

ENCAP

B E Y O N D B A T T E R I E S

USER MANUAL

1.2KWH-24V

EN-1.2k-24-1C-X-X-X-X-1V0-GEN1

VERSION 1 | REVISION 0 | RELEASE DATE: 4th April 2024



SMART MANAGEMENT

- Feature-rich Online Monitoring via App or OLED Display
- Automatic Firmware Updates
- Warning Alarms



EFFICIENT

- Highly Efficient: > 95% RTE (Round Trip Efficiency)
- 100% DOD (Depth of Discharge)
- 500,000 Cell Life Cycles



SAFE & RELIABLE

- Wide Operating Temperature Range
- Deployable in Various Environments including High Altitudes
- No Thermal Runaway Risk

ATTENTION

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Document HISTORY

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SAFETY INSTRUCTIONS

SAFETY GUIDELINES

1. *PERSONAL SAFETY*

- Always wear proper personal protective equipment (eyes protection, gloves, and safety shoes).

2. *GENERAL GUIDELINE*

- Do not subject the Module to strong impact.
- Do not crush or puncture the Module.
- Do not place the Module near a heat source, such as a fireplace.
- Do not disassemble the Module under any circumstances.
- Ensure precautions to prevent short-circuit under all circumstances.
- Do not touch the terminals with conductors while the Module is charging. Serious burns, shock, or material fusing may occur.
- Protect surrounding electrical components from incidental contact.
- Do not subject the Module to high pressure.
- Do not place any object on top of the Module.
- Do not drop the Module. Internal damage may occur that will not be visible.
- Do not stack Modules once they have been removed from the packaging. Instead the Modules should be placed on shelves.

- In case the Module is physically damaged for any reason, do not install and energize the Module under any circumstances and immediately contact your Reseller.

3. MODULE OPERATION

- Do not operate the Module above the specified voltage.
- Always make sure charger is set as recommended.
- When connecting to external devices ensure that galvanic isolation of the external device(s) does not exceed 1000V.
- Always make sure chargers are disconnected while working on Modules.
- Do not connect or disconnect terminals from the Module without first disconnecting the load.

4. MODULE OPERATING ENVIRONMENT

- Location: Indoor/Outdoor
- Operating Temperature Range: -10°C to 55°C (For continuous operations outside this range, please consult your Resellers or Enercap).
- Operating Humidity: Non-Condensing
- Do not charge the Module when the temperature is below -10°C.
- Do not charge the Module when temperature is above 55°C.

5. STORAGE ENVIRONMENT

- Do not store the Module at temperature greater than 55°C.

6. DISPOSAL

- Do not dispose the Module in fire.
- Do not dispose this Module as unsorted municipal waste. Please use a separate collection facility or contact the supplier from whom this Module was purchased. Please make sure discarded electrical waste is properly recycled per applicable regulations to reduce environmental impact.

PRE-INSTALLATION

INSPECTION

Document (e.g., photo) any damage and report this to your Reseller and shipping agent immediately. Remove the Module from the shipping carton and retain the shipping materials until the unit has been inspected and is determined to be operational.

UNPACKING

The Modules and cable accessories are packed in a cardboard carton with foam padding for protection during shipping.

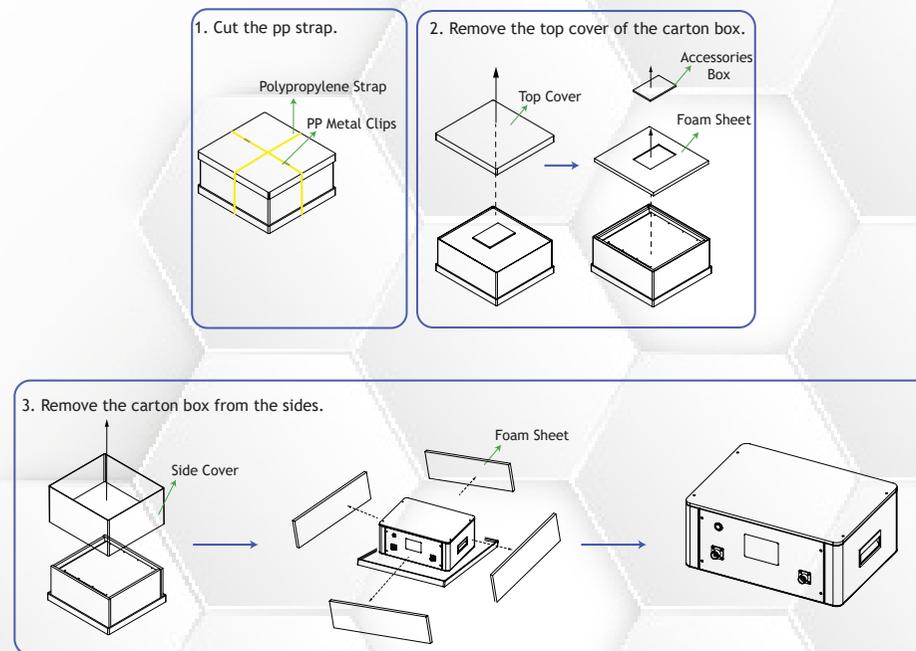


Figure 1: Steps to unpack the Module

HANDLING

The Modules are designed to provide years of trouble-free operation. Proper handling is required to avoid damage to the Module. In particular, the following precautions should be observed.

