



ZONESCANA 
Correlating NB-IoT Leak Noise Logger
with Artificial Intelligence

Safety Guidelines

&

Installation Manual

Language: English

Version: 1.0.2





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1 Usage Instructions

Please read these operating instructions carefully and completely before using the equipment and software for the first time. They contain important information regarding safety, installation, and use. Keep these instructions in a safe place.

1.1 Symbols

| | |
|---|---|
|  | Warning of dangerous situations that can cause injury and damage to the devices. |
|  | Warning of non-ionising electromagnetic radiation. |
|  | Important notes and tips. Follow these guidelines. |
|  | Never put in your household waste bin. |

1.2 Safety



The operating and maintenance personnel must read the instructions carefully before using the equipment. Knowing all the information contained therein - in particular the warning and safety instructions - is needed for safe operation of the equipment, and to protect yourself and others against potential dangers. Ignoring the warning, safety and operating instructions can cause injury, damage, or a considerable shortening of the equipment lifetime. Do not make any changes or alterations to our products.

The AI Logger uses a Lithium primary cell. Do not charge or short-circuit the battery or cell and do not physically damage or expose it to heat, fire, or water. Follow the transport stipulations of the carrier (IATA-DGR, IMDG-Code, ADR, RID) when returning the AI Logger to Gutermann. For questions about replacing the battery, please contact your Gutermann distributor.

To fulfill the standards for human exposure to radiofrequency electromagnetic fields, keep the AI Logger at least 20 cm away from the body.

Never open the device unless otherwise stated in this document, otherwise any warranty and conformity expires.

When using the software or the equipment, make sure you adhere to any applicable regulations, including traffic regulations.

1.3 Intended Use

The ZONESCAN AI logger is intended for use by water suppliers to detect possible leaks in their water pipe networks. The logger is installed underground and attached to water pipes externally via the magnet in the bottom part of the logger. An internal microphone records sound from the water pipe and sends the resulting sound signals via the NB-IoT network to ZONESCAN NET, the Gutermann cloud service, for analysis. The antenna required for connection to the NB-IoT network is attached to the logger via cable and also intended to be installed below ground. See the section on Mechanical installation below for details.

ZONESCAN AI and ZONESCAN NB-IoT products, hardware, software and accessories are exclusively intended for industrial use and exclusively intended for leak detection on water pipes of the public water supply. In particular, these products are not intended to be used on waste water and gas pipes. Gutermann is not liable for any damage caused by misuse, improper operation, and as a result of non-compliance with safety instructions and warnings.

2 Delivery Contents

The ZONESCAN AI Logger set contains

- The ZONESCAN AI logger itself
- An external antenna
- A tool to open the logger casing



3 Preparing the AI Logger for installation

3.1 Requirements

In addition to the AI Logger itself and the tool to open the logger's casing (shipped with the logger), you will need:

- An **NB-IoT SIM** card (one SIM card for each logger). Make sure it's already activated before you begin.
- A so-called **JIG Cable** (sold separately). This cable goes between the AI logger and your Android device during initial setup.
- A **USB On-The-Go (OTG) adapter cable** (not included) to connect the JIG Cable with your Android device. Make sure you have an OTG adapter that fits your Android device, i.e. one that either has a USB-C or Micro USB connector.

Note: You only need one JIG Cable and one OTG adapter, as these are only used during the initial setup of each AI Logger.

3.2 Installing the SIM card

Open the AI Logger by placing the hooks of the provided tool into the two openings in the bottom of the logger. Turn the tool counterclockwise to unscrew the bottom part (including the magnet).

Inside, you will see a slot for the NB-IoT SIM card. Insert it with the contacts facing inwards and press it down until it snaps into place. To remove the SIM card, press it down again and it will eject just enough so you can pull it out with two fingers or a pair of pliers.

Once you have installed the NB-IoT SIM card, place the bottom part back into the logger casing and screw it tight (turning clockwise) using the provided tool. Make sure the O ring (the black ring made of rubber) is still in place to prevent moisture from entering the device.

3.3 Preparing ZONESCAN INSTALL

We assume you have a login (username and password) for ZONESCAN NET and an NB-IoT project in ZONESCAN NET that you have access to. Note that NB-IoT projects in ZONESCAN NET will be used for both ZONESCAN AI and ZONESCAN NB-IoT loggers, but you cannot use AI loggers with Alpha, Lift & Shift, or any other type of project.

