

Gas density monitor with reference chamber

Model GDM-RC-100

WIKA data sheet SP 60.27

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

Description

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



Gas density monitor with reference chamber, model GDM-RC-100

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	
Measurement principle	Reference gas measurement
Measuring range	<ul style="list-style-type: none"> ■ 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	<ul style="list-style-type: none"> ■ ±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	<ul style="list-style-type: none"> ■ ±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	<ul style="list-style-type: none"> ■ ±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	<ul style="list-style-type: none"> ■ ±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	<ul style="list-style-type: none"> ■ ±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	<ul style="list-style-type: none"> ■ ±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	<ul style="list-style-type: none"> ■ 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	<ul style="list-style-type: none"> ■ 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	Potential-free change-over contacts
Electrical connection	
Electrical connection	12-pin TTI plug-in terminal
Wire cross-section	<ul style="list-style-type: none"> ■ Min. 0.5mm² ■ Max. 2.5 mm²
Grounding	Grounding in cable socket available
Quantity	<ul style="list-style-type: none"> ■ 1 micro switch ■ 2 micro switches ■ 3 micro switches ■ 4 micro switches Up to 4 micro switches possible as change-over contact
Switching directions	<ul style="list-style-type: none"> ■ Falling density ■ Rising density

Switch contacts			
Switch points	To customer specification, maximum difference of lowest to highest contact: 4 bar		
Electrical characteristics	Switching voltage	Resistive load A	Inductive load A
	≤ DC 30 V	5 ¹⁾	3 ¹⁾
	≤ DC 50 V	1	1
	≤ DC 75 V	0,75	0.75
	≤ DC 125 V	0,5	0.03
	≤ DC 250 V	0,25	0.03
	≤ AC 125 V	5 ¹⁾	2 ¹⁾
≤ AC 250 V	5 ¹⁾	2 ¹⁾	
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	Measuring range	Hysteresis level	
	-1 ... +5 bar at 20 °C	Typical < 90 mbar ²⁾	
	-1 ... +7.5 bar at 20 °C	Typical < 150 mbar ²⁾	
	-1 ... +11.5 bar at 20 °C	Typical < 220 mbar ²⁾	
	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.
- 2) In accordance with BS 6134:1991, rate of pressure change 1 % of end value per second.

Permissible ambient conditions	
Permissible ambient temperature	
Operating temperature	-40 ... +80 °C [-40 ... +176 °F], gaseous phase
Storage temperature	-50 ... +80 °C [-58 ... 176 °F]
Maximum load	
Minimum bursting strength	> 36 bar
Maximum overpressure	1.43 times the measuring range
Ingress protection	IP65, IP67
Permissible air humidity	≤ 95 % r. h. (non-condensing) Compensating diaphragm against condensation
Shock resistance	<ul style="list-style-type: none"> ■ 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 ... 80 Hz)

EMC tests	
Dielectric strength	<ul style="list-style-type: none"> ■ 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 ⁻⁸ mbar x l/s
Bellows sealing	≤ 1 x 10 ⁻⁸ mbar x l/s

Materials

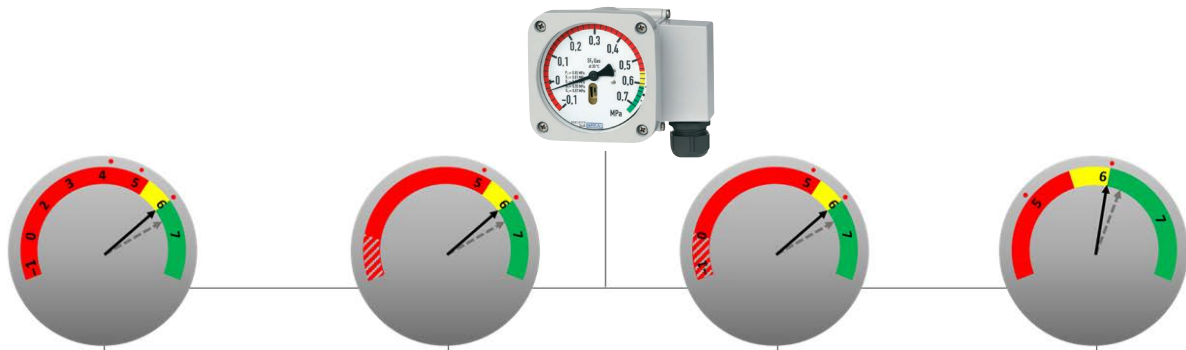
Wetted materials

Reference chamber (pressure element)	Stainless steel, filling with reference gas
Process connection	G ½ B per EN 837, axial or radial, stainless steel, spanner flats 22 mm
	Other connections and connection locations on request

Non-wetted materials

Case and cover	Aluminium die-casting, powder-coated
Cable gland M25 x 1.5	Plastic, sealing range 5 ... 13 mm; (optional 8 ... 17 mm) Tightening torque: 8 Nm
Movement	Brass
Pointer	Aluminium, black
Window	Laminated safety glass

