iJiNUS CLAIRE GROUP

Sensors | Dataloggers | Web services

User guide

BLUE: Autonomous logger

2 x 4-20 mA inputs, Modbus input/output and 2 digital inputs

CONTENTS

1. Introduction

Ijinus loggers are designed to be autonomous and are powered by a lithium battery. They record the data of the sensor to which they are connected. A mobile programming tool (M0C00001) or a Wiji USB stick (WIJIKEY-8) allows you to connect by radio (Wiji protocol) to the logger, configure it and retrieve the data locally. Depending on the model of the logger, it can be equipped with a modem that allows data to be sent automatically and without a wired connection to our www.ijitrack.com web platform or to a customer's server.

2. Document Information

This user guide contains information required for installing, connecting and configuring your device, as well as important maintenance notes.

It is therefore essential you read it before installing a piece of Ijinus equipment.

3. Safety Instructions

This document presents various manipulations and programming operations to be carried out on a logger, sensor or accessory provided by Ijinus. These manipulations should only be carried out by people trained to use Ijinus products.

The instructions given in this user guide will only ensure operational safety if the equipment is used in line with these instructions.

You must use the appropriate personal protective equipment whenever you intervene on the device.

Below is a non-exhaustive list of recommendations to be followed to ensure the safety of Ijinus logger users:

- Only use batteries referenced by Ijinus.
- Fire or burn hazards with the lithium battery supplied by Ijinus: Do not make a short-circuit, or recharge, puncture, incinerate, crush, submerge, fully discharge, or expose the batteries to temperatures above the operating temperature range.
- Do not shake the logger.
- Do not physically modify the logger.
- Do not clean with an aggressive product, especially acetone and similar products.
- The device contains components that can be damaged or destroyed by electrostatic discharges. Discharge the electrical charges from your body before opening the logger and handling it. To do this, touch a grounded metal surface.

Ijinus accepts no liability for any damage resulting from improper use.

4. Equipment Description

The Blue logger is powered by an internal battery. This logger's housing has IP68 sealing (immersion under 2m of water for 100 days). The Blue logger can contain a sensor to measure water pressures between 0 and 25 bar.

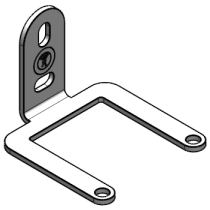
A radio access point, also known as a programming antenna, must be used to program the logger. This access point can also be used to download locally the data measured by the logger (a few dozen meters maximum between the logger and the access point connected to a computer's USB port).

Blue logger

Non-rechargeable lithium battery 3.6V 34 Ah

Programming antenna

External Antenna (optional)



Mounting Bracket

Connection Cable (if necessary)

4.1. Turning on the logger

If there is no cellular communication option, then there is no need to open the logger because the internal battery is already connected so the logger is directly functional.

Ijinus loggers do not require activation because they listen every 10 seconds for a radio connection request from a radio access point or another logger.

If the logger has a communication card (LTE option for example), then you must place the SIM card in the holder. To do this, you have to open the case by unscrewing the 4 screws at the back of the case then unclipping the 4 clips at the front of the case. Depending on the communication card model, the SIM card slot may be on the front or rear side of the electronic card.

If a battery has to be changed (with or without a communication card in the logger), then you must open the case (see description above for inserting the SIM card) then remove the assembly made up of the card electronics, card holder and battery. See the “maintenance” chapter of this user guide.

NB: the Blue logger is designed to receive 4 screws to close the case in addition to the 4 clips. Screws are not required to ensure the sealing of the case. However, if screws not supplied by Ijinus are used, the logger’s case sealing and proper functioning guarantee will no longer be valid.

4.2. Mounting the logger

The two holes used to fix the bracket are oblong to allow you to adjust the horizontality of the two mounting brackets as well as possible.

You must then position the Blue logger on the bracket by "dragging and dropping". Two plastic pieces are included in the shipping box. By inserting them into the holes in the mounting bracket, they prevent the logger from falling off the bracket, in case the bracket is not fixed completely vertically. It is also possible to use a padlock or other device to secure the logger to its holder.

NB: If you have to minimize the risk of theft of the logger, you can fix the bracket "upside down". If the logger is secured by a padlock, it will be more difficult to access the bracket mounting screws with this type of mounting.

NB: The screws used to fix the bracket must be suited to the wall material. This is why no fasteners are included in the logger’s shipping box.

4.3. Connecting the sensors

The Blue logger has an M12 12-pin socket to connect different types of sensors or equipment. The Blue-LP model has an internal pressure sensor directly integrated into the housing.

To connect a sensor to the logger's M12 12-pin socket, you must remove the protective cap and then screw the sensor onto the connector.

CAUTION: To obtain IP68 sealing of the connector, make sure the connector is properly screwed onto the base. To do this, apply maximum hand tightening of the connector on the socket.

If several pieces of equipment need to be connected to the logger, then a junction box is available (reference G0D00051) in order to make this connection with IP68 sealing (subject to the correct tightening of all connectors). The male connector is connected to the logger socket and 3 sockets are then available on the junction box to connect equipment.

NB: The description of the 12-pin connector inputs/outputs – the colors of the wires and the associated functions – is given in the "Blue logger" paragraph of this document.

The internal pressure sensor has a 1/4 Male Gas pressure connection to which a male quick coupling with a "European standard" profile is screwed. This makes it possible to clip a hose with a female quick coupling directly onto the integrated pressure sensor.

NB: It is important that the hose that brings the water to the pressure sensor is purged of any air that may be inside.

5. BLUE logger: analog, Modbus and digital inputs

5.1. Description

Compact and autonomous, the Blue logger allows you to set up a recording of many different parameters (pulse meter, Modbus flowmeter, 4-20mA pressure sensor, etc.).
The Blue logger can be equipped with two options: a built-in pressure sensor (LP option) and/or a cellular communication card (LTE option). The Blue logger is therefore available in four references:

- BLUE-80: Autonomous logger (local radio communication)
- BLUE-LP-80: Autonomous logger with internal pressure sensor (0-25 bar) and local radio communication
- BLUE-82-LTE: Autonomous logger, 2G/LTE-M/NB-IOT communication and local radio communication
- BLUE-LP-82-LTE: Autonomous logger with internal pressure sensor (0-25 bar), 2G/LTE-M/NB-IOT communication and local radio communication

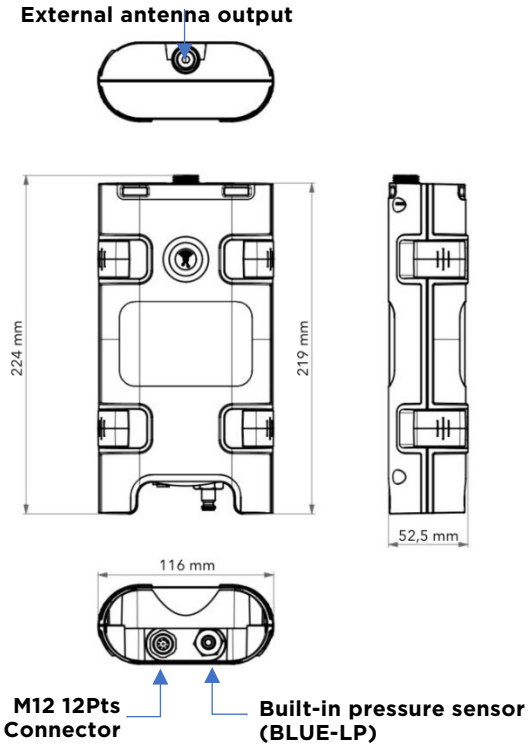
The table below gives the characteristics of the Blue logger referenced BLUE-LP-82-LTE:

Pressure sensor	Built-in, 0-25 bar absolute
Logger	500,000 measurements
Inputs	2x 100 Hz pulse inputs 1x 4-20mA input (built-in pressure sensor) 1x 4-20mA input for external sensor OR 2x 4-20mA inputs if no built-in sensor 1x RS485 Modbus input (if not used as output)
Outputs	1 open drain output 1 Modbus output (if not used as input)
Connector	M12 12 points
Antennas: Radio / Cellular	Internal Radio Antenna, External Cellular
Logger Material	PA12 50% fiberglass
Sealing	IP68: 2m / 100 days
Energy	Battery: 3.6V 34Ah
Configuration	Wireless programming tool (PN: M0C00001 or WIJIKEY) integrating AVELOUR software
Dimensions & Weight	116 x 224 mm for a thickness of 52.5 mm, 700g (with battery and communication card)
Certifications	CE NSF Certified to NSF/ANSI 61 & 372

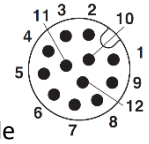
The table below gives the characteristics of the pressure sensor integrated into the Blue logger:

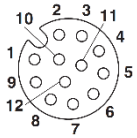
Pressure Type	Absolute
Measuring Range	0-25 bar
Test Pressure	50 bar
Burst Pressure	200 bar
Measurement uncertainty	≤ 0.3% Full Scale
Operating Temperature	-30°C to +85°C
Storage Temperature	-30°C to +100°C
Certifications	NSF/ANSI 61/372 - MH60087

The diagram below shows the dimensions of the logger:



The Blue logger can be connected to the equipment to be connected using the supplied cable. The wiring information is shown in the diagram and table below:

Wiring: Male 

Female 

Cable Color	Brown	Blue	White	Green	Pink	Yellow
PIN No.	**1**	**2**	**3**	**4**	**5**	**6**
Designation	GND	AI 2 if LP option Otherwise AI 1	V in	V out	AI 1 if LP option Otherwise AI 2	Input or output
Characteristic	Ground	Current 2 (if LP option) or Current 1	External power supply or battery (5V... 30V)	5V power supply... 18V* (from internal battery) or Switch Vout=Vin	Current 1 (if LP option) or Current 2	RS485-H
Type		4-20 mA	Power Input	Power Output	4-20 mA	Modbus

* 1.8 W maximum on the Vout if the connected sensor is powered by the internal battery (voltage adjustable by the software)

Cable Color	Black	Grey	Red	Violet	Grey / Pink	Blue / Red
PIN No.	**7**	**8**	**9**	**10**	**11**	**12**
Designation	DI 1	Input OR output	Open-Drain Output	DI 2	DI 3	DI 3
Characteristic	Binary 1 / 100 Hz count N°1	RS485-L	Grounding Contact	Binary 2 / 100 Hz count N°2	Available in 2024	
Type	Digital	Modbus	Open drain (1A/30V)	Digital		

5.2. Applications available with Avelour

Several applications are available when a radio connection is established between the logger and the Avelour software. The available applications depend on the inputs/outputs available on the connected logger. The settings for the various applications are described in the "Applications available with a Blue logger" section.
NB: The Modbus connection cannot be used as both input and output. So, if an application using the Modbus output is selected, then applications using the Modbus input are no longer offered. And vice versa if a Modbus input is selected.

The list of applications available for the Blue logger is given below:

- B&C sensor
- Modbus output
- DI input
- Modbus flowmeter
- 100 Hz Velocity counter
- 4-20 mA sensor

6. External battery and mains power supply

It is possible to use an external battery or mains power supply (30V maximum) with the Ijinus loggers.

6.1. In the case of an external battery

There are two main types of battery available from Ijinus:
- Rechargeable lead-acid battery
- and non-rechargeable lithium battery.

Lead-acid batteries have a voltage of 12V.
Two types of lithium battery are available: 10.8V and 14.4V.
Caution: Do not use a 14.4V battery on a sensor other than the Nivus Doppler. Indeed, the use of a voltage higher than 13V on an Aqualabo sensor would result in the sensor being definitively damaged.

Minimum Voltage Management:

The logger retrieves the voltage from the external voltage and stops measurements if a minimum voltage threshold is reached. This threshold depends on the type of external power supply and the nominal voltage (this can be changed in Expert Mode/Advanced Settings in the Power Management option).

- 12 V Lead-acid battery: Threshold = 12 x 0.875=10.5 V.
- 10.8 V Lithium Battery Pack: Threshold=10.8 x 0.8=8.6 V.

When the customer is using a 14.4 V battery pack:
In expert mode and advanced settings, the nominal voltage must be changed from 10.8 to 14.4V.
The stop threshold will be 14.4 x 0.8 = 11.5 V.

For a lead-acid battery and if the logger has been programmed with a lead-acid battery option, it is not necessary to connect to the logger with Avelour. Simply plug in a recharged battery to restart its operating cycle.
However, for a lithium battery (10.8 or 14.4 V), it is essential to connect to the logger so that it can resume measurements with the external sensor connected.

6.2. In the case of a mains power supply

It is possible to use an external mains power supply for Ijinus loggers. The voltage supplied to the logger must be between 7V and 30V. You must use a transformer (220V / 24V for example) equipped with a grounding system. In the absence of grounding, several malfunctions may occur (metering problems, measurement disturbances, etc.) related to the disturbances caused by the mains power supply.

7. Setting up a logger with Avelour software

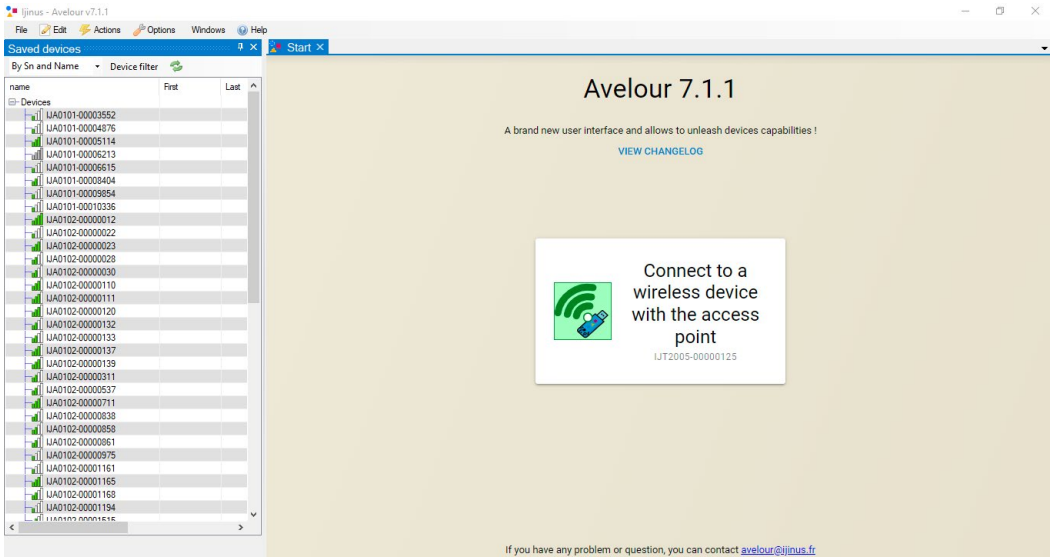
7.1. Equipment required

- Avelour software, version 7.1 minimum

- a Wiji radio antenna in "long range" or "USB key" format

The Avelour software can be downloaded from the Ijinus website (www.ijinus.com) in the "Download" section.

After installing and opening the software, the home screen opens:



Long-range radio antenna to communicate with loggers:

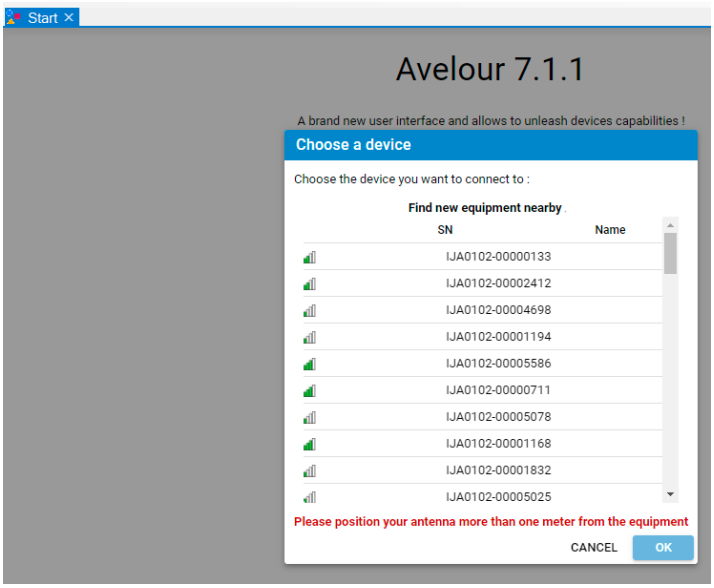
Radio antenna in "USB key" format to communicate with the loggers:

7.2. Run Avelour and connect to the logger to be configured

After connecting the Wiji radio antenna equipped with its antenna (or the Wiji USB stick) to the USB port of your computer, run the Avelour software.

NB: For a correct radio connection, you must keep a minimum distance of one meter between the Wiji antenna and the data logger you want to set up.

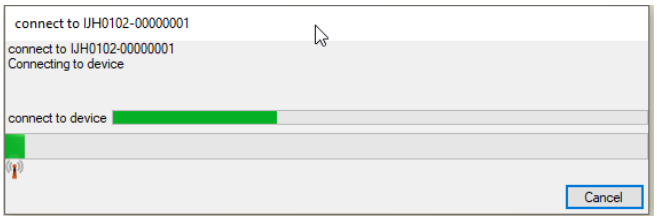
Click the "Connect to a wireless device with the access point" button so that the logger is directly identified by its serial number (S/N:). Locate the sensor's serial number on the sensor label and click the "OK" button.



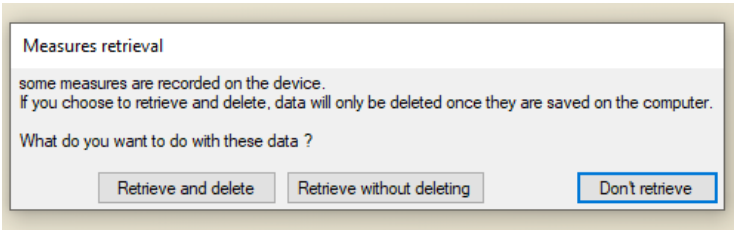
When connecting with the sensor for the first time, only the serial number appears. On subsequent connections, you will also see the name of the logger if you set it up.

Select the logger you want to configure.

