

Physico-chemical sensors

Water quality measurement

User guide

User guide: Version 01

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Chapitre 1. Document information

1.1. Background

This user guide contains all the information required to install, connect and commission the unit, as well as important notes concerning maintenance. It is therefore essential to read it before commissioning any Ijinus equipment.

1.2. Symbols used



This symbol indicates a situation or use that may result in damage, fault or equipment malfunction.



This symbol indicates additional information useful for the understanding and correct use of the equipment.



This symbol indicates a prerequisite for performing a task.

Chapter 2. Safety

2.1. General instructions

This document presents a number of operations and programming to be performed on a data logger, a sensor or an accessory supplied by Ijinus. These operations must only be performed by personnel qualified to use Ijinus products. The information provided in this user guide only ensures operational safety if the equipment is used correctly. Performing any work on the device requires the use of appropriate personal protective equipment. Below we have provided a non-exhaustive list of recommendations to apply to ensure the safety of Ijinus data logger users:

- Only use batteries specified by Ijinus.
- Risk of fire or burns with lithium batteries: do not short-circuit, recharge, puncture, incinerate, crush, immerse, fully discharge or expose the batteries supplied by Ijinus to temperatures above the operating temperature range.
- Do not shake the sensor.
- Do not physically modify the sensor.
- Do not clean the device with an aggressive product, particularly Acetone and similar.
- The device contains components that may be damaged or destroyed by electrostatic discharge. Release any electrostatic charge from your body before opening the device and handling it. To do this, touch a grounded metal surface. Ijinus assumes no liability for damage resulting from incorrect or non-compliant use.

2.2. Note for users in Canada

This device complies with Industry Canada's RSS for license-exempt radio equipment.

The operation is authorized subject to the following two conditions: (1) it must not cause interference, and (2) the user of the device must be prepared to accept any radio interference received, even if this interference is likely to compromise the operation of the device.

In accordance with Industry Canada regulations, this radio transmitter may be operated with an antenna of a type and maximum gain (or less) approved for the transmitter by Industry Canada.

To reduce the risk of radio interference to other users, the type of antenna and its gain must be chosen so that the equivalent isotropically radiated power (e.i.r.p.) does not exceed the intensity required to establish satisfactory communication.

This device complies with the RF personal exposure requirements defined by Industry Canada. This device must be installed so as to provide a separation distance of at least 20 cm from the user, and must not be installed near or used in conjunction with any other antenna or transmitter.

If the antenna is removable (RSS-GEN): This device has been designed to work with the antennas listed below, with a maximum gain of 0 dBi. Antennas not included in this list, or with a gain exceeding 0 dBi, are strictly forbidden for use with this device. The required antenna impedance is 50 Ω . List of acceptable antennae:

- IJINUS
- BOE type

Chapter 3. Product description

3.1. Technical specifications

3.1.1. Data loggers

Features	LOG09V4-82-LTE (868 MHz) LOG09V4-92-LTE (915 MHz)
Data logger	500,000 measurements
Concentrator	Yes
Inputs	1 Voltage input (7V - 24V) 1 Modbus input (if not used as output) 2 Current inputs (4-20 mA)
Outputs	1 Voltage output (5V - 18V on internal battery or Vin switch) 1 Open Collector Output 1 Modbus output (if not used as input)
Communication	- HF radio (868 or 915 MHz) 2G / LTE-M / NB-IoT (via FTPS, HTTPS, COAP or MQTTS protocols)
Radio communication	100M free-field (Wiji protocol)
Radio / mobile antenna	Internal or external radio - External mobile. See configurator for options overleaf.
Temperature range	-40°C to 85°C
Data logger material	PA12
Ingress protection	IP68 (only if using Ijinus mounting kit; P/N: H0T00053 or H0T00060)
Power supply	Internal : 3,6V 34 Ah lithium Battery - External : 7... 24 Vdc
Configuration	Wireless Programming Kit (PN: M0C00001) integrating AVELOUR software
Atex zone 2 certification	II 3G Ex ic ec IIB T4 Gc Ambient temp: -20°C to 60°C
Certifications	  : SE6A002-A0102 / IC: 10983A-A002-A0102

Features	LOG04V4
Storage capacity	500,000 measurements
Concentrator	Yes
Inputs	1 power input (7V - 30V) 1 Modbus input (If not already used as output) 2 Digital inputs or 100 Hz metering
Outputs	1 power supply output (5V - 18V on internal battery) or Vin switch 1 Open drain output

		1x Modbus output (If not already used as input)
Communication	- HF radio (868 or 915 MHz) 2G / LTE M or NB IoT (via FTPS, HTTPS, COAP or MQTT protocols)	- LoRaWAN: Europe 863-870 MHz (SF12 for RX2) - LoRaWAN Specification 1.0.2
Radio range	100 meters in open field (Wiji protocol)	
Radio hub function	Yes	
Radio / mobile antenna	Internal or external radio	Internal or external mobile
Temperature range	-20 to 70°C	
Logger housing	PA12	
Ingress protection	IP68: 1 bar for 1 month (only if using Ijinus mounting kit; PN: HOT00053 or HOT00060)	
Power Supply	Internal : 3,6V 34 Ah lithium Battery – External : 7 ... 30 Vdc	
Configuration	Wireless programming kit (PN: M0C00001) with AVELOUR software, cable and antenna	
Certification Atex zone 2 	II 3G Ex ic ec IIB T4 Gc Ambient temp: -20 °C to 60 °C	Certification:  SE6A002 – IC : 10983A-A002-A0102

3.1.2. Physico-chemical Probes

C4E

Measures	
Measure principle	Conductivity sensor with 4 electrodes (2 graphic, 2 platinum).
Measure ranges conductivity	0-200,0 µS/cm
	0 –2000 µS/cm
	0,00 –20,00 mS/cm
	0,0 –200,0 mS/cm
Resolution	0,01 to 1 according to the range
Accuracy	+/- 1 % of the full range
	Beyond 100 mS/cm use appropriate buffer solution
Measure range salinity	5-60 g/kg
Measure range TDS -KCl	0-133 000 ppm
Temperature	
Technology	NTC
Range	0,00 °C to + 50,00°C
Resolution	0,01 °C
Accuracy	± 0,5 °C
Response time	< 5 s

Storage temperature	-10°C to + 60°C
Response time	< 5 s
Maximum refreshing time	Max < 1 s

Sensor	
Dimensions	Diameter : 27 mm ; Lenght : 177 mm
Weight	Stainless steel version 350g (sensor + cable 3 m)
Wetted material	Body : PVC body + DELRIN
	NTC : stainless steel
	Electrodes : platinum, graphic
	Cable : polyurethane jacket
	Steam gland : Polyamide
Safeway	The 4 electrodes are sensitive to deposits (some fat, hydrocarbons, biofilm, mud)
Maximum pressure	5 bars
IP classification	IP68
Connection	9 armoured connectors, polyurethane jacket, bare-wires or waterproof Fisher connector
Sensor cable	Standard : 3, 7 and 15 m (other length on request).
	100 m Max. Up to 100 m with junction box.

