

## Transmitter

# For density, temperature, pressure and humidity of SF<sub>6</sub> gas Model GDHT-20, with MODBUS<sup>®</sup> output

WIKA data sheet SP 60.14



for further approvals  
see page 3

### Applications

- Permanent monitoring of the relevant gas condition parameters in closed tanks
- For internal and external SF<sub>6</sub> gas-insulated equipment

### Special features

- High-accuracy sensor technology
- MODBUS<sup>®</sup> output protocol via RS-485 interface
- Ingress protection IP65
- Very good long-term stability and EMC characteristics
- Compact dimensions



Transmitter, model GDHT-20

## Description

The model GDHT-20 transmitter is a multi-sensor system with digital output for the measurands of pressure, temperature and humidity. Based on these measured values, the condition-related data can be determined.

### Permanent monitoring

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

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

In addition, the GDHT-20 transmitter delivers humidity or dew point information, which enables monitoring within the terms of the Cigré directives and IEC standards.

### MODBUS<sup>®</sup> fieldbus

The RS-485 interface communicates using the MODBUS<sup>®</sup> RTU protocol. The instrument's output parameters and their units can be configured and read according to requirements. The GDHT-20 transmitter can be configured later by the customer for each defined SF<sub>6</sub> gas mixture with N<sub>2</sub> or CF<sub>4</sub>.

### Signal stability

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

The EMC characteristics fulfil the IEC 61000-4-2 through to IEC 61000-4-6 standards and guarantee an interference-free data output.

## Specifications

### Measuring ranges

|                                |   |
|--------------------------------|---|
| Dew point at ambient pressure: | -50 ... +30 °C  |
| Density:                       | 0 ... 60 g/litre (8.87 bar abs. SF <sub>6</sub> gas at 20 °C) |
| Temperature:                   | -40 ... +80 °C  |
| Pressure at 20 °C:             | 0 ... 8,87 bar abs. SF <sub>6</sub> gas                       |
| Pressure:                      | 0 ... 16 bar abs.   |
| Burst pressure:                | 52 bar abs.   |
| Overload safety:               | up to 30 bar abs.   |
| Pressure reference:            | Absolute  |

### Accuracy<sup>1)</sup>

|   |   |
|---|---|
| Specifications only valid for clean gaseous SF <sub>6</sub> |   |
| Dew point:  | ±3 K  |
| Density:  | ±0.60 %, ±0.35 g/litre (-40 ... 80 °C)                                |
| Temperature:  | ±1 K  |
| Pressure:   | ±0.20 %, ±32 mbar (-40 ... < 0 °C)<br>±0.06 %, ±10 mbar (0 ... 80 °C) |

### Long-term stability at reference conditions<sup>2)</sup>

|              |                        |
|--------------|------------------------|
| Temperature: | ≤ ±0.10 % of span/year |
| Pressure:    | ≤ ±0.05 % of span/year |
| Dew point:   | ≤ ±0.50 % of span/year |

### Refresh rate

|              |  |
|--------------|--|
| Density:     | 20 ms  |
| Temperature: | 20 ms  |
| Pressure:    | 20 ms  |
| Dew point:   | 2 s (typical), auto-adjustment cycle every 30 min. |

### Permissible ambient temperature

| Selectable versions |                 |                 |
|---------------------|-----------------|-----------------|
| Standard            | -40 ... +80 °C  | -40 ... +80 °C  |
|                     | -40 ... +176 °F | -40 ... +176 °F |
| Option              | -60 ... +80 °C  | -60 ... +80 °C  |
|                     | -76 ... +176 °F | -76 ... +176 °F |

### Power supply U<sub>B</sub><sup>+</sup>

DC 17 ... 30 V

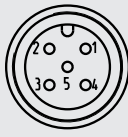
### Power consumption

max. 0.5 W (max. 3 W during the heating phase of the humidity sensor)

### Electrical connection

Circular connector M12 x 1 (5-pin)  
MODBUS<sup>®</sup> RTU via RS-485 interface

### Circular connector M12 x 1 (5-pin)

|   |   |                             |               |
|---|---|-----------------------------|---------------|
|  | 1 | -                           | -             |
|   | 2 | U <sub>B</sub> <sup>+</sup> | Power supply  |
|   | 3 | U <sub>B</sub> <sup>-</sup> | Ground        |
|   | 4 | A                           | Signal RS-485 |
|   | 5 | B                           | Signal RS-485 |

