QUICK-START GUIDE (QSG)

CAIRNET V4
6 sensors

JULY 2024

ENVEA RECOMMENDS READING ALL THESE INSTRUCTIONS
BEFORE POWERING ON AND USING THE EQUIPMENT

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– Enter the address « https://www.envea.global/envea-connect/ » in the Smartphone/Tablet internet browser, or directly enter “ENVEA connect” in the Play store (Android) or in the App store (iOS)

– Download the application.

– Click on the icon to launch the “ENVEA connect” application.

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To download the Micro-sensor documentation or the Cairsoft software from our website https://www.envea.global/, click on the link https://www.envea.global/solutions/ambient-monitoring/faq-cairnet-cairsens-caircloud/

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In order to contribute to environmental preservation, hard copies of the manuals will no longer be printed by ENVEA.

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1. PRESENTATION

(1) Sample gas inlet, (2) Air exhaust, (3) antenna

Figure 1–1 – CAIRNET box presentation

(DO NOT obstruct the sample gas inlet, nor air exhaust).

The CAIRNET can be supplied in two ways:

- Battery recharged by solar panels (standard) or recharged by 18VDC mains supply (optional and for indoor use only),
- Or 12V/2A mains supply.

See paragraph 2.8.2 for instructions about switching from one power supply to the other.

In standard, each assembly is composed of:

- A CAIRNET box (serial number and association code for CAIRCLOUD and modem IMEI number supplied) including the following internal elements (see Figure 1–2):
  - An IQ-LINK electronic box (1) providing power supply, measurement recovery and cellular communication (by default, data is sent each 15, 30 and 60 minutes depending on battery voltage).
  - A 23 Ah 3.7 V nominal [3.0:4.2 V] Li-ion battery, disconnected for transport (2).
  - An additional BQM board (3) managing the autonomous operation (via battery + solar panels).
  - An angle-bracket (4) for CAIRSENS PM adaptation (4.a).
  - Six slots to insert CAIRSENS gas, closed with plugs (5).
  - Six micro-USB cables of 50 cm (6) to be connected to the CAIRSENS sensors.
  - A fan (7) to draw air into the manifold (8).
  - A temperature, relative humidity and atmospheric pressure probe (9).
  - A coaxial cable (10) for connecting the IQ-LINK to the external antenna.
  - A radio antenna (11) to be screwed outside the box (unscrewed for transport).
  - Three cable glands (12) for cable passage from outside.
- A fastening system (plate + stirrups) for CAIRNET fixation.

The following items can be provided as an option:

- An 18 VDC / 1A power supply for indoor use (Ref. : A40-0304), for one-off battery recharging before on-site installation.
- A 12 VDC/ 2.1A power supply for outdoor use in its waterproof box (Ref. : D06-0088), for the continuous power supply of the CAIRNET via the 8-30 VDC input of the IQ-LINK.
- Two 13.5W solar panels to be mounted on a tilting support, and a fixation system on mast. These solar panels are supplied with cables (length: 1m) fitted with telemechanical ends, to be connected to the CAIRNET.
- A mobile tripod or fix holders (tube 0.30m x 0.28mm or 1.5m x 0.28mm) for installation.

WARNING: **The communication system requires a (data) M2M SIM card in (3FF) Micro-SIM format, compatible with GSM networks (3G/4G).**

The type of subscription with the provider must be for sending and receiving data (data package).

CAIRNET (incoming and outgoing) data consumption is less than 100 Mo per month. Plan a package adapted to this volume.

The user has to activate the SIM card before use and get the corresponding APN to configure the modem.

The SIM card used must not be blocked by a PIN code. If it is, unlock the SIM card with a smartphone or ask the provider.

Wireless/cellular remote communication mode: network deployment over a large area in an urban, industrial or rural environment is performed within the telephone coverage limits (3G/4G) and within the limits of local regulations.

(1) IQ-LINK electronic box (1), (2) battery, (3) BQM board, (4) angle-bracket, (4.a) CAIRSENS PM location, (5) plugs to close the gas CAIRSENS location, (6) micro-USB cables, (7) fan, (8) manifold, (9) temperature probe, (10) coaxial cable for connecting the IQ-LINK to the external antenna, (11) radio antenna, (12) cable glands.

Figure 1–2 – Internal elements of the CAIRNET box

Legend:

- SN: CAIRNET serial number,
- Cloud key: CAIRNET association key with CAIRCLOUD,
- IMEI: unique 15-to-17 digit identification number of the cellular module used in the CAIRNET,
- Version: CAIRNET version,
- Input: CAIRNET power supply range,
- P max: maximum electrical power of CAIRNET,
- Temp: operating temperature range of CAIRNET,
- XA internal resettable fuse: X Amp safety fuse available.

Figure 1–3 – Label on the internal face of the CAIRNET door

Figure 1–4 – On-mast fixation system

IQ-LINK connectics description:

– On the IQ-LINK top panel, the connectors have the following functions:

  · Not-polarized DC mains power supply (1), 8-30 VDC, 2A. The 2-pin male connector is only supplied with the 12 VDC waterproof power supply option for outdoor use. If this input is used, the battery and the BQM board must first be removed from the IQ-LINK.

  · Temperature Humidity Pressure sensor (THP) (2).

  · Fan (3).

  · Cellular communication ON/OFF switch (4). It enables to access the station settings (on the first commissioning) or to force data transmission to the Cloud (on standard operation). See chapter 2.6 for more details.

  · Not used (5), (6), (7).

