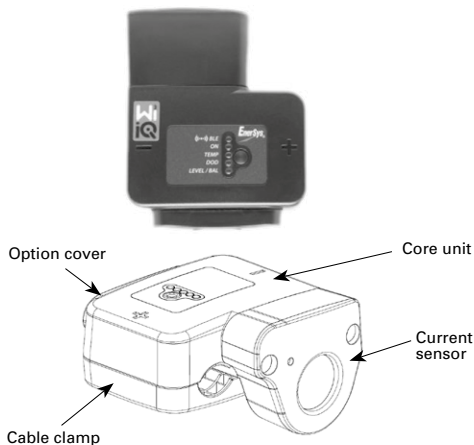


**1. Main unit**

The Wi-iQ3 consists of:

- a core unit (for the measurement and communication features). There are two models, one for industrial batteries from 24V to 80V and one for industrial batteries from 96V to 120V.
- a cable clamp (for mechanical fixation of DC cables)
- a current sensor (for current measurement)
- an option cover (for CAN communication option)

The Wi-iQ3 can be assembled on industrial batteries from 24V to 80V. The Wi-iQ3 120V can be assembled on batteries from 96V to 120V.



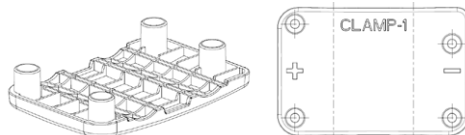
**2. Main unit with cable clamp (no current sensor)**

There are four core part-numbers depending on the DC cable gauge:

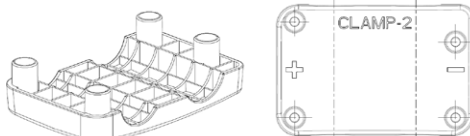
| Product     | DC cable gauge          | Designation  |
|-------------|-------------------------|--|
| Wi-iQ3      | 16 > 50mm <sup>2</sup>  | Wi-iQ3 core cables up to 50mm <sup>2</sup>                 |
|             | 70 > 120mm <sup>2</sup> | Wi-iQ3 core cables 70mm <sup>2</sup> to 120mm <sup>2</sup> |
| Wi-iQ3 120V | 16 > 50mm <sup>2</sup>  | Wi-iQ3 core cables up to 50mm <sup>2</sup>                 |
|             | 70 > 120mm <sup>2</sup> | Wi-iQ3 core cables 70mm <sup>2</sup> to 120mm <sup>2</sup> |

The difference is related to the cable clamp which fits to the cable gauge:

**Clamp-1 (16 > 50mm<sup>2</sup>)**



**Clamp-2 (70 > 120mm<sup>2</sup>)**



NB: the cable clamp model number and the polarities are engraved in the plastic part.

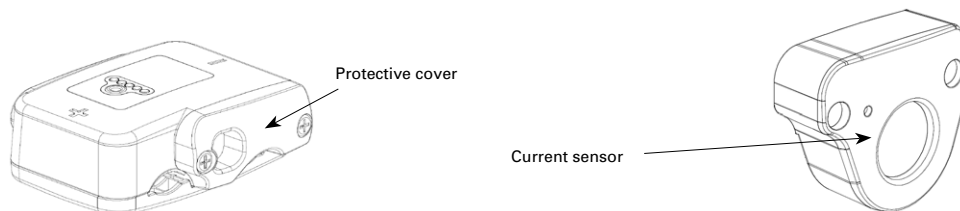
**3. Current sensors**

There are three models of Hall Effect current sensor depending on the DC cable gauge and the battery current rating.

| Product        | DC cable gauge*          | Internal diameter | Truck class recommendation | Max DC current | Designation                    |
|----------------|--------------------------|-------------------|----------------------------|----------------|--------------------------------|
| Current sensor | Up to 35mm <sup>2</sup>  | 15.6mm            | Class 3                    | 300A           | 35mm <sup>2</sup> & 300A max   |
|                | Up to 120mm <sup>2</sup> | 25.2mm            | Class 1 and 2              | 600A           | 120mm <sup>2</sup> & 600A max  |
|                | Up to 120mm <sup>2</sup> | 25.2mm            | Class 1 and 2              | 1000A          | 120mm <sup>2</sup> & 1000A max |

\* The DC cable gauge does not take account of the terminals dimensions. Terminals may need to be assembled after inserting the cable in the current sensor.

