The logo for Intelligent Charging Systems (ICS) is displayed in a large, black, outlined font. The letters are stylized, with the 'i' having a dot and the 'S' having a thick, rounded bottom. The logo is positioned in the upper left quadrant of the image, set against a background of a modern interior with large windows overlooking the ocean.

ICS

intelligent charging systems



ICSESS1

Residential Energy Storage

User Manual

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1. Product and Documentation Information

1.1 Version Number and Applicable Information

This document is valid for the ICSESS1-5kWh

1.2 Qualifications to Perform Instructions

The instructions in this document may only be performed by qualified persons who must have the following skills:













- Knowledge of how a battery works and operates.
- Knowledge of how an inverter works and operates.
- Knowledge of, and adherence to the locally applicable connection requirements, standards, and directives.
- Knowledge of, and adherence to this document and the associated system documentation, including all safety instructions.
- Training in dealing with the hazards associated with the installation and operation of electrical equipment and batteries.
- Training in the installation and commissioning of electrical equipment Failure to do so will make any manufacturer's warranty, guarantee or liability null, and void unless you can prove that the damage was not due to non-compliance.

1.3 Scope

This document contains safety information and instructions, scope of delivery, battery system overview, installation, electrical connection, commissioning, operation, decommissioning, extension, troubleshooting, maintenance and storage of the battery system, technical parameters and contact information. Please finish reading this document before taking any actions on the battery system.

1.4 Labels and technical terms that may be involved in this document

1.4.1 Labels

Label	Explanation
	Please read the manual carefully before operation and operate according to the instructions in this manual
	This symbol indicates the position to connect a grounding conductor.
	Keep the battery modules away from open flame or ignition sources.
	Keep the battery modules away from children.
	Make sure that the battery polarity is connected correctly.
	The voltage of this battery pack is strong enough to cause electric shock.
	Danger area.
	The battery pack may leak corrosive electrolyte.
	The system complies with the requirements of the applicable EU directives.
	This side up.
	Keep dry.
	WEEE designation Do not dispose of the system together with the household waste but in accordance with the disposal regulations for electronic waste applicable at the installation site.

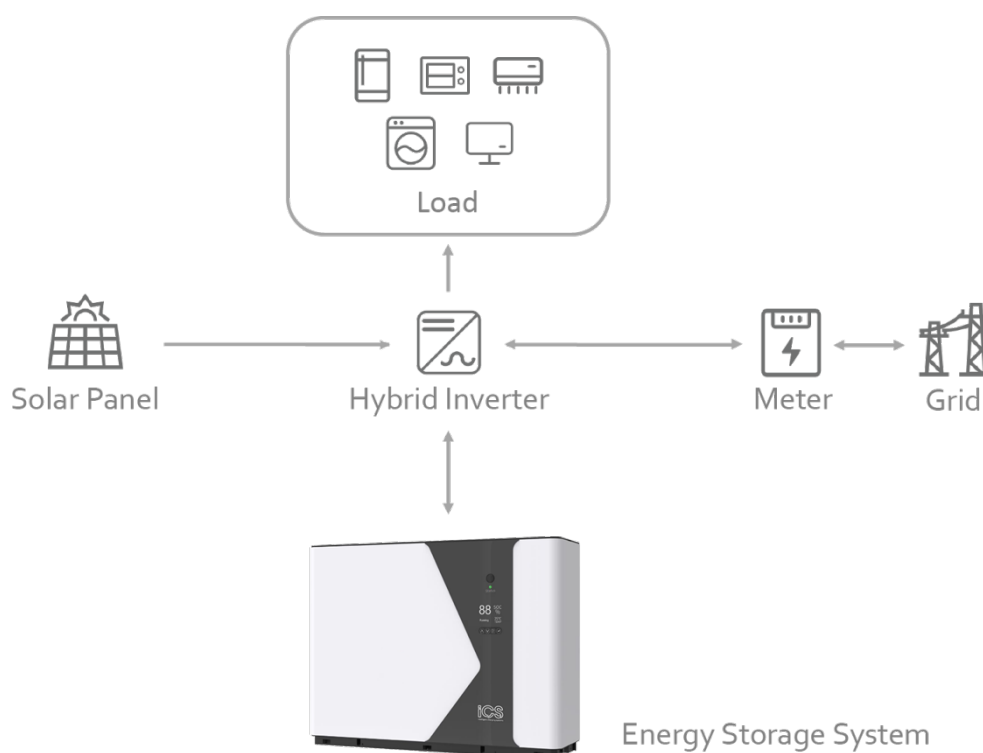
1.4.2 Technical Terms

Battery Pack	Complete battery system - includes cells and BMS
BMS	Battery management system
BMU	Battery management unit
SOC	State of Charge
Standby	The system is standby for order from inverter
Charging	Battery is charging
Discharging	Battery is discharging
Lmt Charging	Charging with limited current
Protected (OV)	Over voltage protection
Protected (UV)	Under voltage protection
Protected (DOC)	Over current protection
Protected (OT/UT)	High/low temperature protection
Protected	Under protection mode

2. Safety

2.1 Intended Use

ICSESS1–5kWh is for residential use and works with a photovoltaic system. It is a 51.2V LFP battery storage system with integrated battery management system. ICSESS1–5kWh will store surplus renewable energy inside the battery and discharge the battery to supply power to local loads when renewable energy is not enough. ICSESS1–5kWh must only be used as stationary equipment. ICSESS1–5kWh is suitable for indoor and outdoor use under the conditions mentioned. ICSESS1–5kWh must only be operated in connection with a compatible inverter. ICSESS1–5kWh is not suitable for supplying life-sustaining medical devices. Please ensure that no personal injury will occur due to the power outage of the battery system. Alterations to the battery system, e.g., changes or modifications, are not allowed unless the written permission is received from iCS. Unauthorized alterations will void the guarantee and warranty claims. iCS shall not be held liable for any damage caused by such changes.



2.2 IMPORTANT SAFETY INSTRUCTIONS

The battery system has been designed and tested in accordance with international safety requirements. However, in order to prevent personal injury, property damage and ensure long-term operation of the battery system, please do read this section carefully and always observe all safety information.




2.2.1 Battery Modules Handling and Storage Guide

- The battery modules and its components should be protected from damage when transporting and handling.
- Do not give impact, pull, drag, or step on the battery modules.
- Do not insert unrelated objects into any parts of the battery modules.
- Do not expose the battery modules to strong oxidizers.
- Do not short circuit the battery modules.
- The battery modules cannot be stored at high temperatures (more than 50°C).
- The battery modules cannot be stored directly under the sun.
- The battery modules cannot be stored in a high humidity environment.
- Do not use the battery modules if it is defective, appears cracked, broken or otherwise damaged, or fails to operate.
- Do not attempt to open, disassemble, repair, tamper with, or modify the battery modules.
- The battery modules are not user serviceable.
- Do not use cleaning solvents to clean the battery modules.

2.2.2 Firefighting Measures

The ICSESS1–5kWh contains a fire suppression system, however the battery modules can still catch fire if the property is on fire. In case of a fire, please make sure that an ABC or carbon dioxide extinguisher is nearby. Water cannot be used to extinguish the fire.

2.2.3 Warning Messages

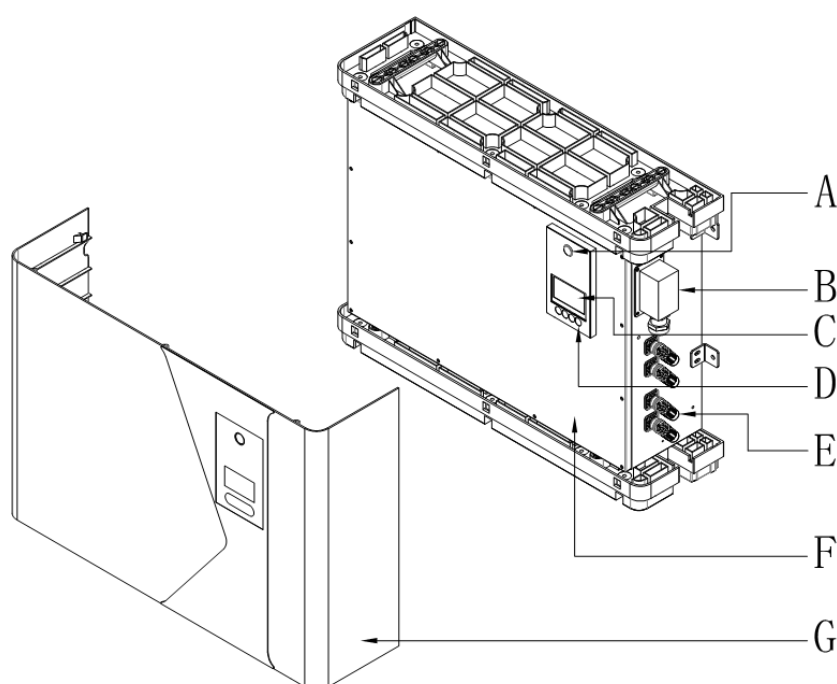
Warning Signs	Alarm information and prompt
	Contact with live parts and cables will cause electric shock, death or casualties. Please carry out good electrical protection.
	Lithium battery has polarity. Please pay attention to the polarity when connecting the circuit.
	The weight of lithium battery is large. Please fully consider the weight of battery during installation and handling