Figure 1–5 – IQ-LINK top panel connections

– On the IQ-LINK front panel, connectics is as follows:

· 6 micro-USB cables (2) for connection to the CAIRSENS range sensors. The colour code of cables is as follows (see Figure 1–7 to view the (black/red/green/white) connection order:

Black	Red	Green	White
GND	VDC	D+	D-

(3) and (4) not used

Figure 1–6 – IQ-LINK front panel

2. INSTALLATION AND COMMISSIONING PROCEDURE

2.1. OPEN THE BOX

See Figure 2–1.

The CAIRNET box is fitted with two hinges used to close and ensure water tightness of the top cover. One of the two hinges opens manually and enables to access inside the CAIRNET (see Figure 2–1, Manual opening hinge).

The other closing hinge can be opened with a flat screwdriver size 3.0 (see Figure 2–1, Screwdriver-opening hinge).

For on-site locations where dimensions do not allow the CAIRNET box cover to be opened correctly, the two hinges can be interchanged in order to reverse the opening direction.

The cover can be directly screwed on the box to block up the manual opening, from one side or the other, or both at the same time. The (M3x8 type, not supplied) screws are under the locking hinge and thus are hidden. (See Figure 2–1, Screw holes).

Manual opening hinge | Screwdriver-opening hinge | Screw holes

Figure 2–1 – CAIRNET box opening

2.2. SCREW THE EXTERNAL RADIO ANTENNA

The antenna is dismounted before transport, it needs to be reassembled during installation. To do this:

- Screw the antenna on the lateral side of the CAIRNET box (Figure 2–2).
- Make sure that the antenna is pointing upwards, with no obstacles at less than 30-50 cm, to ensure an optimum signal.

Figure 2–2 – Radio antenna of CAIRNET

The cable linking the external antenna to the IQ-LINK is fixed on one side to the internal panel (1) of the box, and on the other side to the IQ-LINK box connector identified with an "Antenna" icon (2):

Figure 2–3 – Connection of antenna cable to IQ-LINK

2.3. FREE THE IQ-LINK

The IQ-LINK box is screwed on two angle brackets fixed to the bottom plate of the CAIRNET: it is necessary to free it to make easier access during the various commissioning operation. To do that:

- Unscrew, without removing them, the screws (1) of the two angle brackets holding the IQ-LINK to the bottom plate,
- Gently pull the IQ-LINK upwards to remove it from the CAIRNET.

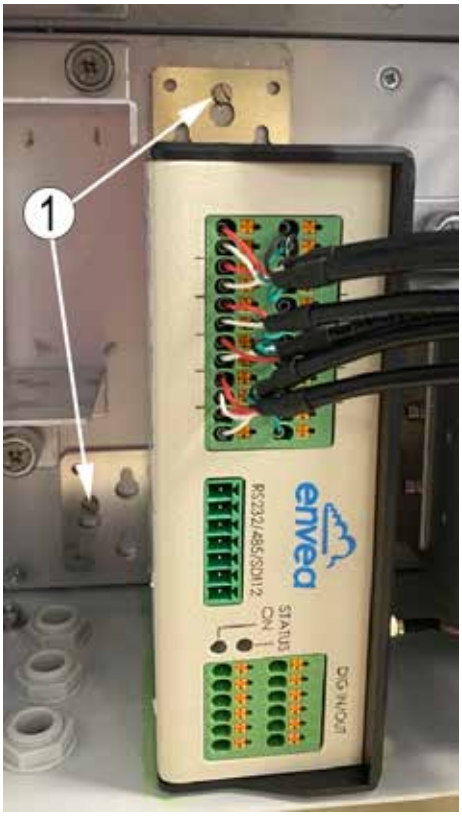


Figure 2–4 – Screws of the brackets holding the IQ-LINK

2.4. INSTALL THE CAIRSENS PM IF USED

The procedure to be applied is as follows:

- To make installation easier and give more space, the IQ-LINK can be released as described in paragraph 2.3 to access to the CAIRSENS PM support bracket. See (4) of Figure 1–2.
- Unscrew the CAIRSENS PM angle bracket with a flat screwdriver and remove it.
- Remove the plug sealing the hole on the left side of the manifold.
- Take the CAIRSENS PM in its kit: it is delivered with a sampling tube, and is equipped with 4 screws inserted on its side. Fix the CAIRSENS PM on the angle bracket with these 4 screws (see Figure 2–5.
- Cut the sample tube to a 3.5 cm length.
- Connect the sample tube to the CAIRSENS PM sample inlet on one side (1), and into the manifold opening on the other side (2). See Figure 2–6.
- Reassemble the CAIRSENS PM screwed on its angle bracket in the box and adjust the sampling tube.