1. LIFTING THE MODULE

1. Pull up the handle on the top of the Module, grip the Module firmly and lift it.

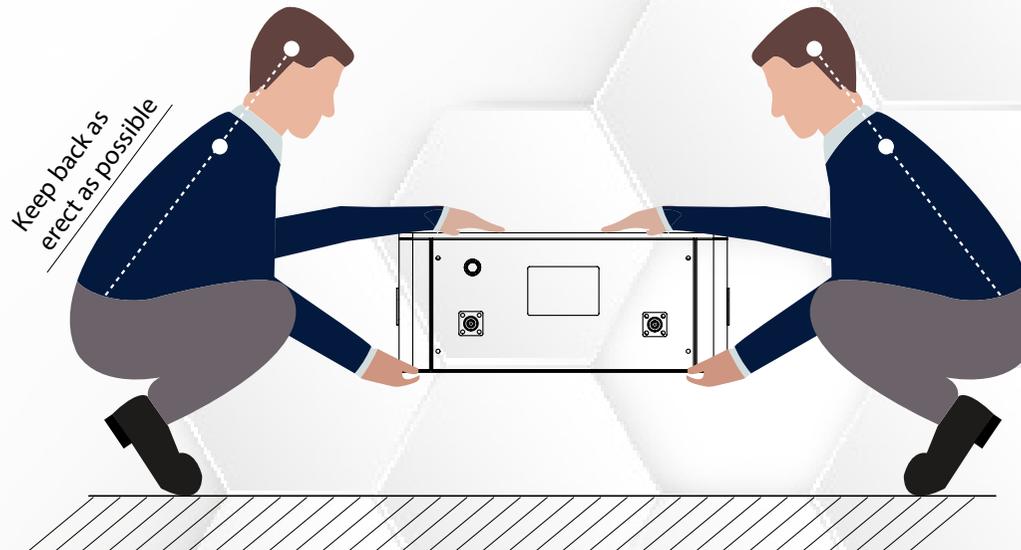


Figure 2: Holding the Module to lift up

1. Lift up straight, remembering not to turn your body while you are lifting.

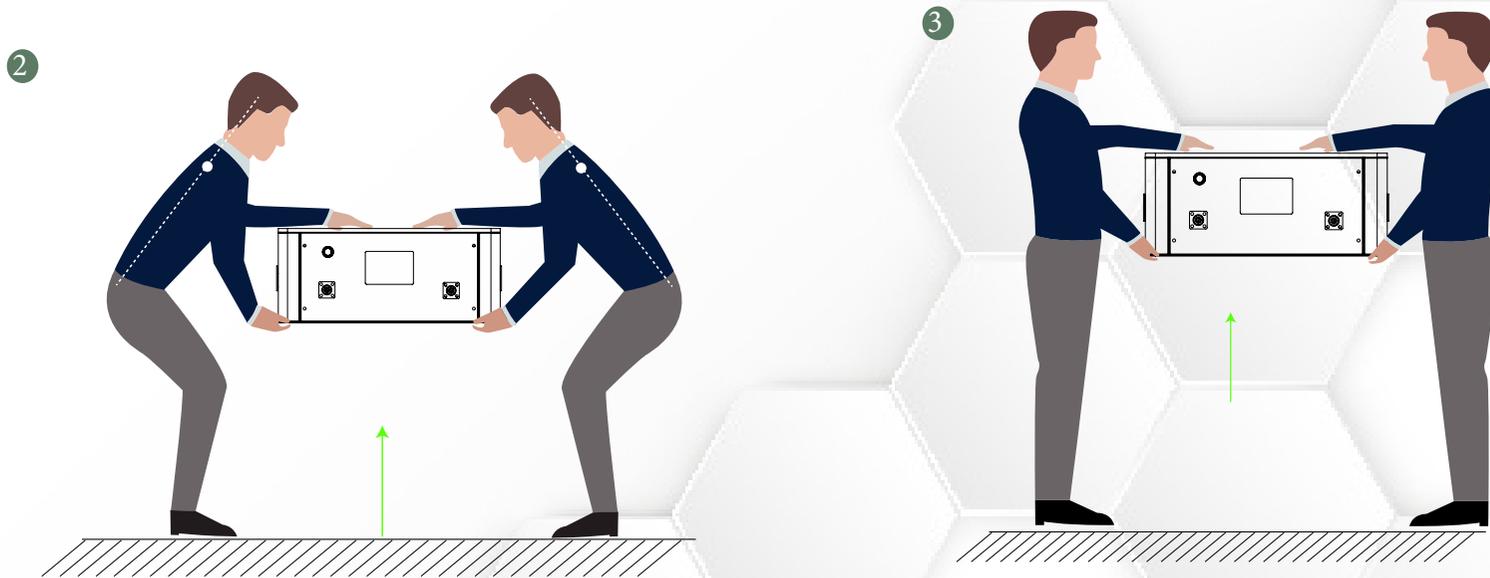


Figure 3: Lifting up the Module

LOCATION REQUIREMENTS

1. AREA OF INSTALLATION

- Install the Module at an appropriate height for ease of viewing LCD and operating switches.

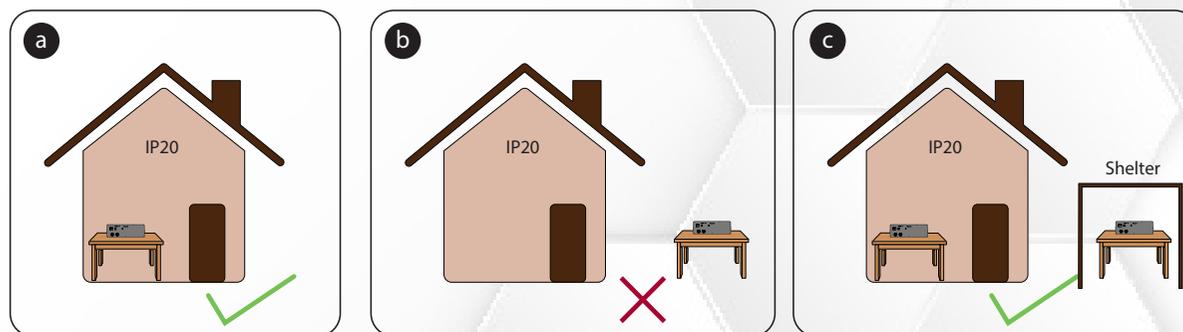


Figure 4: Installation restriction: a) Module can be stored inside b) Modules cannot be stored outside without shelter c) Modules can be installed indoors and outdoors with shelter

2. ENVIRONMENT REQUIREMENTS

- The ambient temperature and relative humidity must meet the following requirements.

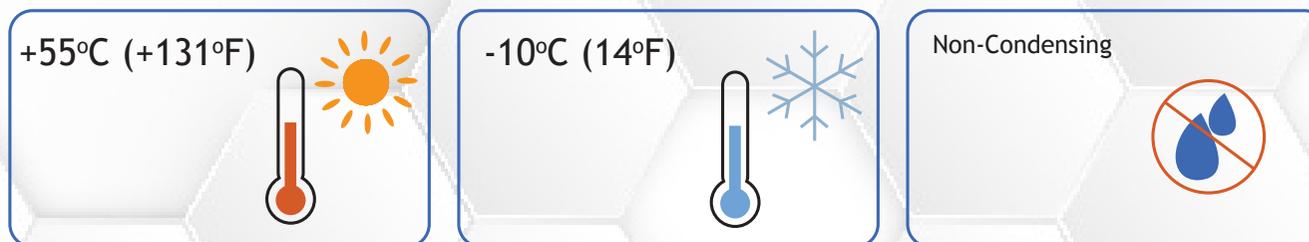


Figure 5: Operating temperatures and humidity of Module

3. ANGLE REQUIREMENT

- Never install the Module vertically, or with a forward tilt/backward tilt, or upside down.

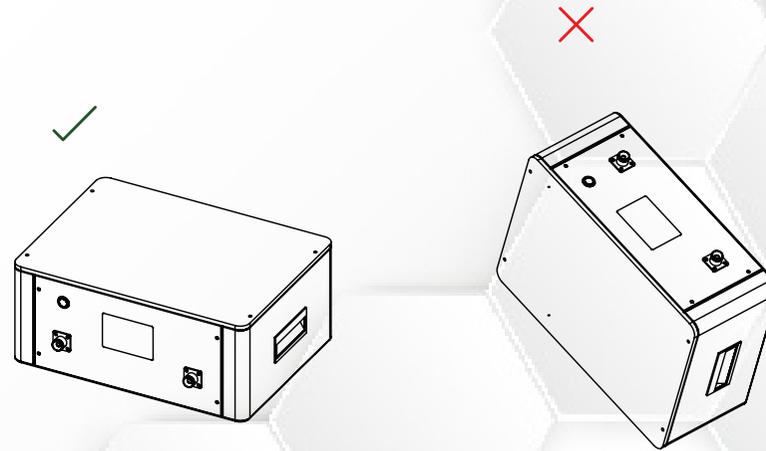


Figure 6: 1) Correct angle position 2) Wrong angle position

ELECTRICAL INSTALLATION

ELECTRICAL SETUP

1. CONNECTING MODULE TO POWER SUPPLY/CHARGER

Connect positive and negative terminals of charger to the positive and negative terminals of the Module, respectively.



Figure 7: Charging Module with power supply

2. CONNECTING MODULE TO LOAD/DISCHARGER

Connect positive and negative terminals of discharger to the positive and negative terminals of the Module, respectively.



Figure 8: Discharging Module from discharger

3. PARALLEL CONNECTION SETUP:

Any number of Modules can be connected in parallel. All Modules must be at 100% SOC before connecting in parallel.

- Connect the positive (+) terminal of all Modules to the positive busbar.
- Connect the negative (-) terminal of all Modules to the negative busbar.
- Refer to the parallel combination of the Modules as shown below and make your connections accordingly.

