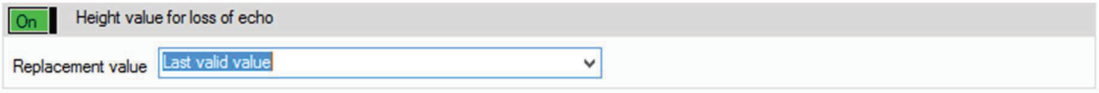
Height value for loss of echo

In the field of ultrasonic, a loss of echoes is reflected by the absence of peaks (or a very weak peaks not detected as an obstacle) on echoes that materialize by a maximal height, the Z value defined during the calibration. This function is used when the sensor encounters this situation, to replace this value “a priori” false by another one defined by the user:

The last valid value, a value you define, no value, …

This option has to be appropriately used, it never should compensate a not completed or not adapted calibration.



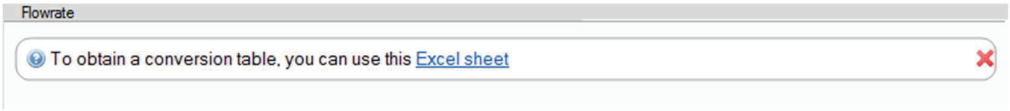
Programing for flow rate calculation from height measures and control a water sampler

Before completing this chapter, it is important to keep in mind that a flow rate measure is obtained by two factors:

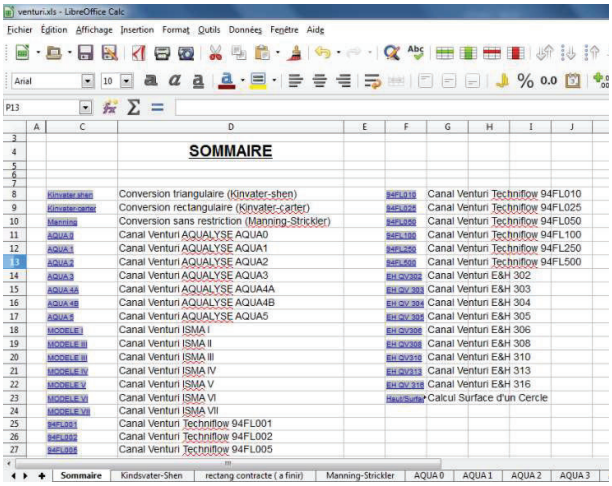
1) the wet area and 2) the average velocity. The sensors described in this document only measure water height (that allows wet area calculation via the collector shape) but never a velocity measure.

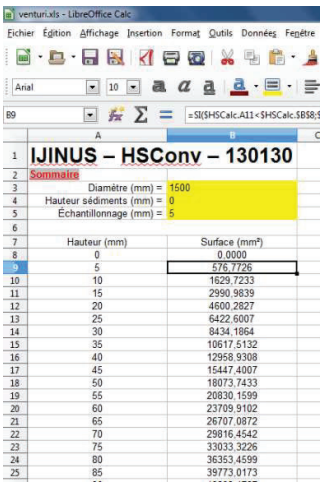
Nerveless some tools to transform water height measured in flow rate (then in volume) by conversion table or measuring system on threshold are available. It is the user’s responsibility to choose the transforming tool. In this case, it has to be chosen at the beginning of the programing (or to modified) height/flow rate like shown below.

Once the programing choice has been done, an example sheet of conversion is available:

