NETRIS3 Radio Unit Lorawan Instruction Manual

Model NETRIS ®3

Operating instructions

WIKA-Radio unit with LoRaWAN® for WIKA measuring instruments
For applications in hazardous areas, model NETRIS® 3

Prior to starting any work, read the operating instructions!
Keep for later use!

Contents

General information

Supplementary documentation:
▶ Please follow all the documentation included in delivery.

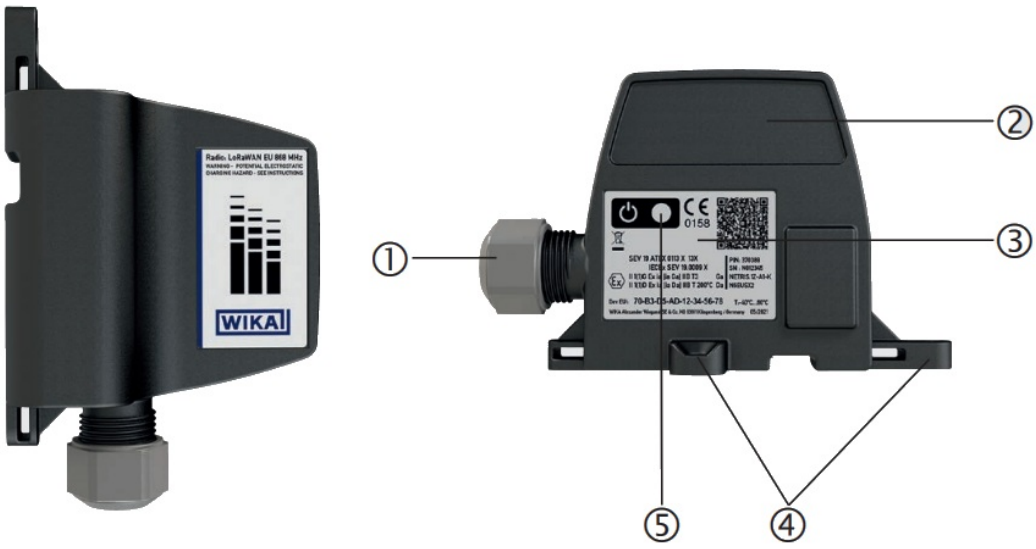
⚠ Before commissioning the instrument, the operating instructions for the WIKA measuring instrument must also be observed!
▶ Model PGU23.100 and PGU26.100, article number 14520946
▶ Model TGU73 article number 14602074
▶ Model TRU article number 14604950
▶ Model FLRU article number 14609053
▶ Model PEU-2x article number 14602071

■ The instrument described in the operating instructions has been manufactured using state-of-the-art technology. All components are subject to stringent quality and environmental criteria during production. Our management systems are certified in accordance with ISO 9001 and ISO 14001.
■ These operating instructions contain important information on handling the instrument.
Working safely requires that all safety instructions and work instructions are observed.
■ Observe the relevant local accident prevention regulations and general safety regulations for the instrument's range of use.
■ The operating instructions are part of the product and must be kept in the immediate vicinity of the instrument and readily accessible to skilled personnel at any time. Pass the operating instructions on to the next operator or owner of the instrument.
■ Skilled personnel must have carefully read and understood the operating instructions prior to beginning any work.
■ In case of a different interpretation of the translated and the English operation instruction, the English wording shall prevail.

■ The general terms and conditions contained in the sales documentation shall apply.
■ Subject to technical modifications.
■ Further information:
– Internet address: **www.wika.de** / **www.wika.com**
– Relevant data sheet: AC 40.03
– Additional documentation: “Special documentation” of the particular WIKA measuring instrument on **www.wika.de**
– Contact Tel.: +49 9372 132-0 **info@wika.de**

Design and function

2.1 Overview



1. Cable gland
2. Internal antenna
3. Product label
4. Fixing holes
5. Status LED

2.2 Description

The NETRIS®3 transmits data over long distances by means of innovative LPWAN® technology (“Low-Power Wide-Area Network”). It is therefore possible to carry out installations inside buildings, in cellars or in underground tanks without any problems.
The transmission of the measured values to the IIoT platform is carried out at a preset sending interval. The measurement and sending intervals, and also the alarm limits, for particular measured values can be configured over the LoRaWAN protocol. A
configuration can be carried out via the cloud.

2.3 Functional principle

The measuring signal is transmitted digitally from the WIKA measuring instrument via a cable to the NETRIS®3 and wirelessly via the antenna of the radio module to a gateway. The NETRIS® 3 uses the LoRaWAN® radio standard, class A, which is designed for energy-saving operation.
This means that communication with a suitable gateway mainly consists of uplinks (messages originating from the measuring instrument). An uplink always occurs in regular, preset cycles (transmission rate). The measuring rate can be defined independently of the transmission rate. If an alarm limit is exceeded or dropped below during a measuring cycle, a data transfer is carried out immediately, regardless of the set transmission rate.
After a successful uplink, two time-limited windows can be used for the downlink (message to the measuring instrument). This enables bidirectional communication and the receipt of network control commands. If this possibility is not used, the end device can only receive data after a new uplink.

→ For details, see website: **https://lora-alliance.org**

Typical uplinks:
■ Measured values: depending on the particular measuring instrument
■ Process alarms: can be set accordingly
■ Technical alarm: reflects the status of the instrument as well as the quality and reliability of the measurement.
■ The alarm of the radio unit: based on the overall condition of the system. If this alarm occurs, the occurrence of a process alarm and also the cyclic measured values must be looked into
■ Notifications for fault diagnosis
■ Configuration ID (for the identification of changes in the measuring and sending rate)
Typical downlink:
Configuration change (e.g. measuring rate, sending rate, alarm parameter etc.).
The WIKA radio unit automatically detects, in the case of messages to be confirmed (e.g. alarms), that the transmission packet has not arrived and transmits it again with changed transmission properties (spreading factors) until the receipt is confirmed by the system.


Higher spreading factors lead to an increased range, a longer sending time and also an increased energy consumption of the radio device.

2.4 Connection to IIoT platform
The instrument is connected to a LoRaWAN® gateway and the measured values are transmitted to the IIoT infrastructure at freely configurable intervals. For instrument-specific registration data for the LoRaWAN® network, see quick start guide (included in delivery).