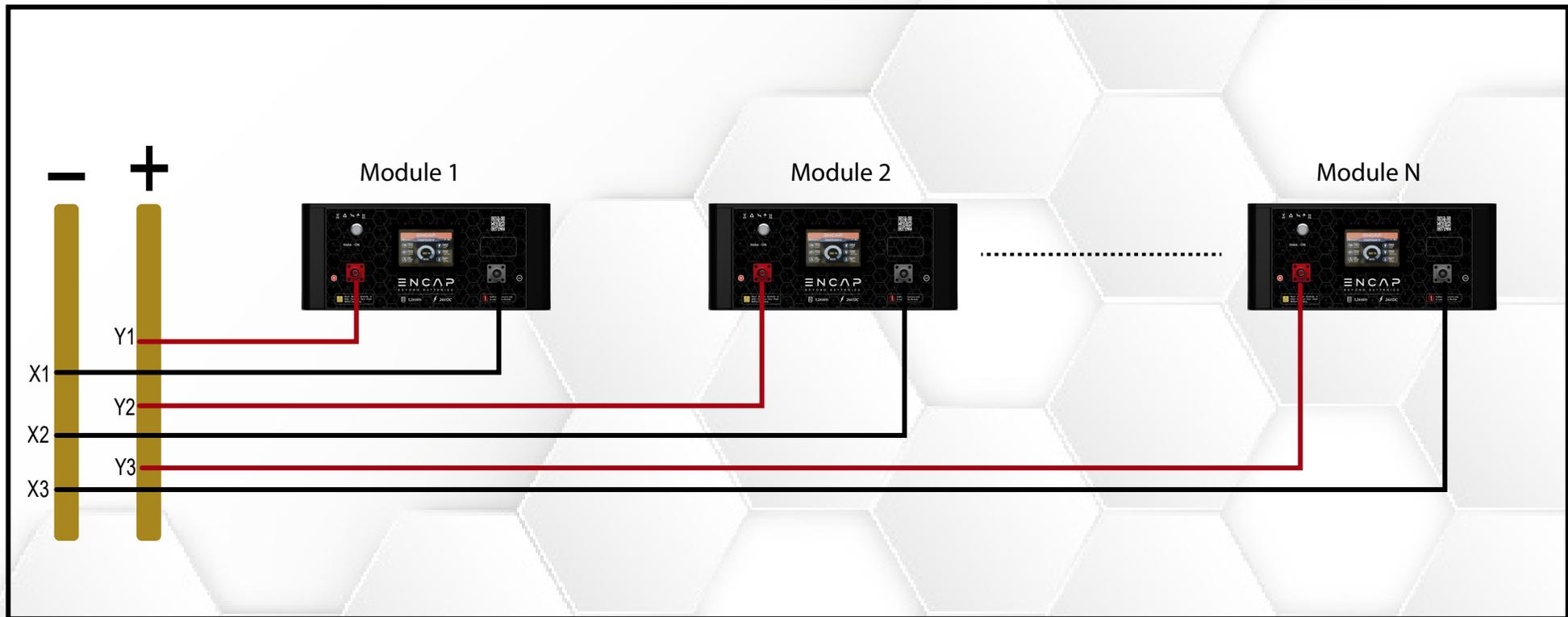


Figure 9: Modules connected in parallel

PARTS DESCRIPTION

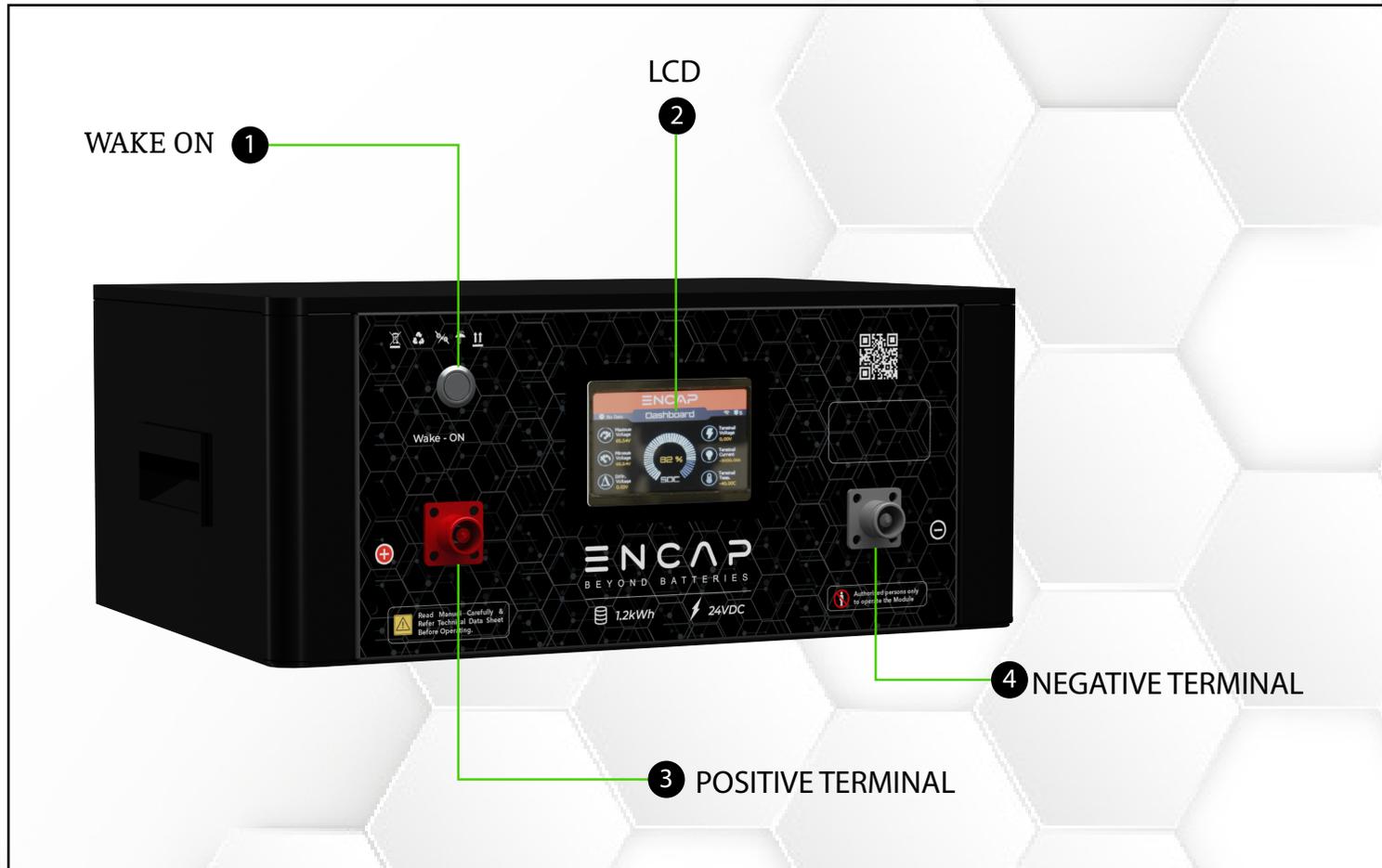


Figure 10: Module parts description

MONITORING LCD (FIRMWARE VERSION 3.0.4)

The Monitoring LCD allows user to monitor and configure the Module.

1. DASHBOARD

The first page on LCD is dashboard by default.

The screenshot shows the ENCAP monitoring LCD dashboard. At the top, the ENCAP logo and 'BEYOND BATTERIES' tagline are visible. The main display area is divided into several sections:

- Left Panel (Red background):** Displays 'Term. Voltage' at 44.70 V and 'Term. Current' at 0.00 A.
- Right Panel (Dark background):** Features a circular gauge showing 'Minute' (0), 'kWh' (7.21), and 'SOC' (30%). Below the gauge are two toggle switches: 'Disch.' (ON) and 'Charge' (ON).
- Bottom Panel (Dark background):** Includes an alarm notification 'No Alarm', a terminal status indicator (ON/OFF), and several connectivity icons: CAN, Bluetooth, WiFi, and SD Card.

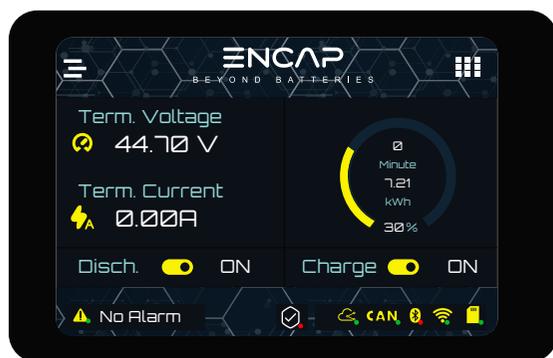
Annotations and their corresponding elements on the dashboard:

- Tap anywhere in the shaded area to view Module parameters:** Points to the menu icon (three horizontal lines) in the top left corner.
- Discharge Status of Module:** Points to the 'Disch.' toggle switch.
- Alarm Notifications:** Points to the 'No Alarm' notification.
- Terminal ON/OFF for secure operation:** Points to the terminal status indicator.
- Minute shows the remaining time for full charge or full discharge. 0 minute means the Module is on standby:** Points to the 'Minute' value in the circular gauge.
- kWh shows the capacity of the Module:** Points to the 'kWh' value in the circular gauge.
- It shows the SOC of the Module:** Points to the '30%' SOC value in the circular gauge.
- Charge Status of Module:** Points to the 'Charge' toggle switch.
- SD Card Status:** Points to the SD Card icon in the bottom right.
- WIFI Status:** Points to the WiFi icon in the bottom right.
- Bluetooth Status:** Points to the Bluetooth icon in the bottom right.
- CANBUS Status:** Points to the CAN icon in the bottom right.
- Online Monitoring Status:** Points to the cloud icon in the bottom right.

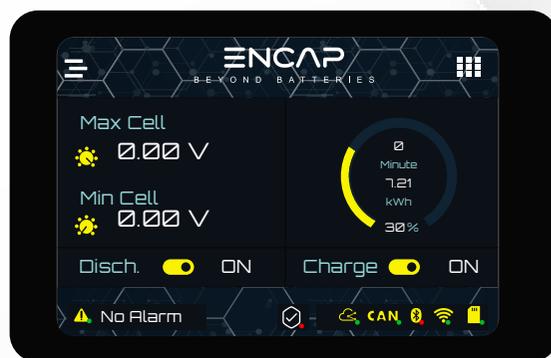
Legend:

- Active (Green dot)
- Non-Active (Red dot)

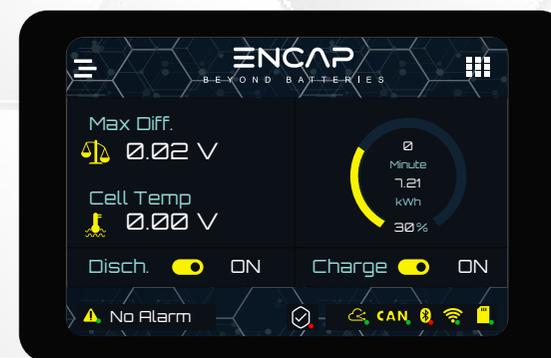
Tap the dashboard to view Module parameters: i.e. Terminal Voltage, Terminal Current, Maximum and Minimum Cell Voltages, Difference of Maximum and Minimum Cell Voltages, Cell Temperature, Charge Energy, Discharge Energy, System Time, System Date, System Alarms, System Mode.