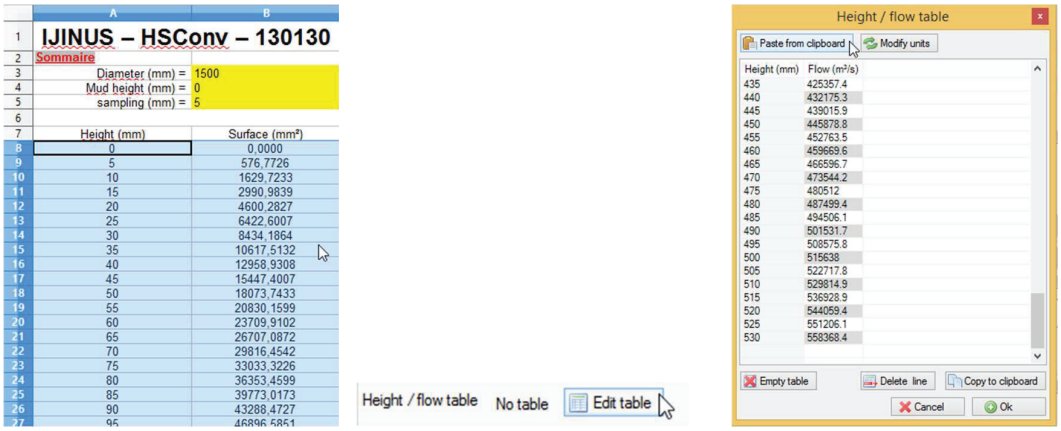


An Excel file will then open with in summary the different type of use. For example, in case of circular collector, the sheet called Height/surface - circle allows you to generate a value table (mm) / Area (mm²) for a circular collector (here for 1500 mm) with the possibility to integrate mud height, this for a scale every 5 mm. Only the yellow cells have to be filled, conversion is done automatically.

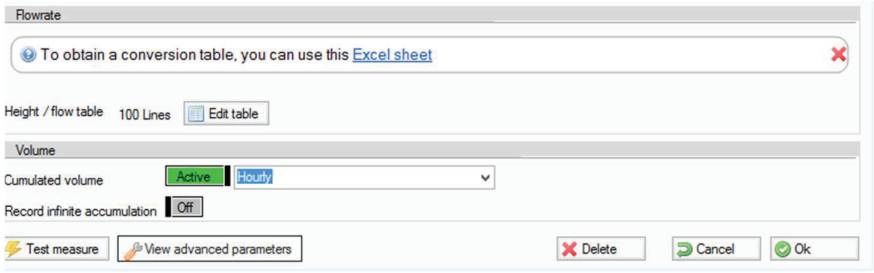




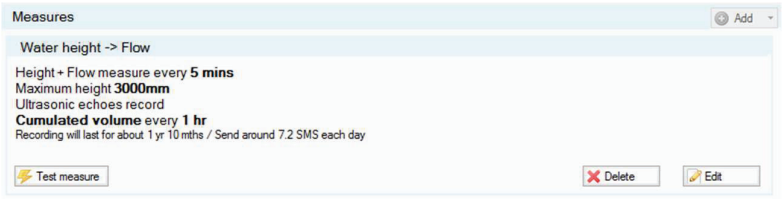
You need to select, copy the bloc Height/Area in Excel (bellow example) and paste the data from clipboard. Final validation is done by pressing the OK button



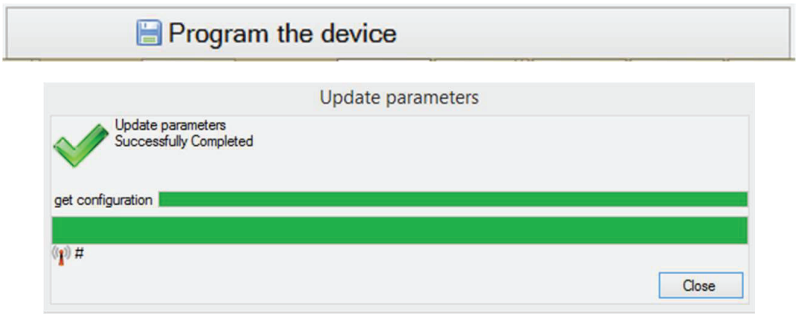
This operation validates the input of these data in the table by displaying the number of lines, then can activate, depending on calculation needs, flow logs and eventually to control a water sampler.



