# ICS SCHNEIDER MESSTECHNIK

# Bourdon tube pressure gauge with wireless transmission
# Safety version, NS 100 [4"]
# Models PGW23.100, PGW26.100

**S** For further approvals, see page 7

**LoRaWAN®**

## Applications

- Condition-based and preventive maintenance through centralised big-data analysis
- Process industry with increased safety requirements: Oil and gas, chemical and petrochemical industries, water and wastewater, power generation, basic materials industry
- Remote monitoring of the process pressure for non-critical applications
- For gaseous and liquid aggressive media that are not highly viscous or crystallising

## Special features

- IIoT-capable measuring instrument with mechanical on-site indication
- Battery-operated LoRaWAN® wireless transmission based on LPWAN technology
- High transmission range up to 10 km [6 mi] with long battery life (up to 5 years)
- Stainless steel version, model PGW23.100 or Monel version, model PGW26.100
- Measuring ranges from 0 … 0.6 to 0 ... 1,600 bar [0 ... 10 to 0 ... 20,000 psi] as well as vacuum and +/- measuring ranges

**IIoT-capable Bourdon tube pressure gauge, model PGW23.100**

## Description

The IIoT-capable model PGW2x.100 pressure gauge finds its use wherever the process pressure has to be indicated on-site and, at the same time, centralised, web-based remote monitoring is required.

The model PGW2x.100 is based on a fully welded and robust Bourdon tube measuring system. It therefore combines the mechanical measuring system with electronic signal processing.

Battery-operated wireless transmission via LoRaWAN® ("Long Range Wide Area Network") is based on LPWAN technology ("Low Power Wide Area Network") to enable high transmission ranges and long battery life.

The model PGW2x.100 pressure gauge fulfils safety-related requirements of the relevant standards and regulations for the on-site indication of the operating pressure of pressure vessels, as well as the requirements of the Radio Equipment Directive for data communication. In particular, the LoRaWAN® network enables the complete end-to-end encryption with bidirectional communication for safe IIoT applications.

The model PGU2x.100 is based upon a model 2xx.30 high-quality pressure gauge with a nominal size of 100, which corresponds to the S3 safety version of the EN 837-1.

**WIKA**

**Smart in sensing**

# Specifications

| Basic information | |
|---|---|
| **Further version** | ■ Oil- and grease-free<br>■ For oxygen, oil- and grease-free<br>■ Monel version; model PGW26.100 |
| **Nominal size (NS)** | Ø 100 mm [4"] |
| **Window** | Laminated safety glass |
| **Connection location** | Lower mount (radial) |
| **Case** | |
| Design | Safety level "S3" per EN 837-1: With solid baffle wall (Solidfront) and blow-out back |
| Material | ■ Stainless steel 1.4301 (304)<br>■ Stainless steel 1.4571 (316Ti) |
| **Ring** | Bayonet bezel, stainless steel |
| **Mounting** | ■ Without<br>■ Panel mounting flange, stainless steel |
| **Case filling** | ■ Without<br>■ Silicone oil |
| **Movement** | Copper alloy |
| **Radio case** | PBT plastic, glass-fibre reinforced |
| **Antenna** | Thermoplastic elastomer (TPE) |
| **Antenna connection (SMA)** | Brass, gold-plated |

| Measuring element | |
|---|---|
| **Type of measuring element** | Bourdon tube, C-type or helical type |
| **Material** | |
| PGW23.100 | Stainless steel 1.4404 (316L) |
| PGW26.100 | Monel 400 (2.4360) |

| Accuracy specifications | |
|---|---|
| **Accuracy class** [1] | 1.0 per EN 837-1 |
| **Temperature error** | On deviation from the reference conditions at the measuring system:<br>≤ ±0.4 % per 10 °C [≤ ±0.4 % per 18 °F] of full scale value |
| **Reference conditions** | |
| Ambient temperature | +20 °C [+68 °F] |

1) The accuracy class is valid for the mechanical indication and for the digitally transmitted measured pressure values.