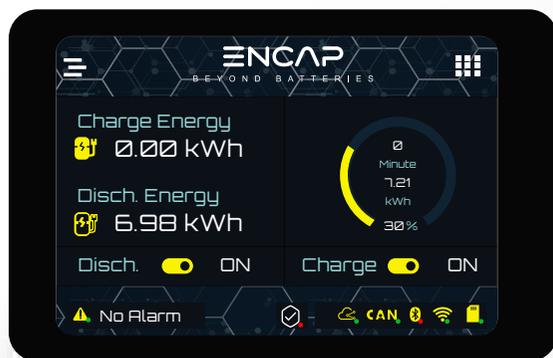
First Display



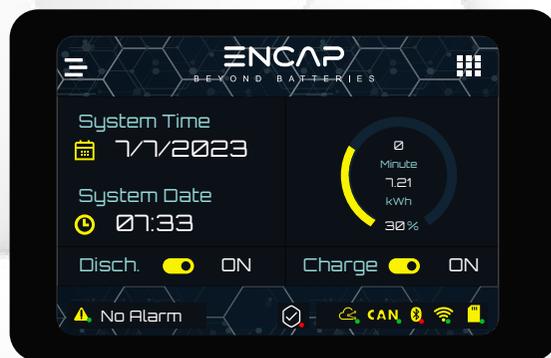
Second Display



Third Display



Fourth Display

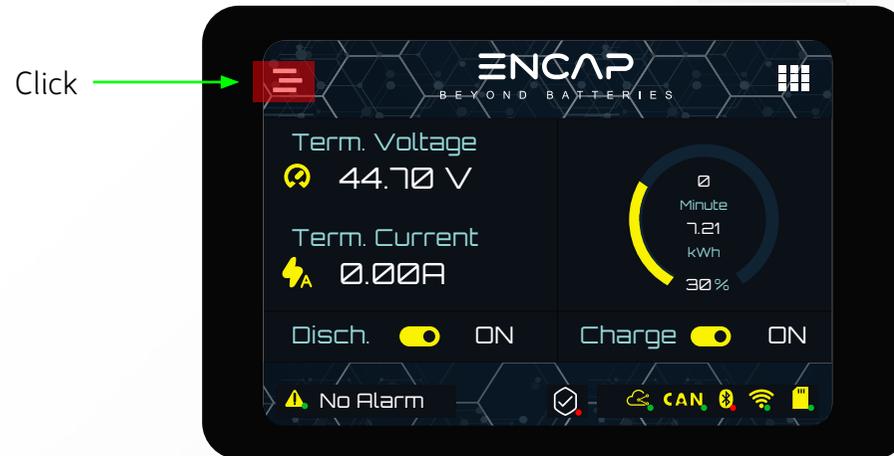


Fifth Display



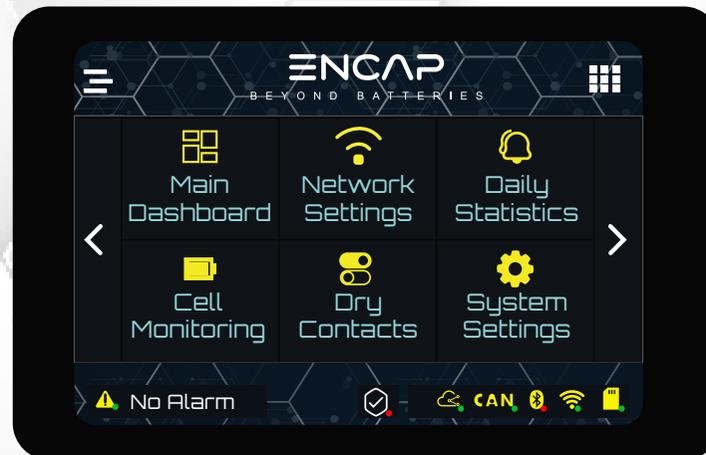
Sixth Display

Click on the menu bar  to go to main menu.

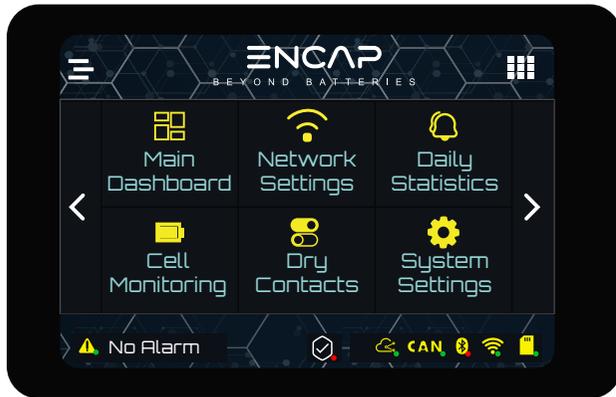


2. MAIN MENU:

The main menu provides parameter viewing and functions setting. The main menu is categorized into three pages.



First page



First page



Second page

Click on right arrow to go to third page



First Page



Second Page



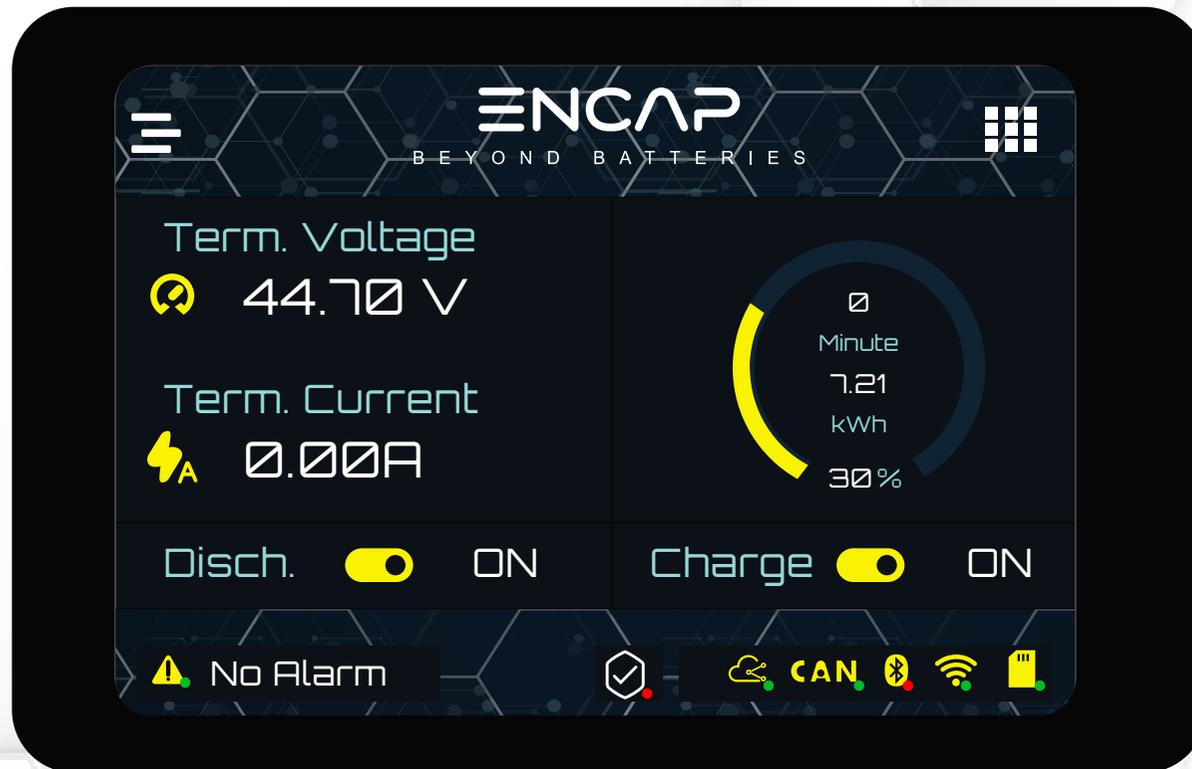
Third Page

FIRST MENU PAGE

First Menu page has Main Dashboard, Network Settings, Daily Statistics, Cell Monitoring, Dry Contacts and System Settings.

1. MAIN DASHBOARD

The first page on LCD is dashboard by default.