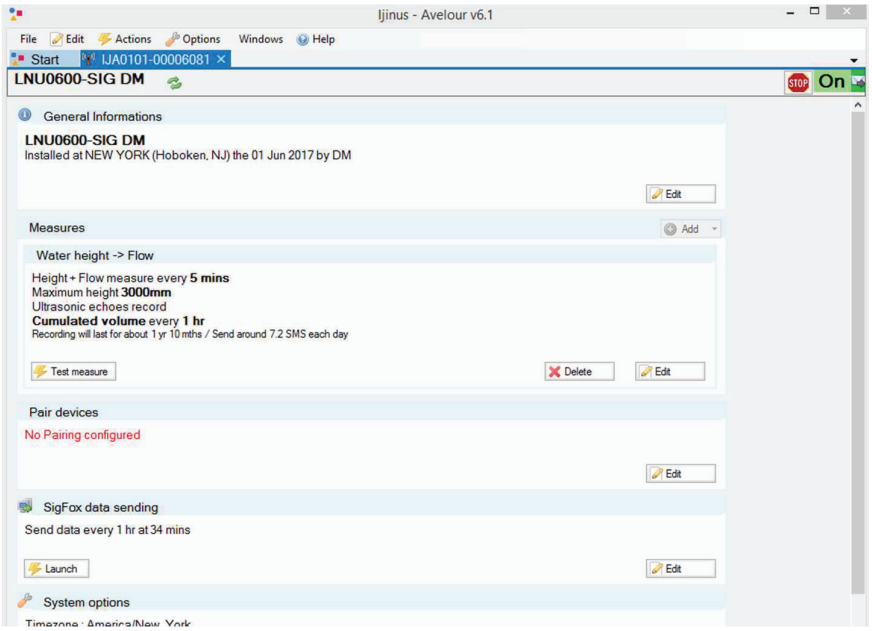
Once the programming is done, a resume summarized your different choices



Finishing of the programming: you have to validate with the "Program the device" button to send the configuration in the sensor memory:



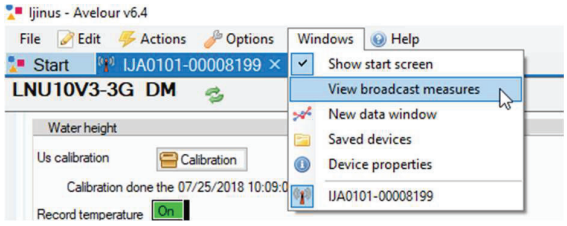
After the saving operation is done please check that you have at the top right corner the two green sign showing that the sensor working and recording, and also sending data. You can stop them both by pressing the red Stop icon, if needed.

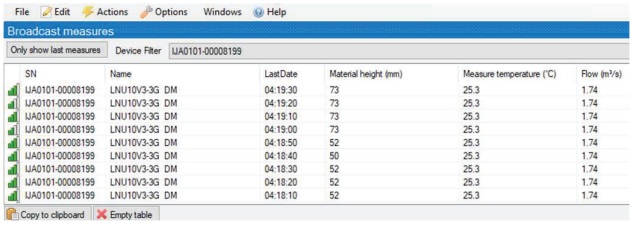


e. Fourth step : Data reading in real time

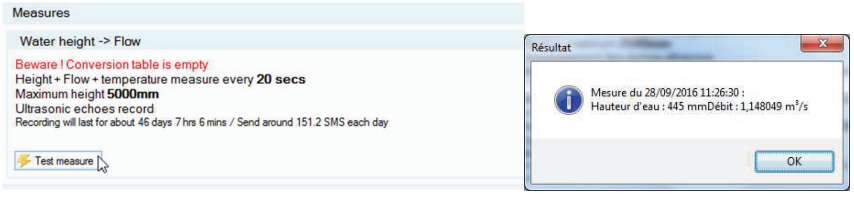
You Have two possibilities to read the data in real time: By pressing the "**Test measure**" button, or by selecting on the main menu the window "**View broadcast measures**" (Main menu > Windows > View broadcast measures)

View broadcast measures: this option opens a window showing the measures received by radio from Ijinus sensors and loggers nearby.





