Bourdon tube pressure gauge with wireless output signal
Safety version, NS 100
Models PGW23.100, PGW26.100

WIKA data sheet PV 42.02

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 display
- Battery-operated LoRa® radio transmission based on LPWAN technology
- High transmission range for the measured values (up to 10 km) with long battery life (up to 5 years)
- 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

Wherever the process pressure has to be indicated locally and, at the same time, centralised, web-based remote monitoring is required, this IIoT-capable measuring instrument finds its use.

The all welded and robust Bourdon tube measuring system produces a pointer rotation proportional to the pressure. The process pressure is indicated continuously by the pointer on the dial. The measuring electronics convert the pointer rotation into an electronic signal, which is further transmitted via the radio module and the antenna.

Battery-operated radio transmission via LoRa® („long range") is based on LPWAN technology ("low power wide area network") to enable high transmission ranges and long battery life.

The IIoT-capable model PGW2x.100 pressure gauge fulfils safety-related requirements of the relevant standards and regulations for the on-site display 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 ("long range wide area network") enables the complete end-to-end encryption with bidirectional communication for safe IIoT applications.

WIKA manufactures and qualifies the pressure gauge in accordance with the requirements of the EN 837-1 European standard in the "S3" safety version. The safety version is made up of a non-splintering window, a solid baffle wall between measuring system and dial and a blow-out back.

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Specifications

Models PGW23.100, PGW26.100	
Nominal size in mm	100
Connection location	Lower mount (radial)
Case	Safety version S3 per EN 837-1 with solid baffle wall (Solidfront) and blow-out back
Case filling	■ Without ■ With case filling
Accuracy class [1]	1.0 per EN 837-1
Temperature effect	On deviation from the reference conditions at the measuring system: ≤ ±0.4 % per 10 °C [≤ ±0.4 % per 18 °F] of full scale value
Scale	■ Single scale ■ Dual scale
Measuring range	0 … 0.6 to 0 … 1,600 bar [0 ... 10 to 0 ... 20,000 psi] [2] or all other equivalent vacuum or combined pressure and vacuum ranges. Other units (e.g. psi, kPa) available
Pressure limitation	
Steady	Full scale value
Fluctuating	0.9 x full scale value
Short time	1.3 x full scale value
Process connection	■ G ½ B ■ ½ NPT ■ M20 x 1.5 Others on request
Material (wetted)	
Process connection, pressure element	■ Model PGW23.100: Stainless steel 316L ■ Model PGW26.100: Monel
Material (in contact with the environment)	
Case, bayonet ring	Stainless steel
Movement	Brass
Window	Laminated safety glass
Radio case	Plastic PBT, glass-fibre reinforced
Antenna	Thermoplastic elastomer (TPE)
Antenna connection (SMA)	Brass, gold-plated
Approved battery	
Battery model	SAFT LS17500
Battery type	Lithium thionyl chloride battery
Voltage	■ DC 3.6 V ■ Max. 0.2 W
Service life (typical)	5 years [3]
Weight	■ 1.1 kg (filled) ■ 0.8 kg (unfilled)

1) The accuracy class is valid for the mechanical display and for the digitally transmitted pressure values.
2) For wetted materials from Monel (model PGW26.100) to max. 1,000 bar
3) 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

Measuring ranges

Gauge pressure						
bar	0 ... 0.6	0 ... 1	0 ... 1.6	0 ... 2.5	0 ... 4	0 ... 6
	0 ... 10	0 ... 16	0 ... 25	0 ... 40	0 ... 60	0 ... 100
	0 ... 160	0 ... 250	0 ... 400	0 ... 600	0 ... 1,000	0 ... 1,600
psi	0 ... 10	0 ... 15	0 ... 30	0 ... 60	0 ... 100	0 ... 150
	0 ... 160	0 ... 200	0 ... 250	0 ... 300	0 ... 400	0 ... 600
	0 ... 800	0 ... 1,000	0 ... 1,500	0 ... 2,000	0 ... 3,000	0 ... 4,000
	0 ... 5,000	0 ... 6,000	0 ... 7,500	0 ... 10,000	0 ... 15,000	0 ... 20,000