Figure 2–5 – Screwing the angle bracket on the CAIRSENS

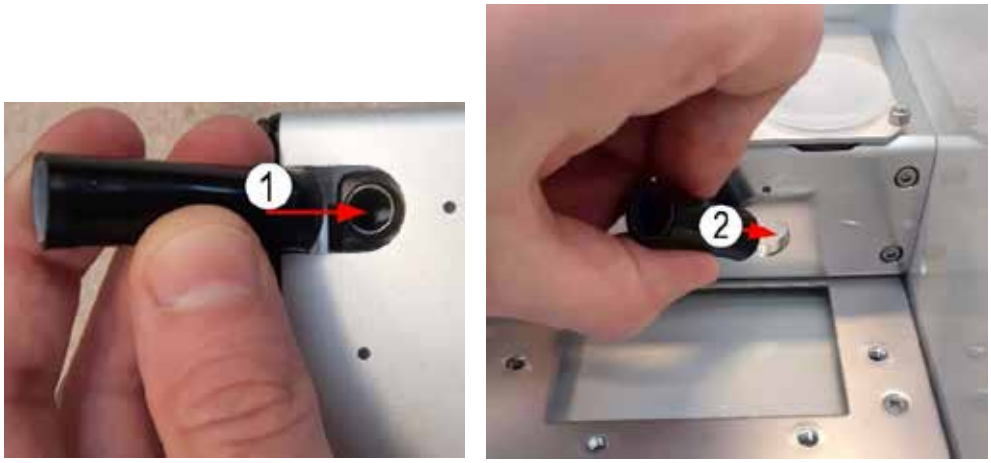
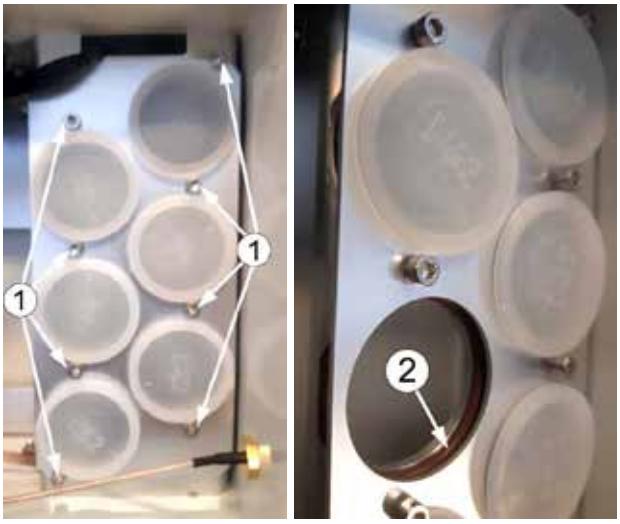


Figure 2–6 – Sampling tube connection

2.5. INSTALL THE CAIRSENS

See Figure 2–7 :

- Unscrew the 8 hexagonal screws of the sensor holding plate with a 2.5 mm Allen spanner (see (1) of Figure 2–7). Remove the plug(s) where the CAIRSENS will be inserted.
- Slightly remove the holding plate of seals (2). This reduces the seal compression caused by the plugs to recover their initial shape and be correctly adapted to the CAIRSENS cylinder.
- Insert the CAIRSENS until limit stop, into the air sampling system body, by placing the fan inside and the screen outside, as shown at (4) of Figure 2–8.
- Tighten all screws. Check that the CAIRSENS is correctly held by the seal to avoid any air "leak". See Figure 2–8 :
- Remove the CAIRSENS cap on front panel to connect the micro-USB cable (4).



(1) screws to be unscrewed, (2) seal

Figure 2–7 – Removing the plugs from the holding plate

(4) Micro USB cable

Figure 2–8 – Setting up the CAIRSENS in the sampling area

2.6. CONFIGURING ACCESS POINT NAME (APN) AND TESTING TELEPHONE NETWORK CONNECTION WITH SIM CARD

Configuration must be done on a CAIRNET assembly equipped with an IQ-LINK having the antenna correctly mounted and the coaxial cable correctly connected to the IQ-LINK, and **without the SIM card inserted during the first steps**. (See Figure 2–2 and Figure 2–3).

The configuration procedure is carried out using a WIFI link between the CAIRNET and a PC (or smartphone) and will also depend on the CAIRNET power supply mode: via a pre-charged battery **(BATTERY MODE) OR via the 12VDC mains supply (MAINS MODE)**.

2.6.1. BATTERY MODE

Power on the IQ-LINK by connecting the CAIRNET battery to the board managing the autonomous mode (battery + photovoltaic panels or 18V power supply) mounted rear the IQ-LINK (see (2) and (3) Figure 1–2).

If the system operates correctly, the “ON” LED of the IQ-LINK gets on and blue, and flashes.

If the battery load is too weak, the “ON” LED gets on and red and flashes: recharge the battery using the 18V power supply.

CAUTION: if the device is only powered by battery, the LEDs will turn off after 1 minute.

SIM card inserted

Press down the ON/OFF button (4) of Figure 1–6 to launch the APN configuration mode: the STATUS LED gets green and flashes, which indicates the configuration mode is active.

The green STATUS LED flashes for about 25 seconds. Then the blue ON LED and the green STATUS LED will flash simultaneously for 3 to 4 seconds. At this time, press the ON/OFF switch at least 3 times to confirm activation, and WIFI will be activated after one minute. If the delay is exceeded, disconnect the battery and repeat this step.

SIM card not inserted

Press down the ON/OFF button (4) of Figure 1–6 to launch the APN configuration mode: the STATUS LED gets green and flashes, which indicates the configuration mode is active. Wait 2 or 3 minutes for the WIFI to be active.

The STATUS LED turns green and flashes, indicating that WIFI configuration mode is active. This mode remains active for 20 minutes, during which time the IQ-LINK generates a WI-FI signal.

When time is over, start again the IQ-LINK by supplying the CAIRNET battery to the board managing the autonomous mode (battery + photovoltaic panels or 18-volt power supply) mounted on the rear panel of the IQ-LINK (see (2) and (3) Figure 1–2).

2.6.2. MAINS MODE (WITHOUT SIM CARD ONLY)

Supply the IQ-LINK without the SIM card by connecting the 12VDC power supply. The system generates WIFI after 2 minutes.