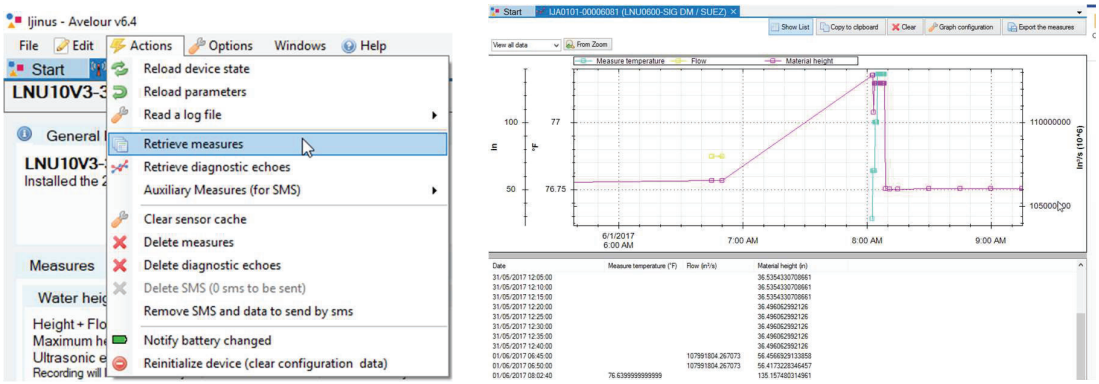
Now you can also press the "**Test measure**" button for a direct reading



f. Fifth Step : Retrieve and see locally your data by radio

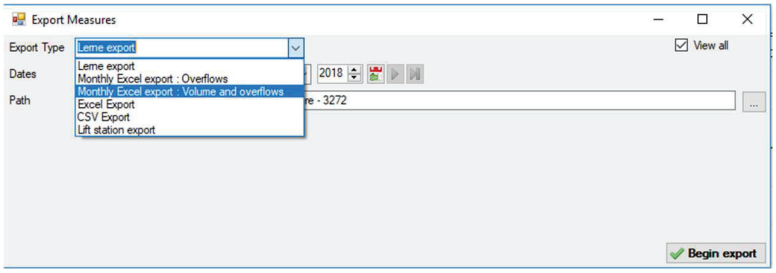
When connected to a sensor, the software directly asks you if you want to retrieve data. After you can find this command from the main menu: Menu > Actions > Retrieve measures

You can view the data, even offline, on graphic and list. A graph configuration module allows you to changes colors, thickness of lines, … , but also to apply statistical filters and formula to your data.



g. Sixth step: Data export

From The graph and/or list of data you find the tab “Export the measures” with the choice of different files format and style of reports, from date to date, by month, or simply all data.

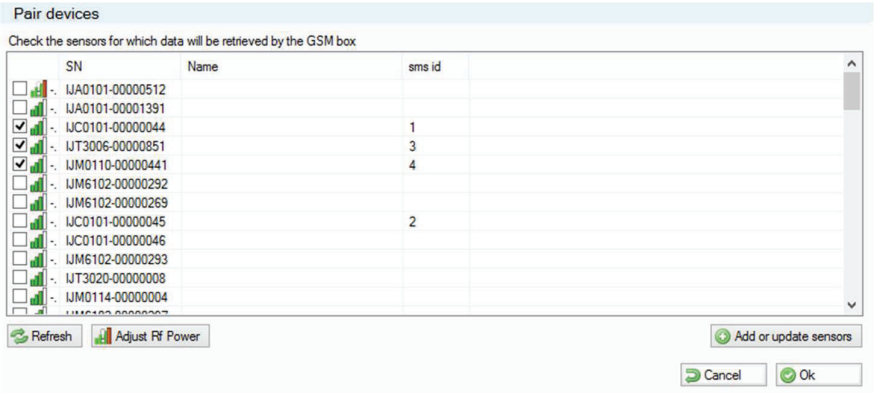


h. Seventh step: Pair devices

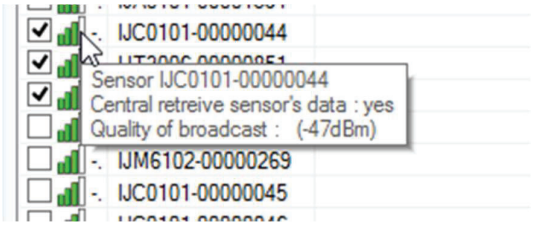
Our level sensor can retrieve locally the data from other sensors and logger nearby by radio, and send them with its modem.

To do this you need to check in Avelour what devices can be seen by the logger around it. In the Pair devices part, click the Edit button

Then you need to click the Refresh button to run the test. Simply tick the boxes corresponding to the devices you want to associate.

