3G/4G WiMo Modem

User Manual

Revision 1.4

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1 Description

The 3G/4G WiMo modem gives the possibility to the WiMo multiparameter probe range to transmit its data using the 3G/4G networks deployed. The modem is multi-operator and can use French and foreign networks.

The modem once paired to a WiMo sonde is automatically detected. The sonde is then able to set it up. The modem retrieves the various files acquired by the probe and transmits them at the rate defined by the user.

It has a GPS inside and can use it to transmit its position through the 3G/4G network. The end-user can setup the modem to monitor a circular area with alarm transmission if the buoy goes outside this area.

1.1 Modem specifications

The WiMo modem transfers the data recovered from the sonde via 3G/4G networks. It is compatible with mobile phone plan of major French and foreign providers.

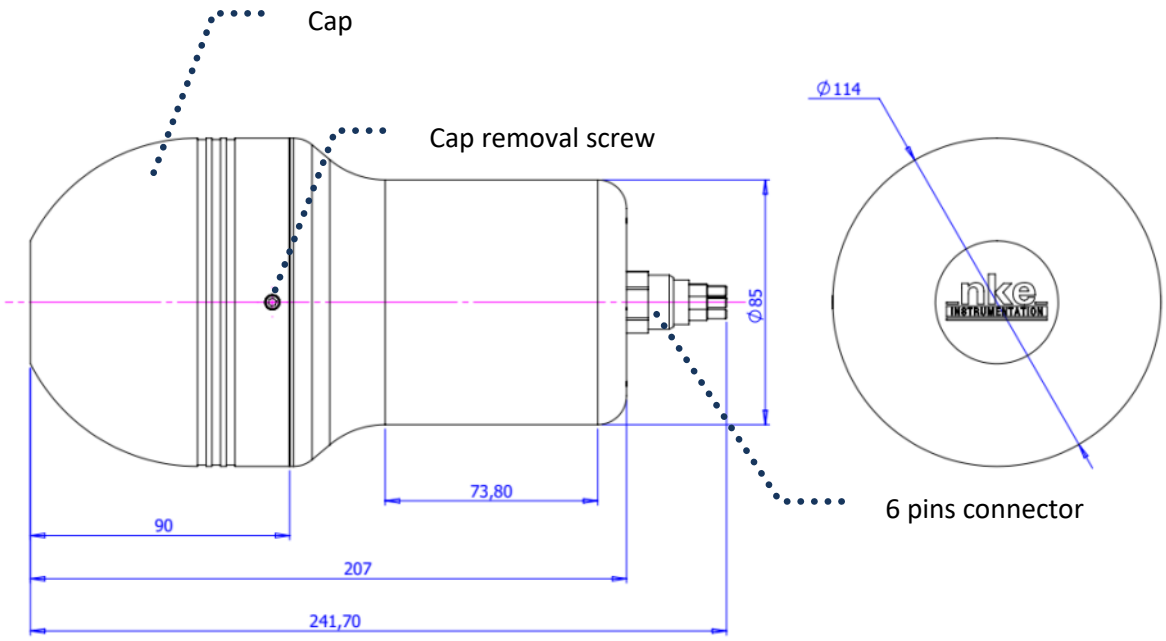
It has a GPS chipset inside allowing to acquire a position of the system and to manage an alarm on unexpected movement detected.

It is powered by 8 Type C Alkaline batteries.

Communication with the modem and its configuration is done via the probe connected to it.

No configuration software is required for the modem. It appears as an accessory in the WEB interface of the probe and the user can activate or not the functions and/or the recurrences of acquisition.

WIMO Modem specifications		
Features	transmission 3G/4G & GPS	
Operating environment	Freshwater and sea water	
Waterproof	IP67	
Communication	3G/4G / serial link	
Power Supply	Internal 8 Type C Alkaline batteries	
Temperature	Storage (no battery): -20°C à 70°C	
	Operating: - 2 à +50°C	
Size	Diameter:	114 mm
	Total length:	242 mm
Weight	1.65 kg	



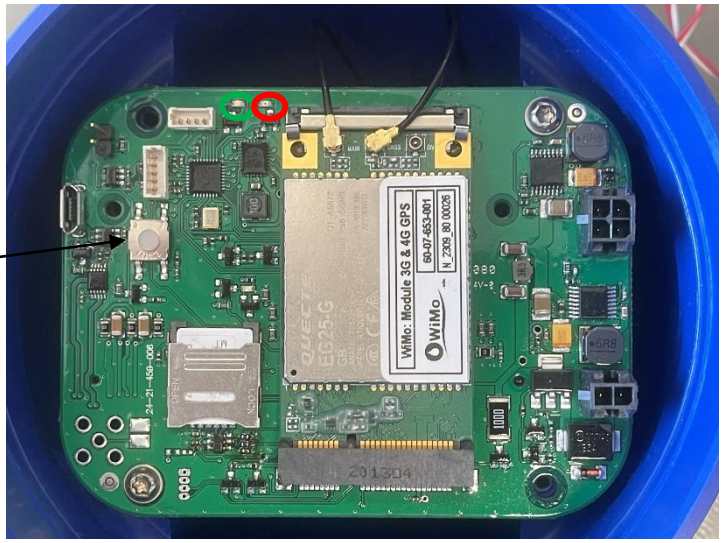
The modem is autonomous. It regularly checks on the WIMO sonde whether data is available and transmits it if necessary. A failure on the modem does not affect the operation of the sonde.

