

ENCAP

BEYOND BATTERIES

USER MANUAL

10KWH-48V

EN-10k-48-1C-X-X-X-X-2V2-GEN1

VERSION 2 | REVISION 2 | RELEASE DATE: 21st Aug 23



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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First release

Issue 02 (2023-14-8)

The header and footer banner are changed.

Addition of safe button, Page 23-24

Addition of firmware update, Page 30

Table of Contents

- DOCUMENT HISTORY 3
- SAFETY INSTRUCTIONS 7
 - SAFETY GUIDELINES..... 7
 - 1. PERSONAL SAFETY 7
 - 2. GENERAL GUIDELINE 7
 - 3. MODULE OPERATION 8
 - 4. OPERATING ENVIRONMENT 8
 - 5. CLEANING 8
 - 6. STORAGE ENVIRONMENT 9
 - 7. DISPOSAL..... 9
- PRE-INSTALLATION 10
 - INSPECTION 10
 - UNPACKING 10
 - CONTENT CHECK 11
 - HANDLING 12
 - 1. LIFTING THE MODULE 12
 - LOCATION REQUIREMENTS..... 14

1. AREA OF INSTALLATION.....	14
2. ENVIRONMENT REQUIREMENTS.....	14
3. ANGLE REQUIREMENT	15
ELECTRICAL INSTALLATION	16
ELECTRICAL CONNECTIONS.....	16
1. CABLE SIZE	16
2. CABLE CRIMPING	16
3. CONNECTING CABLE LUGS, WASHERS, AND BOLTS TO MODULE TERMINALS.....	17
ELECTRICAL SETUP.....	18
1. CONNECTING MODULE TO POWER SUPPLY/CHARGER.....	18
2. CONNECTING MODULE TO LOAD/DISCHARGER	19
3. PARALLEL CONNECTION SETUP:	20
PARTS DESCRIPTION	21
MONITORING LCD.....	22
1 DASHBOARD	22
SAFE:	23
ACTIVATE SAFE:.....	23
DE-ACTIVATE SAFE:	24
2 MAIN MENU:	25
3 GRAPHS:.....	26

4 DRY R:26

5 CONFIGURATION:27

5.1 WIFI-DIRECT27

5.2 ONLINE MONITORING.....29

5.3 BLUETOOTH MONITORING30

5.4 UPDATE FIRMWARE.....30

6. CELLS.....31

7. DRY W.....31

1. STEPS TO CONFIGURE DRY CONTACTS:.....32

DRY CONTACT PIN SELECTION33

DRY CONTACT PARAMETER TYPE SELECTION34

DRY CONTACT CONDITION34

DRY CONTACT FUNCTION SELECTION:35

EXAMPLE:36

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. MODULE CLEANING

- Disconnect the power before cleaning.
- Use a soft cloth dampened in a solution of mild detergent and water.

6. STORAGE ENVIRONMENT

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

7. 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.

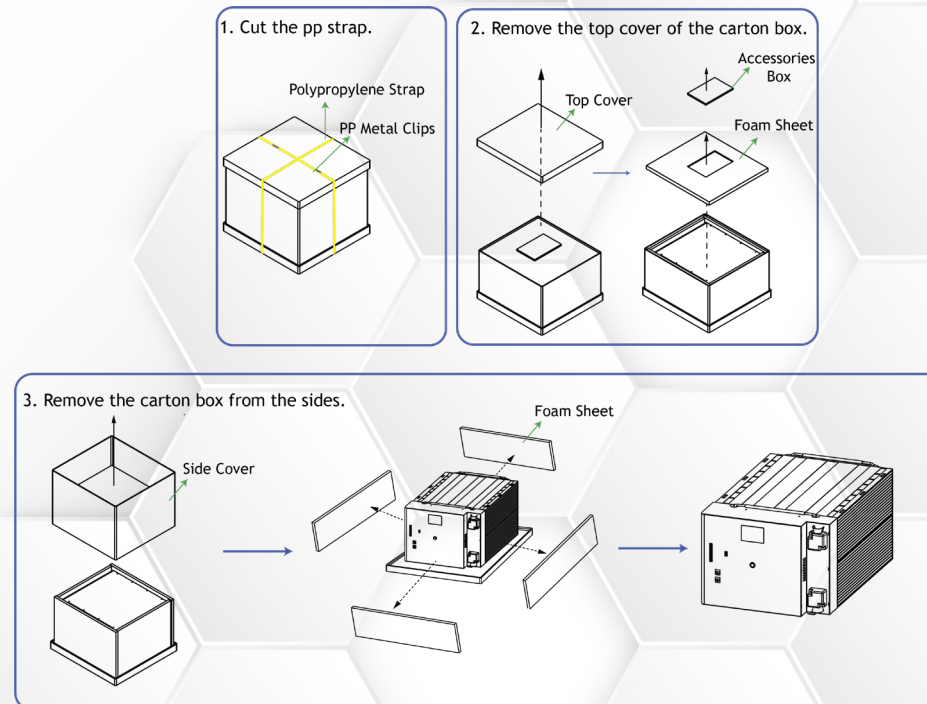


Figure 1: Steps to unpack the Module

CONTENT CHECK

Check the contents of the package. The following are standard items shipped by us.



Figure 2: Module package contents

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.

