

**QUICK-START GUIDE (QSG)**

# **CAIRNET DATA+**

**NOVEMBER 2023**

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



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## 1. PRESENTATION



(1) Sample gas inlet, (2) air exhaust, (3) antenna, (4) RJ45 Ethernet connector.

**Figure 1-1 – CAIRNET DATA+ box presentation**  
**(DO NOT obstruct the sample gas inlet, nor air exhaust).**

CAIRNET DATA+ can be powered in one way only:

- By 12V/2A mains power supply.

See paragraph 2.7.1 for power supply details.

In standard, each set includes:

- A CAIRNET DATA+ box (serial number supplied) including the following internal elements (Figure 1–2.):
  - An IQ-LINK electronic box (1) providing power supply, measurement recovery and cellular communication (by default, data is sent each 15 minutes).
  - An angle-bracket for CAIRSENS PM (4.a) adaptation.
  - Six slots to insert CAIRSENS gas (5), closed with plugs (5.a).
  - Six micro-USB cables (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.
  - An Ethernet connector to connect the box to the LAN network.
  - A WIFI antenna (internal to the IQ-LINK box, so not visible).
- A fastening system (plate + fastening brackets) for CAIRNET DATA+ fixation.

The following items are available as options:

- 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 DATA+ via the 8-30 VDC input of the IQ-LINK.
- 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) **NON M2M CLASSIC SIM card in (3FF) Micro-SIM format, compatible with GSM networks (3G/4G).**

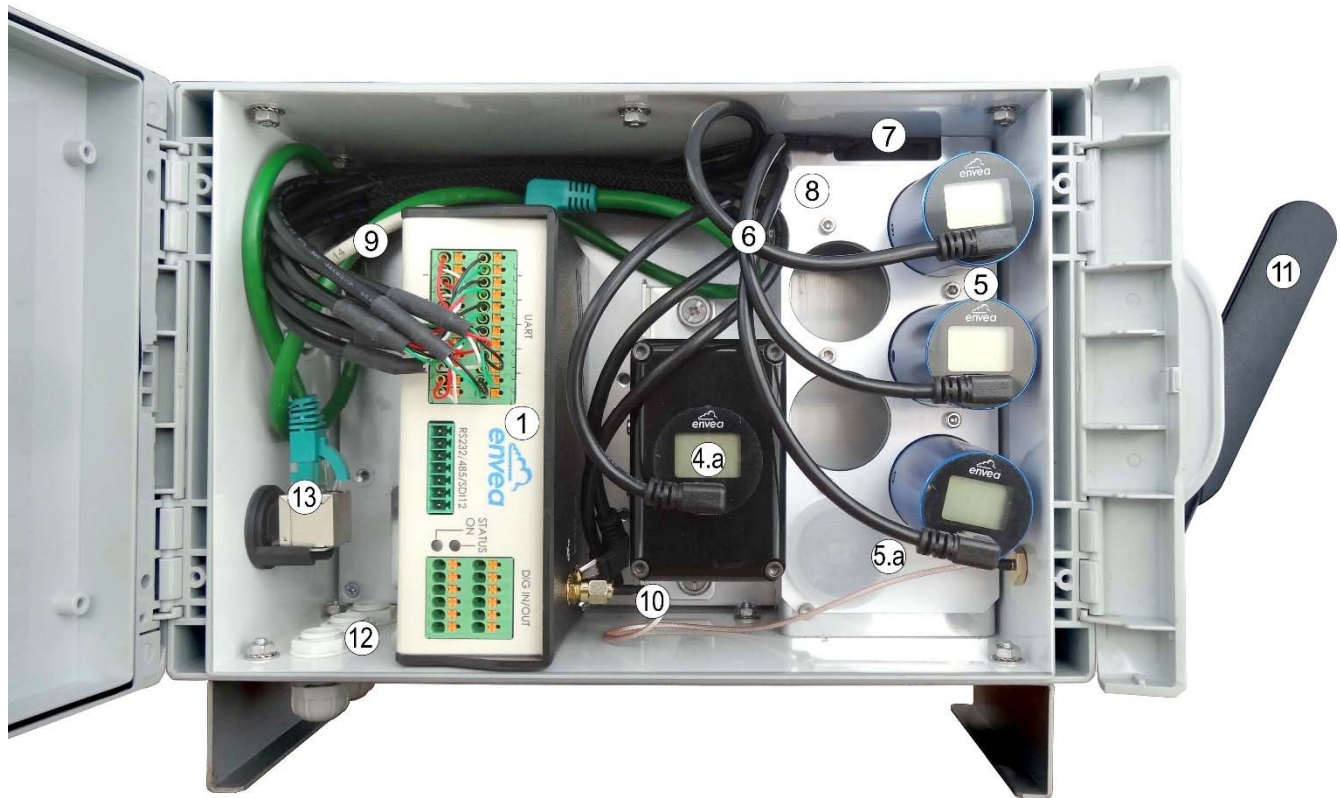
**The type of subscription with the provider must be for sending and receiving data (data package).**

**CAIRNET DATA+ (incoming and outgoing) data consumption is around 5 Go per month. It is necessary to 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.**

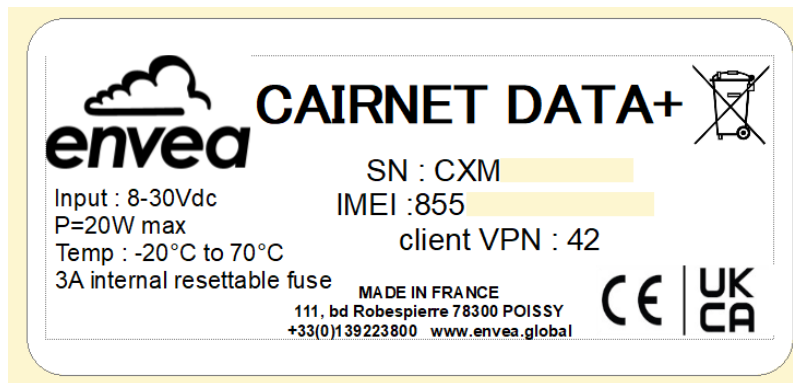
**The SIM card used must not be blocked by a PIN code. If it is, unlock the SIM card with a smartphone or with the IQ-LINK's web application.**

**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, (4. a) CAIRSENS PM, (5) CAIRSENS, (5.a) lids obstructing CAIRSENS gas if not available, (6) micro-USB cables, (7) fan, (8) manifold, (9) temperature sensor, (10) coaxial cable for IQ-LINK connection to external antenna, (11) radio antenna, (12) cable glands, (13) RJ45 Ethernet connector.

**Figure 1-2 – Internal elements of the CAIRNET DATA+ box**



Legend :

- SN: Serial Number of CAIRNET DATA+
- VPN Key: Number of the VPN certificate installed in the equipment for remote support.
- IMEI: 15 to 17-digit unique identification number of the cellular module used in CAIRNET DATA+
- Version: Version of CAIRNET DATA+
- Input: Power supply range of CAIRNET DATA+
- P max: Maximum electrical power of CAIRNET DATA+
- Temp: Operating temperature range of CAIRNET DATA+
- XA internal resettable fuse: Presence of a safety fuse rated at X amperes.

**Figure 1-3 – Label on the inside of the CAIRNET DATA+ door**



**Figure 1-4 – On-mast fixation system**



IQ-LINK connectics description:

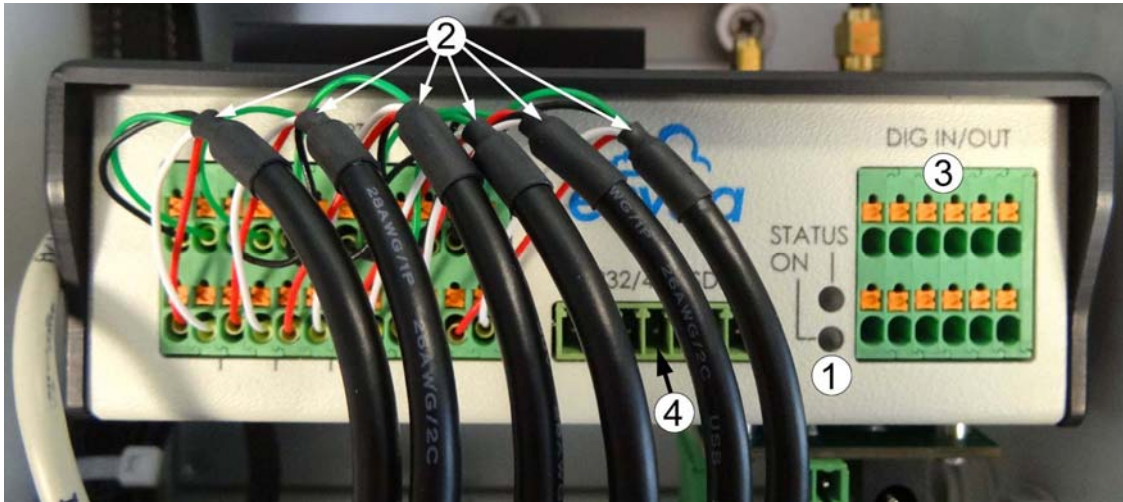
- On the IQ-LINK top panel, the connectors have the following functions :
  - DC mains power supply (1), 8-30 VDC, 2A. The 2-pin male connector is only supplied with the 12 VDC/ 2.1A waterproof power supply option for outdoor use.
  - Temperature Humidity Pressure sensor (THP) (2).
  - Fan (3).
  - Cellular communication ON/OFF switch (4). It is used to access station settings (on 1st commissioning) or to force data transmission to the Cloud (on standard operation). See chapter 2.6 for more details.
  - Not used (5).
  - Ethernet ports (6) to interact with CAIRNET DATA+ web pages via LAN.
  - Not used (7).