Communication – Power supply	
Signal interface	Modbus RTU RS-485 and SDI-12
Power requirements	5 to 12 volts for cable 0-15 m
	7 to 12 volts for cable >15 m
	Max. 13.2 V
Consumption	Standby 25 μ A
	Average RS485 (1 measure/ seconde) : 6,3 mA
	Average SDI12 (1 measure/ seconde) : 9,2 mA
	Current pulse : 500 mA
	Heating time : 100 mS
	Protection against the inversions of polarity

NTU

pH		
Measure principle	Turbidity: Diffusion IR at 90°	
	Temperature: NTC	
Measure ranges	5 to 4000 NTU in 5 ranges:	0 to 4500 mg/L
	• 5 – 50 NTU • 5 – 200 NTU • 5 – 1000 NTU	Calibration : Range 0-500 mg/L according to NF EN 872

	• 5 – 4000 NTU • AUTOMATIC	Range >500 mg/L according to NF T 90 105 2
Resolution	0,01 to 1 NTU - mg/L	
Accuracy	< 5% of the reading	
Temperature		
Technology	NTC	
Range	0,00 °C to + 50,00°C	
Resolution	0,01 °C	
Accuracy	± 0,5 °C	
Response time	< 5 s	
Storage temperature	0°C to + 60°C	

Sensor	
Dimensions	Diameter : 27 mm; length : 170 mm
Weight	300 g (sensor + cable 3 meters)
Wetted material	Head of the sensor : PVC,
	Body : DELRIN,
	Optical part : Quartz,
	Cable : polyurethane jacket
	Steam gland : Polyamide
Safeway	The optical windows are vulnerable to: • chemicals (organic solvents, acids and strong bases, peroxide, hydrocarbons), • mechanical treatments (impact, abrasion).
Maximum pressure	5 bars
IP classification	IP68
Connection	9 armoured connectors, polyurethane jacket, bare-wires or waterproof Fisher connector
Sensor cable	Standard: 3, 7 and 15 m (other length on request). 100 m Max. Up to 100 m with junction box.

Communication – Power supply	
Signal interface	Modbus RTU RS-485 and SDI-12
Power requirements	5 to 12 volts for cable 0-15 m 7 to 12 volts for cable >15 m Max. 13.2 V
Consumption	Standby : 40 μ A
	Average RS485 (1 measure/seconde) : 820 μ A
	Average SDI12 (1 measure/seconde) : 4,2 mA
	Current pulse : 500 mA

	Heating time : 100 ms
	Protection against the inversions of polarity

OPTOD

Measures	
Measure principle	Optical measure by luminescence
Measure ranges	0,00 to 20,00 mg/L 0,00 to 20,00 ppm 0 - 200%
Resolution	0,01
Accuracy	+/- 0,1mg/L Range 0-100 % +/- 0,1 ppm Range 0-100 % +/- 1 % Range 0-100 %
Response time	90% of the value in less than 60 seconds
Frequency of recommended measure	> 5 s
Temperature compensation	Via NTC (compensation active for temperature lower than 0°C)
Measurement range (Temperature)	0.00 to 50.00 °C
Resolution (Temperature)	0.01 °C
Accuracy (Temperature)	0.5°C
Storage temperature	- 10°C to + 60°C

Sensor	
Dimensions	Diameter: 25 mm ; length : 146 mm
Weight	Stainless steel version 450g (sensor + cable 3 m) Titanium version 300 g (sensor + cable 3 m)
Wetted material	Standard Version in passivated Stainless steel 316L body, strainer and screw, For Seawater application Version in Titanium body, strainer and screw, Cable: polyurethane jacket Steam gland: Polyamide Patch with active material (black) – DO DISK : Optical isolation silicon
DO disk	No cross-sensitivity with: • pH 1 – 14 ; CO₂, H₂S, SO₂ • Cross-sensitivity to Organic solvents, such as acetone, toluene, chloroform or methylene chloride • Chlorine gas
Maximum pressure	5 bars
IP classification	IP68
Connection	9 armoured connectors, polyurethane jacket, bare-wires or waterproof Fisher connector
Sensor cable	Standard: 3, 7 and 15 m (other length on request).

100 m Max. Up to 100 m with junction box.

Communication – Power supply	
Signal interface	Modbus RTU RS-485 and SDI-12
Power requirements	4.8 to 24 V
Consumption	Standby < 50 μ A Average RS485 (1 measure/ seconde) : 7,8 mA Current pulse : 100 mA Heating time < 100 mS Protection against the inversions of polarity

PHEHT

pH (cartridge PHEHT & PHT)	
Measure principle	pH/ Redox : Potentiometric measure ;
	pH : pair of electrodes with a reference (Ag/AgCl gel) / H3O+ ions sensitive glass
	Redox : pair of electrodes with a reference (Ag/AgCl gel) / platinum disk (PHEHT cartridge)
	Temperature: NTC
Range	0 – 14 pH
Resolution	0,01 pH
Accuracy	+/- 0,1 pH
Redox (cartridge PHEHT)	
Measure principle	Combined electrode (Redox/reference) : Platinum tip, Ag/AgCl. Gelled reference (KCl)
Range	- 1000 to + 1000 mV
Resolution	0,1 mV
Accuracy	± 2 mV
Temperature	
Technology	NTC
Range	0,00 °C to + 50,00°C
Resolution	0,01 °C
Accuracy	± 0,5 °C
Response time	< 5 s
Storage temperature	0°C to + 60°C

Sensor	
Dimensions	Diameter : 27 / 21 mm ; Lenght : 207 mm
Weight	350 g (sensor + 3 m cable)
Wetted material	Body (electronic part) and clamp in PVC.

	Cartridge in DELRIN, Special pH glass, platinum (cartridge PHEHT), Inox 316L (protective sleeve of the temperature probe) Cable: polyurethane jacket Steam gland: Polyamide
Safetyway	The glass electrode is vulnerable to: - chemicals (organic solvents, acids and strong bases, peroxide, hydrocarbons), - mechanical treatments (impacts). The redox potential electrode is sensitive to sulphide adsorption on platinum.
Maximum pressure	5 bars
IP classification	IP68
Connection	9 armoured connectors, polyurethane jacket, bare-wires or waterproof Fisher connector
Sensor cable	Standard: 3, 7 and 15 m (other length on request). 100 m Max. Up to 100 m with junction box.

Communication – Power supply	
Signal interface	Modbus RTU RS-485 and SDI-12
Power requirements	5 to 12 volts for cable 0-15 m 7 to 12 volts for cable >15 m Max. 13.2 V
Consumption	Standby: 25 μA Average RS485 (1 measure/seconde): 3,9 mA Average SDI12 (1 measure/seconde): 6,8 mA Current pulse: 500 mA Heating time: 100 mS Protection against the inversions of polarity

Chapter 4. Commissioning

If the logger does not have a communication PCB, there is no need to open the housing as the internal battery is already connected to the PCB. The logger is therefore operational immediately.

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

If the logger has a communication PCB (LTE option, for example), then the SIM card must be inserted in its holder, see paragraph [???](#).

