Gas density sensor
For gas density, temperature and pressure of insulating gases
Model GD-20-W with wireless LoRaWAN® output signal

Applications

- Permanent monitoring of the relevant gas condition parameters in closed tanks
- For indoor and outdoor SF_6-insulated equipment
- Density measurement of alternative gases in electrical equipment or in the laboratory
- General pressure and temperature measurement of non-corrosive media, e.g. transformer oil, in power transmission applications

Special feature

- High-accuracy sensor technology
- Wireless LoRaWAN® output signal
- Long battery life
- Very good long-term stability and EMC characteristics
- Very compact design

Gas density sensor, model GD-20-W

Description

Permanent monitoring
In order to prevent system failures in switchgear and network outages, the permanent monitoring of the gas density is essential.

The model GD-20-W calculates the current gas density from the pressure and temperature using a complex virial equation in the gas density sensor's powerful microprocessor. Pressure changes resulting from temperature effects will be compensated by this and will not affect the output value.

Signal stability
Due to its high long-term stability, the sensor is maintenance-free and requires no calibration. Due to the hermetically sealed weld seam and a measuring cell design without sealing elements, the permanent sealing of the measuring cell is ensured.

LoRaWAN® output signal
This gas density sensor requires no external power supply due to an integrated, easily replaceable battery. By means of the integrated antenna, the sensor reliably transmits the measured values based on the LoRaWAN® protocol even over long distances.

Integrated alarm function
The independent sensor enables a variety of alarm settings, including alarms at low densities or high temperatures. By setting the measuring frequency higher than the transmission frequency, the sensor can immediately send a warning when a threshold value is reached and does not need to wait for the next scheduled transmission.

If no threshold value warning is triggered, only the last measured values are transmitted in the next transmission period to save energy and bandwidth.

Data sheets showing similar products:
Transmitter for density, temperature, (...) of insulating gases with Modbus® output; model GDHT-20; see data sheet SP 60.14
Gas density sensor for gas density, temperature, (...) of insulating gases with Modbus® output; model GD-20; see data sheet SP 60.77

Specifications

Compensated pressure range in bar abs. [psi] at 20 °C [68 °F] (g/l SF_6)	Temperature in °C [°F]	Accuracy [1] Standard	Accuracy [1] Option	Operating temperature in °C [°F] [2]	Output parameter	Output signal
■ 0 ... 2 [0 ... 29.00] (12.28) ■ 0 ... 3 [0 ... 43.51] (18.65) ■ 0 ... 6 [0 ... 87.02] (38.87) ■ 0 ... 8 [0 ... 116.03] (53.4)	-40 ... 0 [-40 ... +32]	±2.00 %	±1.5 %	-40 ... +80 [-40 ... +176]	■ Density ■ Compensated absolute pressure at 20 °C [68 °F] ■ Compensated gauge pressure at 20 °C [68 °F] based on 1,013 mbar [14.69 psi] ■ Absolute pressure ■ Temperature ■ Battery status in percent	LoRaWAN®
	0 ... 15 [32 ... 59]	±1.25 %	±1.00 %			
	15 ... 50 [59 ... 122]	±1.25 %	±0.60 %			
	>50 [122]	±1.25 %	±1.00 %			
■ 0 ... 10 [0 ... 145.03] (68.96) ■ 0 ... 12 [0 ... 174.04] (85.79) ■ 0 ... 16 [0 ... 232.06] (124.64)	<15 [59]	±1.25 %	±1.00 %			
	15 ... 50 [59 ... 122]	±1.25 %	±0.60 %			
	>50 [122]	±1.25 %	±1.00 %			

1) Specifications apply to measurement of the compensated pressure under reference conditions and position. Accuracy determined for pure SF_6
2) At temperatures below -35 °C [-31 °F] voltage drops may occur that can lead to signal interruption. The sensor will start to perform normally again when temperatures rise above -35 °C [-31 °F].

Accuracy specifications	
Accuracy of pressure measurement	±0.2 % at 20 °C [68 °F]
Temperature error	±0.8 K
Compensated pressure range at 20 °C [68 °F] (g/l SF_6)	0 ... 16 bar abs. (124.65 g/l SF_6)
Long-term stability at reference conditions	±0.1 % per year for the density signal
Reference conditions	Per IEC 61298-1

