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**“A0101” products (“L” product family)**

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## **Introduction**

This manual includes the most important information concerning the product of the Ijinus's product family called “L”.

In this manual, are detailed :

- installing information
- mechanical characteristics
- electrical characteristics
- security points
- prediagnostic elements

## Contenu

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## **1 Concerned products**

The products concerned by this manual are the devices included in the « L » family.

All these products are based on the same hardware basis and follows the same software updates. Many functionalities are common to all the products. Especially the radio ISM communication.

## 2 Operating and safety instructions

### 2.1 Operating instructions

- Check the presence of a desiccant pack after an opening when you close the housing. This pack must be replaced after a contact with ambient air longer than 3 minutes.
- To ensure the most precise measurements, the sensor must be placed perpendicularly to the target area to measure.
- Only the use of Ijinus' accessories ensures the the best and the more safely installation.
- Do not handle the devices using the antenna.
- Do not mechanically force the connectors.
- Do not use tools to screw the connectors. They are designed to be hand screwed.
- Take care of the wise of insertion of the SIM card.
- Do not unscrew the transparent raising piece without have removed the gray cover.

### 2.2 Safety instructions

- Do not shortcut, reload, pierce, warm, put into fire, crush the batteries
- Do not shake the devices.
- Do not physically modify the devices.
- Do not clean the devices with aggressive products like acetone.
- Do not use batteries not recommended by Ijinus (see battery references in attached documents)
- The devices contain elements sensitive to electrostatic discharge. Download your body from electrostatic loads before opening and manipulate the devices by touching a metallic surface linked to the Earth.



### 2.3 Warning to users in the United States

#### **Federal Communication Commission Interference Statement 47 CFR Section 15.105(b)**

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 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.

This device A0101 complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

**47 CFR Section 15.21**

CAUTION: This equipment may not be modified, altered, or changed in any way without signed written permission from IJINUS. Unauthorized modification may void the equipment authorization from the FCC and will void the IJINUS warranty.

This device complies with FCC RF radiation exposure limits set forth for general population (uncontrolled exposure). This device must be installed to provide a separation distance of at least 20cm from all persons and must not be collocated or operating in conjunction with any other antenna or transmitter

**2.4 Warning to users in the Canada**

This device complies with Industry Canada licence-exempt RSS standard(s). Operation is subject to the following two conditions: (1) this device may not cause interference, and (2) this device must accept any interference, including interference that may cause undesired operation of the device.

Under Industry Canada regulations, this radio transmitter may only operate using an antenna of a type and maximum (or lesser) gain approved for the transmitter by Industry Canada. To reduce potential radio interference to other users, the antenna type and its gain should be so chosen that the equivalent isotropically radiated power (e.i.r.p.) is not more than that necessary for successful communication.

This device complies with Industry Canada RF radiation exposure limits set forth for general population (uncontrolled exposure). This device must be installed to provide a separation distance of at least 20cm from all persons and must not be collocated or operating in conjunction with any other antenna or transmitter.

This device has been designed to operate with the antennas listed below, and having a maximum gain of 0dBi. Antennas not included in this list or having a gain greater than 0dBi are strictly prohibited for use with this device. The required antenna impedance is 50 ohms.

List of acceptable antennas for users in the Canada:

- Bulgin : PX0409 (IJINUS Ref: B0E00004)

- IJINUS :

# B0E00017 : GSM Wired Antenna – 850/900/1800/1900MHz SMB IP68 – with 1m cable

# B0E00018 : GSM Wired Antenna – 850/900/1800/1900MHz SMB IP68 – with 3m cable

# B0E00019 : GSM Wired Antenna – 850/900/1800/1900MHz SMB IP68 – with 5m cable

### 3 Technical specifications

The product line « LNU » (Logger de Niveau par imagerie Ultrasonique in French) includes wireless ultrasonic level sensors.

The product line « LOG » includes logger devices not able to measure by themselves.

#### 3.1 Main specifications

*Measurements Ranges :*

| Products   | LNU0300 | LNU0600 | LNU1000 |
|------------|---------|---------|---------|
| Min (in m) | 0,25    | 0,3     | 0,4     |
| Max (in m) | 3       | 6       | 10      |

*Resolution :*

| Products   | LNU0300 | LNU0600 | LNU1000 |
|------------|---------|---------|---------|
| Up to 1,5m | 2 mm    | 4 mm    | 7 mm    |
| Up to 3m   | 4 mm    | 4 mm    | 7 mm    |
| Up to 6m   | /       | 7 mm    | 7 mm    |
| Up to 8m   | /       | /       | 10 mm   |
| Up to 10m  | /       | /       | 20 mm   |

*Operating temperature range:*

The operating temperature range of the devices described in the user manual is -30 à +80 °C.