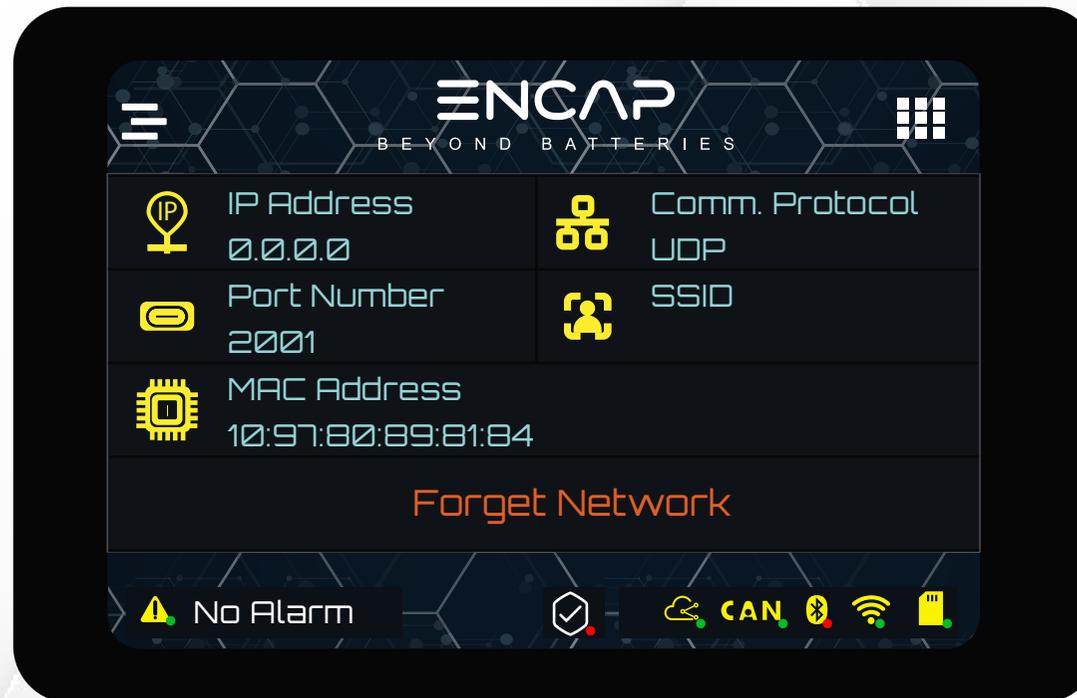


2. NETWORK SETTINGS

This page shows the IP Address, Port Number, Mac Address, Communication Protocol and SSID.

FORGET NETWORK:

Click on Forget Network to delete stored network info and Wi-Fi passwords.

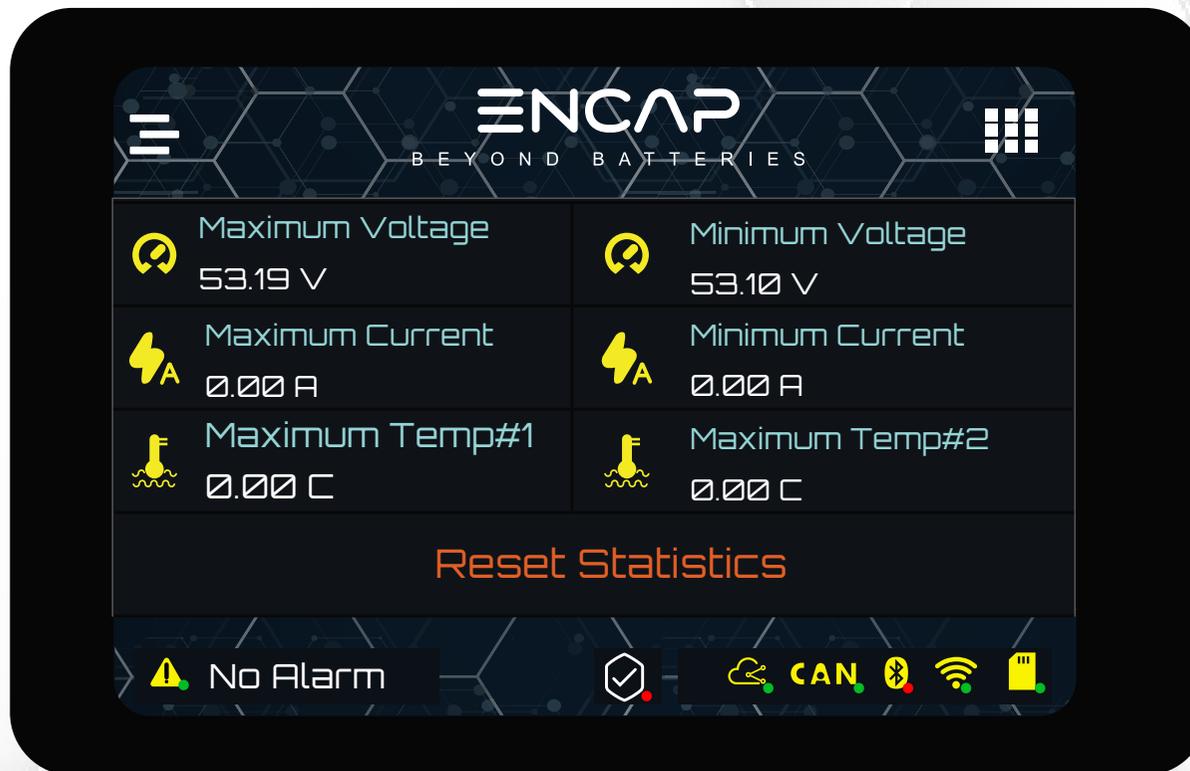


3. DAILY STATISTICS

Daily statistics shows the maximum and minimum voltages, maximum and minimum currents and maximum temperature of the Module.

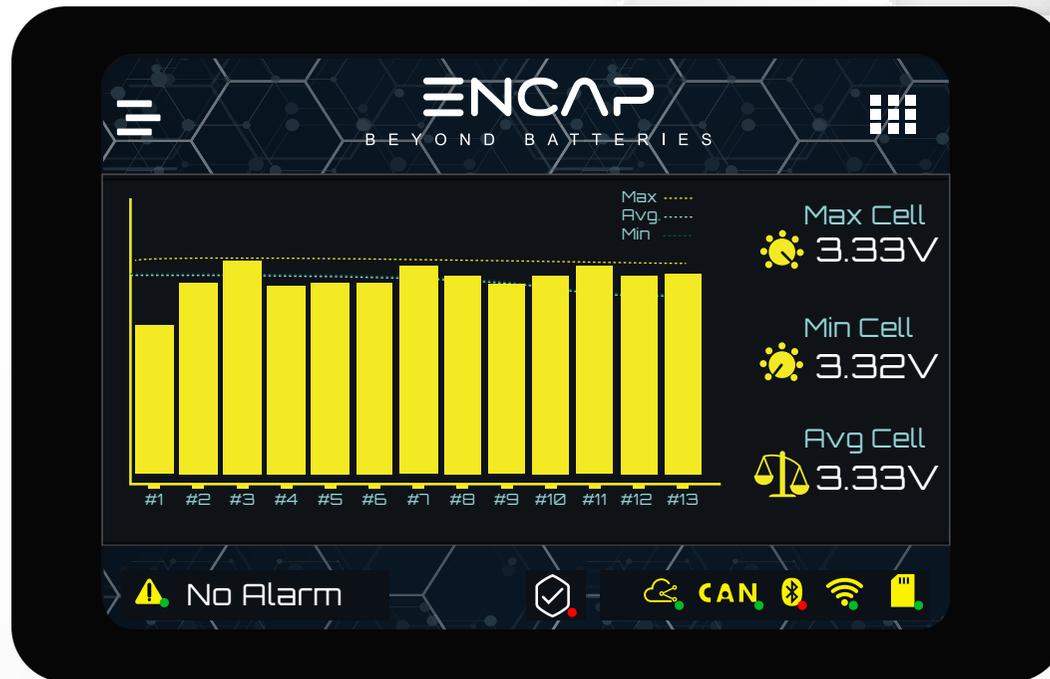
RESET STATISTICS:

Click on Reset Statistics to delete stored preset values.