1. User interface

The **V2 modem available since April 2023**, has a user interface that helps the user in his understanding of the system and simplifies the change of batteries.

It consists of:

- A green light
- A red light
- A push button



- The purpose of the red light is to inform about the activity status of the system. When the red LIGHT is lit, it means that an action is in progress and the power to the system cannot be cut off without risk of corruption.

- The purpose of the green light is to inform of the possibility of shutting down the system. When only the green light is on (red light off), it means that no action is in progress and the power can be safely turned off.
- The push button is used to perform a mode change action. A prolonged action (3 sec) on the push button makes it possible to:
  - Start the product after a battery change (startup validation)
  - Switch to power off mode.

The table below summarizes the different operating modes, the associated light messages, and the combination of inputs.

Mode	Red Light	Green Light	Function
Sleep	-	-	Sleep mode
Activity		-	Action in progress
Extinction			Waiting for power down (15 seconds)
Startup		-	Fast flashing (twice every second)
Defect	50%	-	Slow flashing (change to the second)

1.2 GPS Chipset

The modem can transmit its location. It uses a GNSS module compliant with satellites signals from GPS, Galileo, Glonass, BeiDou constellations.

The GPS function can be activated or not by the user. It can transmit the acquired position at a rate different from that defined for the transmission of data files.

For some applications, the end-user can activate a function to monitor the movement of the sonde with alarm transmission capability.

When switching on the WIMO sonde, if the GPS function is enabled, a reference position is acquired. The modem will keep the position found as the initial position of the sonde. If the probe moves away from this position at a distance greater than the defined avoidance radius, then an alarm can be generated. This position is acquired each time the WIMO probe is switched on.

If the GPS alarm function is enabled, and on alarm detection, a higher GPS acquisition rate can be defined to follow the movement of the sonde.

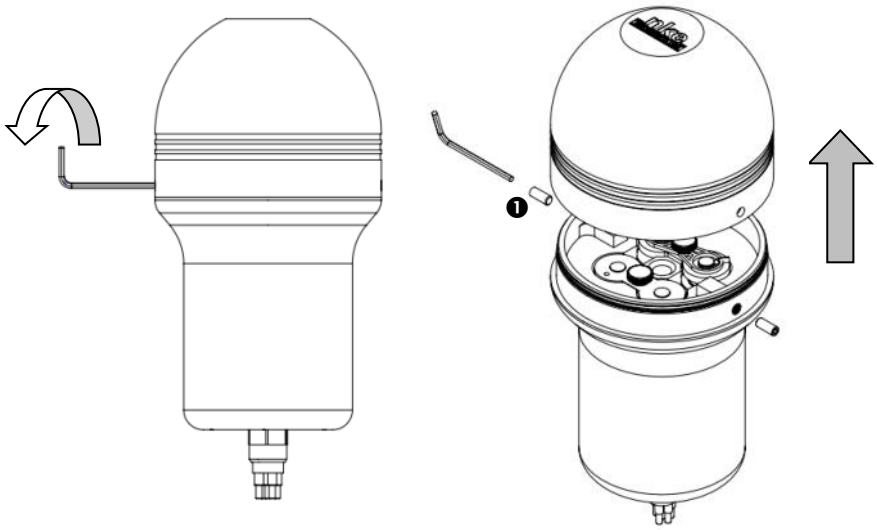
2 Operation

Before intervening on the WiMo modem, check that the power supply is cut (**disconnection of the battery pack, red/black two-wire cable)** or please apply the shutdown procedure according to the model of modem used (§ 2.9).

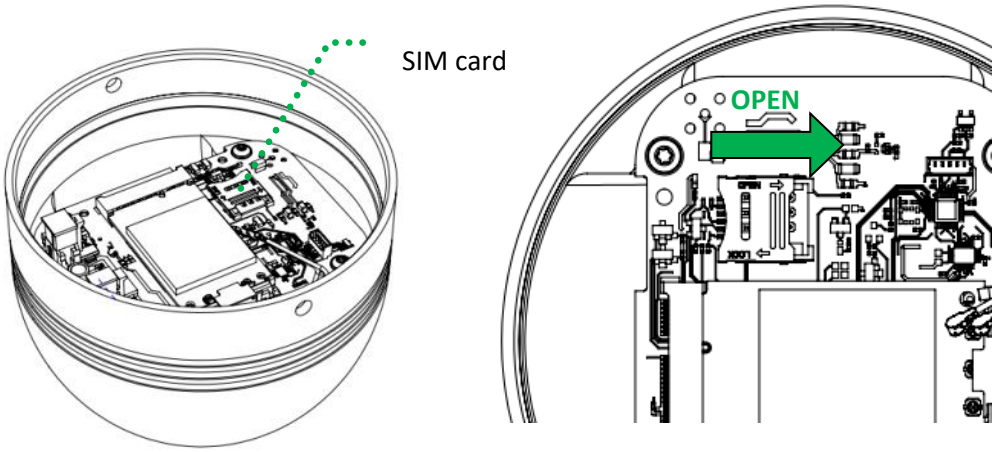
2.1 SIM Card install

The modem uses SIM cards in micro-SIM format.