## Measuring ranges

| bar | | |
|---|---|---|
| 0 … 0.6 | 0 … 10 | 0 … 160 |
| 0 … 1 | 0 … 16 | 0 … 250 |
| 0 … 1.6 | 0 … 25 | 0 … 400 |
| 0 … 2.5 | 0 … 40 | 0 … 600 |
| 0 … 4 | 0 … 60 | 0 … 1,000 |
| 0 … 6 | 0 … 100 | 0 … 1,600 [1] |

| kPa | | |
|---|---|---|
| 0 … 60 | 0 … 1,000 | 0 … 16,000 |
| 0 … 100 | 0 … 1,600 | 0 … 25,000 |
| 0 … 160 | 0 … 2,500 | 0 … 40,000 |
| 0 … 250 | 0 … 4,000 | 0 … 60,000 |
| 0 … 400 | 0 … 6,000 | 0 … 100,000 |
| 0 … 600 | 0 … 10,000 | - |

| MPa | | |
|---|---|---|
| 0 … 0.06 | 0 … 1 | 0 … 16 |
| 0 … 0.1 | 0 … 1.6 | 0 … 40 |
| 0 … 0.16 | 0 … 2.5 | 0 … 60 |
| 0 … 0.25 | 0 … 4 | 0 … 100 |
| 0 … 0.4 | 0 … 6 | 0 … 160 [1] |
| 0 … 0.6 | 0 … 10 | - |

| mbar | | |
|---|---|---|
| 0 … 600 | 0 … 1,100 | 0 … 1,600 |
| 0 … 1,000 | 0 … 1,200 | 0 … 2,500 |

| kg/cm² | | |
|---|---|---|
| 0 … 0.6 | 0 … 10 | 0 … 160 |
| 0 … 1 | 0 … 16 | 0 … 250 |
| 0 … 1.6 | 0 … 25 | 0 … 400 |
| 0 … 2.5 | 0 … 40 | 0 … 600 |
| 0 … 4 | 0 … 60 | 0 … 1,000 |
| 0 … 6 | 0 … 100 | 0 … 1,600 [1] |

| psi | | |
|---|---|---|
| 0 … 10 | 0 … 250 | 0 … 3,000 |
| 0 … 15 | 0 … 300 | 0 … 4,000 |
| 0 … 30 | 0 … 400 | 0 … 5,000 |
| 0 … 60 | 0 … 600 | 0 … 6,000 |
| 0 … 100 | 0 … 800 | 0 … 7,500 |
| 0 … 150 | 0 … 1,000 | 0 … 10,000 |
| 0 … 160 | 0 … 1,500 | 0 … 15,000 |
| 0 … 200 | 0 … 2,000 | 0 … 20,000 [1] |

[1] Only for model PGW23.100

## Vacuum and +/- measuring ranges

| bar | |
|---|---|
| -0.6 … 0 | -1 … +5 |
| -1 … 0 | -1 … +9 |
| -1 … +0.6 | -1 … +15 |
| -1 … +1.5 | -1 … +24 |
| -1 … +3 | -1 … +30 |

| kPa | |
|---|---|
| -60 … 0 | -100 … +500 |
| -100 … 0 | -100 … +900 |
| -100 … +60 | -100 … +1,500 |
| -100 … +150 | -100 … +2,400 |
| -100 … +300 | -100 … +3,000 |

| MPa | |
|---|---|
| -0.06 … 0 | -0.1 … +0.5 |
| -0.1 … 0 | -0.1 … +0.9 |
| -0.1 … +0.06 | -0.1 … +1.5 |
| -0.1 … +0.15 | -0.1 … +2.4 |
| -0.1 … +0.3 | -0.1 … +3 |

| mbar | |
|---|---|
| -600 … 0 | -1,000 … +600 |
| -1,000 … 0 | -1,000 … +1,500 |
| -1,100 … 0 | -1,000 … +3,000 |
| -1,200 … 0 | - |

| kg/cm² | |
|---|---|
| -0.6 … 0 | -1 … +5 |
| -1 … 0 | -1 … +9 |
| -1 … +0.6 | -1 … +15 |
| -1 … +1.5 | -1 … +24 |
| -1 … +3 | -1 … +30 |

| psi | |
|---|---|
| -30 inHg … 0 | -30 inHg … +100 |
| -30 inHg … +15 | -30 inHg … +150 |
| -30 inHg … +30 | -30 inHg … +300 |
| -30 inHg … +60 | - |

| **Further details on: Measuring ranges** | |
|---|---|
| **Unit** | ■ bar<br>■ mbar<br>■ psi<br>■ kg/cm²<br>■ kPa<br>■ MPa |
| **Increased overload safety** | ■ Without<br>■ 1.6 times<br>■ 2 times |
| | The possibility of selection depends on the measuring range |
| **Vacuum resistance** | ■ Without<br>■ Vacuum-resistant to -1 bar |
| **Dial** | |
| Scale layout | ■ Single scale<br>■ Dual scale |
| **Pointer** | |
| Instrument pointer | Aluminium, black |