4.1. Recommendations for use and measurement

4.1.1. OPTOD sensor

Operating temperature: 0°C to 50°C

Compensation of temperature effective on 0-40°C



Warning ! The membrane is vulnerable to:

- chemicals (organic solvents, acids, peroxide),
- mechanical treatments (impact, abrasion, tearing).

For measurement,

- Eliminate bubbles trapped under the membrane. Presence of chlorine will distort the measure (overestimation of dissolved oxygen level).
- During the installation of the sensor in measurement environment, wait for sensor's temperature stabilization before measure processing.

4.1.2. NTU sensor

Operating temperature: 0°C to 50°C



Warning ! The optical windows are vulnerable to:

- chemicals (organic solvents, acids, peroxide),
- mechanical treatments (impact, abrasion, tearing).

While in use, the sensor must not make contact with walls or bottom of the jar. A minimal clearance of 2/3 cm is recommended (depending on the environment concentration). Bubbles on optical parts can interfere with the measurement. On environment change, wait sensor's temperature stabilization before proceeding with measurement.

In the range of 0 to 20 NTU and in case of sensor the saturation (9999 value), it is recommended to use the protection strainer to avoid various interferences like edge effects, solar radiation.

4.1.3. PHEHT sensor

Operating temperature: 0°C to 50°C



The glass electrode is vulnerable to:

- chemicals (organic solvents, acids and strong bases, peroxide, hydrocarbons),
- mechanical treatments (impacts). The redox potential electrode is sensitive to sulphide adsorption on platinum.

- During the installation of the sensor in measurement environment, wait for sensor's temperature stabilization before measure processing.

4.1.4. C4E sensor

Operating temperature: 0°C to 50°C



The 4 electrodes are sensitive to deposits (some fat, hydrocarbons, biofilm, mud)

- During the introduction of sensor in the measurement environment, wait sensor's temperature stabilization before proceeding with measurement.

4.1.5. Oxydo reduction potential sensor

Operating temperature: 0°C to 50°C

The electrode used to measure the redox potential is sensitive to sulphides, which are adsorbed onto the platinum.

- During the installation of the sensor in measurement environment, wait for sensor's temperature stabilization before measure processing.

4.1.6. Capteur CTZ

Operating temperature: 0°C to 50°C



Measurement technology that is 'unaffected' by fouling. However, ensure that the loop is not blocked..

- During the installation of the sensor in measurement environment, wait for sensor's temperature stabilization before measure processing.

The sensor is not suitable for measurements in the lowest ranges

4.2. Probes calibration

4.2.1. Required equipment

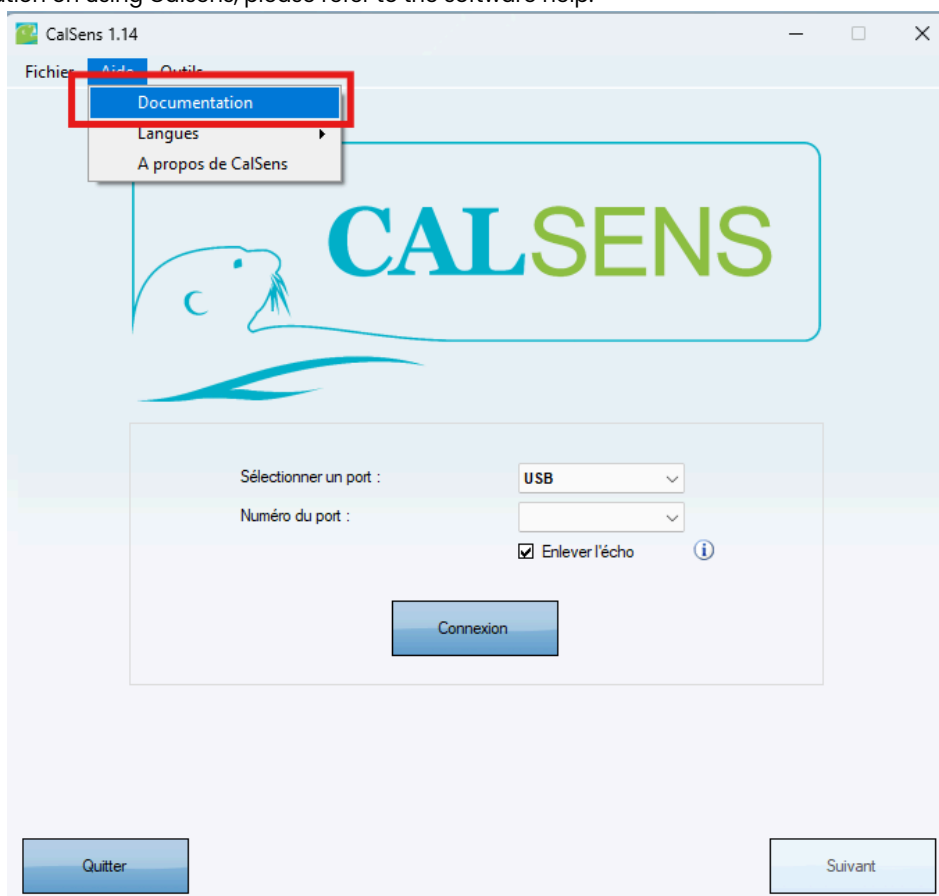
- **Convertisseur AP2V3 - USB / RS485**

The interface enables conversion from MODBUS to USB and powers the sensor via the built-in batteries.

- **CALSENS software** : Available to download from the IJINUS website <https://www.ijinus.com/download/?lang=en>

The software, via the USB port, enables the detection of and connection to sensors, the display of real-time data and the calibration of sensors.

For further information on using Calsens, please refer to the software help.



4.2.2. OPTOD sensor

Oxygen

- On a clean sensor, check once in a while the 0 %Sat value by dipping the sensor in a water solution + sulphite (sulphite concentration <2%). If there is an offset on point 0, proceed with the complete sensor calibration.



Warning : Do not put the sensor in contact with the sulphite solution for more than one hour.

The calibration in 2 points is achieved with one sulphite solution (offset) then after rinsing and drying, the slope of sensor is achieved by exposing the sensor to water vapor saturated air (or in a clear water saturated with air).

Temperature

The sensor's temperature calibration is achieved in 2 steps:

- step 1 (offset) : the sensor is put in a jar which contains a water bath + ice,
- step 2 (slope) : the sensor is put in a known temperature environment (with stabilized temperature). This temperature could be measure with a certified thermometer

4.2.3. PHEHT sensor

- On a clean sensor, carry out a 2-point calibration (offset and slope at pH 7 and pH 4, for example).

4.2.4. NTU sensor

NTU turbidity

The NTU sensor is an optical sensor which just need of a few calibration. On a clean sensor, check once in a while the 0 NTU value by dipping sensor in bubble free clear water. If the 0 point is shifted, proceed with the complete sensor calibration (on 1 or 4 ranges).