Unscrew the two grub screws ❶ with the supplied Allen key so that the cover can be removed. Be careful not to pull too hard on the cover to avoid damaging the connection cables.



Locate the SIM card slot and lift the cover by sliding it back.



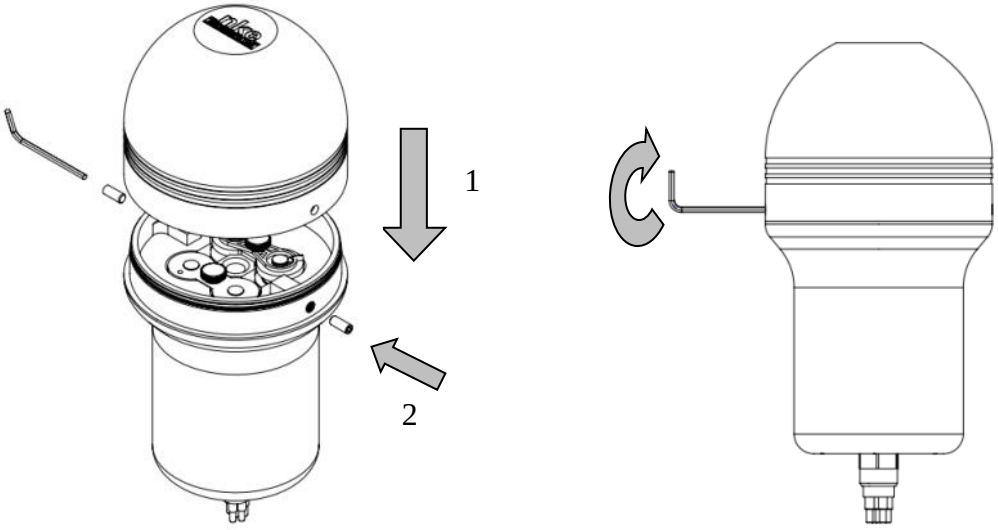
Insert the SIM card in micro-SIM format and lock the cover by sliding it forward.

Note: The SIM card PIN code must be disabled before use in the Modem.

Reconnect the 2-pin connector of the battery pack, taking care to the coding.

Particularity for starting Modem V2:
On power-up, the modem is in “start-up” mode *and the red light is* fast flashing (§ 1.1.1). To give the order to the modem to start, press the push button for 3 seconds. The modem then switches to activated mode, the red-light changes state and lights up continuously.

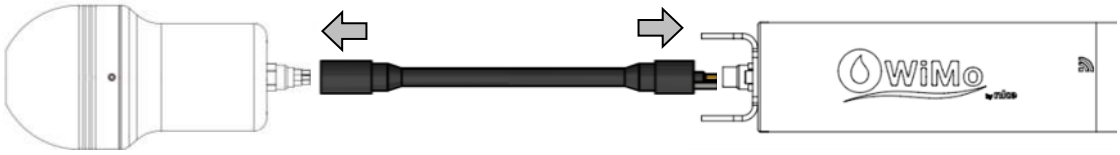
Reassemble the cover on the modem, paying attention to the seal and checking that no impurities have been present. Insert the two grub screws and tighten them with the Allen key until they are flush with the cover.



2.2 Modem settings

2.2.1 Connection to WiMo Sonde

The modem can only be setup if it is connected to a WiMo sonde. Use the SUBCONN 6-contact cable supplied with the modem. Connect the cable to the Modem and the WiMo sonde as shown in the figure below:



Connect via Wi-Fi to the WiMo sonde using a PC, smartphone, or tablet (i.e., WiMo/WiMo Plus User Manual).

2.2.2 Modem configuration update

On the home page under the “Network and Communication” tab, the 3G/4G modem should appear. If it is not present, it is possible to force the detection of the modem by clicking on the Refresh button in the list box.

When Modem changes are made in the web interface, they are not updated in the modem in real time.

The actions that update the modem are as follows:

- By clicking on the Refresh button of the list box.
- Or when the probe is switched on.
- Or at its next transmission due date when the modem is in operation.

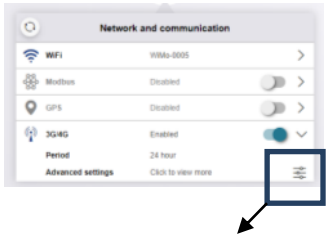
These different actions are similar to an order from the WiMo probe to the Modem to pick up, after a timeout of 5 incompressible minutes, the new configuration available.