Description of Lithium Battery System

3.1 Lithium Battery System Function

The lithium battery BMS uses the lithium battery as the energy storage element. It adopts advanced energy storage management algorithm, monitors the voltage, temperature, total voltage, and total current of each lithium battery in real time. The BMS manages the charging circuit according to the algorithm strategy, and independently equalizes the voltage to make the lithium battery in the best working state and prolong the service life. It has the characteristics of strong stability, good reliability, and high efficiency.

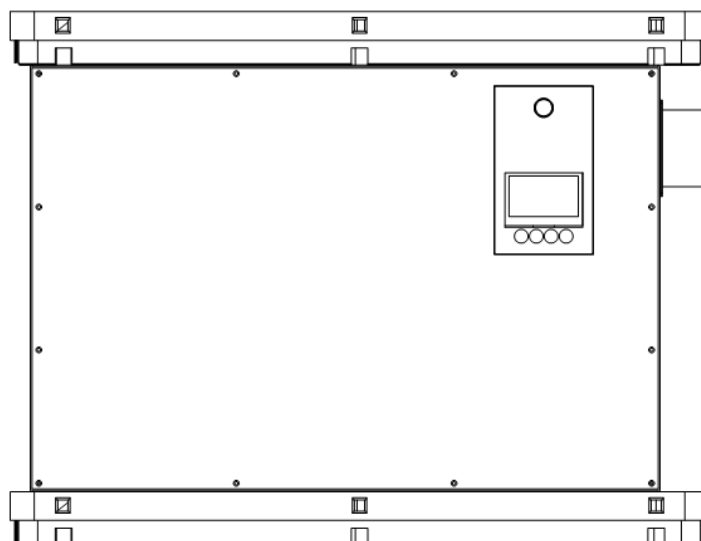
3.2 Composition of Lithium Battery System



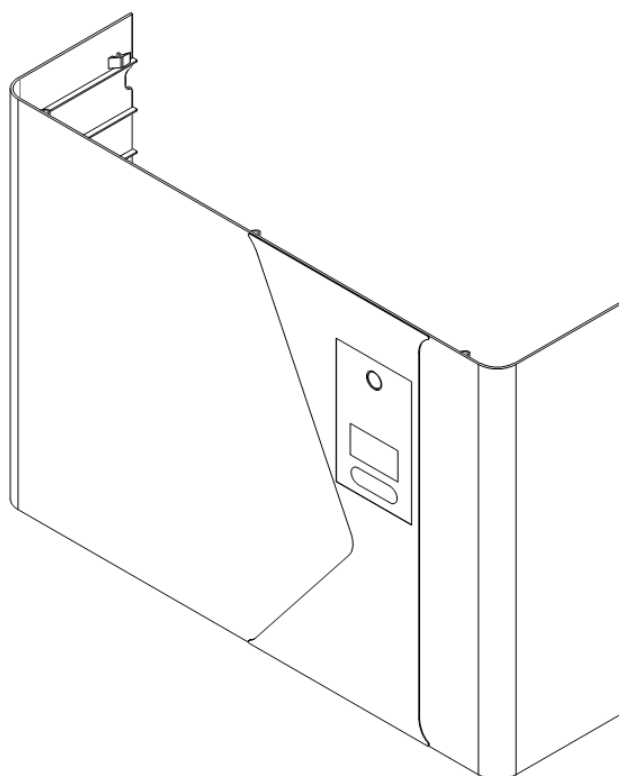
A	Power-on switch (with LED light)
B	Waterproof protection cover
C	LCD Screen
D	Navigation Buttons
E	Power Connection Area
F	Main Body
G	Outer Cover

3. Shipment List







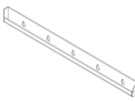

- Lithium battery system main body



- Outer cover



- Parts list (specific quantity varies according to selection)

Parts	Name	Quantity	Parts	Name	Quantity
	Internet cable port gland	1		Screw	6
	M6 Expansion screw & screw anchor	10		Wall holders	4
	Stand holders	4		Power cable connector (Quick plug)	4
	Mounting bracket	2		Top plate	1

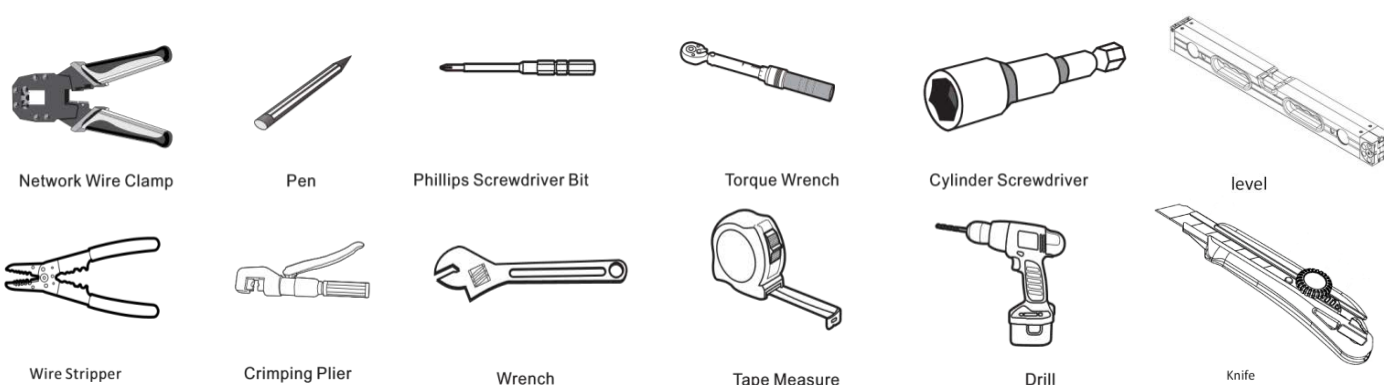
5. Installation

5.1 Installation Requirements

5.1.1. Requirements for Installation Personnel

- The same qualifications as mentioned in this manual (1.2).

5.1.2 Installation Tools Required



5.1.3 Installation Position Requirements

- A solid support surface must be available (e.g., concrete or masonry).
- The installation location must be inaccessible to children.
- The installation location must be suitable for the weight and dimensions of the battery system.
- The installation location must not be exposed to direct sunlight.
- The installation location must not be close to a fire.
- The altitude of the installation location should be less than 3000m.
- The ambient temperature should be between -10°C and +50°C.
- The ambient humidity should be between 5-95%.

5.1.4 Protection Requirements

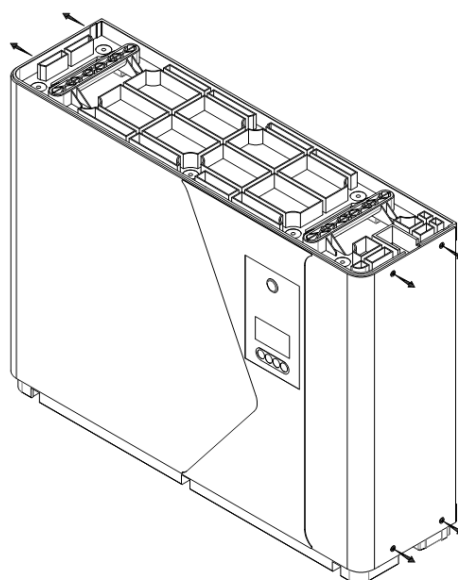
Please wear safety equipment when installing the battery system.