Measuring ranges and overpressure safety		
Compensated pressure range in bar abs. [psi abs.] at 20 °C [68 °F] (g/l SF_6)	**Overload safety in bar abs. [psi abs.]**	**Burst pressure in bar abs. [psi abs.]**
0 ... 2 [0 ... 29.00] (12.28)	6.2 [89.92]	10 [145.03]
0…3 [0 ... 43.51] (18.65)	14.5 [210.30]	24 [348.09]
0…6 [0 ... 87.02] (38.87)	14.5 [210.30]	24 [348.09]
0…8 [0 ... 116.03] (53.4)	31 [449.61]	52 [754.19]
0…10 [0 ... 145.03] (68.96)	31 [449.61]	52 [754.19]
0…12 [0 ... 174.04] (85.79)	31 [449.61]	52 [754.19]
0…16 [0 ... 232.06] (124.64)	62 [899.23]	103 [1,493.89]

Process connections	
Standard	**Thread size**
EN 837	■ G ¼ B ■ G ½ B
B7505	■ G ⅜ B JIS ■ G ½ B JIS
ANSI/ASME B1.20.1	¼ NPT
	Other connections on request

Voltage supply and performance data		
Voltage supply	Via DC 3.6 V battery Tadiran SL860+HLC1020+KAB+STAB (WIKA order number: 14615879), replaceable without tools	
Power consumption	Max. 0.28 W	
	Between each measurement the sensor is automatically switched off to save energy.	
Nominal capacity	2.4 Ah at nominal voltage	
Total current consumption	Max. 55 mA	
Battery life	Depending on transmission and measuring frequency, up to 12 years	
Transmission and measuring frequency	Standard	Sending: every 240 minutes Measuring: every 60 minutes
	Minimum	Every 10 minutes
	Maximum	All 7 days

Radio standard	
LoRaWAN® protocol	
Specification	LoRaWAN® 868 MHz EU
Version	1.0.3
Functions	■ Registration ■ Configuration ■ Sending measured values ■ Alarm management ■ Battery status
Frequency range	863 ... 870 MHz
Range in free field	Typically 10 km [6 mi] → Depending on the ambient conditions, such as topography and building structures.
Antenna	PCB antenna, internal
Channel spacing	200 kHz
Bandwidth	125 kHz
Max. transmission power	14 dBm

Operating conditions	
Medium temperature range	-35 … +80 °C [-31 ... +176 °F] [1]
Ambient temperature range	-35 … +80 °C [-31 ... +176 °F] [1]
Storage temperature range	-40 … +80 °C [-40 ... +176 °F]
Relative humidity, condensation	≤ 90 % r. h. (non-condensing)

Operating conditions	
Shock resistance	
Single shock loads	130g in all axes and directions, 6 ms
Continuous shock	100g in all axes and directions, 500 shocks
Vibration resistance	20g, 30 ... 200 Hz in all axes
Ingress protection per IEC/EN 60529	IP65

1) At temperatures below -35 °C [-31 °F] voltage drops may occur that can lead to signal interruption. The sensor will start to perform normally again when temperatures rise above -35 °C [-31 °F].

Suitable for the following gases

- SF_6
- N_2
- CF_4
- O_2
- CO_2
- 3M™ Novec™ 4710
- He
- Ar

Gas mixtures and components can be individually configured and combined ex-works. The calculation is based on the physical principle of the partial pressure method. The gas mixture cannot be changed subsequently.

Material	
Case	Stainless steel, upper part made of plastic

Alarms	
Alarms	Various alarms can be set → See operating instructions for gas density sensor with wireless transmission, model GD-20-W (item number 14657927)

EMC tests	
ESD per IEC 61000-4-2	6 kV contact discharge, 8 kV indirect discharge
Immunity against electromagnetic fields (EMF) per IEC 61000-4-3	■ 10 V/m (at 80 MHz to 1 GHz) ■ 3 V/m (at >1 GHz to 2.7 GHz)
Immunity against magnetic fields (50/60 Hz) per EN 61000-4-8	■ 100 A/m (continuous) ■ 1 kA/m for 1 s

