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

Ⓢ 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 ■ For oxygen, oil- and grease-free ■ 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) ■ Stainless steel 1.4571 (316Ti)
Ring	Bayonet bezel, stainless steel
Mounting	■ Without ■ Panel mounting flange, stainless steel
Case filling	■ Without ■ 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: ≤ ±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 ■ mbar ■ psi ■ kg/cm² ■ kPa ■ MPa
Increased overload safety	■ Without ■ 1.6 times ■ 2 times
	The possibility of selection depends on the measuring range
Vacuum resistance	■ Without ■ Vacuum-resistant to -1 bar
Dial	
Scale layout	■ Single scale ■ Dual scale
Pointer	
Instrument pointer	Aluminium, black

Other measuring ranges on request

Process connection

Standard	■ EN 837-1 ■ ANSI/B1.20.1	
Size		
EN 837-1	■ G ¼ B, male thread ■ G ½ B, male thread ■ M20 x 1.5, male thread	
ANSI/B1.20.1	■ ¼ NPT, male thread ■ ½ NPT, male thread	
Restrictor	■ Without ■ Ø 0.6 mm [0.024"], stainless steel, selectable for model PGW23.100 ■ 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 ■ Configuration of measuring and transmission rate ■ Sending measured values ■ Alarm management
Frequency range	863 - 870 MHz
Transmission power	12 dBm
Range in free field [1]	≤ 10 km
Approved antennas	■ Rigid antenna (Pulse W5017) ■ 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 → 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 ■ IP65 [1] (case filling)
Permissible pollution degree per EN 61010-1	3
Weight	■ 0.8 kg [2.14 lb] (for instruments without case filling) ■ 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:
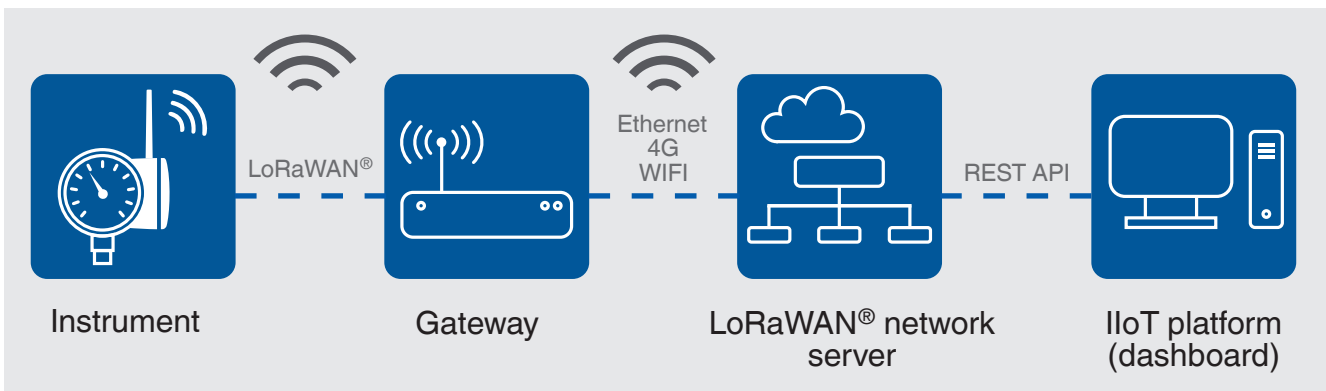
Data from an IIoT-capable measuring instrument is transmitted wirelessly via radio to the gateway. It is ensured that only authorised end devices may communicate with the network server (e.g. LoRaWAN®). For this, the measuring instrument must first be coupled with the network server. In LoRaWAN®, the 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 EN 61326 emission (group 1, class B) and immunity (industrial application) 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 Radio equipment regulations Valid approval currently only for model PGW23.100. The approval for model PGW26.100 is in progress.	South Africa

Certificates

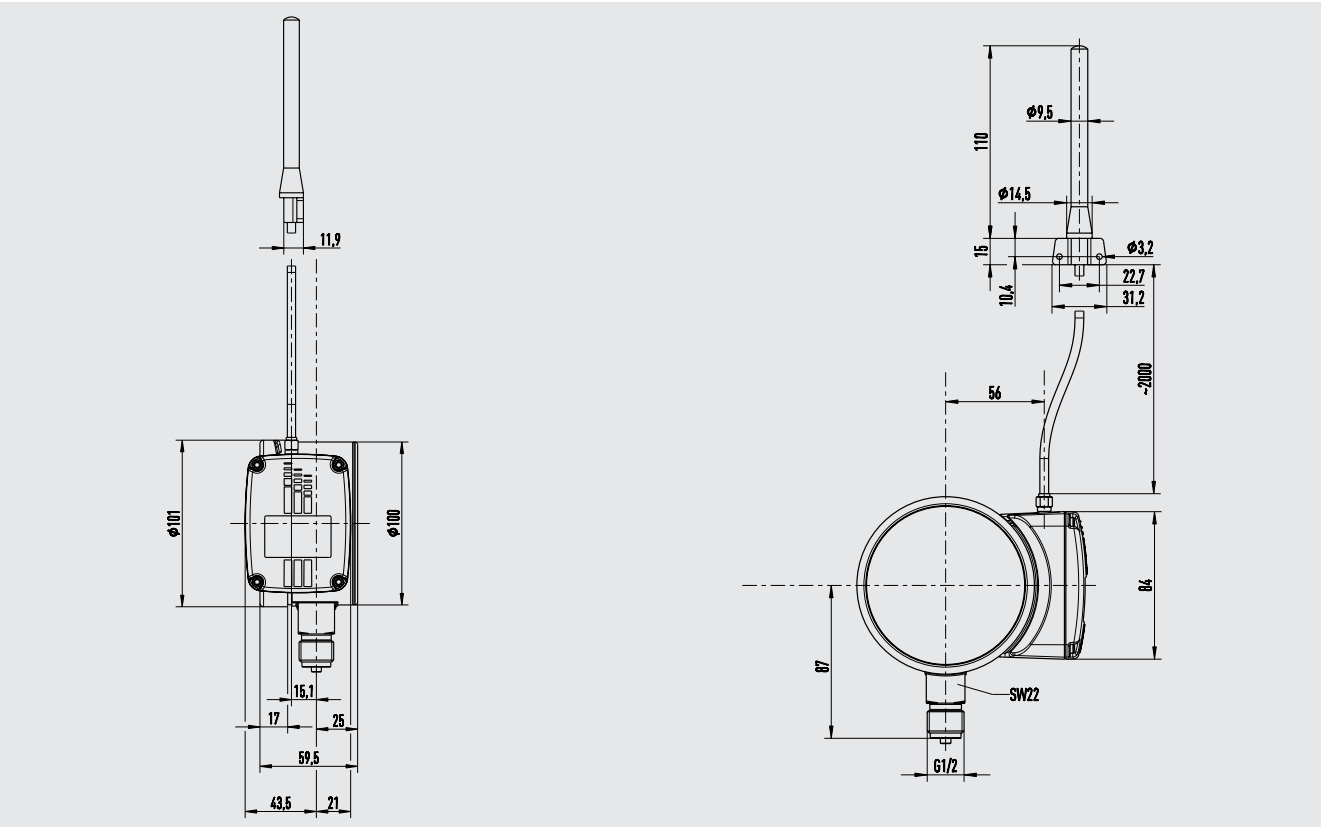| Certificates	
Certificates	■ 2.2 test report per EN 10204 (e.g. state-of-the-art manufacturing, indication accuracy) ■ 3.1 inspection certificate per EN 10204 (e.g. indication accuracy)