5.2 Installation Steps

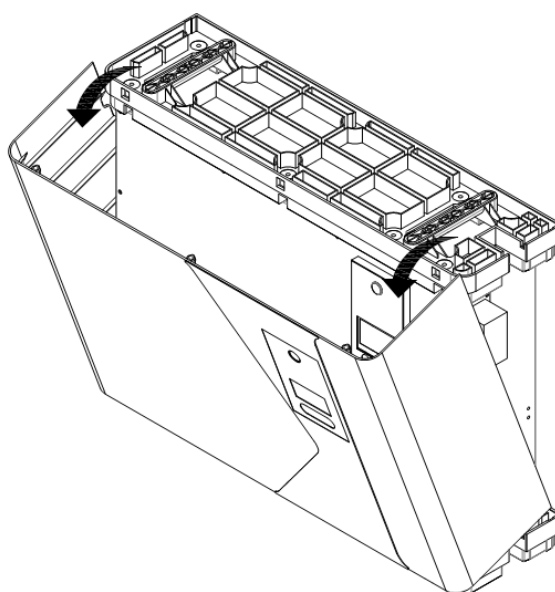
5.2.1 Remove the body and the outer cover from the package and place the body upright.

Remove the outer cover from the body.

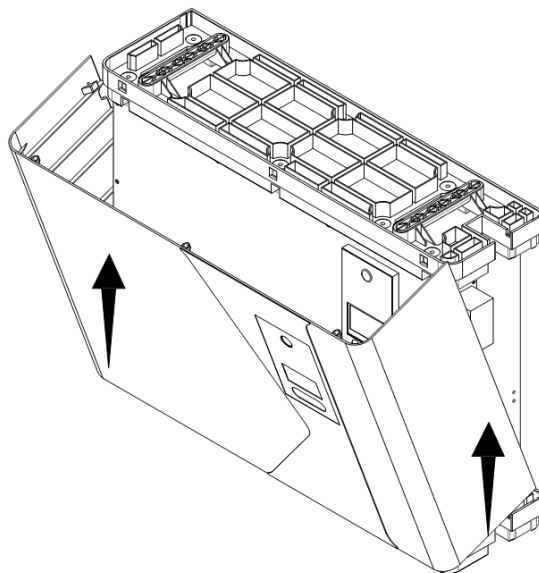
- Use a Phillips screwdriver to remove the screws from the outer cover.



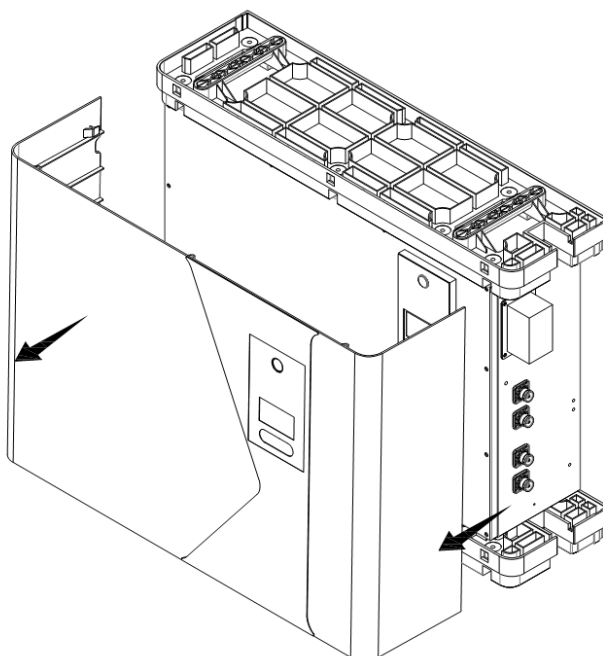
- Placing both hands firmly on both sides of the outer cover, slowly pull towards you to separate the top half of the cover from the battery.



- Placing both hands firmly on both sides of the outer cover, slowly pull with upwards to remove the cover.



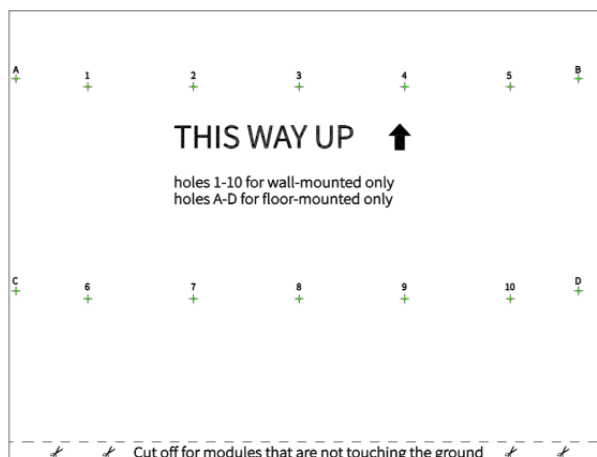
- Slowly pull until the whole cover separates from the body.



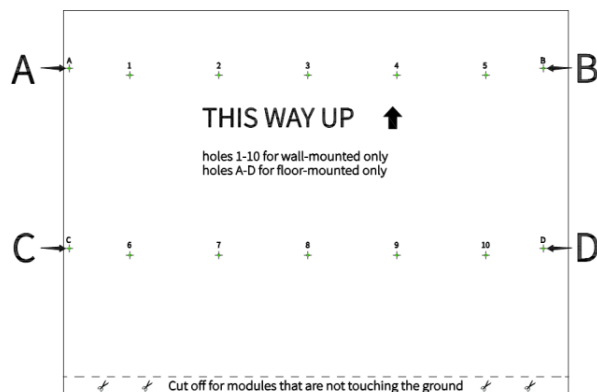
5.2.4 Ground Mounting of One Battery Module

Follow the below instructions to mount 1 battery module which is to be installed on the ground against the wall.

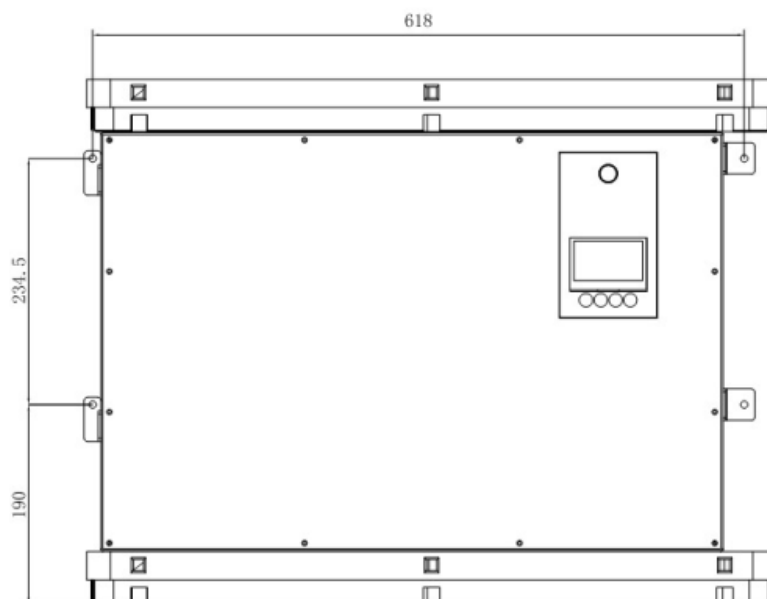
1. Using a level, ensure the ground is perfectly horizontal, if it is not, you may wish to wall mount.
2. Select a suitable location to install the module, using the included drill template with the printed side facing you place the template against the wall with the lower edge of the template touching the ground.



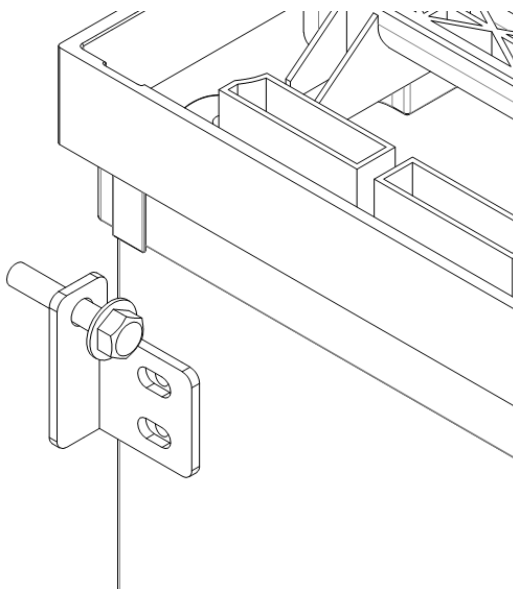
3. Mark holes on the wall at positions A, B, C, D as shown on the drill template. Remove the drill template and drill holes of at least 65mm deep and install the expansion screws.