IJINUS do not ensure a correct operation, if the devices are used out of the recommended operating temperature range.

*Ultrasonic Frequencies :*

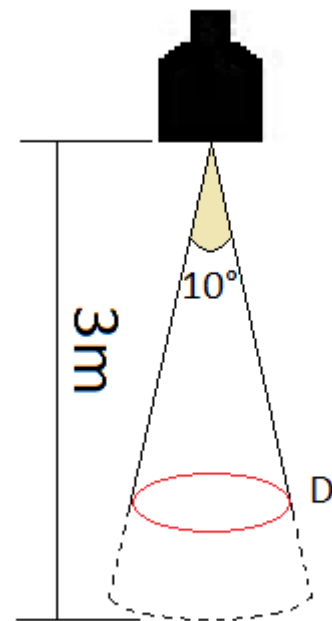
| Products        | LNU0300 | LNU0600 | LNU1000 |
|-----------------|---------|---------|---------|
| Frequency (KHz) | 120     | 75      | 40      |

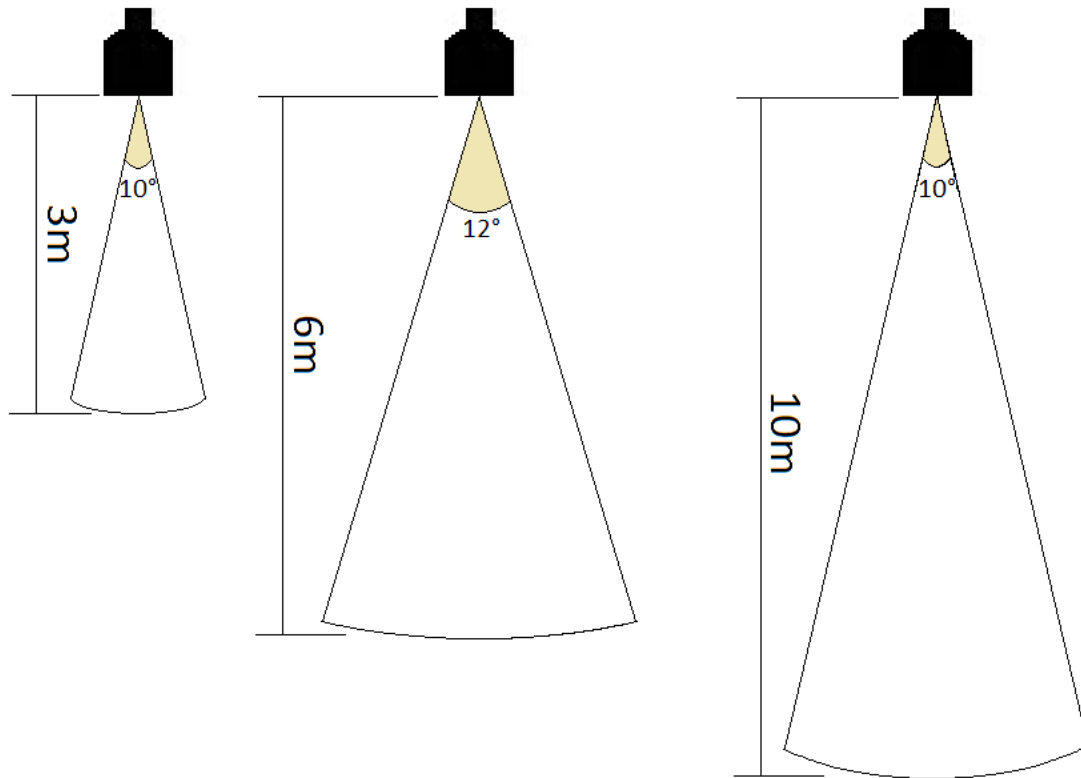
*Battery life span:*

The sensor has a 5 year life span when the measure period is set to 20 minutes and when 1 sms is sent every day.