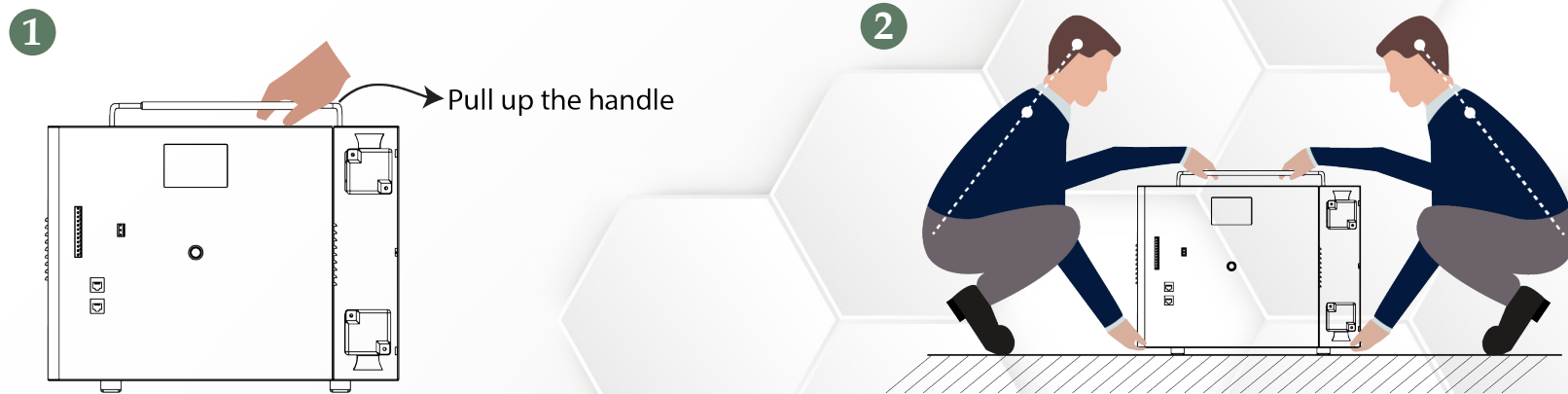


Figure 3: Holding the Module to lift up

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

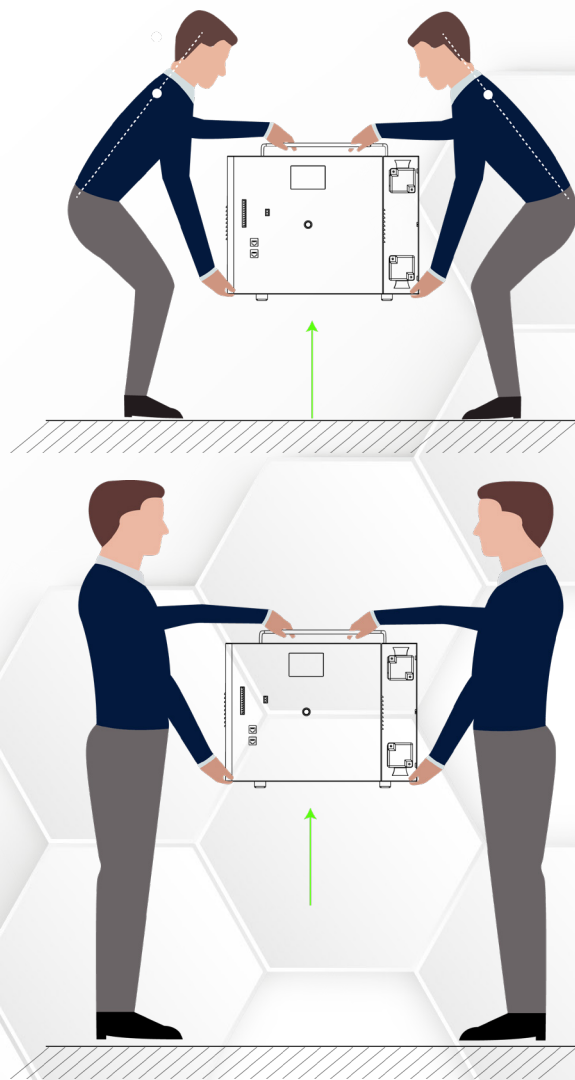


Figure 4: Lifting up the Module

LOCATION REQUIREMENTS

1. AREA OF INSTALLATION

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

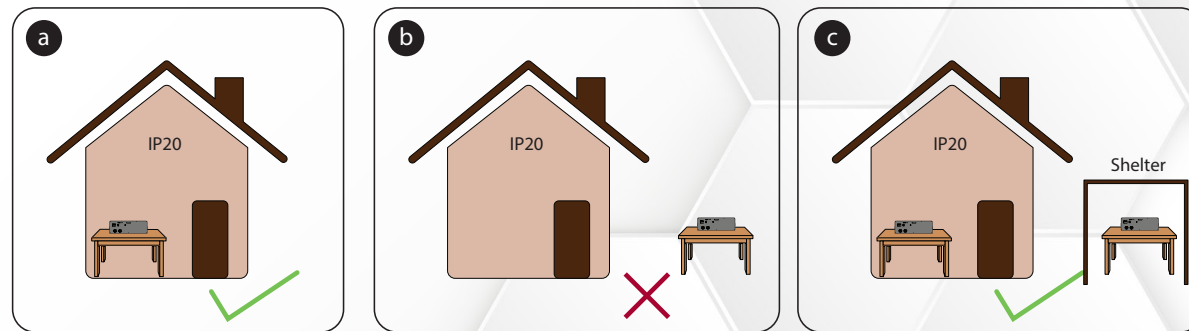


Figure 5: Installation restriction: a) Module can be stored inside b) Modules cannot be stored outside without shelter c) Modules can be installed indoors and outdoors with shelter

2. ENVIRONMENT REQUIREMENTS

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

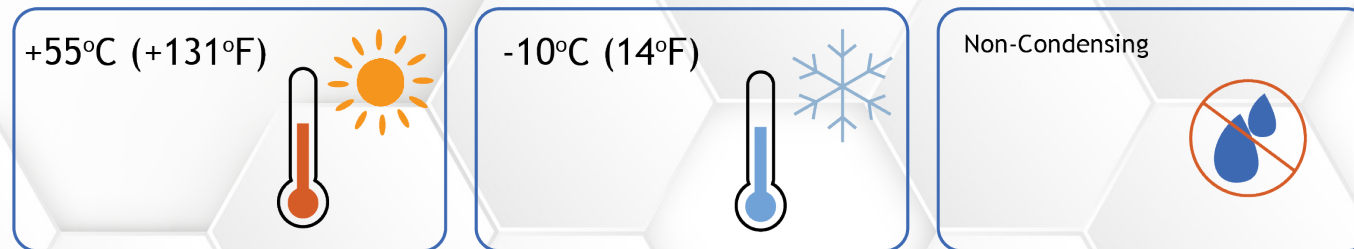


Figure 6: Operating temperatures and humidity of Module

3. ANGLE REQUIREMENT

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

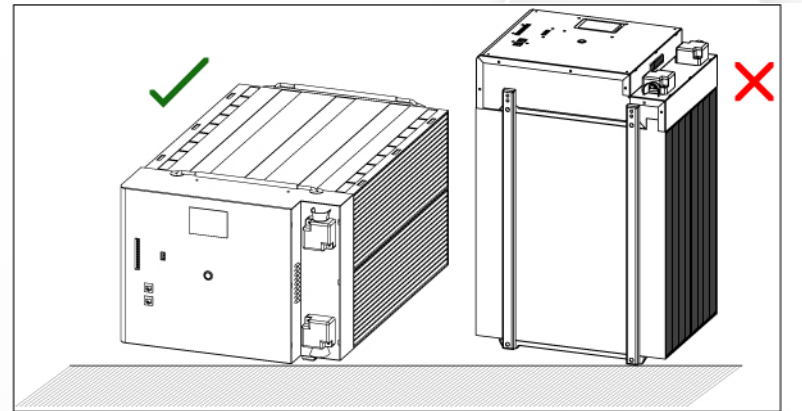


Figure 7: 1) Correct angle position 2) Wrong angle position

ELECTRICAL INSTALLATION

ELECTRICAL CONNECTIONS

1. CABLE SIZE

We recommend a cable size of 150mm² thickness and 1m length to hold current up to 300A. Please use a thicker cable for lengths longer than 1m.

2. CABLE CRIMPING

Crimp the cables for connecting the Modules in series or parallel.

- Wrap the wire crimping area with heat shrink tubing or insulation tape.
- When using a heat gun, protect the equipment from being scorched.

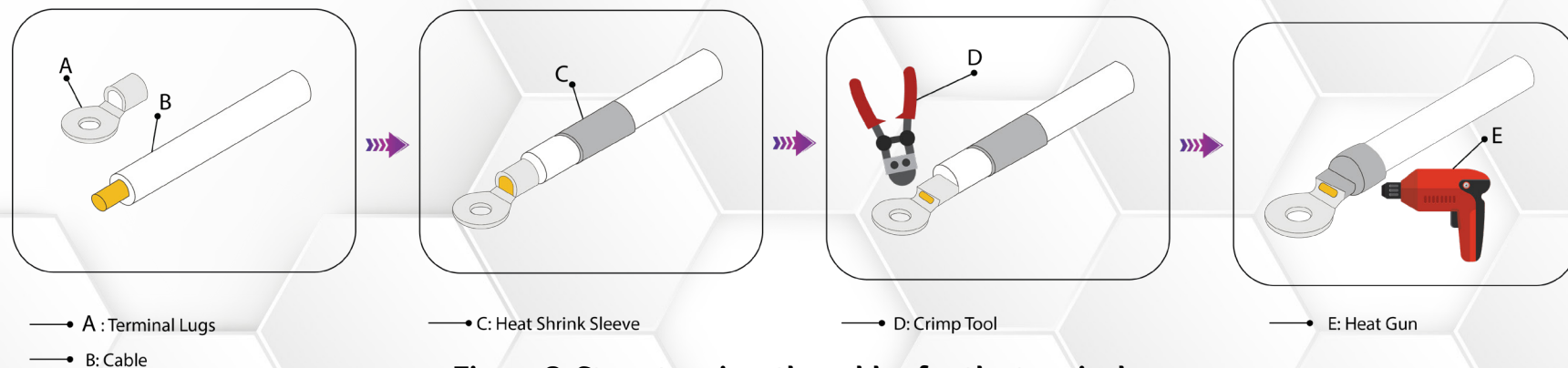


Figure 8: Steps to crimp the cables for the terminal

3. CONNECTING CABLE LUGS, WASHERS, AND BOLTS TO MODULE TERMINALS

Follow the sequence below to connect the cable lugs, washers, and bolts to the positive and negative terminals of the Module.