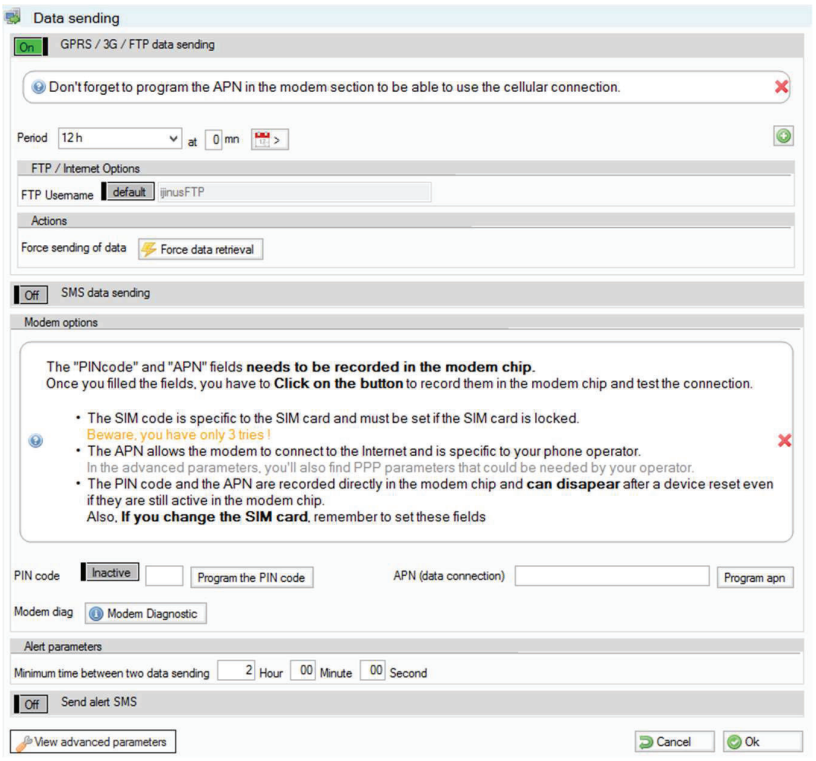


Check the strength of the radio signal by placing the cursor on the indicator (Be careful the quality of radio signal cannot be compared with cellular values: -70 dB is a bad quality for radio and excellent for cellular communication



i. Eighth step : Data sending

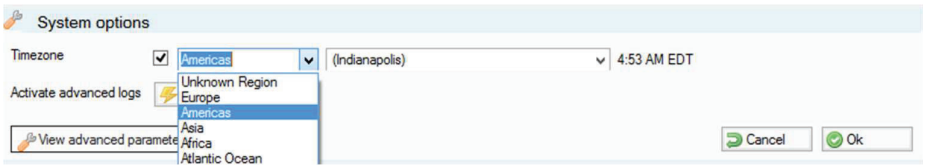
As we said at the beginning of the document different ways to send data are possible like SMS or FTP transfer. In this part I will show you the way to do it by FTP. First keep in mind that on the installation location if you already can't find operator signal in surface, it will be even more difficult while under a metal cover in the manhole.



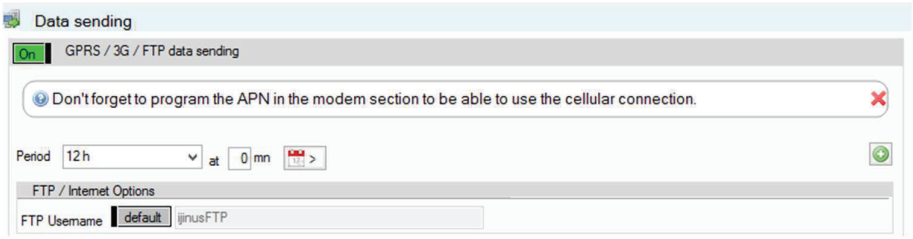
First of all you need to:

- Insert in the sensor sim holder a regular size data SIM card with at least 5 Mo per month available. While buying the card please ask the APN of the operator, as well as the PIN code if any. We will need these informations. The cellular antenna has also to be connected to the connector on top of the sensor.