Beam diameter vs distance between sensor and target area :

| Distance between sensor and target area (m) | Beam Diameter (m) |         |         |
|---|-------------------|---------|---------|
|   | LNU0300           | LNU0600 | LNU1000 |
| 0,2   | 0,05              | /       | /       |
| 0,4   | 0,09              | 0,11    | /       |
| 0,6   | 0,14              | 0,17    | 0,14    |
| 0,8   | 0,18              | 0,23    | 0,18    |
| 1   | 0,23              | 0,27    | 0,23    |
| 1,2   | 0,27              | 0,34    | 0,27    |
| 1,4   | 0,32              | 0,40    | 0,32    |
| 1,6   | 0,36              | 0,46    | 0,36    |
| 1,8   | 0,41              | 0,52    | 0,41    |
| 2   | 0,45              | 0,57    | 0,45    |
| 2,2   | 0,50              | 0,63    | 0,50    |
| 2,4   | 0,55              | 0,69    | 0,55    |
| 2,6   | 0,59              | 0,75    | 0,59    |
| 2,8   | 0,64              | 0,80    | 0,64    |
| 3   | 0,68              | 0,86    | 0,68    |
| 3,5   | /                 | 1,00    | 0,87    |
| 4   | /                 | 1,15    | 1,00    |
| 4,5   | /                 | 1,29    | 1,12    |
| 5   | /                 | 1,43    | 1,25    |
| 5,5   | /                 | 1,58    | 1,37    |
| 6   | /                 | 1,72    | 1,50    |
| 6,5   | /                 | /       | 1,62    |
| 7   | /                 | /       | 1,75    |
| 8   | /                 | /       | 1,99    |
| 9   | /                 | /       | 2,24    |
| 10  | /                 | /       | 2,49    |





*Record Memory :*

These products are able to record up to 500 000 measurements. When this value is reached the user can choose to delete de new data or the remplace the oldest one.

*Power supply :*

All the products described in this user manual are powered by 3,6V lithium batteries witch capacity can be 19Ah or 38Ah. They can not be reloaded.

Use batteries recommended by IJINUS.

*Sealing : IP68*

Warning : the degree of protection is ensured when the device is equipped with accessories recommended by IJINUS.



### 3.2 Mechanical specifications

The products described in this user manual have a versatile building. They are composed of 2 or 3 units depending of the device model. (a shaft, a raising part and a cover)

The different technical drawings are shown in the additional documents.

### 3.3 Functionalities

**Measure** : Each level sensor is able to measure a level using ultrasonic waves by determining the time used by the wave to come back to the sensor after a reflexion on the target area.

**Record** : Each device is able do record up to 500 000 values. These values can be measured by the sensor himself or retrieved from an other sensor.

**Concentrate and Broadcast** : The sensors or loggers are able to retrieve data from other sensors or loggers with a short range radio connection.

The devices equipped with a GSM/GPRS modem are able to send data though a cellular network to a SCADA for example.

### 3.4 Connectors and wiring

The table below presents the wiring of 2 types of optional connectors:

| Connector Options                                      | Wiring type |
|--|-------------|
| 2 TOR 1 Hz Inputs + 1 OW Input (digital T°C)           | 5B          |
| 1 MODBUS RS485 Interface + 1 switch + 1 TOR 1 Hz Input | 8A          |

Refer to the table below to find the different ways of wiring :

| Numéro PIN   | 1  | 2  | 3  | 4  | 5  |
|--------------|----|----|----|----|----|
| Couleur 5pts | BN | WH | BU | BK | GY |

| Câblage type 5B | Vout     | GND  | OW      | TOR 1         | TOR 2         |
|-----------------|----------|------|---------|---------------|---------------|
| Signal          | 5V       | 0V   | T°C Num | input Contact | input Contact |
| Type            | Alim out | Alim | Digital | Digital 1hz   | Digital 1hz   |

| Numéro PIN   | 1  | 2  | 3  | 4  | 5  | 6  | 7  | 8  |
|--------------|----|----|----|----|----|----|----|----|
| Couleur 8pts | WH | BN | GN | YE | GY | PK | BU | RD |

| Câblage type 8A | Vin Switch in | GND  | A / H  | B / L  | Switch out | TOR 1       | NO/NF       | Shield |
|-----------------|---------------|------|--------|--------|------------|-------------|-------------|--------|
| Signal          | 7...24V       | 0V   | RS485  | RS485  | 7...24V    | input TOR   | Contact     | Tresse |
| Type            | Alim in       | Alim | Modbus | Modbus | Alim out   | Digital 1hz | Digital 1hz | Masse  |