Figure 9: Connecting lugs, washers, and bolts to negative terminal of Module



Figure 10: Connecting lugs, washers, and bolts to positive terminal of Module

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.

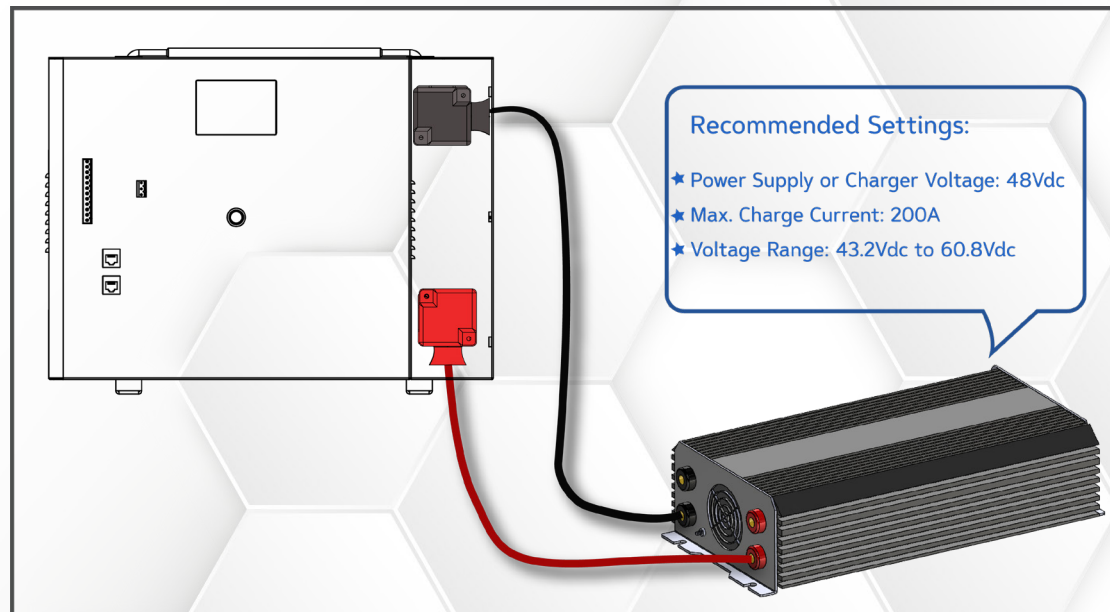


Figure 11: Charging Module with power supply

2. CONNECTING MODULE TO LOAD/DISCHARGER

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

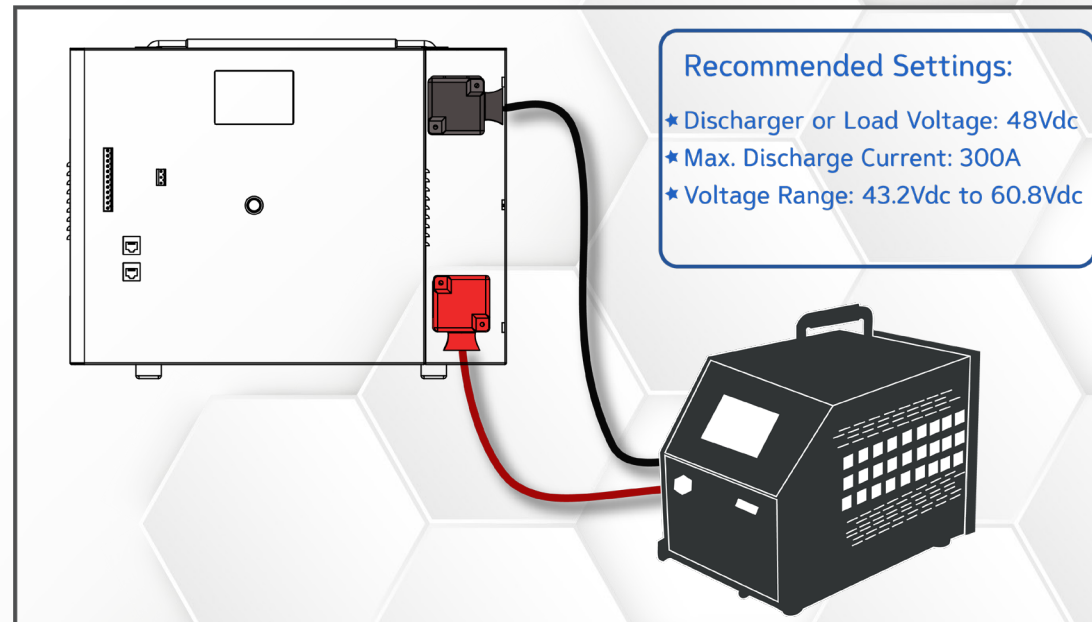


Figure 12: Discharging Module from discharger

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.