4. Take the four stand holders. The left stand holders have an irregular shape while the right stand holders have an L shape. Fix the stand holders correctly on both sides of the battery module with a screwdriver.



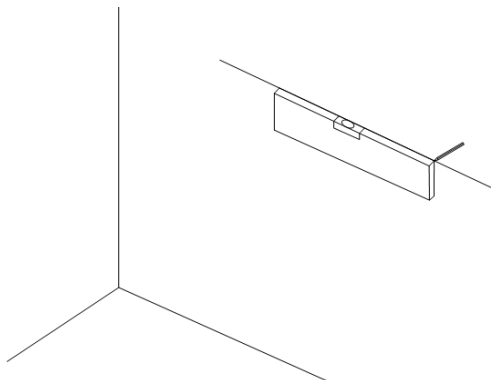
5. Align the four stand holders with the expansion screws, tighten the expansion screws until the battery module is secure.



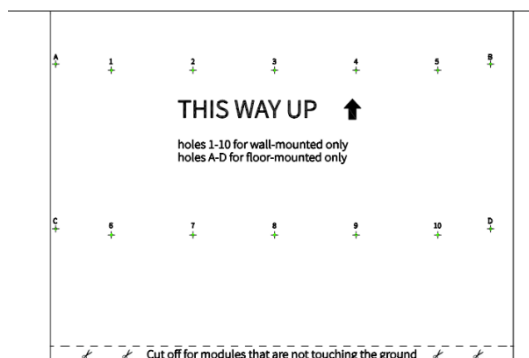
5.2.3 Wall Mounting of One Battery Module

Follow the below instructions to mount 1 battery module which is to be wall mounted.

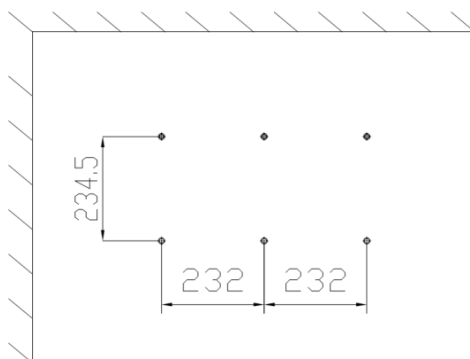
1. After selecting a suitable height, draw a horizontal line along on the wall where you wish the bottom of the module to be. Use the level to make sure to line is horizontal.



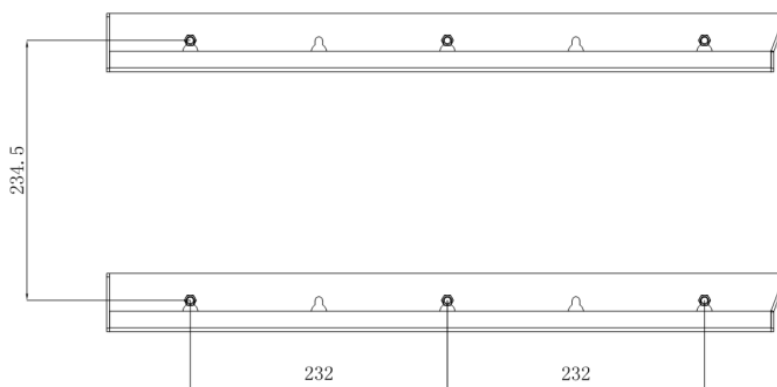
2. Align the drill template to the horizontal line and make sure that it does not move.



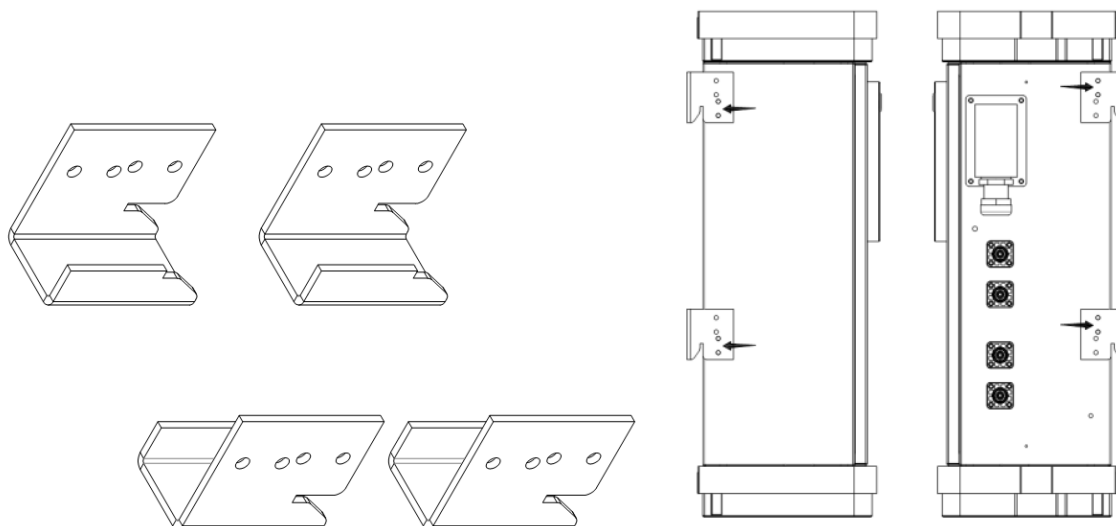
3. Mark the number 1 - 10 holes on the wall according to the drill template. Drill those holes to at least 65mm deep with a drilling machine and install the expansion screws. Minimum of 6 holes are required as shown on the photo below. If it is not secure enough, you can drill all 10 holes as marked.



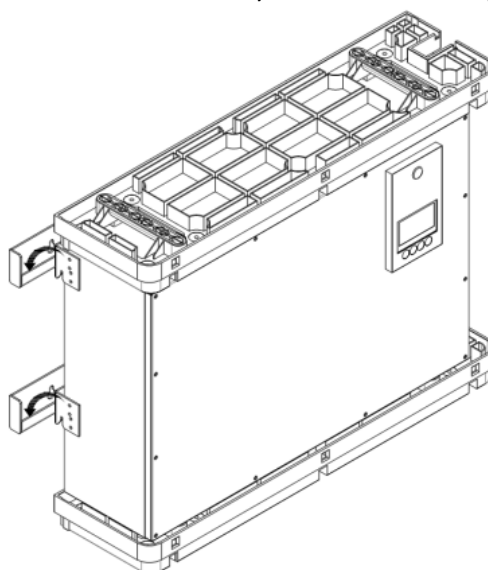
4. Install the mounting bracket according to the image below. The flat side of the mounting bracket should be facing the wall and the hook is at the bottom.



5. Take the four wall holders. The left and right holders are different and the side with a crevice is always facing down.