Figure 1-5 – IQ-LINK top panel connections

- On the IQ-LINK front panel, connectics is as follows:
  - 6 micro-USB (2) cables for connection to the CAIRSENS range sensors. The color code of cables is as follows (see Figure 1-6 to view the (black/red/green/white) connection order :

Black	Red	Green	White
GND	VDC	D+	D-



- RS485 connection (4) useful for certain applications, in particular to communicate with a 4024 ADAM module with analog outputs.
- (3) 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 DATA+ box is fitted with one hinge 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 DATA+ (see Figure 2–1, Manual opening hinge).

For on-site locations where dimensions do not allow the CAIRNET DATA+ box cover to be opened correctly, the two hinges can be swapped 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).



Figure 2–1 – CAIRNET DATA+ box opening

## 2.2. FASTEN THE EXTERNAL RADIO ANTENNA

The antenna is dismantled for transport, it has to be reassembled during installation. To do this:

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



Figure 2–2 – Radio antenna of CAIRNET DATA+

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

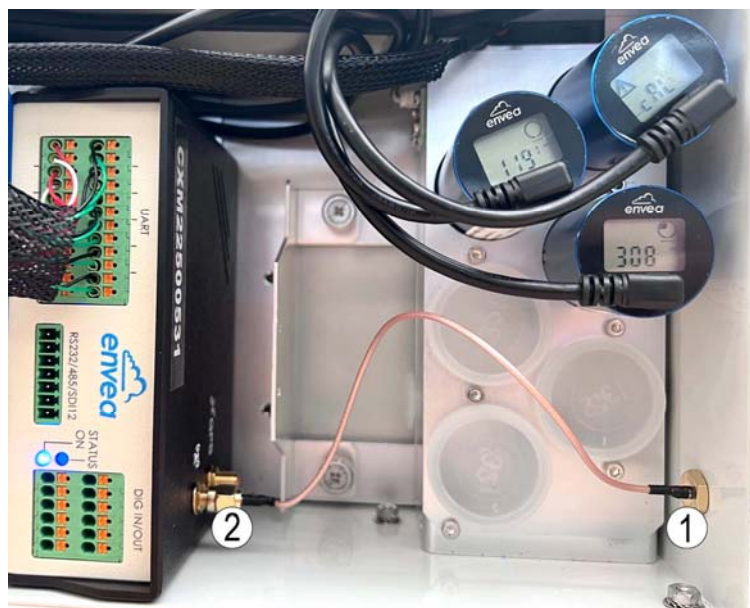


Figure 2–3 – Connection of antenna cable to IQ-LINK

### 2.3. FREE THE IQ-LINK

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

- Loosen 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 DATA+.



Figure 2-4 – IQ-LINK mounting bracket screws

## 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 section 2.3 to access the CAIRSENS PM angle bracket. See (4.a) 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 from 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

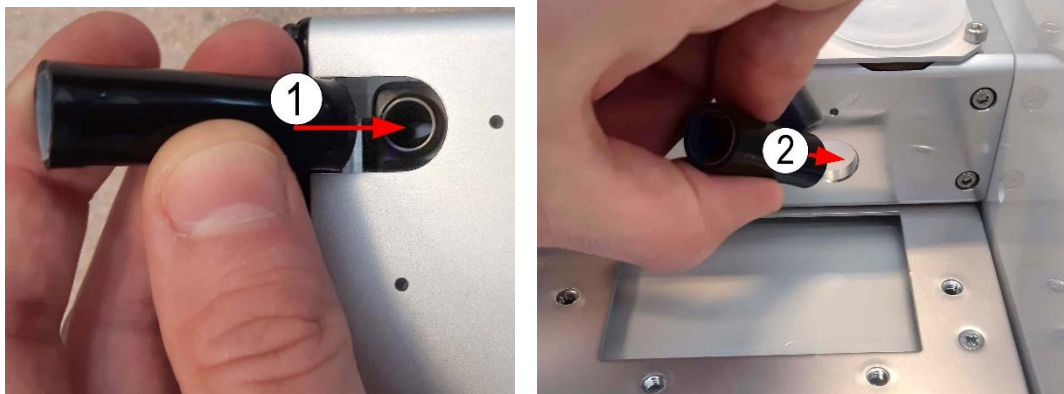


Figure 2–6 – Sample tube connection

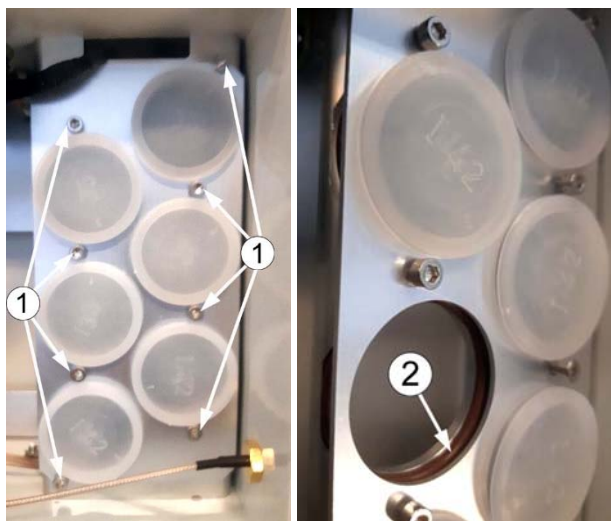
## 2.5. INSTALL THE CAIRSENS

See Figure 2–7 :

- Unscrew the 8 hexagonal screws of the sensor holding plate with a 2.5 mm Allen wrench (see (1) of Figure 2–7). Remove the lid(s) where the CAIRSENS will be inserted.
- Slightly peel the holding plate from the seals (2). This will reduce the seal compression caused by the lids, recover their initial shape and hence properly fit 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 on (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 removed, (2) seal

**Figure 2–7 – Removing the lids from the holding plate**



(4) Micro USB cable

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

## 2.6. CONFIGURING THE ACCESS POINT NAME (APN) AND TESTING THE CONNECTION TO THE TELEPHONE NETWORK

The configuration must be carried out on a CAIRNET DATA+ assembly equipped with an IQ-LINK, with the antenna properly mounted, the coaxial cable correctly connected to the IQ-LINK, and **with the SIM card inserted**.

**Insert the SIM card in the IQ-Link** following the procedure detailed below:

- Access the IQ-LINK box previously released from the bottom plate (see § 2.3).
- The SIM card is to be inserted into the slot in the lower part of the IQ-LINK. This part is not visible when it is embedded inside the CAIRNET DATA+.
- Tilt over the IQ-LINK box or remove it from the CAIRNET DATA+. The cable length is sufficient to insert the micro-SIM card without disconnecting the elements.
- Insert the micro-SIM card until limit stop into the intended-for slot, chip (golden side) downwards, as shown in Figure 2–9. When completely inserted, the micro-SIM card is no longer visible from the front.
- Replace the IQ-LINK box in the CAIRNET DATA+ box and fix it back on.
- Check that the antenna and extension cable are correctly connected to the IQ-LINK



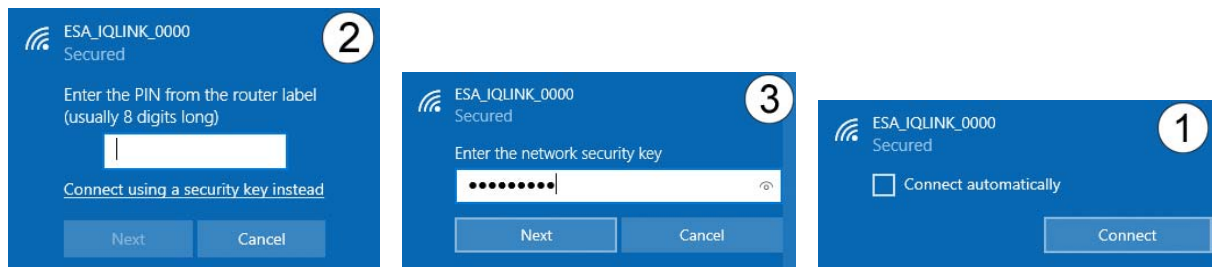
Insertion direction of the anti-mistake index

**Figure 2–9 – Micro SIM card insertion**



Configuration procedure is done using a Wi-Fi connection between the CAIRNET DATA+ and a PC (or smartphone) :


- Power the IQ-LINK without the SIM card by connecting the 12VDC power supply.
- Wait for 5 minutes for the system to start.
- Press 3 times the physical button located next to the IQ-LINK power supply.
- Wait for less than 20 seconds.
- The Status LED should flash 3 times in green or white to indicate that the command has been correctly recognized by the IQ-LINK. If the command is not recognized, it will flash in red. In this case, retry the operation by pressing the button only 2 times.
- The system will generate Wi-Fi after 2 minutes.
- Prepare a computing device (PC, mobile phone, tablet) with Wi-Fi capability.
- Activate Wi-Fi and search for the list of available devices.
- Connect to the "CDMxxxxxxx" signal (where xxxxxxxx refers to the serial number (SN) CAIRNET DATA+ CDMxxxxxxx). Three windows will open successively:
  - In window (1), check the "Connect automatically" box and press "Connect."
  - In window (2), click on "Connect using a security key,"
  - In window (3), enter the security key "123456789" and press "Next."