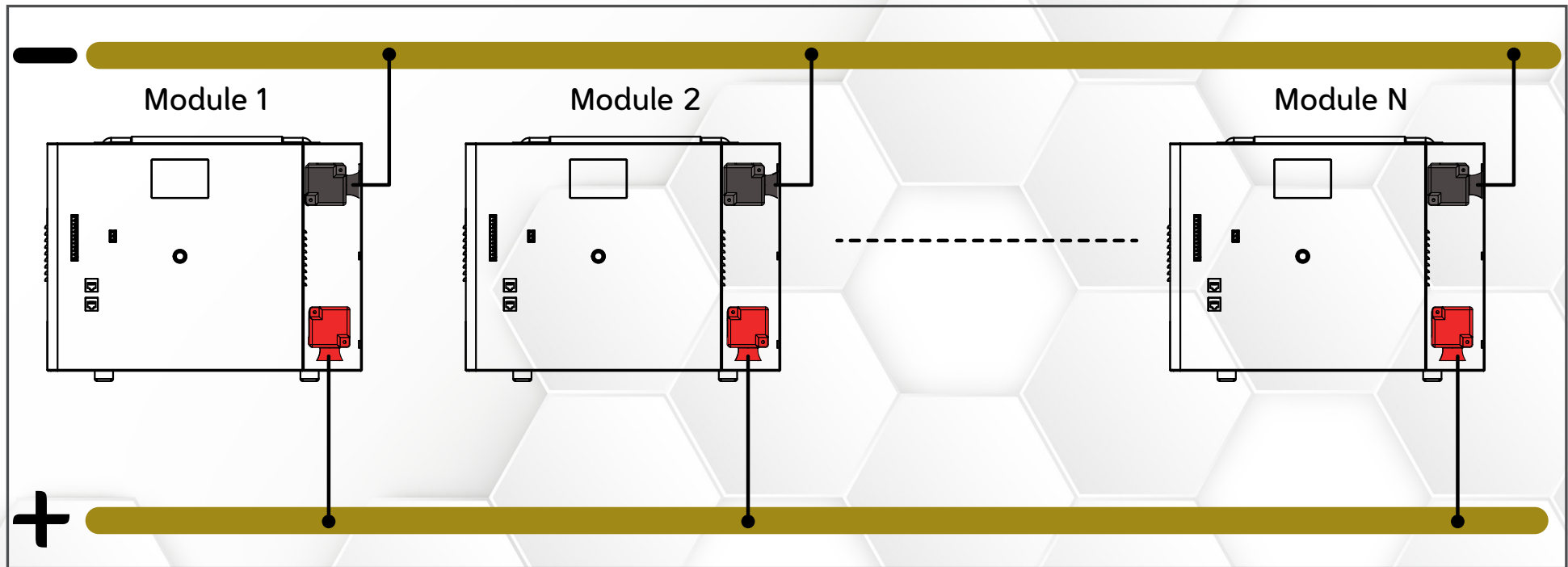


Figure 13: Modules connected in parallel

PARTS DESCRIPTION

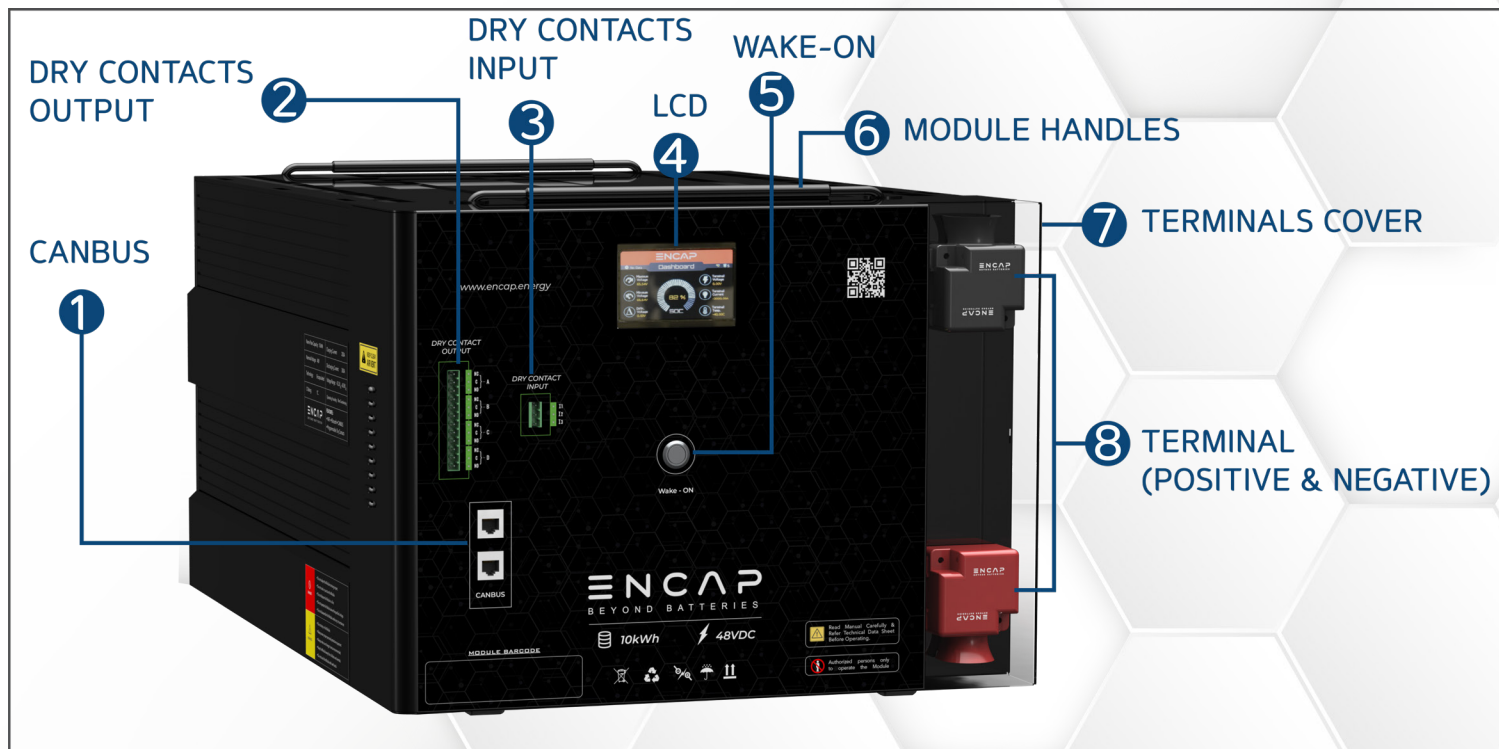


Figure 14: Module parts description

MONITORING LCD

The Monitoring LCD allows user to monitor and configure Modules.

The first page on LCD is dashboard by default.

1 DASHBOARD

Click on the dashboard to go to main menu.

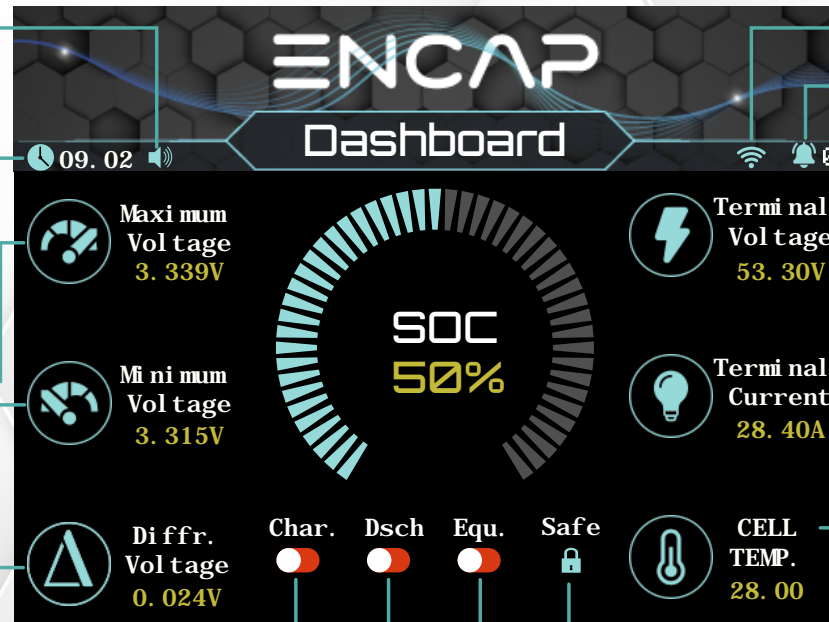
Buzzer: The buzzer beeps after every 8 seconds when the Module data is updated. This is indicated that the data is updating without interruption. If you don't want the beep sound, click on the icon to mute it. (Mute buzzer)

Clock: It shows the time stamp

Maximum Voltage: It displays the maximum Voltage of the cell

Minimum Voltage: It displays the minimum Voltage of the cell

Difference voltage: This shows the voltage difference of the maximum cell voltage and minimum cell voltage



It shows the availability of WIFI

Alarm List: It shows the list of alarms

Terminal Voltage: It displays voltage of the Module

Terminal Current: It displays the current (charge or discharge) of the Module

Cell Temperature: It displays the ambient cell's temperature

Module is not Charging

Module is Charging

Module is not Discharging

Module is Discharging

Terminal ON/OFF for secure operation

Equalizer is not active

Equalizer is active

SAFE:

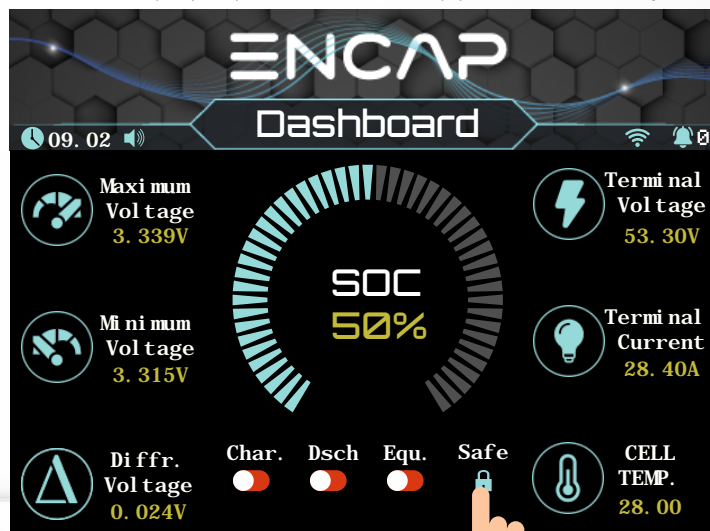
This feature is added to secure the operation of BMS.