If you haven't already done so, download the ZONESCAN INSTALL app from the Google Play Store onto your Android device and open it.

The following are the minimal steps you have to go through to be able to use ZONESCAN INSTALL to configure and deploy AI Loggers. For detailed instructions, please refer to the ZONESCAN INSTALL manual.

- Accept the license agreement
- Enter your company's name

- From the Project Management screen, tap on the “Enable Account Settings” prompt at the bottom of the screen
- Enter your ZONESCAN NET username and password
- Go back to the Project Management screen and tap on the reload symbol in the upper right corner to download a list of your projects
- Tap on the Download option of the project you want to use
- Once the project has been downloaded, tap on the project’s name to select it
- ZONESCAN INSTALL will ask you to enter the Gateway Settings:
 - Gateway Address: **95.217.68.86**
 - Port: 45709¹
 - APN: APN of your network provider
 - Username (Optional): *(leave empty unless explicitly required by your network provider)*
 - Password (Optional): *(leave empty unless explicitly required by your network provider)*
 - Network Operator (Optional): *(leave empty)*
 - Bands: Tap to open a popup. Select all bands that your network provider supports.
 - Time Offset: *(for your information only)*
This is the offset to GMT, as set in ZONESCAN NET. It will be used to set the time zone of the AI logger once it has been properly registered.
 - Network Contact Time: Delay before the AI Logger will try to register itself at the gateway. Default: 5 minutes.
Note: For successful registration, the AI Logger will have to be known to ZONESCAN NET. So you have to upload the project from ZONESCAN INSTALL to ZONESCAN NET before this time is up.
- After tapping Next, ZONESCAN INSTALL is set up and you can start configuring and deploying your AI Loggers.

Gateway Settings

Gateway Address
95.216.101.201

Port
45709

APN

Username (Optional)

Password (Optional)

Network Operator (Optional)

Bands

Network Contact Settings

Time Offset
+01:00

Network Contact Time
Device will contact the network provider in 5 min(s) after the network settings are transferred

Note: If you need to change any of the Gateway Settings, you can do so by switching to the map view and selecting Project > Project Settings from the menu on the top right of the screen.

3.4 Configuring and deploying the AI Logger

You need to configure the AI Logger before you deploy it. Refer to the photo below for correct cable connections and follow these steps:

- Remove the external antenna from the AI Logger
- Attach the JIG Cable to the AI Logger
- Plug a Micro USB Cable into the JIG Cable box

¹ In the unlikely event that your network provider has blocked port 45709, you can use port 8472 as an alternative.

- Connect the OTG adapter cable with the USB-A connector of the Micro USB Cable (see picture below for clarification)
- In ZONESCAN INSTALL, select Logger Setup from the menu
- Plug the OTG adapter cable directly into your Android device



- Confirm the Android dialog asking you to allow ZONESCAN INSTALL to access the USB device to proceed.

