

# Gas density monitor With Modbus® output Model GDM-100-TI-D

WIKA data sheet SP 60.23

## Applications

- Gas density monitoring in closed SF<sub>6</sub> gas tanks
- Remote monitoring of the SF<sub>6</sub> condition

## Special features

- Ideally suited for Smart Grid or modernisation projects
- On-site display with switch contacts and Modbus® output
- Modbus® delivers measured values for pressure, temperature and gas density
- Compact design with only one process connection
- Precision sensors enable high-accuracy gas density determination



Gas density monitor, model GDM-100-TI-D with Modbus® output

## Description

Gas density is a crucial operating parameter for high-voltage switchgear. If the required gas density is not present, safe operation of the plant cannot be guaranteed.

The gas density measuring instruments from WIKA warn reliably against dangerously low gas quantities, even under extreme environmental conditions. If the gas density drops as a result of a leakage, the switch contacts will switch. In addition to the traditional gas density monitor, with the model GDM-100-TI-D with Modbus® output, high-precision sensors and evaluation electronics are incorporated.

### Numerous fields of application

The GDM-100-TI-D only requires one connection to the measuring point to determine the pressure, temperature and gas density.

Via the on-site display, the pressure related to 20 °C can be read directly on the instrument. With the integrated switch contacts, simple switching tasks can be realised quickly

and without complication. The integrated Modbus® sensors enable remote monitoring of the plant.

### Remote monitoring with Modbus®

The measured data for pressure, temperature and gas density are transmitted using the standardised Modbus® RTU protocol. The advantages of this digital fieldbus are reduced cabling costs and very detailed measured data.

The GDM-100-TI-D delivers continuous data packets to a local controller or a central control system with SCADA. There, the data packets can be saved and evaluated. The data storage enables trend analysis to be carried out, so that critical SF<sub>6</sub> conditions can be predicted and rectified in time. An optimisation of the maintenance strategy from time-based (TBM) to condition-based (CBM) is possible through the use of the GDM-100-TI-D.

TBM = Time Based Maintenance  
CBM = Condition Based Maintenance

# Gas density monitor

## Nominal size

100

## Calibration pressure $P_E$

To customer specification

## Accuracy specifications

- $\pm 1$  % at ambient temperature  $+20$  °C
- $\pm 2.5$  % at ambient temperature  $-20 \dots +60$  °C and with calibration pressure in accordance with reference isochor (reference diagram KALI-Chemie AG, Hannover, prepared by Dr. Döring 1979)

## Scale range

Vacuum and overpressure range with measuring span of 1.6 ... 16 bar (with an ambient temperature of  $20$  °C and gaseous phase)

## Permissible ambient temperature

Operation:  $-20 \dots +60$  °C ( $-4 \dots +140$  °F)

Storage:  $-40 \dots +60$  °C ( $-40 \dots +140$  °F)

## Process connection

G  $\frac{1}{2}$  B per EN 837, lower mount

Stainless steel, Spanner flats 22 mm

Other connections on request.

## Pressure element

Stainless steel, welded

Gas-tight: leak rate  $\leq 1 \cdot 10^{-8}$  mbar · l / s

Test method: helium mass spectrometry

## Movement

Stainless steel

Bimetal link (temperature compensation)

## Dial

Aluminium

The scale range is subdivided into red, yellow and green ranges

## Pointer

Aluminium, black

## Case

Stainless steel, with gas filling

Gas-tight: leak rate  $\leq 1 \cdot 10^{-5}$  mbar · l / s

Test method: helium mass spectrometry

## Window

Selectable versions	
Option 1	Laminated safety glass
Option 2	Clear non-splintering plastic

## Bezel ring

Bayonet ring, stainless steel, secured by means of 3 welding spots

## Permissible humidity

$\leq 90$  % r. h. (non-condensing)