Vacuum and +/- measuring ranges									
bar	-1 ... 0	-0.6 ... 0	-1 ... +0.6	-1 ... +1.5	-1 ... +3	-1 ... +5	-1 ... +9	-1 ... +15	-1 ... +24
inHg ... psi	-30 ... 0	-15 ... 0	-30 ... +15	-30 ... +15	-30 ... +30	-30 ... +60	-30 ... +100	-30 ... +150	-30 ... +300

Radio standards

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

LoRaWAN® specification	
LoRaWAN® specification	LoRa® 868 MHz EU
Version	1.0.3
Frequency range	863 - 870 MHz
Transmission power	12 dBm
Range [1]	≤ 10 km
Approved antennas	■ Rigid antenna (Pulse W5017) ■ Antenna with extended cable (Linx ANT-868-ID-2000-SMA)
Antenna gain	■ +2 dBm (rigid antenna (Pulse W5017)) ■ +0.6 dBm (antenna with extended cable (Linx ANT-868-ID-2000-SMA))
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 up to transmission rate, however max. 18 hours
For ≤ -20 °C [-4 °F]	Adjustable: 1 minute up to transmission rate, however max. 18 hours
Transmission rate [3]	Adjustable: 1 minute to 7 days (maximum transmission rate limited by ETSI EN300 220 [4])
Security	Full end-to-end encryption → 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 and 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 sending frequency and duty cycle comply with the standard ETSI EN300 220.

Operating conditions	
Operation site	Taking into account the following operating conditions, the instrument can be used in indoor and outdoor areas.
Operation altitude	≤ 2,000 m 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]
Relative humidity, condensation	0 ... 75 % r. H. (non-condensing)
Ingress protection (IP code) per IEC 60529	■ IP54 ■ IP65 (case filling)
Permissible pollution degree per EN 61010-1	3

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:
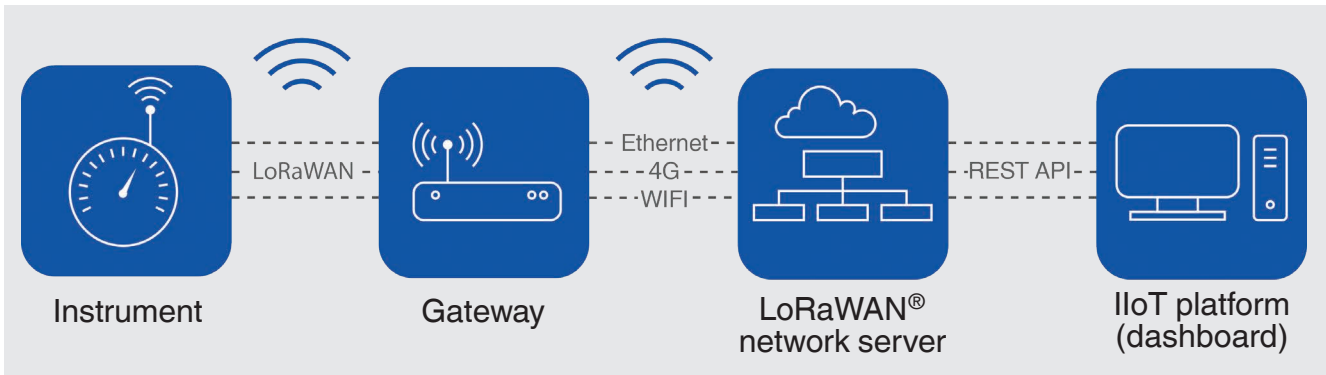
Data from an IIoT-capable measuring instrument is transmitted wirelessly via radio to the gateway. It is ensured that only authorised end devices may communicate with the network server (e.g. LoRaWAN®). For this, the measuring instrument must first be coupled with the network server. In LoRaWAN®, the radio 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 LoRa®-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.

App "myWIKA wireless device"

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:
- Display of the instrument information
- Display of the instrument status
- Reading the current measured value
- Activating and deactivating the data transfer
- Manual join request for the LoRa® network
- Access to the product passport

For iOS-based mobile phones, the app is available in the Apple Store under below link.

Download here

For mobile phones with an Android operating system, the app is available in the Play Store under the link below.