For this procedure, a Formazin solution, with concentration matching the middle of the measurement range, will be necessary. This solution will be prepared from a 4000 NTU main solution. For the preparation of solutions, take a flask of 200 mL. Introduce the necessary volume of Formazin (cf. table below) and fill up to 200 mL with distilled water. The formazin solutions of concentrations lower at 1000 NTU deteriorate quickly, so do not preserve a solution during several days.

The solution at 2000 NTU can be preserve in the refrigerator for 2 or 3 weeks in a opaque flask

Measurement range	Concentration Formazin solution	Volume of Formazin (mL)
0.0-50.0 NTU	25 NTU	1,25 mL
0.0-200.0 NTU	100 NTU	5 mL
0-1000 NTU	500NTU	25 mL
0-4000 NTU	2000 NTU	100 mL

Turbidity in mg/L

For Using this sensor with Turbidity in mg / L, it is necessary to calibrate the sensor on a real sample. The calibration is achieved in 2 steps:

- Step 1 (offset) : immerse the sensor in distilled water (0 mg / L),
- Step 2 (slope) : immerse the sensor into a sample of sludge, maintained under agitation, and validate the theoretical value measured by the sensor. Analysis the sample dry weight in the laboratory according to the NF standard IN 872 for a range of 0-500 mg / L and according to the NF standard T 90 105 2 for a concentration > 500 mg / L.

Temperature

The calibration of the temperature sensor is achieved in 2 steps:

- step 1 (offset) : the sensor is put in a jar which contains a water bath + ice,
- step 2 (slope): the sensor is put in a known temperature environment (air or water of thermostated bath). This temperature could be measure with a certified thermometer.

4.2.5. C4E sensor

Conductivity

Using a clean sensor, proceed with the calibration of sensor in 2 steps (offset and slope with a standard solution of conductivity adapted for measurement range) on 1 or 4 ranges:

Measurement range	Concentration standard solution of conductivity
0.0-200.0 $\mu\text{S/cm}$	84 $\mu\text{S/cm}$
0-2000 $\mu\text{S/cm}$	1 413 $\mu\text{S/cm}$
0.00-20.00 mS/cm	12,88 mS/cm

Measurement range	Concentration standard solution of conductivity
0.0–200.0 mS/cm	111,8 mS/cm

Temperature

The calibration of the temperature sensor is achieved in 2 steps:

- step 1 (offset) : the sensor is put in a jar which contains a water bath + ice,
- step 2 (slope): the sensor is put in a known temperature environment (air or water of thermostated bath). This temperature could be measure with a certified thermometer.

4.2.6. CTZ sensor

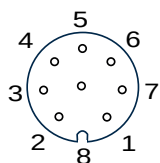
The calibration of the temperature sensor is achieved in 2 steps:

- step 1 (offset) : the sensor is put in a jar which contains a water bath + ice,
- step 2 (slope): the sensor is put in a known temperature environment (air or water of thermostated bath). This temperature could be measure with a certified thermometer.

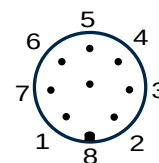
Chapter 5. Connections

5.1. LOG04 Logger

Wiring



Female



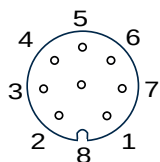
Male

Cable color	White	Brown	Green	Yellow	Grey	Pink	Blue	Red
								
8-pin connector: No.	1	2	3	4	5	6	7	8
Name	Vin	GND	Vout	Input OR Output	Input OR Output	Input	Input	Output Open-Drain
Features	(5 V - 30 V)	Ground	5 V - 18 V * (internal battery) or Switch Vout = Vin	RS485-H	RS485-L	On/Off 2 / Metering 1 100Hz	On/Off 2 / Metering 2 100Hz	Contact Grounding
Type	Power supply input		Power supply output	Modbus	Modbus	Digital	Digital	Open drain (1 A / 30 V)

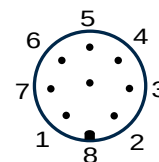
* Maximum 1.8 W on V_{out} if the connected sensor is powered by the internal battery (voltage adjustable via software)

5.2. LOG09 Logger

Wiring



Female



Male

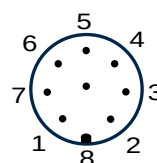
Cable color	White	Brown	Green	Yellow	Grey	Pink	Blue	Red
								
8-pin connector: No.	1	2	3	4	5	6	7	8

Name	Vin	GND	Vout	Input OR Output	Input OR Output	Input	Input	Output Open-Drain
Features	(5V to 30V)	Ground	5V to 18V * (internal battery) or Switch Vout = Vin	RS485-H	RS485-L	Current 1	Current 2	Contact Grounding
Type	Power supply input		Power supply output	Modbus	Modbus	4 - 20 mA	4 - 20 mA	Open drain (1A/30V)

* Maximum 1.8 W on V_{out} if the connected sensor is powered by the internal battery (voltage adjustable via software)

5.3. Physical-chemical sensors

Wiring



Female

Cable color	Black	Red	White	Green
8-pin connector	2	3	4	5
Name	GND	V+	Modbus	Modbus
Features	Masse	Alimentation	RS485 H	RS485 L

Chapter 6. Installation

6.1. Physico-chemical probes installation



When submerged, the sensor must be held by the body and must not be left hanging by the cable, as this may damage the sensor.

- When installing sensors in submerged conditions or inserting them into plastic or stainless steel pipes, it is recommended that you use only suitable fittings supplied by AQUALABO.
- Please refer to the AQUALABO manual for further information.

Chapter 7. Configuration on Avelour

7.1. Equipment required

- Avelour software version 7.1 or later.
- A Wiji radio antenna in “long range” or “USB device” format.

7.2. Connecting to a logger

- Connect the Wiji radio access point and its antenna (or the Wiji USB device) to your computer’s USB port.

If the Wiji USB device is not detected:

- Remove the USB device from the port, reboot the PC and reinsert the device.
- If the device is still not detected, remove it and reinstall the drivers.

C:\Program Files (x86)\Ijinus\Avelour_7.1.2\Driver

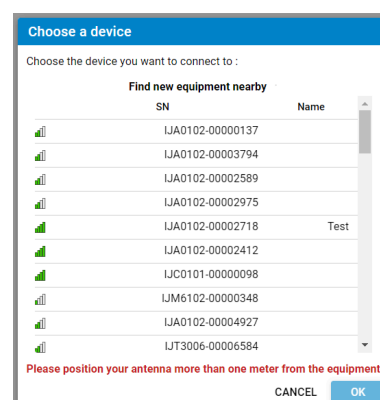
- Restart the PC and reinsert the USB device.
- Position your Wiji antenna at least one meter from the logger.
- Open the Avelour software.
- Open the logger selection window by clicking on “Connect to a wireless device”.