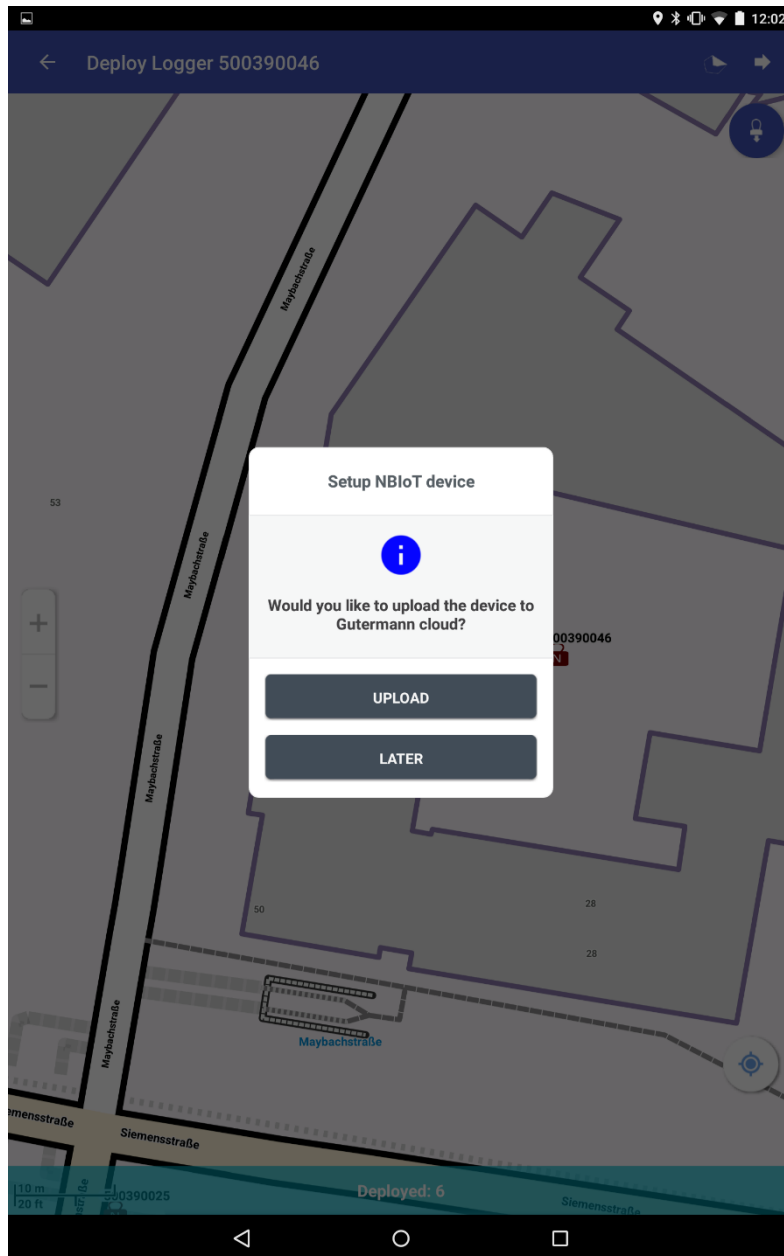


- Confirm the dialog asking if you want to synchronize the network settings.

Once the AI Logger has been successfully configured, you can deploy it.

- Remove the JIG Cable from the AI Logger and attach the original external antenna again.
- Deploy the logger as usual. Refer to the ZONESCAN INSTALL manual if you are not familiar with deploying a logger.

- Once the AI Logger has been deployed, you can either upload the device information to ZONSCAN NET immediately (recommended) or continue configuring and deploying additional AI Loggers.



Important: Remember to upload the project (which includes the information about the deployed loggers) within the time window defined by the Network Contact Time in the Gateway Settings. If you upload the project data too late, the logger will not be able to register. It will try again every 24 hours, though.

4 Mechanical installation

4.1 Safety Precautions



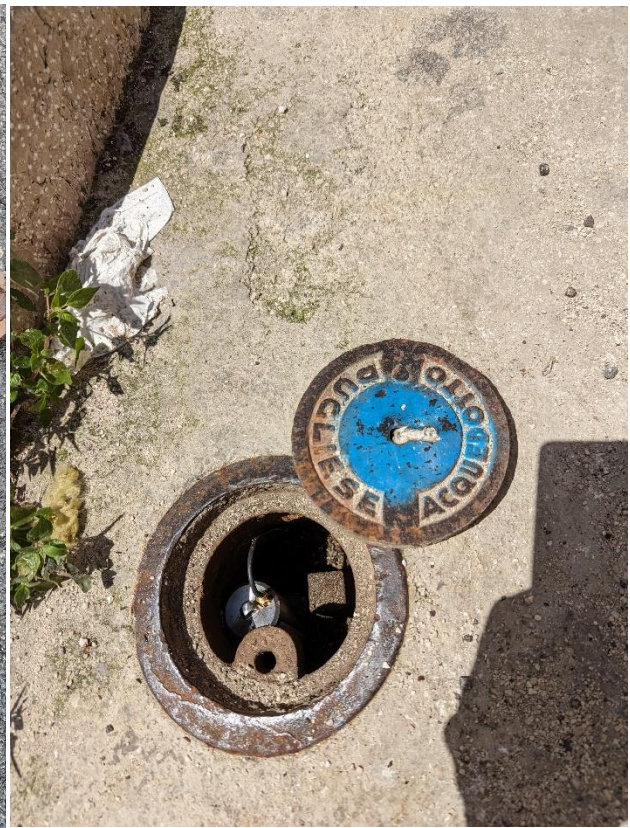
You must ensure that there is adequate safety present when working at great heights, in deep chambers, or traffic situations.