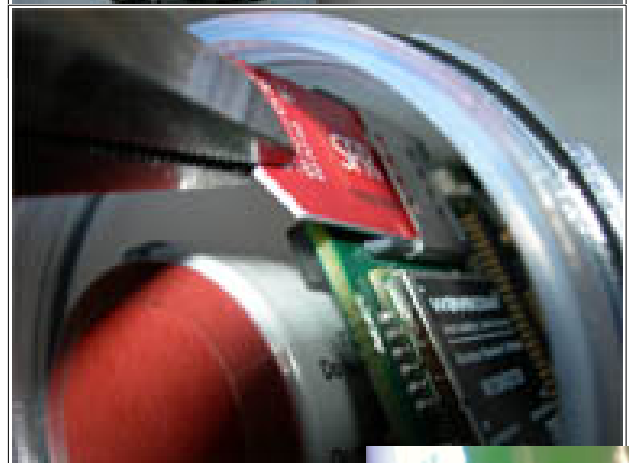
## 4 Installation guide

### 4.1 Inserting the SIM card

To retrieve data by GSM/GPRS, the sensors and data loggers that have the GSM option require a SIM card. It must be installed in the card holder provided for this purpose. This card holder is located on top of the sensor on the component side, to the right of the modem.

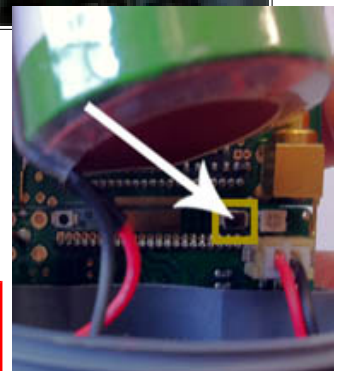
Before handling the sensor, do not forget to discharge yourself from electrostatic loads by touching a grounded conductive surface. The procedure for setting up the SIM card is:

- Only unscrew the top cover of the sensor / logger (see photo).
- It is necessary that the modem is inactive (modem LED off) when inserting the SIM card to be recognized by the drive. If not, perform a reset of the device.
- Insert the SIM card with a pair of tweezers (see photo below cons). The notch of the SIM card must be in the upper left of the connector when inserted.
- Verify the presence of desiccant bags.
- Before closing the lid, turn it anticlockwise one turn to adjust the antenna wire. Then turn it clockwise until it stops.



### 4.2 Changing batteries

- Unscrew the top lid, hold with your finger the electronic card, disconnect the lid cord.
- Unscrew the transparent-extension tube (optional).
- Remove the battery from its housing and disconnect it. Perform multiple presses on button until the LED to the right of the button does not light up.
- Take off the old desiccant bags
- Insert the battery and connect it (connector is keyed).



**At restart the indicator light should flash red/green and then the LED should flash green every 10 seconds.**

- **Insert the desiccant packs** to the side of the battery, screw the transparent extension tube (optional). Reconnect the lid cord and then close the lid thoroughly, taking care to preload cord.