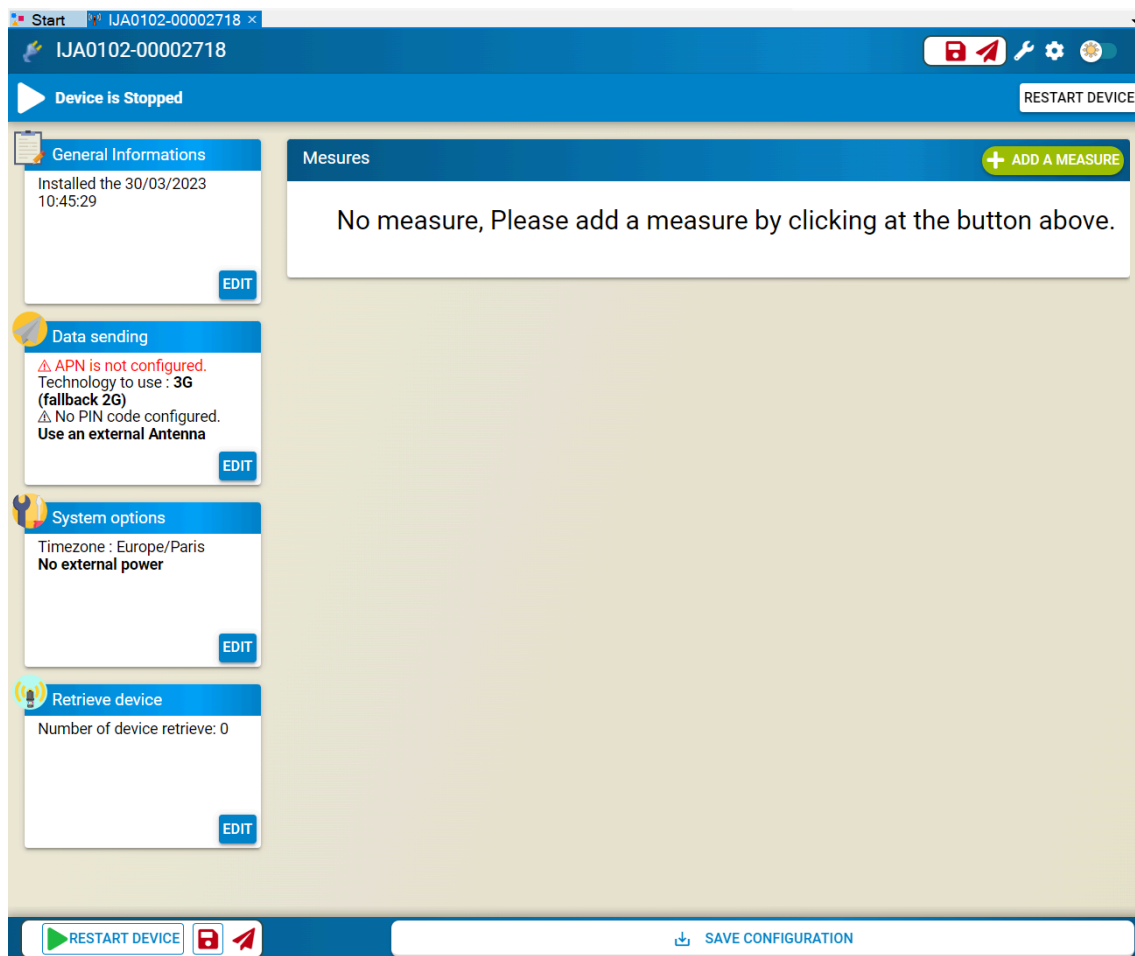
- Select the logger identified by its serial number (refer to its nameplate) and click “OK”.



Location of serial number



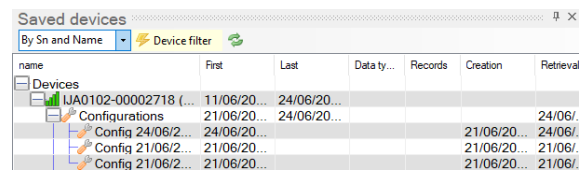
-> The logger configuration window opens.



Configuration window for logger S/N: IJA0102-00002718

-> A configuration file is automatically created.

-> A folder is created in the following directory: C:\ProgramData\Ijinus\Avelour_Main_7.1.2\SavedSensors\IJA0102-00002718



name	First	Last	Data ty...	Records	Creation	Retrieval
IJA0102-00002718 (...)	11/06/20...	24/06/20...				
Configurations	21/06/20...	24/06/20...				24/06/...
Config 24/06/2...	24/06/20...				21/06/20...	24/06/...
Config 21/06/2...	21/06/20...				21/06/20...	21/06/...
Config 21/06/2...	21/06/20...				21/06/20...	21/06/...

Configuration file in the saved data browser.

7.3. Configuring a measurement recording



Prerequisites: In Avelour, the Wiji connection to the logger must be established, see [Connecting to a logger](#).

The sensor is connected to the logger.

- Click  to add a measurement configuration and select "Physicochemical measurement (conductivity, turbidity, pH, dissolved oxygen)".
- Select a period between each measurement from the list. In the example above, a measurement will be taken every 15 minutes.

Physicochemical measure (conductivity, turbidity, pH, dissolved oxygen)
 


Measure period

[Go to power configuration menu](#)

No external power

Power supply delay

 ms

☐ Off C4E conductivity sensor

☐ Off CTZ induction conductivity sensor

☐ Off NTU turbidity sensor

☐ Off PHEHT Ph and Redox sensor

☐ Off OPTOD optical dissolved oxygen sensor

VIEW RESUME

7.3.1. Power supply

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

It is also possible to use an external battery or AC power supply (7-30 V).

- If an external power supply (battery or mains) is connected to the logger, refer to paragraph [???](#)

By default, the power supply delay is set to 800 ms.

7.3.2. C4E conductivity sensor

Data to record : Conductivity or salinity or Conductivity + salinity.

Measurement range : Corresponds to the measurement range of the sensor according to the expected levels.

- Click the  button to start a test measurement and display the result.

Define a threshold

- See [???](#).

7.3.3. CTZ induction conductivity sensor

Data to record : Salinity (g/kg), Conductivity ($\mu\text{S}/\text{cm}$), Conductivity + Salinity ($\mu\text{S}/\text{cm}$)

Measurement range : Corresponds to the measurement range of the sensor according to the expected levels.

- Click the  button to start a test measurement and display the result.

Define a threshold

- See [???](#).

Change Modbus ID

- Click  to view and edit the **Modbus ID**.

7.3.4. NTU turbidity sensor

Data to record : FNU Turbidity (FNU), Turbidity (FNU + TU), or Turbidity (TU) (mg/L)

Measurement range : Corresponds to the measurement range of the sensor according to the expected levels.

- Click the  button to start a test measurement and display the result.

Define a threshold

- See [???](#).

7.3.5. PHEHT Ph and Redox sensor

Data to record : pH, Redox (mV) or pH + Redox

Measurement range : Corresponds to the measurement range of the sensor according to the expected levels.

- Click the  button to start a test measurement and display the result.

Define a threshold

- See [???](#).

7.3.6. OPTOD optical dissolved oxygen sensor

Data to record : *Oxygen saturation* (%Sat), *Dissolved oxygen* (mg/L) or *Dissolved oxygen + saturation*.

Measurement range : Corresponds to the measurement range of the sensor according to the expected levels.

- Click the  button to start a test measurement and display the result.

Define a threshold

- See [???](#).