## APN Configuration via a web browser (Google Chrome, Mozilla Firefox, Safari...).

### Do not use Internet Explorer.

Refer to Figure 2–10.

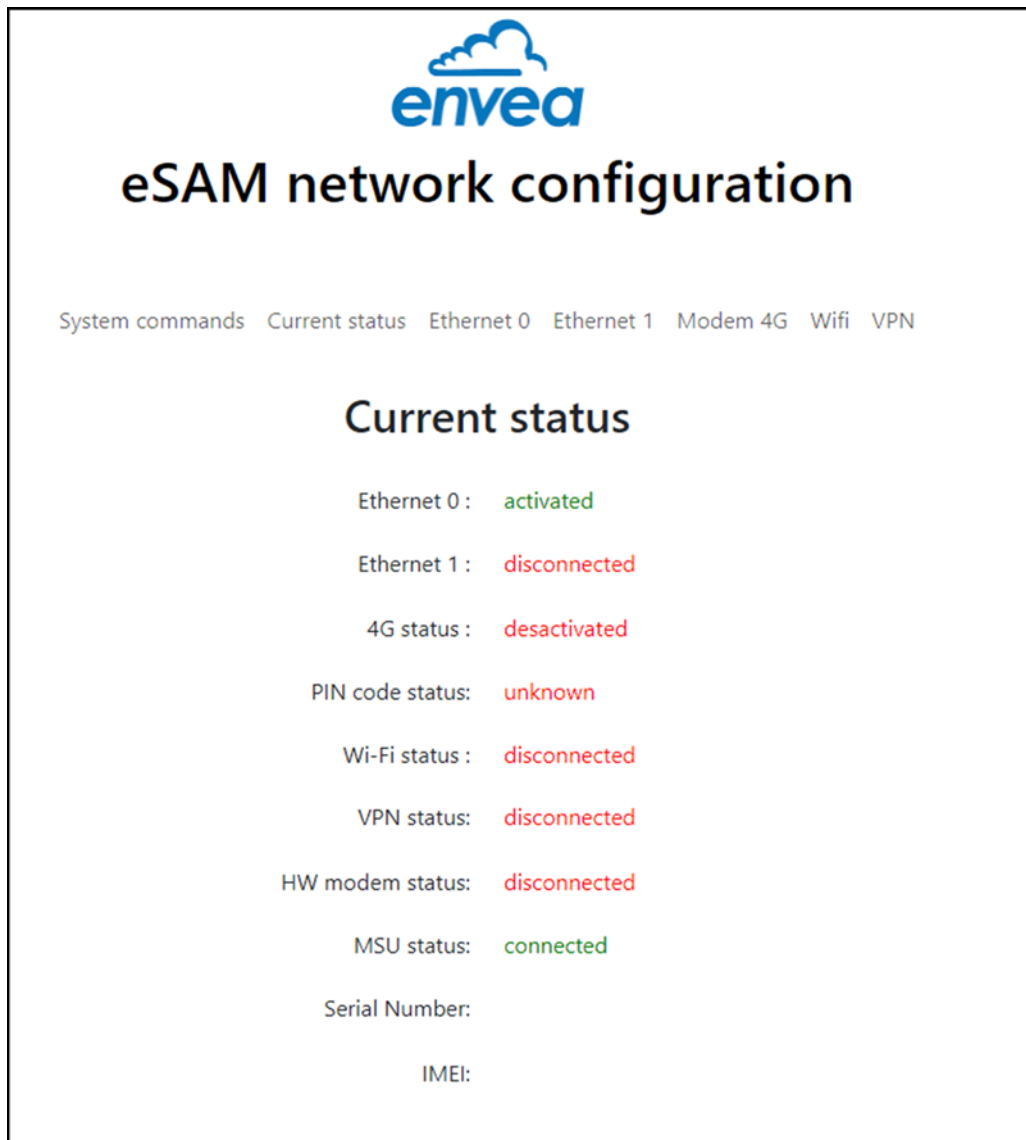
- 1) Open a new web page and connect to the address 192.168.43.1:9400 in the web browser's address bar  
 : the configuration page for the ENVEA IQ-LINK networks will open. If you enter 192.168.43.1, port :80 will be automatically used, and you will reach the ESAM web page, which is irrelevant here but may be useful if you want to view sensor data.
- 2) In the "CURRENT STATUS" tab: verify that the CAIRNET DATA+ serial numbers and IMEI displayed on the label inside the box match with the currently configured CAIRNET DATA+.
- 3) In the "MODEM 4G" tab: fill in the three fields: "APN," "Username," and "Password" corresponding to the network operator of the SIM card being used. Refer to "Network Operator Information (2)." Note: the "Username" and "Password" fields can remain empty.
- 4) If an "unlock SIM" button is displayed, it means the SIM card is secured with a PIN code. Click on this button and enter the PIN code to permanently remove this security.
- 5) Press "Save."
- 6) Go to the "SYSTEM COMMANDS" tab and click "Reboot" to restart the IQ-LINK.
- 7) Repeat all the steps from the beginning of this chapter up to configuring the APN Username and Password fields.
- 8) Check that the previously entered APN settings are displayed correctly.
- 9) Check the modem communication quality. To do this:

Go to the "CURRENT STATUS" tab and check the "4G status" value: if it is green, the connection is good; if the value is red, there is a problem. If the "MSU status" is also red, then the 4G problem is related to the MSU not being connected. If the "MSU status" is green, then you should go to the "MODEM 4G" tab and click on the "List Modems" and "Monitor Modems" buttons to get more information about the 4G connection problem. To analyze the information, see below:

- OPERATOR field: It indicates the operator used by the SIM card.
- STATE field: It can return 5 states:
  - "Connected": The connection is established and functional.
  - "Connecting": The connection is in progress and requires some waiting time.
  - "Registered": The modem is connected to a cellular relay but is blocked before finalizing the network connection. Check that:
    - The settings for APN, USER, PW are correct,
    - The SIM card is active, not blocked, and not locked by a PIN code.
  - "Not connected" or empty field: The connection cannot be established. Retry the test.
  - "Locked": The SIM card is locked by a PIN code. Unlock it using a smartphone or contact the operator.

If the connection is still not established, check that:

- The APN, USER, and PASSWORD information have been correctly entered,
- The SIM card is correctly inserted, and the antenna is properly mounted.
- SIGNAL field: indicates the network signal quality based on a scale from 0 to 100% (0%: no signal, 100%: proper signal).



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## eSAM network configuration

System commands Current status Ethernet 0 Ethernet 1 Modem 4G Wifi VPN

### Current status

Ethernet 0 : **activated**

Ethernet 1 : **disconnected**

4G status : **deactivated**

PIN code status: **unknown**

Wi-Fi status : **disconnected**

VPN status: **disconnected**

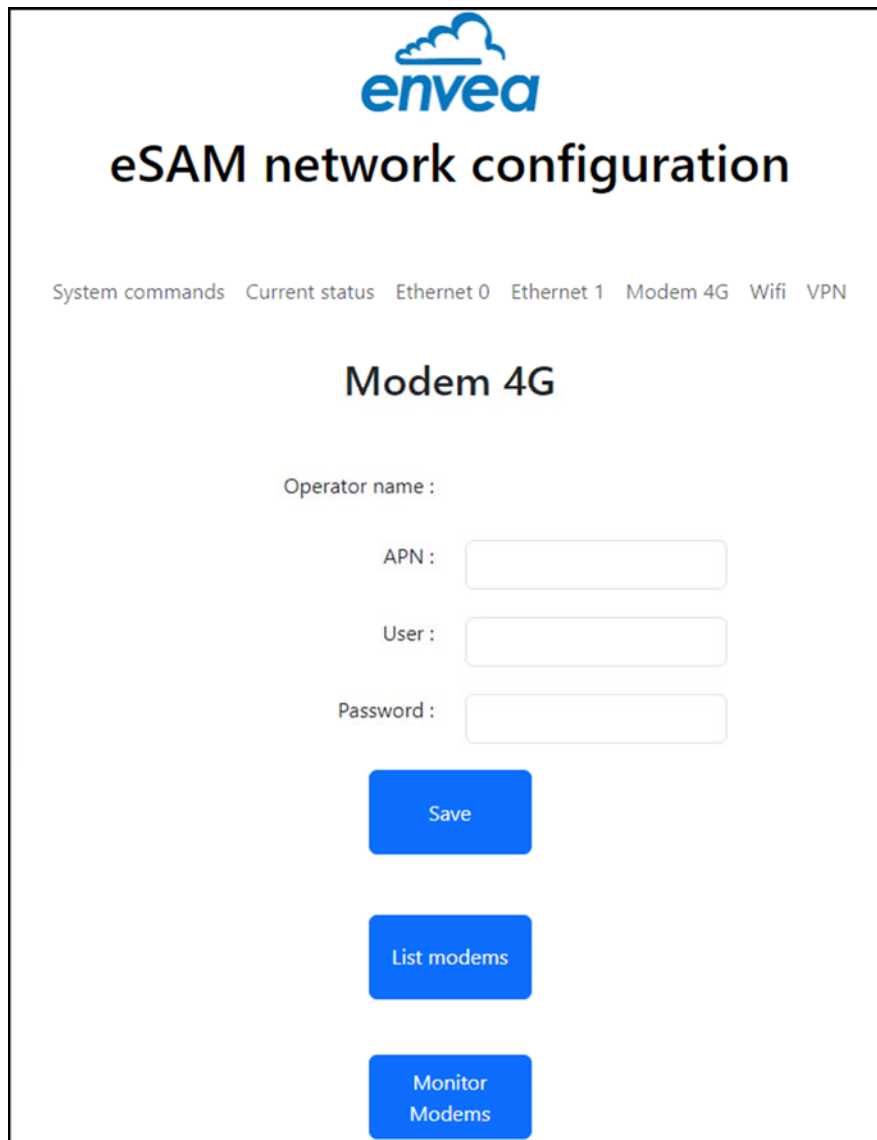
HW modem status: **disconnected**

MSU status: **connected**

Serial Number:

IMEI:

Figure 2–10 – Current Status Tab



The screenshot shows the 'eSAM network configuration' interface. At the top, there is the 'envea' logo and the title 'eSAM network configuration'. Below the title, there is a navigation menu with the following items: 'System commands', 'Current status', 'Ethernet 0', 'Ethernet 1', 'Modem 4G', 'Wifi', and 'VPN'. The 'Modem 4G' tab is selected and highlighted. The main content area is titled 'Modem 4G'. Underneath, there is a label 'Operator name :'. Below this, there are three input fields: 'APN :', 'User :', and 'Password :'. Each input field is a simple rectangular box. Below the input fields, there are three blue buttons: 'Save', 'List modems', and 'Monitor Modems'.

Figure 2–11 – 4G Modem tab

## 2.7. DC MAINS POWER SUPPLY

The CAIRNET DATA is powered by a 12VDC power supply from the mains.

### 2.7.1. POWERING UP THE CAIRNET DATA+ WITH 18VDC MAINS SUPPLY

The CAIRNET DATA+ can be powered continuously via the 8-30 VDC input of the IQ-LINK (see (1) Figure 1–5). To do this, use the waterproof 12 VDC external power supply option (item code = A40-0304-\*).

Connect the "external power source (A40-0304-\*)" option connector 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: no polarity is required for connection to the IQ-LINK.

- Connect the 2-pin connector to the 8-30 VDC IQ-LINK input (see Figure 2–12).
- Connect the 12 VDC power supply to mains: the CAIRNET DATA+ is then continuously powered.



Figure 2–12 – Connection of the 2-pin connector to the 8-30 VDC IQ-LINK input

## 2.8. DESCRIPTION OF LED DISPLAY

LED Sequencing during Normal Operation	
(2) 	The STATUS or ON LED is blue and flashes once per second: the IQ-LINK is starting up. Please wait
(3) 	The STATUS or ON LED turns green and flashes for 1 to 2 minutes: the IQ-LINK is starting up. Please wait.
(3) 	The STATUS or ON LED blinks for 3 seconds: the user has pressed the physical button on the IQ-LINK, and the number of presses matches with a known command for the IQ-LINK which will execute this command, such as turning on Wi-Fi.
(4) 	The STATUS or ON LED blinks in red for 3 seconds: the user has pressed the physical button on the IQ-LINK, but the number of presses does not match with any known command for the IQ-LINK.
(2) 	The STATUS LED is steady blue: the IQ-LINK has started up and is ready to receive commands on its hardware button.
	No LED is lit, IQ-LINK is switched off

## 2.9. MOUNTING THE BOX ON A HOLDER BRACKET

For the box:

- Perform the installation with POWER OFF.
- Fix the CAIRNET DATA+ holder bracket on the intended-for tripod mast: loosen the 2 bolts to separate the holding jaws and install the assembly (see Figure 1–4).
- Then, position the CAIRNET DATA+ 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 2–14).



Figure 2–13 – Fixation of CAIRNET DATA+ holder to the tripod mast



**Figure 2–14 – CAIRNET DATA+ installation on its holder**



## 2.10. SYSTEM START-UP

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 DATA+, disconnect it from the power supply.

### 3. COMMUNICATION OPTION WITH A THIRD-PARTY SYSTEM

#### 3.1. ANALOG COMMUNICATION (4-20 MA)

The CAIRNET DATA+ can have 4 analog outputs in order to communicate data to an automaton. This communication is implemented via an ADAM module of 4024 series.

##### 3.1.1. 4024 ADAM MODULE

The 4024 ADAM module is a digital/analog conversion interface, intelligent computer-sensors containing an integrated microprocessor. The ADAM module can be mounted on panels, holders or DIN rails.

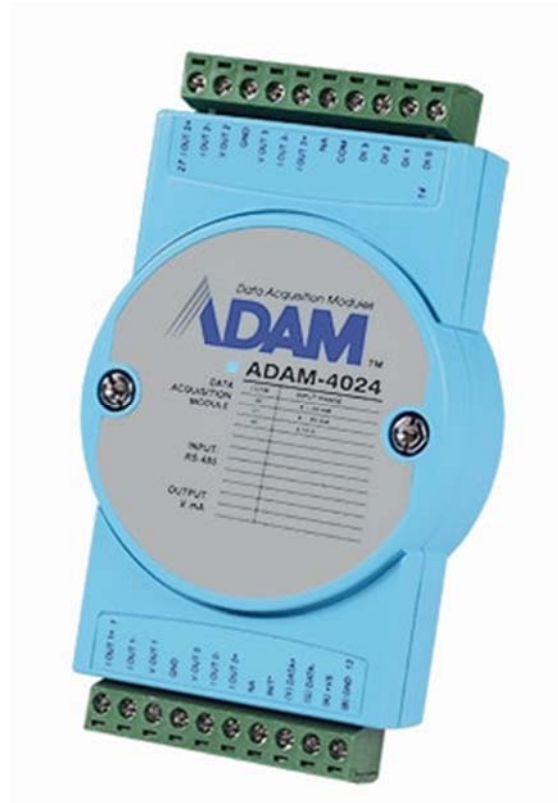


Figure 3-1 – 4024 ADAM Module

Analog outputs : 4

- +/- 10 V
- 0-20 mA
- 4-20 mA
- Resolution : 12 bits

Connectors :

- 2 x 13-pin screw connectors

**3.1.2. CABLING**

**3.1.2.1. Power supply**

Small systems can be powered using modular wall-mounted power supply blocks. Power supply cables should be chosen according to the length of the owner’s lines and the number of modules connected. We recommend the following standard colors (as indicated on the modules) for each power supply line:

- + Vs (R) Red
- GND (B) Black.

In our case, the power is directly supplied by the CAIRNET box. No external power source is required.

**3.1.2.2. Communication cabling**

We recommend the use of shielded twisted-pair cable in the ADAM module network to reduce interference, but the cable should comply with the EIA RS-485 standard. In addition, only one set of twisted-pair cable is required for data transmission. We recommend the following standard colors (as indicated on the modules) for each communication line:

- DATA + (Y) Yellow,
- DATA - (G) Green.

The remote 4024 ADAM module is wired directly to pins A and B of the IQ-Link, as follows:

- Pin A must be connected to the 4024 ADAM module / Data + line,
- Pin B must be connected to the 4024 ADAM module / Data – line.

An external resistor needs to be added to the RS485 of the IQ-LINK (120 Ohms).

**CAUTION:** the maximum cable length must not exceed 1m. For a longer distance, the use of an RS485 signal amplification is required, and the 4510S ADAM module is recommended.



Figure 3-2 – RS485 cabling on IQ-LINK side



Figure 3-3 – RS485 cabling on ADAM side

### 3.1.3. ANALOG OUTPUT CONFIGURATION

Analog outputs can be configured directly via the eSAM WEB interface (see eSAM interface section).

#### 3.1.3.1. Connection to eSAM interface

Log-in as administrator to the eSAM WEB interface. To do this:

- (1) Click on Guest,
- (2) Then click on : change profile,
- (3) And enter login : admin,
- (4) And enter password : admin (by default).