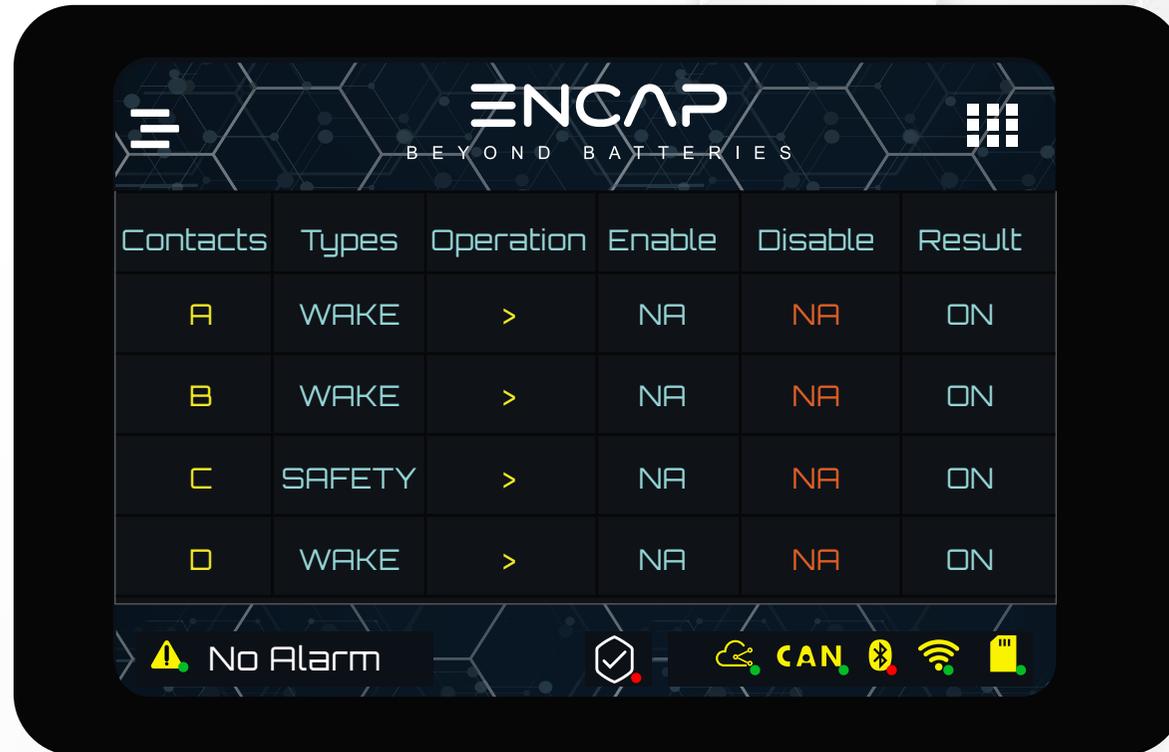
4. CELL MONITORING

This page gives information on each cell's voltage in the Module. This page helps the user to know about the imbalance and under/over voltage of cells.



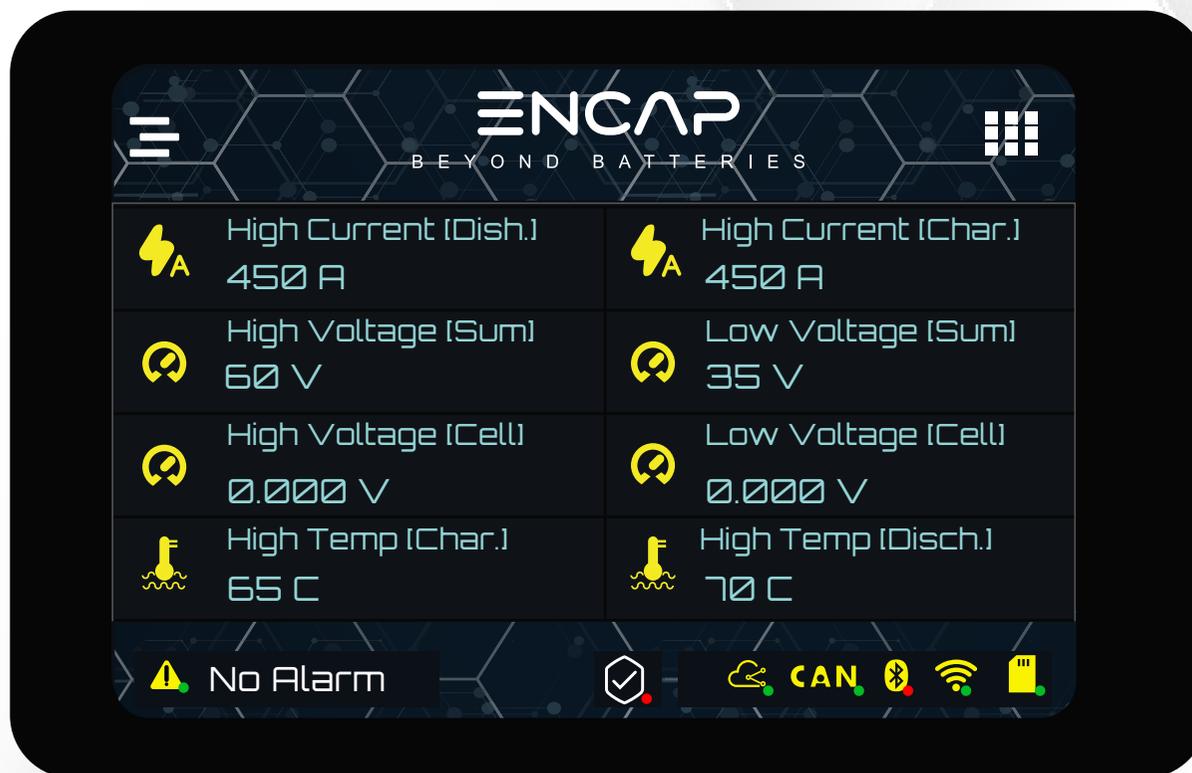
5. DRY CONTACTS

This is the Dry Contact read page. This page helps the user to view all the settings of the configured Dry Contacts.



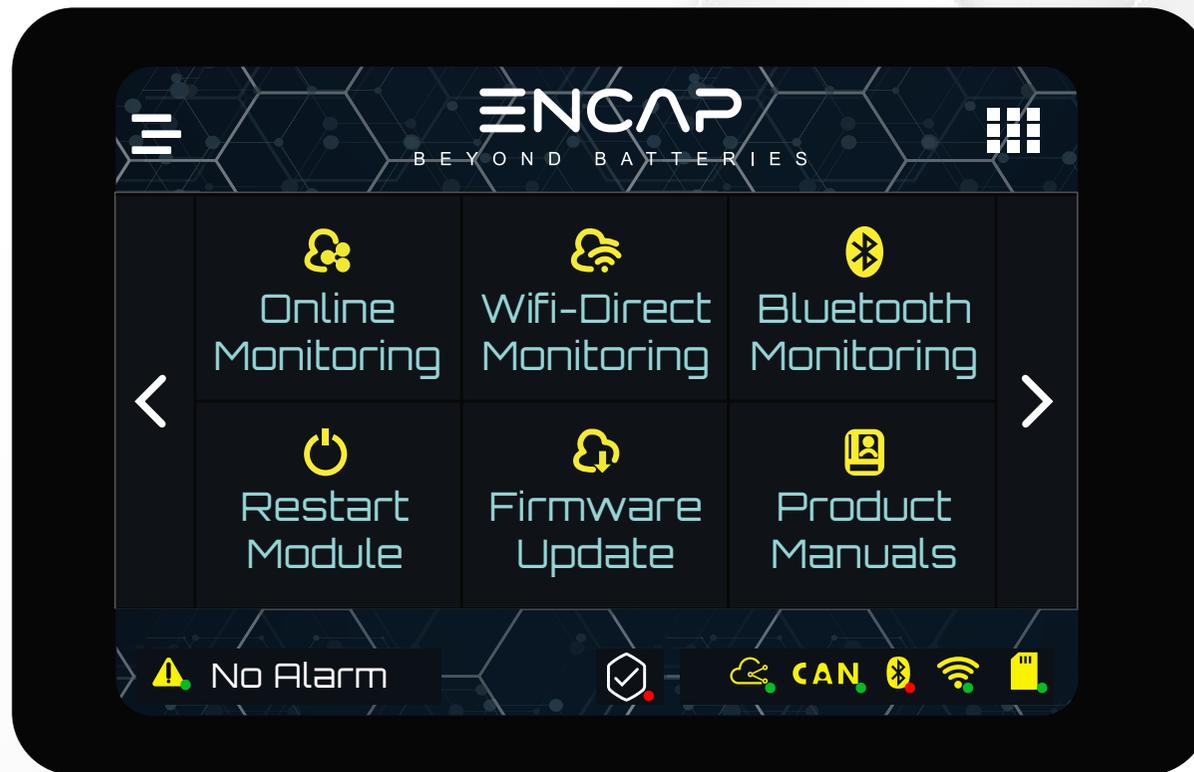
6. SYSTEM SETTINGS

System settings shows the preset limit of high current during charging and discharging, high and low voltage of Module, high and low voltage of cells and high temperature during charging and discharging.