Check correct sensor operation

- Click  to view the measured values.

→ The connection to the device is activated and a new window displays the measured values.

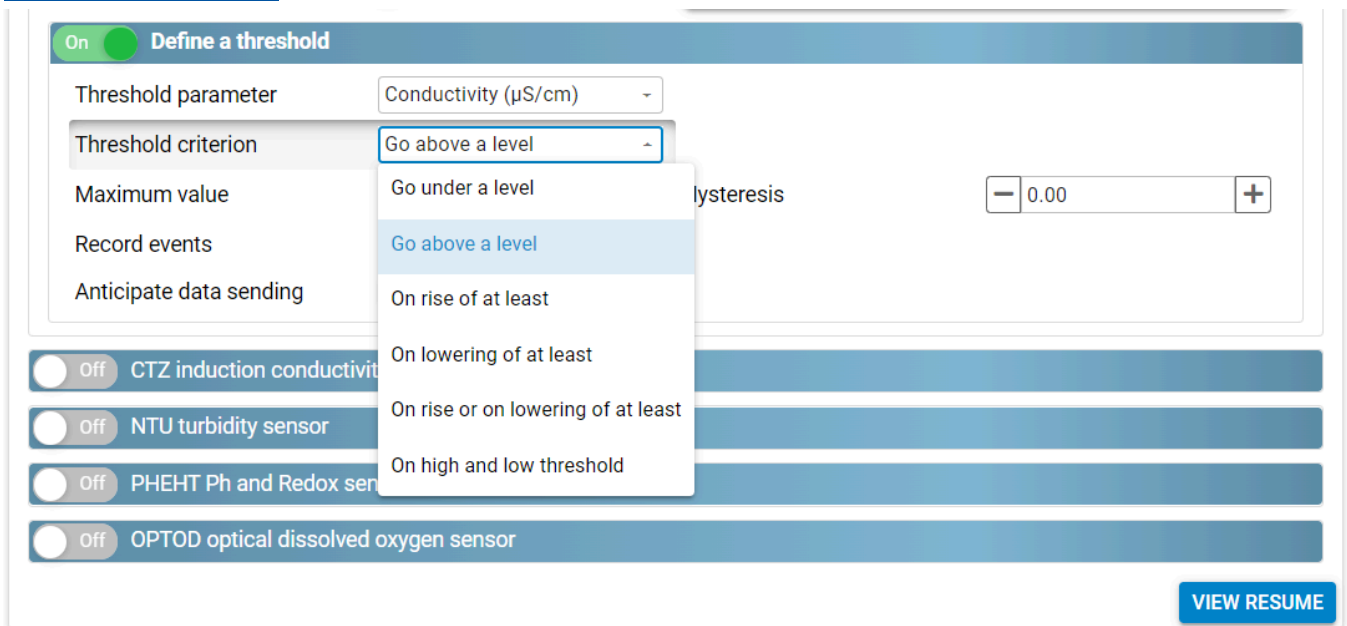
Change the measurement period (advanced setting)

- Click  to display the measurement period parameter (4000 ms by default).

Change Modbus ID (advanced setting)

- Click  to view and edit the **Modbus ID**.

Define a threshold



Threshold parameter : Measurement parameter to select according to the type of sensor.

Threshold criterion : Criterion defining the type of crossing:

- Go below a level: measured level passes below the configured threshold.
- Go above a high level: the measured level exceeds the configured threshold.
- On rise of at least: the value between 2 measurements exceeds the configured threshold.
- On high and low threshold: measured level exceeds the high threshold or drops below the low threshold.

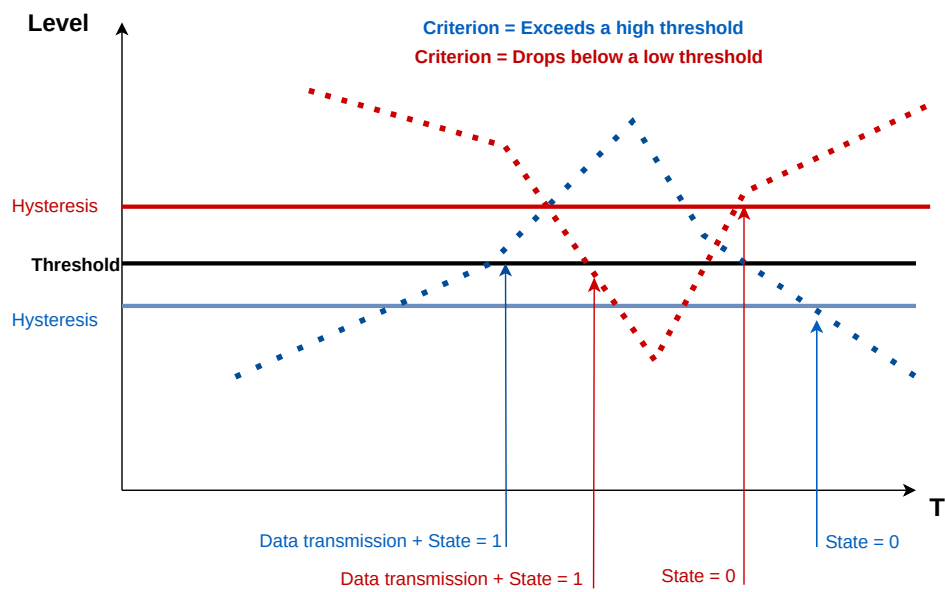
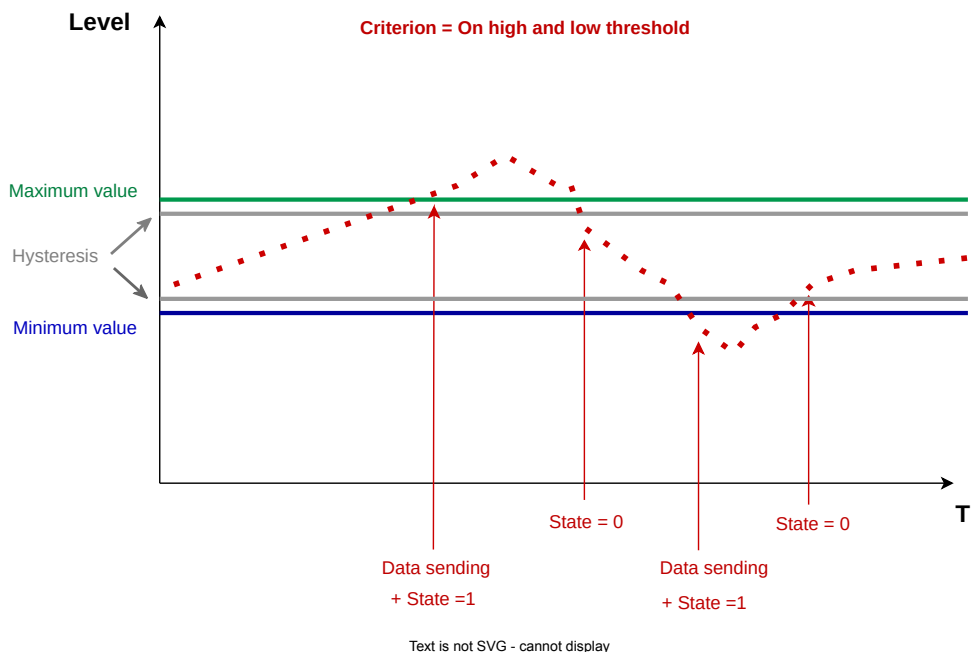
Hysteresis : Value to be subtracted/added to the threshold for which its state is deactivated. **Record events** : Threshold crossing state = 0 or 1.