→ For approvals and certificates, see website

Dimensions in mm

Rigid antenna (Pulse W5017)
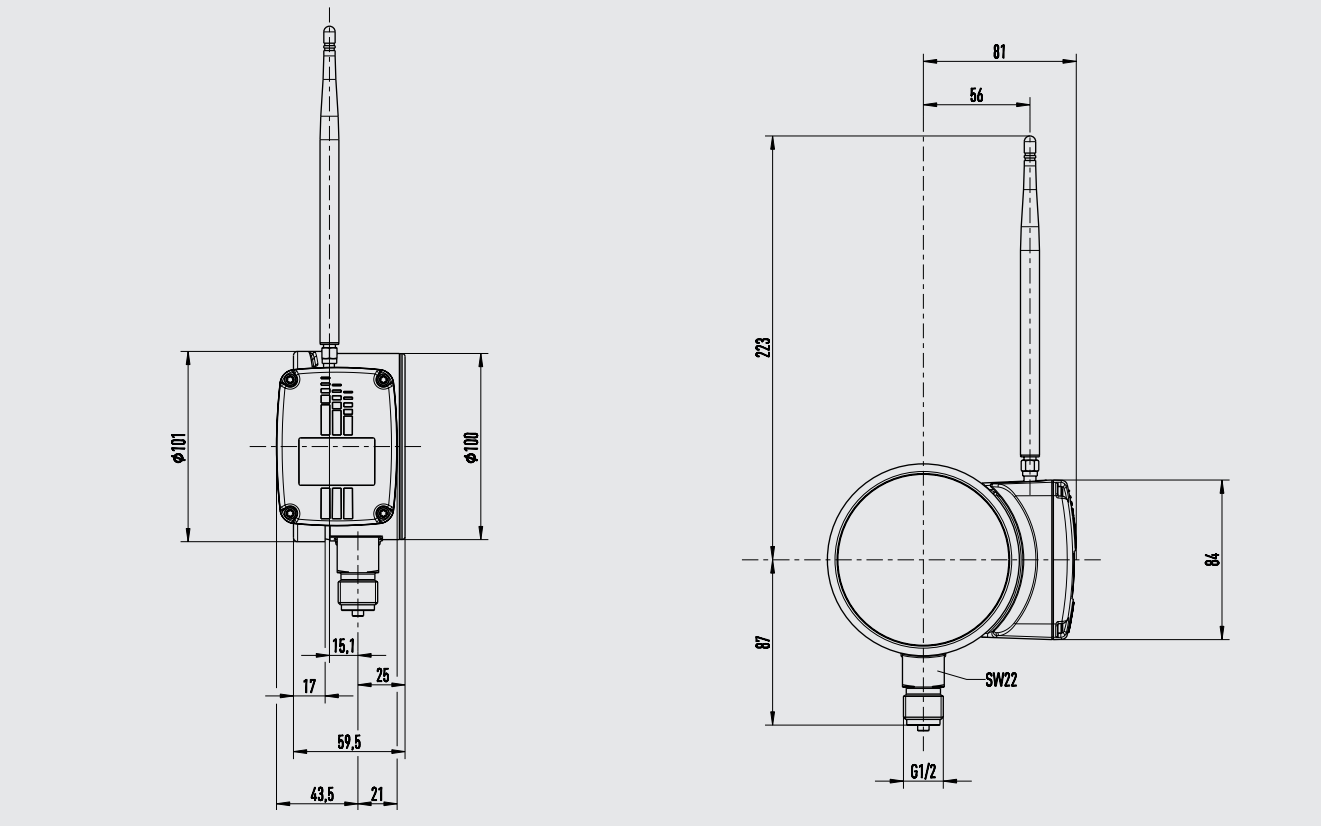
Antenna with extended cable (2 m [6.56 ft]) (Linx ANT-868-ID-2000-SMA)

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

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