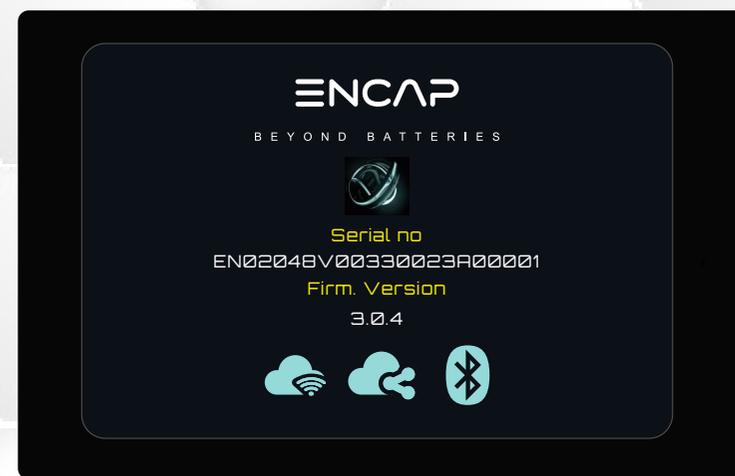
SECOND MENU PAGE

Second menu page has Online Monitoring, Wifi-Direct Monitoring, Bluetooth Monitoring, Restart Module, Firmware Update and Product Manuals.



1. ONLINE MONITORING

Click on Online Monitoring, Module will restart. While restarting, the Online Monitoring will brighten up.



Online Monitoring will connect automatically if SSID and password are defined. For connecting for the first time, user need to define SSID and password. Kindly refer to Monitoring QR for defining SSID and password.

2. WIFI- DIRECT MONITORING

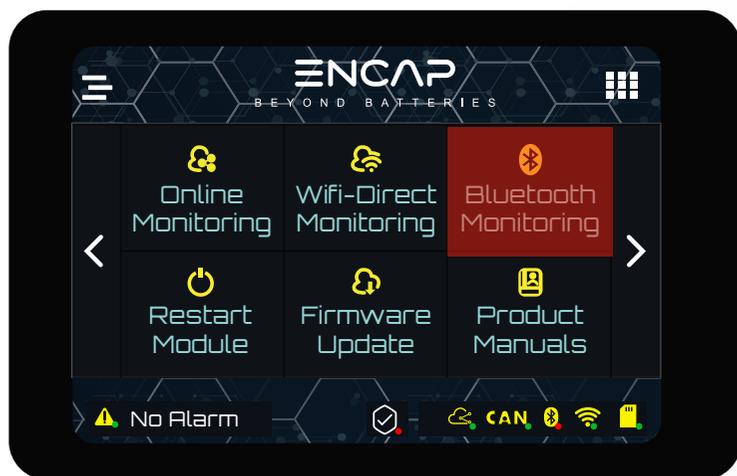
Click on Wi-Fi Direct Monitoring, Module will restart. While restarting, the Wi-Fi Direct icon will brighten up.



Wi-Fi Direct will connect automatically if SSID and password are defined. For connecting for the first time, user need to define SSID and password. Kindly refer to Monitoring QR for defining SSID and password.

3. BLUETOOTH MONITORING

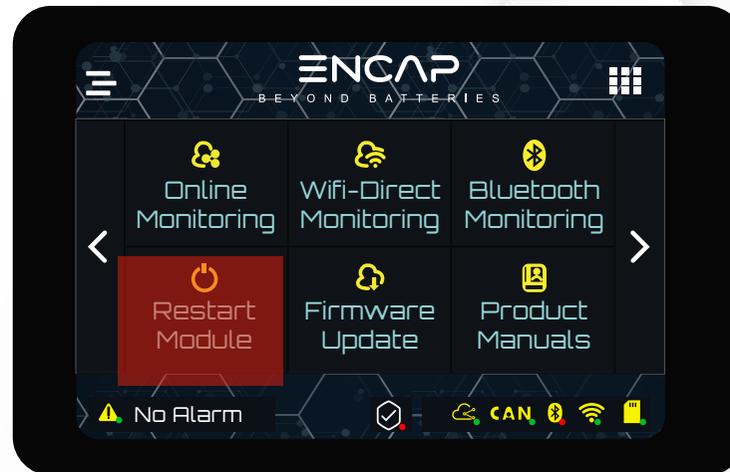
Click on Bluetooth Monitoring, Module will restart. While restarting, the Bluetooth icon will brighten up.



This function is only for use by ENCAP and not available to a user at this time.

4. RESTART MODULE

If user want to restart Module, click on restart Module to restart the Module.



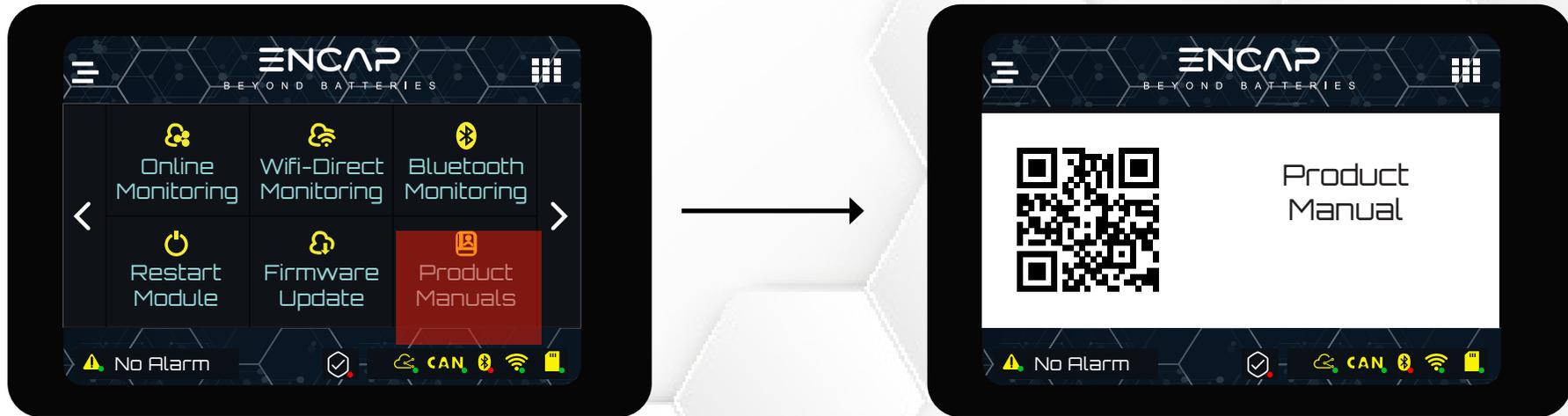
5. FIRMWARE UPDATE

Make sure the Module is in Online Monitoring mode when updating the firmware. Click on Firmware Update.



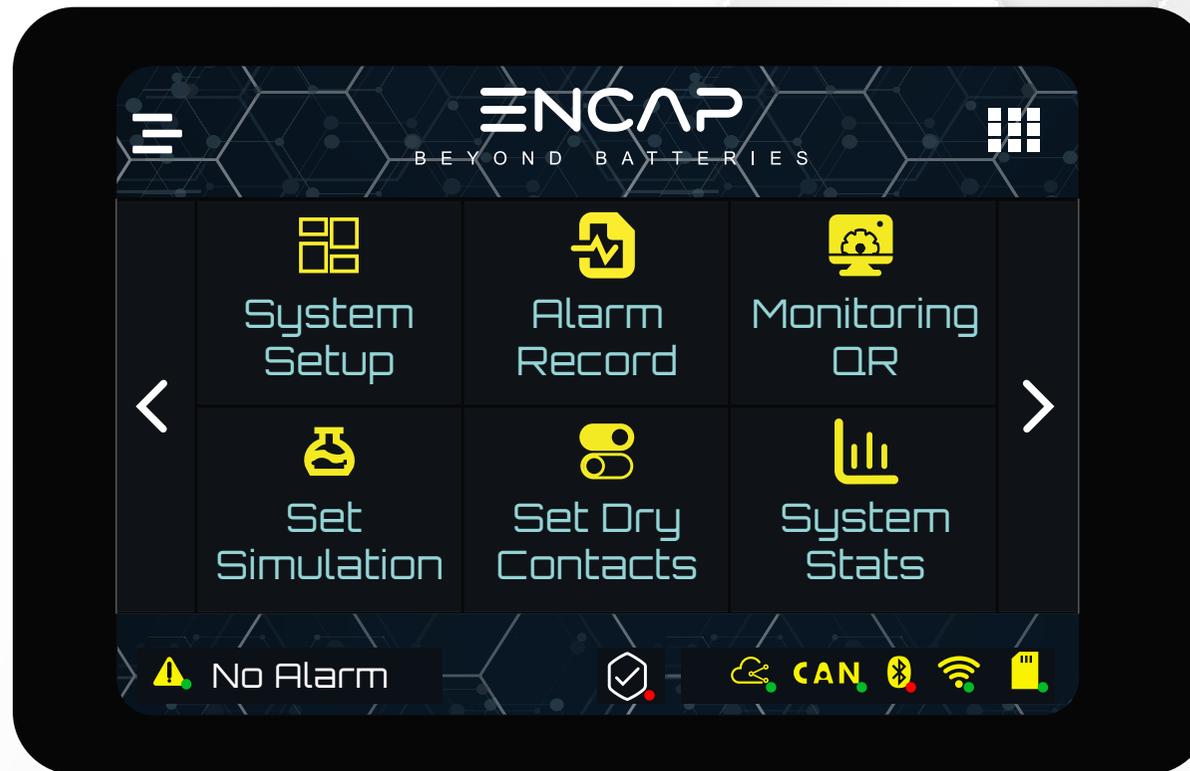
6. PRODUCT MANUAL

Click on product manual. Scan the QR code to download this product manual.