Other measuring ranges on request

| **Process connection** | | |
|---|---|---|
| **Standard** | ■ EN 837-1<br>■ ANSI/B1.20.1 | |
| **Size** | | |
| EN 837-1 | ■ G ¼ B, male thread<br>■ G ½ B, male thread<br>■ M20 x 1.5, male thread | |
| ANSI/B1.20.1 | ■ ¼ NPT, male thread<br>■ ½ NPT, male thread | |
| **Restrictor** | ■ Without<br>■ Ø 0.6 mm [0.024"], stainless steel, selectable for model PGW23.100<br>■ Ø 0.6 mm [0.024"], Monel, selectable for model PGW26.100 | |
| **Material (wetted)** | | |
| Process connection, measuring element | Model PGW23.100 | Stainless steel 1.4404 (316L) |
| | Model PGW26.100 | Monel [1] |

1)  Measuring range up to max. 1,000 bar [15,000 psi] for wetted materials from Monel

Other process connections on request

## NFC radio standard

| | |
|---|---|
| On-site interface | NFC (near field communication) |
| Standard | ISO/IEC 15693 type 5 tag |
| Frequency | 13.56 MHz |

## LoRaWAN® radio standard

| | |
|---|---|
| LoRaWAN® specification | LoRaWAN® 868 MHz EU |
| LoRaWAN® protocol | 1.0.3 |
| Functions | ■ Registration<br>■ Configuration of measuring and transmission rate<br>■ Sending measured values<br>■ Alarm management |
| Frequency range | 863 - 870 MHz |
| Transmission power | 12 dBm |
| Range in free field [1] | ≤ 10 km |
| Approved antennas | ■ Rigid antenna (Pulse W5017)<br>■ Antenna with extended cable (Linx ANT-868-ID-2000-SMA) |
| Antenna gain | |
| Rigid antenna (Pulse W5017) | +2 dBm |
| Antenna with extended cable (Linx ANT-868-ID-2000-SMA) | +0.6 dBm |
| Number of channels | 10 |
| Channel spacing | 200 kHz |
| Bandwidth | 125 kHz |
| Max. output power | 14 dBm |
| Measuring rate [2] | |
| For > -20 °C [-4 °F] | Adjustable: 10 seconds to transmission rate, however max. 18 hours |
| For ≤ -20 °C [-4 °F] | Adjustable: 1 minute to transmission rate, however max. 18 hours |
| Transmission rate [3] | Adjustable: 30 minutes to 7 days (maximum transmission rate limited per ETSI EN 300 220 [4]) |
| Security | Full end-to-end encryption<br>→ For details on security, see website: https://lora-alliance.org |

1) The range depends on the topography. 10 km can be achieved in free field conditions with a spreading factor of 12.
2) As-delivered condition: 1 measured value per minute (only adjustable via the IIoT platform).
3) As-delivered condition: 1 transmission every 30 minutes (only adjustable via the IIoT platform).
4) The maximum transmission frequency and duty cycle comply with the ETSI EN 300 220 standard.

## Voltage supply and performance data

| | |
|---|---|
| Battery | Lithium thionyl chloride battery (model SAFT LS17500), interchangeable |
| Battery voltage | DC 3.6 V |
| Battery life [1] | ≤ 5 years |

1) Applies under the following measuring and sending conditions, as well as reference conditions:
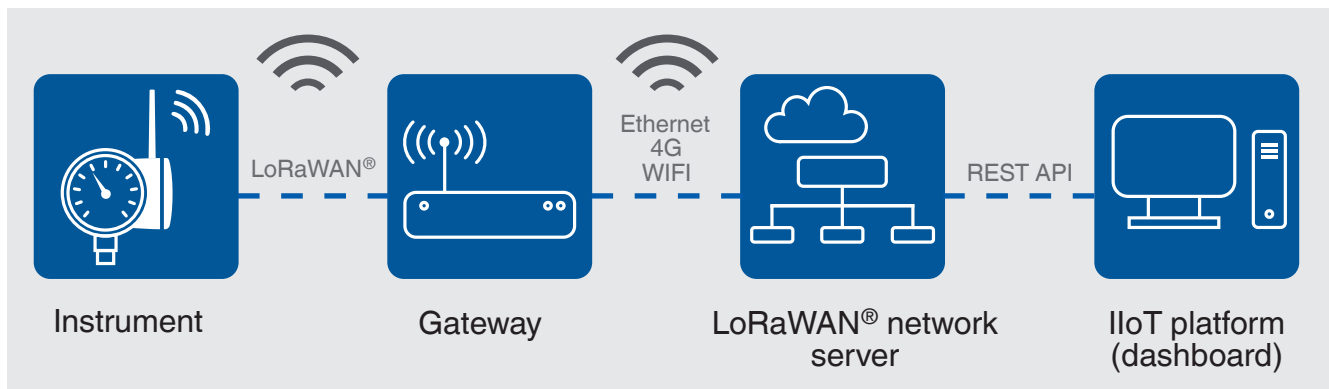   Measuring rate: 1 x per minute and sending rate: 1 x per hour, spreading factor: 7, ambient temperature: 20 °C [68 °F], relative humidity: 65 %, gauge pressure: 1,013 mbar [29.91 inHg]