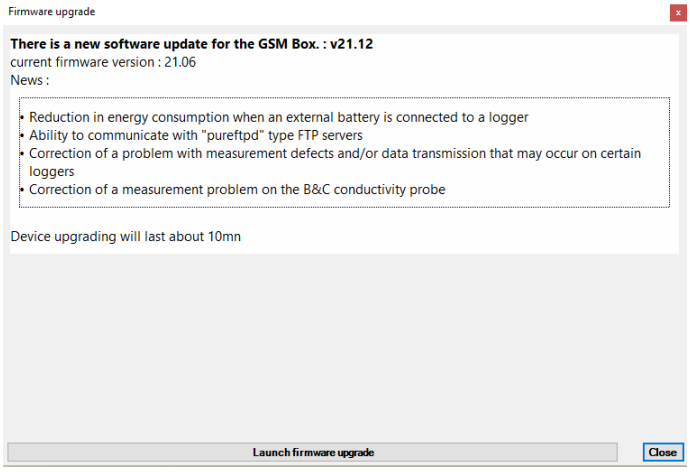
During its connection with the sensor, the following window appears:

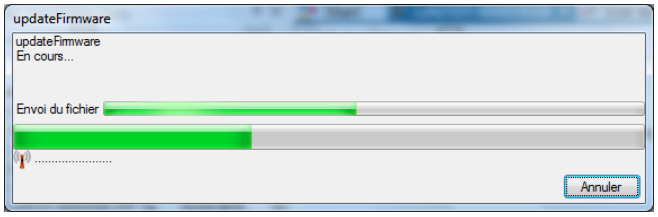


Once connected and only if the sensor already has measurements in memory, the following options will allow you to retrieve the measurements:



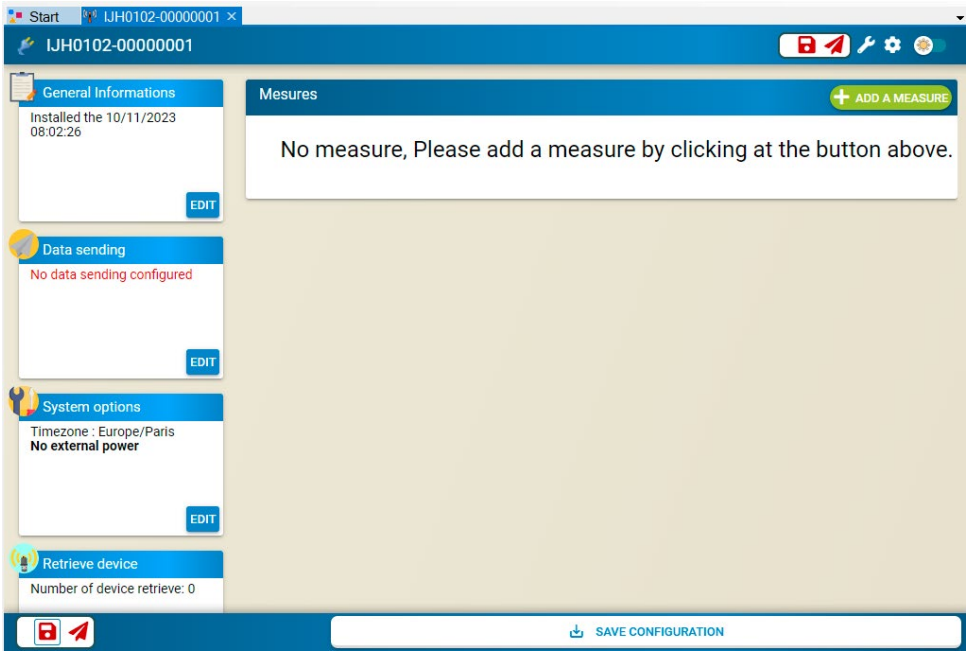
After choosing one of these three options, if the sensor is not up to date (case of a new firmware developed since your last connection or if you connect with a new version of the Avelour software), the window below is proposed. It is strongly recommended that you read the various messages offered in the different windows.





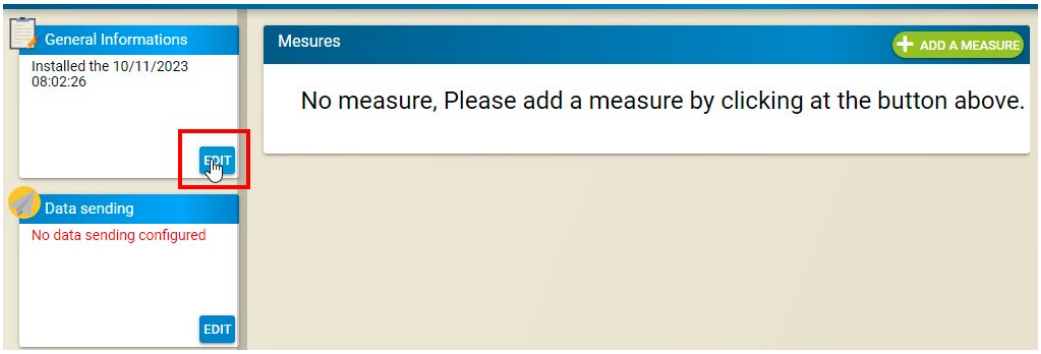
The update usually takes between 7 and 12 minutes depending on the radio connection. It is therefore advisable to do it in the office. On site, prefer the best possible communication by radio (i.e. avoid radio communication through a closed manhole cover for example).

When the logger has completed the checks, Avelour will look like this:

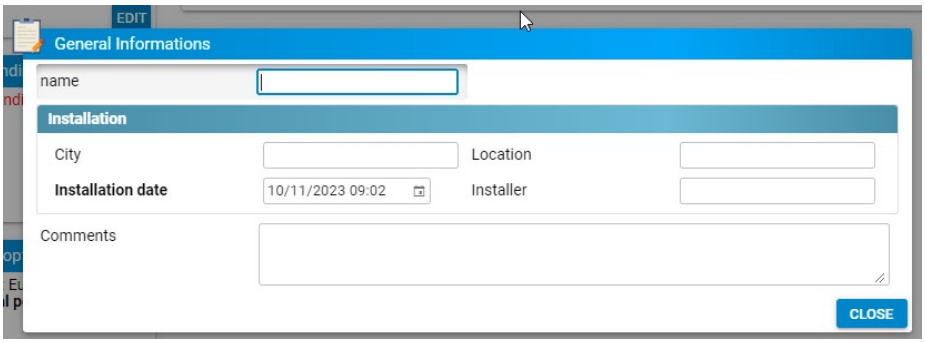


7.3. General Information and Logger Name

This part is useful for describing the measuring point. The most important piece of information is the name that will help you find your sensor when making a future connection. To open the "General Information" window, click on the "edit" button:



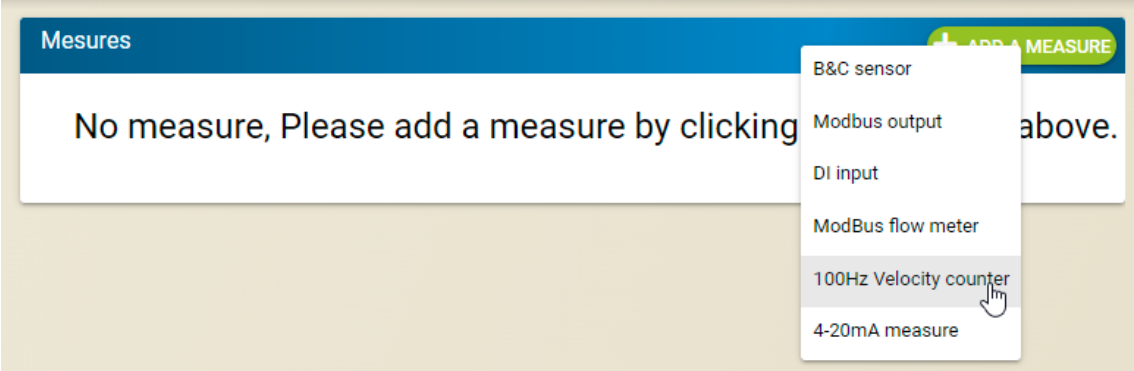
The window below appears. It is possible to enter the name of the logger (displayed later in the Avelour connection window) as well as other information (installation location, date, etc.).



Once the "General Information" section has been filled in, you will have to set up a measurement. The setting options differ depending on the type of logger used. The following paragraph describes the available applications.

8. Applications available with a Blue logger:

You must choose one or more of the possible applications with the logger in order to define the measurements to be made.
Click the "Add a measure" button and then choose the application you want to use. For example, the "100 Hz Velocity counter" application:

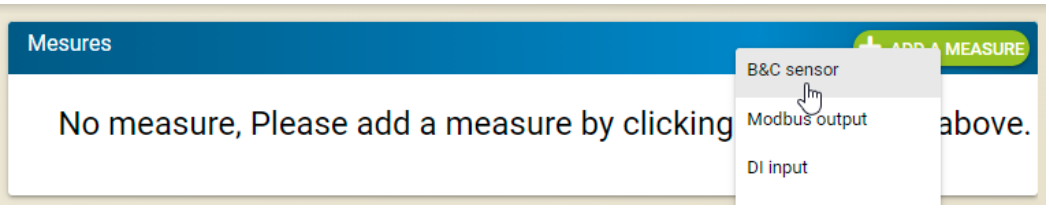


8.1. Application: B&C Sensor

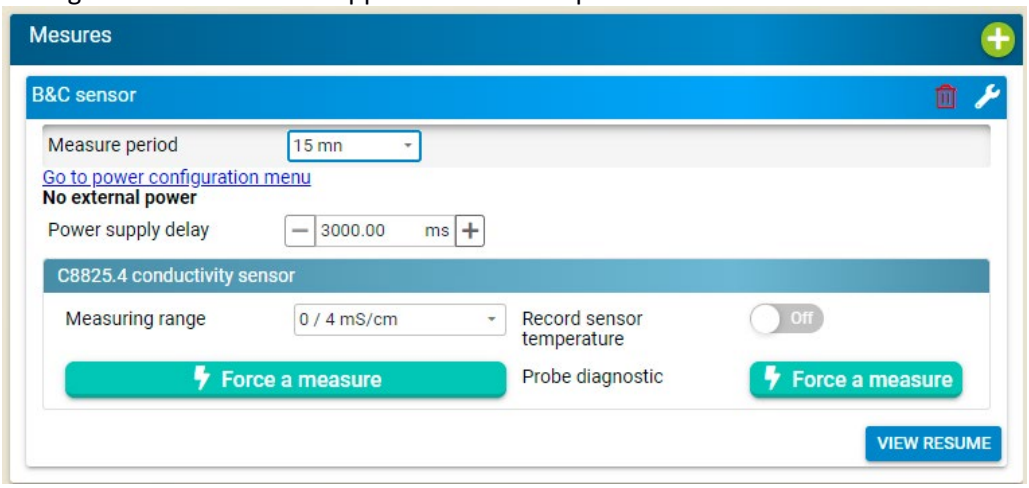
The B&C sensor is an inductive conductivity measurement sensor. An electric current is passed through an emitting coil in order to induce a magnetic field in the liquid. The ions present in the liquid are then passed through by a current. This is measured at a receiver coil.
For more information, the B&C sensor data sheet is available on the Ijinus website: www.ijinus.fr

Choosing which app to configure

This part describes the settings to be made on the logger to allow the associated sensor to function.
First, click the "Add a measure" button and then choose the "B&C Sensor" application.

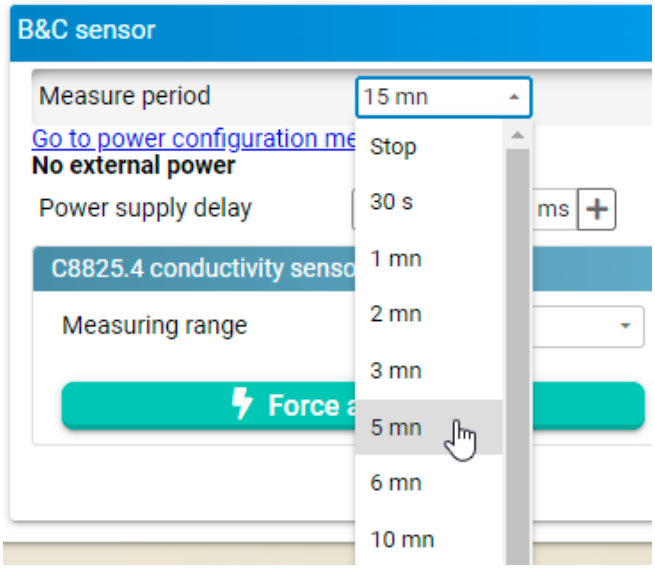


The configuration table for this application is then opened:



Choosing the measurement period

From this menu, select the measurement period you want (in this example, every 5 minutes).



Choosing the power source for the sensor

It is possible to power an external sensor directly from the logger's internal battery. In this case, no specific settings are required.

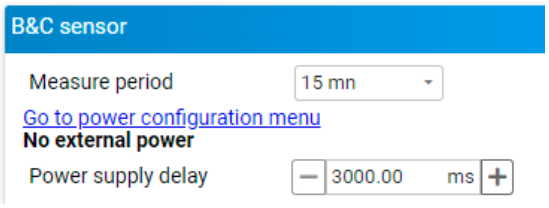
However, it is also possible to use an external battery or mains power supply (7-30V).

If an external power supply is plugged into the logger then click on the "Go to power configuration menu" button or click directly on the "Edit" button in the "System Options" box. See the "System Options" chapter of this document for a description of the settings to be made.

For the B&C sensor, the possible voltage range is from a minimum of 9V to a maximum of 36V.

Choice of sensor power duration:

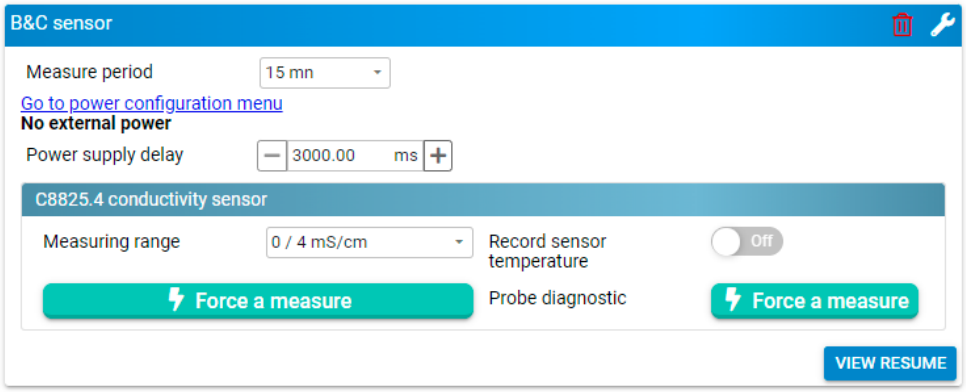
By default, the power time is set to 3000 ms (3 seconds), which is the time needed for the B&C conductivity probe.



B&C sensor settings:

Two different ranges are available: 0 – 4 mS/cm or 0 – 200 mS/cm. Choose the range according to the expected conductivity values.

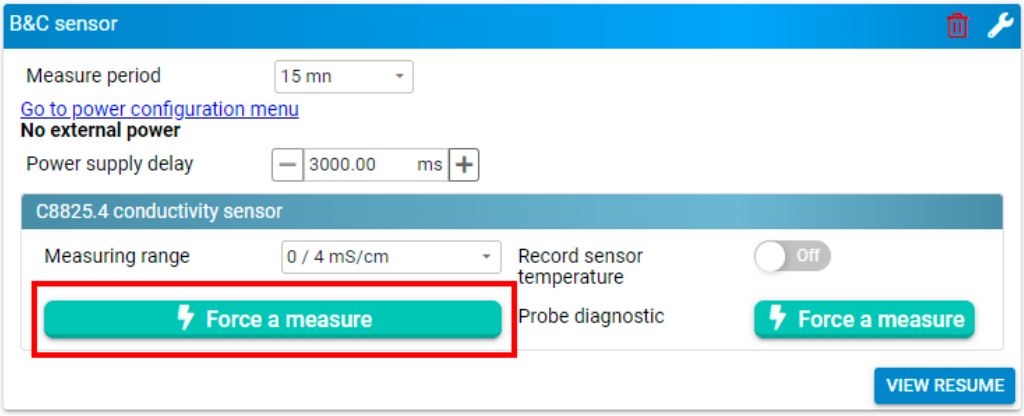
It is possible to record the temperature measured by the sensor by clicking on the "Off" button to change it to "On".

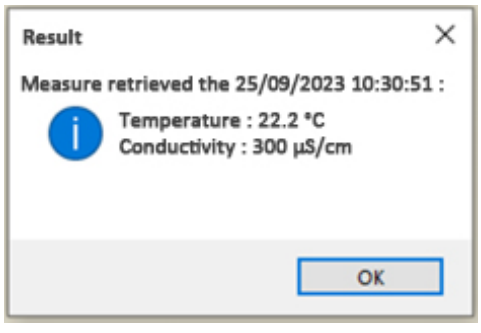


"Force a measure" button:

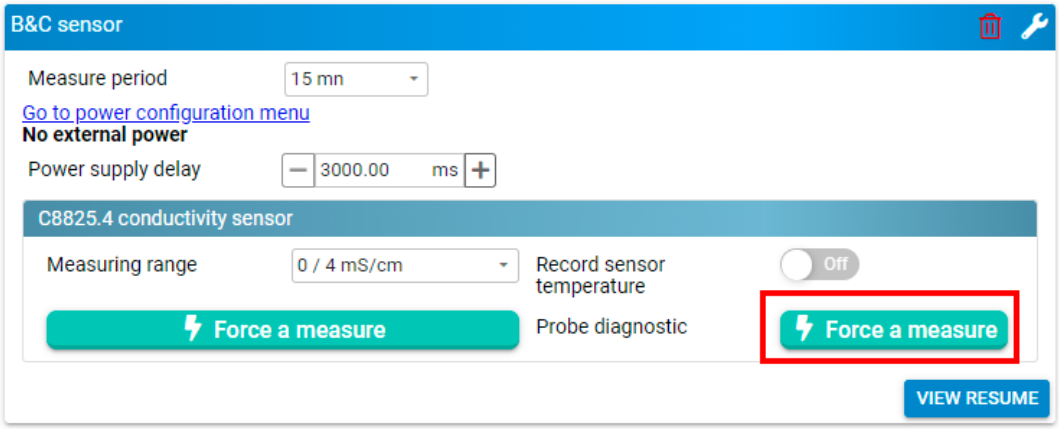
Two "Force a measure" buttons are available in this app.

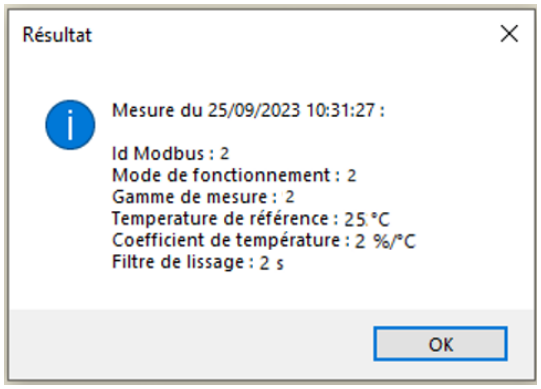
By clicking on the button on the left, the conductivity and temperature values are displayed:





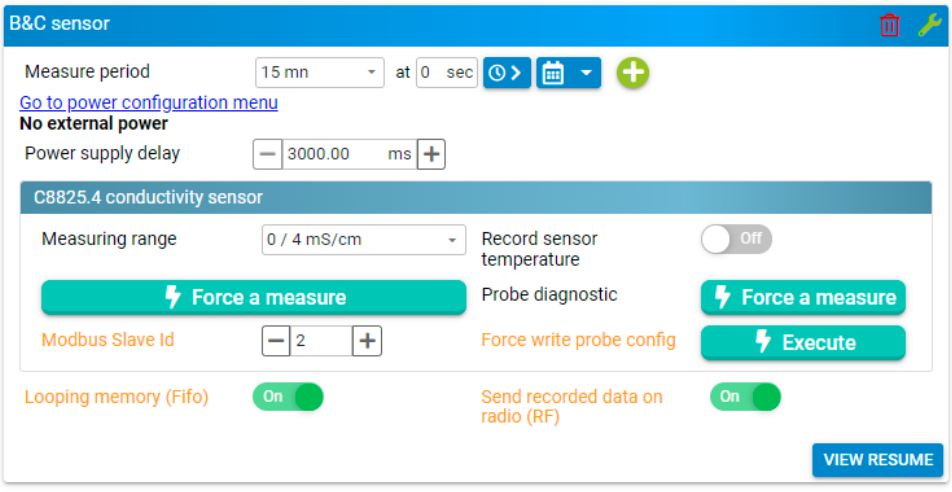
By clicking on the button on the right next to "Probe diagnostic", the sensor configuration is displayed:





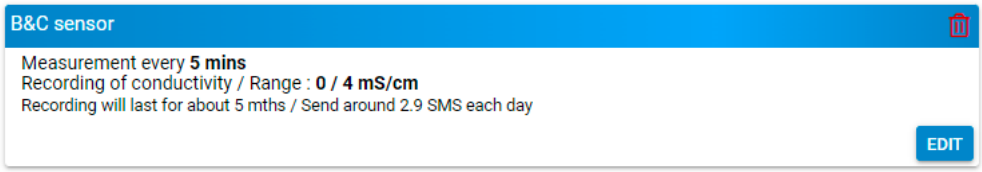
Advanced settings

The "Show advanced parameters" button provides access to more features:



Viewing the parameter summary

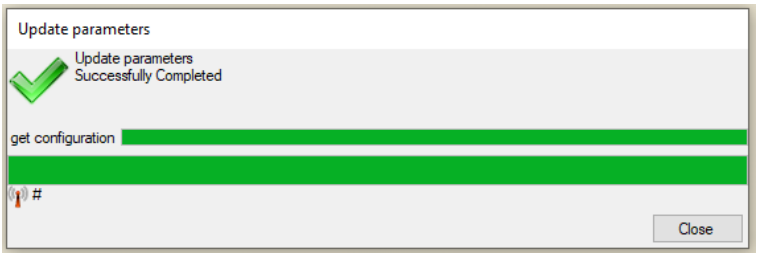
Once programming is complete, a summary displays the different choices:



Saving the setting

You must validate the configuration made with the "save configuration" button to send the configuration to the logger's memory.