- Set now your timezone in the **System options** menu:



- After clicking the Edit button, choose the sending period, define to send every day or only some of them. You can define several periods by clicking on the green + icon. Depending on your configuration you may need to choose a minimum delay between 2 anticipated data sending.

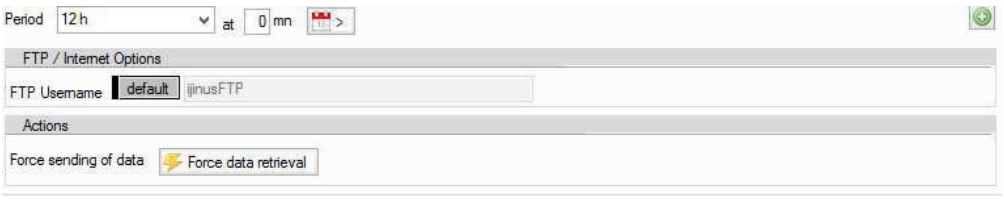


- If the sim card is locked, please enter your code (if any) and press the **Inactive** button (that will turn green, and become **Active**) and **Program the pin code** button.

- Enter **your** APN code and press the **Program APN** button.

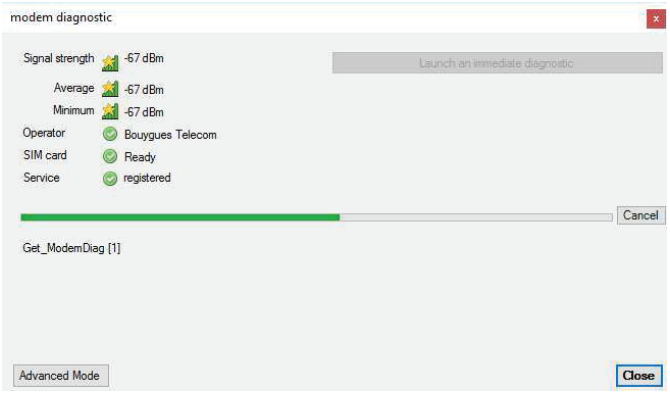
A message will confirm the success for each operations.

By default, the parameters are set to send the data to our server as we propose a **web platform www.ijitrack.com** with different services to manage them. So **if you choose this option, you don't have to change the FTP Username**.



At this step you can run a sending test by pressing the **Force data retrieval** button and check on www.ijitrack.com, in your account, if the sensors data appears. Of course if your account is already created. Please ask otherwise our customer service to do so for you. You should also write the **Rfid product number** on the label of the sensor, the **address of the installation**, you will need them later to set up the sensor on our web platform.

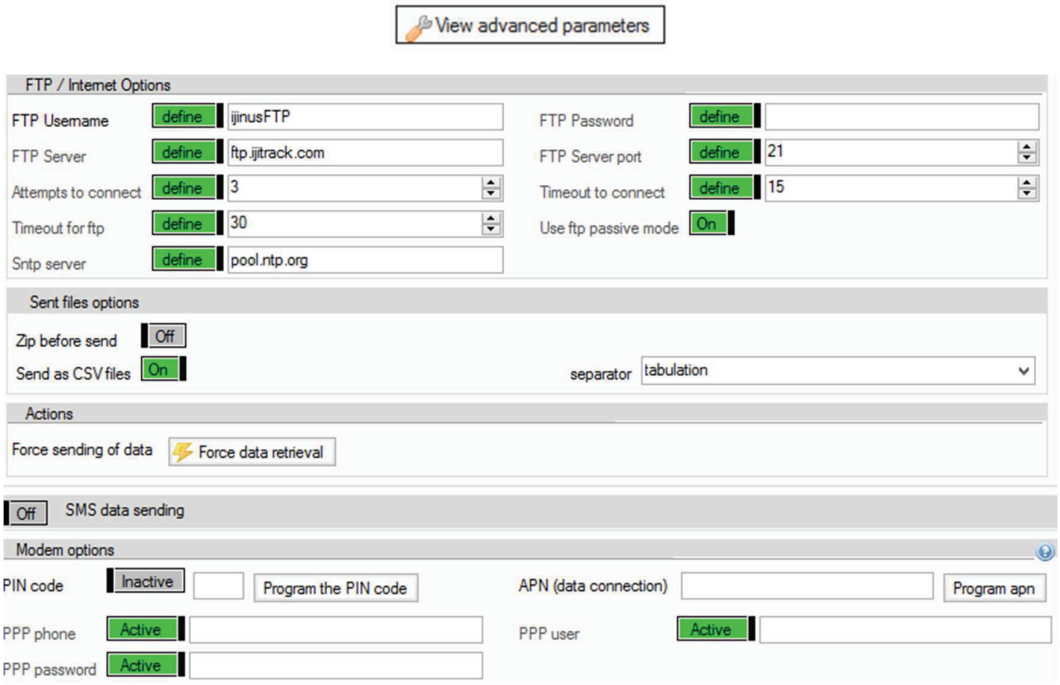
The **modem diagnostic** button available on the modem configuration allows a better diagnostic of the 2G, 3G, LTE or NB-IoT reception by doing multiple measurements.