2.3 Provider settings

If a new SIM card has been inserted, you must set up the information about the network provider. The information is:

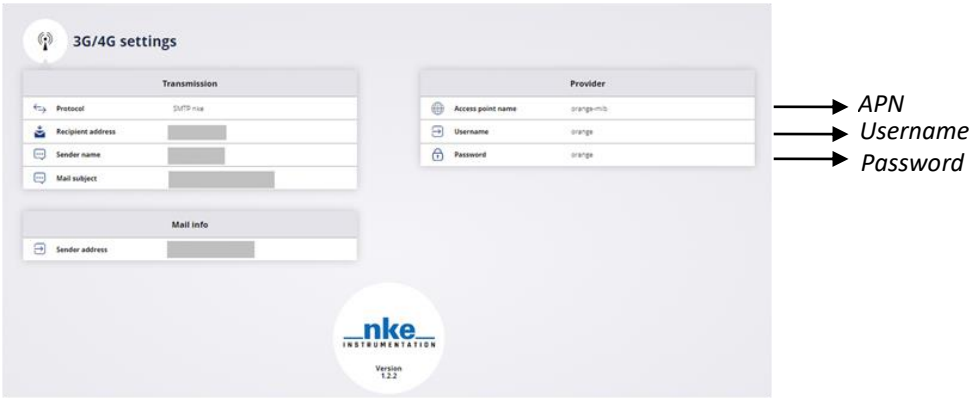
- APN
- The login
- The password

Information must be retrieved from the supplier of the SIM card. To set up the provider click on advanced settings.



Settings access

A new page opens allowing access to the provider settings.



Enter the APN as well as the Username and associated Password provided by your provider.

2.4 SMTP / FTP protocol

2.4.1 Choice of server

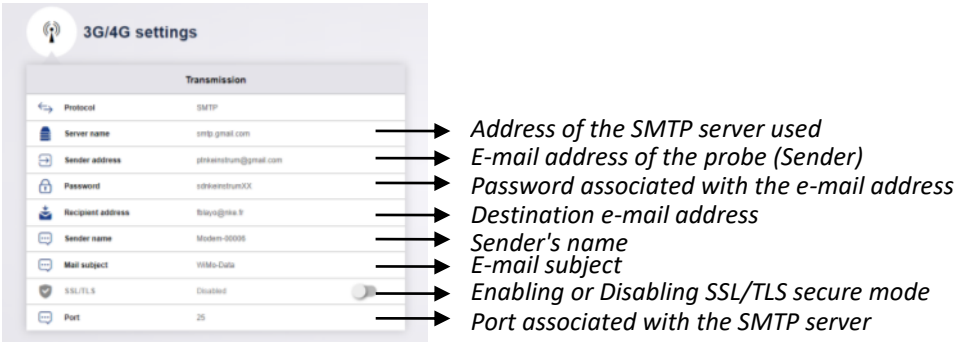
The WiMo probe, when it leaves the factory, is preconfigured to work with nke Instrumentation SMTP and FTP servers. This is a free* service that we offer to all users of WiMo probes. Each probe has its identifier and its secure password allowing you to connect to your account and manage your data.

**Contact our sales department for more information.*

You therefore have the possibility of selecting, from the list of choices present in the “3G/4G settings” window, the desired transmission protocol. The FTPnke and SMTPnke choices correspond to the configuration to work with nke servers. The two other choices give access to the different fields that you will need to fill in to configure the modem with your own server.

2.4.2 SMTP protocol

The data can be sent by e-mail to the user as an attachment. To select this mode, choose SMTP in the "Protocol" selection box. The protocol must then be set up. The user must create an e-mail address for the probe which is the sender address. He must enter the SMTP server used and the password associated with the Mail account.



The destination address is the address where the data files will be received.

The sender’s name as well as the subject of the email are user-configurable text fields. When leaving the factory, the sender’s name will be: Modem-XXXXXXX or XXXXXXX corresponds to the last 7 digits of the modem serial number.

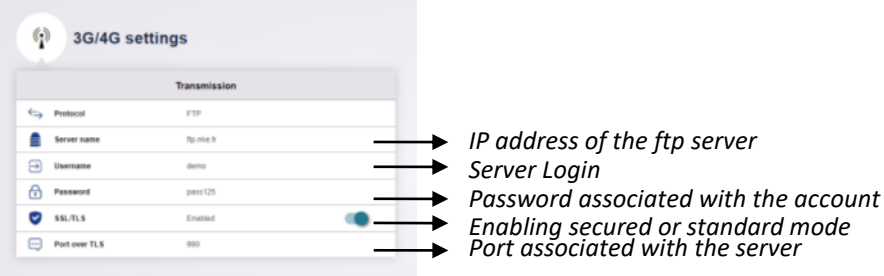
Please note that the ports used for SSL/TLS secure and non-secure modes are not the same. Fill in correctly the one corresponding to the chosen mode.

2.4.3 FTP Protocol

Data files can be directly deposited in a directory on a server using the FTP protocol. Three types of FTP servers are compliant with the Modem:

- The standard unsecured FTP mode on port 21 by default.
- SSL/TLS secured FTPS mode in Implicit mode on port 990 by default.
- SSL/TLS secured FTPES mode in Explict mode on port 21 by default.

To select the FTP mode, select in the FTP "Protocol" dialog box FTP.



It is not possible to define a destination directory. The modem will drop the files in the directory where the FTP account has access (at the root of the access directory most of the time).

2.5 GPS period

The GPS function may or may not be activated depending on the installation location. The role of this function is first to locate where the probe recovers measurements, but it can also monitor the system to detect unexpected displacement.

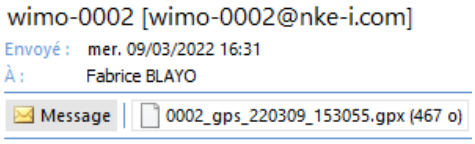
If the GPS function is activated, it is possible to define in the "measurement period" field the recurrence of GPS position acquisition according to the predefined list of choices (in hours). In the configuration presented above, the user will therefore receive his GPS position every 12 hours.