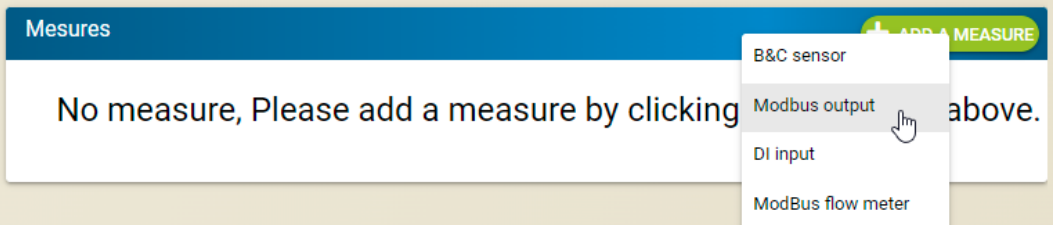
After a few seconds, a screen will appear to indicate the correct recording of the setting in the logger.



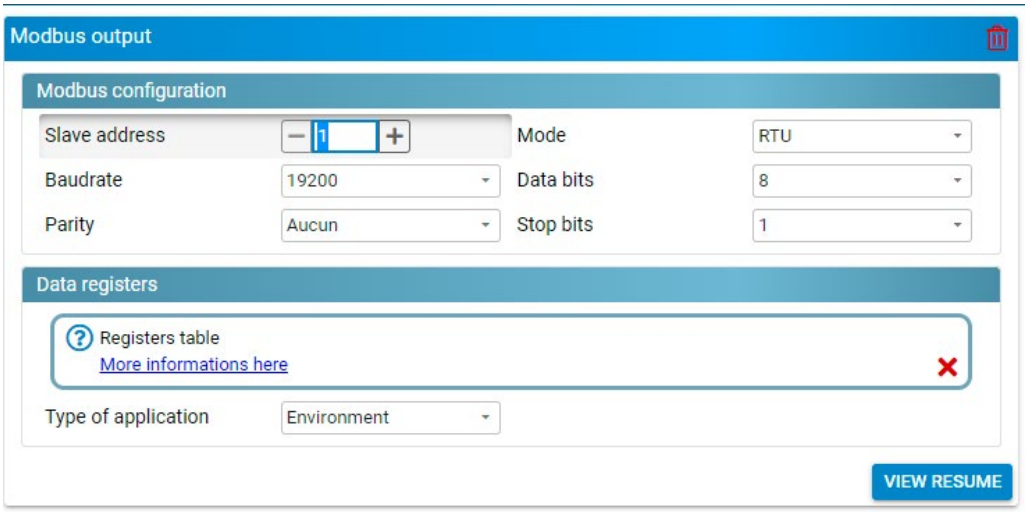
8.2. Application: Modbus Output

The "Modbus Output" app allows the logger to be connected to a PLC in order to send it the measured data. This option is not available if the Modbus connection is used by another application (e.g. Modbus Flowmeter). This is because the logger has only one Modbus connection that can be used either as an input or as an output, but it is impossible to use both applications at the same time.
Important: Since Modbus communication is based on a concept of requests and responses, it is essential that the logger remains on at all times.

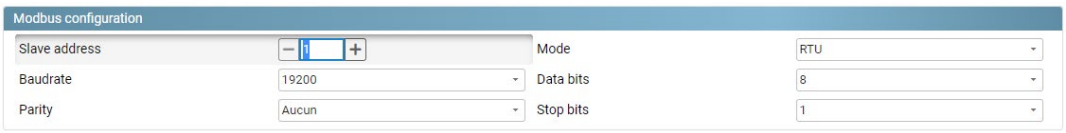
Choosing which app to configure
Click on the "Add a measure" button, then choose the "Modbus Output" application.



The configuration table for this application then opens:

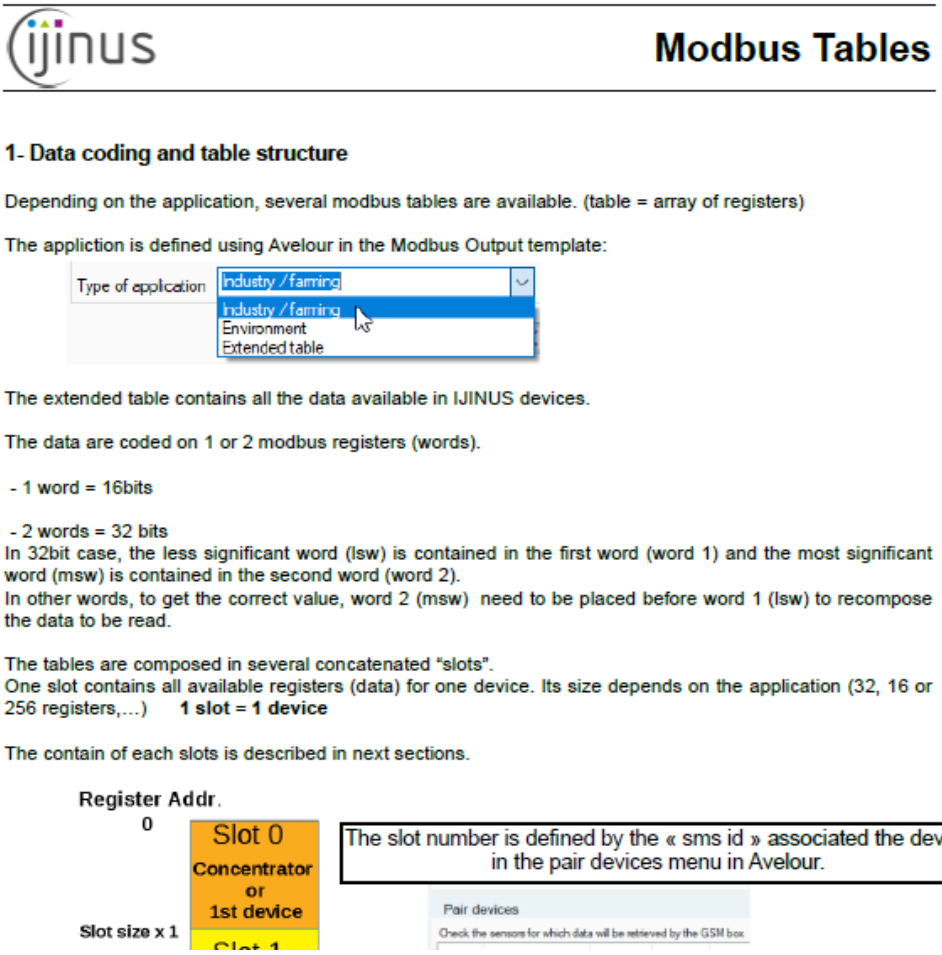


Modbus configuration
It is in this part that the parameters of the Modbus output must be configured. It is essential that these parameters coincide perfectly with the parameters expected by the PLC connected to the Ijinus logger.



Viewing Data Logs

It is possible to view a document by clicking on the "More information here" link. This document, called "Modbus Tables", describes for each piece of data measured by an Ijinus logger: address, offset, size and encoding (integer, inverted integer, etc.).



ijinus

Modbus Tables

1- Data coding and table structure

Depending on the application, several modbus tables are available. (table = array of registers)

The appliction is defined using Avelour in the Modbus Output template:

Type of application: Industry / farming

Industry / farming
Environment
Extended table

The extended table contains all the data available in IJINUS devices.

The data are coded on 1 or 2 modbus registers (words).

- 1 word = 16bits

- 2 words = 32 bits
In 32bit case, the less significant word (lsw) is contained in the first word (word 1) and the most significant word (msw) is contained in the second word (word 2).
In other words, to get the correct value, word 2 (msw) need to be placed before word 1 (lsw) to recompose the data to be read.

The tables are composed in several concatenated "slots".
One slot contains all available registers (data) for one device. Its size depends on the application (32, 16 or 256 registers,...) **1 slot = 1 device**

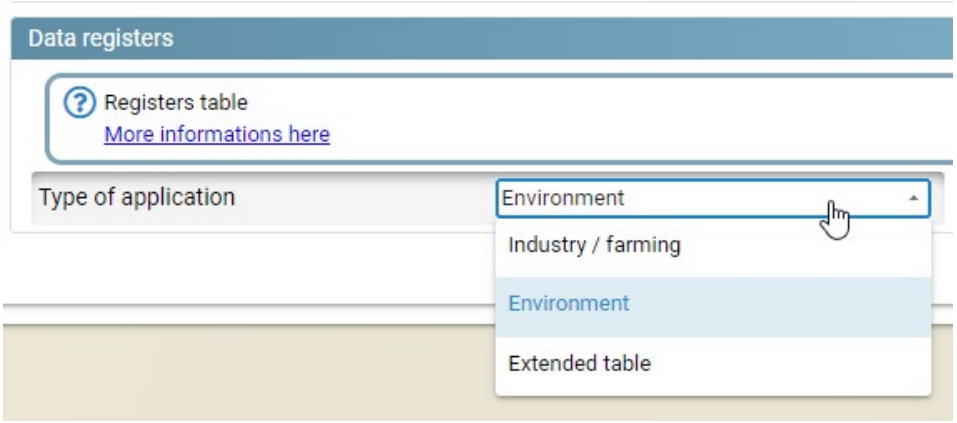
The contain of each slots is described in next sections.

Register Addr.
0
Slot 0
Concentrator or 1st device
Slot size x 1

The slot number is defined by the « sms id » associated the device in the pair devices menu in Avelour.

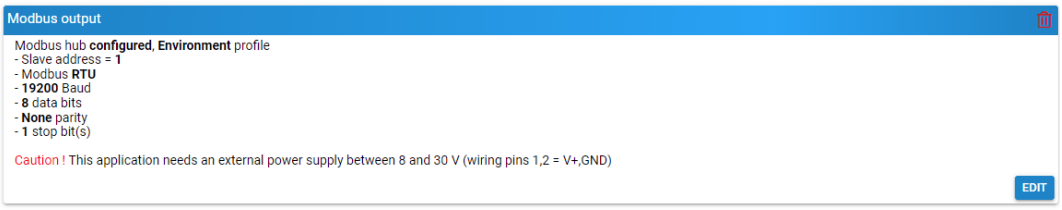
Pair devices
Check the sensors for which data will be retrieved by the GSM box

Depending on the type of application chosen in the drop-down menu below, the table applied (and therefore the data encoding) will not be the same. It is therefore essential to take into account the correct register table in order to be able to send the desired measurements to the controller via the Modbus output.



Viewing the parameter summary

Once you're done programming, you'll see a summary of your choices:

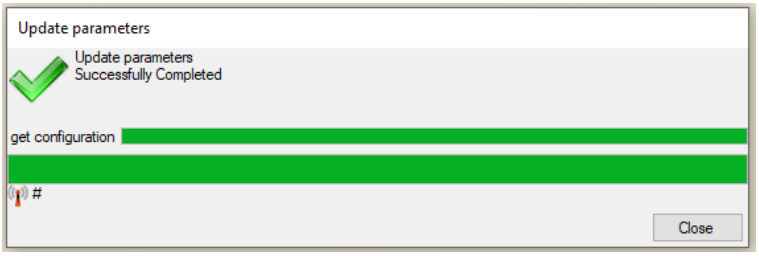


Reminder: the logger must be powered continuously (mains power between 7 and 30V, Lithium battery or lead-acid battery) to allow the Modbus output to function.

Saving the setting

You must validate the configuration made with the "save configuration" button to send the configuration to the logger's memory.

After a few seconds, a screen will appear indicating the correct recording of the setting in the logger.

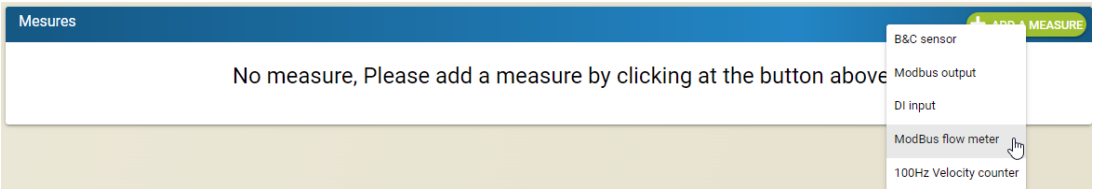


8.3. Application: ModBus Flowmeter

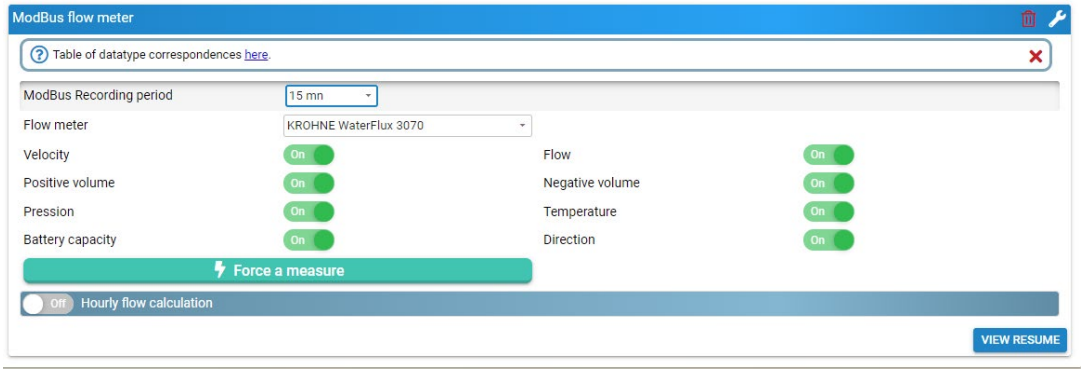
Choosing which app to configure

This section explains how to set up your sensor.

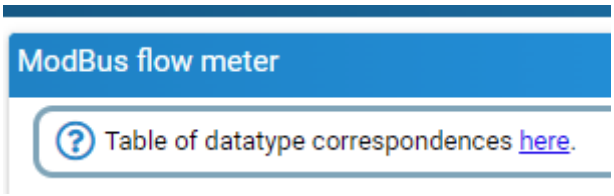
First, click on the "Add a measure" button and then choose the "Modbus Flowmeter" app:



The configuration table for this application then opens:



Clicking on the word "here" opens a pdf file.

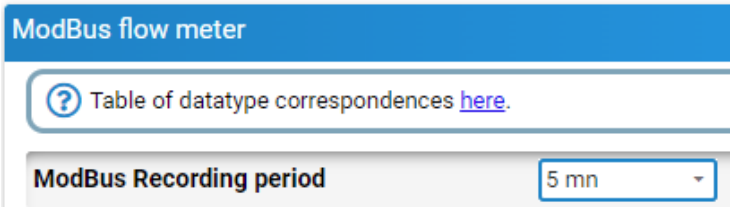


For each brand of flowmeter, this file contains the correspondence between the type of data recorded (volume, flow, pressure, etc.) and the number encoded by the Ijinus logger (datatype). Since multiple items of data of the same type can be stored, a channel number is also added to the datatype.

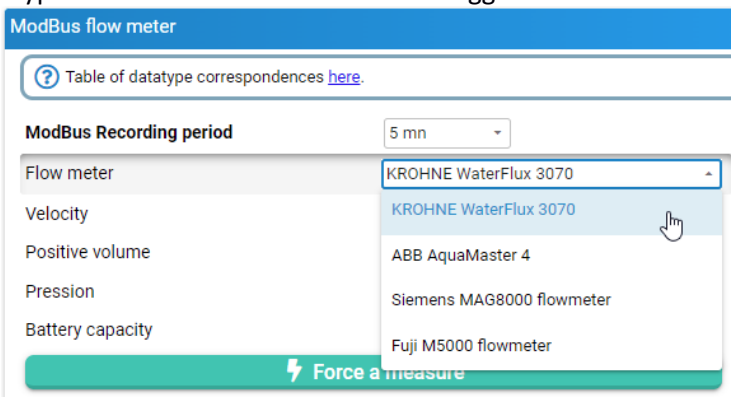
Debitmeter	Data	Datatype	Channel	Description
Waterflux 3070	Volume	39	24	Total volume
	Flowrate	34	20	Flowrate
	Speed	24	20	Speed
	Volume	39	20	Forward volume
	Volume	39	21	Reverse volume
	Pressure	37	20	Liquide pressure
	Temperature	12	20	Liquid temperature 1/10°C
	Real	4	20	Battery
	Unsigned interger	2	20	Flow direction
	Unsigned interger	2	21	Alarms
Aquamaster 4	Volume	39	21	Reverse volume
	Volume	39	20	Forward volume
	Volume	39	24	Total volume
	Flowrate	34	20	Flowrate
	Pressure	37	20	Liquide pressure
	Speed	24	20	Speed
	MODBUS register	21	20	Alarm
MAG8000	Speed	24	20	Speed
	Flowrate	34	20	Flowrate
	Volume	39	20	Forward volume 1
	Volume	39	21	Reverse volume 1
	Volume	39	22	Forward volume 2
	Volume	39	23	Reverse volume 2
	MODBUS register	21	20	Default
	MODBUS register	21	21	Config
M5000	Speed	24	20	Speed
	Flowrate	34	20	Flowrate
	Volume	39	20	Forward volume 1
	Volume	39	21	Reverse volume 1
	Volume	39	22	Forward volume 2
	Volume	39	23	Reverse volume 2
	MODBUS register	21	20	Default
	MODBUS register	21	21	Config
Hourly flowrate + night flowrate	Volume	39	25	Hourly volume
	Volume	39	28	Average flowrate
	Volume	39	26	Minimum flowrate
	Volume	39	27	Maximum flowrate
	Counter	22	26	Minimum flowrate date
	Counter	22	27	Maximum flowrate date

Choice of measurement period

On this menu, select the measurement period you want (in this example, every 5 minutes).