## Ingress protection

IP65 per IEC/EN 60529

## Weight

approx. 1.4 kg

## High-voltage test 100 %

2 kV, 50 Hz, 1s

## Switch contacts

### Number of switch contacts

Selectable versions	
Option 1	1 magnetic snap-action contact
Option 2	2 magnetic snap-action contacts
Option 3	3 magnetic snap-action contacts

### Switching directions

Selectable versions	
Option 1	Falling pressure
Option 2	Rising pressure

### Switching functions

Selectable versions	
Option 1	Normally open
Option 2	Normally closed
Option 3	Change-over contact (max. 2 switch points)

### Circuits

Selectable versions	
Option 1	Galvanically connected (not for change-over contact)
Option 2	Galvanically isolated

### Switching accuracy in temperature range $-20 \dots +60$ °C

Switch point = calibration pressure  $P_E$ : As measuring span

Switch point  $\neq$  calibration pressure  $P_E$ : Shifted parallel to calibration pressure

### Switch points

Not adjustable and secured against adjustment.

### Max. switching voltage

AC 250 V

### Switching power

30 W / 50 VA, max. 1 A

### Material of switch contacts

80 % Ag / 20 % Ni, gold-plated

Further information on magnetic snap-action contacts in data sheet AC 08.01

## Sensor system with Modbus® output

### Measuring ranges

Density:	0 ... 60 g/litre (8.87 bar abs. at 20 °C)
Temperature:	-40 ... +80 °C
Pressure:	0 ... 16 bar abs.
Overload safety:	up to 30 bar abs.
Pressure reference:	Absolute

### Accuracy specifications

Specifications only valid for clean gaseous SF<sub>6</sub> gas

Density:	±0.60 %, ±0.35 g/litre (-40 ... +80 °C)
Temperature:	±1 K
Pressure:	±0.20 %, ±32 mbar (-40 ... < 0 °C) ±0.06 %, ±10 mbar (0 ... 80 °C)

### Long-term stability at reference conditions

Temperature:	≤ ±0.10 % of span/year
Pressure:	≤ ±0.05 % of span/year

### Refresh rate

Density:	20 ms
Temperature:	20 ms
Pressure:	20 ms

### Voltage supply U<sub>B</sub>

DC 17 ... 30 V

### Power consumption

max. 0.5 W

### Electrical connection

Connection cross-section max. 2.5 mm<sup>2</sup>

Modbus® RTU via RS-485 interface

For the configuration of the cable socket, see product label.

### Functionality Modbus®

Mixture ratio of SF<sub>6</sub> to N<sub>2</sub> or CF<sub>4</sub> (default 100% SF<sub>6</sub> gas)

Customer-specific name of measuring point

Measured values with alternative units can be retrieved directly in the Modbus® registers.

- Density: g/litre, kg/m<sup>3</sup>
- Temperature: °C, °F, K
- Pressure: mbar, Pa, kPa, MPa, psi, N/cm<sup>2</sup>, bar (at 20 °C)