Always activate safe terminals before connecting the terminals of the Module to charger or discharger. When safe feature is on, Module will not charge or discharge.

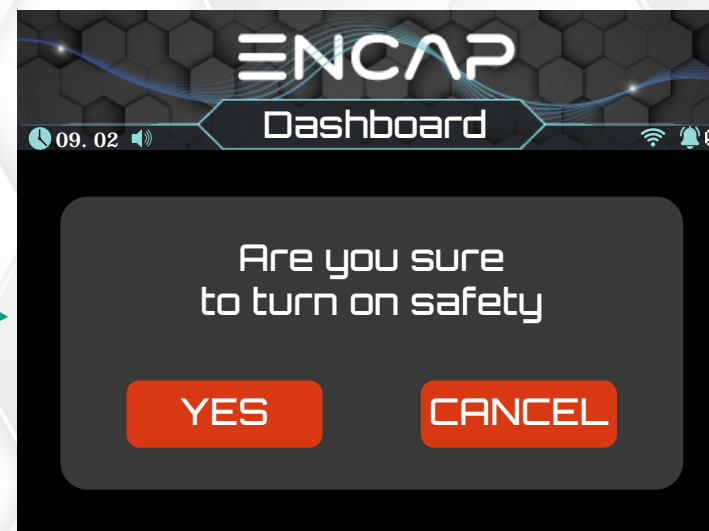
If you want to charge and discharge the Module, deactivate the safe feature.

ACTIVATE SAFE:

Click on safe button, a pop up window will appear. Click on yes to activate the feature.



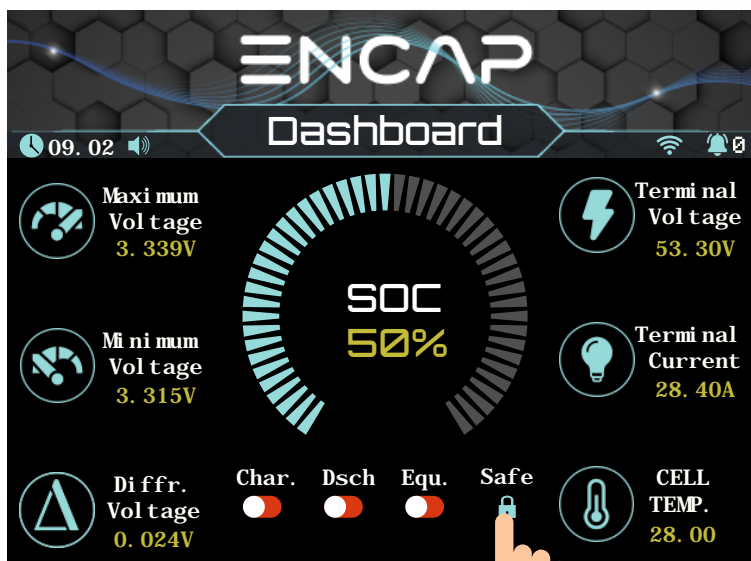
Click on safe



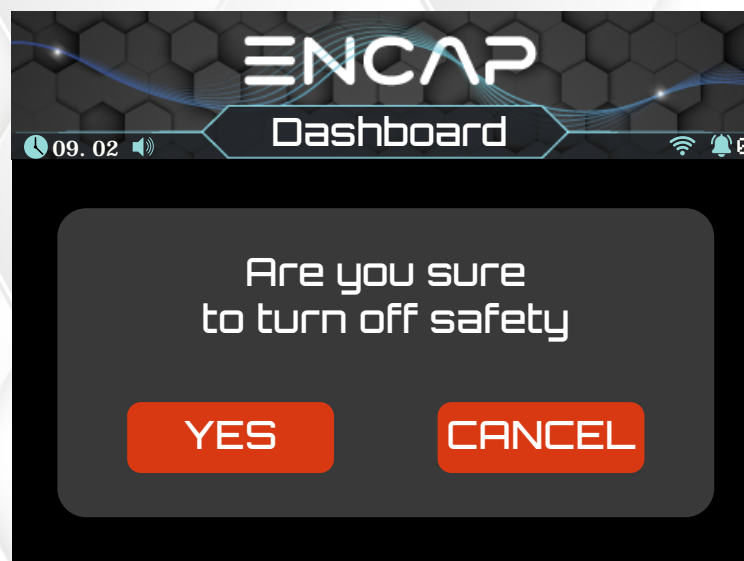
Pop-up window

DEACTIVATE SAFE:

Click on safe button, a pop up window will appear. Click on yes to deactivate the feature.



Click on safe

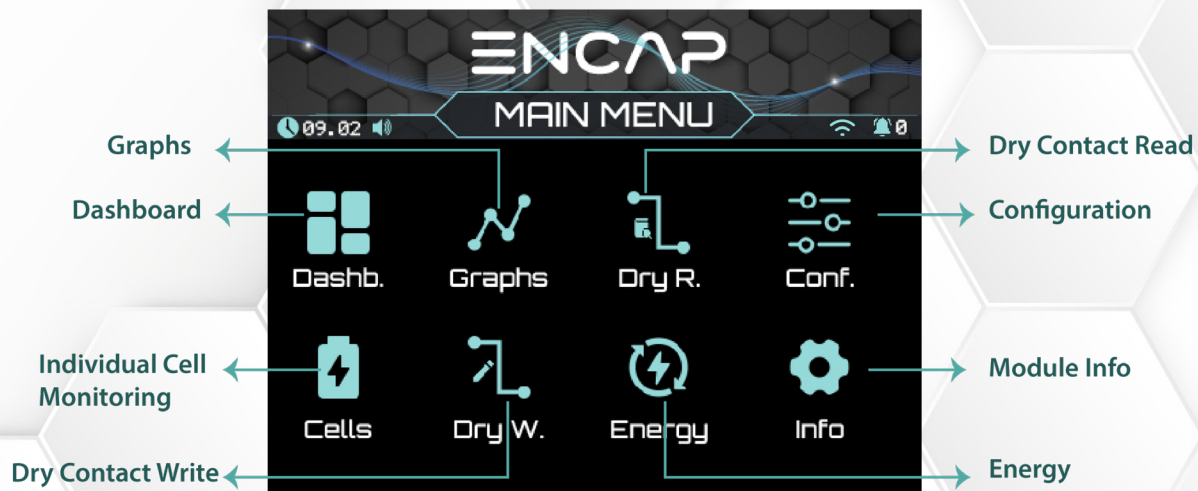
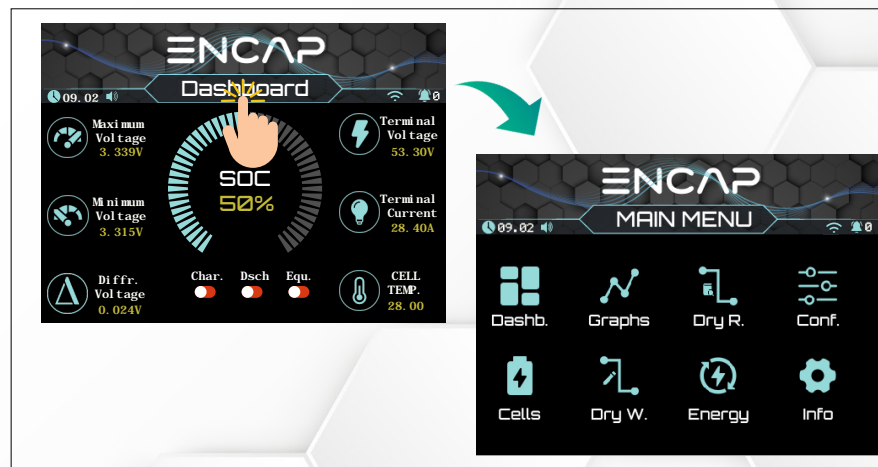


Pop-up window

Note: If you want to charge/ discharge the Module, deactivate the safe button.