The GPS file is in GPX format and is compatible with google maps.

Note: a high rate strongly affects the autonomy of the modem. In the absence of GPS position, the timestamp of the modem is not functional.

Positioning is done in the first quarter of an hour after the Modem is switched on. Do not activate the GPS function if the modem is in a room or if it is not in its final position (avoiding radius alarm).

- •Example of GPS file

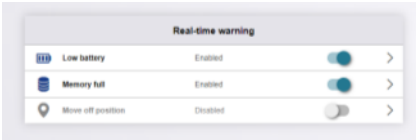


2.6 GPS Alarm

The modem can generate an alarm if the acquired GPS positions are too far from the reference GPS position of the measurement point. Enabling is setup in the "Alarm" tab of the sonde (see WiMo/WiMo Plus user manual).

The "Alarm General Settings" allows you to define the area radius (Move off position) from which a GPS alarm will be generated. The "Tracking period" corresponds to the new rate of acquisition of GPS positions if the Modem is outside the avoidance radius.

To activate the GPS alarm, you must switch the "Real Time Warning" settings Move off position to enable. Otherwise, the alarm will not be managed.



To avoid generating false GPS alarms, the Modem must be switched on at the site where the Modem will be permanently installed. This position must be determined, considering the swing radius (e.g., mooring linked to the length of the chain for an installation on a buoy).

2.7 Upload files period

The rate at which files are sent is defined by the "Period" parameter in the "3G/4G" parameter list. Transmissions can be setup to every 5 minutes up to several hours.

Note: the recurrence of transmissions strongly impacts the battery life and therefore the autonomy of the modem.

2.8 Starting modem

Once set up the modem will scan at the sending and/or GPS rate if there are files to be transmitted. If no files are available (e.g., sensor stopped) then there will be no transmission.

Note that if the modem is activated it will automatically scan the probe at the sending rate, whether the probe is stopped or not. Also, if the transmission rate is high, this scanning will impact the autonomy of the modem. In this case it is recommended to set the modem to a low rate (24h).

⚠ Note that the modem transmits within 5 minutes of switching on the WiMo probe a first measurement file and potentially its GPS position if the function is activated.

2.9 Storage mode.

⚠ In order to avoid any malfunction of the modem when replacing the batteries or for immobilization of the modem (storage mode), it is essential to shut down the modem.

The modem is autonomous. After changing the batteries or if it is no longer used (probe not connected), it will wake up on the recurrence of its last configuration and try to take a GPS position if this option is activated. These events will have an impact on the autonomy of the batteries and possibly on its behavior when the modem is restarted (example: attempts to take GPS positions when the power is restored).

2.9.1 Storage mode

- Connect via Wi-Fi to the WiMo probe.
- Check the presence of the modem in the “Network and Communication” tab.
- If absent, force the detection of the modem by clicking on the Refresh button in the list box.
- Disable the 3G/4G functionality: in “Disable”.
- The “3G deactivation” window appears and offers two choices.
- Select the “Power down”* button to deactivate the modem functionality.
- This action simultaneously deactivates the 3G/4G and GPS transmission mode.
- The probe sends the order to the modem to retrieve its new configuration. Wait 10 minutes; this is the time required for the modem to put it in storage mode.

  Note: it is now possible to cut the power supply to the modem by disconnecting the cable (two-wire red/black cable disconnected)

⚠ Do not unplug the communication cable until the 10 minutes timeout is complete.

*Note: By selecting the "Disable Only" choice, only the 3G/4G transmission mode will be disabled. The modem will take its new configuration at its next transmission deadline. It is possible to force the update by clicking on the Refresh button in the listbox.

3 Maintenance

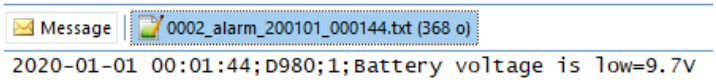
3.1 Management of alarm files

3.1.1 Internal battery monitoring alarms

The Modem has two levels of internal battery voltage monitoring. It generates then transfers an alarm file on detection of weak batteries. The second level of detection makes it possible to secure the modem if the voltage of the batteries reaches a critical level. In this case, the modem switches to "Stop" mode.

Exemple:

- • WiMo modem alarm: Low battery voltage



The code "D980" gives the type of alarm received

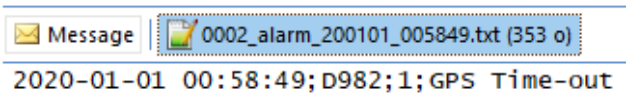
it is particularly important to manage these alarm files to anticipate battery replacement as soon as possible.

3.1.2 GPS Alarm

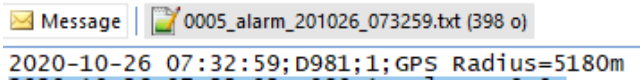
As seen previously, the WiMo Modem can generate different GPS alarms.

Exemples :

- • WiMo Modem Alarm on GPS Time out (lack of valid positions taken)



- • WiMo modem alarm on avoidance radius

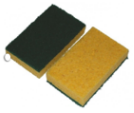


It should be noted that in case of reception of alarm messages on dodge radius (Move off position activated), it is necessary to cut the power supply of the modem to deactivate the function!