Always thoroughly clean the logger and fittings according to local laws and regulations, to eliminate risk of contamination of drinking water.



Use protective gloves to prevent cuts from sharp edges.



4.2 Installing the AI Logger

The AI Logger connects to the water pipes externally through the magnet in the bottom part of the logger. Typically, it is placed on a metal connector between pipe segments, such as a shutter or other connecting element. Make sure you place the logger on a piece that is actually part of the pipe system, so it can pick up the sound within the pipes. Do not place it on other parts of the chamber that happen to be magnetic but are not directly connected to the pipes.

4.3 Directions for the External Antenna

Use the provided antenna.

Tighten connectors correctly to ensure good contact and sealing. No tools necessary – fingertight fastening is adequate.

The antenna has a magnetic foot for easy application to ferrous surfaces. Place the antenna as high as possible to ensure good radio connection.



Not using an antenna (not connecting anything to the RSMA connector) may potentially damage the equipment when it is powered on.



The AI Logger has to be used only with the antenna (ANT-ZS-NBIOT) provided with the device. Please refer to sections 5.2 and 5.3 for details on selecting the right antenna.

4.3.1 Recommendations for Placing the Antenna

- Place the antenna as high as possible, i.e. close to ground level.
- Horizontally, make sure to keep a distance of several centimeters from metal surfaces such as the chamber walls.
- Place the antenna vertically (with the tip pointing upwards), preferably centred below the cover of the chamber. If the cover has a metal perimeter, keep a distance of a few centimeters from it.



5 Technical Data

The ZONESCAN AI Logger can be identified by the ZONESCAN AI label and the model name: ZSNB-L20

The physical appearance is otherwise identical to the ZONESCAN NB-IoT Logger, as described below.

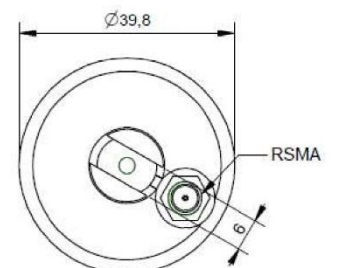
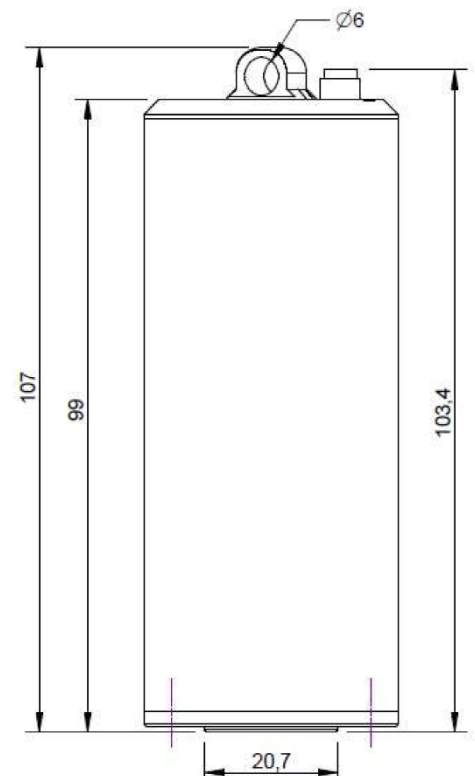
5.1 ZONESCAN AI Logger (model ZSNB-L20)

| Mechanical dimensions | | | |
|-----------------------|-------|----|--|
| Diameter | 39.8 | mm | |
| Height | 103.4 | mm | |
| Weight | 500 | g | |
| Hook diameter | 6 | mm | |

| Connectors | |
|-------------------|-----------|
| Antenna connector | RSMA jack |

| Battery | | | |
|-----------------------|---------------------------------|-------|------|
| Type of cell | Primary cell (not rechargeable) | | |
| Chemistry | Li-SOCl ₂ | | |
| Cell size | C | | |
| Nominal Voltage | 3,67 | Volts | 0 mA |
| Nominal Capacity | 5,8 | Ah | |
| Max. continuous drain | 1,3 | A | |
| Pulse capability | 2 | A | |

| Modem | |
|---------------|---|
| Type of modem | NB-IoT |
| LTE Bands | B1, B2, B3, B4, B5, B8, B12, B13, B17, B18, B19, B20, B25, B28, B66, B70, B85 |