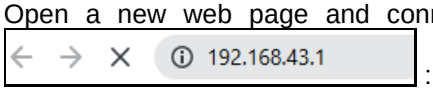
1) Get a hardware (computer, smartphone, tablet) having a WI-FI link.
2) Activate WI-FI and search for the list of available devices.
3) Connect to the "ESA_IQ_LINK_xxxxxxxx" (where xxxxxxxx refers to the serial number (SN) CAIRNET CXMxxxxxxxx). Three windows open successively:
   - In the window (1), check the « Connect automatically » box and press down « Connect ».
   - In the window (2), click on « Connect using a security key instead »,
   - In the window (3), enter the network security key « 123456789 » then press down « Next ».

From this point on, two possibilities are available for APN configuration: either via a web browser (different from Internet Explorer), or via the ENVEA Connect application.

A – APN configuration via a WEB browser (Google Chrome, Mozilla Firefox, Safari …)

ENVEA IQ-LINK application not compatible with Internet Explorer

See Figure 2–10.

1) Open a new web page and connect to the address 192.168.43.1 in the web site address bar 

: the ENVEA IQ-LINK configuration page launches.

2) In the INFO section: check that the CAIRNET serial number and CAIRCLOUD association key (1) displayed on the label pasted on the box inside door correspond to the CAIRNET being configured. IMPORTANT: **copy the activation key to a text file and save.**

3) In the GSM CONFIG section: fill in the three « APN », « Username », « Password » fields corresponding to the mobile network operator of the used SIM card. See « Network operator information (2) ». Note: **The Username and Password fields can be left blank**.

4) Press down **« Save (3) ».**

5) Refresh the page and check the APN parameters are well taken into account.

6) Test the modem communication. To do that, **insert the micro-sim card in the IQ-LINK** following the procedure detailed below:

· Access the IQ-LINK box previously released from the bottom plate (see section 2.3).

· The SIM card is to be inserted in the lower part of the IQ-LINK, not visible when it is mounted in the CAIRNET.

· Remove the IQ-LINK box from the CAIRNET.

· Insert the micro SIM card into the slot until it stops, with the chip (gold side) facing down, as shown in Figure 2-9. When fully inserted, the micro SIM card is no longer visible from the front.

· Replace the IQ-LINK box in the CAIRNET and fix it again.

Insertion direction of the Anti mistake index

Figure 2–9 – Micro-SIM card insertion

7) Check the antenna and its extension cord are correctly linked to the IQ-LINK.
8) Press down « Connect » (4) to start the cellular connection test. It may last few minutes. When the test is finished, the « Operator », « State » and « Signal » fields are filled in. See (5) giving the results of the network connection tests.
9) If the test fails, run it again.

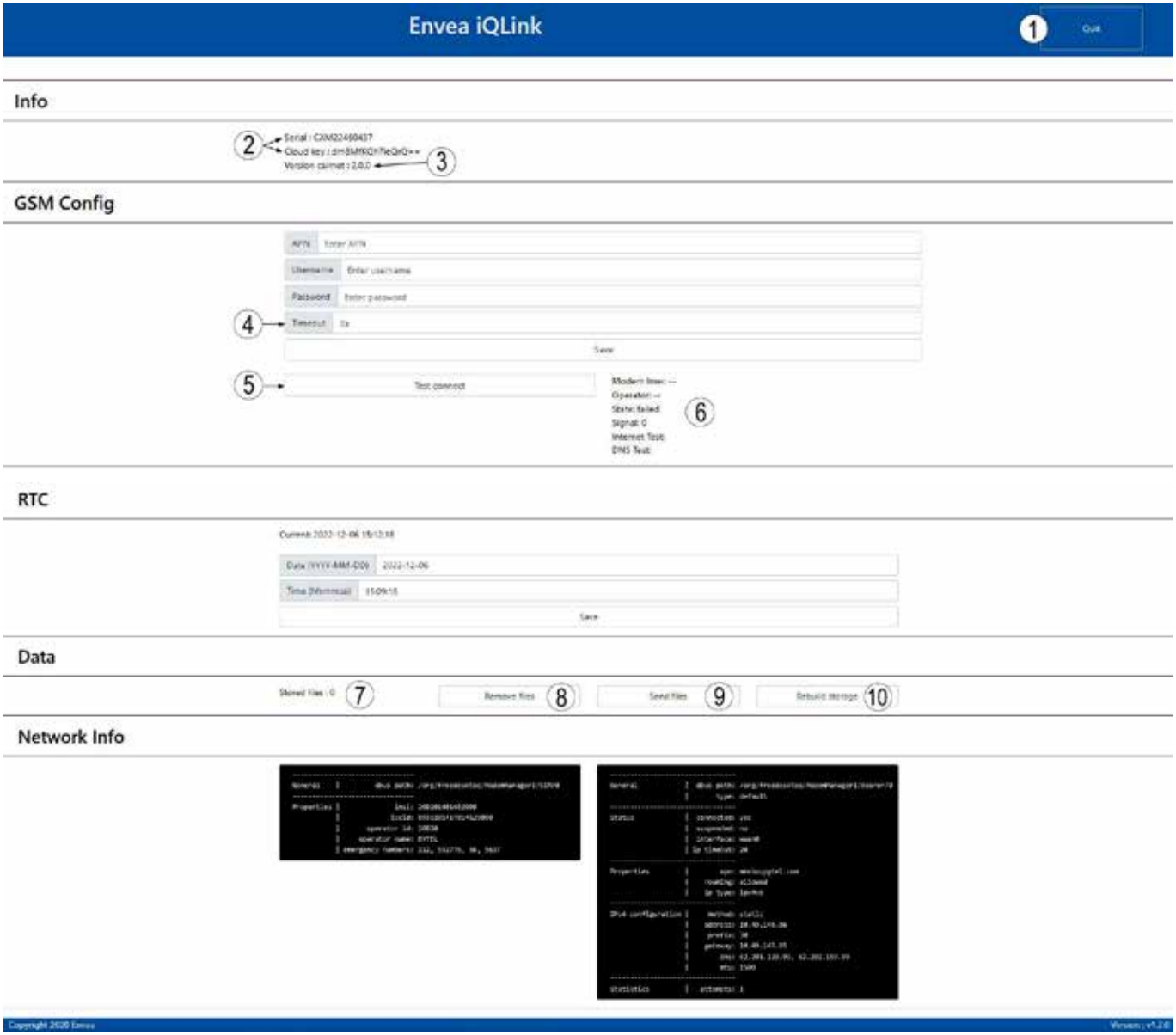
OPERATOR field: it indicates the operator used by the SIM card.