If you use the advanced mode, you also do continuous modem measurements on a longer period. These options are practical to know on what side of the manhole to place the antenna before drilling in the concrete under the cover plate and inserting it.

Advanced parameters

If you need to send the data to **your server**, first click the “View advanced parameters”, then the FTP / internet Options will appear as well PPP options in the modem options. You need to fill in **your own information details** regarding your server access. Your server administrator can provide to you those information.



After completing this chapter please press the Program the devise button, the configuration will be sent by radio to the sensor.

5. Elements for good practice and installation examples

We propose here, and without being exhaustive, some elements of good practice such as:

- The sensor have to front and be perpendicular to the surface water to be measured. This surface has to be stable and without ripples for more accuracy, without foam). If possible, it shouldn't be any obstacle between the sensor and the water surface (if you can't avoid it, please refer to the calibration chapter to mask it with a filter).

- The calibration is compulsory and the verification of the max distance (Z) very important.

Calibration has to be checked at least once a year.

- Sensors with ultrasonic technology don't need much maintenance, but at least once every six months you should clean it, check on-site the presence of debris, floating debris, anything hang to the sensor

Finally, below are some photos of sensors installed in different environments:

Venturi type channels:



Measurement in collectors:


CSO, SSO applications:



Angle adaptor fixation :

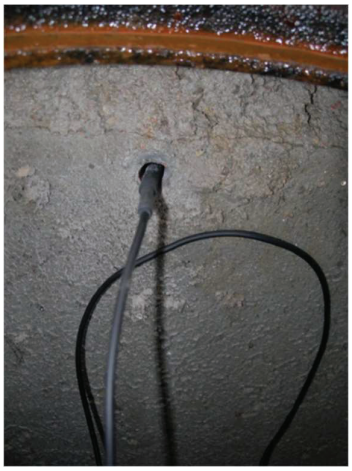
Install in river:


Installation on lamp post

Positioning different type of antenna in manhole:

*Positioning of a **Sigfox** antenna*

*Positioning of a **Sigfox** antenna 1*



Insertion of cellular antenna in the concrete when sensor install under a manhole cover

6. Procedure for inserting the SIM card

Loggers with 2G/3G or 2G/LTE/NB-IoT modem need a SIM CARD to send data.

The card holder is located on the board.
Following steps need to be respected to ensure proper operation of the device :