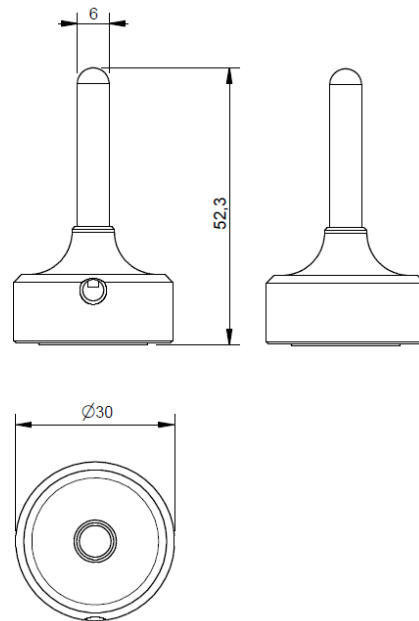


5.2 External Antenna

The AI logger requires an external antenna to connect to the network. All antenna types use the same base but with an antenna rod designed for the specific band used by the network provider, as detailed below. The antenna base is available with with different-length cables.

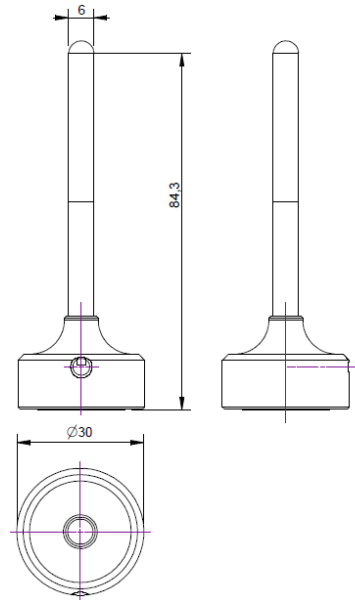
5.2.1 ANT-ROD-30

| Product | | | | |
|-------------------------|--------------------------|-------|-----------|-------|
| Antenna rod model name | ANT-ROD-30 | | | |
| Antenna base model name | ANT-BASE-06 | | | |
| Mechanical | | | | |
| Parameters | Value | Units | Tolerance | |
| Diameter | 30 | mm | | |
| Length | 52,3 | mm | | |
| Weight | 60 | gm | ±10 | |
| Connector | RSMA Plug | | | |
| Cable length | 0,6 meters | | | |
| Battery | | | | |
| Parameters | Min | Typ | Max | Units |
| Operational temperature | -30 | | 70 | °C |
| Frequency | 1710 | | 2200 | MHz |
| Power RF | | | 3 | W |
| Impedance | | 50 | | Ω |
| Polarization | Linear; Vertical | | | |
| Bands | B1, B2, B3, B4, B25, B66 | | | |