2.5 LoRaWAN® specification
For the data transmission NETRIS® 3 uses LoRaWAN® version 1.0.3.

2.6 Scope of delivery
WIKA radio unit:

- WIKA radio unit, model NETRIS®3
- Quick start guide
- Operating instructions

Mounting kit:

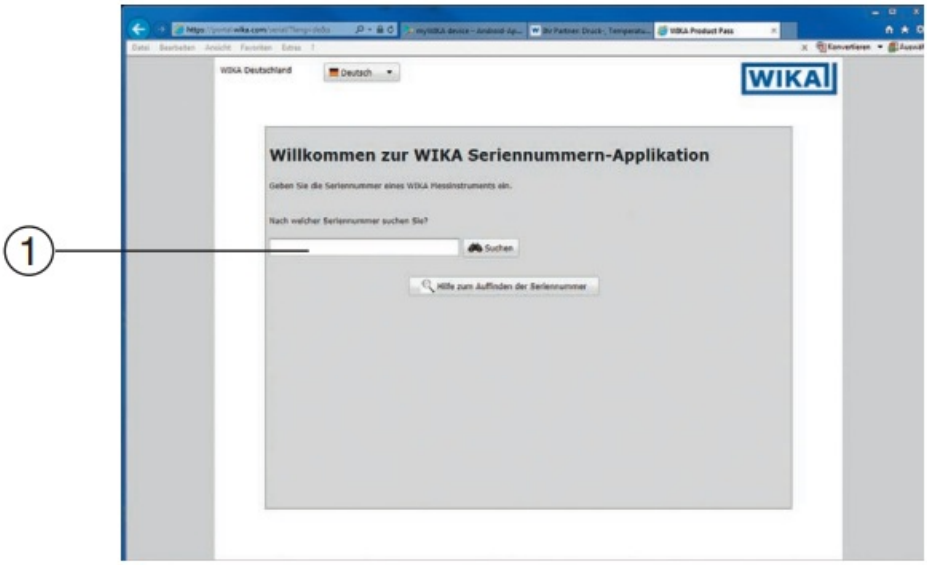
- Activation magnet
- 1 x long screw for wall mounting
- 1 x wall plug for wall mounting
- 2 x short screws, only for fixing to the rear case wall of the pressure gauge
- 2 x cable ties for pipes, up to a max. of 80 mm [3.15 in] diameter

Cross-check scope of delivery with delivery note.

2.7 Product pass
The product pass can be accessed on the product details page of the WIKA website or via the QR code on the product label directly via the associated WIKA serial number application.

Web application	Product page

WIKA – intelligent serial number
The “WIKA – intelligent serial number” and the corresponding serial number application is the central tool in which all the required information on the specific instrument can be found.



After entering 1 the intelligent serial number into the web application, all instrumentspecific details on the manufactured version are displayed.

Safety

3.1 Explanation of symbols

WARNING!
… indicates a potentially dangerous situation that can result in serious injury or death, if not avoided.

CAUTION!
… indicates a potentially dangerous situation that can result in light injuries or damage to property or the environment, if not avoided.

DANGER!
… identifies hazards caused by electrical power. Should the safety instructions not be observed, there is a risk of serious or fatal injury.

DANGER!
… indicates a potentially dangerous situation in the hazardous area that can result in serious injury or death, if not avoided.

Information
… points out useful tips, recommendations and information for efficient and trouble-free operation.

3.2 Intended use

The model NETRIS® 3 is a radio unit that transmits data of a sensor or measuring instrument and is used for condition-oriented and preventive or corrective maintenance in industrial applications.
The instrument can be used wherever centralised, web-based remote monitoring is required in Ex-protected areas.
The remote monitoring of the process pressure via radio transmission is only suitable for non-critical and non-safety-relevant applications.

The LoRaWAN® signal may only be used for mobile applications to a limited extend. This applies particularly to high spreading factors.
The remote monitoring of the measuring location is achieved over a web-based platform.
Only use the instrument in applications that lie within its technical performance limits.
The instrument has been designed and built solely for the intended use described here, and may only be used accordingly. The manufacturer shall not be liable for claims of any type based on operation contrary to the intended use.

3.3 Improper use

WARNING!

Changes to the instrument

Changes to the instrument can lead to hazardous situations and injuries.
▶ Refrain from unauthorised modifications or changes to the instrument.
▶ The instrument must only be used for the usage described here.

WARNING!

Injuries through improper use

Improper use of the instrument can lead to hazardous situations and injuries.
▶ Refrain from unauthorised modifications to the instrument.
The remote monitoring function must not be used for control purposes, as it cannot be guaranteed that data packets won't be lost during radio transmission.
Any use beyond or different to the intended use is considered as improper use.

3.4 Responsibility of the operator

The instrument is used in the industrial sector. The operator is therefore responsible for legal obligations regarding safety at work.
The operator is obliged to maintain the product label in a legible condition.
To ensure safe working on the instrument, the operating company must ensure
■ that suitable first-aid equipment is available and aid is provided whenever required.
■ that the operating personnel are regularly instructed in all topics regarding safety at work, first aid and environmental protection and know the operating instructions and in particular, the safety instructions contained therein.
■ that the instrument is suitable for the particular application in accordance with its intended use.
■ that personal protective equipment is available.

With increased requirements for technical cleanliness, suitability for the application must be checked by the operator before commissioning.

3.5 Personnel qualification

WARNING!

Risk of injury should qualification be insufficient

Improper handling can result in considerable injury and damage to property.
▶ The activities described in these operating instructions may only be carried out by skilled personnel who have the qualifications described below.
Skilled personnel
Skilled personnel, authorised by the operator, are understood to be personnel who, based on their technical training, knowledge of measurement and control technology and on their experience and knowledge of country-specific regulations, current standards and directives, are capable of carrying out the work described and independently recognising potential hazards.