THIRD MENU PAGE

Third menu page has System Setup, Alarm Record, Monitoring QR, Set Dry Contacts and System Statistics.



1. SYSTEM SETUP

User can enable/disable BMS buzzer, enable/disable terminal safety and set and read CAN ID from system setup page.

BMS BUZZER:

If the BMS buzzer is enabled, whenever the touch functionality is triggered, it will buzz. Tap on the BMS buzzer to disable it.

Tap here to enable or disable



TERMINAL SAFETY:

This feature is added to secure the operation of BMS. Click on Terminal Safety to enable the feature. When safe feature is enabled, Module will not charge or discharge.

If you want to charge and discharge the Module, disable the safe feature by clicking on Terminal Safety. .



Click to enable or disable



SET CAN_ID and Read CAN ID is for racked and containerized Modules only.

2. ALARM RECORDS

Encap Module has all the alarms settings with protection feature as default. This page shows all the logged alarms with time and date.

NO.	Time	Event	Voltage	Current	SO
0	2001/1/6 21:13:32	Undefined	52.60V	0.00A	90
1	2001/1/1 8:00	Undefined	52.80V	0.00A	90
2	2003/12/20 8:28:32	Undefined	52.80V	0.00A	90
3	2023/12/19 16:49:22	Undefined	52.80V	0.00A	90
4	0/0/0 0:00	HSumVolt#1	52.80V	-3000.00	90

ENCAP BEYOND BATTERIES

No Alarm

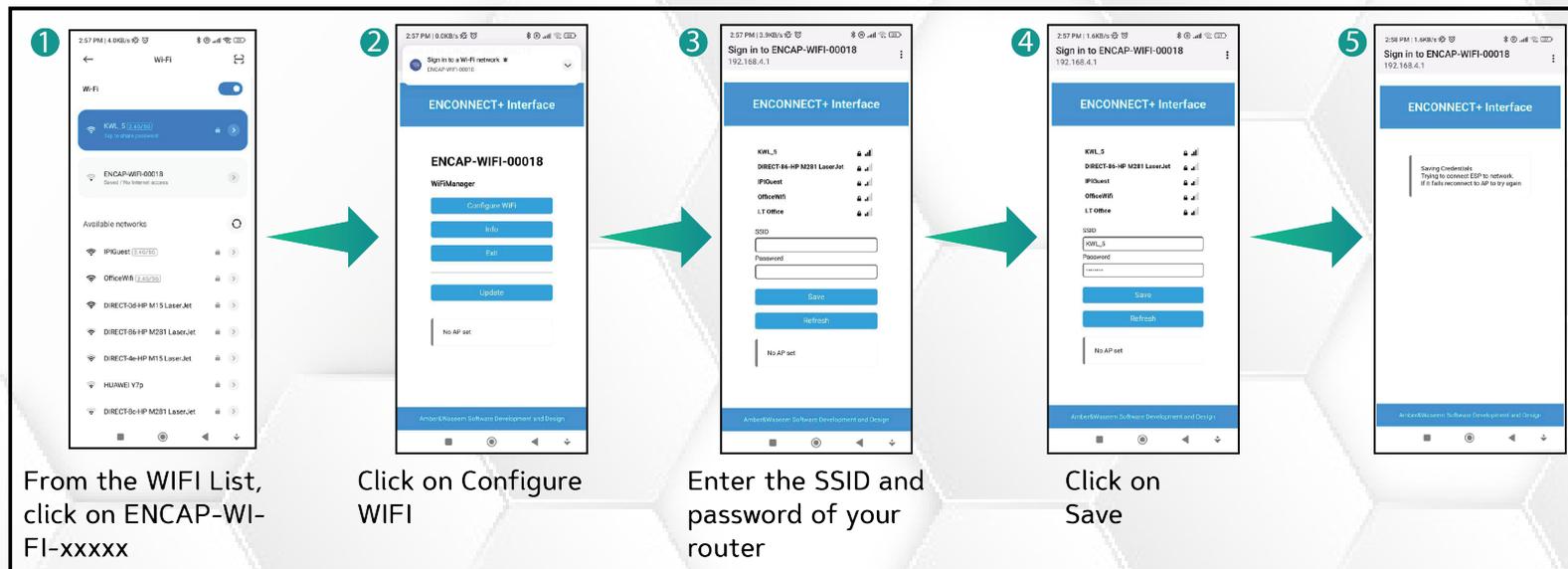
CAN, Bluetooth, Wi-Fi, Mobile Data

MONITORING QR

Click on monitoring QR to scan the QR code.

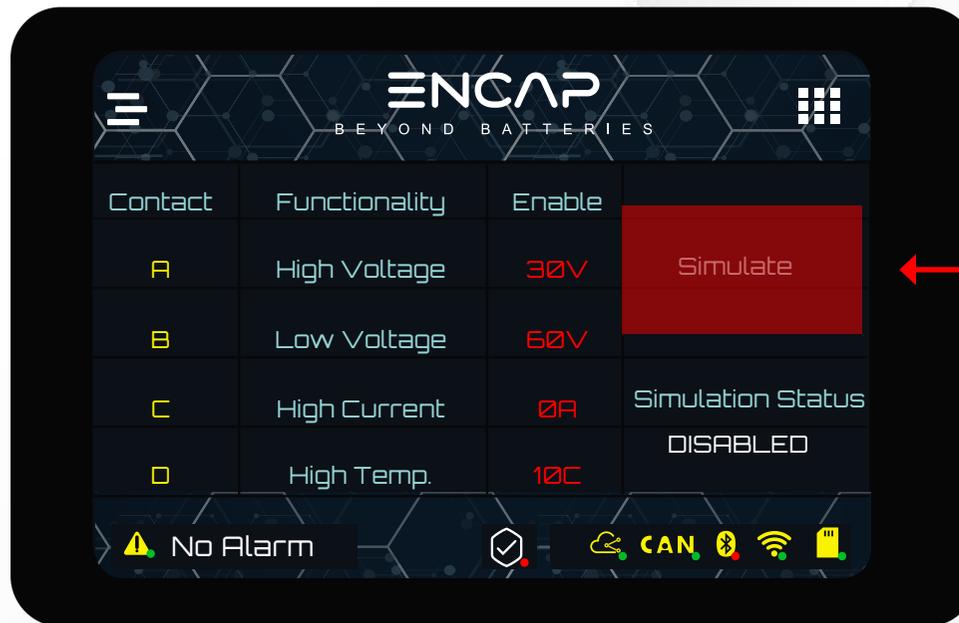


Follow the steps below to complete the process:



SET SIMULATIONS

Set Simulations is use to test Dry Contacts. To check if Dry Contacts are working, click on simulate to enable or disable Dry Contacts.



Click on Simulate to enable or disable the Dry Contacts

SET DRY CONTACTS

Dry Contact Write page allows the user to configure the Dry Contacts.

The user can specify Dry Contact, its type, and the condition they want. Module has four Dry Contacts:

- Dry Contact A
- Dry Contact B
- Dry Contact C
- Dry Contact D

These Dry Contacts can be set for the following six parameters.

- Terminal Voltage
- Current
- Temperature
- SOC
- Disable
- Enable

1. STEPS TO CONFIGURE DRY CONTACTS:

Click on Set Dry Contacts. Set Dry Contacts window will open.



DRY CONTACT PIN SELECTION

Tap on the Contact Name to navigate through the Dry Contact A, B, C and D.



DRY CONTACT CONDITION

There are two set conditions:

1. Less than or equal to
2. Greater than

Tap on the Contact Condition to navigate through the conditions



DRY CONTACT PARAMETER TYPE SELECTION

Select the Contact type by navigating through the list. Tap on the Contact Type for navigation.



DRY CONTACT FUNCTION SELECTION:

After the name, type and condition of the Dry Contact is set, choose the set value to enable and disable the function.



Clicking enable or disable will open the set value prompt window.



Write the value and click OK. When everything is set, click on Save Configurations.

SYSTEM STATS

System stats shows the statistics of the Module from the time of first start. It shows total charge and discharge energies, highest and lowest current read, system run time, main board and BMU serial.