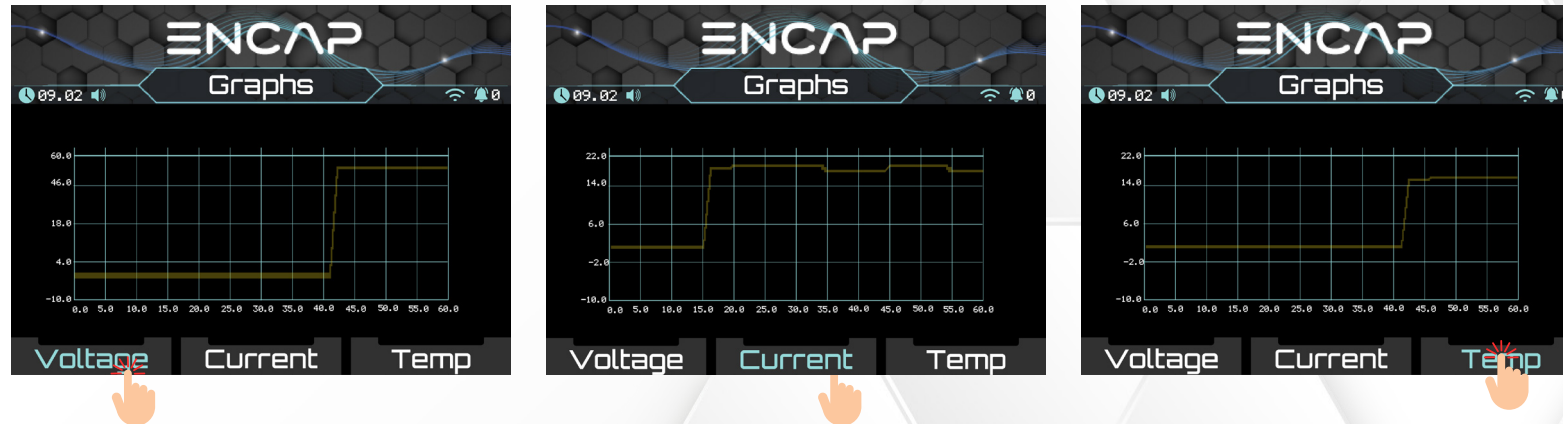
2 MAIN MENU:

The main menu provides parameter viewing and setting functions, as shown below;



3 GRAPHS:

The graph page shows voltage, current and temperature graphs. The graph logs data after every eight seconds.



4 DRY R:

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

Contact Name	Contact Type	Operation	Enable	Disable	Status
Dry Contact A	Term.Volt.	>	85.00	22.00	OFF
Dry Contact B	Term.Volt.	<=	0	0	OFF
Dry Contact C	Term.Volt.	>	0.00	0.00	ON
Dry Contact D	Term.Volt.	>	0.00	0.00	ON

Digital Inputs Input#1 ● Input#2 ● Input#3 ●

5 CONFIGURATION:

ENCAP has three modes of monitoring:

1. WIFI-Direct
2. Online Monitoring
3. Bluetooth

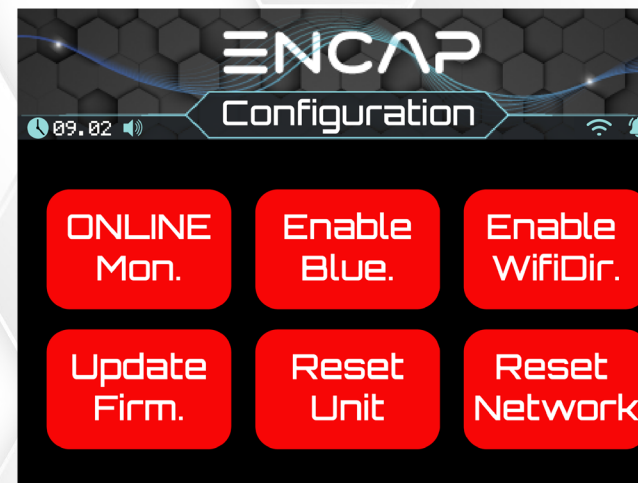
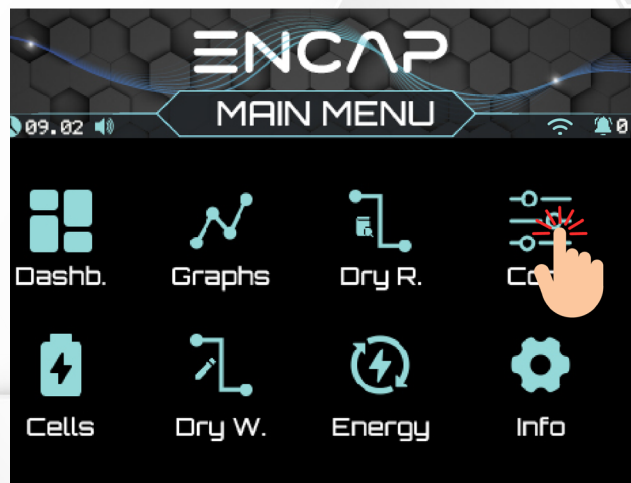
5.1 WIFI-DIRECT

WIFI-Direct allows user to do the following tasks:

1. Monitor Module form an Internet browser
2. Download SD Card loggings

Connect WIFI-DIRECT:

1. Go to Main Menu, click on Configurations. The configuration page will open.



2. Click on Enable WifiDir.
3. On your phone or PC, go to WIFI list.

1 From the WIFI List, click on ENCIP-WIFI-xxxxx

2 Click on Configure WIFI

3 Enter the SSID and password of your router

4 Click on Save

5

4. On the main menu page, swipe right.

Swipe right

ENCAP MAIN MENU

ENCAP Dry Contacts

QR Code for Monitoring & Configuring

Scan here

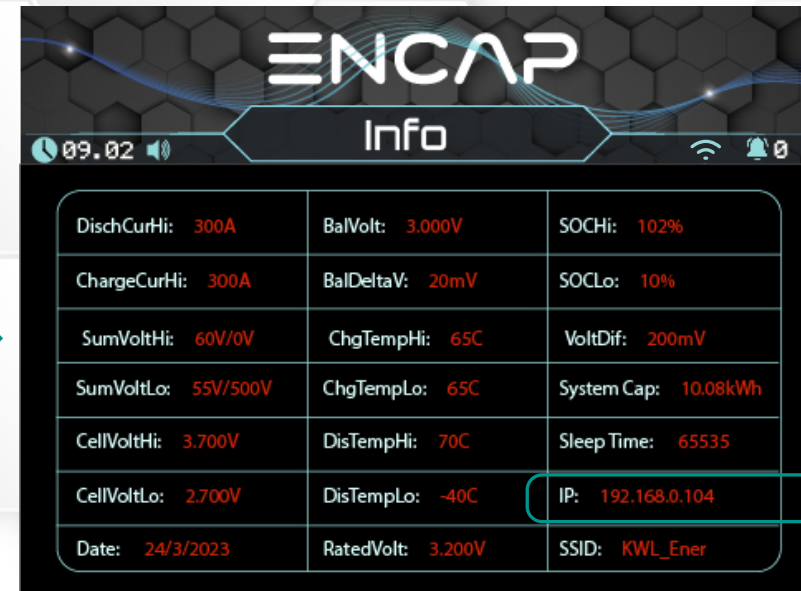
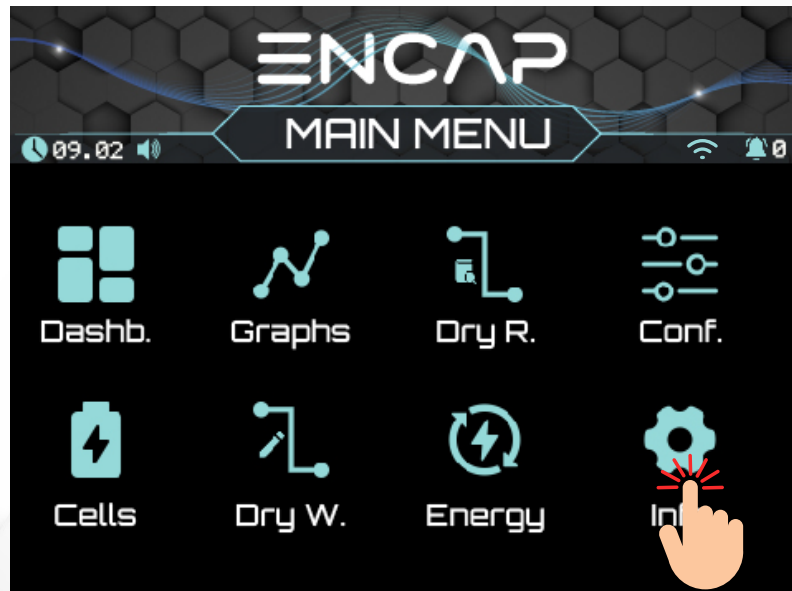
5.2 ONLINE MONITORING

Online monitoring allows user to do the following tasks:

1. User can monitor the Module form anywhere in the world (IOT devices).
2. Module can be updated for a new firmware version.

Connect Online Monitoring:

1. Go to Menu Page, then to info. Copy the IP address.



2. Write the IP address in the browser.

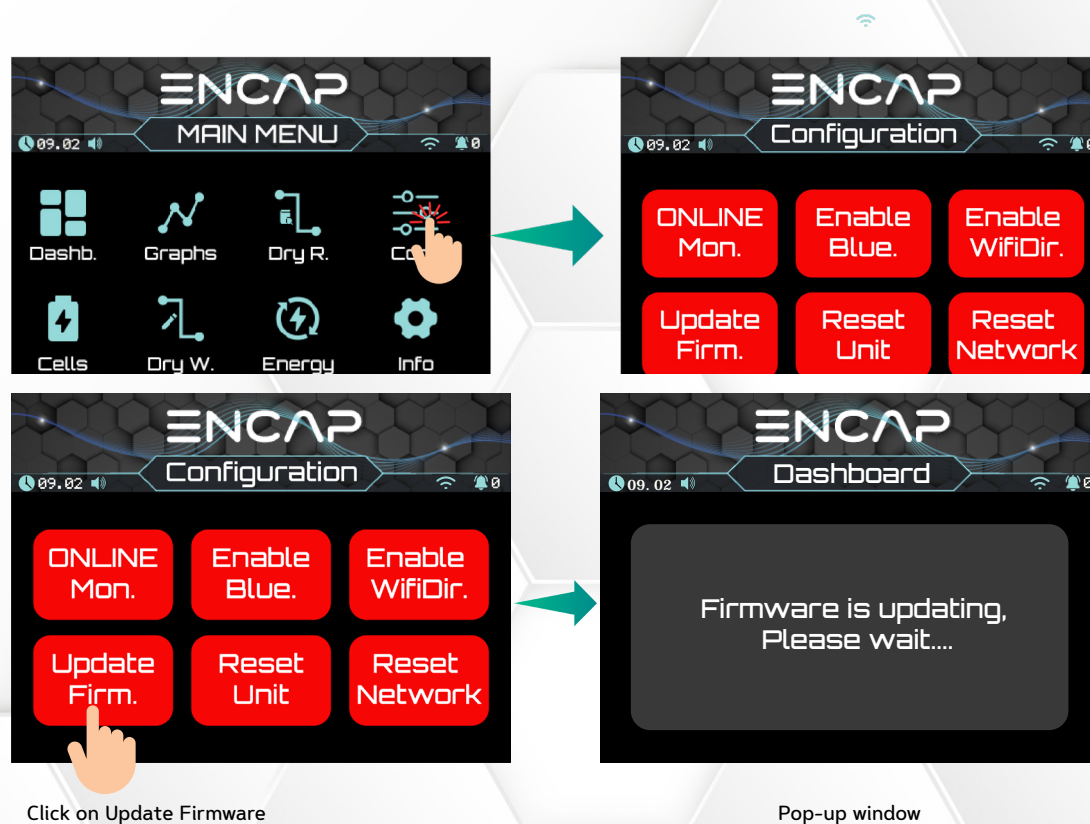
5.3 BLUETOOTH MONITORING

This feature is accessible by factory engineers only. The Bluetooth mode is enabled by default. It is used to reconfigure custom parameter and alarms.

5.4 UPDATE FIRMWARE

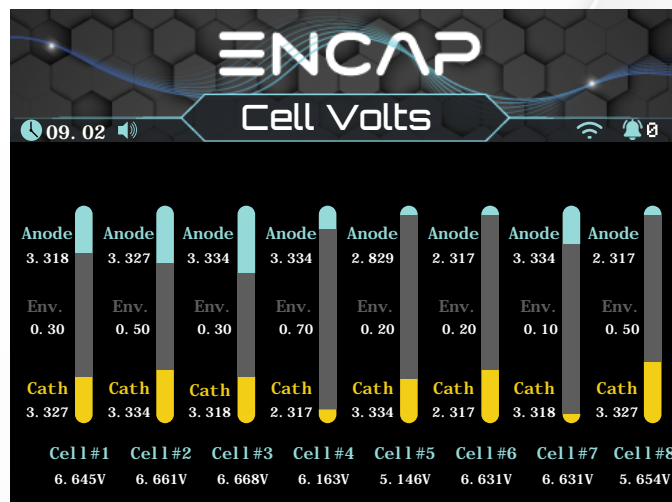
Make sure the Module is in Online monitoring mode when updating the firmware.

1. Go to Main Menu, click on Configurations. The configuration page will open.



6. CELLS

This page gives information of the voltage of each cell in the Module. This page helps the user to learn about the unbalancing and under/over voltage of cells.



7. DRY W.

Dry Contact Write page allows the customer(s) to configure the Dry Contacts.