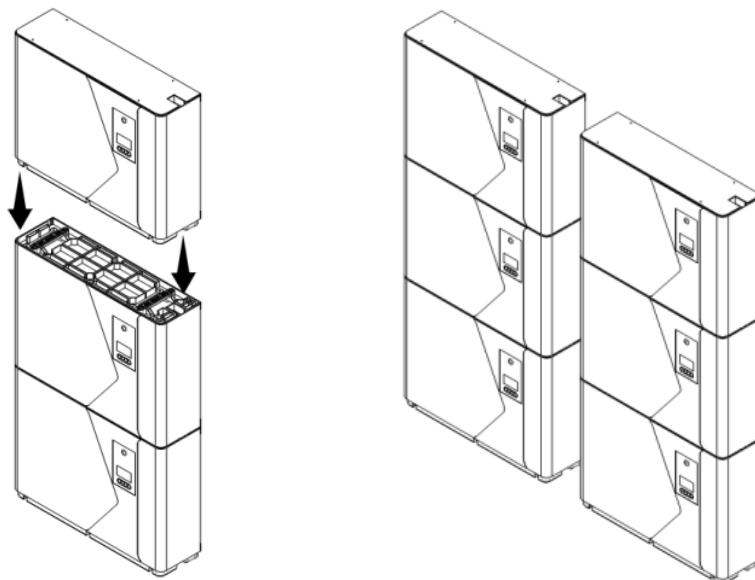


1. Install the wall brackets to the main body and slot the battery on the support frame

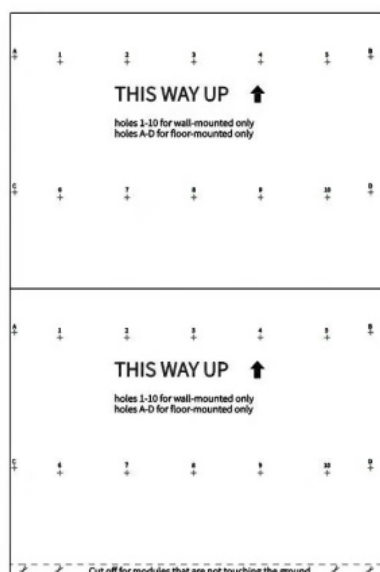


5.2.5 Parallel Setup Installation

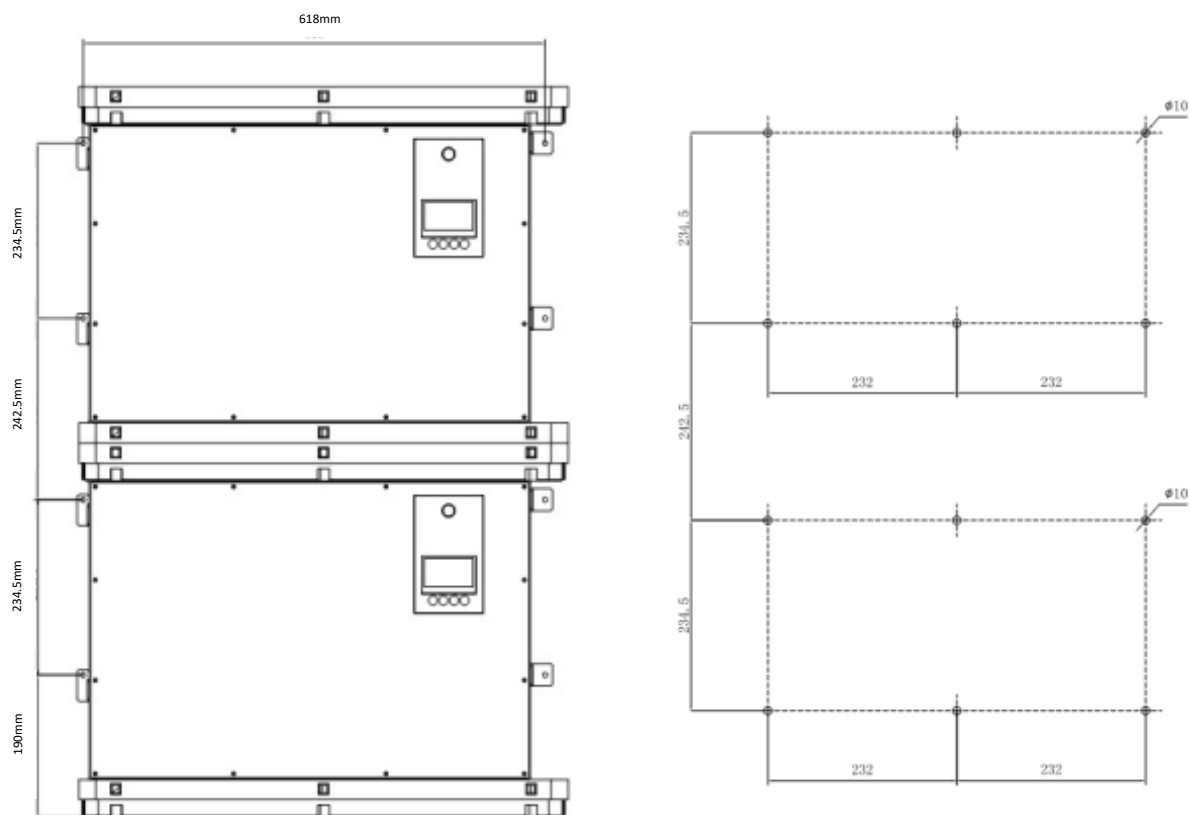
When fitting multiple battery modules, it is recommended to stack the modules vertically (no more than three per vertical group). You should place them on a solid and flat foundation. When the installation requires more than three battery modules then you should separate the modules to ensure that each group doesn't go higher than three high.



1. Put the first drill template on the wall with the lower edge of the template touching the ground. On the second template, cut off the bottom part as indicated on the template. Align the lower edge of the second drill template to the upper edge of the first drill template, if there is a first module then repeat the steps.



2. Mark holes on the wall at positions A, B, C, D as shown on the drill template. Remove the drill template and drill holes of at least 65mm deep and install the expansion screws.



3. Other installation steps are the same as the stand-alone version shown above.




5.2.2 DIP Switch Settings (For both series and parallel version).

When connecting multiple battery modules in parallel it is important to address each battery using the DIP switches.

Ignore the DIP switch label and follow the instructions below.

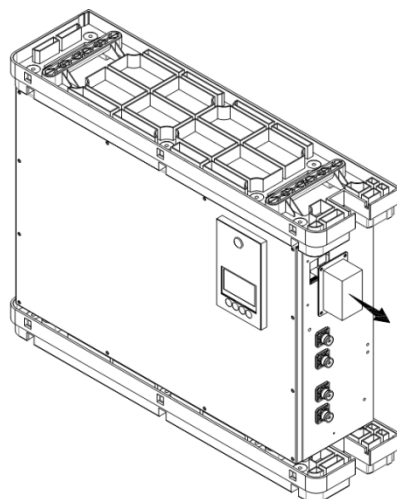
Address DIP switch: Use a 4-digit binary DIP switch for setting address assignment for extended modules, 1, 2, 3, 4 from left to right, with DIP code 1 being the highest and 4 being the lowest.

In the case of parallel connection of multiple modules, it is necessary to configure the address of each module first, and it is not possible for any of the modules to have the same address.

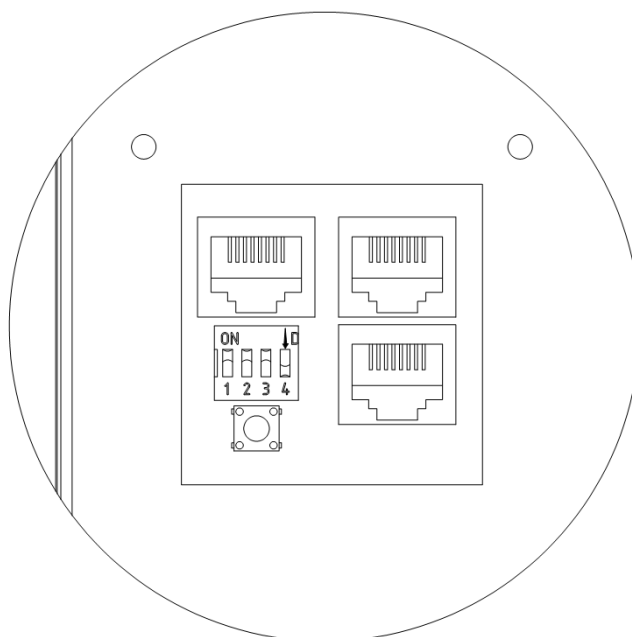
The dialing code is in BCD code format, address 0 is defined as  (down is OFF state, up is ON state), address 1 is defined as , address 2 is defined as , and so on for other addresses. For address 3, you would put down both 1 & 2, address 5 would be 1&4, etc.

5.2.3 Install Communication Cable For 1 Battery Module to Inverter

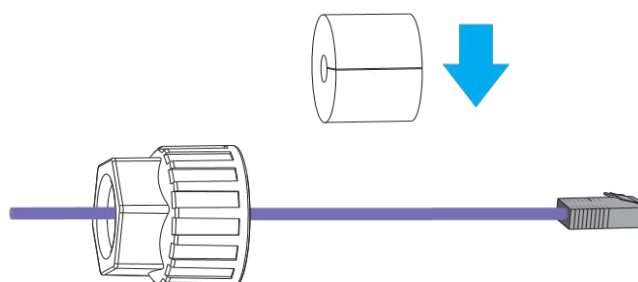
1. Remove the screws of the waterproof cover of the communication interface on the side of the body with a screwdriver.