STATE field: it can send 4 status:

– « Connected »: the connection is on and operational,
– « Connecting »: the connection is being finalized and requires some additional waiting time,
– « Registered »: the modem is connected to a cellular relay, but is blocked before the network connection is finalized. Check that:
  · The setting of APN, USER and PASSWORD fields is correct,
  · The SIM card is well active, not blocked, not locked by a PIN code.
– « Not connected » or blank field: the connection cannot be established. Repeat the test.
– « Locked »: the SIM card is blocked by a PIN code. Unlock with a smartphone or check with the operator.

  If the connection is still not established, check that:
  · The APN, USER and PASSWORD information was well entered,
  · The SIM board is correctly inserted and the antenna is well wired.

SIGNAL field: indicates the network signal quality based on a 0-100 % scale (0 %: no signal, 100%: correct signal).



Legends are as follow:

Mark	Function
(1)	When the configuration is finished, disconnect by clicking on the Quit button. Communication with the cloud will continue.
(2)	CAIRNET serial number and association key.
(3)	Current version of the software embedded in the CAIRNET.
(4)	In the event of network connection problems (no data transmission), set a waiting time of 3 to 10 minutes (this may reduce autonomy). The setting is m for minutes, s for seconds.
(5)	You can run a connection test to check that the modem, SIM card and network are working properly. When this test is in progress, the button is locked.
(6)	The results of the connection test and the modem IMEI number are displayed here.
(7)	Number of files stored waiting to be sent to the cloud.
(8)	Deletes stored files.
(9)	Perform a connection to the cloud to send data.
(10)	This can solve problems of corrupted files.

Figure 2–10 – ENVEA IQ-LINK configuration interface

B – APN configuration via the « ENVEA Connect » application

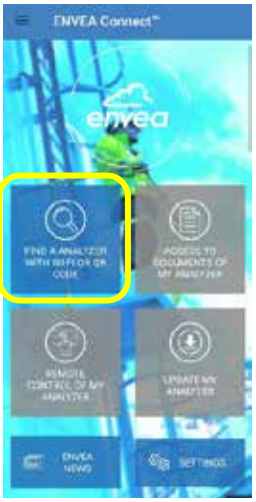
The “ENVEA Connect” application for Smartphone/Tablet can be download as follows:

- Enter the address « https://www.envea.global/envea-connect/ » in the Smartphone/Tablet internet browser, or directly enter “Envea connect” in the Play store (Android) or in the App store (iOS),
- Download the application.

When the application is downloaded:

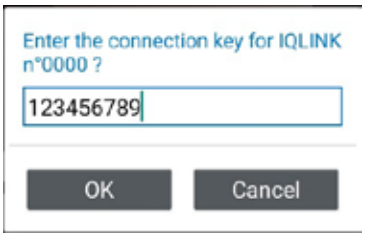
1 – Touch/click on the icon to start the ENVEA Connect application. If it is the first connection, accept the access authorization requests (WI-FI, Geolocation, etc.)

Touch the icon « FIND AN ANALYZER WITH WI-FI OR QR CODE ».



2 – Place two fingers on top of the screen and slide them down to display the list of Wi-Fi devices. Touch « IQLINK n°0000 » to select the IQ-LINK.

The input field is displayed: touch this field to display the input keyboard, enter the connection key 123456789 for the selected IQ-LINK and validate by touching « OK ». « Cancel » closes the input field without validating.



Note: the camera section to scan a QR code is not used.

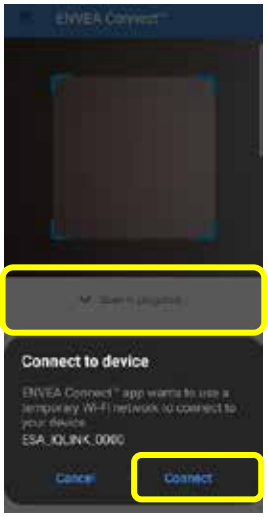
3 – Connect to device

The smartphone/tablet searches for the available Wi-Fi network to connect to. The following message is displayed on the screen:

« ENVEA Connect app wants to use a temporary Wi-Fi network to connect to your device».

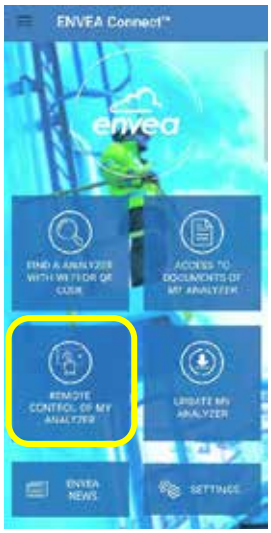
ESA_IQLINK_0000 is the CAIRNET Wi-Fi address.