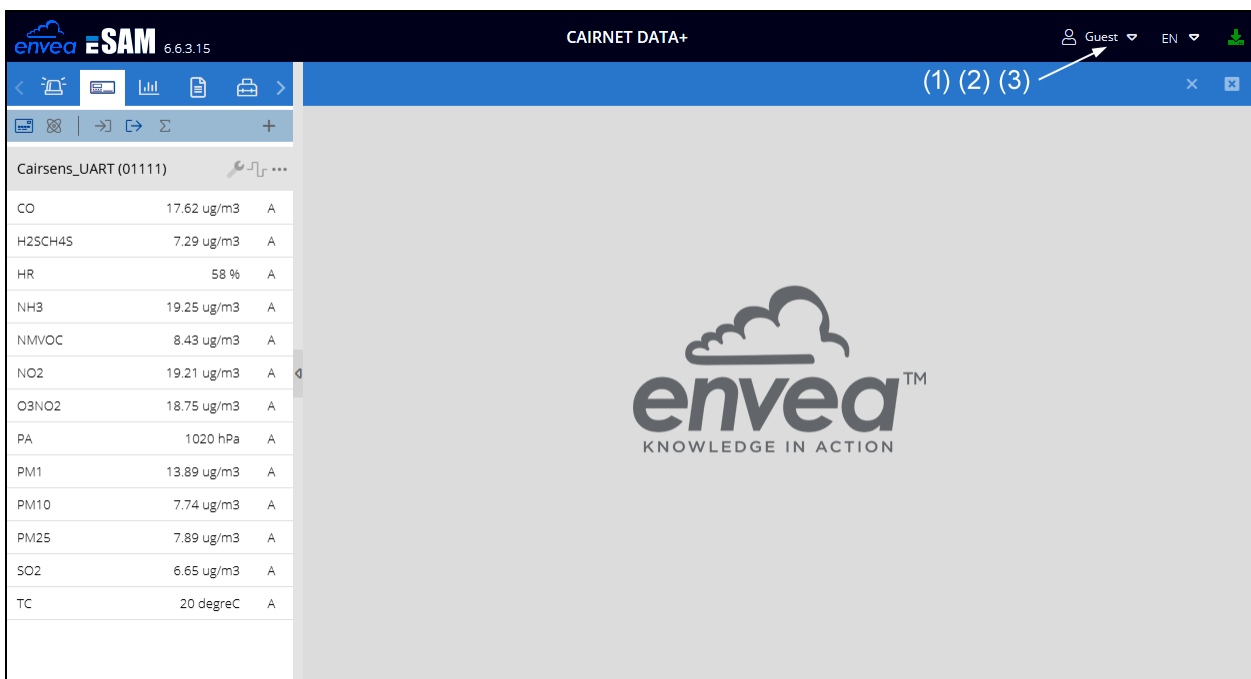


Figure 3–4 – Switching to Administrator mode

### 3.1.3.2. Access to analog output configuration menu

Clicking on the analog output menu (1) displays the screen below with the 4 available analog outputs (2).

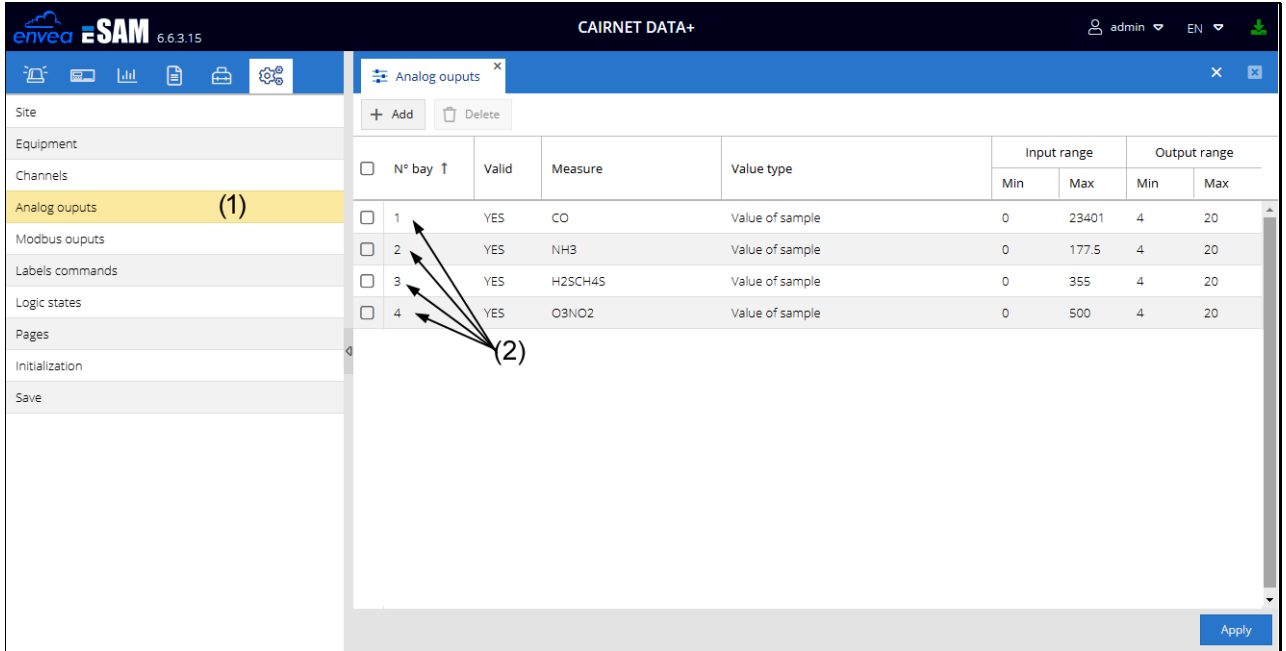
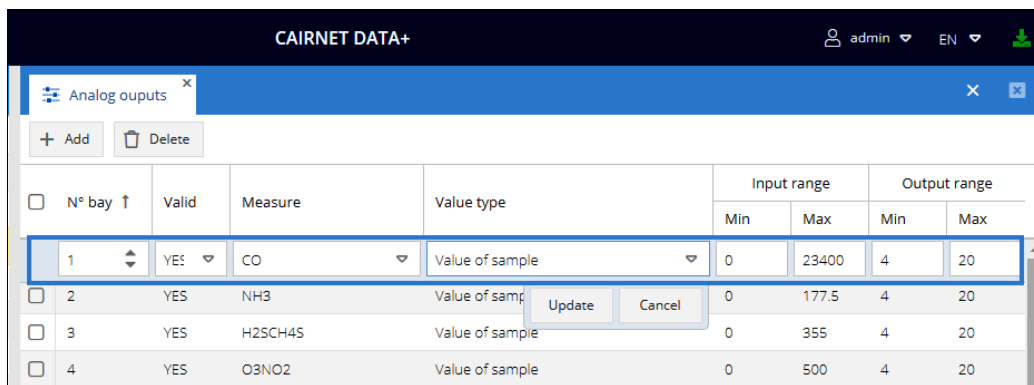


Figure 3-5 –Analog output configuration screen

### 3.1.3.3. Analog output modification

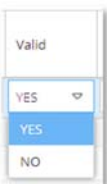
An analog output is modified via the following menu by filling-in the below information:

- Analog channel number
- Analog output validity
- Measurement to be supplied in analog
- Value to be supplied
- The input scale corresponds to the measurement range, e.g. from 0 to 100  $\mu\text{g}/\text{m}^3$  for CO measurement,
- Measurement conversion to electric signal, e.g. for CO: 4 mA for 0  $\mu\text{g}/\text{m}^3$  and 20 mA for 100  $\mu\text{g}/\text{m}^3$ .



N° bay ↑	Valid	Measure	Value type	Input range		Output range	
				Min	Max	Min	Max
1	YES	CO	Value of sample	0	23400	4	20
2	YES	NH3	Value of sample	0	177.5	4	20
3	YES	H2SCH4S	Value of sample	0	355	4	20
4	YES	O3NO2	Value of sample	0	500	4	20

#### Validity



Valid

YES

YES

NO

#### Available measurements



Measure

CO

CO

NH3

H2SCH4S

O3NO2

SO2

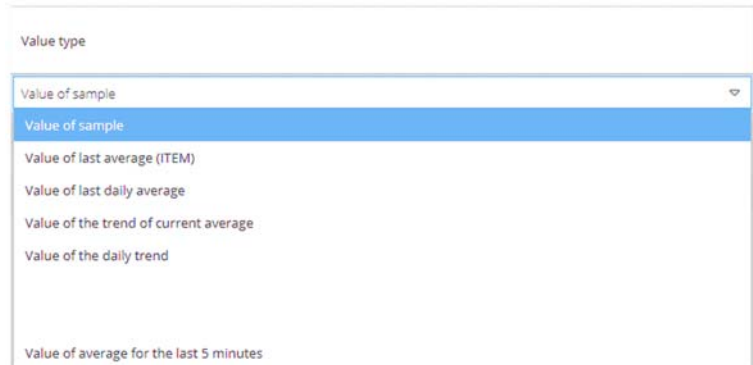
NO2

NMVOG

PM25

PM10

#### Available values



Value type

Value of sample

Value of sample

Value of last average (ITEM)

Value of last daily average

Value of the trend of current average

Value of the daily trend

Value of average for the last 5 minutes

Figure 3–6 – Data selection for an analog output

The available analog values are :

- Sample (1 minute),
- Last 15-minute average,
- Last daily average,
- Current average trend,
- Daily average trend,
- Average of the last 5 minutes.