The Wi-iQ3 core unit is delivered with a protective plastic cover that needs to be removed to assemble the selected current sensor.

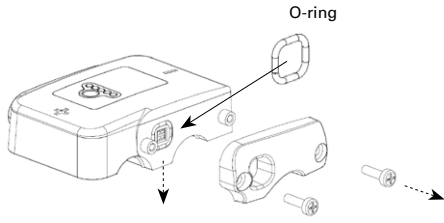
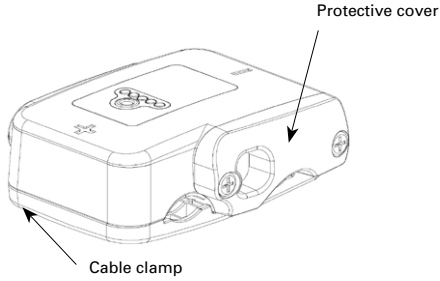


#### 4. Installation

Carefully follow the installation procedure as described below.

**4.1 Make sure the cables are not connected to the battery before proceeding to the assembly.**

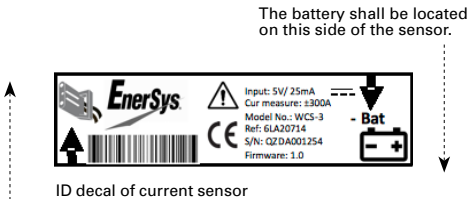
**4.2 Remove the current sensor protective cover and the cable clamp from the main unit.**



**CAUTION:** there is an O-ring seal between the Wi-iQ3 main unit and the protective cover. Make sure the O-ring is still properly located in the main unit when assembling the current sensor.

**4.3 Insert the NEGATIVE battery cable in the current sensor.**

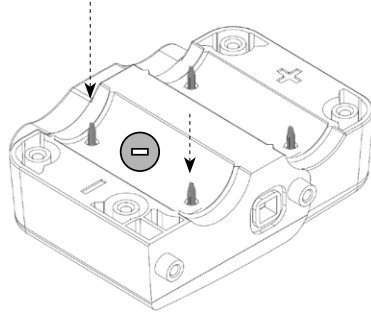
**CAUTION:** make sure to properly orientate the battery cable during assembly on the current sensor (refer to the ID decal on the current sensor).



The battery plug shall be located on this side of the sensor.

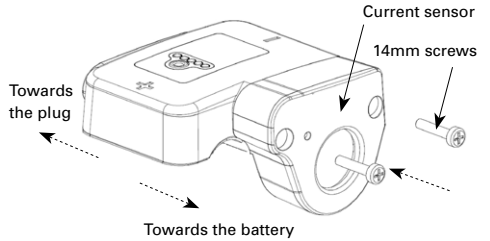
**4.4 Press the NEGATIVE cable on the pins.**

Press carefully and perpendicularly the cable on the pins.



**CAUTION:** the cable shall be pressed carefully against the pins perpendicularly to avoid bending the pins.

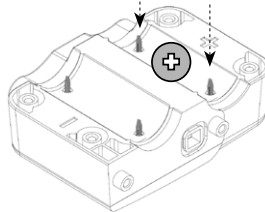
**4.5 Assemble the current sensor on the main unit (torque 1.5Nm±0.1). Make sure to use the appropriate screws (delivered with the current sensor).**



**CAUTION:** using inappropriate screws (type and length) may damage the product and impact its reliability.

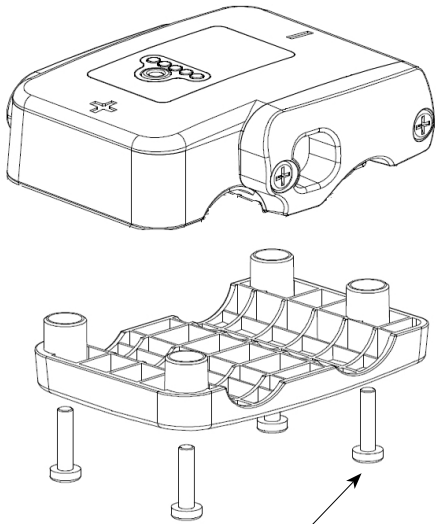
**4.6 Press the POSITIVE cable on the pins.**

Press carefully and perpendicularly the cable on the pins.