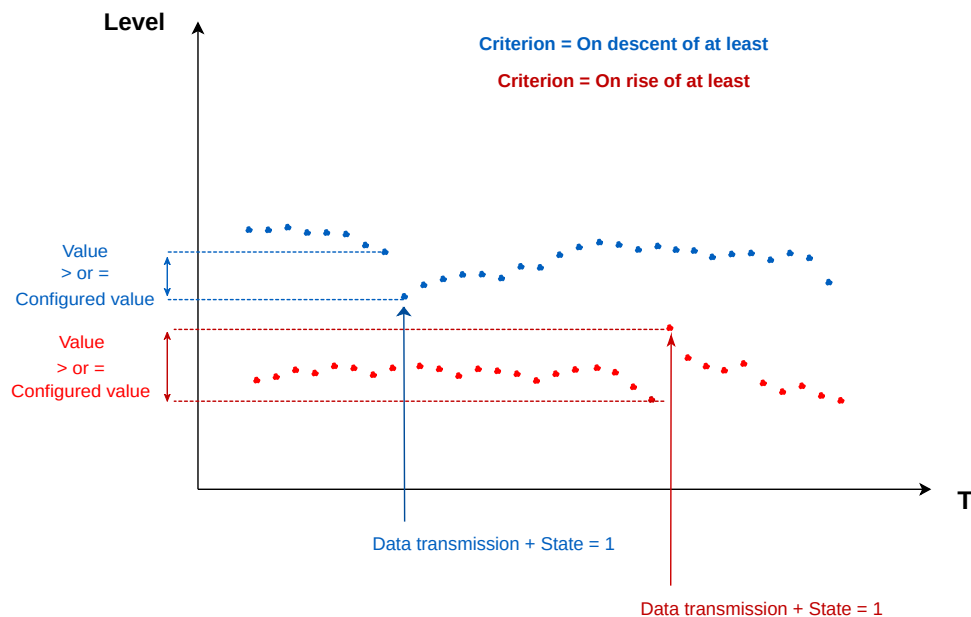
Anticipate data sending : Data transmission may be forced upon activation, deactivation or both.

Repeat sending : If data transmission on activation is selected, enables you to modify the data transmission period.



If anticipate data sending is activated, an alert SMS is sent to an operator when the threshold is reached, if this option is configured (see ???).





Fifo Memory (Advanced Setting)

By default, when the logger memory is full, data are deleted in chronological order of recording, from oldest to newest.

- Click  to display advanced settings.
- If Fifo memory is disabled, change the maximum number of timestamps for the main memory (used for sending data via Internet) and the auxiliary memory (used for sending data via SMS) if necessary.

Maximum records SMS Maximum records

Configuration summary

To view the configuration summary:

- Click [SEE OVERVIEW](#) to display a summary of the configuration.

Physicochemical measure (conductivity, turbidity, pH, dissolved oxygen)



Physicochemical measurement every **15 mins**

Sensor **C4E** : Recording of **Conductivity + Salinity** / Range : **Automatic**

Conductivity (µS/cm) threshold according to the criterion : **Go above a level 0**, with **recording of events**, with **anticipated data sending**

Recording will last for about 10 days 10 hrs / Send around 1.9 SMS each day

EDIT

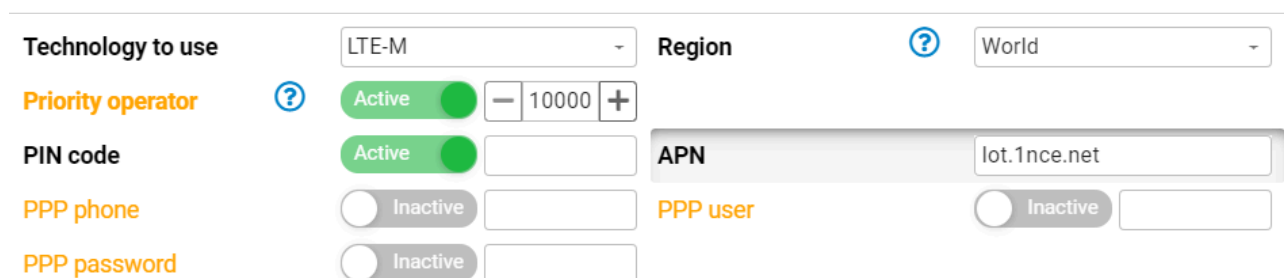
7.4. Test data transmission before commissioning

7.4.1. Objective

Before commissioning an Ijinus datalogger equipped with a communication PCB, you must ensure it operates correctly in the field with the selected communication networks.

7.4.2. Test procedure

1. In the data transmission menu, click on the edit button, when the popup opens click on the wrench  in the top right to display the advanced settings.
2. Configure the modem part as shown below:



The screenshot shows a configuration window for a modem. It includes the following fields and controls:

- Technology to use:** A dropdown menu set to 'LTE-M'.
- Region:** A dropdown menu set to 'World'.
- Priority operator:** A toggle switch set to 'Active', followed by a numeric input field containing '10000' with minus and plus buttons.
- PIN code:** A toggle switch set to 'Active' followed by an empty text input field.
- APN:** A text input field containing 'lot.1nce.net'.
- PPP phone:** A toggle switch set to 'Inactive' followed by an empty text input field.
- PPP user:** A toggle switch set to 'Inactive' followed by an empty text input field.

- Select "LTEM" technology only.
 - Set the location to **world**.
 - Enter the **APN** linked to your SIM card.
 - Activate the priority operator: the space to enter the code is now available (you will need to know the operator code beforehand — see the list of operators in the country).
3. Program the modem.  **1 : Program modem**
 4. Run modem diagnostics .
 5. Activate  data sending by Internet with the desired transmission cycle.
 6. Start a data transmission test.