Measurement range

Input range	
Min	Max
0	100

Conversion to electric signal

Output range	
Min	Max
4	20

Figure 3–7 – Range configuration for an analog output

Once the configuration parameters are modified or created:

- Click on the Update button (1)
- Click on the Apply button (2)

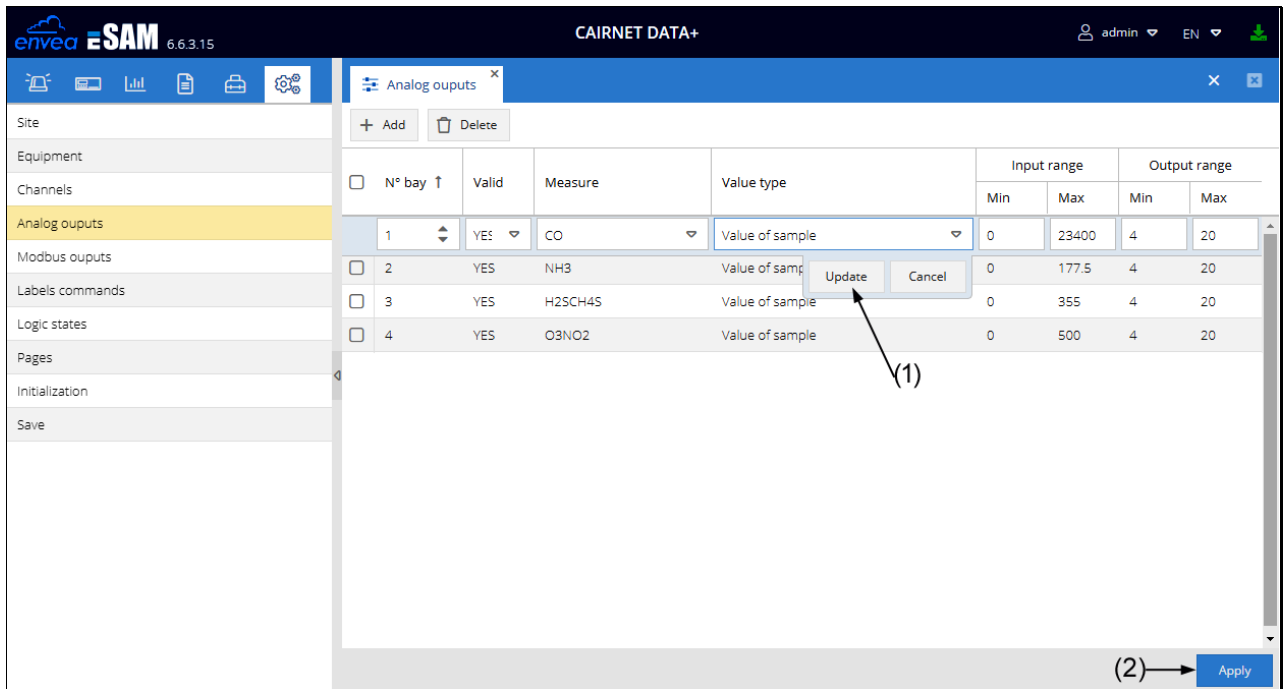


Figure 3–8 – Configuration saving of an analog output

Then finish by clicking on the update icon (3) to valid the configuration:



Figure 3–9 – Configuration validation

The user can delete an analog output and create a new one.  
Our CAIRNETs are designed to have 4 or 8 analog outputs.

## 3.2. CLIENT MODBUS TCP-IP COMMUNICATION

### 3.2.1. MODBUS EXCHANGE TABLE

By default, a Modbus exchange table is defined. Modbus TCP/IP and Holding registers are used. Information and Modbus addresses are described in the exchange table.

To connect to the IQ-LINK Modbus server, its IP address must be filled-in and port 1502 opened.

The following information is then available:

- The last value of the 10-second sample in Float
  - 40001 for CO
  - 40003 for H2SCH4S
  - ...
- The Quality code associated to the data (A, N, M, S, D) in 16 bit Word
  - 40051 for CO
  - 40053 for H2SCH4S
  - ...

The decimal value returned by the Modbus protocol is the value of the ASCII code of the quality code character. For example, the ASCII code of character A is 65.

Quality code	Description	Sample quality code (MODBUS)	Valid state (MODBUS)
A	Usable data	65	1
N	Missing equipment	78	0
M	Maintenance	77	0
S	Substitution data	83	0
D	Fault	68	0

**Figure 3–10 – Correspondence table of Quality code / MODBUS sample code**

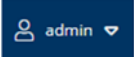

- Measurement status associated to the data (0 or 1) in 16 bit Word
  - 40052 for CO
  - 40054 for H2SCH4S



Pollutant	Information	Modbus TCP/IP register		Type
CO	Value of sampling 60 s	40001	Float32	Holding register
CO	Quality code	40051	Word16	Holding register
CO	Valid state	40052	Word16	Holding register
H2SCH4S	Value of sampling 60 s	40003	Float32	Holding register
H2SCH4S	Quality code	40053	Word16	Holding register
H2SCH4S	Valid state	40054	Word16	Holding register
NH3	Value of sampling 60 s	40005	Float32	Holding register
NH3	Quality code	40055	Word16	Holding register
NH3	Valid state	40056	Word16	Holding register
NMVOG	Value of sampling 60 s	40007	Float32	Holding register
NMVOG	Quality code	40057	Word16	Holding register
NMVOG	Valid state	40058	Word16	Holding register
NO2	Value of sampling 60 s	40009	Float32	Holding register
NO2	Quality code	40059	Word16	Holding register
NO2	Valid state	40060	Word16	Holding register
O3NO2	Value of sampling 60 s	40011	Float32	Holding register
O3NO2	Quality code	40061	Word16	Holding register
O3NO2	Valid state	40062	Word16	Holding register
PM1	Value of sampling 60 s	40013	Float32	Holding register
PM1	Quality code	40063	Word16	Holding register
PM1	Valid state	40064	Word16	Holding register
PM10	Value of sampling 60 s	40015	Float32	Holding register
PM10	Quality code	40065	Word16	Holding register
PM10	Valid state	40066	Word16	Holding register
PM2_5	Value of sampling 60 s	40017	Float32	Holding register
PM2_5	Quality code	40067	Word16	Holding register
PM2_5	Valid state	40068	Word16	Holding register
SO2	Value of sampling 60 s	40019	Float32	Holding register
SO2	Quality code	40069	Word16	Holding register
SO2	Valid state	40070	Word16	Holding register

Figure 3–11 – Modbus exchange table

### 3.2.2. CONFIGURATION

Configuration is only accessible in administrator mode . So by connecting, the configuration icon  is now available.

The three main menus used for the IQ-Link are “Channels”, “Modbus output” and “Save”. These are the only menus to be used for configuration.