**CAUTION:** the cable shall be pressed carefully against the pins perpendicularly to avoid bending the pins.

4.7 Assemble the plastic clamp on the main unit (torque 1.5Nm±0.1) using 16mm long screws.



16mm screws

**CAUTION:** using inappropriate screws (type and length) may damage the product and impact its reliability.

4.8 Fasten the DC cables with cable ties at each side of the Wi-iQ3 to avoid stressing the connections during handling.



4.9 The Wi-iQ3 main unit should be securely installed in order to avoid any shock and misuse during handling and operation.

4.10 As soon as supplying the Wi-iQ3 unit with the battery voltage, make sure that the LEDs lit according to the initialization sequence:

- the BLE blue LED is lit for 7 seconds,
- then all LEDs are blinking quickly for a few seconds.

## 5. LEDs

There are five LEDs on the Wi-iQ3 for status indication.



NB:

- When the Wi-iQ3 is connected to the battery voltage for the first time, the BLE blue LED is lit for 7 seconds then all LEDs are blinking quickly for a few seconds (initialization sequence).
- The button close to the LEDs has no function at this stage.

| LED       | Color | Lit                   | Slow blinking<br>(1s ON / 1s OFF)    | Fast blinking<br>(0.3s ON / 0.3s OFF)  | Unlit   |                                  |
|-----------|-------|-----------------------|--------------------------------------|--|---|----------------------------------|
| BLE       | Green | N/A                   | Paired to a BLE sensor               | Paired to a BLE sensor                 | All LEDs blinking fast during 10s = Identification sequence |                                  |
|           | Blue  | N/A                   | Communicating in BLE (E connect App) | N/A                                    |   | No BLE communication in progress |
| ON        | Green | N/A                   | Normal status                        | Communicating in Zigbee (Wi-iQ Report) |   | Misfunction                      |
| TEMP      | Red   | High temperature      | N/A                                  | N/A                                    |   | Normal status                    |
| DOD       | Red   | Alert DOD             | Warning DOD                          | N/A                                    |   | Normal status                    |
| LEVEL/BAL | Blue  | Low electrolyte level | Unbalance voltage                    | N/A                                    |   | Normal status                    |

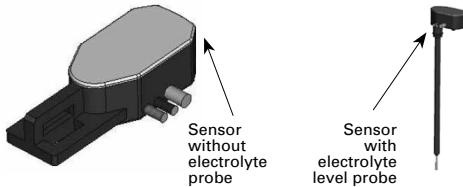
## 6. BLE peripheral sensors

The Wi-iQ3 can be associated to a peripheral sensor allowing battery temperature measurement, electrolyte level and unbalanced voltage detections. Two main types of sensors are available depending on the battery configuration:

- 2V sensors for assembly on 2V cells (with or without electrolyte level probe)
- 12V sensors for assembly on 12V blocs

| Product    | Electrolyte level probe | Temperature probe | Unbalance detection | Designation                |
|------------|-------------------------|-------------------|---------------------|----------------------------|
| 2V sensor  | Yes                     | Yes               | Yes                 | BLE T°/ LEV 2V (EMEA/ASIA) |
|            | No                      | Yes               | Yes                 | BLE T° 2V (EMEA/ASIA)      |
| 12V sensor | No                      | Yes               | Yes                 | BLE T° 12V (EMEA/ASIA)     |

The sensors communicate with the Wi-iQ3 unit via Bluetooth Low Energy (BLE) process (they are also called BLE sensors). The pairing process with the Wi-iQ3 unit is described in the Pairing section.

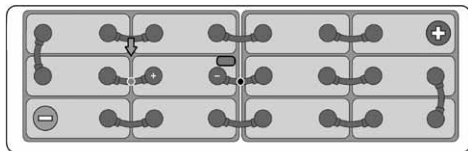


| Wire          | Function          | Length |
|---------------|-------------------|--------|
| Red           | POSITIVE voltage  | 300mm  |
| Black (small) | NEGATIVE voltage  | 300mm  |
| Black (large) | Temperature probe | 300mm  |

## 7. BLE peripheral sensor installation

The BLE sensors should be installed according to the sketches below.