Touch « Connect » to allow the smartphone connection to the CAIRNET Wi-Fi network.



4 – When the connection is established, the home screen is automatically displayed with the « REMOTE CONTROL OF MY ANALYZER » unlocked icon.

Touch this icon.



5 – The ENVEA IQ-LINK page opens: follow the procedure described from **A – 2). (page 15)**

WARNING: **The functionalities of the ENVEA Connect application are only active when there is an available Wi-Fi network to which the user can be connect to.**

2.7. CAIRNET SYNCHRONISATION WITH THE CAIRCLOUD ACCOUNT

This operation has to be performed after the modem configuration step (§ 2.6) in order to synchronize the CAIRNETs with the CAIRCLOUD account on which the measurements will be visible.

REMARK: **The CAIRNET has to operate and send a first batch of data after the configuration step to be acknowledged in the CAIRCLOUD, (at least one data transmission after 15 to 30 minutes of operation), before carrying out the synchronization step.**

– The CAIRNETs are identified by their serial number. First, copy the cloud key of each CAIRNET present on the label pasted in the lower left corner of the box door (Figure 2–11). This cloud key is also visible in the ENVEA IQ-LINK interface previously used for modem information configuration. In this case, a copy and paste avoids typing errors of association key characters (see section 2.6).

Figure 2–11 – CAIRNET label with serial number and cloud key

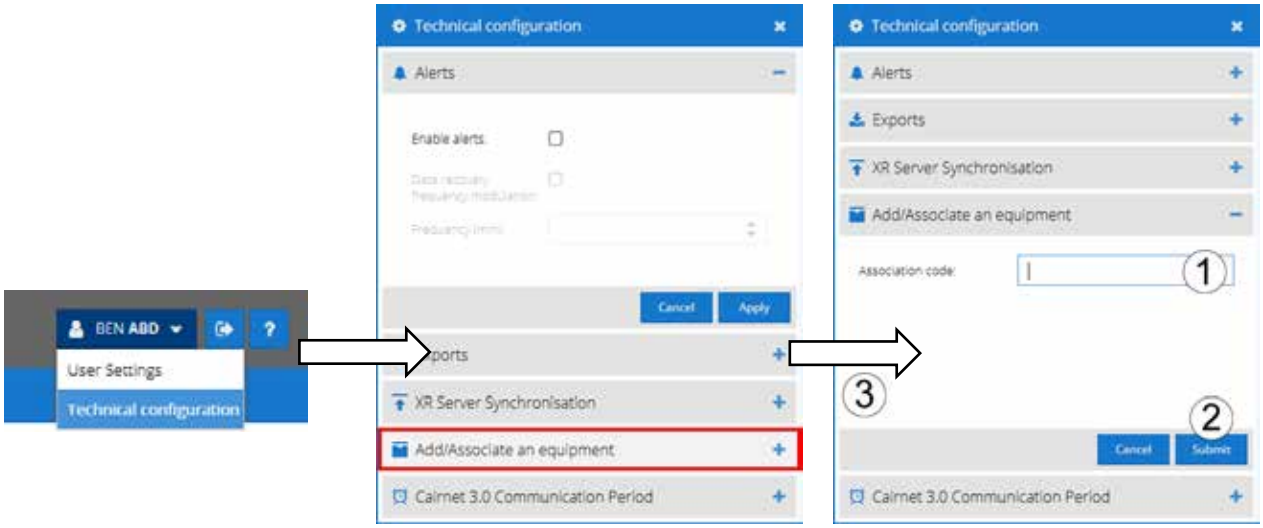
– Connect to the http://caircloud.iseo.fr/login web site and identify with the username and password corresponding to the user account. For more information about CAIRCLOUD operation, click on ? to open the available user guide.

– Then, perform the CAIRNETs association to be synchronized with this user account so that the data retrieved by the box be linked to this account, and only visible on this account. Follow the Figure 2–12 diagram.

After having entered the activation key and pressed "OK", two different messages may be displayed, depending on the case:

· Either the association operates, and the equipment list and the CAIRNET serial number are displayed in green;

· Or the association does not operate, and the error message "This code is not matching" is displayed. Wait for 15 minutes, then return to step 2.6 "Configuring the access point name (APN) and testing the telephone network connection with the SIM card".



At the top right, click on the registered account user name, then go to "Technical configuration".

Then, go to the “Add/ Associate an equipment” tab

(1) enter the code here,
(2) press down “Submit” to validate
(3) repeat the procedure for each cloud key

Figure 2–12 – CAIRNET association with a CAIRCLOUD user account

2.8. POWERING ON AND SUPPLY MODE OF CAIRNET

The CAIRNET can be powered on with 2 completely different ways:

- By battery, which can be recharged in 2 ways:
  - Permanently by solar panels (optional), for outdoor use.
  - Occasionally via the 18VDC mains supply, for indoor use only.
- Via the 12VDC mains supply.

2.8.1. CAIRNET POWERING ON WITH BATTERY SUPPY

From now on, the CAIRNET configuration is considered as previously done (see part 2.6).

- Connect the battery (3) to the connector (1) of the battery supply board (2), as shown in Figure 2–13. From this time on, the system is powered up and running.

  When starting the system on battery, a red LED flashes for few seconds indicating the system initialization. A blue LED indicates that the system is in standard operation. See the LED status in the Presentation section.