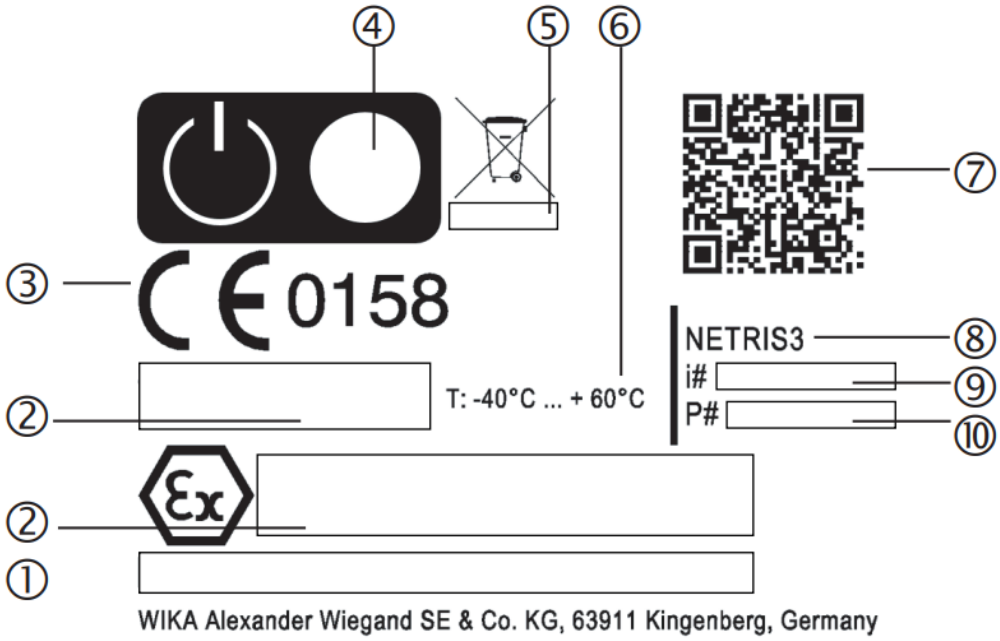
Special knowledge for working with instruments for hazardous areas:

The skilled personnel must have knowledge of ignition protection types, regulations and provisions for equipment in hazardous areas.

3.6 Labelling, safety marks

The labelling, safety markings must be maintained in a legible condition.

Product label



1. 64-bit unique identifier (DevEUI)
2. Ex marking
3. Conformity marking + identification number of the notified or approved body
4. Status LED
5. Date of manufacture (MM/YYYY)
6. Permissible ambient temperature
7. QR code for serial number application
8. Model
9. Serial number
10. Article number

Symbols

Do not dispose of with household waste. Ensure a proper disposal in accordance with national regulations.
→ For further information on the QR code, see “Technical Recommendation TR005” of the LoRa Alliance® at https://lora-alliance.org

3.7 Ex marking

DANGER!

Danger to life due to loss of explosion protection

Non-observance of these instructions and their contents may result in the loss of explosion protection.

▶ Observe the safety instructions in this chapter and further explosion protection instructions in these operating instructions, see 9 Specifications“.

▶ Observe the information given in the applicable type examination certificate and the relevant country-specific regulations for installation and use in hazardous areas (e.g. IEC 60079-14). Check whether the classification is suitable for the application. Observe the relevant national regulations.

▶ The case is factory-sealed. The case must not be opened. Before installation, it must be checked whether the instrument is in a defect-free, undamaged condition.

▶ No conversions or changes may be made to the instrument.

▶ The device contains active energy storage also in the non-operational status. Therefore, defective devices have

to be taken out of the Ex area within one year and disposed appropriately.

3.8 Special conditions for safe use (X conditions)

Under certain extreme circumstances, the non-metallic enclosure may generate an ignition-capable level of electrostatic charge. Therefore the equipment shall not be installed in a location where the external conditions are conductive to the build-up of electrostatic charge on such surfaces. In addition, the equipment shall only be cleaned with a damp cloth.

3.9 ATEX information

 The WIKA model NETRIS® 3 radio unit carries a marking for zone 0. Therefore, the WIKA radio unit may be installed and used in zones 0, 1 and 2.

Since the WIKA model NETRIS® 3 radio unit is always operated in combination with a WIKA measuring instrument (e.g. with model PGU2x.100), the instrument with the lower Ex zone specifies the entire Ex zone. Thus, in the lower case, Ex zone 1. The WIKA

PGU2x.100 measuring instrument is certified for use in zone 1. The NETRIS® 3 radio unit is certified for use in zone 0. The assembly of these two instruments may, thus, only be operated in Ex zone 1 areas.

3.10 Data transmission security

As part of the join procedure, a mutual authentication between a LoRaWAN® end device and the LoRaWAN® network is established. This ensures that only real and authorised devices are connected to real and authentic networks.

LoRaWAN® applications are origin-authenticated, integrity-protected, replication-protected and encrypted. Combined with mutual authentication, this protection ensures that network traffic has not been altered, comes from a legitimate device, is not understood by wiretaps, and has not been intercepted and replayed by unauthorised third parties. In addition, end-to-end encryption protects the usage data of applications exchanged between end devices and application servers.

The security mechanisms mentioned are based on the standardised cryptographic AES algorithms. These algorithms have been analysed by the cryptographic community for many years, are recognised by NIST and are widely accepted as best security practice for sensor nodes and networks.

LoRaWAN® security uses the cryptographic principle of AES cryptography in combination with several operating modes: CMAC2 for integrity protection and CTR3 for encryption.

Each LoRaWAN® device is personalised with a unique 128-bit AES key (AppKey) and a globally unique identifier (EUI-64-based DevEUI), both used during the device authentication process.

Further details can be found in the official Security White Paper from the LoRa Alliance : → See website: **https://lora-alliance.org**

Transport, packaging and storage

4.1 Transport

Check the instrument for any damage that may have been caused by transport.

Obvious damage must be reported immediately.

 **CAUTION!**

Damage through improper transport

With improper transport, damage to property can occur.

▶ When unloading packed goods upon delivery as well as during internal transport, proceed carefully and observe the symbols on the packaging.

▶ With internal transport, observe the instructions in chapter 4.2 „Packaging and storage“.

If the instrument is transported from a cold into a warm environment, the formation of condensation may result in instrument malfunction. Before putting it back into operation, wait for the instrument temperature and the room temperature to equalise.

4.2 Packaging and storage

Storage in an Ex area must not take place. Do not remove packaging until just before mounting.

Keep the packaging as it will provide optimum protection during transport (e.g. change in installation site, sending for repair).