1) Following DIN EN 60770-2

2) per IEC 61298-2

### Functionality MODBUS<sup>®</sup>

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 sensor name

Measured values with alternative units can be retrieved directly in the MODBUS<sup>®</sup> 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)
- Humidity: ppmv, ppmw
- Dew point: °C
- Freezing point: °C
- Relative humidity: %

### Process connections

#### Selectable versions

|                                     |
|-------------------------------------|
| G 1 B, male thread, stainless steel |
| DN20, female thread                 |
| G ½ B, male thread                  |
| Malmkvist <sup>®</sup>              |
| G ¾ JIS                             |
| Flange D40                          |
| M10 x 0.5                           |
| Via measuring chamber (see page 5)  |
| DN8, female thread                  |
| Other connections on request        |

### Case

Stainless steel

### Permissible air humidity

≤ 90 % r. h. (non-condensing)

### Ingress protection

IP65, only when plugged in and using mating connectors with the corresponding ingress protection

### Electrical safety

Protected against reverse polarity, protected against overvoltage

### Dimensions

Diameter: 48 mm  
Height: 96 mm

### Weight



approx. 0.40 kg

## EMC tests

For EMC, observe the installation instructions of the operating instructions.

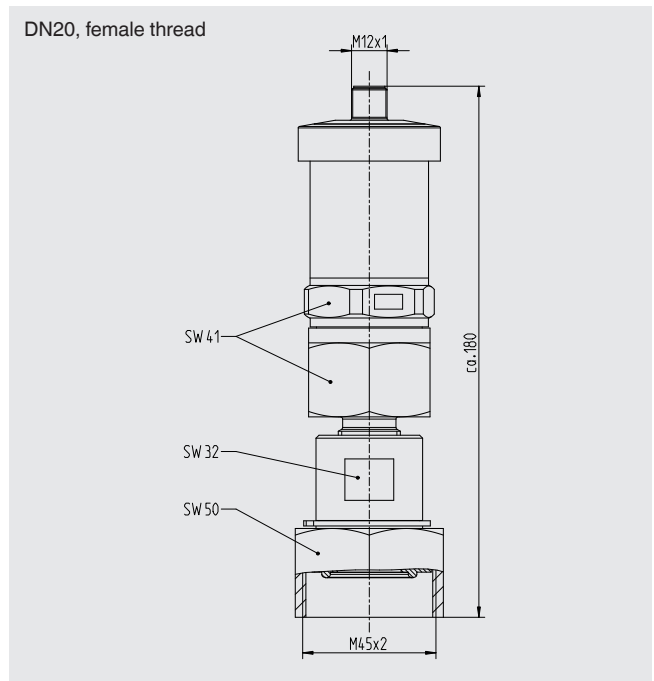
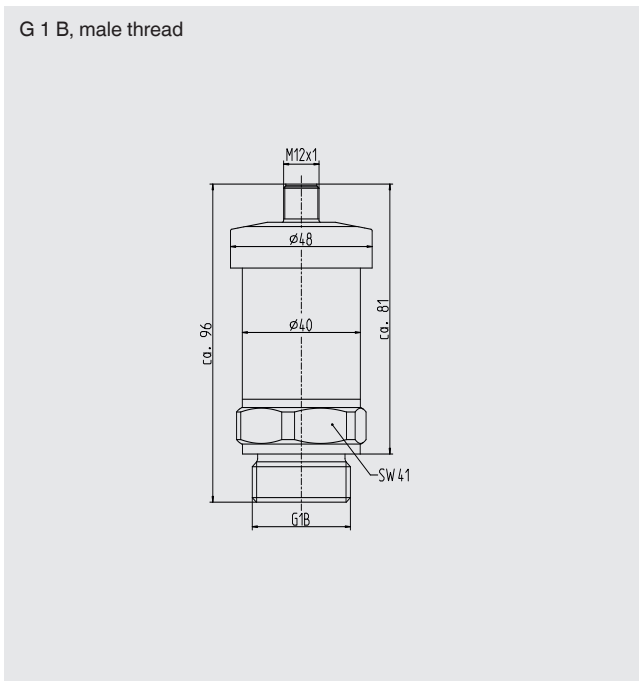
- **Immunity per IEC 61000-4-3:**  
30 V/m (80 MHz ... 2.7 GHz)
- **Burst per IEC 61000-4-4:** 4 kV
- **Surge immunity per IEC 61000-4-5:** 1 kV conductor to ground, 1 kV conductor to conductor
- **ESD per IEC 61000-4-2:** 8 kV/15 kV, contact/air
- **High-frequency fields per IEC 61000-4-6:** 3 V