Download here

Approvals

| Logo	Description	Country
CE	**EU declaration of conformity**	European Union
	Pressure equipment directive (pressure accessory, module A)	
	Radio equipment directive	
	EMC directive EN 61326 emission (group 1, class B) and immunity (industrial application) The appliance may be used without restriction in the following areas EU and CH, NO, LI	
	RoHS directive	

Certificates (option)

- 2.2 test report per EN 10204 (e.g. state-of-the-art manufacturing, indication accuracy)
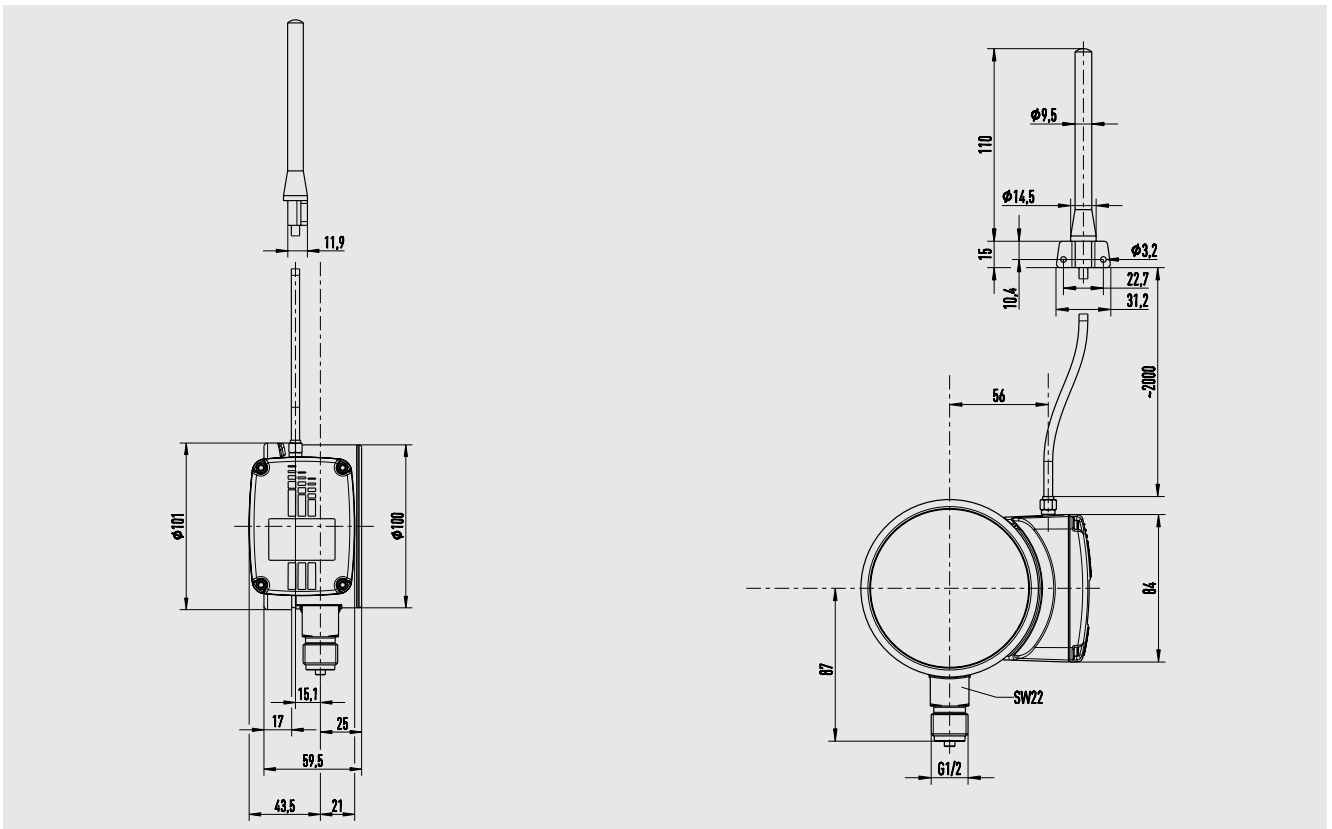- 3.1 inspection certificate per EN 10204 (e.g. indication accuracy)