Permissible conditions at the place of storage:

Ambient temperature: -40 … +60 °C [-40 … +140 °F] Storage temperature: -40 … +70 °C [-40 … +158 °F] Humidity: 20 … 90 % of relative humidity

Avoid exposure to the following factors:

- Direct sunlight or proximity to hot objects
- Mechanical vibration, mechanical shock (putting it down hard)
- Soot, vapour, dust and corrosive gases

Store the WIKA radio unit in its original packaging in a location that fulfils the conditions listed above. If the original packaging is not available, decommission, pack and store the WIKA radio unit as described below:

1. Deactivate the WIKA radio unit using the activation magnet.
2. Wrap the WIKA radio unit in an anti-static plastic film.
3. Place the WIKA radio unit, along with shock-absorbent material, in the packaging.
4. If stored for a prolonged period of time (more than 30 days), place a bag containing a desiccant inside the packaging.

Commissioning, operation

Personnel: Skilled personnel
Only use original parts, see chapter 2.6 „Scope of delivery“.

 **DANGER!**
Danger to life from explosion!
Through working in flammable atmospheres, there is a risk of explosion which can cause death.
▶ Only carry out set-up work in non-hazardous environments!

 **WARNING!**
Physical injury
When commissioning, there is a danger from aggressive media and high pressures.
▶ Observe the information in the material safety data sheet for the corresponding medium.
▶ Before connecting to a vessel, pipeline or system, depressurise them.
Before installation, commissioning and operation, ensure that the appropriate instrument has been selected in terms of scale range, design and specific measuring conditions.
The operator must ensure that the system is properly installed and checked before it is commissioned for the first time. An explosion protection document must be created under the responsibility of the operator. The proper condition of the system is maintained through regular testing and maintenance.

5.1 Mechanical mounting
CAUTION!
Damage to the instrument
In order to prevent any damage to the instrument, observe the following:
▶ The instrument must not be subjected to any mechanical loading (e.g. use as a climbing aid, support for objects).
▶ Install the instrument in such a way that process-related electrostatic charges (e.g. caused by flowing media) can be excluded.
▶ Ensure that the instrument can establish a proper wireless connection to the gateway.
▶ When installing, make sure that the instrument is installed with as little vibration as possible and free from magnetic fields.

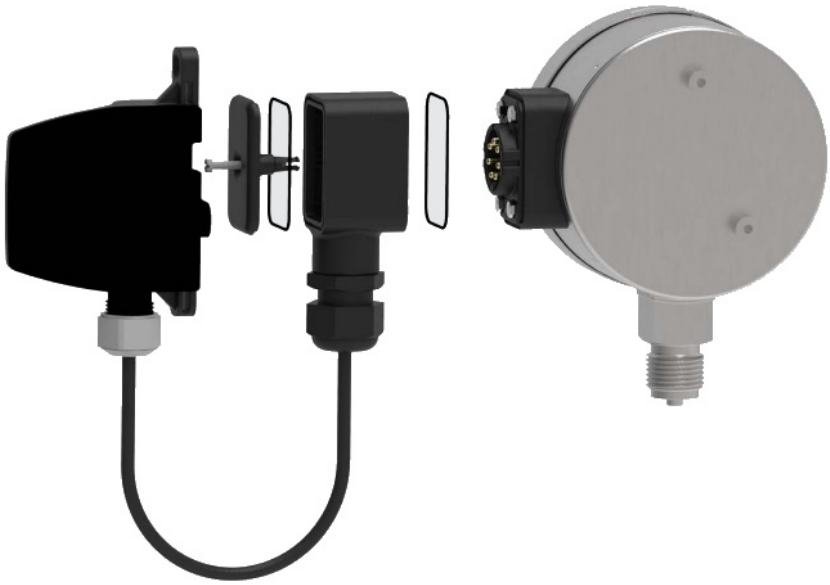
Safety instructions for installation
Install instruments in accordance with the manufacturer’s instructions and the valid standards and regulations. For outdoor applications, the selected installation location has to be suitable for the specified ingress protection, so that the instrument is not xposed to impermissible weather conditions. In order to avoid any additional heating, the instruments must not be exposed to direct solar irradiation while in operation.

 To ensure that the ingress protection level is maintained, ensure that the seal is fitted.

Installation

1. Unpack the WIKA radio unit and WIKA measuring instrument and check that they are complete.
2. To mount the WIKA radio unit, use only the separately packaged mounting kit included in delivery.
3. Only remove the packaging and protective caps of all components immediately before assembly, in a non-hazardous area and in a dry environment, making sure that there is sufficient ESD protection (e.g. ESD clothing).
4. Plug the connector on the WIKA measuring instrument into the WIKA radio unit in accordance with the orientation guide.
5. Tighten the screw so that there is a firm connection to the connector. Make sure that the connector is not damaged.
   → Secure the M12 connector with the cap sleeve.

5.2 Mounting the radio unit
For example with WIKA measuring instrument model PGU23.100
NETRIS® 3 and WIKA measuring instrument are not connected



NETRIS® 3 and WIKA measuring instrument are connected through direct mounting

To mount the WIKA radio unit on the rear of the model PGU2x.100 case, only use the short screws from the scope of delivery. Tighten with a torque of 1.5 Nm. The WIKA radio unit may only be installed on the WIKA measuring instrument up to the maximum allowable temperature at the measuring instrument of 60 °C [140 °F]. If the maximum allowable temperature is exceeded, the possibility of mounting away from the measuring location must be used, see „NETRIS® 3 and WIKA measuring instrument are connected at a distance (wall mounting)“.

NETRIS® 3 and WIKA measuring instrument, connected at the process pipe

The WIKA radio unit may only be installed at the process up to the maximum allowable temperature at the process pipe of 60 °C [140 °F]. If the maximum allowable temperature is exceeded, the possibility of mounting away from the measuring location must be used, see „NETRIS® ® 3 and WIKA measuring instrument are connected at a distance (wall mounting)“.

NETRIS 3 and WIKA measuring instrument are connected at a distance (wall mounting)

For wall mounting of the WIKA radio unit, only use the long screws from the scope of delivery.

Requirements for the installation location

The instruments should be protected against coarse dirt and wide fluctuations in ambient temperature. The ambient and medium temperatures must never be outside the permissible operating conditions (see chapter 9 „Specifications“). The temperature at the
case of the instrument must not exceed a value of 60 °C [140 °F]. The limit value at the instrument must be fulfilled by taking appropriate measures, e.g. mounting with a distance from large, hot surfaces or vessels.

Notes on radiation characteristics

■ To achieve the best possible sending quality, the radio link from the antenna to the receiving gateway should be as free from barriers as possible.