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

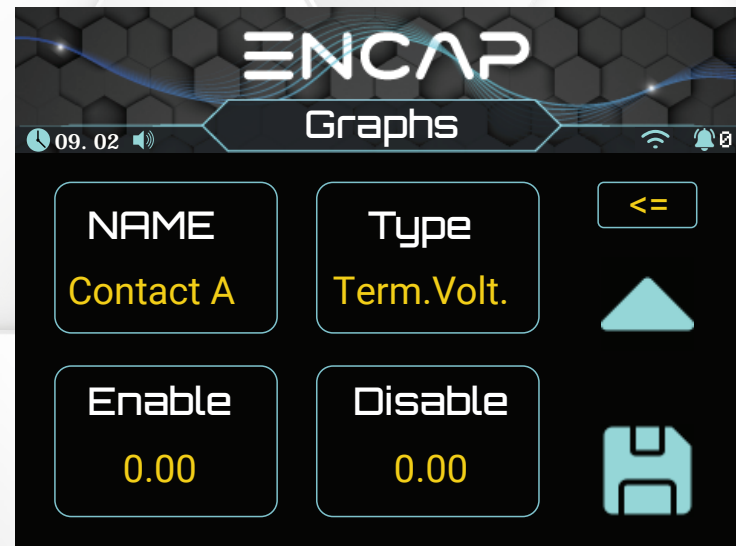
- Dry Contact A
- Dry Contact B
- Dry Contact C
- Dry Contact D

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

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

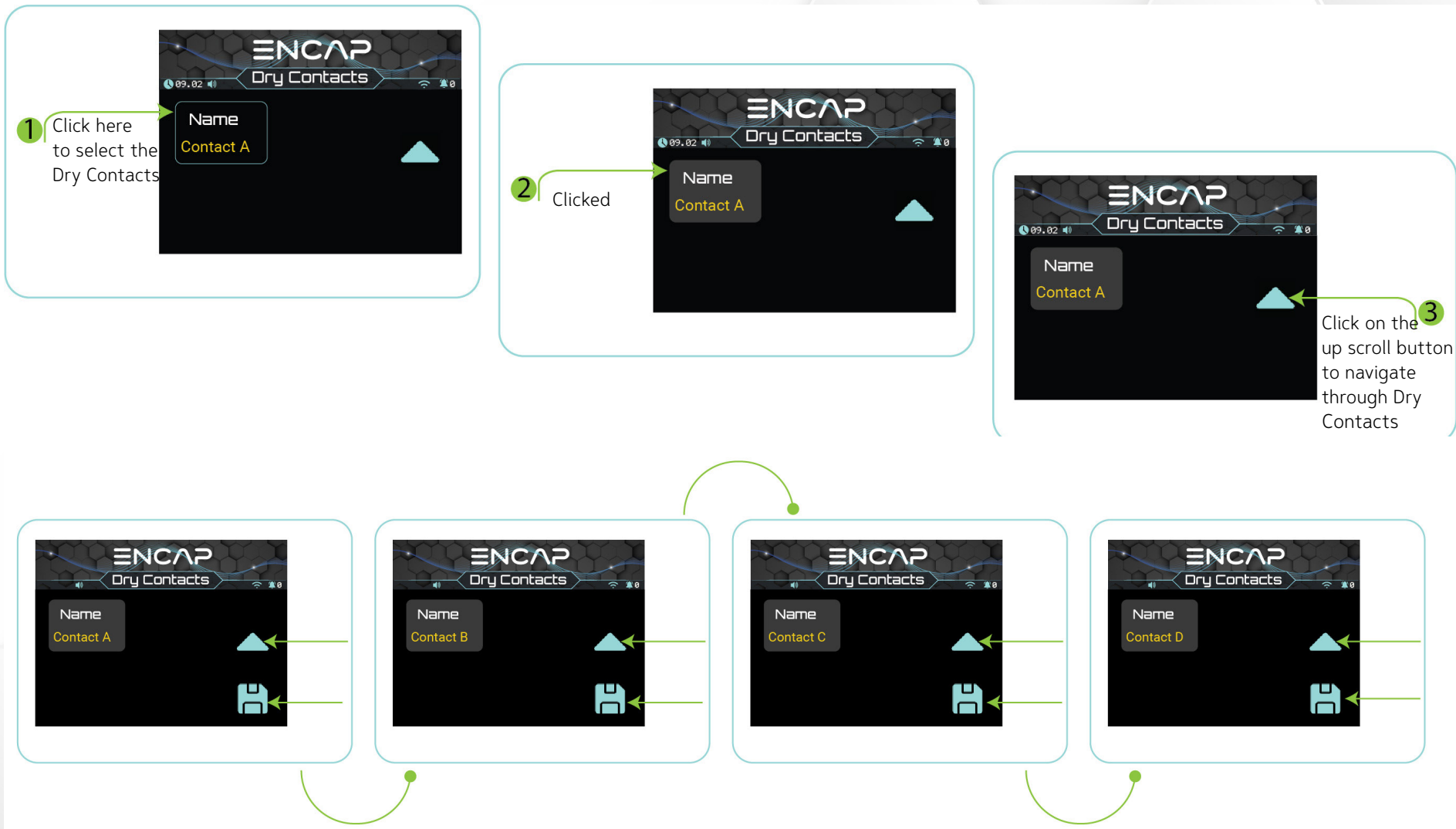
1. STEPS TO CONFIGURE DRY CONTACTS:

1. Go to **Main Menu**.
2. Tap the **Dry W.**
3. The Dry Contacts page will appear.

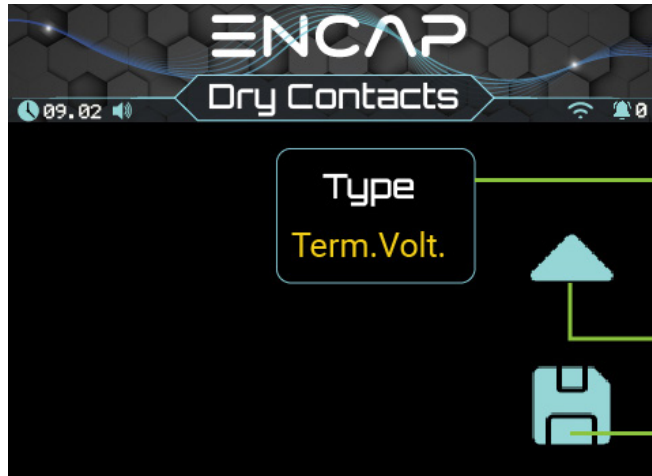


DRY CONTACT PIN SELECTION

Lets understand the parameters one by one;



DRY CONTACT PARAMETER TYPE SELECTION



- Term.Volt.
- abs(Current)
- Temperature
- SOC
- ENABLE
- DISABLE

Select the parameter for configuration from the list

Click on the up scroll button to navigate through parameters

Save the function parameter

DRY CONTACT CONDITION

There are two set conditions:

1. Less than or equal to
2. Greater than



- <= >
- >
- <

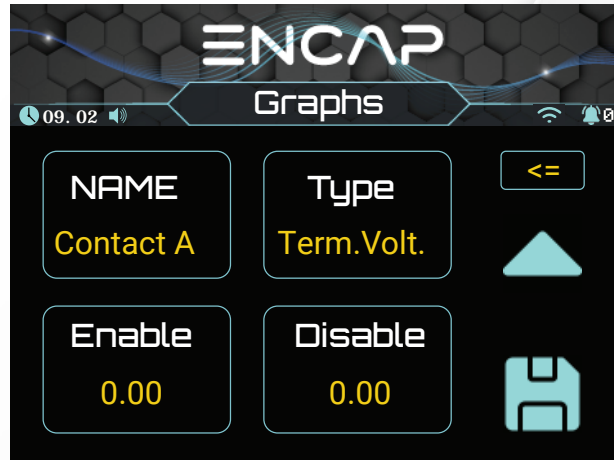
Select the condition from the list

Click on the up scroll button to navigate through conditions

Save the condition

DRY CONTACT FUNCTION SELECTION:

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



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



Write the value and click OK.

EXAMPLE:

Let's consider an example. The Dry Contact A is set to a triggered alarm. It should be enabled when the terminal voltage reaches above 57V and disabled when its goes below 55V.

1. Select Dry Contact A and click on the save button to set the parameter.
2. Then in the type, select the terminal voltage and click on the save button.
3. Select the condition greater than and click on save button.
4. Click on Enable and write 57V in the prompt window.
5. Click on Disable and write 55V in the prompt window.
6. Click on the save button.