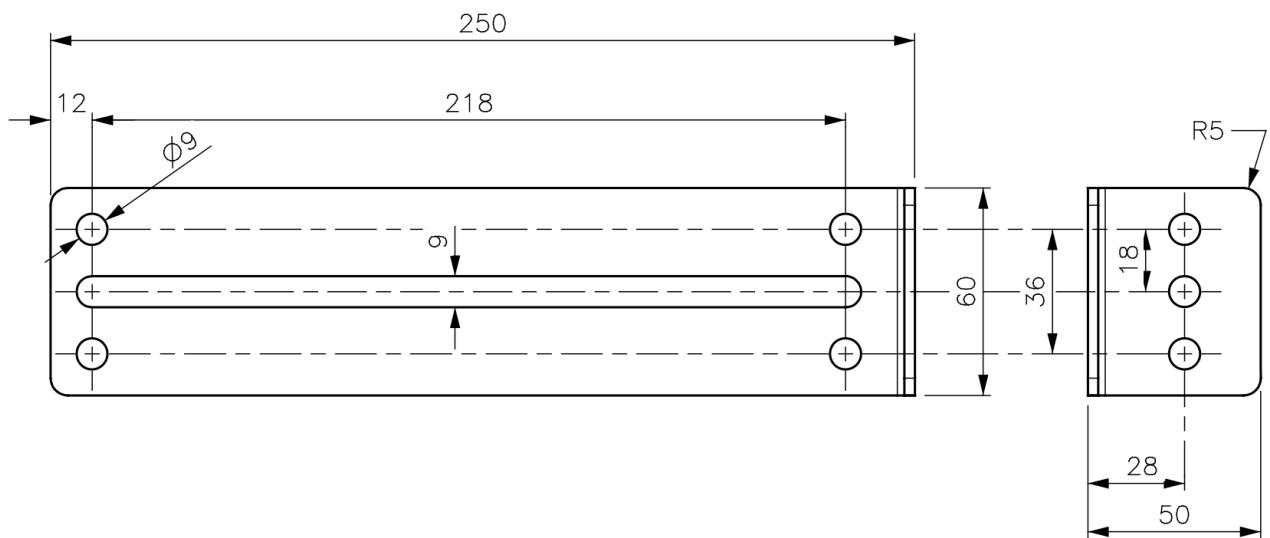
**Note:** After changing the battery, the stored measurements in a sensor are recoverable.

**Replacement batteries should not be exposed to temperatures above 25 ° C (capacity degradation).**

**In cases where replacement batteries are led to be stored for several weeks, it is recommended to place them in a cool place (fridge for example).**

**WARNING:** This operation must be done quickly because the desiccant packs have a very short life in the open air (about 3 minutes). After this period, they no longer provide full functions. You must then reconnect your device to reset the time using the software AVELOUR to ensure that your measurement dates are not wrong.

**4.3 Mounting the sensor with our mounting plates**



Mounting plates allow secure attachment while sufficient mobility is needed for the proper orientation of the sensor (perpendicular to the surface of the fluid).

## 5 Quick Troubleshooting

### 5.1 Meaning of the LED flashes

The operating LED the of the motherboard is located above the battery connector. The operating LED the of the modem is located under the SIM card.

- Motherboard (battery side) :

Alternating red/green for 1 second (10 x 100 ms) then orange for 5 seconds in the following cases:

- All restart with external power supply connected
- Connecting an external power supply (including USB)
- Reset command launched by the application (for example Firmware Update)

Once the application is launched:

- 1 green flash 100 ms all 2100 ms
- 1 flash green every 50 ms radio activity
- 1 red flash of 100 ms in case of system error
- Red or fixed green in case of a system failure (followed by an automatic restart after about 16 seconds)

- Modem card (SIM card side) :

- Inactive modem (not supplied): Led off
- Starting the modem (power application): Green flash and led off for about 2 seconds. Fixed green light during the recording of the GSM network (10 to 30 seconds)
- Operating: Solid green if the modem is not registered on the network or while a network search. Fixed green light of 200 ms every 2 seconds if the modem is registered on the network.

### 5.2 Sensor update

If the device you want to connect to is not up to date, an automatic updating procedure is done from the latest version of AVELOUR.

### 5.3 FAQ

*From where can I download AVELOUR?*

You can download AVELOUR using the download link that was sent to you with your order. However, if you have misplaced it, you can send a request by mail to the customer service to get a new one.

*Which of the two applications should I install ?*

You have the choice between two executables:

Setup\_Avelour\_XXXX.exe and Setup\_Avelour\_XXXX\_DotNet\_x32.exe

You must install the "DotNet" if you have never installed on your computer AVELOUR. Alternatively, you can install the other version.

*My access point does not detect any devices.*

Check that the antenna provided in the programming kit is placed on the access point and its LED flashes green.

Check that the USB cable is properly connected and undamaged.

*My sensor does not appear in the list of possible connections in AVELOUR.*

Check the LED status of this sensor, near the battery connector, that should flashes green.

A minimum distance of 1m between the sensor and the access point is required.

Check the connection of the battery.

*I do not receive SMS after doing the "sending SMS test" under AVELOUR.*

Verify the presence and the direction of insertion of the SIM card as well as the presence of the GSM antenna.

Also check the network status using the "modem diagnostic" button under AVELOUR. The sensor can send SMS from the moment the reception level(RSSI) is greater than -100.