| Operating conditions | |
|---|---|
| **Place of use** | Taking into account the following operating conditions, the instrument can be used in indoor and outdoor areas. |
| **Altitude** | ≤ 2,000 m [6,561 ft] above sea level |
| **Medium temperature range** | -40 ... +100 °C [-40 ... +212 °F] |
| **Ambient temperature range** | -40 ... +60 °C [-40 ... +140 °F] |
| **Storage temperature range** | -40 ... +70 °C [-40 ... +158 °F] |
| **Pressure limitation** | |
| Steady | Full scale value |
| Fluctuating | 0.9 x full scale value |
| Short time | 1.3 x full scale value |
| **Relative humidity, condensation** | 0 ... 75 % r. h. (non-condensing) |
| **Ingress protection (IP code) per IEC 60529** | ■ IP54<br>■ IP65 [1] (case filling) |
| **Permissible pollution degree per EN 61010-1** | 3 |
| **Weight** | ■ 0.8 kg [2.14 lb] (for instruments without case filling)<br>■ 1.1 kg [2.95 lb] (for instruments with case filling) |

1) Checked and validated in vertical mounting position

# LPWAN infrastructure

A measuring instrument that allows remote monitoring via radio must be integrated into the IIoT infrastructure. The following schematic illustration shows a typical LPWAN infrastructure:



Data from an IIoT-capable measuring instrument is transmitted wirelessly via radio to the gateway. It is ensured that only authorised end devices may communicate with the network server (e.g. LoRaWAN®). For this, the measuring instrument must first be coupled with the network server. In LoRaWAN®, the wireless transmission can be up to 10 km. The ranges are dependent on factors such as topography, placement of the gateway or environmental influences.

Measured values from several hundred LoRaWAN®-enabled IIoT instruments, such as the model PGW2x.100, can be captured by a gateway and transmitted via cable connections (e.g. via Ethernet) or over-the-air (e.g. via 4G or WLAN) on to a network server.

In a web-based IIoT platform, the measured data can be stored, alarms can be set and configurations can be made on the instrument. If the limit values are exceeded, alarm messages can be sent as notification via SMS or e-mail. The measured data can be analysed via the visualisation in the dashboard, thus enabling remote monitoring of the process pressure.
WIKA provides an app called "myWIKA wireless device" to support commissioning and local status inquiries of the measuring instrument.

## "myWIKA wireless device" app

Via the "myWIKA wireless device" app, the measuring instrument can be activated and deactivated through a mobile device. Furthermore, the instrument data and the current measured value can be read.
The app functions are used via Near Field Communication (NFC) and an NFC-enabled mobile device.

**Functions of the app:**
- Indication of the instrument information
- Indication of the instrument status
- Reading the current measured value
- Activating and deactivating the data transfer
- Manual join request for the LoRaWAN® network
- Access to the product passport

For iOS-based end devices, the app is available in the Apple Store via the link below.

Download here

For Android-based end devices, the app is available in the Google Store via the link below.