3.2 Routine maintenance

Regular maintenance of the equipment ensures maximum longevity. A thorough visual inspection must be conducted regularly, and any damaged part must be replaced.

Use a sponge with warm soapy water (such as dishwashing liquid) to clean the body. Never use abrasive agents (e.g., a scouring sponge).



In case of heavy contamination with barnacles (or calcifying organisms), rinsing with water may not be sufficient. Depending on the degree of contamination, we recommend removing the heaviest contamination. Then use a soft sponge with a 5% acetic acid solution (white vinegar), preferably with warm water, and rinse with fresh water.

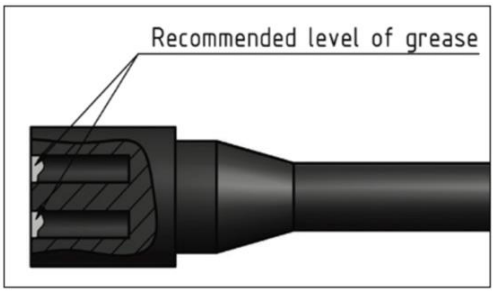
Wipe and dry the sensor with a soft cloth or optical wipes

3.3 O-rings and SUBCONN connector service

The O-rings seal the modem. Any O-rings damaged can affect the reliability of the modem. A visual inspection must be conducted systematically at each disassembly or reassembly. Check that no hair-type, particle-like elements are found on the O-rings. If the surface has impurities, gently clean them with a non-fluffy wipe and lightly grease the O-rings with molykote grease. Any damaged O-rings must be changed.

The connectors of the connection cable between the WiMo probe and the modem must be lubricated regularly in accordance with the manufacturer's recommendations.

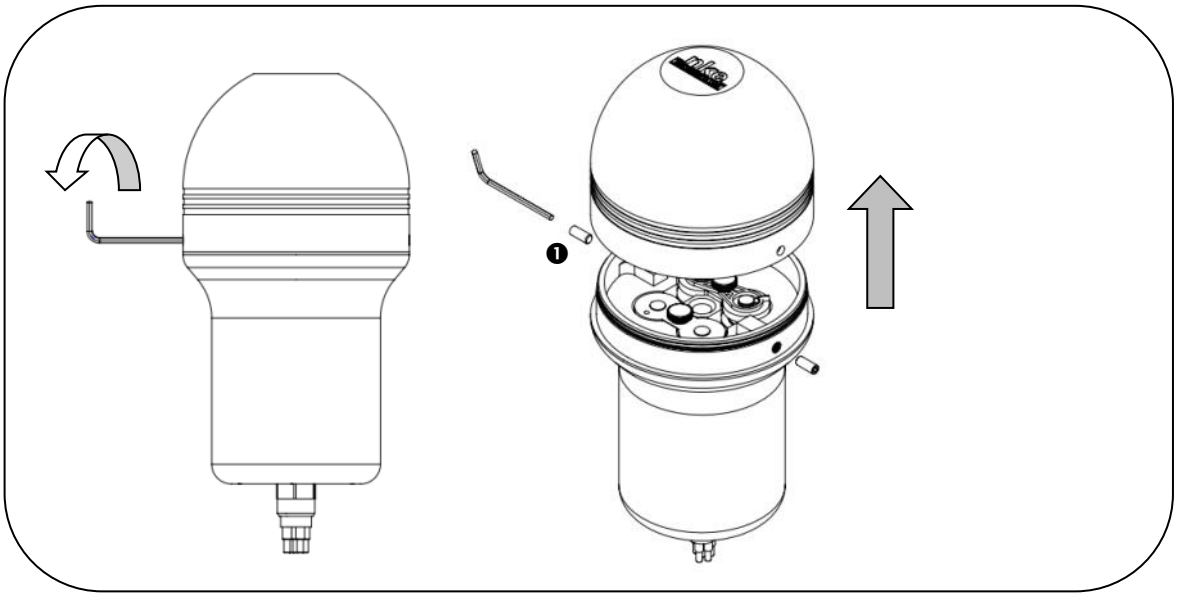
Apply to the female connector a layer of grease corresponding to at least 1/10 of the depth. The inside edge of all sockets should be completely covered with a thin transparent layer of grease left.



3.4 Replace batteries

The WiMo Modem works with 8 alkaline type C batteries. It is important to use reliable Alkaline batteries, especially batteries with a notified capacity to ensure maximum longevity.

Step 1: Unscrew the two grub screws ❶ with the supplied Allen key so that the cover can be removed. Be careful not to pull too hard on the cover to avoid damaging the connection cables.



Step 2 : Shut down the modem

- **Procedure modem V1 (before April 2023)**

Apply the procedure « **Erreur ! Source du renvoi introuvable.**Storage mode.» (§2.9.1).