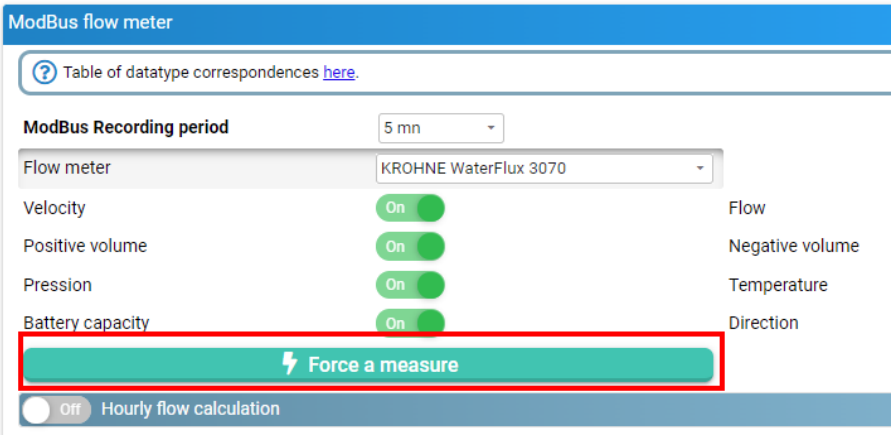


Then choose the type of flowmeter connected to the logger:



Force a measurement

In order to check that the measurements made by the connected flowmeter are correctly taken, it is possible to view the measured data by clicking on the "Force a measure" button.

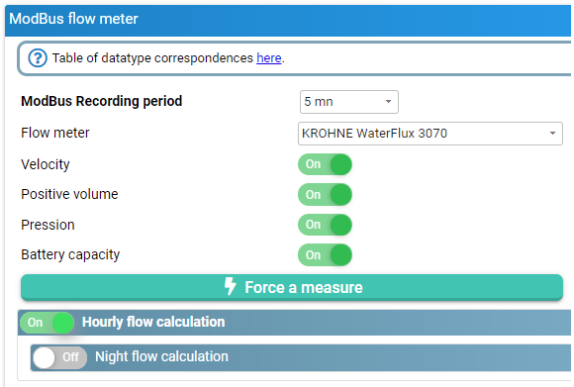


After a few seconds, the readings taken by the flowmeter are displayed. In the event of a problem, you must check:

- that the flowmeter is properly connected to the Ijinus logger.
- That the flowmeter is working properly
- the status of the logger's internal battery (and external battery pack if needed) and the flowmeter's internal battery

Hourly flow calculation

It is possible to calculate an hourly flow rate from the flow data sent by the flowmeter.



Calculation of a minimum nighttime flow

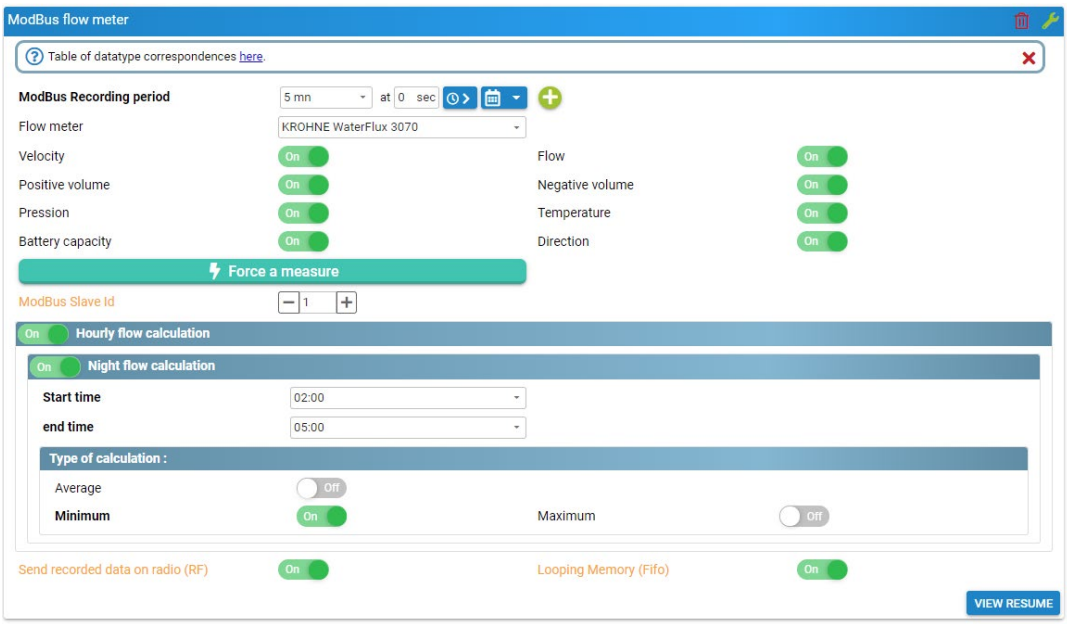
If an hourly flow rate is calculated, it is possible to perform calculations on the hourly volume. In particular, it is possible to calculate an average flow, a minimum flow rate and/or a maximum flow over a given period.
Typically, this option is used to calculate the minimum nighttime flow, see example below:

Viewing the parameter summary

Once you're done programming, you'll see a summary of your choices:

Advanced settings

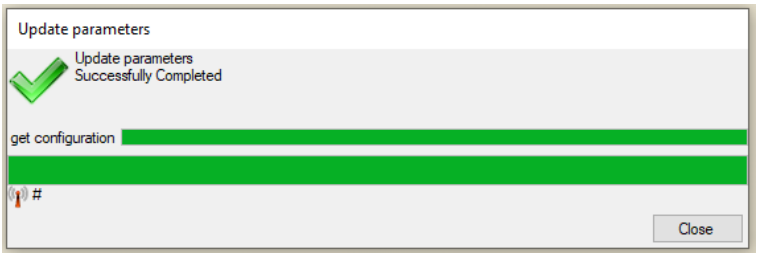
The wrench icon at the top right of the screen provides access to more features:



Saving the setting

You must validate the configuration made with the "save configuration" button to send the configuration to the logger's memory.

After a few seconds, a screen will appear indicating the correct recording of the setting in the logger

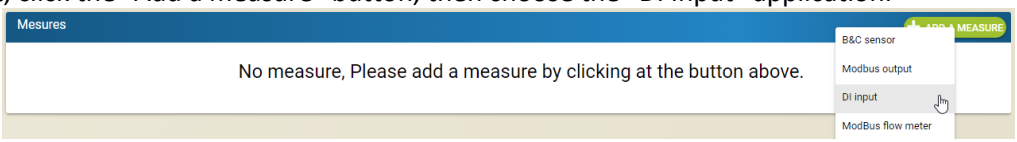


8.4. Application: DI Input

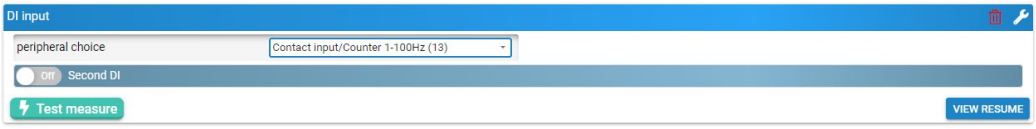
Choosing which application to configure

This section explains how to set up your sensor.

First, click the "Add a measure" button, then choose the "DI Input" application.

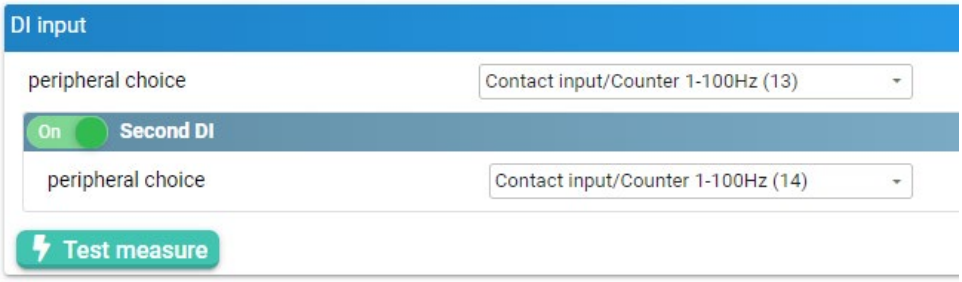


The configuration table for this application then opens:



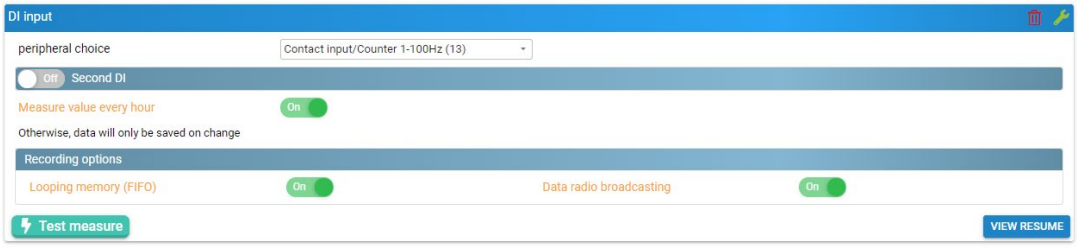
This application allows you to detect closing of a contact on one of the logger's digital inputs and then to record it with the timestamp of the status changes.

The detection and recording of a change of state is also possible on a 2nd channel:



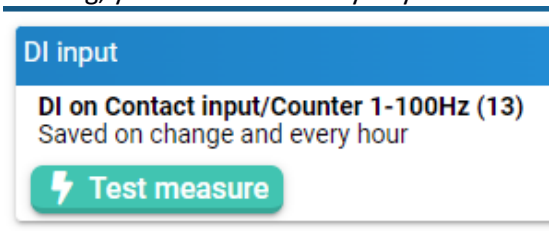
Advanced settings

The wrench icon at the top right of the screen provides access to more features:



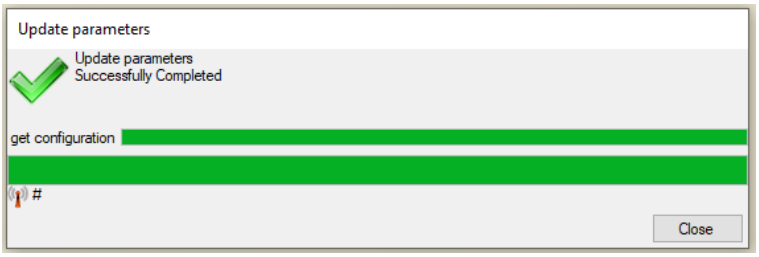
Viewing the parameter summary

Once you're done programming, you'll see a summary of your choices:



Saving the setting
You must validate the configuration made with the "save configuration" button to send the configuration to the logger's memory.

After a few seconds, a screen will appear indicating the correct recording of the setting in the logger.

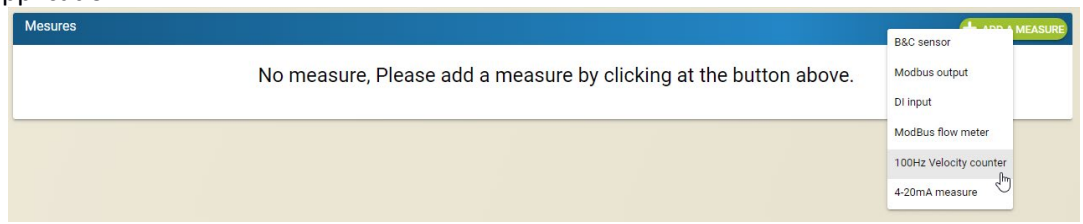


8.5. Application: 100 Hz counter

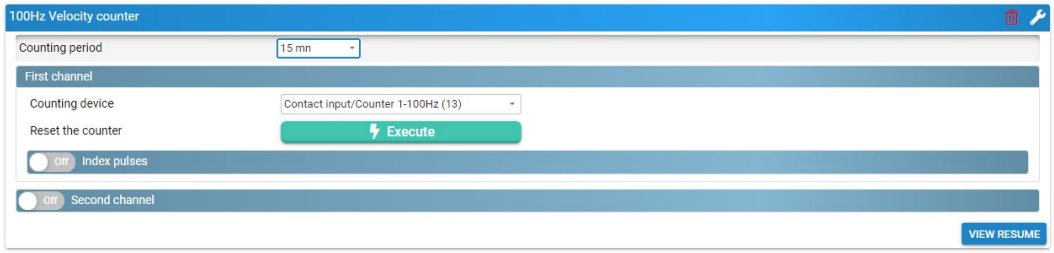
This application is mainly used to record pulses from a flowmeter.

Choosing which app to configure

This section explains how to set up your sensor.
First, click on the "Add a measure" button and then choose the "100Hz velocity counter" application.

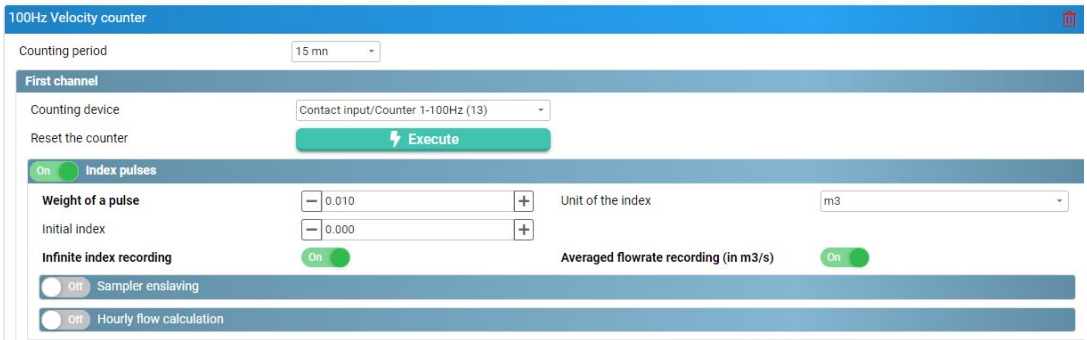


The configuration table for this application then opens:



The counting period is the length of time during which a cumulative number of pulses received will be counted.
It is possible to reset the pulse counter to 0 by clicking on the "Execute" button opposite the "Reset the counter" line.

The "index pulses" option allows you to transform the pulses sent by the flowmeter into a volume and therefore a flow rate. To do this, you need to specify the "weight" of each pulse, as set in the flowmeter. In the example below, the flowmeter has been set to send 1 pulse each time a volume of 0.01 m^3 has been measured. It is therefore this configuration that must be filled in the Avelour software:



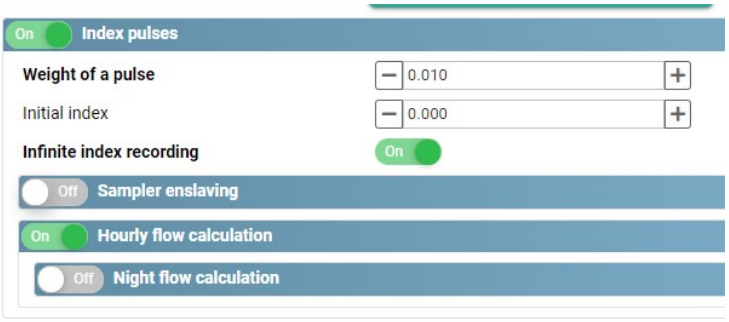
Sampler slaving option
If the pulses sent by the flowmeter have been converted into volume, it is possible to control a sampler by controlling the logger's open-drain output. In the example below, the logger sends 1 pulse to the sampler each time it has calculated that a volume of 1 m^3 has passed through the flowmeter.

NB: the logger is in standby mode between 2 measurements. This means that if the measurement period is 15 minutes, then no pulse will be sent to the sampler between 2 periods. For example, if the logger has received 1000 pulses from the flowmeter in 15 minutes (i.e. 10m^3 according to the example above) then 10 pulses will be sent in a row to the sampler after 15 minutes.

The "Execute" button located on the "Force one pulse" line, allows you to check the correct wiring between the Ijinus logger and the sampler since, in this case, a single pulse is sent to the sampler.

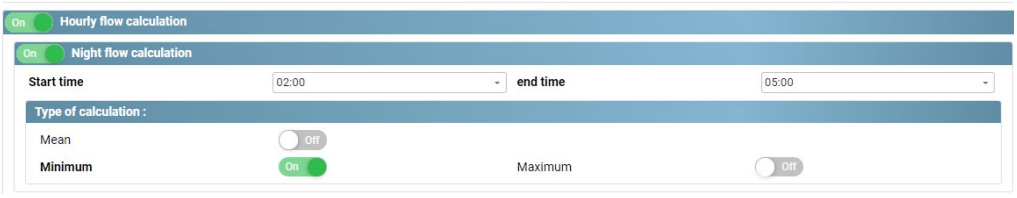
Hourly flow calculation

It is possible to calculate an hourly flow rate from the pulse data sent by the flowmeter.



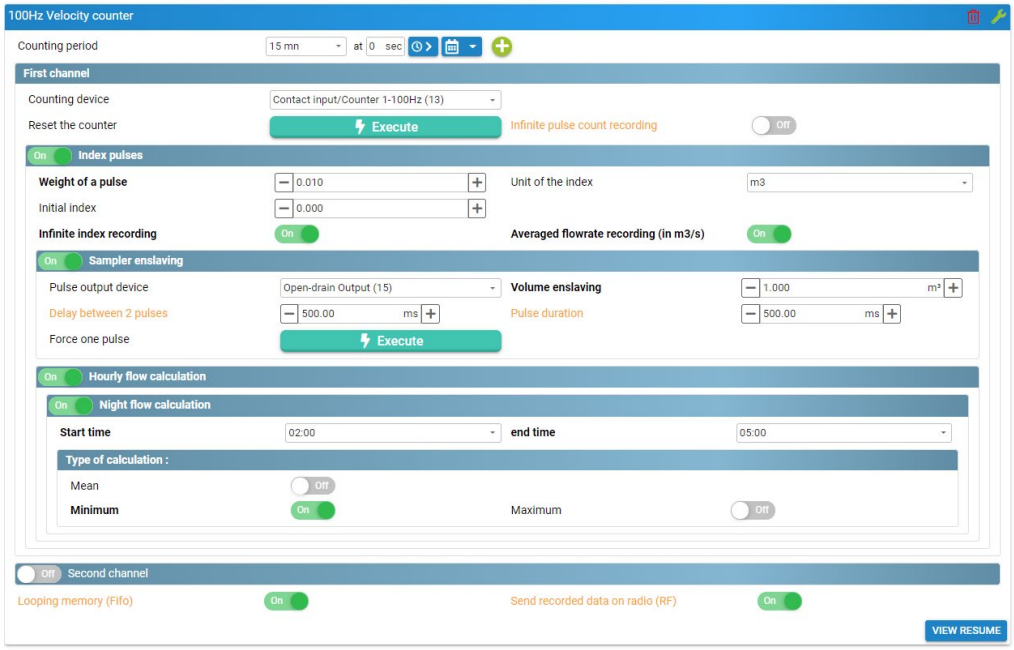
Calculation of a minimum nighttime flow

If an hourly flow rate is calculated, then it is possible to perform calculations on the hourly volume. In particular, it is possible to calculate an average flow, a minimum flow rate and/or a maximum flow over a given period.
Typically, this option is used to calculate the minimum nighttime flow, see example below:



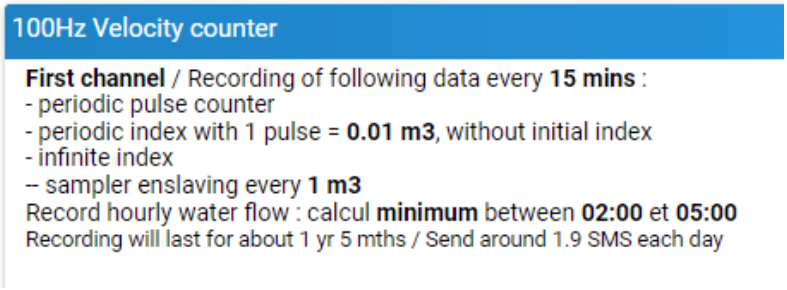
Advanced settings

The wrench icon at the top right of the screen provides access to more features:



Viewing the parameter summary

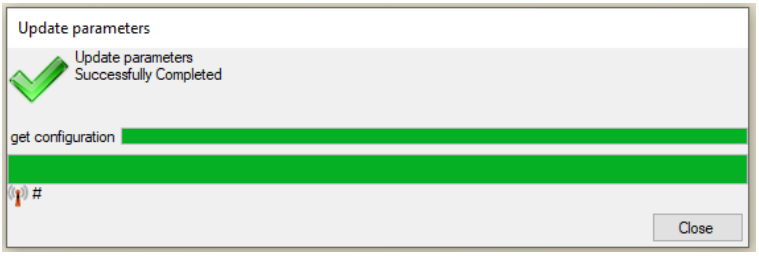
Once you're done programming, you'll see a summary of your choices:



Saving the setting

You must validate the configuration made with the "save configuration" button to send the configuration to the logger's memory.