■ The signal strength is from slightly to severely affected by concrete walls, metal shielding, shells and hilly landscapes.

■ For the best possible transmission power of the antenna, no metal objects, such as pipelines, may be closer than 10 cm [3.94 in] to the antenna.

Radiation characteristics

When installing the radio unit, the following principles must be observed in order to fully utilise the radiation characteristics of the antenna:

■ There should be no components such as metal pipes, control cabinets, etc. in the viewing direction to the LoRaWAN® gateway. Concrete parts that contain reinforcement, and buildings made of concrete, can also have a negative impact on the radiation characteristics. Any barrier between the radio unit and the gateway can negatively affect the transmission quality.

■ Mount the radio unit as high as possible. Use the maximum cable length for this purpose.

■ In order to ensure the maximum transmission power of the antenna, there must be no metal objects, such as pipes, closer than 10 cm [3.94 in] to the antenna.

■ Optimum radiation characteristics are achieved when the radio unit is mounted with the z-axis pointing upwards (see „Fig. Radiation characteristics“).

■ The receiving gateway should be in line of sight to the y-axis in order to obtain optimal transmission power (see „Fig. Radiation characteristics“).

Horizontal polarisation, X-Z plane
Vertical polarisation, X-Z plane
Fig. Radiation characteristics

Information on the installation of the receiving gateway

Position the gateway in such a way that the transmission power is optimally utilised. For this, the following recommendations should be observed:

■ Depending on the application, a gateway for indoor or outdoor use should be selected.

■ Between the instrument antenna and the gateway, there should be as few barriers as possible (e.g. walls and hills).

■ The radiation characteristics of the antenna must be taken into account when positioning the gateway.

■ If the measuring instruments are located on one level, vertical mounting of the LoRaWAN® antenna on the gateway is recommended.

■ The location should ideally be in the middle of the area to be covered.

■ Ensure that the gateway is mounted at a sufficient height and is not covered by anything in the immediate vicinity. The higher the gateway is positioned, the further the LoRaWAN® connection reaches.

Permissible vibration load at the installation site

The instruments should always be installed in locations free from vibration load. If necessary, it is possible to isolate the instrument from the mounting point, e.g. by installing a flexible connection line between the measuring location and the instrument and mounting the instrument on a suitable bracket.

If this is not possible, the following limit values of the weakest link must not be exceeded:

Frequency range < 150 Hz

Acceleration < 0.5 g (5 m/s²)

The permissible vibration load when mounting the WIKA radio unit on the rear of the case of the WIKA model PGU2x.100 measuring instrument is determined by the component with the weakest limit values.

Temperature load

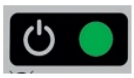
The installation of the instrument should be made in such a way that the permissible operating temperature, also considering the effects of convection and thermal radiation, neither exceeds nor falls below the permissible limits.

5.3 Activating NETRIS®3 (active mode)

The active mode is used as the main operating mode with the full functionality of the LoRaWAN® communication.

Only activate the WIKA model NETRIS® 3 radio unit from storage mode to active mode using the activation magnet included in delivery.

With the instructions described below, the LED will light up green for approx. 5 s after successful activation.

1.  Use the activation magnet to actuate the reed switch in the location shown. LED lights up red approx. 1 s.
2.  Within 3 s, move the activation magnet over the reed switch a second time to start activation. The LED lights up green for approx. 1 s and the LoraWAN® Join Process starts with the authorisation.
   → Without this step, the instrument remains deactivated. This second step prevents an accidental activation of the instrument.
3.  After successful activation and a successful LoRaWAN® Join Process, the LED lights up green for 5 s.
4.  After successful activation and a failed LoRaWAN® Join Process, the LED lights up red for 5 s. The instrument remains activated and repeats the LoRaWAN® Join Process based on the instrument configuration data.

5.4 Deactivating NETRIS® 3 (storage mode)

The storage mode is used in order to deactivate all functions, in particular the LoRaWAN® communication, during storage and transport. Delivery of the instrument is made in storage mode. The storage mode can be reactivated, at any time, using a magnet.
The deactivation of the WIKA model NETRIS® 3 radio unit from active mode to storage mode works with an activation magnet. With the instructions described below, the LED will light up red for approx. 3 s after successful deactivation.

1.  Use the activation magnet to actuate the reed switch in the location shown. LED lights up green approx. 1 s.
2.  Within 3 s, move the activation magnet over the reed switch a second time to start deactivation. The LED lights up red for approx. 1 s and the deactivation process starts.
   → Without this step, the instrument remains activated and a reset (join request, initialisation, etc.) is triggered.
3.  Then move the activation magnet over the reed switch a third time to complete the deactivation.
4.  The LED lights up red for approx. 3 s, after which the instrument is put into storage mode.
   → Without this step, the instrument remains activated and a reset (join request, initialisation, etc.) is triggered.

5.5 Manual initiation of a LoRaWAN® transmission

When activated, if it is integrated into a LoRaWAN® network, the WIKA model NETRIS® 3 radio unit can trigger a manual data transmission.

 Move the activation magnet over the reed switch to confirm activation.
LED lights up red approx. 1 s. After successful activation, the LED lights up green for 5 s.

5.6 Battery life

Since the battery life is influenced by many factors, such as the measurement and sending rate, the spread factor, and the ambient and process temperatures, this value is only an approximation. The calculation of the approximate value is based on a constant ambient temperature of 20 °C [68 °F] is assumed.
The battery life depends very strongly on how often the instrument carries out a measurement using the connected measuring instrument and then transmits or sends this value via LoRaWAN. Therefore, in order to keep the battery operational for up to 10 years,

an hourly measurement and transmission should not be exceeded.

5.7 Registration

For the IIoT connection, all relevant data for registration, commissioning and maintenance, as well as an interface specification for further processing of the data are provided (see chapter 1 „General information“ “Additional documentation”).

The deployment package includes the following registration information:

■ DevEUI (64-bit end device, unique identifier)
■ AppEUI (64-bit unique application identifier)
■ AppKey (128-bit key)
■ Interface specification (→ see special documentation “LPWAN communication protocol” of the corresponding WIKA measuring instrument on the WIKA website).

Payload description

With a customer-specific integration, the payload interpretation must be carried out by the customer (see special documentation “LPWAN communication protocol” for the particular WIKA measuring instrument on the WIKA website).