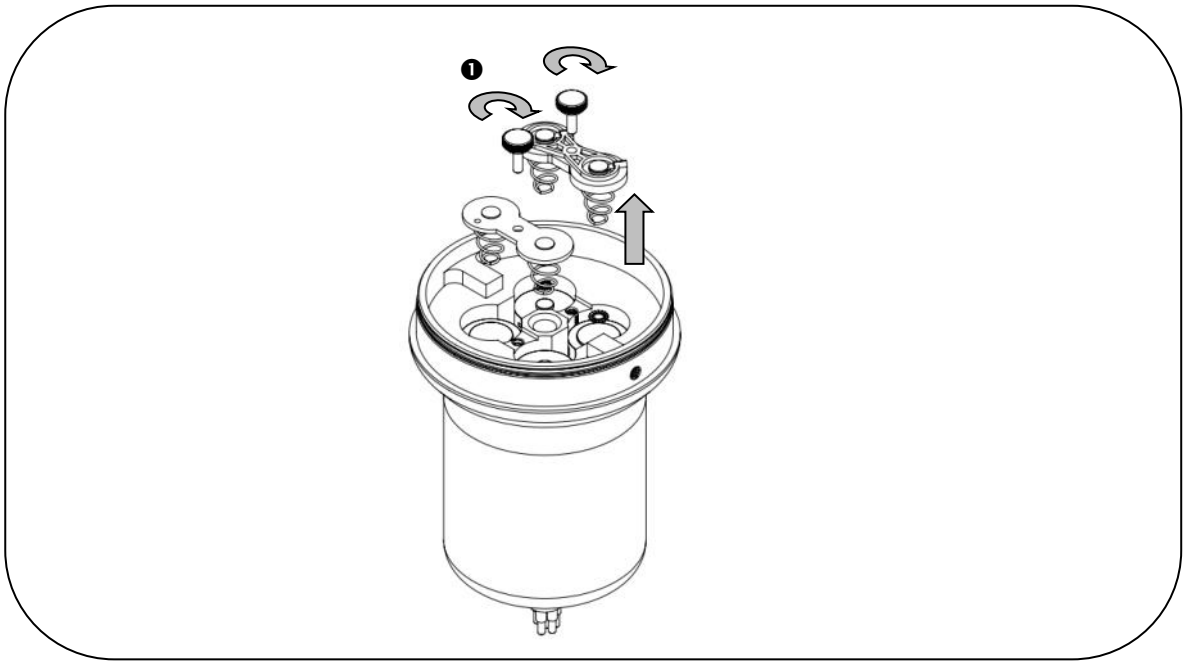
Then, once the timer has elapsed, remove the cover, and disconnect the cable (red/black two-wire cable).

- **Change of batteries Modem V2 (since April 2023)**

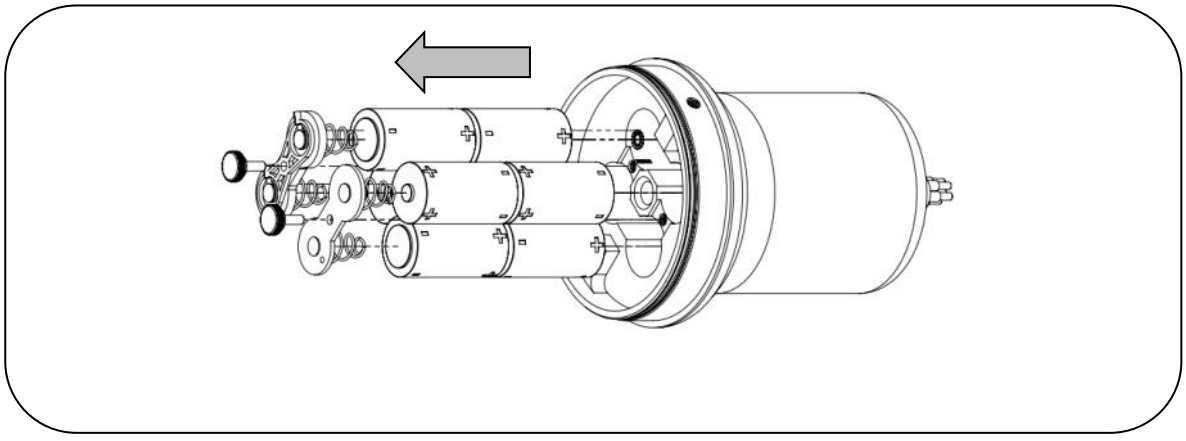
The V2 modem has a user interface that improves certain actions and helps the user in the working state of the modem (see § 1.1.1). He is therefore no longer obliged to connect via Wi-Fi to the WiMo probe1.

1. Check the activation status of the red LIGHT and wait for it to be turned off.
2. Locate the push button and press for 3 seconds, the green light lights up continuously for 15s (timer corresponding to the time allowed to disconnect the power).