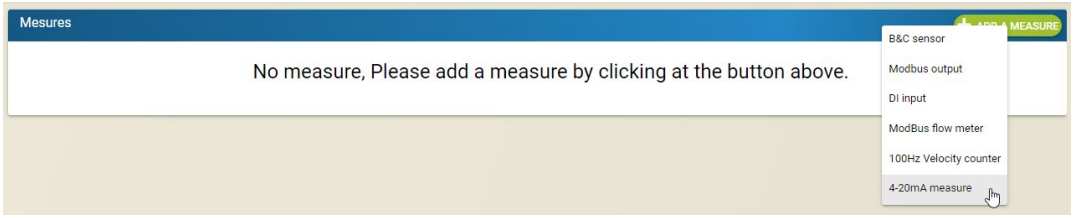
After a few seconds, a screen will appear indicating the correct recording of the setting in the logger



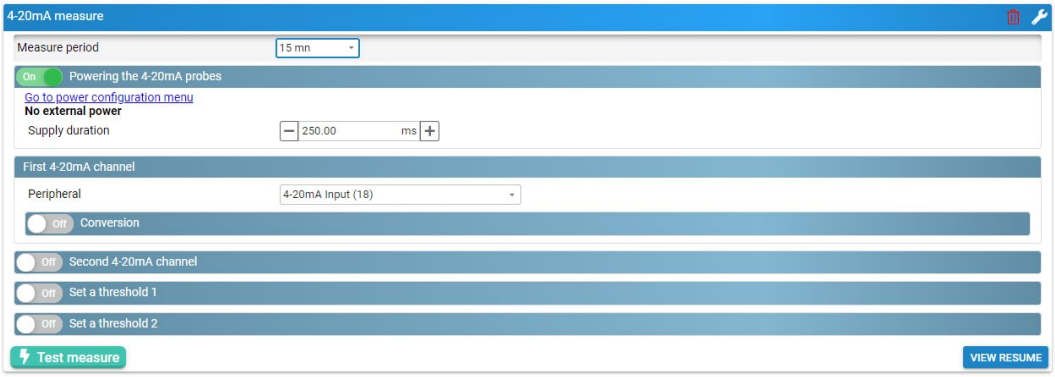
8.6. Application: 4-20mA measure

This application allows you to set up the retrieval of data from a sensor connected to an Ijinus logger via a 4-20 mA signal.

Choosing which app to configure
This section explains how to set up your sensor.
First, click the "Add a measure" button, and then choose the "4-20 mA measure" application.

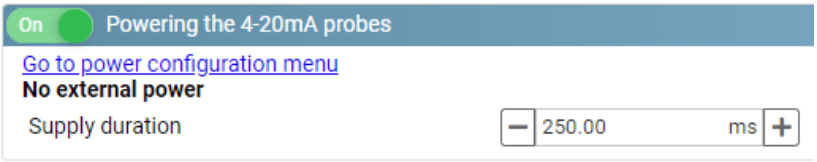


The configuration table for this application then opens:



Choosing the measurement period
From this menu, select the measurement period you want (in this example, every 15 minutes).

Choosing the power supply of the external sensor
It is possible to choose whether or not to power the 4-20 mA sensor used. By default, the choice is "yes" but if the sensor is already powered by a power source other than that of the logger or a battery connected to it, then the option must be changed to "no".

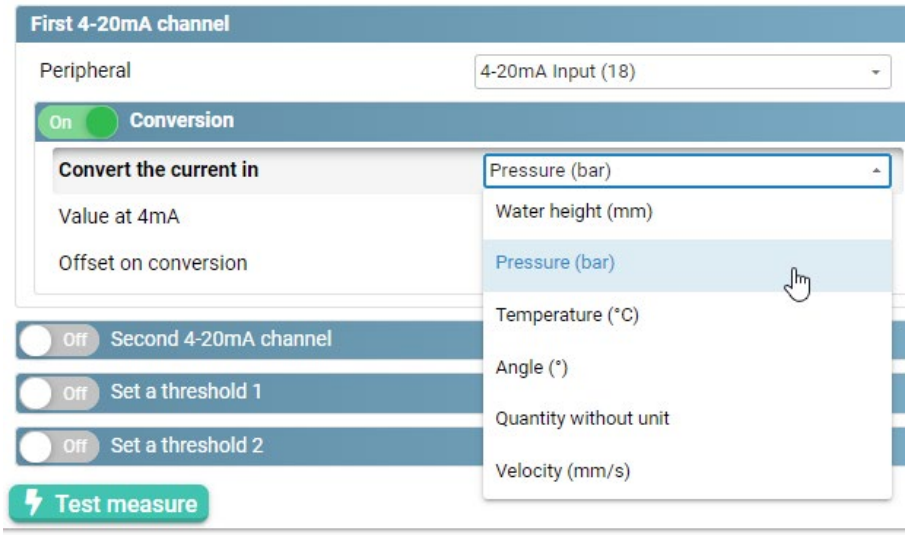


If the external sensor is powered by the logger, then it is possible to use either the internal battery (within the limit of 5 to 18 V and 1.8 Watt maximum) or to connect an external battery between the logger and the sensor. In this case, you need to set up the logger by clicking on the "Go to power management block" link. Setting of the power options is explained in this document in the "External battery and mains power supply" paragraph.

Whether the sensor is powered by the internal battery or via an external battery, it is very important to determine how long power is supplied. This is the amount of time that the sensor will be powered by the logger before measuring the 4-20 mA signal emitted by the external sensor.
If this duration is too short, then the measured 4-20 mA signal will not be correct and the measured value may be slightly or even extremely different from the one actually expected.
If the power supply time is too long, then the measured 4-20 mA signal will be correct, but the autonomy of the system will be reduced due to overconsumption of power.
It is not possible to specify a power supply time because it can vary from 25 ms for some piezometric sensors to several tens of seconds for some water level sensors. The default value has been set to 250 ms because this time is enough to power the 4-20 mA piezometers sold by Ijinus.
Please note that for the inclinometer sold by Ijinus, the minimum power supply time is 500 ms.

Setting up the 4-20 mA signal conversion

If no conversion is set, then only the 4-20 mA signal value will be recorded. It is possible to convert the value of the measured 4-20 mA signal into a parameter (to be chosen from a list below), which provides additional options.

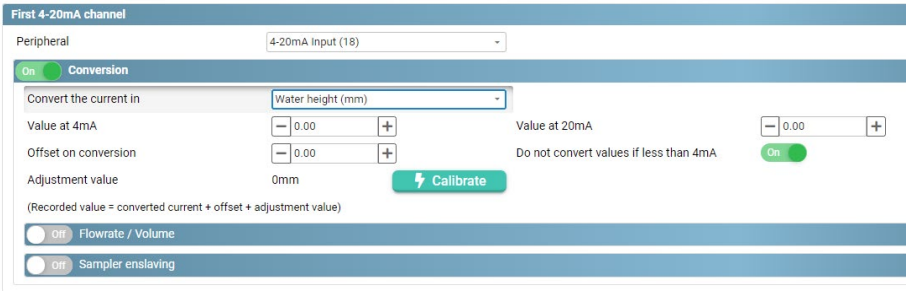


Peripheral: Choose value: "4-20 mA Input"
Conversion: Click on "Off" to display the "On" button in green so you can convert the 4-20 mA signal to a parameter to be chosen from the drop-down menu
Convert the current in: Select the desired conversion unit
Value at 4mA: the minimum value (usually 0) of the sensor connected to the logger
Value at 20mA: the full-scale value of the sensor connected to the logger
Offset on conversion: to be defined if necessary for measurement
Calibration: calibration of the sensor connected to the logger is possible with the use of the "Adjustment Value"

There are two main types of conversion: water height conversion and other types of conversion. Indeed, the conversion to water height offers flow/volume calculation options and also allows you to control a sampler.

Convert current to water height

In the example below, the 4-20 mA sensor is a 0-10m (10,000 mm) range piezometer. By clicking on the "calibrate" button, it is possible to adjust the measured water height according to a reference height at the time of calibration.

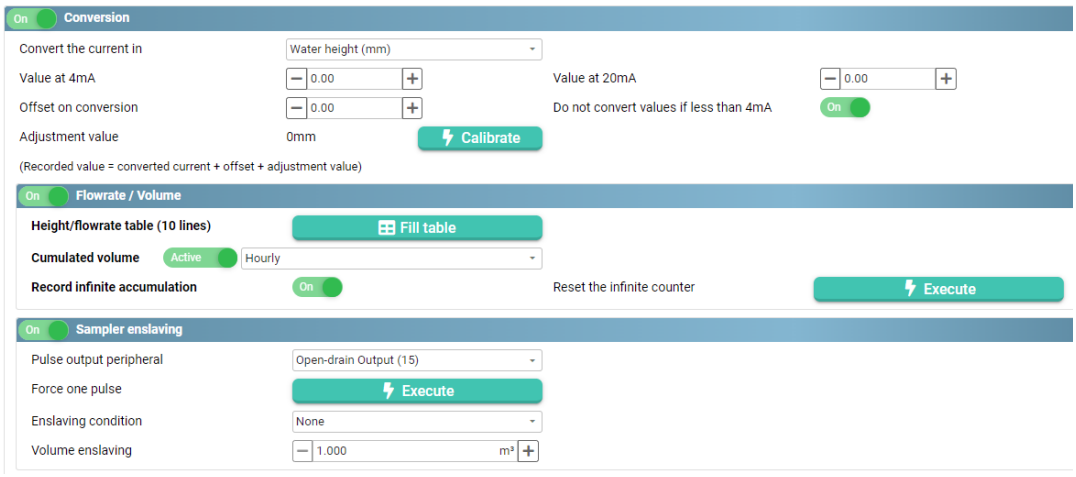


Setting up the Height/Flow Relationship

These options are only available if the 4-20 mA signal is converted to water height. In this case, it is possible to fill in a height/flow table so that the logger transforms the 4-20 mA signal into a water level and then transforms the water level into a flow rate. To do this, click on the "fill table" button. Be careful to respect the units indicated in the table (mm or m and m^3/s or m^3/h).

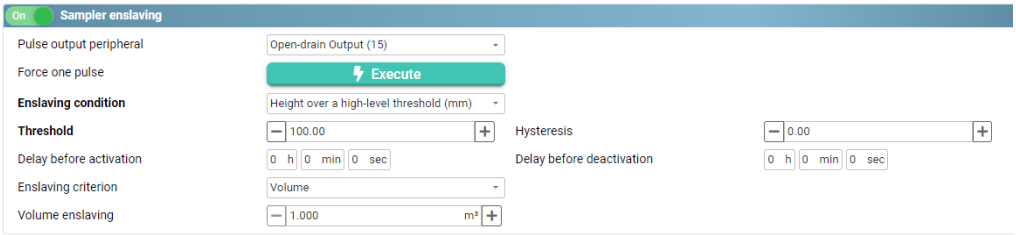
There is an option to transform flows into transited volume. It is then possible to record an hourly, daily or monthly volume accumulation. Infinite volume is also available.

The "Execute" button will reset the infinite volume to 0 if necessary.



Setting up sampler control

If a height/flow relationship has been specified, then it is possible to send pulses to a sampler connected to an Ijinus logger.



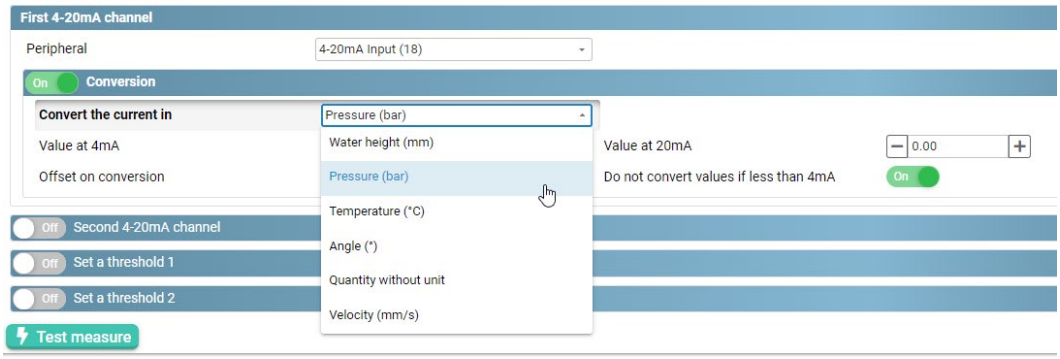
The "Execute" button to the right of the "Force one pulse" line allows you to test that the link between the logger and the sampler is functional. If you click this button, the logger will send a pulse to the Open-Drain output that must be detected by the connected sampler.

It is possible to choose several slaving conditions: either on a water level or on the flow rate. A delay can also be added to this condition, whether it is when the pulses are activated or deactivated.
Finally, there are two possible slaving criteria:

- Volume control. This means that, in the example above, 1 pulse will be sent each time the logger has measured 1 m^3 of volume transited.
- Time control. This means that, as long as the condition is met, 1 pulse will be sent to the sampler at the set frequency. The measured flow rate will have no effect on the number and frequency of pulses sent.

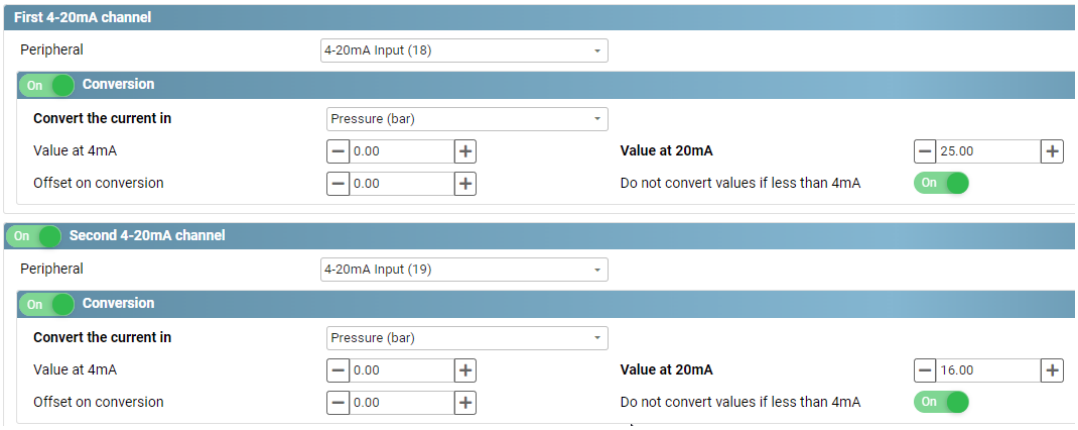
NB: the logger is in standby mode between two measurements and therefore cannot send pulses. At the time of measurement, if the logger calculates a transit volume of 5 m^3, then 5 pulses will be sent in a row. Similarly, with time control, if the pulse sending frequency is set to 1 minute but the 4-20 mA measurement frequency is only 5 minutes, then no pulses will be sent between 2 measurements. On the other hand, for each alarm and if the servo condition is still met, 5 pulses will be sent to the sampler every 5 minutes.

Convert current to pressure, temperature, angle, velocity, or quantity without unit:
For the other types of conversion, the possibilities are the same as for the conversion to bar shown below.

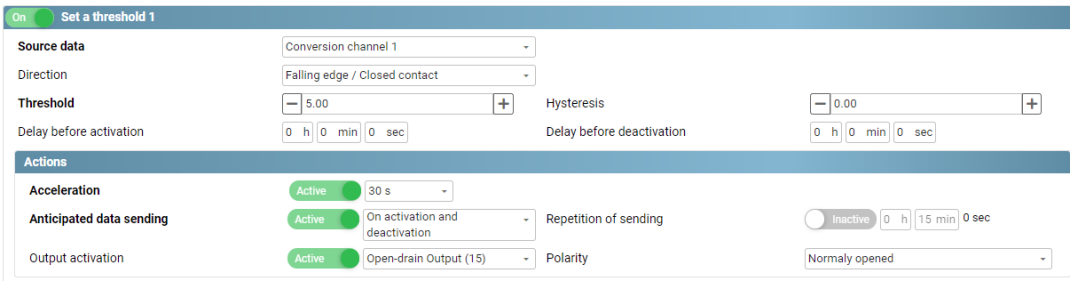


In the example below, the 4-20 mA sensor is a 0-25 bar range sensor. It is possible to adjust the measurement made on a reference measurement, using the offset on the conversion.
There is an option for not converting the current values if they are lower than 4 mA. This means that the conversion will be done at the indicated value at 4 mA (in the example below: 0 bar) regardless of whether the current is measured at 0 mA, 2 mA or 3.99 mA.

Using a second 4-20 mA sensor:
It is possible to add a second 4-20 mA sensor to the logger. The options and possibilities are identical to those already presented for the first 4-20 mA sensor.

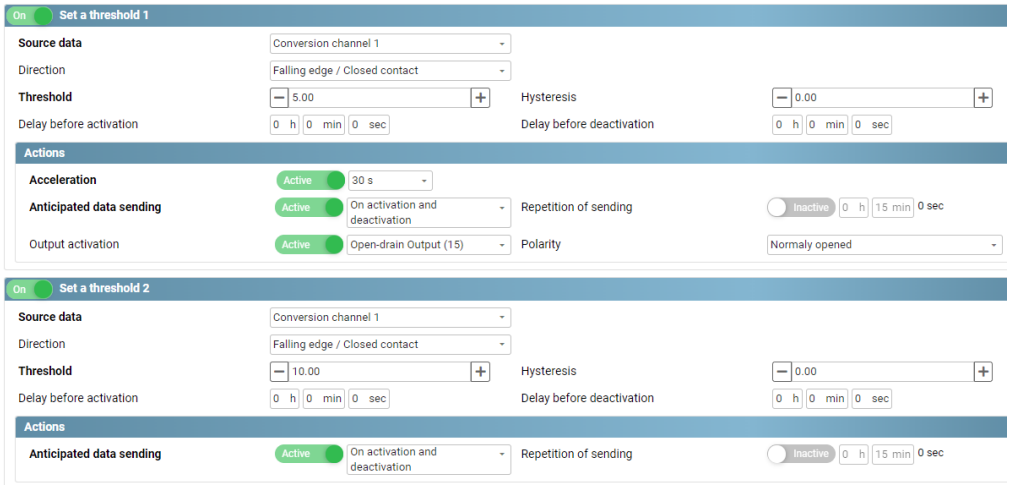


Setting a threshold
If needed, you can set a threshold as shown in the image below.