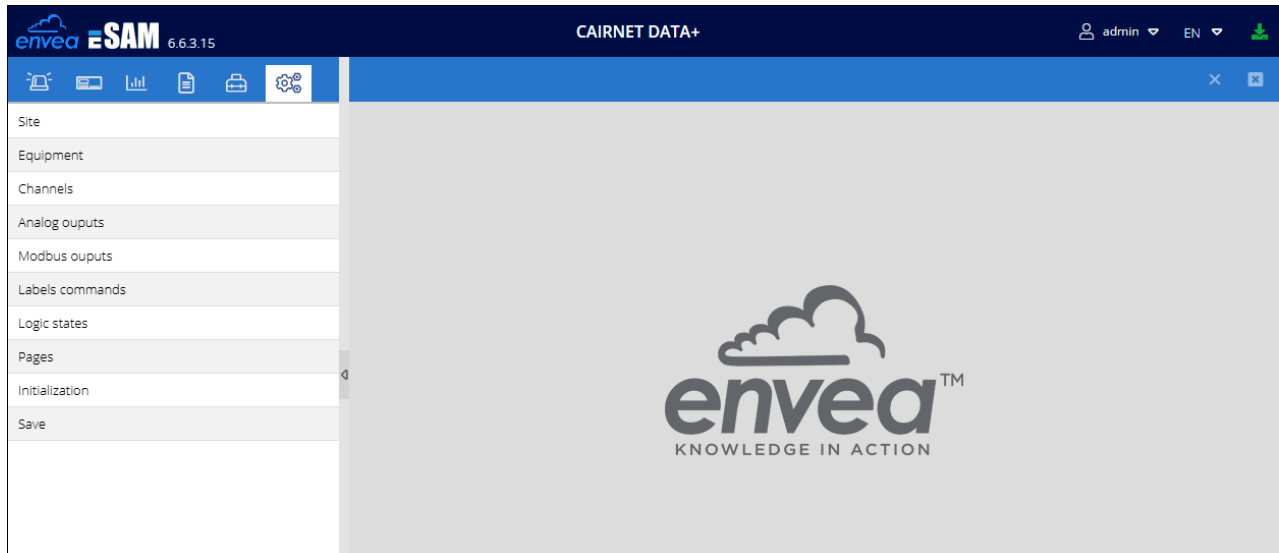


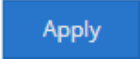

Figure 3–12 – Available menus in configuration mode

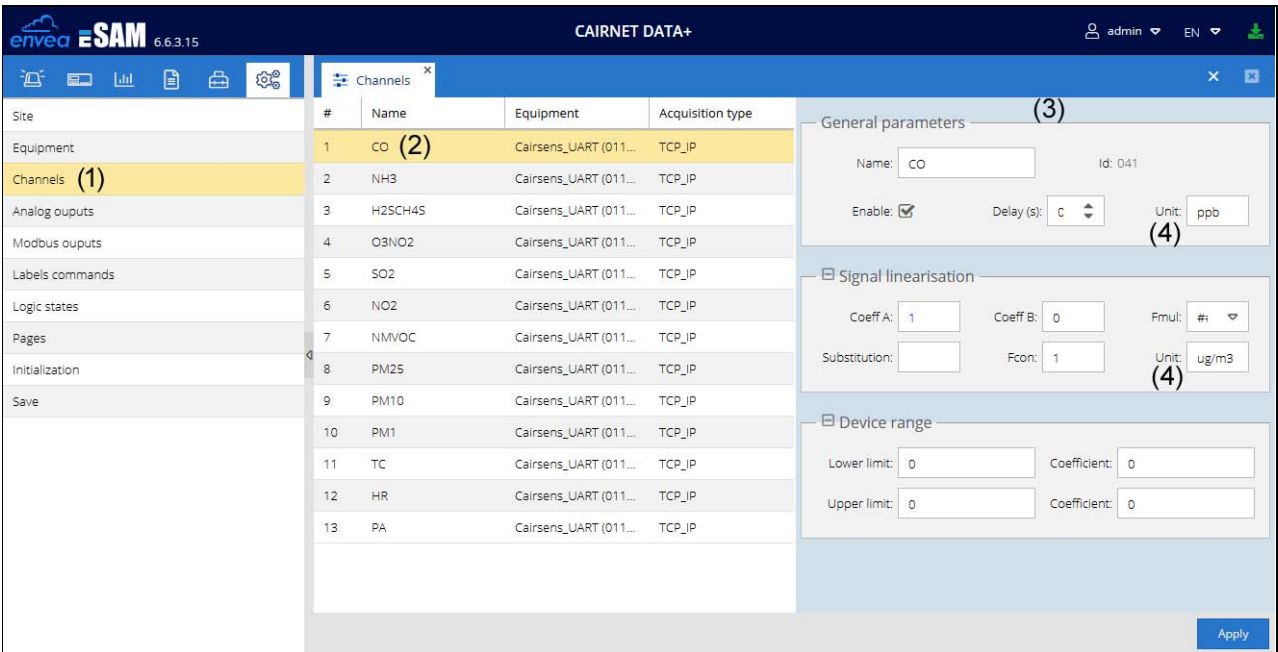
### 3.2.3. ACQUISITION UNIT CONFIGURATION

The factory setting of the measurement acquisition unit is ppb. It is possible to modify this acquisition unit to  $\mu\text{g}/\text{m}^3$ .

The unit modification has no impact on the Modbus table, only the values will be different since the acquisition is in  $\mu\text{g}/\text{m}^3$  instead of ppb.

To configure the measurement unit, follow the below procedure :

- (1) Click on the « Channels » menu,
- (2) Click on the pollutant name, e.g. CO,
- (3) A menu is displayed on the right side with measurement information,
- (4) Modify units in the « Units » fields of the « General parameters » and « Signal linearisation » frames, then click on  to apply the modifications.
  - $\mu\text{g}/\text{m}^3$  instead of ppb (**CAUTION : the symbol  $\mu$  does not exist, the user have to write u**).
- (5) Validate the modifications by clicking on .



#	Name	Equipment	Acquisition type
1	CO (2)	Cairsens_UART (011...	TCP_IP
2	NH3	Cairsens_UART (011...	TCP_IP
3	H2SCH4S	Cairsens_UART (011...	TCP_IP
4	O3NO2	Cairsens_UART (011...	TCP_IP
5	SO2	Cairsens_UART (011...	TCP_IP
6	NO2	Cairsens_UART (011...	TCP_IP
7	NMVOC	Cairsens_UART (011...	TCP_IP
8	PM25	Cairsens_UART (011...	TCP_IP
9	PM10	Cairsens_UART (011...	TCP_IP
10	PM1	Cairsens_UART (011...	TCP_IP
11	TC	Cairsens_UART (011...	TCP_IP
12	HR	Cairsens_UART (011...	TCP_IP
13	PA	Cairsens_UART (011...	TCP_IP

Figure 3–13 – Measurement unit configuration

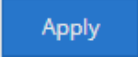

### 3.2.4. MODBUS OUTPUT MODIFICATION

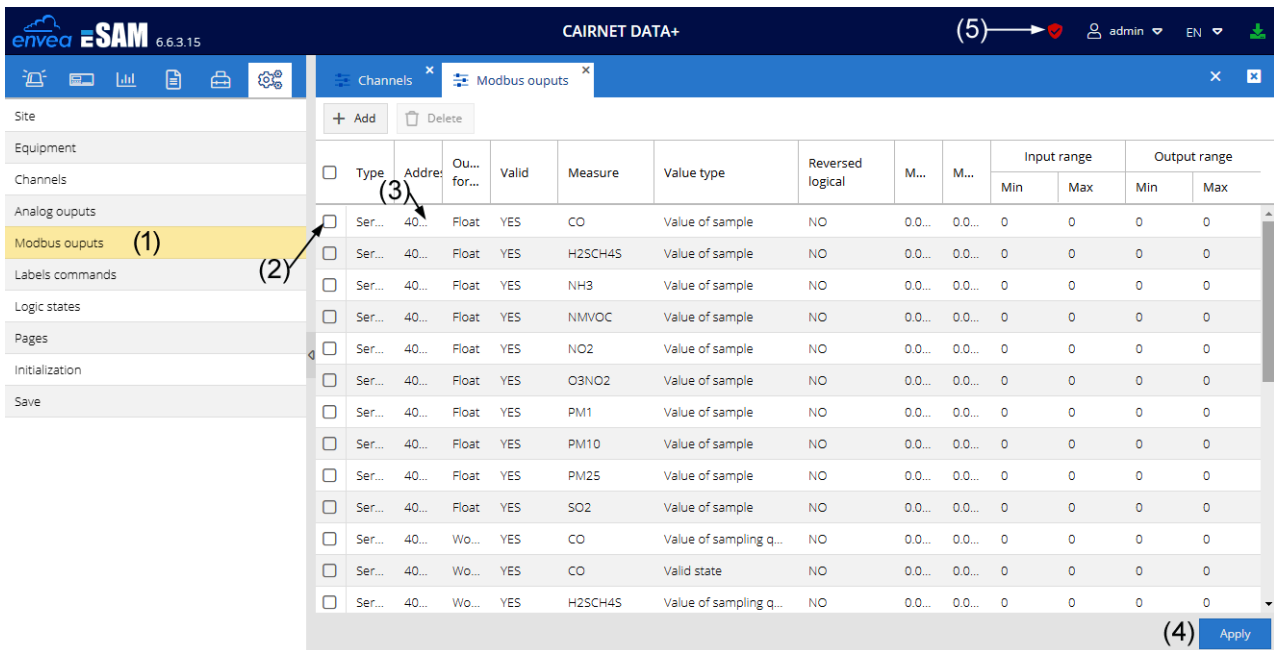
The Modbus table at production output is defined by the exchange table. It is advised against modifying these addresses. However these modifications are possible via the configuration domain.

Before any modification, the user have first to save the factory configuration. Thus, it will be always possible to restore the factory configuration if necessary.

The configuration saving procedure is described in section 4.4.

To modify a Modbus address, follow the steps of Figure 3–14:

- (1) Click on the Modbus output menu,
- (2) Click on the measurement check-box,
- (3) Modify the Modbus address (**CAUTION to remain in the 40000 register**),
- (4) Click on  to apply the modifications.
- (5) Validate the modifications by clicking on .



	Type	Address	Output for...	Valid	Measure	Value type	Reversed logical	M...	M...	Input range		Output range	
										Min	Max	Min	Max
<input type="checkbox"/>	Ser...	40...	Float	YES	CO	Value of sample	NO	0.0...	0.0...	0	0	0	0
<input type="checkbox"/>	Ser...	40...	Float	YES	H2SCH4S	Value of sample	NO	0.0...	0.0...	0	0	0	0
<input type="checkbox"/>	Ser...	40...	Float	YES	NH3	Value of sample	NO	0.0...	0.0...	0	0	0	0
<input type="checkbox"/>	Ser...	40...	Float	YES	NMVOG	Value of sample	NO	0.0...	0.0...	0	0	0	0
<input type="checkbox"/>	Ser...	40...	Float	YES	NO2	Value of sample	NO	0.0...	0.0...	0	0	0	0
<input type="checkbox"/>	Ser...	40...	Float	YES	O3NO2	Value of sample	NO	0.0...	0.0...	0	0	0	0
<input type="checkbox"/>	Ser...	40...	Float	YES	PM1	Value of sample	NO	0.0...	0.0...	0	0	0	0
<input type="checkbox"/>	Ser...	40...	Float	YES	PM10	Value of sample	NO	0.0...	0.0...	0	0	0	0
<input type="checkbox"/>	Ser...	40...	Float	YES	PM25	Value of sample	NO	0.0...	0.0...	0	0	0	0
<input type="checkbox"/>	Ser...	40...	Float	YES	SO2	Value of sample	NO	0.0...	0.0...	0	0	0	0
<input type="checkbox"/>	Ser...	40...	Wo...	YES	CO	Value of sampling q...	NO	0.0...	0.0...	0	0	0	0
<input type="checkbox"/>	Ser...	40...	Wo...	YES	CO	Valid state	NO	0.0...	0.0...	0	0	0	0
<input type="checkbox"/>	Ser...	40...	Wo...	YES	H2SCH4S	Value of sampling q...	NO	0.0...	0.0...	0	0	0	0

Figure 3–14 – Modbus table modifications

## 4. ESAM INTERFACE

A WEB interface can be accessed at the IQ-Link IP address (using port 80 by default).

- <http://10.205.226.200/esam> for the fixed IP address,
- <http://adresseIpDeLaSam/esam> for the dynamic IP address.

This interface enables to :

- View data,
- Export archived data (in csv or pdf file),
- Configure :
  - The units (ppb or  $\mu\text{g}/\text{m}^3$ ). By default, the unit is ppb.
  - The Modbus addresses. The default exchange table is described in the Modbus exchange table section.
- Save the configuration and update the firmware.