  When the initialization is finished, the CAIRSENS screen indicates the measurement performed and the data transmission to the cloud is done automatically at regular intervals (every 15 minutes by default).

  The jack connector (4) is used to occasionally recharge the battery with the 18 VDC / 1A power supply for indoor use (item code option = D06-008-, not supplied).

  Take care of burn hazard by contact with the power supply board during charging with power supply.

  During this phase, the CAIRNET door cannot be closed, so it is recommended to carry out this operation indoors only, away from any rain.

(1) Connector for battery connection, (2) battery supply (BQM) board, (3) battery, (4) battery recharge connector via 18V internal power supply, (5) solar panel connector.

Figure 2–13 – Battery connection to the power supply board

WARNING: **1 – It is strongly recommended to re-load the batteries with the 18V/1A mains supply before autonomous operation on site.**

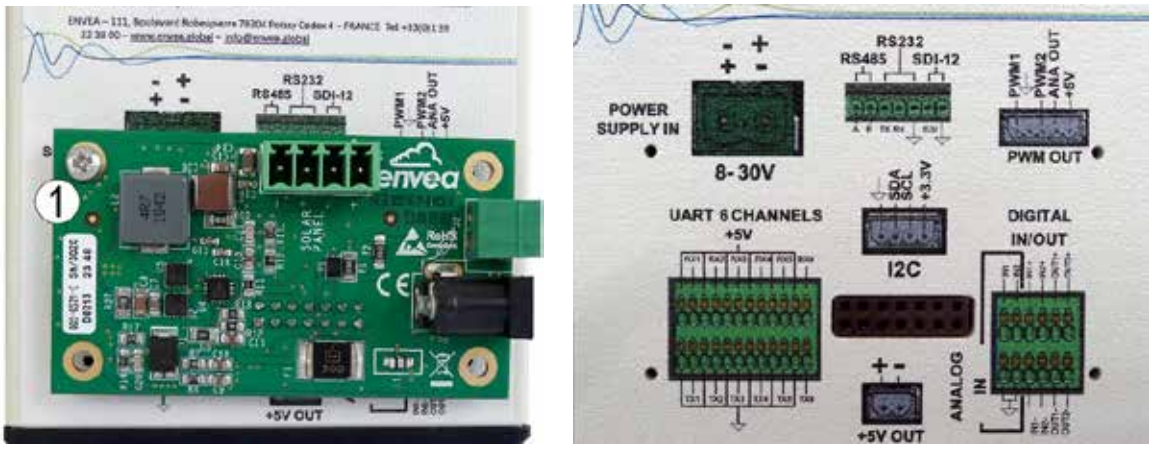
2 – If the autonomous power supply board is disconnected from the IQ-LINK, NEVER reconnect it when powered up, as this could cause irreversible damage to the system.

2.8.2. CAIRNET POWERING ON WITH 18VDC MAINS POWER SUPPLY

The CAIRNET can be supplied in continuous via the 8-30 VDC input of the IQ-LINK (see (1) Figure 1–6). In this case, the battery is not used. To do that, the 12 VDC waterproof power supply option for outdoor use (item code = A40-0304-*) has to be used.

To install this option, it is first necessary to disconnect **the autonomous power supply board from the IQ-LINK**:

- Disconnect the battery,
- Free the IQ-LINK as detailed in section 2.3,
- Unscrew the 4 screws of the autonomous power supply board of the IQ-LINK (BQM) and remove it.
- Extract the BQM board (1).
- Then, replace the IQ-LINK in the box.



(1) BQM board

Figure 2–14 – Autonomous power supply board of IQ-LINK

Then, the option connector of the “outdoor power supply source (A40-0304-*)” has to be connected to the IQ-LINK. To do that:

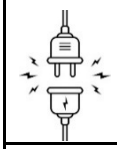
- Remove the 2-pin connector from the 12 VDC option,
- Pass the sheath containing the 2 cables (1 red (+) 1 black (-)) through one of the cable glands,
- Reconnect the 2 cables to the 2-pin connector.

  NOTE: there is no need to respect polarity for connection to IQ-LINK.
- Connect the 2-pin connector to the 8-30 VDC IQ-LINK input (see Figure 2–15).
- Connect the 12 VDC power supply to mains: the CAIRNET is then supplied in continuous.

Figure 2–15 – Connection of the 2-pin connector to the 8-30 VDC IQ-LINK input

2.9. LED DISPLAY DESCRIPTION

2.9.1. CASE 1: CAIRNET SUPPLIED BY BATTERY RECHARGED BY SOLAR PANNELS OR BY MAINS

LED sequencing during normal operation and data transmission to the CAIRCLOUD	
Sequencing and LED status	**Meaning**
	IQ-Link powering on.
	The LED is ON and red, and it flashes (cycle 2s, period 1s), system waiting for information about the battery charge level provided by the BQM board (3a). Otherwise, it is necessary to recharge the battery to continue commissioning CAIRNET.
	After a 5-second delay, the LED turns blue (voltage level >= 3300mV).
	The blue LED turns off and the green LED starts flashing.
	The green LED flashes: the CAIRNET collects data from the various sensors (Cairsens and others if present).
	The red LED flashes: the CAIRNET transfers data to the cloud.
	The LED turns blue and flashes: data transfer is finished. The system switches to stand-by mode and waits for the next data transfer cycle (15 minutes by default).