Faults

Personnel: Skilled personnel

 **DANGER!**

Danger to life from explosion

Through working in flammable atmospheres, there is a risk of explosion which can cause death.

▶ Only rectify faults in non-flammable atmospheres!

 **CAUTION!**

Physical injuries and damage to property and the environment

If faults cannot be eliminated by means of the listed measures, the instrument must be taken out of operation immediately.

▶ Contact the manufacturer.

▶0 If a return is needed, please follow the instructions given in chapter 8.20 0„Return“.00

 For contact details, see chapter 11 „General information“ or the back page of 0the operating instructions.

Fault	Causes	Measures
Connection to the IIoT platform is not successful	Access data lost	Contact the distributor/seller
	Incorrect login credentials	Check using the supplied login credentials
	Customer firewall blocks interfaces	Contact the person responsible for infrastructure
	Instrument is outside the range of the gateway	Observe instructions in accordance with the operating instructions
	Faulty commissioning or improper, unsuitable installation location	
QR code is not readable	Unfavourable light and distance conditions	Optimisation by the operator
	Label damaged	Instrument-specific registration data for the LoRaWAN® network can be taken from the quick start guide (included in delivery).
No measured value transmission	Battery empty	Replace the instrument, since the battery is not exchangeable
	Instrument outside the range of the gateway	Observe instructions in accordance with the operating instructions (→ see chapter 3.2 „Intended use“)
	Damage due to improper use	Observe instructions in accordance with the operating instructions (→ see chapter 3.2 „Intended use“)
	Changes in the infrastructure	Contact the person responsible for infrastructure
Individual measured value not transmitted	Collision in the data transmission	Unavoidable! Adaptation of infrastructure possible
Mechanical damage	Improper handling	Replace instrument
	Impermissible loading at the installation location (e.g. fire)	
	Damaged cable	

Maintenance and cleaning

For contact details, see chapter 1 „General information“ or the back page of the operating instructions.

7.1 Maintenance

The instrument is maintenance-free. If the battery is empty, the instrument must be completely replaced and registered again in the cloud at the same location, see chapter 5 „Commissioning, operation“.

7.2 Cleaning

CAUTION!

Physical injuries and damage to property and the environment

Improper cleaning may lead to physical injuries and damage to property and the environment. Residual media at the dismounted instrument can result in a risk to persons, the environment and equipment.

▶ Use the requisite protective equipment.
▶Carry out the cleaning process as described below.

1. If necessary, disable data transmission for cleaning.
2. Prior to cleaning, properly disconnect the instrument from the WIKA measuring instrument.
3. Use the requisite protective equipment.
4. Clean the instrument with a moist cloth. The antenna connection must not come intocontact with moisture!

   CAUTION!

   Damage to property

   Improper cleaning may lead to damage to the instrument!

   ▶ Do not use any aggressive cleaning agents.

   ▶ Do not use any hard or pointed objects for cleaning.

   ▶ Do not use solvents or abrasives for cleaning.
5. Wash or clean the dismounted instrument, in order to protect persons and the environment from exposure to residual media.

Dismounting, return and disposal

DANGER!
Danger to life caused by electric current
Upon contact with live parts, there is a direct danger to life.
▶ The dismounting of the instrument may only be carried out by skilled personnel.
▶ Only dismount the pressure measuring instrument/measuring assembly/test and calibration installations once the system has been isolated from power.

WARNING!
Physical injuries and damage to property and the environment through residual media
Residual media at the dismounted instrument can result in a risk to persons, the environment and equipment.
▶ Use the requisite protective equipment.
▶ Observe the information in the material safety data sheet for the corresponding medium.
▶ Wash or clean the dismounted instrument, in order to protect persons and the environment from exposure to residual media.

8.1 Dismounting

Disconnect the connector on the WIKA measuring instrument from the NETRIS® 3 in accordance with the orientation guide, see chapter 5.1 „Mechanical mounting“

8.2 Return

Strictly observe the following when shipping the instrument:
All instruments delivered to WIKA must be free from any kind of hazardous substances (acids, bases, solutions, etc.) and must therefore be cleaned before being returned.
Written proof of decontamination must be enclosed with the return, see returns portal at **www.wika.de**.

Before returning, the data transmission of the NETRIS®3 radio unit must be deactivated and the radio unit must be completely detached from the measuring instrument.

Instruments with lithium-ion batteries or lithium-metal batteries
The lithium-ion batteries or lithium-metal batteries included are subject to the requirements of the dangerous goods law. Special requirements for packaging and labelling must be observed when shipping. A dangerous goods expert must be consulted when preparing the package. Do not send any damaged or defective rechargeable batteries. Observe the 0different dangerous goods requirements relative to the respective modes of transport and 0any other national regulations.

When returning the instrument, use the original packaging or a suitable transport 0packaging.
To avoid damage:

1. Wrap the instrument in an anti-static plastic film.
2. Place the instrument, along with a shock-absorbent material, in the packaging. Place shock-absorbent material evenly on all sides of the transport packaging.
3. If possible, place a bag, containing a desiccant, inside the packaging.
4. Label the shipment as carriage of a highly sensitive measuring instrument.

Information on returns can be found under the heading “Service” on our local website.

8.3 Disposal

Incorrect disposal can put the environment at risk. Dispose of instrument components and packaging materials in an environmentally compatible way and in accordance with the country-specific waste disposal regulations.
If possible, completely discharge the batteries before disposal and isolate contacts to prevent short-circuits.

Do not dispose of with household waste. Ensure a proper disposal in accordance with national regulations.