Download here

## Approvals

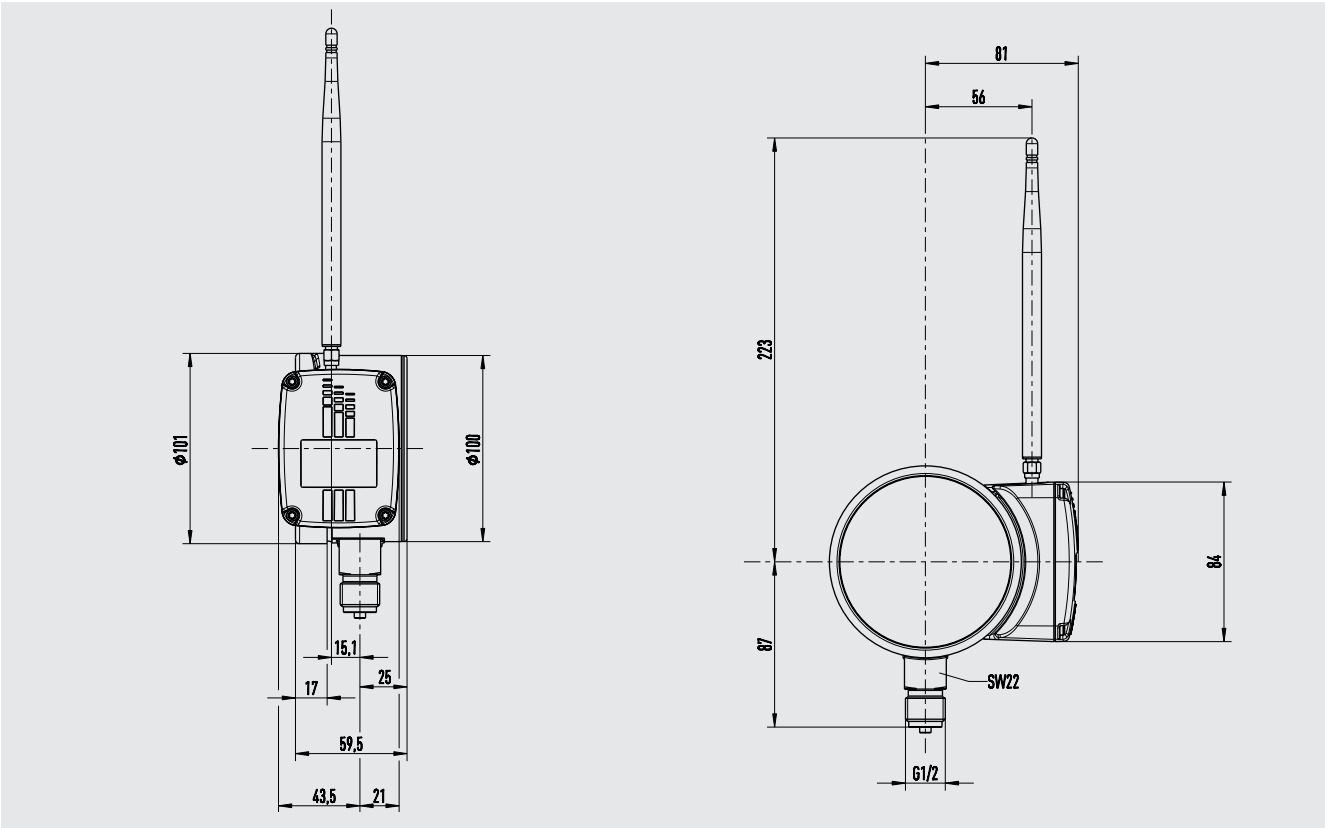| Logo | Description | Region |
|---|---|---|
| CE | **EU declaration of conformity** | European Union |
| | Pressure Equipment Directive (pressure accessory, module A) | |
| | Radio Equipment Directive | |
| | EMC directive<br>EN 61326 emission (group 1, class B) and immunity (industrial application)<br>The instrument may be used without restriction in the following areas: EU and CH, NO, LI | |
| | RoHS directive | |
| UKCA | **UKCA** | United Kingdom |
| | Pressure equipment (safety) regulations | |
| | Radio equipment regulations | |
| | Restriction of hazardous substances (RoHS) regulations | |
| - | ICASA<br>Radio equipment regulations<br>Valid approval currently only for model PGW23.100. The approval for model PGW26.100 is in progress. | South Africa |