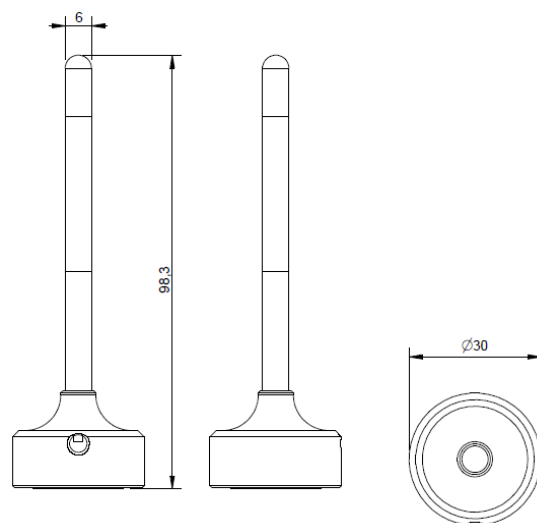
5.2.2 ANT-ROD-65

| Product | | | | |
|-------------------------|------------------|-------|-----------|-------|
| Antenna rod model name | ANT-ROD-65 | | | |
| Antenna base model name | ANT-BASE-06 | | | |
| Mechanical | | | | |
| Parameters | Value | Units | Tolerance | |
| Diameter | 30 | mm | | |
| Length | 87,3 | mm | | |
| Weight | 65 | gm | ±10 | |
| Connector | RSMA Plug | | | |
| Cable length | 0,6 meters | | | |
| Battery | | | | |
| Parameters | Min | Typ | Max | Units |
| Operational temperature | -30 | | 70 | °C |
| Frequency | 880 | | 960 | MHz |
| Power RF | | | 3 | W |
| Impedance | | 50 | | Ω |
| Polarization | Linear; Vertical | | | |
| Bands | B8 | | | |



5.2.3 ANT-ROD-76

| Product | | | | |
|-------------------------|------------------------|-------|-----------|-------|
| Antenna rod model name | ANT-ROD-76 | | | |
| Antenna base model name | ANT-BASE-06 | | | |
| Mechanical | | | | |
| Parameters | Value | Units | Tolerance | |
| Diameter | 30 | mm | | |
| Length | 98,3 | mm | | |
| Weight | 65 | gm | ±10 | |
| Connector | RSMA Plug | | | |
| Cable length | 0,6 meters | | | |
| Battery | | | | |
| Parameters | Min | Typ | Max | Units |
| Operational temperature | -30 | | 70 | °C |
| Frequency | 791 | | 849 | MHz |
| Power RF | | | 3 | W |
| Impedance | | 50 | | Ω |
| Polarization | Linear; Vertical | | | |
| Bands | B5, B18, B19, B20, B26 | | | |

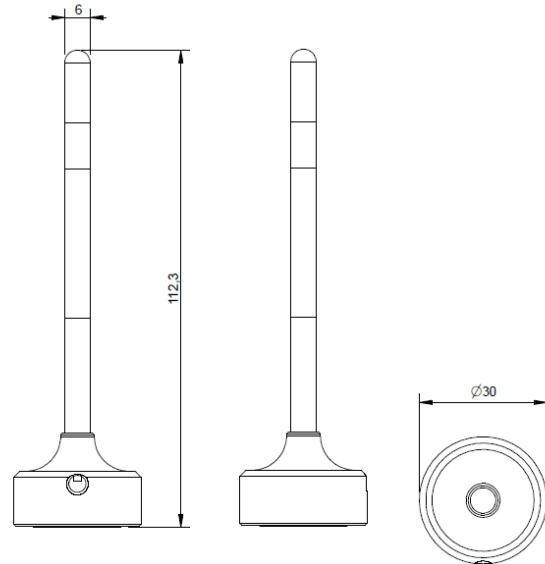


5.2.4 ANT-ROD-90

| Product | |
|-------------------------|--------------------|
| Antenna rod model name | ANT-ROD-90 |
| Antenna base model name | ANT-ZS-NBIOT-90-05 |

| Mechanical | | | |
|--------------|------------|-------|-----------|
| Parameters | Value | Units | Tolerance |
| Diameter | 30 | mm | |
| Length | 112,3 | mm | |
| Weight | 70 | gm | ±10 |
| Connector | RSMA Plug | | |
| Cable length | 0,6 meters | | |

| Battery | | | | |
|-------------------------|-------------------------|-----|-----|-------|
| Parameters | Min | Typ | Max | Units |
| Operational temperature | -30 | | 70 | °C |
| Frequency | 699 | | 751 | MHz |
| Power RF | | | 3 | W |
| Impedance | | 50 | | Ω |
| Polarization | Linear; Vertical | | | |
| Bands | B12, B13, B17, B28, B85 | | | |

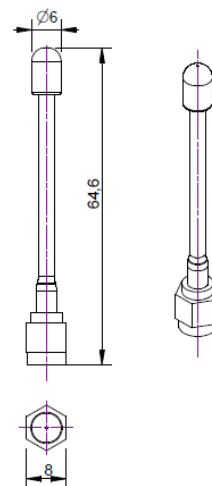


5.2.5 ANT-ZS-FLEX-30

| Product | |
|------------------------|----------------|
| Antenna rod model name | ANT-ZS-FLEX-30 |