Specifications

Overview of versions of suitable WIKA measuring instruments

Model		Description
	**PGU2x.100**	Bourdon tube pressure gauge → See data sheet PV 42.03
	**TGU**	Gas-actuated thermometer → See data sheet TV 17.13
	**TRU**	Miniature resistance thermometer → See data sheet TE 63.03
	**FLRU**	Reed level transmitter → See data sheet LM 20.13
	**PEU-2x**	Pressure sensor → See data sheet PE 87.23

Basic information

Case	Grilamid TR 90 UV
Mounting	Mounting kit for NETRIS®3, all types of mounting → Included in delivery

Radio standard
LoRaWAN®

LoRaWAN® specification	LoRaWAN® 868 MHz EU
LoRaWAN® protocol	Version 1.0.3
Functions	■ Registration ■ Configuration of measuring and transmission rate ■ Sending measured values ■ Alarm management
Frequency range	863 … 870 MHz
Range in free field [1)]	Typically 10 km [6,21 mi]
Transmission power	12 dBm
Antenna	Internal
Max. output power	14 dBm
Measuring rate	Min. 60 seconds up to transmission rate, max. 24 hours
Transmission rate	1 minute to 7 days (maximum transmission rate limited by ETSI EN 300 22 0)
Safety	Full end-to-end encryption → For details on security, see website: **https://lora-alliance.org**

1) The range depends on the topography. 10 km [6,21 mi] can be achieved in free field conditions with a spreading factor of 12.
Voltage supply and performance data

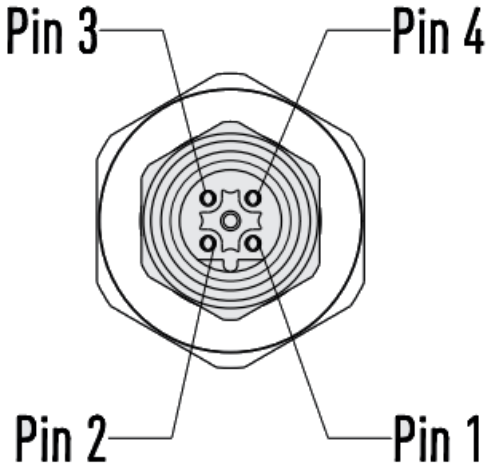
LoRaWAN®	
Battery	Lithium thionyl chloride battery (model SAFT LM17500), potted
Battery voltage	DC 3 V
Battery life [1)]	< 10 years

1) At reference conditions a measurement and a transmission every hour (24x day) takes place at spreading factor 10.
Electrical connection

Connection type	Cable length
Angular connector	■ 0.19 m [0.623 ft] ■ 2.85 m [9.35 ft]
Circular connector M-12 ×1 (4-pin)	■ 0.5 m [1.64 ft] ■ 2.85 m [9.35 ft]

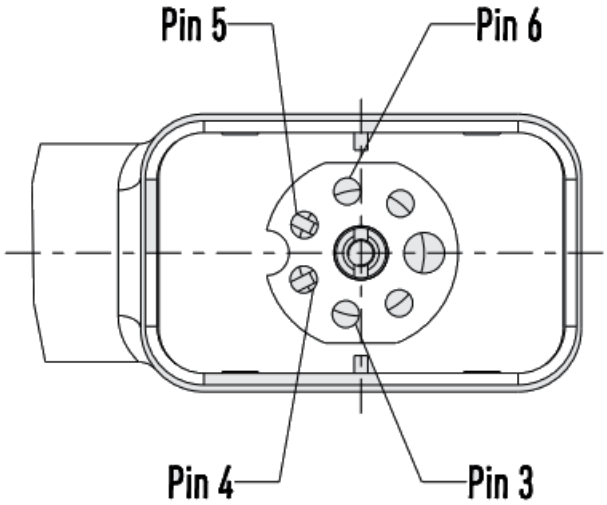
Pin assignment

Circular connector M-12 x 1 (4-pin)



1	GND
2	UWI: SSM → CM
3	VCC
4	UWI: CM → SSM

Angular connector



3	UWI: SSM → CM
4	UWI: CM → SSM
5	GND
6	VCC

Legend

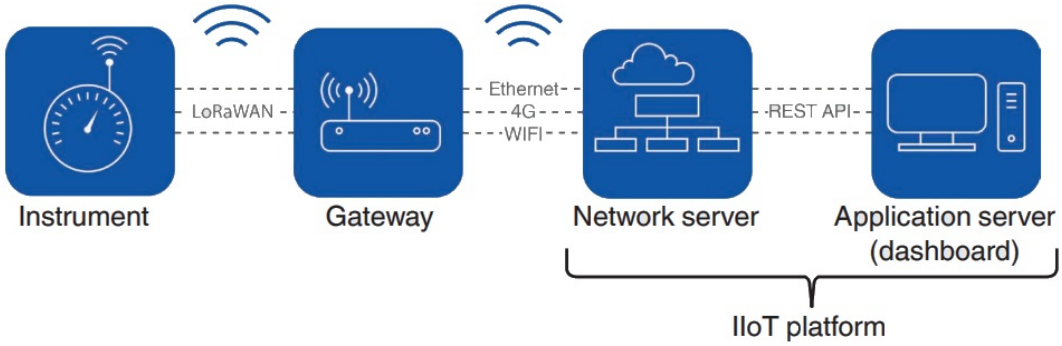
UWI	Unified WIKA Interface (UWI)
GND	Ground
VCC	Supply voltage
SSM	Sensor module
CM	Communication module

Operating conditions

Ambient temperature range	-40 … +60 °C [-40 … +140 °F]
Storage temperature range	-40 … +70 °C [-40 … +158 °F]
Relative humidity, condensation	20 … 90 %, non-condensing
Vibration resistance per IEC 60068-2-6	a = 1 g (7 … 18 Hz) 10… 14.53 Hz
	A = 0.8 mm (18 … 50 Hz)
	a = 8 g (50 … 200 Hz) [1)]
Shock resistance per IEC 60068-2-31 [1)]	25 g, 9 ms
Free fall per IEC 60068-2-31	
Individual packaging	1.2 m [3.94 ft]
Multiple packaging	0.5 m [1.6 ft]
Ingress protection per IEC/EN 60529	IP65

1) Mounting with cable ties can only be made under vibration-free conditions.

LPWAN infrastructure
A measuring instrument that allows remote transmission 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 [6,21 mi]. 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 PGU23.100 incl. NETRIS® 3 assembly, can be captured by a gateway and transmitted via cable connections (e.g. via Ethernet) or over-the-air (e.g. via 4G) 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 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 the measuring instrument.