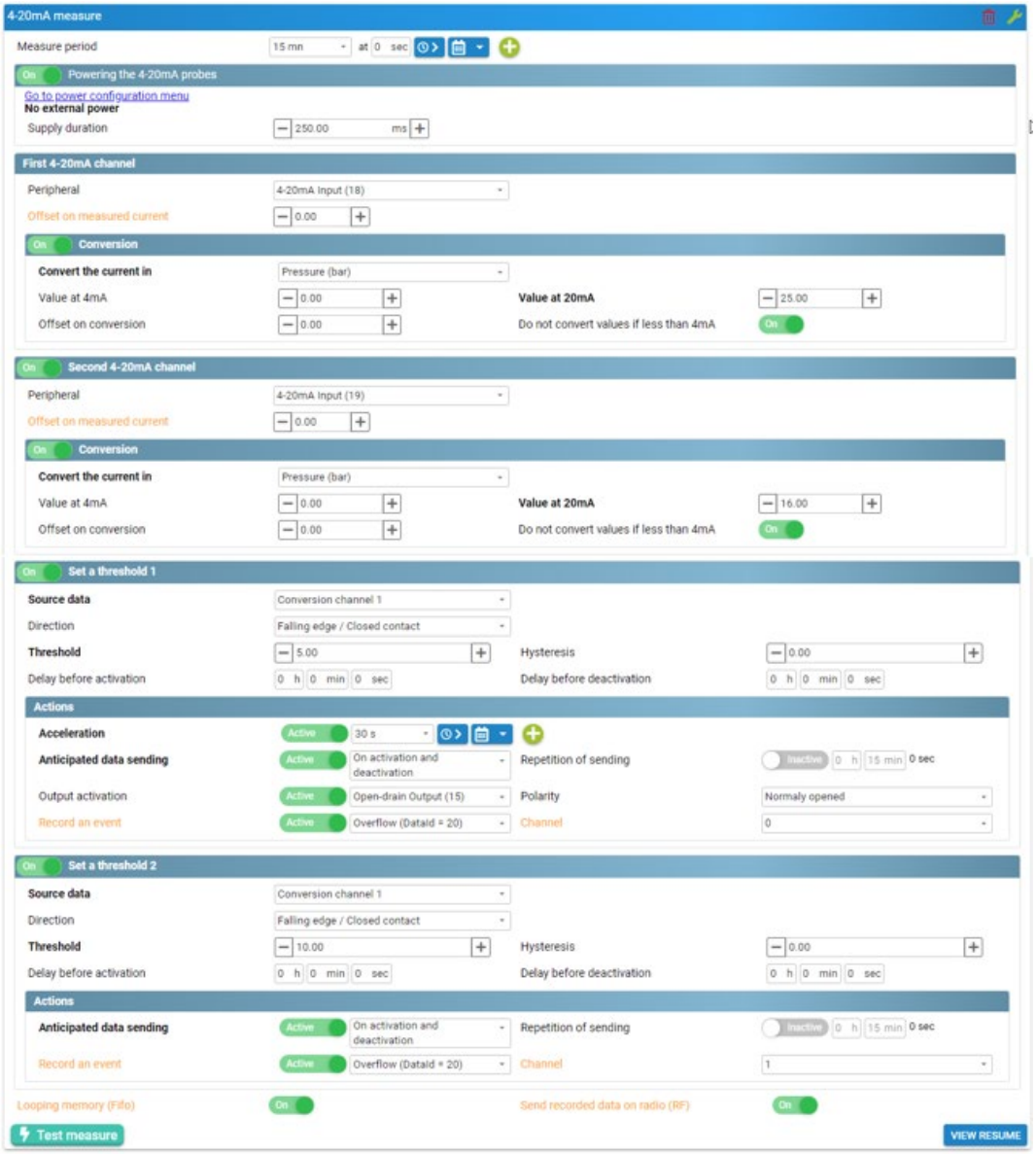
In this example, the threshold is based on converting channel 1 to "rising edge" (but you can choose "falling edge") for the direction. The delay can also be chosen for activation and/or deactivation.
If you want to speed up the measurement period, press the "Active" button on the acceleration action and enter the new period.
It is also possible to anticipate the sending of data (if the logger's communication mode allows it) on the activation and/or deactivation of the set threshold.
Finally, it is possible to activate the Open-Drain output to close a contact if the threshold is exceeded (normally open operation), or to open the contact if the threshold is exceeded (normally closed).

It is possible to set a second threshold for which neither the option to accelerate measurements nor the option to enable the Open-Drain output is available.



Advanced settings

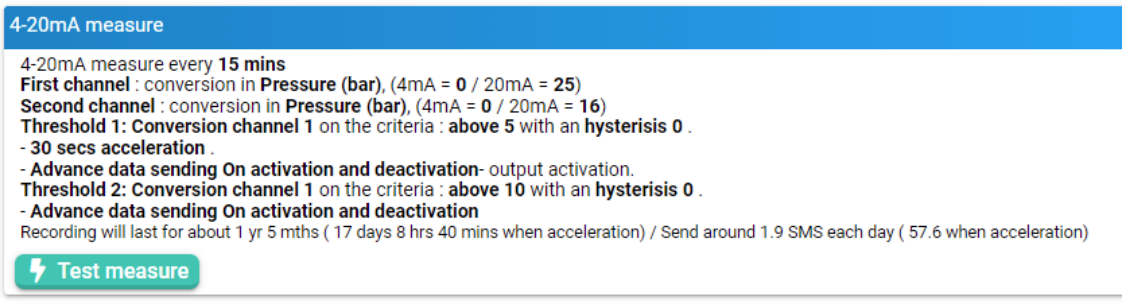
The wrench icon at the top right of the screen provides access to more features:



Viewing the parameter summary

Once programming is complete, a summary displays the different choices. If you need to change this configuration, press the "Edit" button.

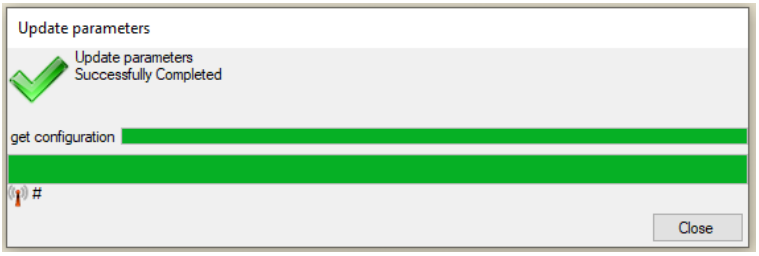
Saving the setting



You must validate the configuration with the "save configuration" button to send the

configuration to the logger's memory.

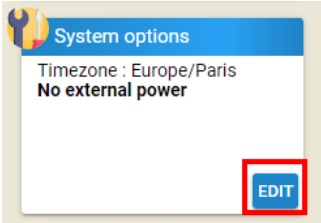
After a few seconds, a screen will appear indicating the correct recording of the setting in the logger.



9. System Options:

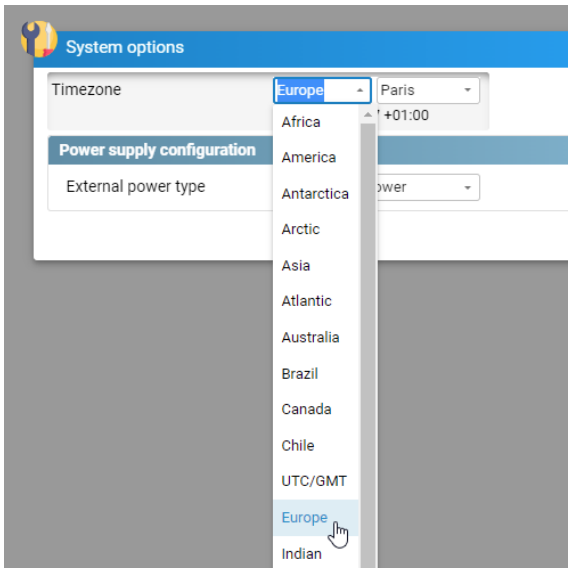
The "System Options" box allows you to define:

- The time zone used by the logger. This is the time that will be used by the logger for each programmed action but also for the timestamp of the measured data.
- Power management. It is in this section that it is possible to declare whether a power source is used in addition to the internal battery.

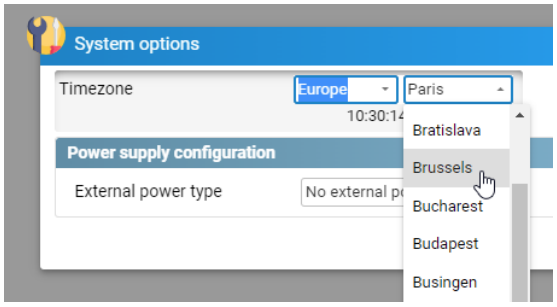


9.1. Time zone

Click on the drop-down menu to choose the desired time zone (Europe in the example below):



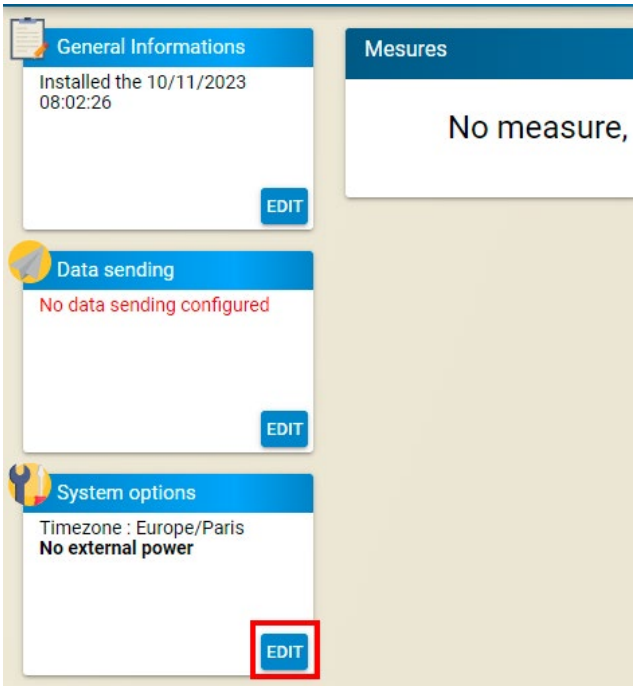
Then click on the drop-down menu to choose the city corresponding to the desired time zone (Brussels in the example below). The time that will be applied to the logger is then automatically recalculated.

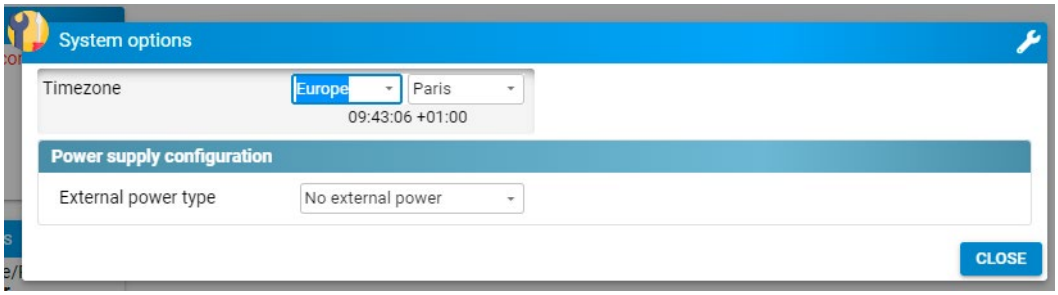


9.2. Power Management

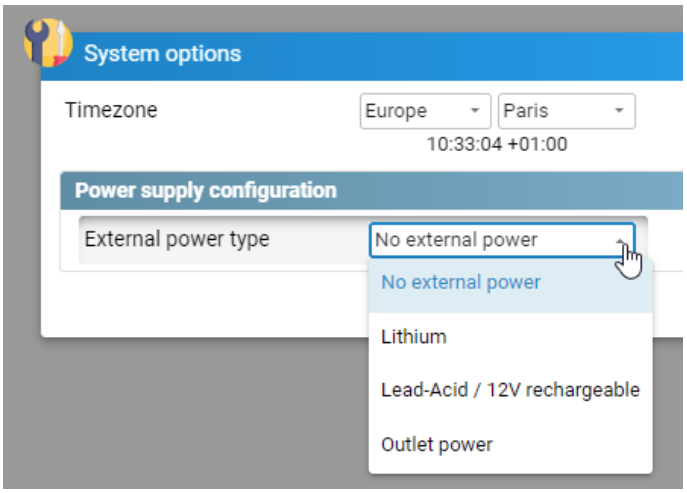
It is possible to power an external sensor directly from the logger's internal battery. However, it is also possible to use an external battery or mains power supply (7-30V).
Some sensors (some Doppler sensors in particular) must be powered by an external source because the power required to power them is too high compared to the capacity of the internal battery (1.8 W maximum).

There is a "System Options" box on the left side of the Avelour software. Click on the "edit" button to configure this box and open the settings window.

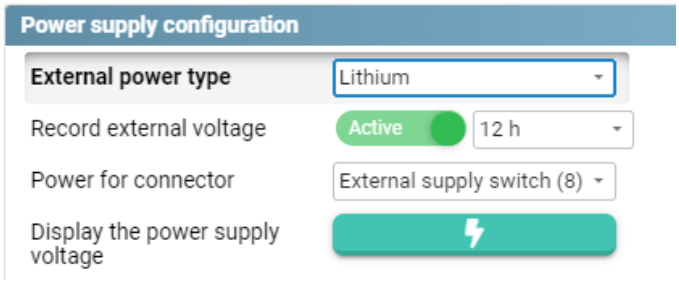




In the "External power type" section, click on the drop-down menu to select the type of external power supply. By default, no external power supply is selected, which means that the external sensor will be powered by the logger's internal battery, if possible. Three choices are possible: Lithium battery pack (non-rechargeable), 12V lead-acid battery (rechargeable) or mains power:

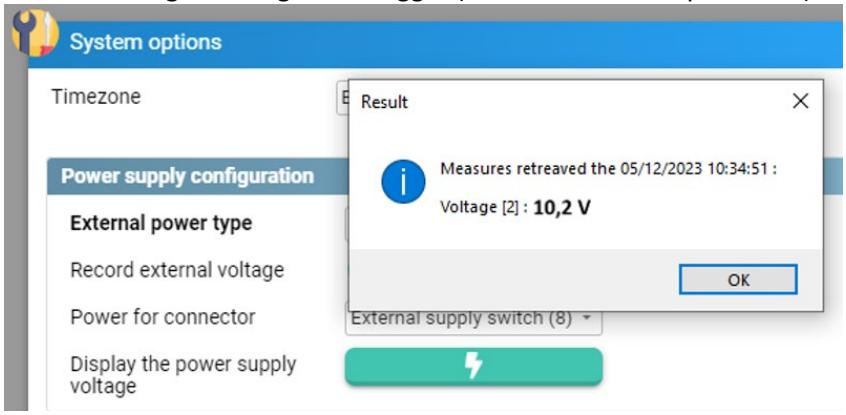


Select the external power supply connected to the logger, Lithium in the example below:

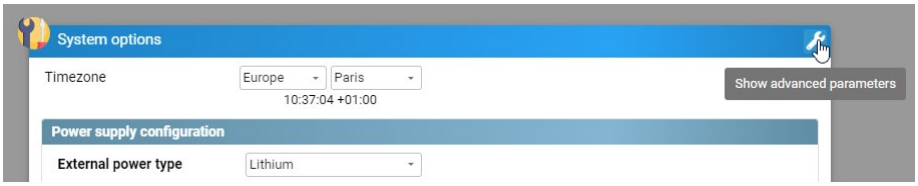


By default, the voltage of the external power supply is recorded every 12 hours. If the logger is equipped with a communication card, this allows remote alerting in the event of a dead battery and the imminent cessation of measurements. If the sensor is not communicating, the battery voltage will still be recorded for diagnosis when retrieving data locally.

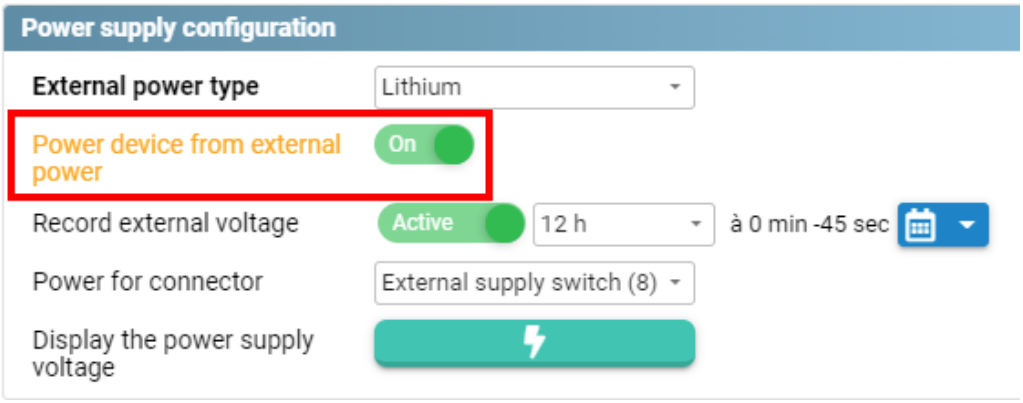
The lightning bolt button to the right of the "Display the power supply voltage" option allows you to measure the voltage arriving at the logger (10.2 V in the example below):



By clicking on the wrench icon at the top right of the "System Options" box, it is possible to see the advanced settings:



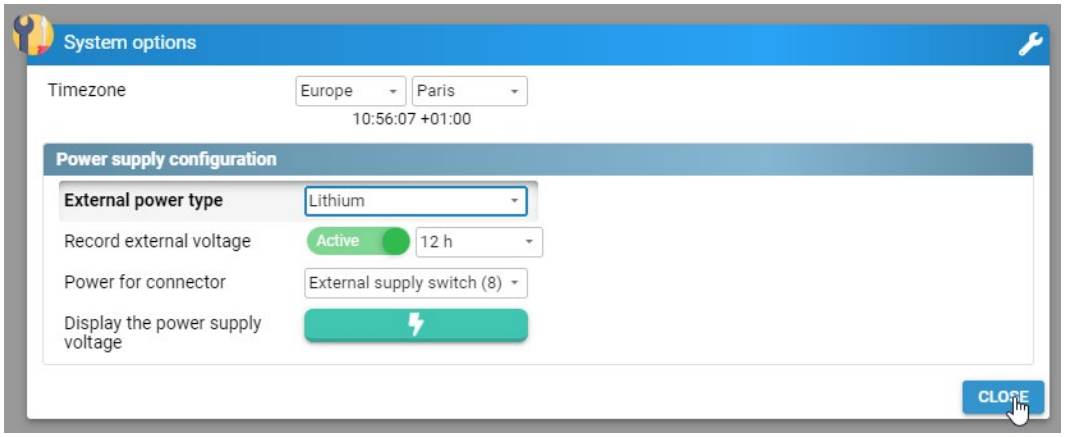
One option in particular appears: "power device from external power". This option is enabled by default.



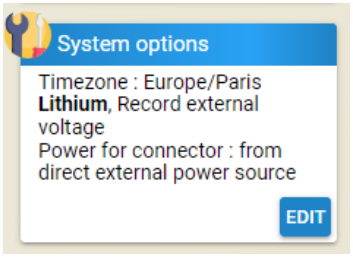
This means that, by default, the energy required for the logger is taken from the external power supply. In this way, the internal battery is preserved since it is only used for standby power and the logger's radio ping. However, if the goal is to maximize system autonomy, it is possible to disable this option so that the logger uses the energy of its internal battery each time it wakes up and especially when sending data via the cellular communication card.