## Certificates

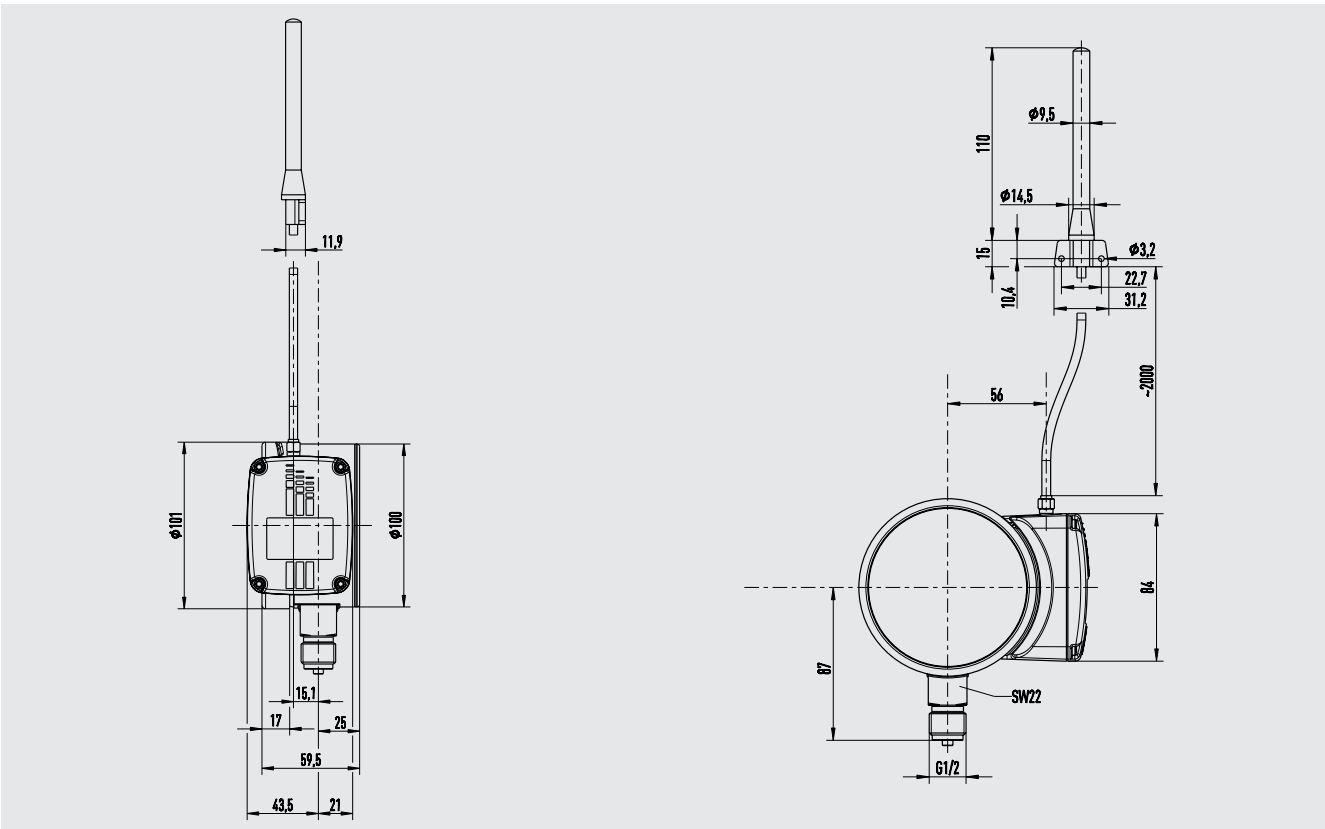| Certificates | |
|---|---|
| Certificates | ■ 2.2 test report per EN 10204 (e.g. state-of-the-art manufacturing, indication accuracy)<br>■ 3.1 inspection certificate per EN 10204 (e.g. indication accuracy) |

→ For approvals and certificates, see website

# Dimensions in mm

**Rigid antenna (Pulse W5017)**



**Antenna with extended cable (2 m [6.56 ft]) (Linx ANT-868-ID-2000-SMA)**

# Accessories and spare parts

| Description | Order number |
|---|---|
| **LoRaWAN® gateway, preconfigured for WIKA network server** | |
| Gateway for indoor use | On request |
| Gateway for outdoor use | On request |
| **Rigid antenna (Pulse W5017)** | 14482866 |
| **Antenna with extended cable (2 metres) (Linx ANT-868-ID-2000-SMA)** | 14482867 |
| **Battery (SAFT LS17500)** | 14376742 |

| Model | | Description |
|---|---|---|
|  | **910.17** | Seals<br>→ See data sheet AC 09.08 |
|  | **910.15** | Syphons<br>→ See data sheet AC 09.06 |
|  | **910.13** | Overpressure protector<br>→ See data sheet AC 09.04 |
|  | **IV10, IV11** | Needle valve and multiport valve<br>→ See data sheet AC 09.22 |
|  | **IV20, IV21** | Block-and-bleed valve<br>→ See data sheet AC 09.19 |
|  | **IVM** | Monoflange, process and instrument version<br>→ See data sheet AC 09.17 |
|  | **910.32** | Cooling element for pressure measuring instruments<br>→ See data sheet AC 09.21 |

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