## Approvals

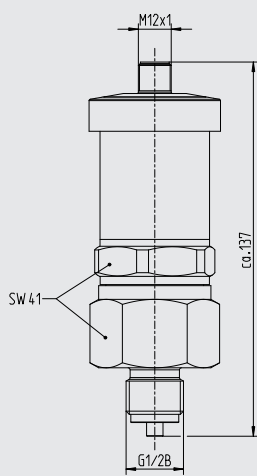
| Logo  | Description   | Country                     |
|---|---|-----------------------------|
|  | <b>EU declaration of conformity</b> <ul style="list-style-type: none"> <li>■ EMC directive, EN 61326 emission (group 1, class B) and immunity (industrial application)</li> <li>■ RoHS directive</li> </ul>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

Approvals and certificates, see website

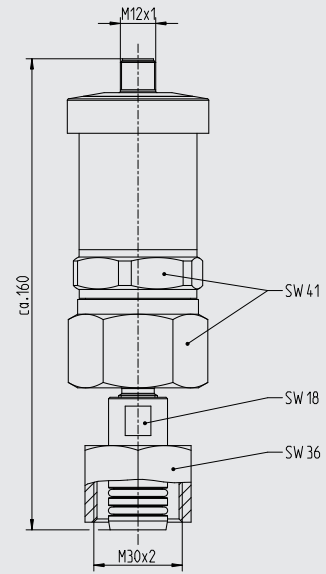
## Dimensions in mm



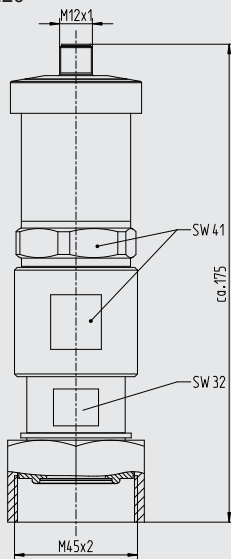