- **2V cell setting:**



The 2V sensor is only connected to ONE cell (2V nominal voltage – red and black main supply wires). It is recommended to install the BLE sensor close to the middle of the battery. The 2V BLE sensor without electrolyte level probe shall be secured on a harness using cable ties.

## 8. BLE sensors LEDs

There are two LEDs on the top of each sensor for status indication.

| Color | Lit                   | Confidence blinking (every 32s)  | Slow blinking | Alternate blinking      | Unlit         |
|-------|-----------------------|----------------------------------|---------------|-------------------------|---------------|
| Red   | High temperature      | N/A                              | Misfunction   | Identification sequence | Normal status |
| Blue  | Low electrolyte level | Normal status (unit in function) | N/A           |                         |               |

**CAUTION:** DO NOT CONNECT the sensor to more than ONE cell, a voltage above 4V would cause a permanent product failure.

For connecting each wire on the battery, use only the genuine parts supplied with the BLE sensor:

- black voltage tap for **ANY** wire
- heat-shrinkable crimping splice



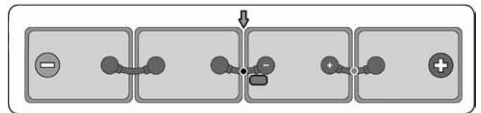
Wire connection assembly details

NB: the BLE sensor includes its own protective fuses then the connection materials shall not include any additional fuse.

Unbalance detection is made by comparing the average bloc voltage measured by the Wi-iQ3 with the bloc voltage measured by the BLE sensor. It is possible to deactivate the unbalance detection by unticking the “Balance” selection box in the App or in Wi-iQ Report.

- CAUTION:** on BLE sensors with electrolyte level detection:
- the level probe shall be cut in order to be located 5mm above the separator and shall not touch the separators or the internal cells plates.
  - make sure that the level probe is fully protected by the plastic housing over its entire length (no hole, no deformation) to avoid false detection.

- **12V bloc setting:**



The 12V sensor is only connected to ONE bloc (12V nominal voltage – red and black main supply wires). The 12V BLE sensor shall be secured on a harness using cable ties.

**CAUTION:** DO NOT CONNECT the sensor to more than ONE bloc, a voltage above 24V would cause a permanent product failure.

For connecting each wire on the battery, use only the genuine parts supplied with the BLE sensor:

- black voltage tap for **ANY** wire
- heat-shrinkable crimping splice



Wire connection assembly details

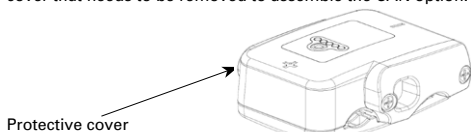
NB: the BLE sensor includes its own protective fuses then the connection materials shall not include any additional fuse.

Unbalance detection is made by comparing the average bloc voltage measured by the Wi-iQ3 with the bloc voltage measured by the BLE sensor. It is possible to deactivate the unbalance detection by unticking the “Balance” selection box in the App or in Wi-iQ Report.

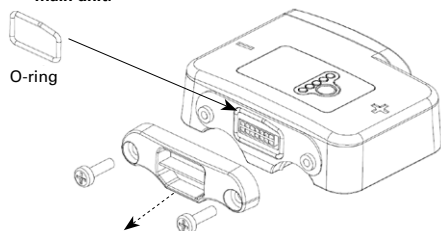
## 9. Option

It is possible to communicate with the Wi-iQ3 unit through CAN communication protocol. It is done through a CAN option device which has to be connected to the Wi-iQ3.

The Wi-iQ3 main unit is delivered with a protective plastic cover that needs to be removed to assemble the CAN option.



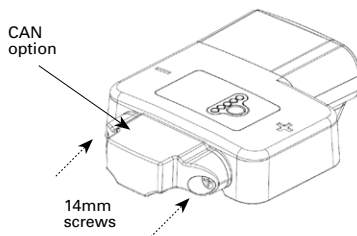
### 9.1 Remove the current sensor protective cover from the main unit.



**CAUTION:** there is an O-ring seal between the Wi-iQ3 main unit and the protective cover. Make sure the O-ring is still properly located in the main unit when assembling the current sensor.