The setting is almost identical for the 3 possible external power options.

Once the configuration is complete, click on the "close" button at the bottom right of the window to save the changes:



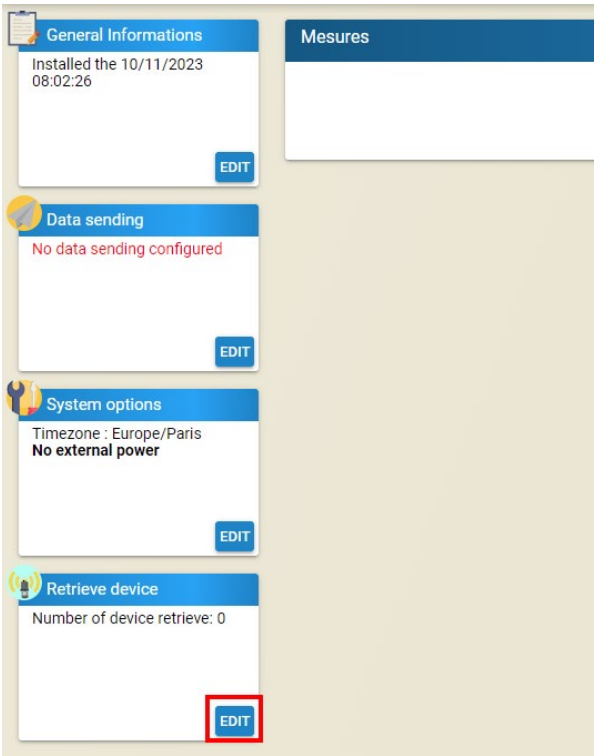
A summary of the settings is available in the "System Options" block on the left side of the Avelour software:


System options
Timezone : Europe/Paris
Lithium, Record external voltage
Power for connector : from direct external power source
EDIT

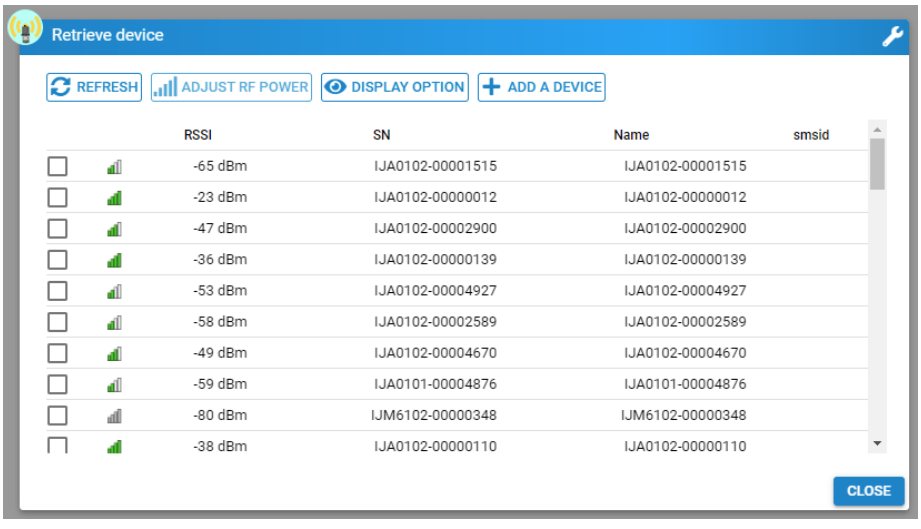
10. Pair a device

In addition to its ability to make a measurement, a logger can be used as a hub (or master logger). In fact, it can wirelessly and radio-retrieve data from another logger, if they are less than 25 m apart in an unobstructed open field, or if one is buffered and the other out of buffer (in this case the distance between the two hubs must be less than 5 m). The "master" logger then retrieves data from a "slave" logger. This option is called pairing and is set up in the "master" logger. No settings need to be made in the "slave" logger.

In the “Retrieve device” section, click on "Edit":



Then, the different loggers that can be "seen" by the host being programmed are proposed in the "Retrieve device" window.



The quality of reception is indicated by green bars (the more there are, the better the quality) and a numerical value.

If CISO < -75 dbm then 0 green bar: communication is not possible

If RSSI < -65 dbm then 1 bar: communication difficult, communication impossibilities may occur between the two loggers

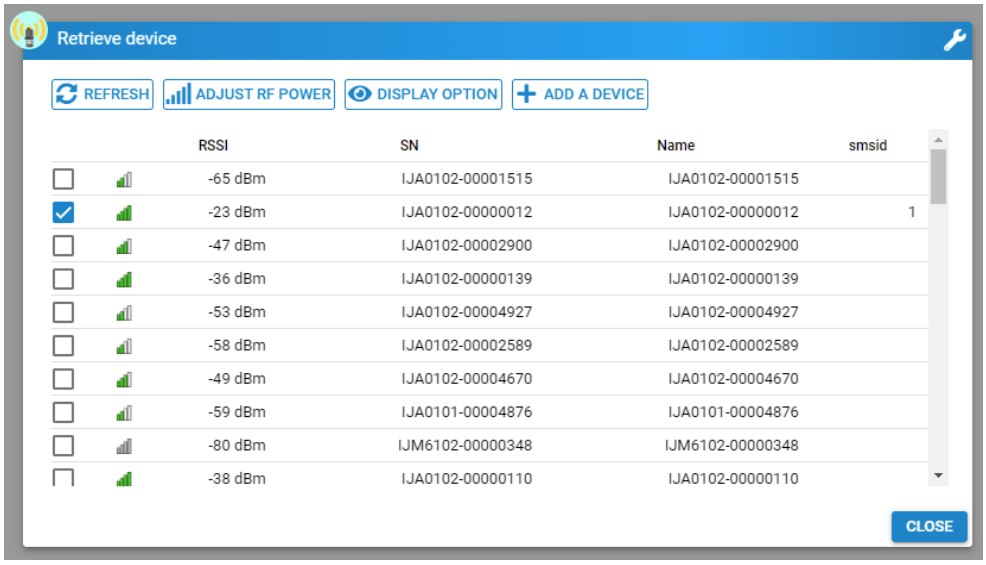
If RSSI < -50 dbm then 2 bars: correct communication

If RSSI < -40 dbm then 3 bars: good communication

If RSSI < -20 dbm then 4 bars: excellent communication

If RSSI > -20 dbm then 4 bars and a red exclamation mark: the two loggers are too close, it is necessary to adjust the radio power. See explanations below.

Check the boxes to select the logger(s) to be paired. It is possible to pair up to 8 "slave" loggers, but the greater the number of paired loggers, the greater the power consumption for the radio dialogue between the two devices. The autonomy of the "master" logger can therefore be significantly reduced.

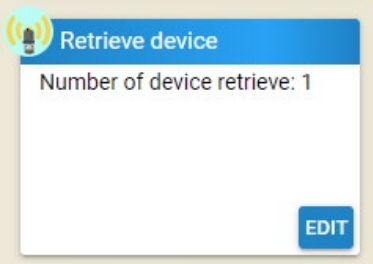


If the sensor you are looking for is not available, you can refresh the page by clicking on the "refresh" button.

Point of vigilance for data intended to be sent to supervisors:

The channel number used by some supervisors to associate data from equipment is by default (therefore not modifiable via the software) 0 for a "master" logger. The channel numbers for the paired loggers are set by the "sms id" (here e.g. 1). Each paired sensor will therefore have a different "sms id".

Once the configuration is complete, click on the "close" button and a summary will be displayed on the left side of the Avelour software:



Case for two loggers very close together (less than 1m):

By default, the loggers are set to maximum radio power. For 4th generation loggers named V4 and whose serial number starts with IJA0102 or IJH0102, the radio power adaptation is automatic. No configuration is required.

However, for V3 (IJA0101-) loggers, the maximum radio power does not allow two nearby loggers to communicate. To allow pairing, the radio transmitting power must be reduced. To do this, after selecting a "slave" logger, click on the "adjust RF power" button. The power will then be automatically reduced to the power necessary for proper communication between the two loggers.

NB: The decrease in radio power can lead to communication difficulties between the logger concerned and the radio access point, i.e. with the computer equipped with Avelour.

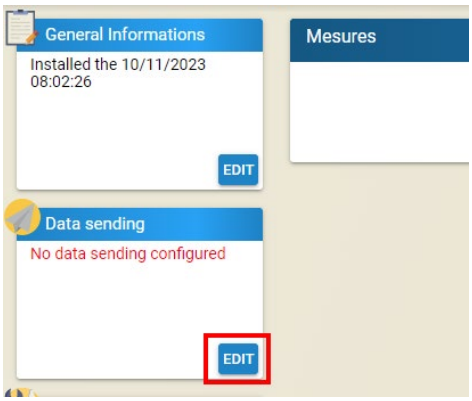
11. Data transmission

As mentioned at the beginning of the document, data can be transmitted in several ways, such as SMS or M2M (Machine to Machine) communication in FTP or CoAP protocol. Several technologies can be used for this: 2G, 3G, LTE-M or NB-IoT.

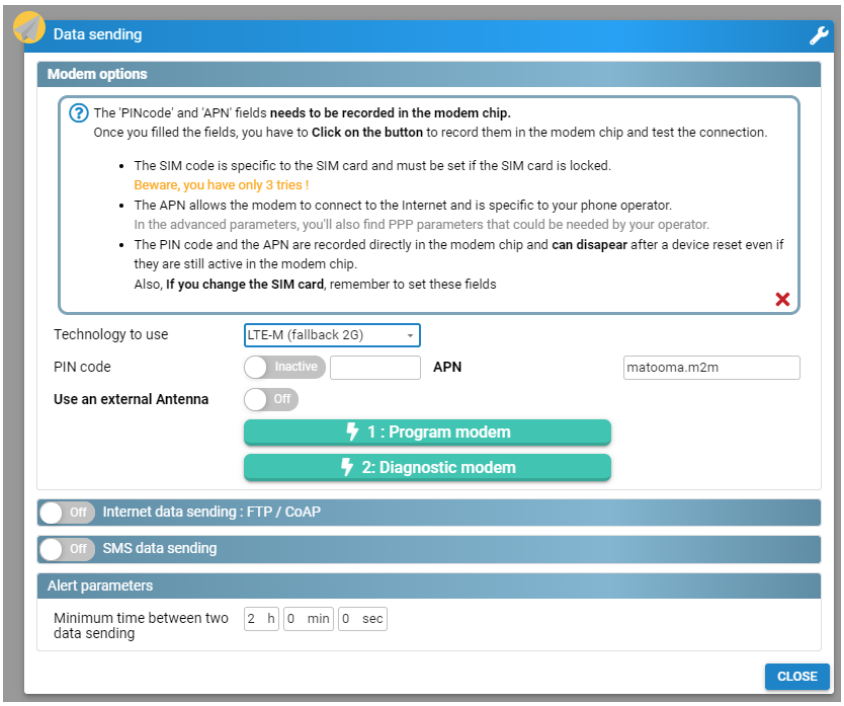
Important: NB-IoT technology does not allow data to be sent via SMS.

A very important factor in data transmission is the quality of the telephone operator's signal at the location where the logger is installed. Depending on how the logger is installed, the quality of the signal may be degraded, for example if the logger is placed in a manhole closed by a metal cover.

To set up the data to be sent from the logger, click on the "Edit" button in the "Data sending" application:



The settings window opens in the middle of the screen:



11.1. Modem Settings

Before you can send data by SMS or M2M, it is essential to set up the communication card's modem.

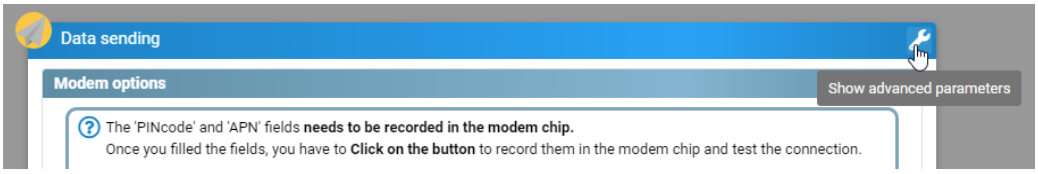
The first piece of information to be entered is the technology used. This can be 2G, 3G, LTE-M or NB-IoT. For 3G, LTE-M and NB-IoT technologies, it is possible to choose an option where 2G technology will be used as a backup if the technology chosen first is not available.

Please note: the chosen technology must be compatible with the SIM card inserted in the logger as well as with the relay antennas located near the logger.

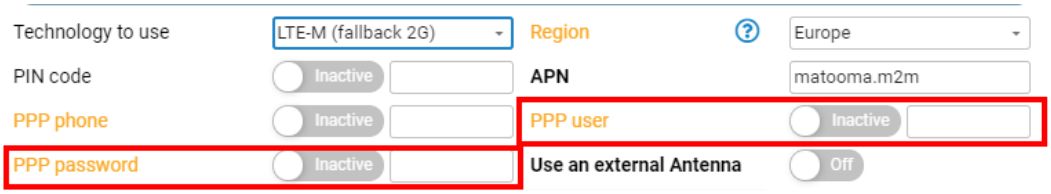
If the SIM card is protected by a PIN code, it must be entered. Please note that only 3 attempts are possible before the SIM card is blocked.

Finally, if the data is sent via M2M (via FTP(S) or CoAP), then the SIM card APN must be set up. By hovering the mouse over the question mark, a list of the APN of some telephone carriers is provided.

In the case of a private APN with a password, it is necessary to switch to advanced settings. To do this, click on the wrench icon at the top right of the application:



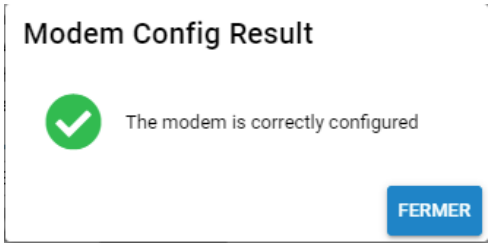
New options appear, including fields to fill in the username (PPP User) and password (PPP Password). You must click on the "Inactive" button of each parameter to make it "Active" so you can fill in the fields.



Important:

When the various parameters required for the Modem have been entered, you must click on the "1: Program modem" button. This button allows you to send the data to the modem, but simply saving the configuration does not allow you to configure the modem.

It takes a few minutes to program the modem. On completion, a window will open indicating configuring has been successful:



If programming fails, a window will open to indicate the problem encountered (missing SIM card, wrong PIN code, etc.)

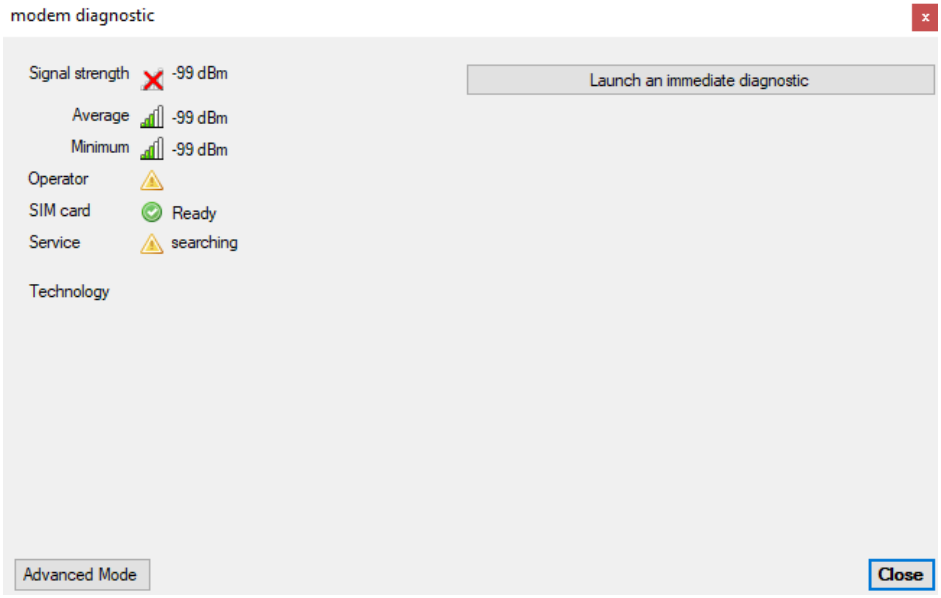
So, each time a parameter is changed (change of technology for example), you must click on the button "1: Program modem".

11.2. Modem diagnosis

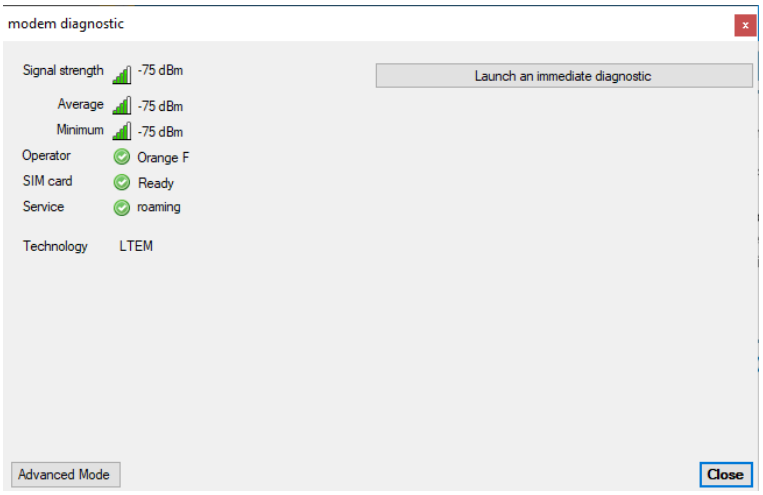
After setting up the modem, you must make sure that a communication network is available. To do this, click on the "2: Diagnostic modem" button.

After clicking this button, the communication card will start and look for a cellular signal. A window will open to view the results.

If the result is as shown below, it means that the signal was not found.



Clicking on the "Launch an immediate diagnostic" button gives the modem more time to hook up a network. Within a few tens of seconds, a satisfactory result as shown below should appear:



If, after 5 minutes of searching, the result is not satisfactory, that means there is a problem with the connection to the network. There are several possible scenarios:

- No network is available for the selected technology. Fix: choose another communication technology if the SIM card allows it and then click on the "1: program modem" button.
- No network is available for the SIM card operator. Fix: Use a multi-carrier SIM card or a SIM card from another operator.
- No network is available for any technology. Fix: Place the external antenna connected to the logger in a location where communication is more favorable. For example, take the antenna outdoors if it was placed in a manhole or installation.
- The SIM card has not been activated. Fix: Check with the SIM card provider to see if it has been activated. Check the SIM card's scope of validity. Some SIM cards may be limited to certain countries or continents depending on the subscription purchased.

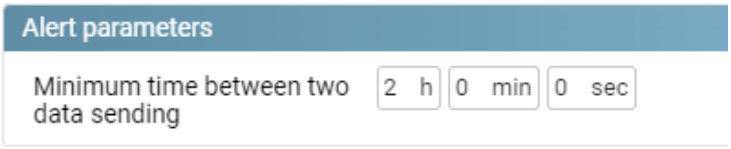
By using advanced mode, it is possible to perform continuous signal strength measurements over a longer period of time. This option can be used to set the best antenna position before drilling a hole in the manhole to offset the antenna from the metal cover.