Approvals

Logo	Description	Region
CE	**EU declaration of conformity**	European Union
	RED-Radio Equipment Directive The instrument may be used without restriction in the following areas: E U and UK, CH, NO, LI	
	RoHS directive	
Ex	**EU declaration of conformity**	European Union
	ATEX directive Hazardous areas – Ex i Zone 0 gas II 1G Ex ia [ia Ga] IIC T4 Ga Zone 20 dust II 1D Ex ia [ia Da] IIIB T200135 °C Da	
IEC IECEx	**IECEx (option)** Hazardous areas – Ex i Zone 0 gas Ex ia [ia Ga] IIC T4 Ga Zone 20 dust Ex ia [ia Da] IIIB T200135 °C Da	International

Safety-related characteristic values (Ex)

Ex approval		
	Approval	IECEx SEV 22.0026X

IECEx	IECEx marking	Gas Ex ia [ia Ga] IIC T4 Ga Dust Ex ia [ia Da] IIIB T200 135°C Da
	Applied standards	■ IEC 60079-0 ■ IEC 60079-11
ATEX	Approval	SEV 22 ATEX 0622 X
	ATEX marking	Gas II 1(1)G Ex ia [ia Ga] IIC T4 Ga Dust II 1(1)D Ex ia [ia Da] IIIB T200 135°C Da
	Applied standards	■ EN IEC 60079-0 ■ EN 60079-11

Short-term input parameter	
Test duration	≤ 1 s
Max. current UI	8 V
Max. power II	500 mA

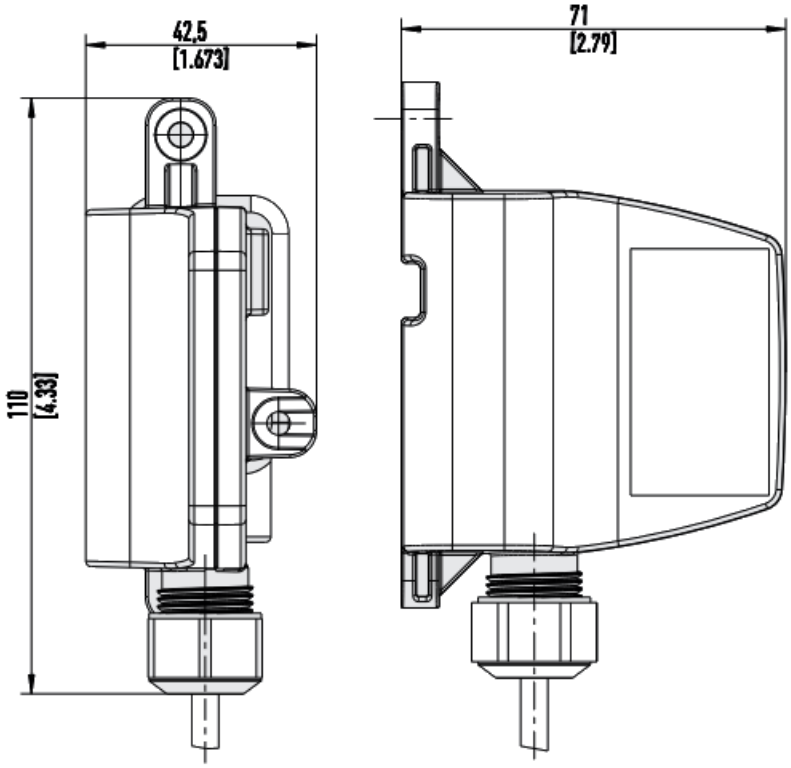
Output parameters	
U0	≤ 5.88 V
I0	≤ 200 mA
P0	≤ 295 mW

Max. allowable capacitance / inductance for gas group IIB											
C0 [µF]	10	15	19	23	31	39	52	83	140	340	1,000
L0 [mH]	5	2	1	0.5	0.2	0.1	0.05	0.02	0.01	0.005	0.002

Max. allowable capacitance / inductance for gas group IIC											
C0 [µF]	1.3	1.9	2.6	3.7	4.6	5.8	8.1	11	16	30	43
L0 [mH]	1.6	1	0.5	0.2	0.1	0.05	0.02	0.01	0.005	0.002	0.001

Ambient temperature range	-40 … +60 °C [-40 … +140 °F]
Surface temperature for dust applications	T200 135 °C

Dimensions in mm [in]



Annex: EU Declaration of Conformity

EU Declaration of Conformity

Dokument Nr. / *Document No.* 14603631 — **Revision** / *Issue* 01

We declare under our sole responsibility that the CE marked products

Type Designation	**NETRIS®3**
Description	***Radio unit with LoRaWAN® for WIKA measuring instruments***
gemäß gültigem Datenblatt *according to the valid data sheet*	AC 40.03

are in conformity with the following relevant Union harmonisation legislation		*Applied harmonised standards:*
2011/65/EU	*Hazardous substances (RoHS)*	EN IEC 63000:2018
2014/34/EU	*Explosion protection (ATEX)* (1)	
	Ex II 1(1)G Ex ia [ia Ga] IIC T4 Ga II 1(1)D Ex ia [ia Da] IIIB T≤135 °C Da	EN IEC 60079-0:2018 EN 60079-11:2012
2014/53/EU	Funkanlagen (RED) *Radio Equipment (RED)*	Gesundheit und Sicherheit (Artikel 3 (1) a)) *Protection of health and safety (Article 3 (1) (a))* EN 62368-1:2014 + AC:2015 EN 62479:2010 Elektromagnetische Verträglichkeit (Artikel 3 (1) b)) *Electromagnetic compatibility (Article 3 (1) b))* EN 301 489-1 V2.2.3 EN 301 489-3 V2.1.1 effiziente Nutzung Frequenzspektrum (Artikel 3 (2)) *effective use of spectrum (Article 3 (2))* EN 300 220-2 V3.2.0

(1) *EU-type examination certificate SEV 22 ATEX 0622 X of Eurofins Electric & Electronic Product Testing A G, Switzerland (Reg. 1258)*

Unterzeichnet für und im Namen von / *Signed for and on behalf of*

WIKA Alexander Wiegand SE & Co. KG

Klingenberg, 2023-02-24

Alfred Häfner, Vice President
Process Instrumentation Pressure

Stefan Lux, Vice President
IIoT Systems & Solutions

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Documents / Resources

	NETRIS NETRIS3 Radio Unit Lorawan [pdf] Instruction Manual NETRIS3 Radio Unit Lorawan, NETRIS3, Radio Unit Lorawan, Unit Lorawan, Lorawan

References

- Home - WIKA Alexander Wiegand SE & Co. KG
- Startseite - WIKA Alexander Wiegand SE & Co. KG
- LoRa Alliance - Homepage - LoRa Alliance®
- User Manual