### Electrical safety

Protected against reverse polarity

### High-voltage test 100 %

1 kV DC, 5s

## Approvals

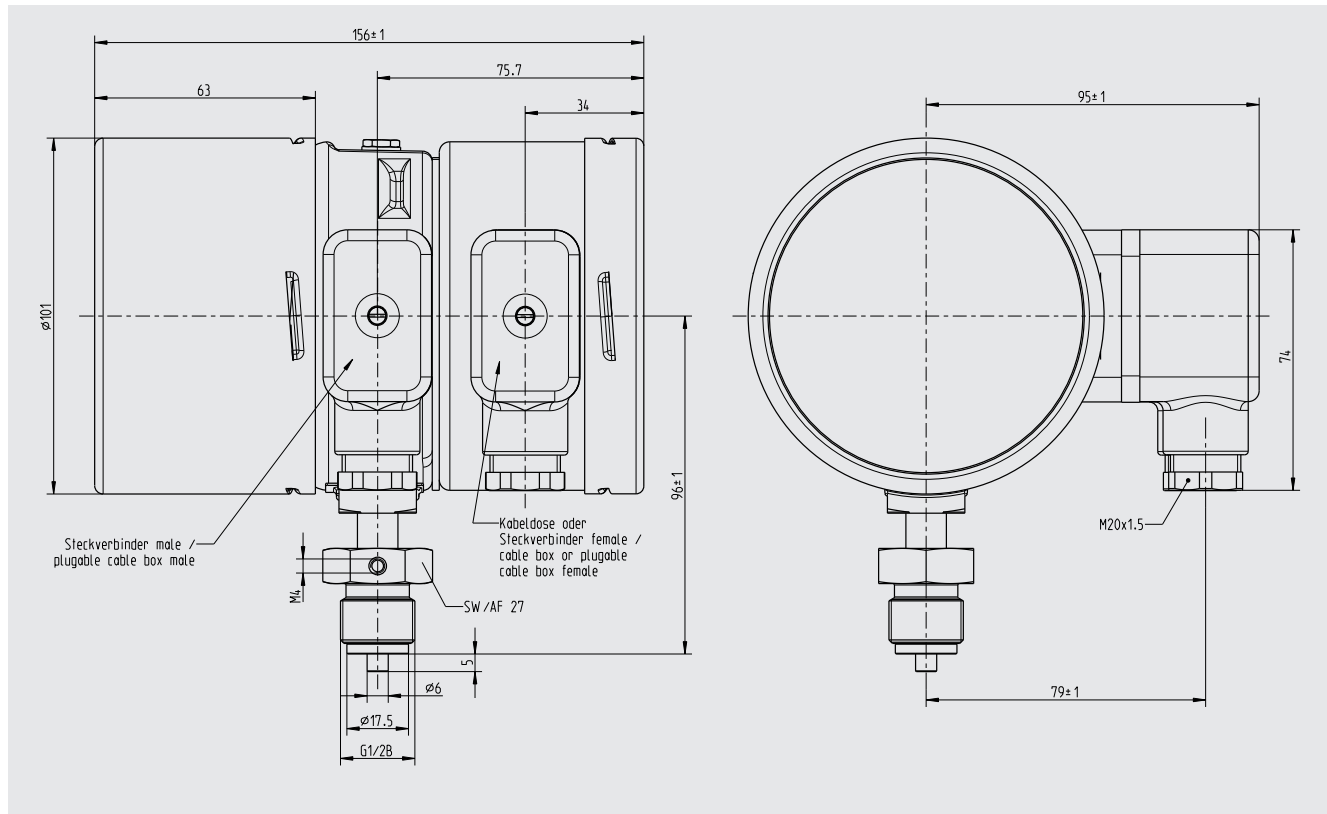
Logo	Description	Country
	<b>EU declaration of conformity</b> <ul style="list-style-type: none"><li>■ EMC directive</li><li>■ EN 61326 emission (group 1, class B) and interference immunity (industrial application)</li><li>■ RoHS directive</li></ul>	European Union
	<b>EAC</b> EMC directive	Eurasian Economic Community

Approvals and certificates, see website

### EMC tests

- **Interference immunity per IEC 61000-4-3:**  
30 V/m (80 MHz ... 2.7 GHz)
- **Burst per IEC 61000-4-4:**  
4 kV
- **Impulse voltages per IEC 61000-4-5:**  
2 kV conductor to ground, 1 kV conductor to conductor
- **ESD per IEC 61000-4-2:**  
8 kV/15 kV, contact/air
- **High-frequency fields per IEC 61000-4-6:**  
10 V

## Dimensions in mm



## Accessories

### Modbus® startup kit (Order number 14075896)

Consisting of:

- Power supply unit for transmitter
- Connection cable
- Interface converter (RS-485 to USB)
- USB cable type A to type B
- Modbus® tool software on USB stick

### Ordering information

Model / Permissible ambient temperature / Window / Number of switch contacts / Switching direction / Switching function / Circuit type / Accessories

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