### 4.1. HOME PAGE

The home page is as follow :



Figure 4–1 – Home page of eSAM interface

In the example above, only three CAIRSENS sensors are connected: H2SCH4S, CO and RH humidity.

The value measured stated in the defined unit, and the quality code associated to the measurement (A in the screen above) are indicated on the interface. Quality code A indicates that the measurement value can be used. In return, the quality code N indicates that there is no CAIRSENS sensor connected or that the measurement value is not acquired. In this case, the value cannot be used.

A Modbus correspondence table is described in the correspondence table section.

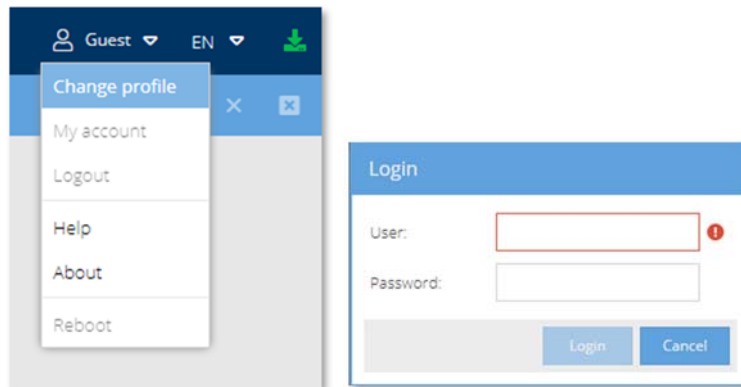
## 4.2. USER ACCOUNTS

Two connections are possible :

- Guest
- Admin

In Guest mode, configuration is not allowed. The user can only view the data and export it.

In Admin mode, it is possible to modify the configuration, update the system, saving the configuration and restore a configuration.




**Figure 4-2 – Connection in Guest or Administrator mode**

To connect in administrator mode:

- Click on the Guest icon and then on Change profile. A window will open.
- User: admin / Password: admin

### 4.3. LOCAL DATA ARCHIVING

By clicking on the data archiving icon , the measurement list appears on the screen.

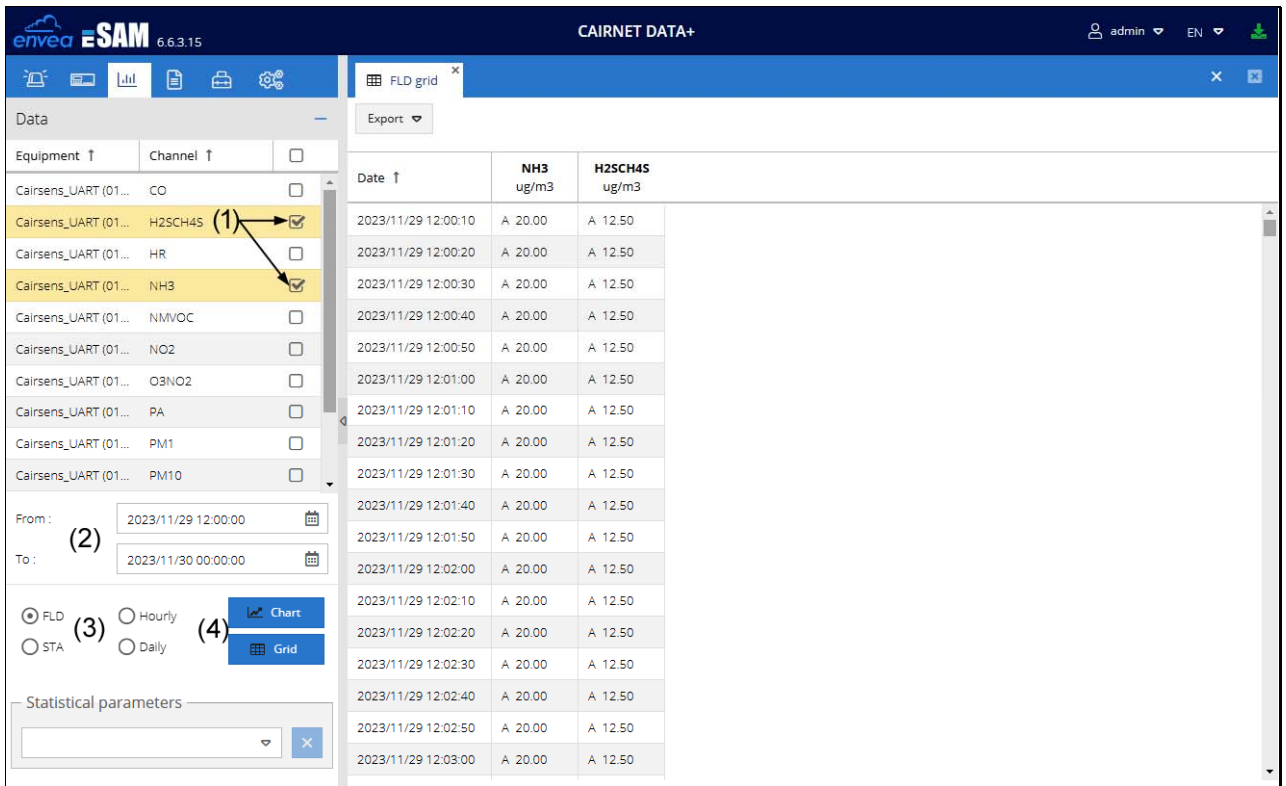


Figure 4–3 – Archived data display and export

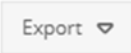
Archived data can be displayed and exported to the IQ-Link. The archiving depth is 3 months. Data can be recovered in csv or pdf format file.

The data that can be exported is :

- FLD – First Level Data : 10-second sample data,
- STA – Short Time Average : 15-minute average data,
- Hourly : hourly data,
- Daily : daily data.

To recover data, the user have to choose:

- (1) data to be exported by clicking in the checkboxes,
- (2) period : start and end date,
- (3) type of data to be recovered (FLD, STA, Hourly, Daily),
- (4) archiving format:
  - Chart,
  - Grid.

To export the data, it is necessary to click on  and choose the csv or pdf format.

#### 4.4. SAVING THE CONFIGURATION

On the first commissioning, it is strongly advised to carry out a total saving of the system (to USB key, external hard disk, et c.). To do this, log-in to the eSAM WEB interface in administrator mode (Connection to the eSAM interface). Then, in the configuration menu, click on:

- (1) Save, in the left-hand menu,
- (2) Save, in the Settings menu.

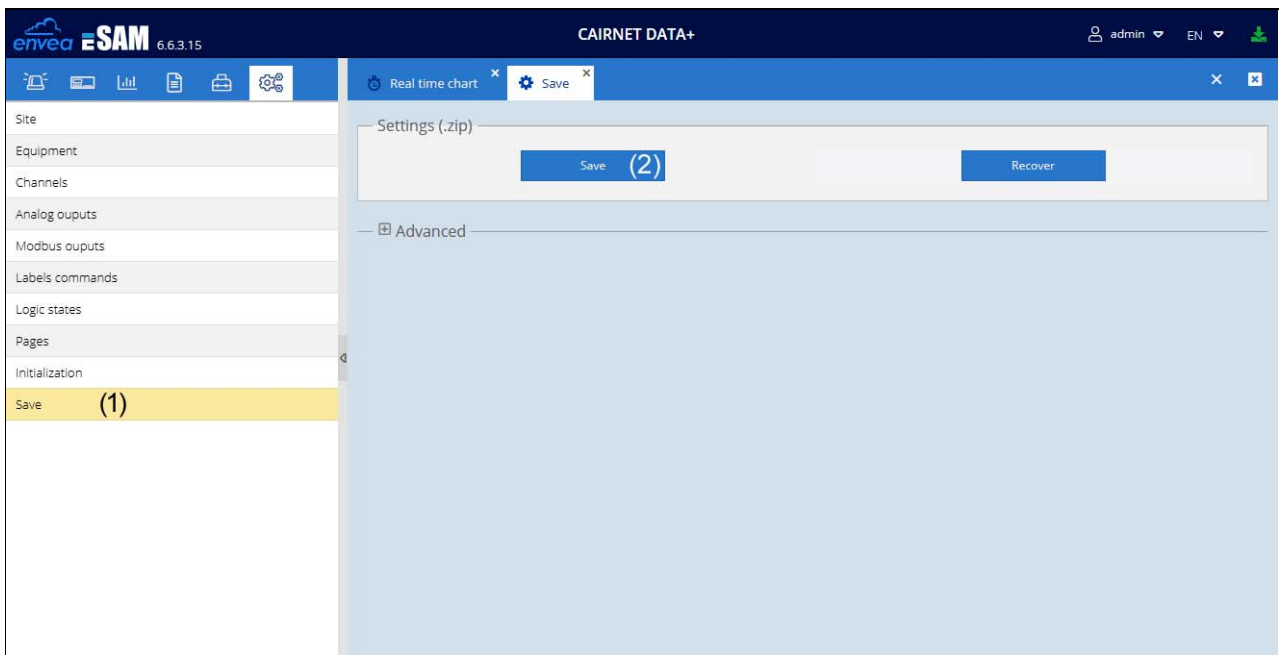
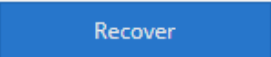


Figure 4–4 – Saving the factory configuration

If the system no more operates, simply restore the configuration by clicking on  and linking the saving file.



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