G ½ B, male thread



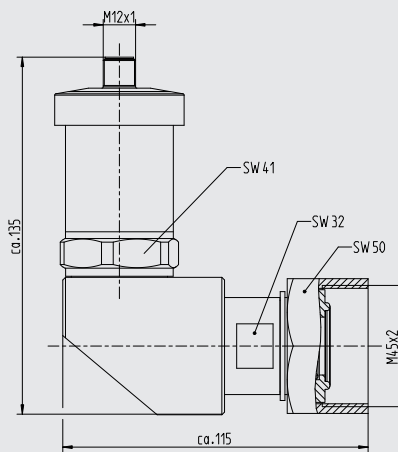
Malmkvist®



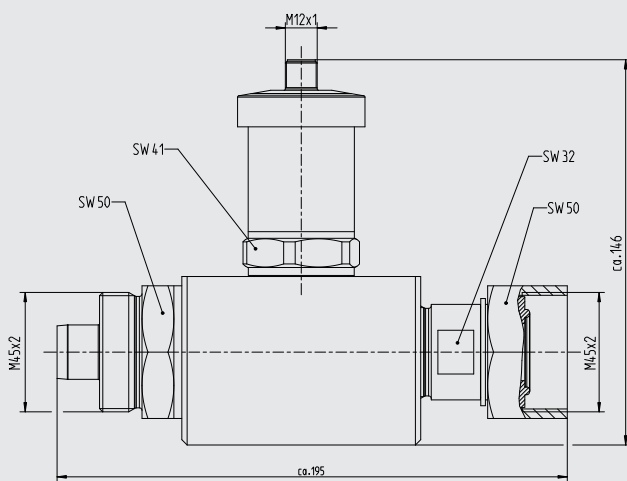
Measuring chamber, DN20



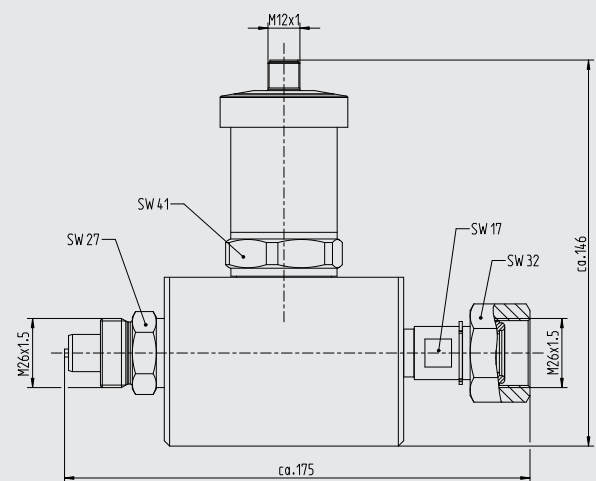
Measuring chamber, DN20, 90° angled



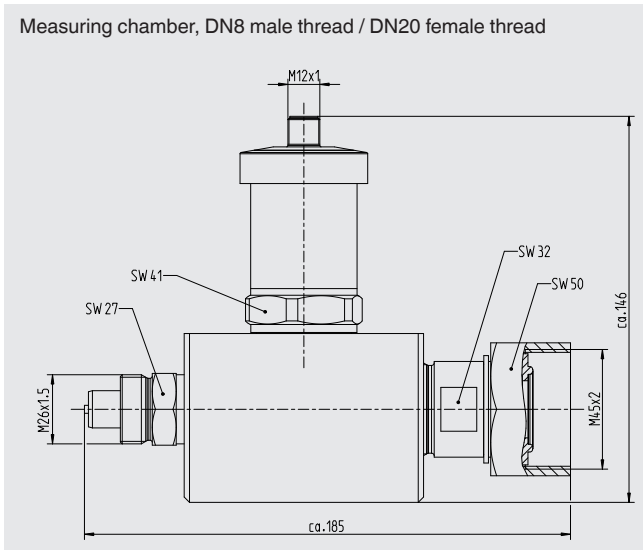
Measuring chamber, DN20 male thread / DN20 female thread



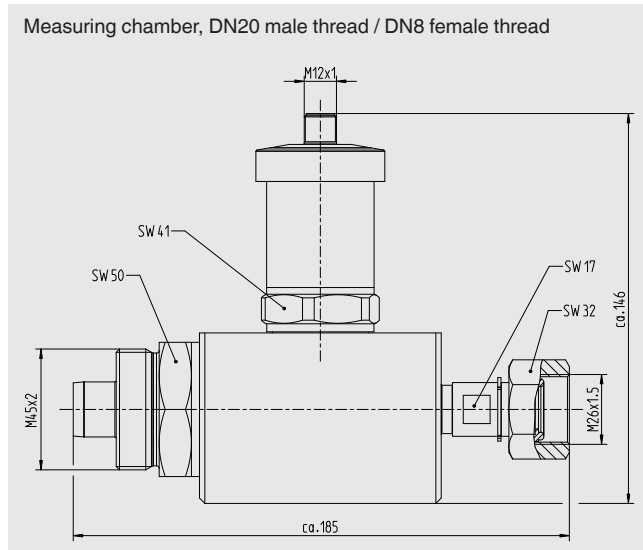
Measuring chamber, DN8 male thread / DN8 female thread



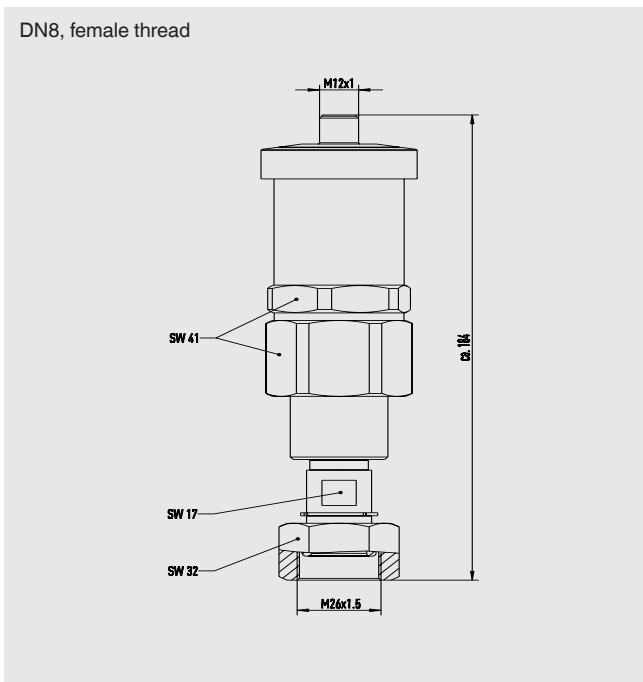
Measuring chamber, DN8 male thread / DN20 female thread