Dial layouts



V1: Full scale

- Full scale
- Vacuum display

V2: Partial scale

- Full scale
- Vacuum display

V3: Partial scale +

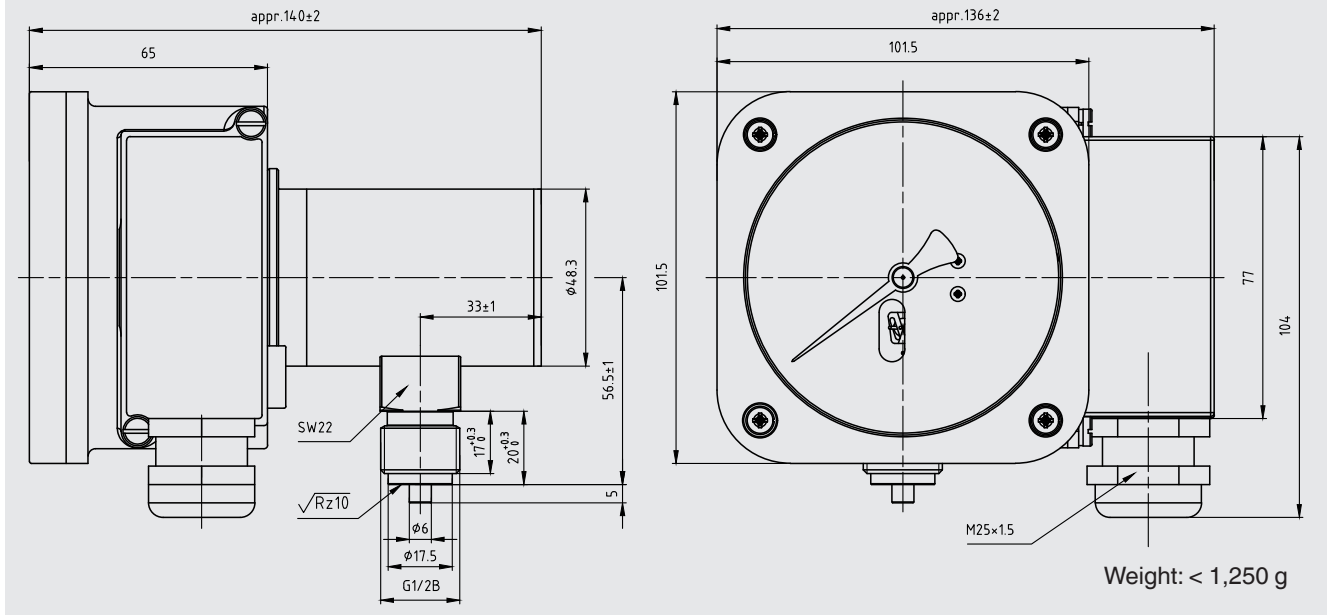
- Full scale
- Vacuum display

V4: Exploded scale

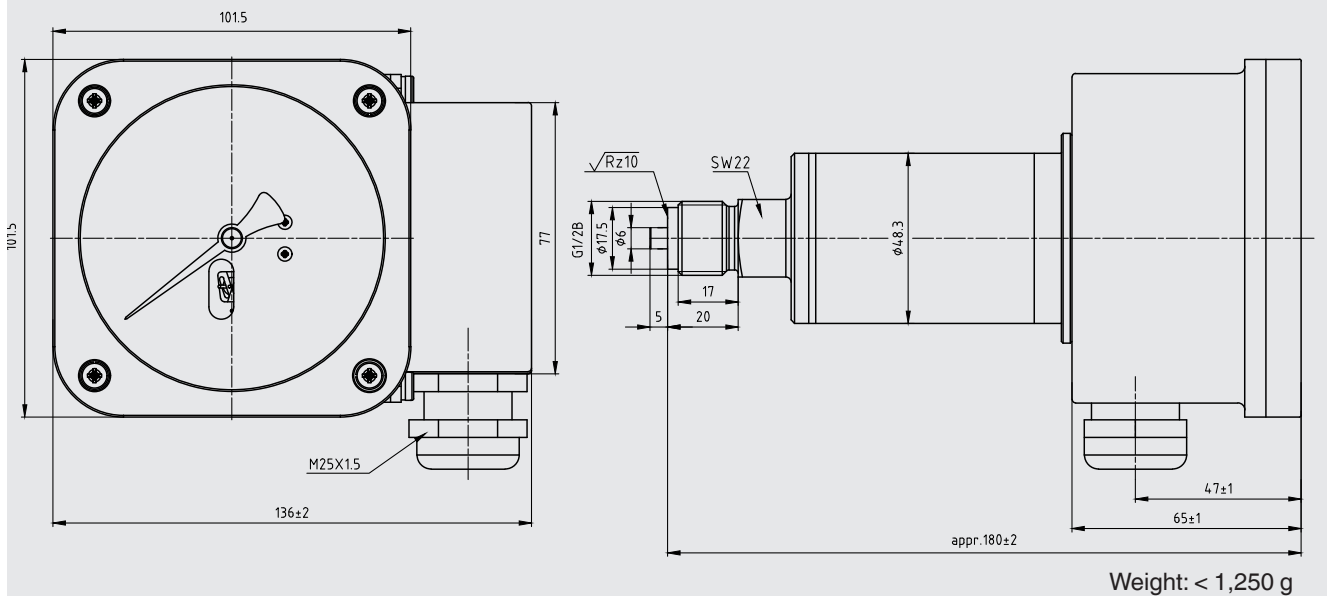
- Exploded scale

Dimensions in mm

Vertical version



Back mount version



Approvals

Logo	Description	Country
	EU declaration of conformity <ul style="list-style-type: none">■ Low voltage directive■ RoHS directive	European Union
	EAC <ul style="list-style-type: none">■ Low voltage directive	Eurasian Economic Community

Manufacturer's information and certifications

Logo	Description
-	China RoHS directive

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

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