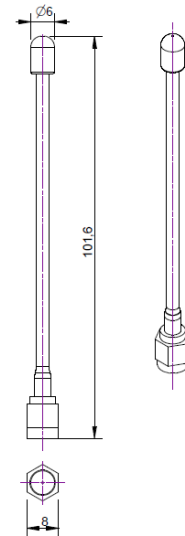
| Mechanical | | | |
|------------|-----------|-------|-----------|
| Parameters | Value | Units | Tolerance |
| Diameter | 10 | mm | |
| Length | 65 | mm | |
| Weight | 4 | gm | ±1 |
| Connector | RSMA Plug | | |

| Battery | | | | |
|-------------------------|-------------------------------|-----|------|-------|
| Parameters | Min | Typ | Max | Units |
| Operational temperature | -30 | | 70 | °C |
| Frequency | 1710 | | 2200 | MHz |
| Power RF | | | 3 | W |
| Impedance | | 50 | | Ω |
| Polarization | Linear; Vertical | | | |
| Bands | B1, B2, B3, B4, B25, B66, B70 | | | |



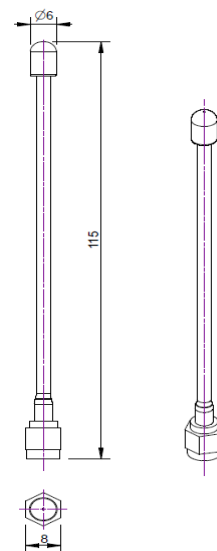
5.2.6 ANT-ZS-FLEX-65

| Product | | | | |
|-------------------------|------------------|-------|-----------|-------|
| Antenna rod model name | ANT-ZS-FLEX-65 | | | |
| Mechanical | | | | |
| Parameters | Value | Units | Tolerance | |
| Diameter | 10 | mm | | |
| Length | 102 | mm | | |
| Weight | 4,1 | gm | ±1 | |
| Connector | RSMA Plug | | | |
| Battery | | | | |
| Parameters | Min | Typ | Max | Units |
| Operational temperature | -30 | | 70 | °C |
| Frequency | 880 | | 960 | MHz |
| Power RF | | | 3 | W |
| Impedance | | 50 | | Ω |
| Polarization | Linear; Vertical | | | |
| Bands | B8 | | | |



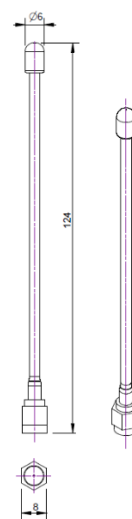
5.2.7 ANT-ZS-FLEX-76

| Product | | | | |
|-------------------------|------------------------|-------|-----------|-------|
| Antenna rod model name | ANT-ZS-FLEX-76 | | | |
| Mechanical | | | | |
| Parameters | Value | Units | Tolerance | |
| Diameter | 10 | mm | | |
| Length | 115 | mm | | |
| Weight | 4,2 | gm | ±1 | |
| Connector | RSMA Plug | | | |
| Battery | | | | |
| Parameters | Min | Typ | Max | Units |
| Operational temperature | -30 | | 70 | °C |
| Frequency | 791 | | 849 | MHz |
| Power RF | | | 3 | W |
| Impedance | | 50 | | Ω |
| Polarization | Linear; Vertical | | | |
| Bands | B5, B18, B19, B20, B26 | | | |



5.2.8 ANT-ZS-FLEX-90

| Product | | | | |
|-------------------------|-------------------------|-------|-----------|-------|
| Antenna rod model name | ANT-ZS-FLEX-90 | | | |
| Mechanical | | | | |
| Parameters | Value | Units | Tolerance | |
| Diameter | 10 | mm | | |
| Length | 124 | mm | | |
| Weight | 4,3 | gm | ±1 | |
| Connector | RSMA Plug | | | |
| Battery | | | | |
| Parameters | Min | Typ | Max | Units |
| Operational temperature | -30 | | 70 | °C |
| Frequency | 699 | | 751 | MHz |
| Power RF | | | 3 | W |
| Impedance | | 50 | | Ω |
| Polarization | Linear; Vertical | | | |
| Bands | B12, B13, B17, B28, B85 | | | |