Battery charge status display							
Battery voltage (mV)	**Battery charge level (%)**	**CAIRSENS operation status**	**Data transfer frequency**	**LEDs status** Out of data transfer to the cloud			
							
>= 4100	>90	ON	15 minutes			Flashes (cycle 1s, period 0.9s)	
>= 3750	>30	ON	30 minutes			Flashes (cycle 1s, period 0.8s)	
>= 3300	>5	ON	60 minutes			Flashes (cycle 1s, period 0.6s	
< 3300	0	OFF	None	Flashes (cycle 5s, period 0.2s)			

LED sequencing when data transfer is forced by pressing the ON/OFF switch once (Only when the system is powered by battery) Forced data transfer period of 15, 30, or 60 minutes (depends on battery charge level)						
Battery voltage (mV)	**Battery charge level (%)**	**CAIRSENS operation status**	**Transfer data frequency**	**LEDs status Out of data transfer to the cloud**		
						
>= 4100	90	ON	15 minutes			Flashes
>= 3750	30	ON	30 minutes			Flashes
>= 3300	5	ON	60 minutes			Flashes
< 3300	0	OFF	None		Flashes	

OTHER LED DISPLAY: WIFI ACTIVATION (configuration phase of the mini-station)	
	The blue LED is continuously ON, and the green LED flashes for 5 seconds. WIFI activated for 20 minutes.

2.9.2. CASE 2: CAIRNET POWERED SUPPIED BY +12VDC MAINS (WITHOUT BATTERY)

LED sequencing during normal operation and data transmission to the CAIRCLOUD	
(2) 	The LED is blue and flashes once per second: normal operation, the system is in stand-by and waiting for the next data transfer cycle to the cloud.
(3) 	The LED turns green and flashes during 1 to 2 minutes: the data transfer cycle begins.
(4) 	The LED turns red and flashes during 5 to 35 seconds: the data transfer to the cloud is in progress.
(5) 	The LED is blue and flashes once per second: the data transfer to the cloud is finished, the system returns to step (2). By default, the data transfer cycle to the cloud will start again in 15 minutes.

2.9.3. CASE 3: CAIRNET POWER SUPPIED BY BATTERY RECHARGED BY 18VDC MAINS

CAUTION: Data transfer in forced mode can only be done if the system is supplied by battery + 18 volts + sim card inserted.	
(1) 	The LED is blue and flashes once per second: the system is in standby mode and waiting for the next data transfer cycle to the cloud.
(2) 	**To activate forced mode** from standard mode, press the ON/OFF button to start the data transfer cycle.
(3) 	The LED turns green and flashes during about 1 minute.
(4) 	The blue LED is ON in continuous and the green LED flashes during 5 seconds. During this phase, **if the user wants to force WIFI mode**, press down the ON/OFF button  5 times.
(5) 	The LED turns green and flashes during 1 to 2 minutes: the data transfer cycle begins.
(6) 	The LED turns red and flashes during 5 to 35 seconds: the data transfer to the cloud is in progress.
(7) 	The LED is blue and flashes once per second: the data transfer to the cloud is finished, the system returns to standby mode. By default, the data transfer cycle to the cloud will start again in 15 minutes.

2.10. BOX FIXATION ON HOLDER

- Perform the installation with POWER OFF.
- Fix the CAIRNET holder on the intended-for tripod mast: loosen the 2 bolts to separate the holding jaws then install the assembly (see Figure 1–4).
- Then, position the CAIRNET on its fixation holder with the hexagonal screws fixed on the rear panel of the boxes to be inserted in the intended-for lock holes (Figure 2–17).

2.11. SOLAR PANELS FIXATION AND COMMISSIONNING

Solar panels fixation:

- The black adapting piece with stirrups to be fixed on the solar panel holder is not assembled to facilitate transport: fix it with the 4 hexagon socket screws (5 mm Allen key).
- Fix the solar panels on their holder, block them with the hexagon screws (2.5mm).
- For installation on mast with jaws, do the same as for the box holder. See Figure 2–16.
- For a better yield, orient the solar panels to the South (for the northern hemisphere, and inversely for the southern hemisphere).
- Adjust the inclination angle of the solar panel holder with the pin.
- The optimum inclination angle varies with the seasons in order to optimize the yield: 60° in winter, 45° in spring, and 20° in summer.

Figure 2–16 – Fixation of CAIRNET holder and solar panels on the tripod mast

Figure 2–17 – CAIRNET installation on its holder

Solar panel connection

This operation has to be done when the autonomous power supply board is mounted on the IQ-LINK.

Each of the two solar panels of the photovoltaic kit has a sheath containing 2 cables (blue= - / brown= +), fitted with telemechanical ends for connection to the 4-pin connector of the autonomous power supply board located on the lateral side of the IQ-LINK. To do that:

- Check that the device is powered off before performing this operation.
- Free the IQ-LINK electronic box from the CAIRNET to access more easily to the cable connection system (see § 2.3).
- Pass each of the cables through the cable glands at (12) of Figure 1–2.
- Connect the cables to the 4-pin connector to be screwed as indicated in Figure 2–18, from left to right (Solar panel PS2 (-), Solar panel PS2 (+), Solar panel PS1 (-), Solar panel PS1 (+).

  DO NOT cross the wires of 2 different solar panels.
- Check that the cables are well maintained in the connector to ensure electric contact.
- Put back in place the IQ-LINK in the CAIRNET.
- Power supply the assembly via the battery (see §2.8) which will be re-loaded by these two solar panels.

Figure 2–18 – Solar panel wiring on the power supply board

2.12. SYSTEM STARTING ON

There is no ON/OFF button. As soon as the box is powered on, it starts operating in its normal status.

To switch off the CAIRNET, disconnect it from all power sources, including the battery connector if fitted.

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