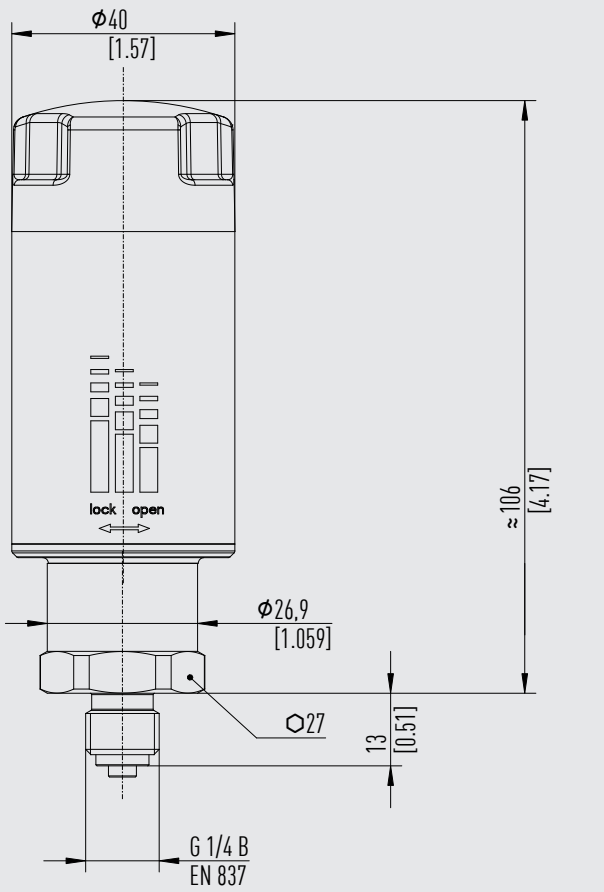
Approvals

Logo	Description	Country
CE	**EU declaration of conformity**	European Union
	EMC directive EN 61326 emission (group 1, class B) and immunity (industrial application)	
	Radio Equipment Directive	
	RoHS directive	

→ For approvals and certificates, see website

Dimensions in mm [in]

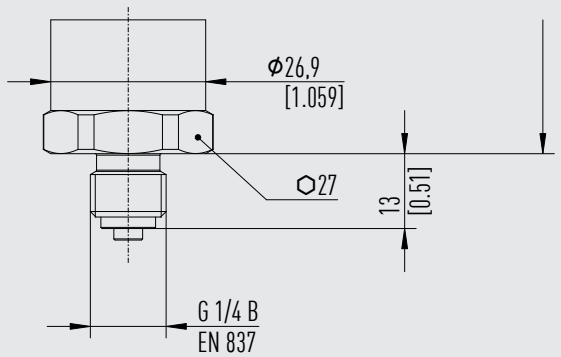
Model GD-20-W



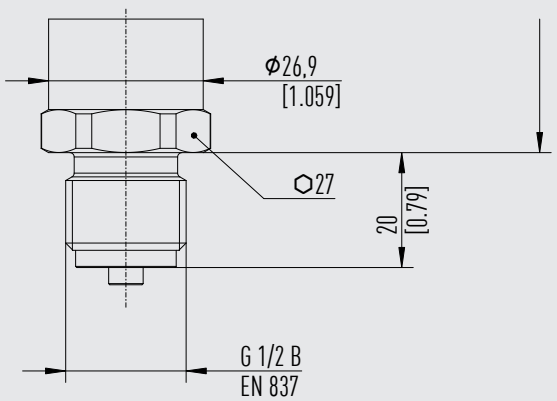
Weight: ≤ 300 g [0.66 lb]

Process connections

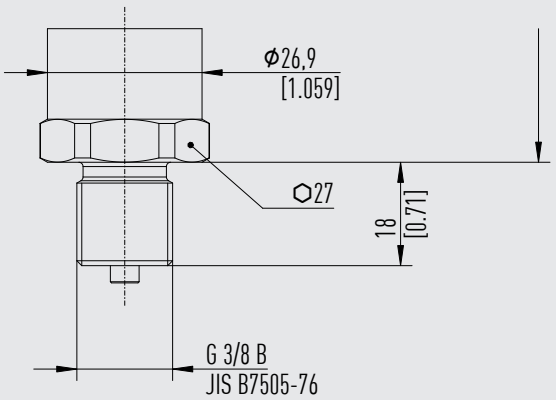
G ¼ B



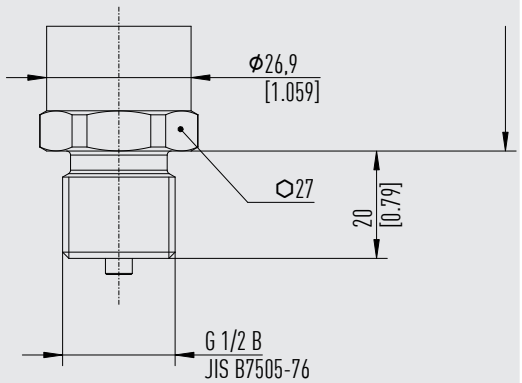
G ½ B



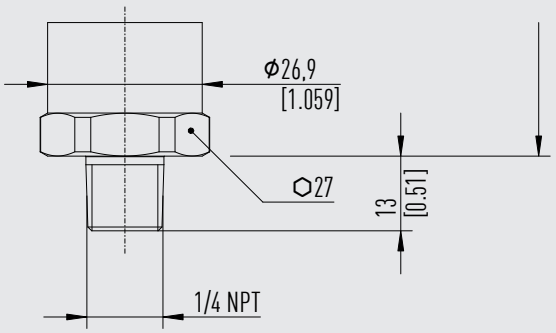
G ⅜ B JIS



G ½ B JIS



¼ NPT



Ordering information

Model / Measuring chamber / Process connection / Options

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