5.3 Antenna Length and Frequency Bands

Table 1: Base + Rod

| | Band 1 | Band 2 | Band 3 | Band 4 | Band 5 | Band 8 | Band 12 | Band 13 | Band 17 | Band 18 | Band 19 | Band 20 | Band 25 | Band 28 | Band 66 | Band 70 | Band 85 |
|---------------|--------|--------|--------|--------|--------|--------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| ANT-ROD-30 | X | X | X | X | | | | | | | | | X | | X | X | |
| ANT-ROD-65 | | | | | | X | | | | | | | | | | | |
| ANT-ROD-76 | | | | | X | | | | | X | X | X | | | | | |
| ANT-ROD-90 | | | | | | | X | X | X | | | | | X | | | X |
| ANT-BASE-06 * | | | | | | | | | | | | | | | | | |
| ANT-BASE-15 * | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X |
| ANT-BASE-29 * | | | | | | | | | | | | | | | | | |

* Cable length in meters 06 = 0,6 meters 15 = 1,5 meters 29 = 2,9 meters

Table 2: Flexible Antennas

| | Band 1 | Band 2 | Band 3 | Band 4 | Band 5 | Band 8 | Band 12 | Band 13 | Band 17 | Band 18 | Band 19 | Band 20 | Band 25 | Band 28 | Band 66 | Band 70 | Band 85 |
|----------------|--------|--------|--------|--------|--------|--------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| ANT-ZS-FLEX-30 | X | X | X | X | | | | | | | | | X | | X | X | |
| ANT-ZS-FLEX-65 | | | | | | X | | | | | | | | | | | |
| ANT-ZS-FLEX-76 | | | | | X | | | | | X | X | X | | | | | |
| ANT-ZS-FLEX-90 | | | | | | | X | X | X | | | | | X | | | X |

5.4 Firmware Updates

The firmware of the AI Logger can be updated to fix issues and implement additional features. Firmware updates will usually be delivered over the NB-IoT network or can be applied locally by connecting with the logger via the JIG Cable. In rare cases, such as changes in the NB-IoT standard or underlying technology, technical reasons may require that the logger be sent back to the factory to perform the upgrade.

6 Storage and Transport

In order to avoid unwanted radio transmissions and prevent battery depletion, connect the logger to ZONESCAN INSTALL (using the JIG cable) and send it to sleep using the “Logger Sleep Mode” option from the main menu.

Alternatively, open the Logger chassis and remove the battery.

7 Disposal



Never put electrical appliances in a household waste bin. Always collect them separately and perform an environmentally friendly recycling. When disposing of electrical appliances always comply with national and regional waste disposal regulations. If an orderly disposal of our products is not possible, send the unit to us. We dispose of our products environmentally friendly. Address see below.

8 Imprint

Gutermann Technology GmbH
Gottlieb-Daimler-Str. 10
88214 Ravensburg, Germany

Tel: +49 751 3590 1682
Fax: +49 751 3590 1699
www.gutermann-water.com
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Subject to changes

9 US and North America Contact

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Technical Director Americas
Gutermann, Inc.
36 South 27th Street
Camp Hill, PA 17011
phone 603.204.3232
eric.galosi@gutermann-water.com
www.gutermann-water.com

10 Conformity

This device complies with part 15 of the FCC Rules and contains licence-exempt transmitter(s)/receiver(s) that comply with Innovation, Science and Economic Development Canada's licence-exempt RSS(s). Operation is subject to the following two conditions:

1. This device may not cause harmful interference, and
2. This device must accept any interference, including interference that may cause undesired operation of the device.

L'émetteur/récepteur exempt de licence contenu dans le présent appareil est conforme aux CNR d'Innovation, Sciences et Développement économique Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes :

1. L'appareil ne doit pas produire de brouillage;
2. L'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

Note: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules.

These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation.

If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.

- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

Please use this device only with the appropriate Gutermann antenna as described in section 5 above.

11 Important Information

Please draw your attention to all warnings and information in the manual and on the products. By using this product, you acknowledge that you are aware of and have read the warnings and information provided in the manual.



Always clean the sensors and mechanical accessories with a clean towel after use before stowing them away in the carry case.