Signal Strength Value:

- 49 dBm: Default value that may indicate a network hook-up problem
- 70 to -80 dBm Very good quality
- 80 to -90 dBm Good quality
- 90 to -100 dBm Average Quality
- 100 - 105 dBm Poor signal quality
- 113 dBm No communication possible

11.3. Alarm Settings

There is a safety setting in place to avoid draining the internal battery too quickly in the event of a programming error. This is called the "Alert parameters". By default, this setting imposes a minimum of 2 hours between two alert-related transmissions. You can change this value.



11.4. Data transmission by SMS

Insert a SIM card (with a "voice" plan or a plan that allows you to send text messages) into the holder.

In Avelour, click on the "Off" button next to "SMS data sending". The button turns green and several options are displayed.

The "Sending period" is the frequency with which data is desired. One transmission every 12 hours in the example below:

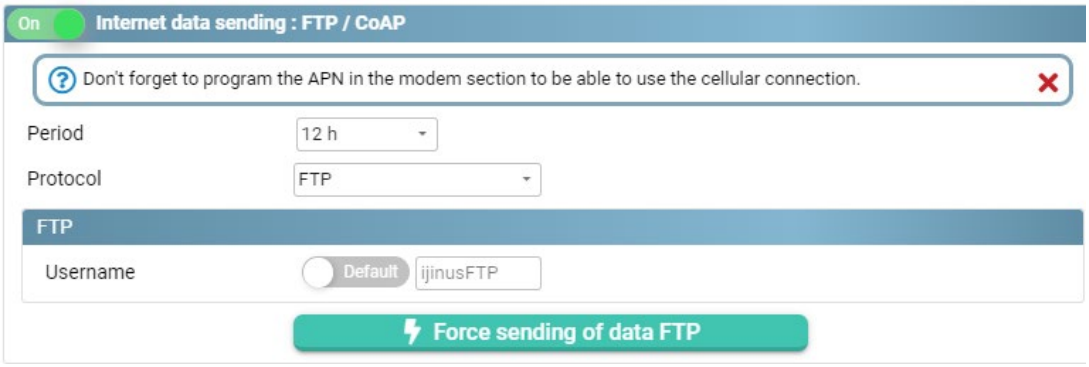
To check that SMS transmission functions correctly, enter a phone number in the box next to the "Sending a test SMS" line indicating the country code. Then click on the "Send a test SMS" button and check that the SMS has arrived on the indicated phone.

Lastly, you will have to enter the server's phone number in order to send the data to it. The "SMS Site ID" value is a value that identifies the logger on the server and the supervisor used to display the data. If the data is sent to the Ijitrack web service, no changes are necessary. If the data is sent to another supervisor, you will have to check with the person in charge in order to set the correct SMS Site ID.

11.5. Data transmission by internet

Insert a SIM card (with a plan that can send at least 5 MB of data per month) into the holder. When purchasing the SIM card, ask for the operator's APN as well as the PIN code if it exists as this information will be required. The GSM/GPRS antenna must also be connected to the connector on the top of the logger.

In Avelour, click on the "Off" button next to "Internet data sending: FTP / CoAP". The button turns green, and several options are displayed.

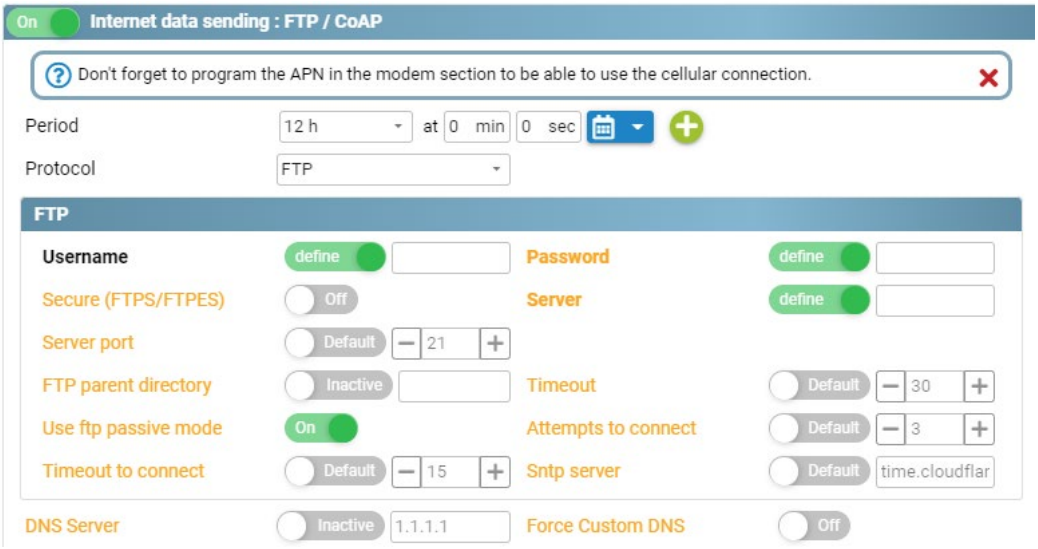


Fill in the transmission cycle (12 hours in the example above).

The logger is programmed by default to send the data to Ijitrack. In this case, no changes to the settings are required.

If you do not have an Ijitrack account, please contact our customer service (sav.ijinus.fr). You will be asked for the following information: product number on the logger label and the address of the facility.

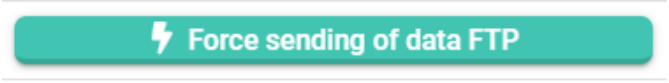
If the data is sent to a server other than Ijitrack, you will have to switch to advanced settings. To do this, click on the wrench icon at the top right of the screen. Several additional parameters appear:



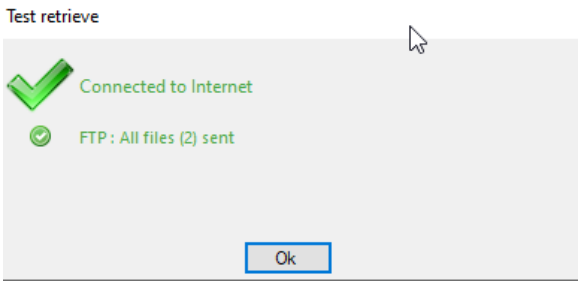
If necessary, check with the FTP server manager to obtain the 3 parameters required to send data to a server:

- The name or IP address of the server: "Server"
- The name of the user for access to the server: "Username"
- The password associated with the defined user: "Password"

It is possible to check that the data is being sent correctly by clicking on the "Force sending of data FTP" button.



If the data is sent, the following window appears:



After a few minutes, check that the data has arrived on the Ijitrack account or on a server other than Ijitrack.

There are several possible causes if data transmission fails:

- Poor network quality. Fix: Move the antenna to a location that is more conducive to communication.
- The SIM card has not been activated. Fix: Check with the SIM card provider to see if it has

been activated. Pay attention to the SIM card's scope of validity. Some SIM cards may be limited to certain countries or continents depending on the subscription purchased.

- The AFN was not properly filled in. Fix: check and, if necessary, correct the APN set and then click on the "1: Program modem" button
- For a server other than Ijitrack: incorrect configuration of the name and/or access to the server

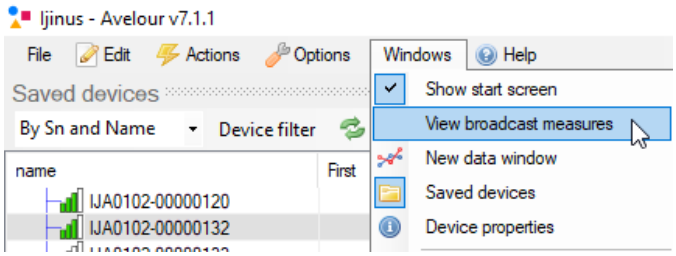
Once you have set all these parameters, click on the "**save configuration**" button to save the configuration to the logger.

12. Real-time data visualization

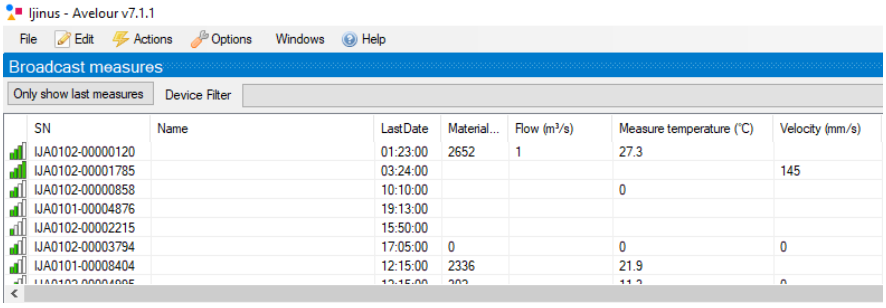
You have two options for reading the data in real time:

- by pressing the "Force a measure" button (if available in the selected app). A point measurement is displayed in a matter of seconds.

- or by selecting the "View broadcast measures" window from the main menu (In the main menu: Windows > View RF Received Measurements):



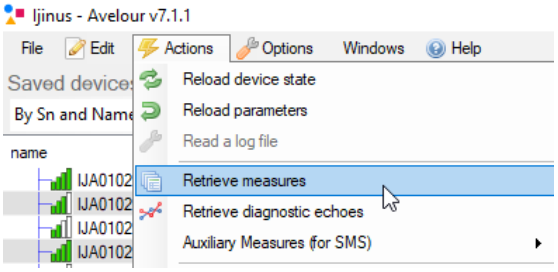
The data will appear based on the counting period set in the selected app. In the example below, several loggers can be seen by the Wiji radio key. Logger IJA0102-0000120 indicates that the last measurement was made at 1:23 and that the measured value was 27.3°C for the temperature.



13. Retrieving and visualizing data retrieved by radio communication

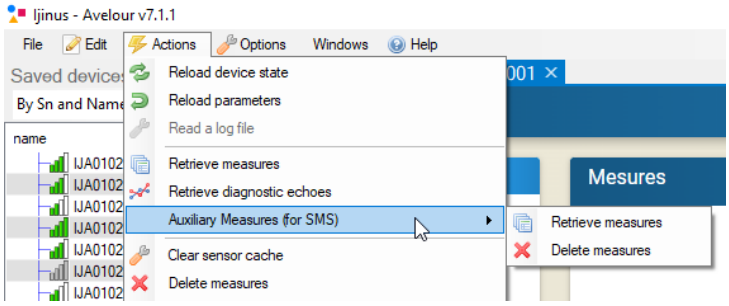
When connected to a logger, the software can retrieve the data.

It is also possible to run this command from the "Actions > Retrieve measures" main menu:



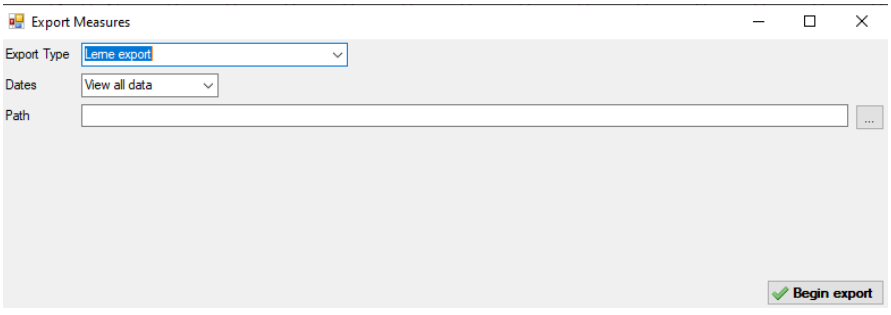
You can view the data, even offline, in graphical and list formats. A graphics configuration module allows you to change the colors and line thicknesses,... and also to apply statistical filters and formulas to your data.

If you want to download the data locally with a sensor programmed to send the data via M2M or SMS, you must use "Actions> Auxiliary Measures (for SMS)>Retrieve measures" on the main menu.



13.1. Data export

In the graphic and/or data list, you will find the "Export Measures" tab with the choice of different file formats and report styles, from date to date, by month or just all data.



14. Maintenance

14.1. Connecting a remote antenna

You must use an Ijinus remote antenna. Three lengths are available as standard: 1, 3 or 5m. In exceptional cases, a length of 10m may be proposed.
The antennas are suitable for sewerage network applications with a thick cable and reinforced sealing.
Important: The antenna must be connected to the sensor by screwing it firmly by hand and all the way to ensure a good seal.
Identify the best conditions for installing the antenna, in particular the drilling direction for the best communication quality. A positioning and data transmission test is available in the Avelour software. You must do this test before and after installation (cover closed in the case of a manhole).

14.2. Setting up a SIM card

Our sensors and loggers contain components that can be damaged by electrostatic discharges. Discharge the electrical charges from your body before opening the device and handling it. To do this, touch a grounded metal surface, such as the metal housing of an electrical cabinet.
Discard desiccant packets if they are green and replace with two orange packets.
Our sensors and loggers with built-in GSM/GPRS/3G modem need a SIM card to work. The SIM card holder is located on the communication card.

- Open the case by unscrewing the 4 screws on the rear of the case and then unclipping the 4 clips from the front of the case.

- You must not leave the logger open for too long (a few minutes) because the desiccant bags will absorb too much humidity and will no longer fulfill their role.

- Insert the SIM card into the support provided for this purpose, taking care to respect the insertion direction. There is a diagram on the communication card showing this.

- Close the logger, taking care not to put any electrical wires or objects between the front of the case and the seal on the rear. Reclip the 4 clips then, if necessary, retighten

the 4 screws.

14.3. Changing the battery

- Open the case by unscrewing the 4 screws on the rear of the case and then unclipping the 4 clips from the front of the case.

- You must not leave the logger open for too long (a few minutes) because the desiccant bags will absorb too much humidity and will no longer fulfill their role.

- Replace the desiccant bags if they are green.

- Partially remove the card support from the case in order to access the battery connector located at the back of the electronic card.

- Remove the used battery from its housing and disconnect it from the electronic card.

- Connect the new battery to the electronic card (the connector is fool proofed) then place the battery in its housing.

- When restarting the electronic card, the LED located on the front of the card must flash Red/Green then, after 2 to 3 minutes, just one green flash every 10 seconds.

- Put the card support back in the pins provided for this purpose.

- Close the logger, taking care not to put any electrical wires or objects between the front of the case and the seal on the rear. Reclip the 4 clips then, if necessary, retighten the 4 screws.

- After changing the internal battery, you will have to connect to the device via the Avelour software to indicate that this has been done. Click on “notify battery change” so that the logger restarts and the energy gauge returns to 0.

15. Troubleshooting & Repair

In case of a problem with an Ijinus logger or sensor, you should contact our Customer Service either by email: sav@ijinus.fr or by phone: +332.98.09.03.32

You will be instructed on the procedure to follow in order to either carry out tests on the affected product or to return it to the factory for testing on our premises.

16. Technical Specifications

The most versatile logger on the market.

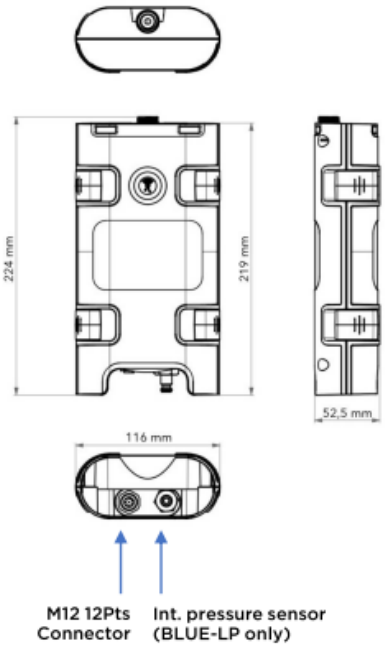
Battery powered and compact, this data logger allows you to record many different parameters (pulse count, Modbus flow meter, 4-20mA pressure sensor, ...).

The BLUE logger is also available with a built-in pressure sensor :
The BLUE-LP logger

Both BLUE and BLUE-LP can be equipped with a cellular communication card (2G, LTE-M or NB-IoT) to send data to a SCADA.

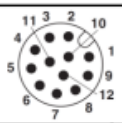
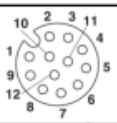
- Quick and easy installation
- Battery powered logger with a 500 000 measures memory
- **2x digital contact inputs or counter 100 Hz max**
  (Ready for 4 digital inputs)
- **1x 4-20 mA analog inputs**
- **1x Modbus RS485**
- **1x open collector output**
- Built-in absolute pressure sensor 0-25 bar option
  Drinking water certification : NSF/ANSI 61/372 - MH60087
- **Configuration by radio on-site**
- Communication option by 2G / 4G (LTE-M, NB-IoT)

Features	BLUE-LP-82-LTE (868 MHz)
Pressure sensor	Built-in, 0-25 bar
Data Logger memory	500 000 measures
Inputs	2x pulse inputs 100 Hz 1x 4-20mA input (built-in sensor) 1x 4-20mA input for external sensor 1x RS485 Modbus input (if not used as output)
Outputs	1x open collector 1x Modbus output (If not already used as input)
Connector	M12 12points
Antennas : radio / cellular	Internal radio antenna and external cellular antenna See configurator for options
Logger Housing	PA12 50% glass fiber
Sealing grade	IP68 : 2m / 100 days
Energy	Battery : 3,6V 34Ah
Configuration	Wireless configuration kit (PN : MOC00001 or WijiKey) that includes the software AVELOUR
Dimensions and weight	224 x 116 mm for a thickness of 52,5 mm 700g (with battery and cellular card)
Certifications	CE NSF



Internal pressure sensor	
Logger pressure type	Absolute
Measuring range	0-25 bar
Test pressure	50 bar
Burst pressure	200 bar
Accuracy	≤ 0.3 % of full scale
Operating temperature	-30°C to + 85°C
Storage temperature	-30°C to + 100°C
Certifications	NSF/ANSI 61/372 - MH60087

Blue logger part numbers	
BLUE-80	Battery powered logger Data download by radio on-site
Optional built-in pressure sensor	
BLUE-LP-80	Battery powered logger Internal pressure sensor 0...25 bar Data download by radio on-site
Optional cellular communication card	
BLUE-82-LTE	Battery powered logger radio / 2G / LTE-M / NB-IOT communication
BLUE-LP-82-LTE	Battery powered logger Internal pressure sensor 0...25 bar radio / 2G / LTE-M / NB-IOT communication

Connector wiring : Male :  Female : 

Cable colors	Brown	Blue	White	Green	Pink	Yellow
PIN Number	1	2	3	4	5	6
Signal	GND	AI 2	V in	V out	Not available used for internal pressure sensor	Input or output
Features	Ground	Current 2	External power or battery (5V...30V)	Power 5V...18V* (internal battery) or Switch Vout=Vin		RS485-H
Type		4-20 mA	Power Supply in	Modbus	4-20 mA	Modbus

* 1,8W maximum on Vout, if external sensor connected and powered by internal battery (adjustable voltage by software).

Cable colors	Black	Grey	Red	Purple	Grey/Pink	Blue/Red
PIN Number	7	8	9	10	11	12
Signal	DI 1	Input or output	Open drain output	DI 2	DI 3	DI 4
Features	Digital 1 / Counter 1 100 Hz	RS485-L	Ground contact	Digital 2 / Counter 2 100 Hz	Available from 2024	
Type	Digital	Modbus	Open drain (1A/30V)	Digital		

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

This device complies with Industry Canada license-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

18. 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.

Devices A0102 and H0102 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.

19. Document version

Date	Version	Writer	Modifications
04/10/2023	1A01	A. TRIBALLIER	Original document