7.4.3. Troubleshooting

Network connection issues can occur at key stages of the test:

Problem	Step	Corrective action
Failed to connect to the network	4	• Change the priority operator and redo from step 3 on existing networks • Increase timeout from 120 s to 180 s (see image below)

		⚡ 1 : Program modem ⚡ 2: Diagnostic modem Modem connection timeout Active 180
Failed to connect to SNTP server	6	• Check the APN code • Change the priority operator and try again
Connected to the SNTP server but failed to connect to the FTP	6	• Check the FTP server identifiers

7.5. Save the configuration to the logger



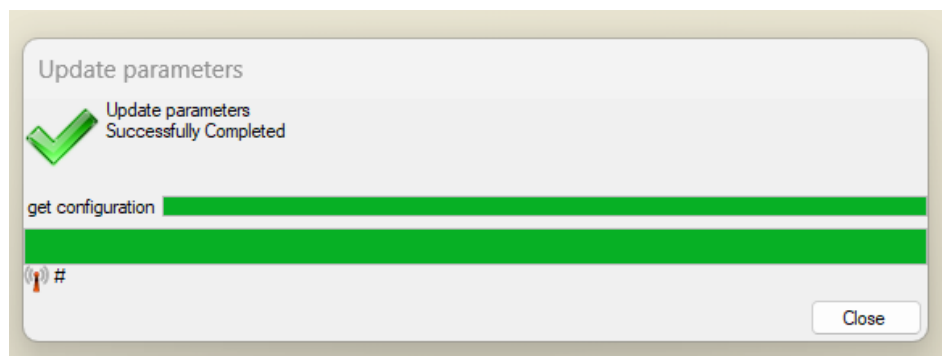
Prerequisites: The logger is connected to Avelour (see [Connecting to a logger](#)).

To save all the settings configured on the logger:

- Click "SEND CONFIGURATION".



-> An update loading window is displayed.



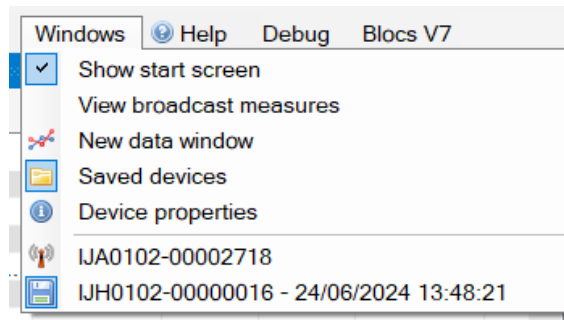
-> Data recording is activated and its status is visible via the  icon located at the top right of the configuration window (see paragraph [???](#)).

-> Data transmission is activated and its status is visible via the icon  icon located at the top right of the configuration window (see paragraph [???](#)).

7.6. Visualize measured values in real time

To visualize the values measured and received by radio from the Ijinus loggers located nearby:

- In the windows tab, click on "View broadcast measures".



-> A new window is displayed.

Broadcast measures																							
Only show last measures		Device Filter																					
SN	Name	LastDate	Current	Material	Overflo	Velocity	Measur	H2S Co	Capact	Debug	Debug	Flow (m)	Debug	Volume	Doppler	Doppler	Doppler	Counter	Volume	State	Measur	Oxygen	Dissolv
IJA0102-00002718	Test	09-10-00																					
IJA0102-00000348		01:37:40																					
IJA0102-00004927		11:00:00																					
IJA0102-00004789		09-13-40	1515																				
IJA0102-00000022		09-10-00																					
IJA0102-00000120		01:23:00	2052																				
IJA0102-00000557		09-10-00																					
IJA0102-00004001		15:37:00	66																				
IJA0102-00000075		09-12-00																					
IJA0102-00002302		09-12-00																					
IJA0102-00001669		09-13-00																					
IJA0102-00003749		09-10-00																					



The amount of data transmitted over the radio is limited by the size of the (Type-8) frames that can be sent over the radio.

Additional note: The channel number in RF frames is encoded using 3 bits, so it can only take values from 0 to 7. For higher channel numbers, modulo 8 is used.

Chapter 8. Maintenance

In the event of a problem with an Ijinus logger or sensor, we recommend that you contact our after-sales department either by e-mail: sav@ijinus.fr or by telephone: +33 (0)298 090 332

You will be informed of the applicable procedure, so that you can either test the product yourself or return it to the factory for testing on our premises.

8.1. Replacing the cartridge on a PHEHT sensor

- To avoid damaging the sensor's electronic components, hold the cartridge in one hand and unscrew the clamping ring with the other hand.
- Remove the used cartridge and fit the new one before screwing the clamping ring back on.

PHEHT cartridge P/N : FOA00003

8.2. Cleaning

8.2.1. OPTOD sensor

After each use:

- rinse meticulously the sensor and the membrane with clear water.
- If deposits like biofilm or mud persist, wipe the membrane gently with a sweet cloth or an absorbent paper.



Warning : for the Titanium version clean the sensor body with acetone (do not use alcohol, ethanol or methanol).

Warning : Only unscrew the strainer containing the DODISK in case of change. If replacing the strainer, replace the new one and screw back slowly so the air can escape slowly.

8.2.2. NTU sensor

- After each use, rinse meticulously the sensor with clear water.
- If deposits like biofilm or mud persist, clean the sensor with soapy water and wipe the head with a soft cloth or an absorbent paper.

8.2.3. PHEHT sensor

After each use, rinse meticulously the sensor with clear water.

pH: If deposits like biofilm or mud persist, put the sensor in a cleaning solution (H0Y00012) for a few hours and rinse profusely before use.

Avoid using a soft cloth or an absorbent paper because the glass ball is extremely vulnerable to frictions.

Redox: clean the platinum disk with an abrasive moist paper (type P1200 or P220)

8.2.4. Redox annulaire

- After each use, rinse the sensor thoroughly with clean water. Clean the platinum ring using fine, damp sandpaper (such as P1200 or P220).

8.2.5. C4E sensor

After each use, rinse meticulously the sensor with clear water. If deposits like biofilm or mud are still in the measuring gap or on the electrodes, use a moist abrasive paper to clean off the surface of electrodes.

8.2.6. CTZ sensor

After each use, rinse the sensor thoroughly with clean water.

Chapter 9. Storage

9.1. Sensor Storage

9.1.1. OPTOD sensor

Temperature of storage: - 10°C to + 60°C

- Keep the membrane hydrated with the protective case and a moist absorbent surface (like cotton).
- After dry storage, rehydrate the membrane for a 12 hours period.

9.1.2. PHEHT sensor

Temperature of storage: - 10°C to + 60°C

- Maintain the glass membrane **hydrated in the protection case with a few drops of preservation agent solution** or, if it is not available, with the solution of pH4. Rinse profusely the bulb of glass before use.
- After storage in dry environment, put the sensor in a standard solution PH4 for 12 hours.
- The case protects against direct impact on the head of the sensor. The platinum electrode is preserved dry.

9.1.3. Redox annulaire sensor

Temperature of storage: 0°C to + 60°C

- Keep the sensor head moist using the protective case containing a few drops of preservative solution or a KCl solution.
- Rinse the sensor head thoroughly before use.
- After dry storage, place the probe in a KCl solution for 12 hours. The protective case absorbs direct impacts to the sensor head.

9.1.4. NTU sensor

Temperature of storage: - 10°C to + 60°C

- Put the protection case on the head of the sensor to protect the optical part.

9.1.5. C4E sensor

Temperature of storage: 0°C to + 60°C

The case protects against direct impact on the head of the sensor. The platinum electrode is preserved dry.

For short-term storage, place a cotton wool pad at the bottom of the case with a few drops of buffer solution at 1413 $\mu\text{S}/\text{cm}$.

9.1.6. CTZ sensor

Temperature of storage: - 10°C to + 60°C

The sensor is kept dry.