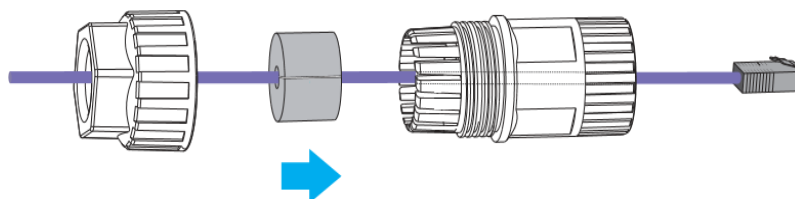
2. Configure the DIP switch to position 1. (Labelled as DIP 4 on the switch)



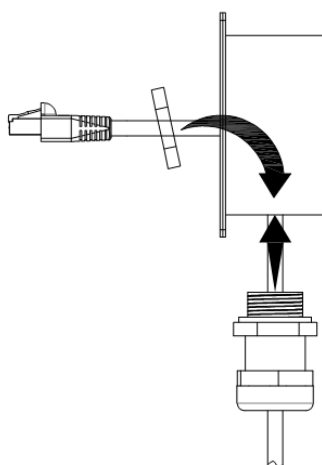
3. Install the gland cover and sealing rubber as shown in the figure below.



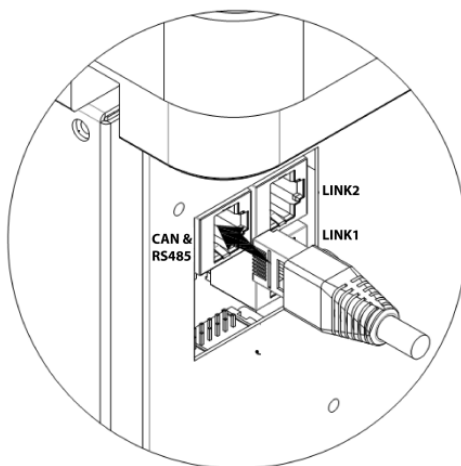
1. Get the main part of the gland through the network cable and tighten the gland as shown in the figure, paying attention to leaving enough length for the network cable.



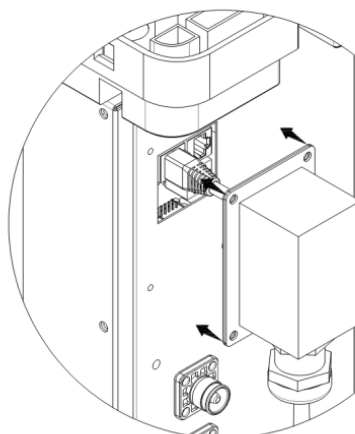
2. Get the network cable through the round hole on the bottom side of the waterproof protection cover and tighten the sealing ring.



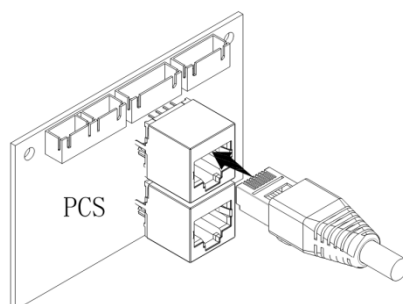
3. Plug the network cable into the CAN&RS485 port.



4. Install back the waterproof protection cover of the communication interface on the side of the machine body.

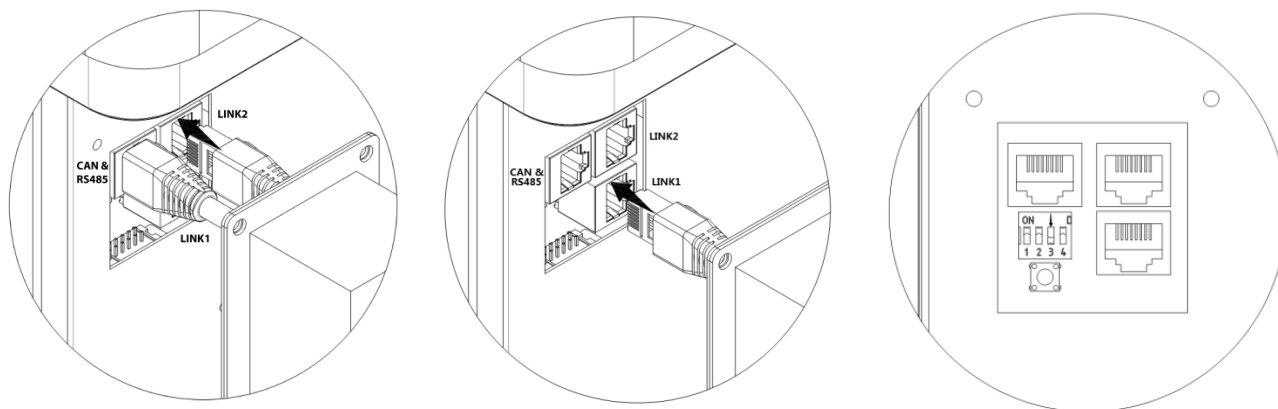


5. Connect the other end of the communication cable to the hybrid inverter.

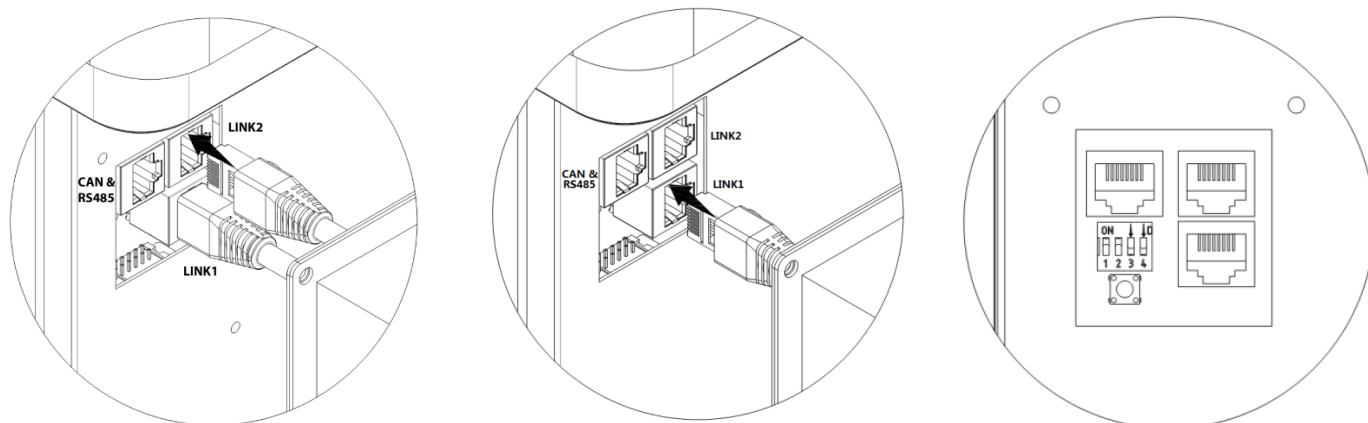


5.2.4 Install Communication Between Modules (Only required for parallel version)

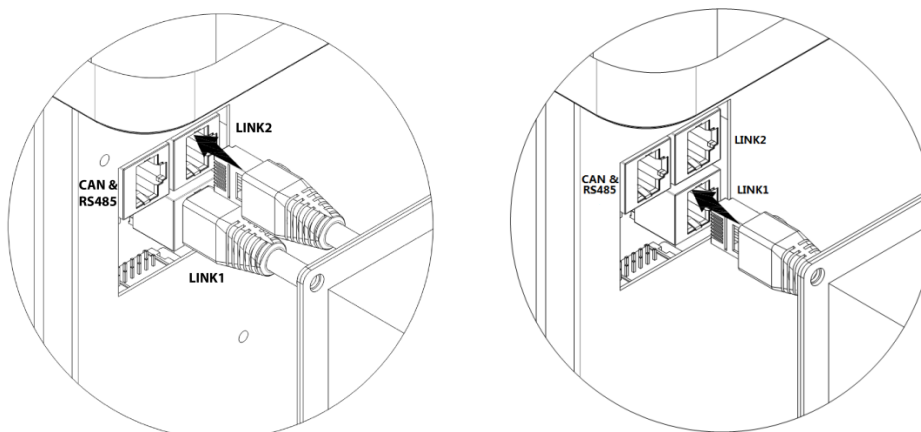
1. Plug one end of the network cable into LINK2 socket of the first module and the other end into the LINK1 socket of the second module and turn the DIP switch of the second module to 2.



2. If there is a third module, plug one end of the network cable into the LINK2 socket of the secondary module and the other end into port LINK1 of the third module and turn the DIP switch of the third module to 3.

