micro switches  
- 3 micro switches  
- 4 micro switches  

Up to 4 micro switches possible as change-over contact

#### Switching directions

- Falling density  
- Rising density

#### Switch points

To customer specification, maximum difference of lowest to highest contact: 4 bar
Switch contacts

<table>
<thead>
<tr>
<th>Electrical characteristics</th>
<th>Supply voltage</th>
<th>Resistive load A</th>
<th>Inductive load A</th>
</tr>
</thead>
<tbody>
<tr>
<td>≤ DC 30 V</td>
<td>5 1)</td>
<td></td>
<td>3 1)</td>
</tr>
<tr>
<td>≤ DC 50 V</td>
<td>1</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>≤ DC 75 V</td>
<td>0,75</td>
<td>0,75</td>
<td></td>
</tr>
<tr>
<td>≤ DC 125 V</td>
<td>0,5</td>
<td>0,03</td>
<td></td>
</tr>
<tr>
<td>≤ DC 250 V</td>
<td>0,25</td>
<td>0,03</td>
<td></td>
</tr>
<tr>
<td>≤ AC 125 V</td>
<td>5 1)</td>
<td>2 1)</td>
<td></td>
</tr>
<tr>
<td>≤ AC 250 V</td>
<td>5 1)</td>
<td>2 1)</td>
<td></td>
</tr>
</tbody>
</table>

Minimum switching voltage and current: 12 V, 10 mA

Calibration pressure: First switch point below filling pressure

Switching function: Change-over contact

Circuits: Galvanically isolated

Maximum number of cycles: 10,000 mechanical and electrical

Insulation resistance contact: > 100 MOhm

Switch hysteresis

<table>
<thead>
<tr>
<th>Measuring range</th>
<th>Hysteresis level</th>
</tr>
</thead>
<tbody>
<tr>
<td>-1 ... +5 bar at 20 °C</td>
<td>90 mbar</td>
</tr>
<tr>
<td>-1 ... +7.5 bar at 20 °C</td>
<td>150 mbar</td>
</tr>
<tr>
<td>-1 ... +11.5 bar at 20 °C</td>
<td>220 mbar</td>
</tr>
</tbody>
</table>

Lower switch hysteresis on request

1) Only up to an ambient temperature of 70 °C

At an ambient temperature of 70 ... 80 °C the contacts may be operated with a maximum of 1 A.

Permissible ambient conditions

<table>
<thead>
<tr>
<th>Permissible ambient temperature</th>
<th>Operating temperature</th>
<th>Storage temperature</th>
</tr>
</thead>
<tbody>
<tr>
<td>Standard</td>
<td>-40 ... +80 °C [-40 ... +176 °F], gaseous phase</td>
<td>-50 ... +80 °C [-58 ... 176 °F]</td>
</tr>
<tr>
<td>Extended temperature range</td>
<td>-50 ... +80 °C [-58 ... 176 °F], gaseous phase</td>
<td>-50 ... +80 °C [-58 ... 176 °F]</td>
</tr>
</tbody>
</table>

Ingress protection: IP65, IP67

Permissible air humidity: ≤ 95 % r. h. (non-condensing)
Compensating diaphragm against condensation

Shock resistance:
- 50 g/11 ms: no contact bouncing at a distance of 200 mbar from the switch point
- 150 g: no damage in all axes and directions

Vibration resistance:
- 4 g at a distance of 50 mbar from the switch point, no contact bouncing (20 ... 100 Hz)
- 20 g, duration 24 minutes, no damage to instrument (100 Hz)

EMC tests

Dielectric strength:
- 2 kV pin on grounding (case)
- 2 kV pin on pin (micro switch on micro switch)
- 1 kV pin on pin within micro switches - 1 minute

Lightning: 7 kV x 1.2/50 μs

Leak tightness

Process connection: ≤ 1 x 10⁻⁵ mbar x l/s

Bellows sealing: ≤ 1 x 10⁻⁵ mbar x l/s
## Materials

### Wetted materials

<table>
<thead>
<tr>
<th>Component</th>
<th>Material</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reference chamber (pressure element)</td>
<td>Stainless steel, filling with reference gas</td>
</tr>
<tr>
<td>Process connection</td>
<td>G ½ B per EN 837, axial or radial, stainless steel, spanner flats 22 mm</td>
</tr>
<tr>
<td></td>
<td>Other connections and connection locations on request</td>
</tr>
</tbody>
</table>

### Non-wetted materials

<table>
<thead>
<tr>
<th>Component</th>
<th>Material</th>
</tr>
</thead>
<tbody>
<tr>
<td>Case and cover</td>
<td>Aluminium die-casting, powder-coated</td>
</tr>
<tr>
<td>Cable gland M25 x 1.5</td>
<td>Plastic</td>
</tr>
<tr>
<td></td>
<td>Brass with nickel coating, high EMC stability</td>
</tr>
<tr>
<td>Movement</td>
<td>Brass</td>
</tr>
<tr>
<td>Pointer</td>
<td>Aluminium, black</td>
</tr>
<tr>
<td>Window</td>
<td>Laminated safety glass</td>
</tr>
</tbody>
</table>

### Maximum load

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Minimum bursting strength</td>
<td>&gt; 36 bar</td>
</tr>
<tr>
<td>Maximum overpressure</td>
<td>1.43 times the measuring range</td>
</tr>
<tr>
<td>Weight</td>
<td>&lt; 1,250 g</td>
</tr>
</tbody>
</table>

## Dial layouts

- **V1: Full scale**: Full scale, Vacuum display
- **V2: Partial scale**: Full scale, Vacuum display
- **V3: Partial scale +**: Full scale, Vacuum display
- **V4: Exploded scale**: Exploded scale
Dimensions in mm

Vertical version

Back mount version
Optional accessories

<table>
<thead>
<tr>
<th>Optional accessories</th>
<th>Description</th>
</tr>
</thead>
</table>
| Sun and rain protection              | Two-part, for screw fastening and plug-in  
Consisting of sheet-metal sunshade and temperature insulation                               |
| Recalibration valve                  | Model GLTC-CV  
Enables easy recalibration of the gas density monitor without dismounting  
Welded permanently to the instrument or available as loose valve for retrofitting       |
| Connection cable for switching outputs | Terminal without wiring  
Connector mounted on the instrument side, cable with loose ends  
Various cable lengths on request                                                    |

Ordering information

Model / Process connection / Pressure unit at 20 °C / Filling pressure / Number of switch points / Switch configuration at 20 °C / Gas mixture / Dial layout / Optional accessories