Measuring chamber, DN20 male thread / DN8 female thread



DN8, female thread



## Accessories

| Designation  | Order number   |
|--|--|
| Modbus® startup kit for measured value recording and configuration, consisting of: <ul style="list-style-type: none"> <li>■ Power supply unit for transmitter</li> <li>■ Cable with M12 x 1 connector</li> <li>■ Interface converter (RS-485 to USB)</li> <li>■ USB cable type A to type B</li> <li>■ Modbus® tool software</li> </ul> | 14075896   |
| WIKAsoft-GD for configuration and testing of the sensor  | Free download from: <a href="http://www.wika.com/Download">www.wika.com/Download</a> |

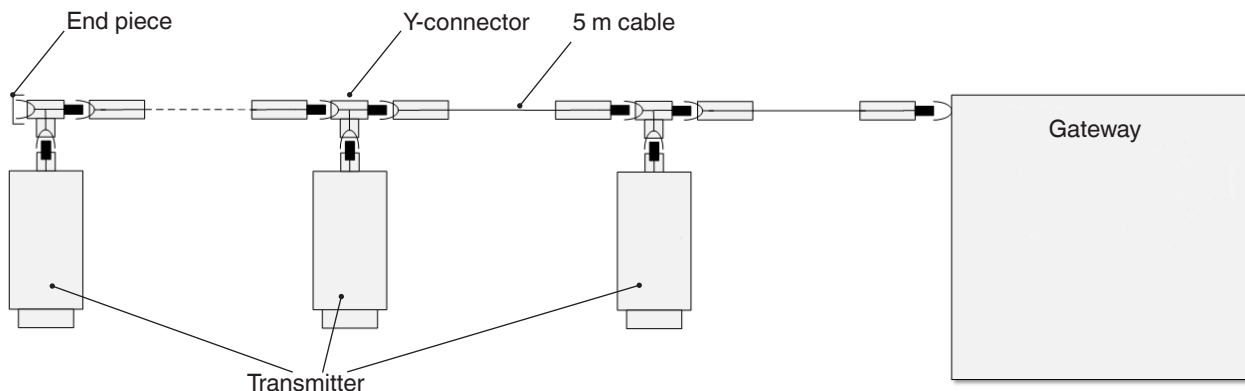
| Cable shielded, M12 x 1, AWG20 | Order number |
|--------------------------------|--------------|
| Length 1 m                     | 14372501     |
| Length 2 m                     | 14372502     |
| Length 3 m                     | 14372503     |
| Length 4 m                     | 14372504     |
| Length 5 m                     | 14372505     |
| Length 6 m                     | 14372506     |
| Length 7 m                     | 14372507     |
| Length 8 m                     | 14372500     |
| Length 9 m                     | 14372509     |
| Length 10 m                    | 14372510     |
| Length 15 m                    | 14372511     |
| Length 20 m                    | 14372513     |
| Length as required             | on request   |

| Conector                     | Shield                 | Order number |
|------------------------------|------------------------|--------------|
| Y-connector, M12 x 1 (5-pin) | Sensor side unshielded | 14294061     |
| T-connector, M12 x 1 (5-pin) | Sensor side unshielded | 14294063     |
| Y-connector, M12 x 1 (5-pin) | Sensor side shielded   | 14271396     |
| T-connector, M12 x 1 (5-pin) | Sensor side shielded   | 14109450     |
| End piece, M12 x 1           | -                      | 14299963     |

If no cable will be installed between connector and sensor, we recommend using connectors which are unshielded on the sensor side.

| Spare parts  | Order number |
|--|--------------|
| Sealing for process connection G 1 B, male thread, (included in the standard scope of delivery.) | 14046738     |

## Installation example



## Ordering information

Model / Permissible ambient temperature / Process connection / Accessories

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