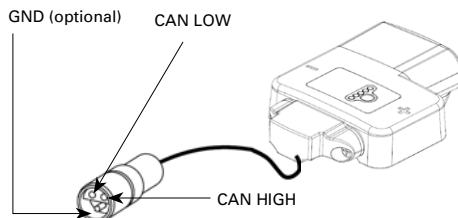
### 9.4 The loose male connector is included in the option (ITT-CANON SURE-SEAL IP68 3-contact receptacle with 2 pins and 1 socket adapted for 0.75-1.5mm<sup>2</sup> wires).

### 9.2 Assemble the CAN option on the main unit (torque 1.5Nm ±0.1). Make sure to use the appropriate screws (delivered with the CAN option).



**CAUTION:** using inappropriate screws (type and length) may damage the product and impact its reliability.

### 9.3 The female pin connector is described below.



| Product             | Receptacle part number | Contact part number     |                     |                     |
|---------------------|------------------------|-------------------------|---------------------|---------------------|
|                     |                        | Wire gauge              | Pin (qty 2)         | Socket (qty 1)      |
| ITT-CANON SURE-SEAL | 120-8551-001 (SS3R)    | 0.5–1.0mm <sup>2</sup>  | 330-8672-001 (SS20) | 031-8703-001 (SS20) |
|                     |                        | 0.75–1.5mm <sup>2</sup> | 330-8672-000 (SS10) | 031-8703-000 (SS10) |

## 10. Communication / Download

There are two modes of communication available on the Wi-iQ3 devices:

- Zigbee: this is the existing protocol already in use on Wi-iQ1 and Wi-iQ2 devices. It will continue to provide communication to existing Life iQ chargers.
- BLE: this is a new feature which provides communication to a Smartphone.

The Wi-iQ3 can also be configured and provide data via Zigbee (Wi-iQ Report – v5.1.X minimum) or BLE (E connect App).

### 11. "E connect" App

A Mobile App is developed for iOS and Android Smartphones. The App name is "E connect" and will be available from App Store and Play Store. Access is protected by login/password. Several access levels will be available through passwords. The App is combining the existing COMPACT App features (for on-board chargers) with the new Wi-iQ3 ones.



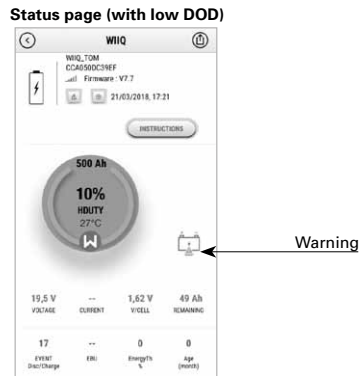
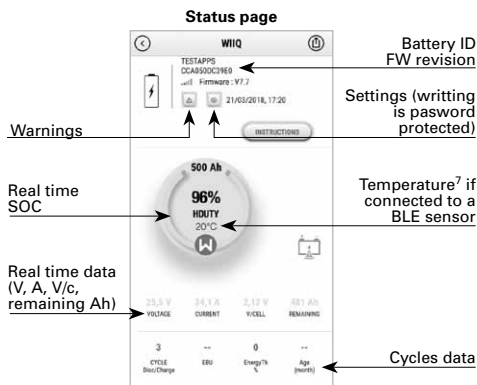
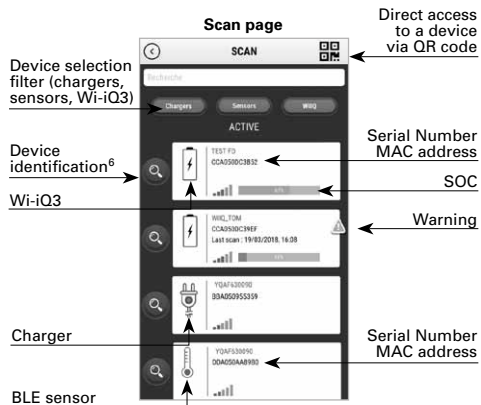
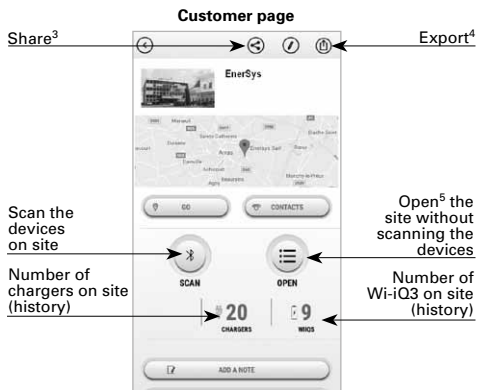
This App requires to be connected to Internet (3G/4G or WIFI) to take advantage of full features. This App allows mainly:

- to scan<sup>1</sup> and then associate the Wi-iQ3 to a customer site (list of devices is automatically recorded on a remote server<sup>2</sup>)
- to set the Wi-iQ3 battery parameters (such as technology, capacity etc)
- to download the Wi-iQ3 history data (data downloaded are automatically transferred to a remote server\* - there is no data stored on the Smartphone)
- to pair a Wi-iQ3 device with a BLE sensor

#### Notes:

- (1) When launching the App, Bluetooth is automatically activated.
- (2) If the Smartphone is not connected to Internet during scan and data download, the transfer to the remote server will be done as soon as the Internet connection is restored.

The main screens of the App with the main parameters are shown in the next pages.



**Notes:**

- (3) The 'Share' button allows to share the site data with another user (through his e-mail address). By default, a customer site is only visible by its owner (who created it).
- (4) The 'Export' button allows to export data in a .xrp file format which can be imported in the Wi-iQ Report software for deeper analysis. A web link to download the file is provided or sent to any user e-mail address.

- (5) The 'Open' button allows to access to the list of devices already recorded in the customer site in Off-line mode.

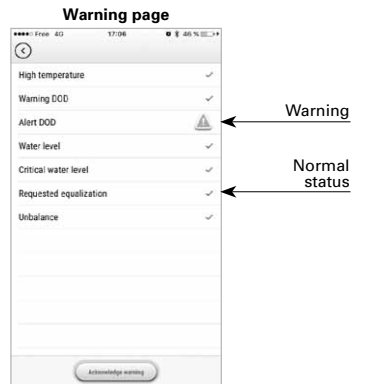
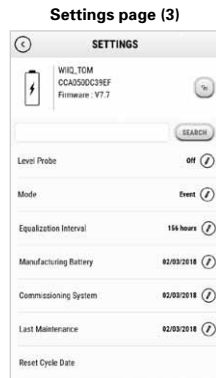
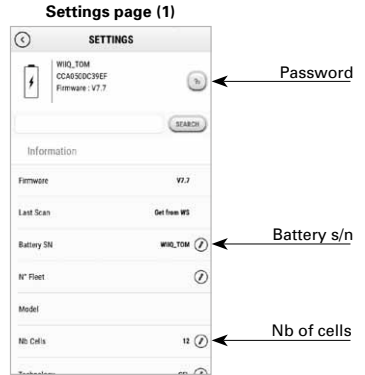
- (6) The 'Identification' button allows to visually identify the selected device through the identification sequence of its LEDs.

- (7) As long as the Wi-iQ3 is connected to the App, there is no communication with the BLE sensor (i.e. temperature data is not refreshed).



Off-line status when displaying a Wi-iQ3 which is out of range

Only settings parameters can be displayed



Multiple graphs are available (SOC, temperature, Ah...) with various period filters (day, week, year).

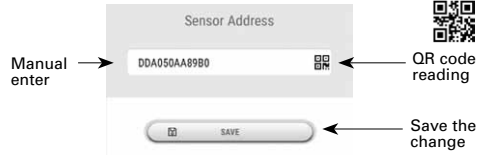
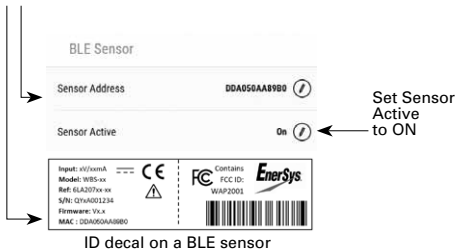
## 12. Pairing a Wi-iQ3 with the BLE sensor

The process to associate (i.e. to pair) a BLE sensor to a Wi-iQ3 unit is described below:

### 12.1 With the E connect Mobile App (using Bluetooth)

- After installing the Wi-iQ3 and BLE units on the battery
- Launch the Mobile App
- Scan the Wi-iQ3 units
- Access to the selected Wi-iQ3
- Enter in the Settings section
- Enter the password
- Scroll down to the BLE Sensor section
- Set the Sensor Active parameter to ON
- Enter the BLE Sensor Address (MAC) – you can either fill it manually or read it via the BLE QR code

Enter the BLE sensor address (MAC# on the BLE ID decal)



NB: how to get the BLE sensor address in case the decal is missing or not readable:

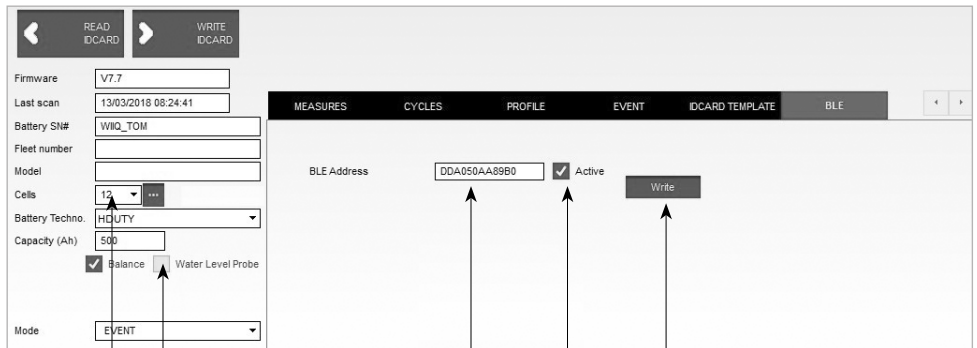
- Launch the SCAN process to detect the surrounding BLE sensors
- Activate the IDENTIFICATION mode of the detected sensors and identify the right one
- Record its MAC address

To verify that pairing is effective, it is needed to disconnect the App from the BLE sensor then:

- Exit from the settings section and return to the SCAN page (or Exit from the App)
- Check that the green BLE LED is blinking on the Wi-iQ3 (refer to section 5)

### 12.2 With the Wi-iQ Report Software (using Zigbee dongle)

- After installing the Wi-iQ3 and BLE units on the battery
- Launch Wi-iQ Report with the USB dongle connected (v5.1.X minimum)
- Scan the Wi-iQ3 units
- Add and access to the selected Wi-iQ3
- Enter in the BLE section
- Tick the Active box
- Enter the BLE Sensor Address (MAC)
- Tick the appropriate boxes and set cells balance number depending on the BLE sensor model
- Click on Write



Enter the number of cells

Tick the appropriate boxes depending on BLE model

Enter the BLE sensor address (MAC# on the BLE ID decal)

Tick the Active box

Click on "Write"

- Verify that pairing is effective by checking that the green BLE LED is blinking on the Wi-iQ3 (refer to section 5)



### 13. Use conditions

1. The Wi-iQ3 is a battery controller expected to be mounted on an industrial battery.
2. The assembly has to be made in a non-confined place.
3. Input Voltage range : [15Vdc ; 120Vdc]
4. Battery voltage: 24, 36, 48, 72 & 80V (Wi-iQ3)  
96 & 120V (Wi-iQ3 120V)
5. Current measurement range: [+/-300A][+/-600A][+/-1000A]
6. Temperature range: [0 ; 70°C]
7. Altitude <2000m, Pollution level protection: 3 (dusty environment)
8. Measurement level: I (measures unconnected to network), do not use in level II,III,IV
9. Technical support: Refer to our website: [www.enersys.com](http://www.enersys.com) to find your local contact.
10. Standards:
  - \* Radio Spectrum (Directive 2014/53/EU - RED)
  - \* FCC ID: T7V4561HM (Panasonic industrial 802.14.4 modem – 2.405-2.475GHz)
  - \* FCC ID: WAP2001 (Cypress BLE PRoC – 2.402-2.48GHz)

This device complies with part 15 of the FCC rules. Operation is subject to the following two conditions:

(1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation. In accordance with FCC requirements, changes or modifications not expressly approved by EnerSys could void the user's authority to operate this product.

**Subject to technical modification without any prior notice. E.&O.E.**

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