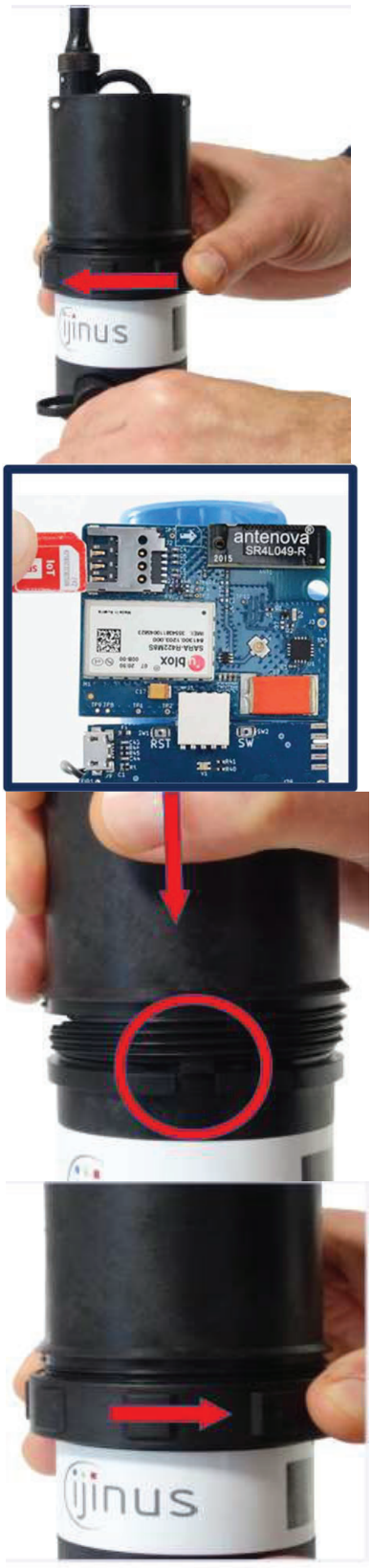
- The sensor must be in standby mode (no connection with our software Avelour or USB) for the modem to recognize the SIM card.

- Unscrew the ring then take off the cover.

- It is imperative not to leave the sensor open too long (max 2 min) the desiccant bags may absorb too much moisture and do not fulfill their role thereafter (condensation)

- Insert the SIM card (beveled edge side up right).

- Place the lid back (mind the notch) on the threads and screw back the ring to the end.



7. Procedure for removing a battery

- Unscrew the cover
- Remove the battery from its housing and disconnect.
- Throw away the desiccant bags present in the sensor if they are green
- Connect the new battery (the connector is keyed)

At restart, the indicator light must flash Red/Green, and then the light has to flash every 10 seconds

- **Insert the new desiccant bags** on the side of the battery, then screw the cover back into place.

- Set the battery removing by connecting with the software Avelour to your logger sensor.

Warnings:
Use only battery provided by IJINUS.
Warning – Potential electrostatic charging hazard.

8. WARNING TO USERS IN CANADA / ATTENTION POUR LES UTILISATEURS AU 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.

/

Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes : (1) il ne doit pas produire de brouillage, et (2) l'utilisateur du dispositif doit être prêt à accepter tout brouillage radioélectrique reçu, même si ce brouillage est susceptible de compromettre le fonctionnement du dispositif.
Conformément à la réglementation d'Industrie Canada, le présent émetteur radio peut fonctionner avec une antenne d'un type et d'un gain maximal (ou inférieur) approuvé pour l'émetteur par Industrie Canada.
Dans le but de réduire les risques de brouillage radioélectrique à l'intention d'autres utilisateurs, il faut choisir le type d'antenne et son gain de sorte que la puissance isotrope rayonnée équivalente (p.i.r.e.) ne dépasse pas l'intensité nécessaire à l'établissement d'une communication satisfaisante.

Le présent appareil est conforme aux niveaux limites d'exigences d'exposition RF aux personnes définies par Industrie Canada. Cet appareil doit être installé afin d'offrir une distance de séparation d'au moins 20cm avec l'utilisateur, et ne doit pas être installé à proximité ou être utilisé en conjonction avec une autre antenne ou un autre émetteur.

Si l'antenne est amovible (CNR-GEN):
This device has been designed to operate with the antenna(s) 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 antenna(s):
- IJINUS - B0E type

Ce dispositif a été conçu pour fonctionner avec les antennes énumérées ci-dessous et ayant un gain maximal de 0dBi. Les antennes non incluses dans cette liste ou dont le gain dépasse 0dBi sont strictement interdites pour l'exploitation de ce dispositif. L'impédance d'antenne requise est 50Ω.
Liste des antennes acceptables :
- IJINUS - B0E type

9. 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 *A0102* 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.

NO UNAUTHORIZED MODIFICATIONS

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.

10. Document History

Date	Revision	Writer(s)	Changes
2018-11-09	A01	ALG	Creation with document identification from existing user manual
2019-07-12	A02	DM	Adding procedure and image modifications
17/02/2022	A03	AT	Update for V4 product line