Prior to joining the after-sales service, please verify that your version of AVELOUR and firmware version of your devices are up to date. To do this, download the latest version of AVELOUR from the download link that has been delivered at the same time as your order and connect to your equipment with it.

Please contact the sales person in charge of your area or the after sales service before any return. When you return equipment, please attach a note explaining your request.

**The after sales service will take into account only full and cleaned equipment.**

The coordinates of the different services are in attached documents,

## 6 Attached documents

### 6.1 Batteries recommended by IJINUS

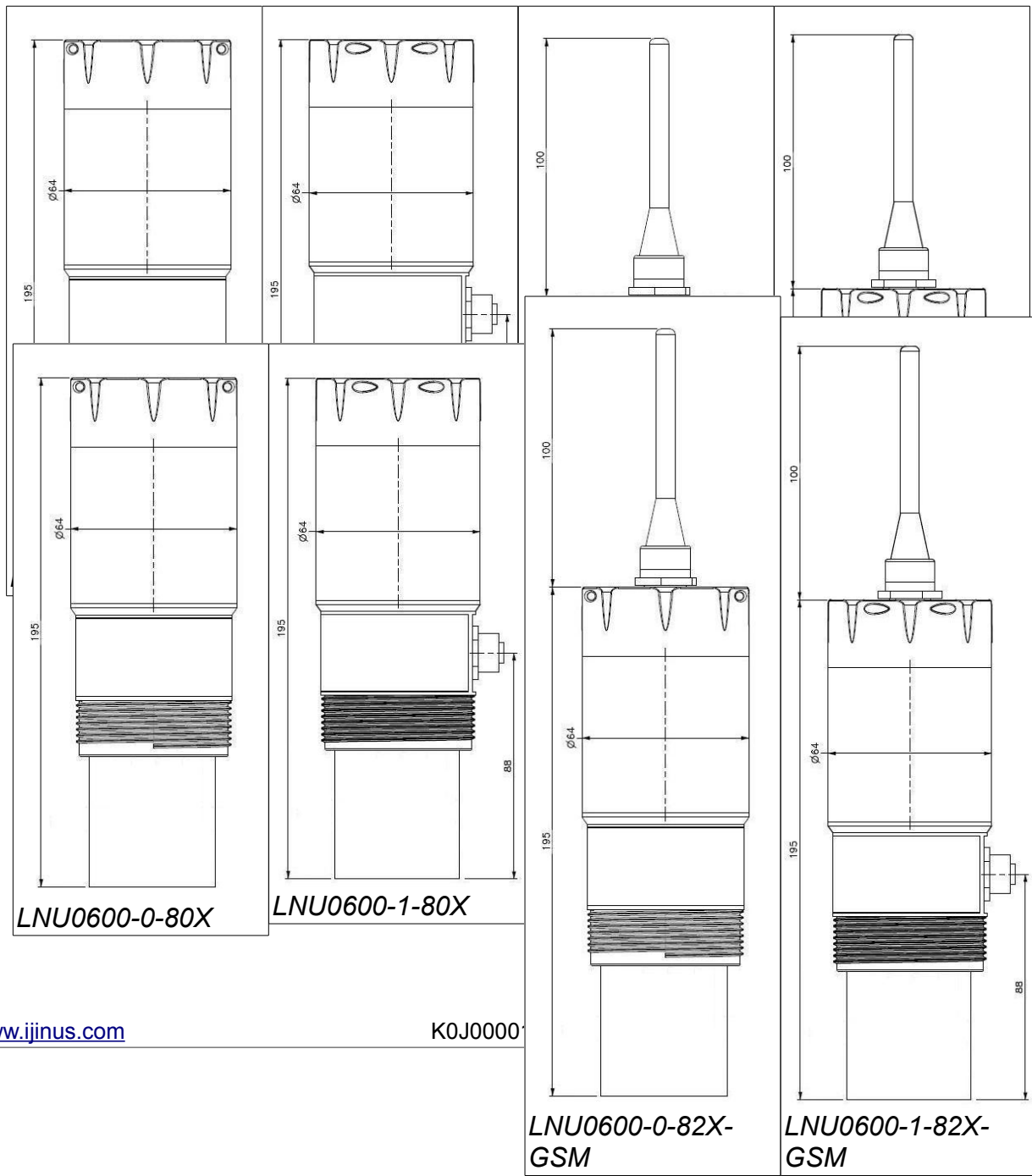
The batteries used in our products are:

- ➔ A0G00020 (3,6V ; 19Ah) To be used with the sensors and data logger without GSM
- ➔ A0G00017 (3,6V ; 38Ah) To be used with the sensors and data logger with GSM

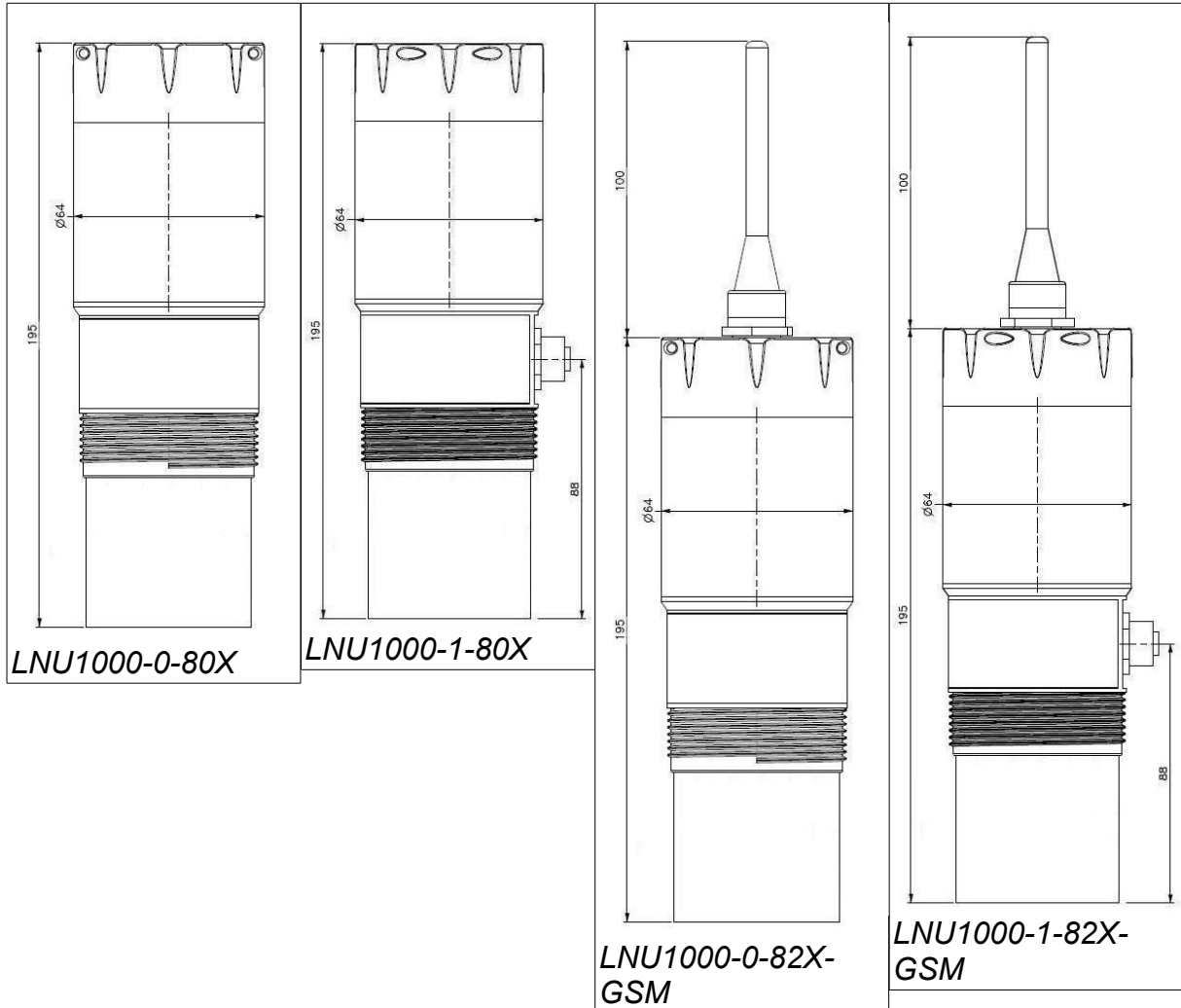
The use of any other battery exposes you to the cancellation of the guarantee.