→ For approvals and certificates, see website

Dimensions in mm

Rigid antenna (Pulse W5017)
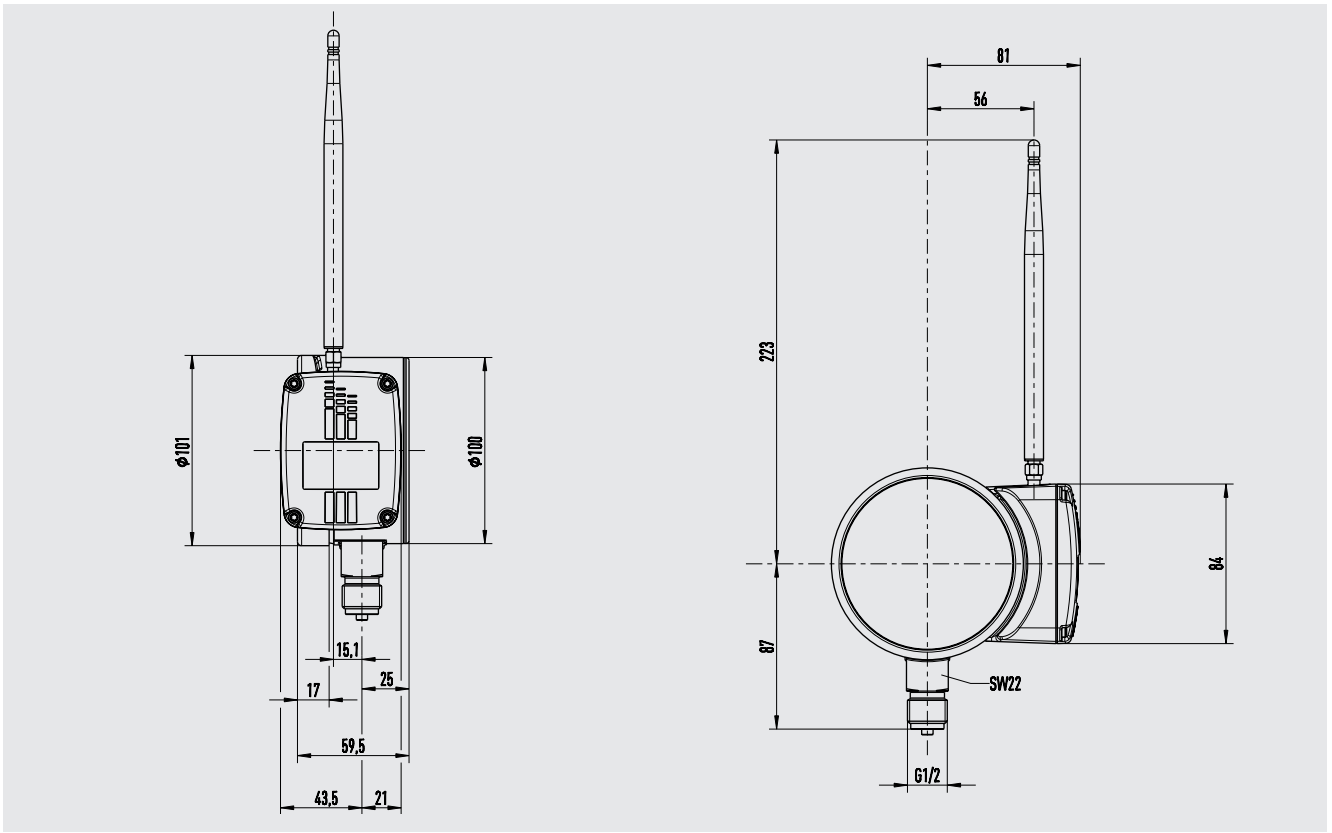
Antenna with extended cable (2 metres) (Linx ANT-868-ID-2000-SMA)

Accessories

Description	Relevant data sheet	Further information
LoRaWAN® gateway, pre-configured for WIKA network server		
Gateway for indoor use	-	On request
Gateway for outdoor use	-	On request
Sealings, model 910.17	AC 09.08	
Valves		
Models IV20/IV21	AC 09.19	
Models IV10/IV11	AC 09.22	
Syphons, model 910.15	AC 09.06	
Overpressure protector, model 910.13	AC 09.04	
Cooling element, model 910.32	AC 09.21	

Ordering information

Model / Connection to platform / Liquid damping / Scale range / Process connection / Antenna

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