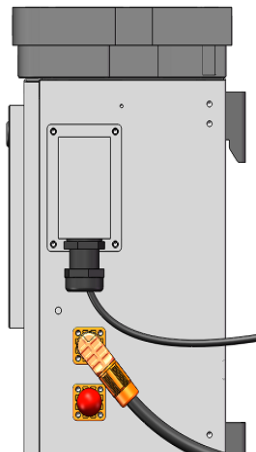


3. If you have more modules, repeat the second step and make sure the DIP switch address increases in sequence.

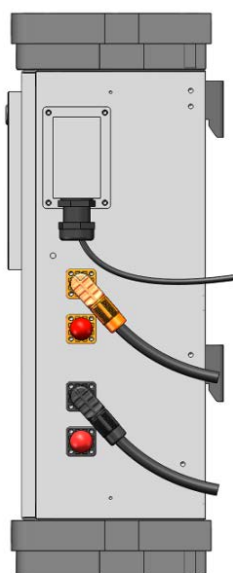


5.2.6 Power Connection to Inverter (Require for both stand-alone and parallel versions).

1. Insert the **red** end of the quick plug power cable connector into the upper **red** socket and connect the other end to the positive pole of the hybrid inverter.

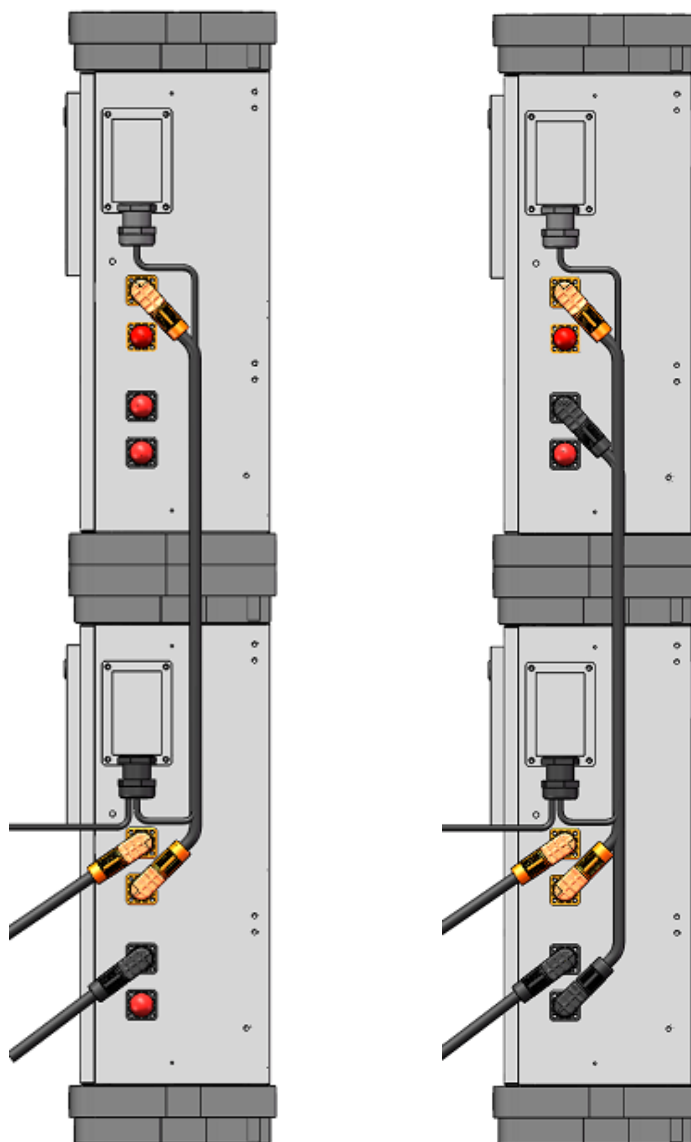


2. Insert the **black** end of the quick plug power cable connector into the upper **black** socket, connect the other end to the hybrid inverter negative pole, and cover the remaining sockets with plastic sleeves.



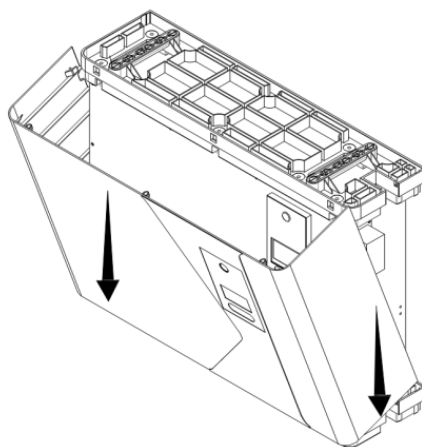
5.2.7 Power Connection Between Batteries (Only required for parallel setup)

- Use the quick plug power cable connector with **red** heads, insert one end into the second **red** socket of the first module, and the other end is inserted into the first **red** socket of the second module.
- Use the quick plug power cable connector (wire B) with **black** heads, insert one end into the second **black** socket of the first module, and the other end is inserted into the first **black** socket of the second module.
- If there are multiple systems in parallel, please repeat the above two steps until the end. Cover the remaining interfaces with plastic sleeves.

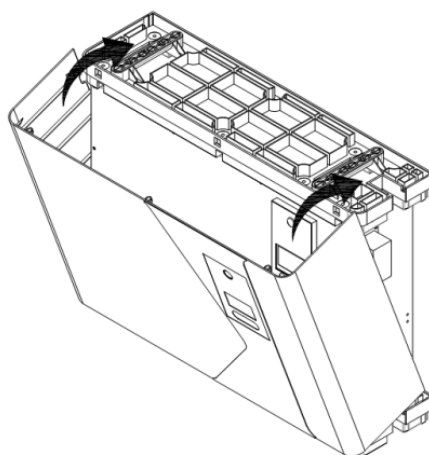


5.2.8 Install The Outer Cover

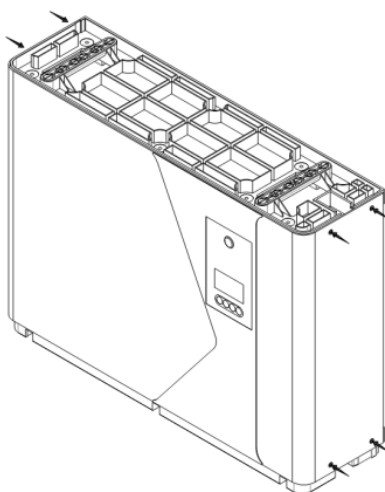
1. Align the buckle under the cover to the hole, and slowly force to put it in place.



2. Slowly push forward to put in place all the other buckles.



3. Put back all the screws.



6. Operation and Troubleshooting

6.1 Startup Operation

Press the 'Power on Switch'.

After the self-check is completed successfully, the light will quickly switch to green and remain on for a long time. This means the battery has entered standby mode and ready for operation.



If there is an error during self-check, the light will turn red and remain on for a long time. Please check on the screen for error information and carry-on troubleshooting.



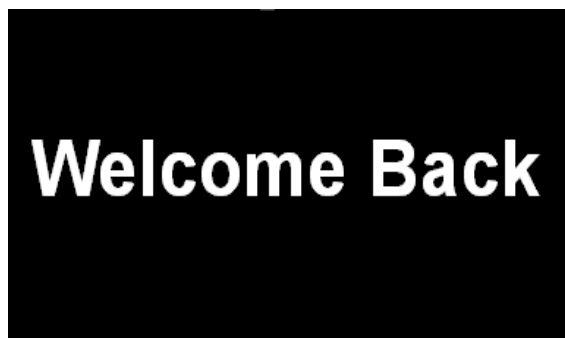
6.2 Shutdown Operation

Press the startup switch above the screen, the switch will rebound, and the light will go out.

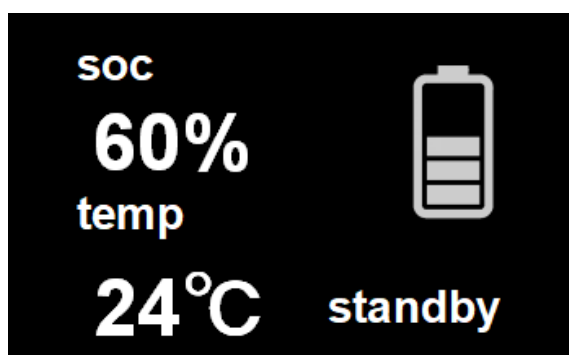


6.3 Key Operation

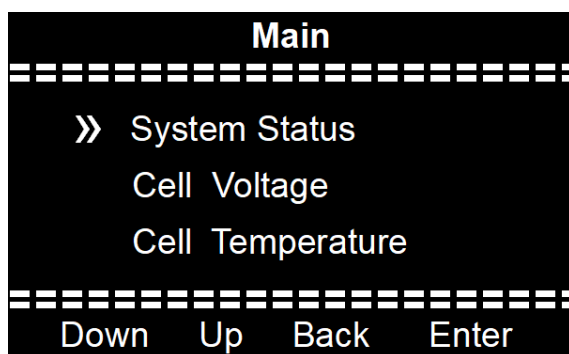
After startup, "Welcome Back" is shown on the screen.