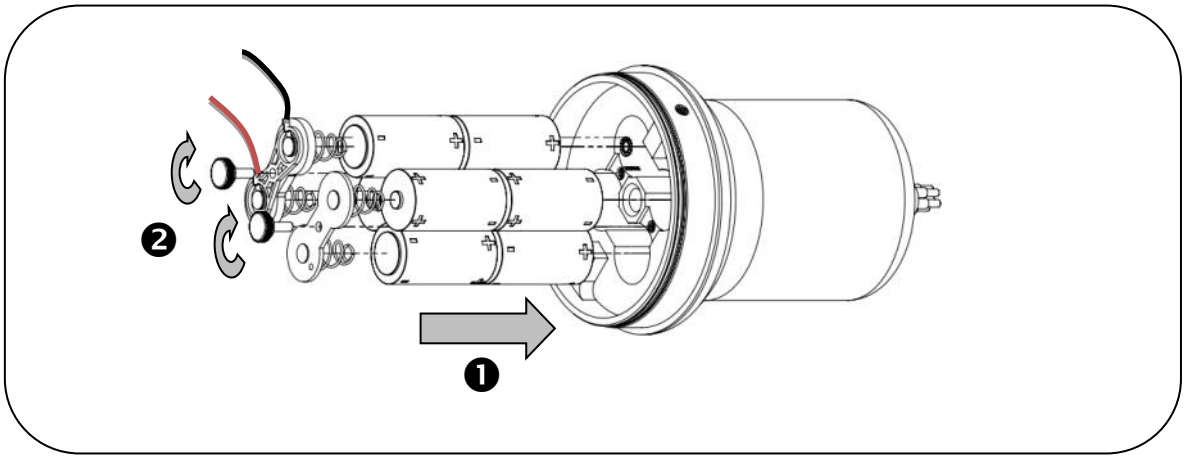
Step 3: Disconnect the red & black 2-wire cable from the electronic board, taking care that no light is lit (green and/or red). Unscrew the two knurled screws ❶ until they come out of their housing.



Step 4: Gently remove the batteries from the battery compartment.

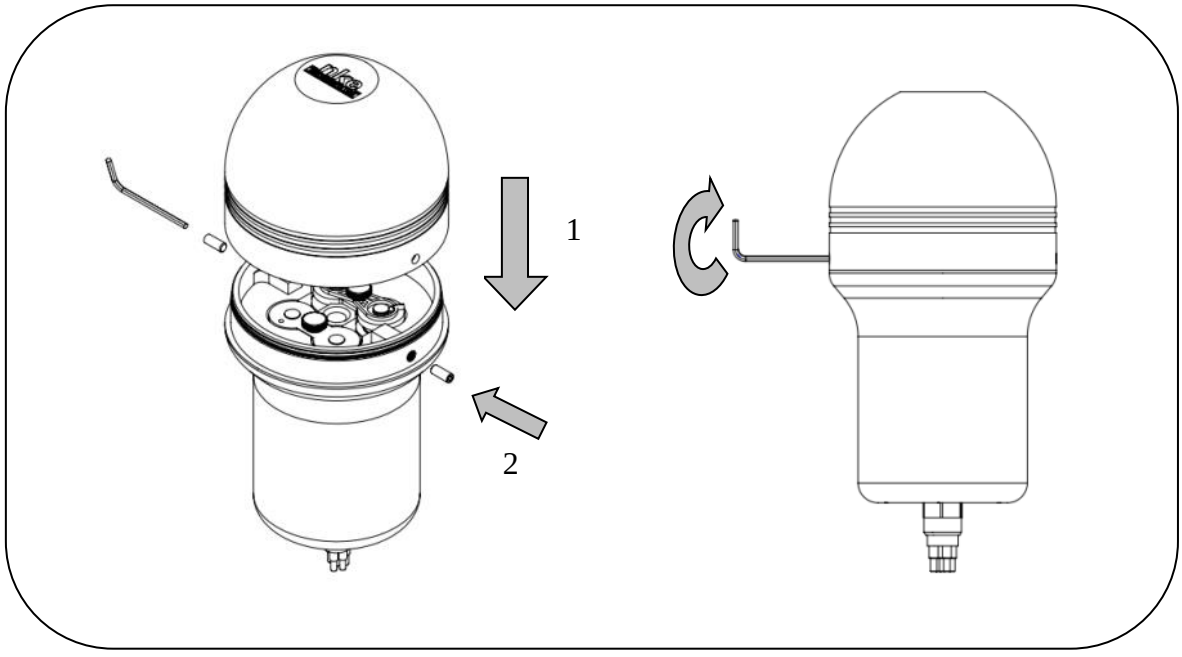


Step 5: Insert new type C batteries, **paying attention to polarity!** Follow the direction indicated on the case label. Screw the battery holders back on as shown in the diagram. Check that the spring associated with the black wire is on the negative pole of the battery and that the spring associated with the red wire is on the positive pole of the battery.



Step 5: Reconnect the 2-pin connector of the battery pack, paying attention to the coding of the connector.
On power-up, the modem is in “start-up” mode *and the red light is* fast flashing (§ 1.1.1). To give the order to the modem to start, press the push button for 3 seconds. The modem then switches to activated mode, the red-light changes state and lights up continuously.

Reinstall the cover on the modem, checking the seal and checking that no impurities are present. Insert the two grub screws and tighten them with the Allen key until they are flush with the cover.



4 Product Identification

The modem is identified by a label stuck on its side. It identifies the type of product and its serial number.

❶ Product Name / version identification

❷ Product family code (internal nke instrumentation code)

❸ Product serial number

5 Return a product to the factory

For a consideration of your product by our after-sales service it is essential to follow the RMA procedure. Any material returned without an RMA number will not be considered.

- In case of shipment for repair or expertise, obtain an RMA number by using the procedure available on the website: https://nke-instrumentation.com/product-return-form/
- Pack the product in its original shipping box to prevent damage in transit.

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