### 6.2 Technical drawings

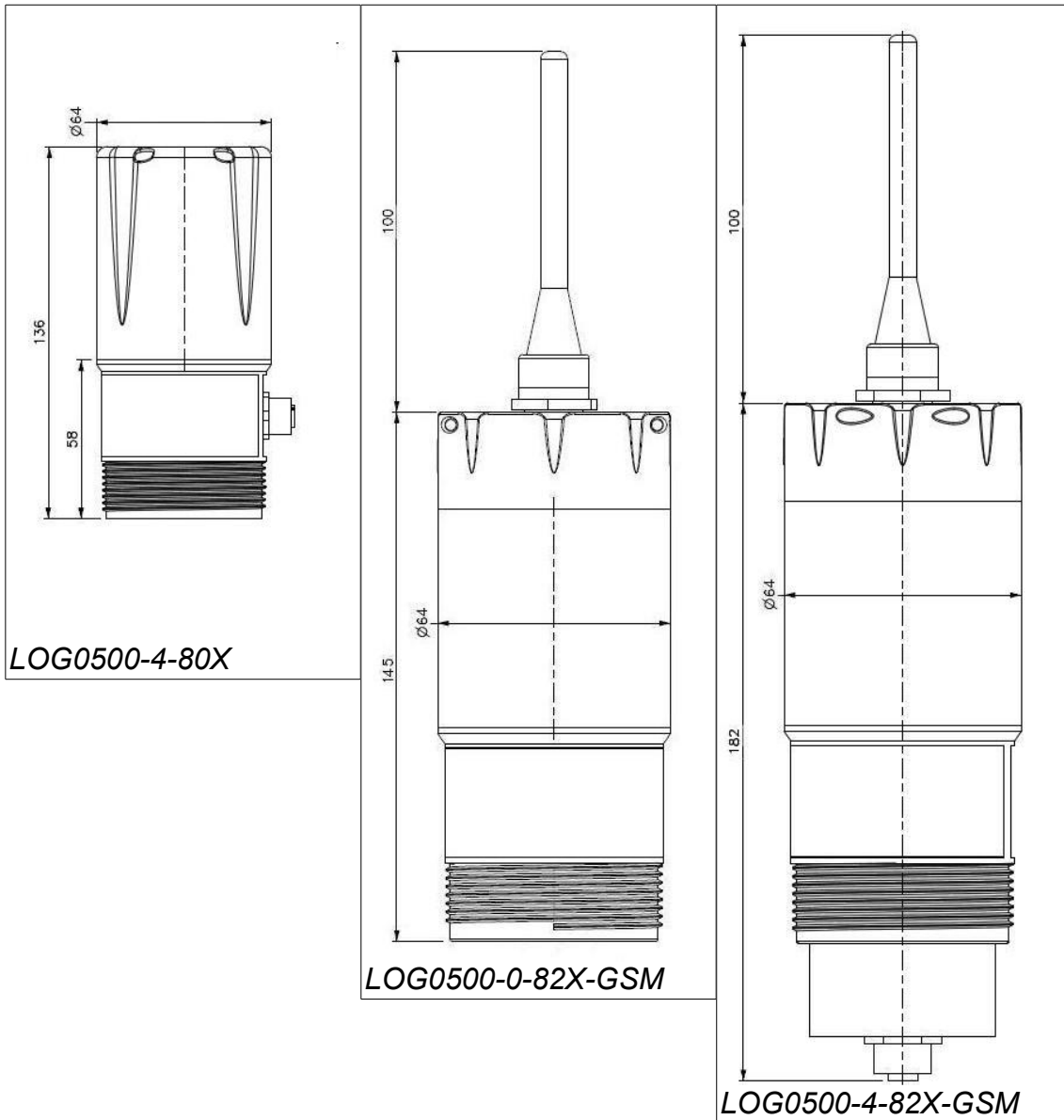
#### 6.2.1 LNU0300/0600 :



6.2.2 LNU1000 :



6.2.3 LOG :





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## 8 Document History

| Date       | Revision | Autor(s)               | Changes                     |
|------------|----------|------------------------|-----------------------------|
| 26/02/2013 | A01      | A. LE BARS             | Creation                    |
| 08/03/2013 | A02      | A. LE GAC /<br>D. MAHE | Translation                 |
| 21/03/2013 | A03      | A. LE GAC              | FCC warnings to users added |
| 05/04/2013 | A04      | A. LE GAC              | IC warnings added           |

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