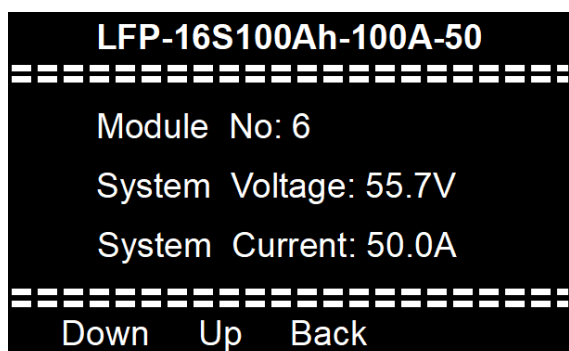
The main page of the system will then be shown on the screen. This screen show: State of Charge (SOC), Current Temperature (temp), System Status (standby, charging, discharging, protected, etc.).



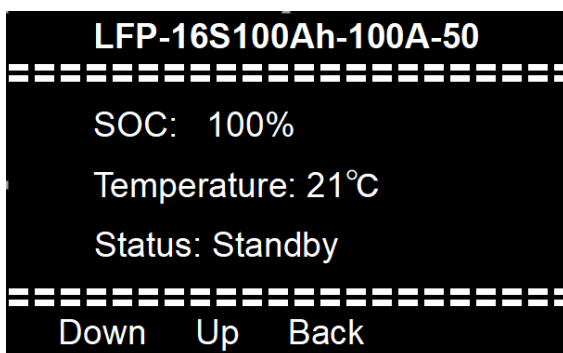
Press any key under the current page to enter the directory page.



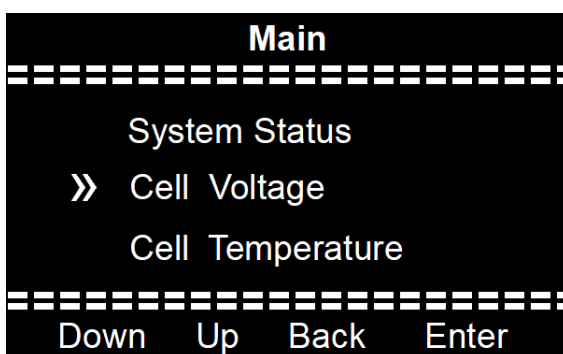
Press ENTER on the current page to enter the status information page.



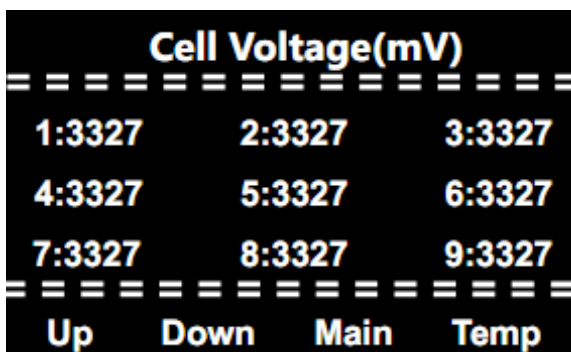
Press UP or DOWN on the current page to enter the battery information page.



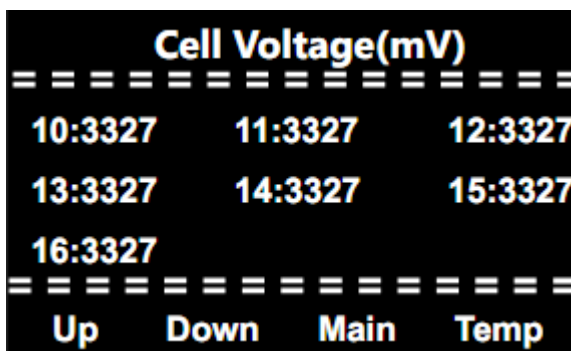
Press BACK to return to the directory page.



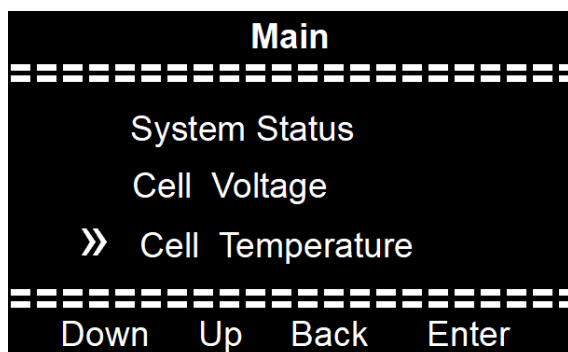
Use UP and DOWN key to navigate. Press ENTER to select Cell Voltage to enter the Cell Voltage page.



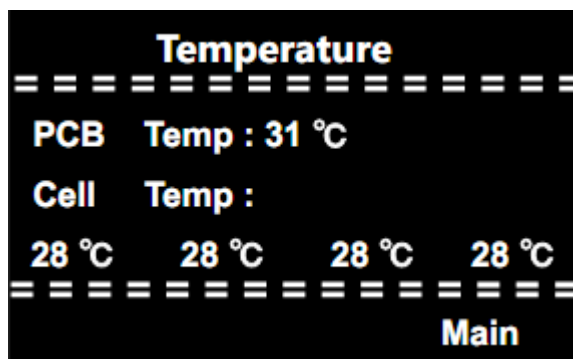
This page displays the battery voltage and key definitions for sections 1-9. Press the **▼** key to view the cell voltage information on the next page, press the **▲** key to view the cell voltage information on the previous page.




Press BACK to return to the directory page. Use UP and DOWN key to navigate. Press ENTER to select Cell Temperature to enter the Cell Temperature page.



Here, the PCB temperature and cell temperature are displayed.



Press  to return to the main page.

6.4 Fault Definitions

Status		Indicator Light	Display
Shutdown / Sleep mode		OFF	OFF
Standby mode	Normal	Green light is always ON	Standby
	Fault	Red light is always ON	Protected
Charging	Normal	Quick flashes of green light	Charging
	Notice	Quick flashes of green light	Charging
	Overvoltage protection	Green light is always ON	Protected (UV)
	Temperature protection	Red light is always ON	Protected (OT/UT)
	Overcurrent limit	Quick flashes of green light	Lmt Charging
Discharging	normal	Long flashes of green light	Discharging
	Notice	Long flashes of green light	Discharging
	Undervoltage protection	Red light is always ON	Protected (UV)
	Temperature protection	Red light is always ON	Protected (OT/UT)
	Discharge overcurrent alarm	Long flashes of green light	Discharging
	Overcurrent protection	Red light is always ON	Protected (DOC)

7. Troubleshooting

If the start-up switch turns red, an error occurred. Troubleshooting operation is as followed. Please do not open the main body yourself as this can cause serious harm and will void all warranty provided.

7.1 The start-up switch light is red when power on

Generally, it is caused by failure of the temperature sensor of the panel. Please observe the status information on the screen. If it prompts Protected (OT/UT), please switch to the temperature page to observe whether the four temperatures are positive.

7.2 The start-up switch light is red when standby

7.2.1 Protected (OT/UT) (temperature protection)

- The working environment temperature might be too high, please control the ambient temperature.
- The working environment temperature might be too low, please control the ambient temperature.
- If the ambient temperature is within limits, then please contact iCS for support.

7.2.2 Protected (UV)

- Battery low voltage, please charge the battery.

7.3 The start-up switch light is red when charging

7.3.1 Protected (OT/UT) (temperature protection)

- Please stop charging, wait for the temperature to return to the normal value, and the indicator light turns green before charging.
- If the indicator light is still red, please contact iCS for support.

7.4 The start-up switch light is red when discharging

7.4.1 Protected (DOC) (over current protection)

- The discharge current is too large, and an alarm is triggered. Please adjust the size of the load, the system will automatically release after 60s of protection, or you can release the charge, the charging current is >1A.

7.4.2 Protected (OT/UT) (temperature protection)

- If the temperature is too high, please reduce the ambient temperature and reduce the output current. Wait for the temperature to return to the recovery point, and the system will release from the protection.
- If the temperature is too low, increase the ambient temperature. Wait for the temperature to return to the recovery point, and the system will be released from the protection.