



**ELESHELL-10.2HV**

**User Manual**

**Model**

**ELESHELL-10.2HV**

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Light up every corner of the world with renewable energy.

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## 1 General Information

This manual introduces the **ELESHELL-10.2HV** battery products. Please read this manual carefully before using the battery. For any questions, please contact EITAI immediately for advice and clarification.

### 1.1 Validity

This user manual is applicable to **ELESHELL-10.2HV**.

This manual contains **ELESHELL-10.2HV** information, usage, guidance, safety information, installation guide and details on common operation issues and subsequent maintenance measures.

### 1.2 Intended Use

**ELESHELL-10.2HV** is an energy storage unit, that is designed for residential application scenarios with the capability of short-term backup.

#### Notes:

**ELESHELL-10.2HV** is not suitable for supporting life-sustaining medical devices. This product is intended for use only in accordance with the information provided in the enclosed documents and applicable local standards and regulations. Any other use may result in personal injury or property damage. The illustrations in this manual are only intended to help explain the concept of the system configuration, including use guidelines, safety precautions, common operating problems, and subsequent battery maintenance.

Alterations to the product, e.g. changes or modifications, are only permitted with the express written permission of EITAI. Unauthorized changes will not be allowed by warranty claims. EITAI shall not be liable for any damage resulting from such changes. Any use of the product other than described in the intended use section does not qualify as appropriate. The enclosed documentation is an integral part of this product. Please keep the documentation in a safe and convenient place for future reference.

Product model labels (see Section 1.3) must be attached to the product.

### 1.3 Product Identification

The type labels were attached on the product, which contain the product identification information. For safe usage, the user must be well-informed of the contents in the type labels.

The Labels include:

	Lithium-ion Battery Pack	
Battery Model	ELESHELL-10.2HV	
Total Energy Capacity (Wh)	10240	
Rated Voltage (V dc)	51.2	
Rated Capacity (Ah)	200	
Max.Output Power (W)	5000	
Output Voltage Range (V dc)	330-450	
Max.Output Current (A)	16	
Reference Weight (Kg)	86	
Unit 2101 NO.8, Chengyi North Street, Software Park Phase III, High-tech Zone, Xiamen City, China		
<b>CAUTION!</b> Do not disassemble Do not short-circuit Donot place in fire or near hot source Please read user manual carefully		
UN38.3, MSDS, CE, ROHS		



**DANGER !**  
**CHEMICAL HAZARD & SHOCK HAZARD**

- Do not disassemble or repair by yourself.
- Do not drop, deform, impact, cut or spearing with a sharp object.
- Do not place near open flame or incinerate.
- Do not put any objects onto the battery.
- Do not allow to contact with liquid.
- Keep out of reach of children, animals or insects.
- Contact the supplier within 24 hours if anything wrong.

**WARNING !**

Stop the battery operation immediately to secure the battery safety when environmental temperature is over working temperature (suitable operation temperature is 0~45°C).  
If battery is at high temperature usually, it will impact battery performance.

## 2 Safety Measures

This section contains safety information that must always be observed when using or installing batteries. To prevent personal injury or property damage and ensure long-term operation of the batteries, please read this section carefully, always watch for warnings   from all safety messages.

### Environmental requirements:

1. Do not expose the battery to temperature above 50 °C;
2. Do not place the battery near any heat source;
3. Do not expose the battery to moisture or liquid;
4. Do not expose the battery to a corrosive gas or liquid;
5. Do not expose the battery to a combustible gas or liquid;
6. Do not expose the battery to direct sunlight for extended periods of time;
7. Battery power terminals are not allowed to contact conductive objects, such as electric wires;
8. Place the battery in safe place that away from children and animals.

### Operation Precautions:

1. Do not disassemble the battery;
2. Do not touch the battery pack with wet hands;
3. Do not smash, fall, or puncture the battery;
4. Do not reverse the polar series connection battery;
5. Do not short-circuit the terminal, and remove all metal jewelry items that may produce a short-circuit before installation and repair;
6. Always handle the products in accordance with the local safety regulations;
7. Store and use the battery in the user's manual;
8. Ensure reliable grounding;
9. Disconnecting all batteries to the wires before installation and repair;
10. Do not stack batteries outside the protective packaging during storage or handling;
11. The stacking of packaging batteries shall not exceed the quantity specified on the packaging;
12. Continued operation of a damaged battery may lead to dangerous situations, causing serious injuries such as electric shock or combustion.

### 3 Technical Parameters

Model	ELESHELL 10.2K-HV
<b>Main parameters</b>	
Battery type	LiFePO4
Nominal capacity (Ah)	200
Nominal voltage (V)	51.2
Battery voltage range(V)	46.4~57.9
System working voltage(V)	330~450
System energy capacity (kWh)	10.24
System available energy (kWh)	9.22 (90%DOD)
Maximum number of parallel	16pcs
Rated output power (kW)	4.8
Max. output power (kW)	5
Charging/ discharging current (A)	Recommend:12.5
	Max:16
<b>Other parameters</b>	
Recommended discharge depth	90%
Dimensions (W/D/H, mm)	519*161*956
Approx weight (Kg)	86
Protection level	IP54
Working temperature	0℃~60℃
Storage temperature	0℃~35℃
Store humidity	5%~95%
Working altitude	≤2000m
Circle life	≥6000 times
Installation	Wall-Mounted, Floor-Mounted
Cooling mode	Natural Cooling
Communication port	CAN,RS485
Warranty	5+5 years
Certificate	CE、IEC62619、MSDS、UN38.3、ROHS

\* Working current derating depends on the battery voltage and temperature

## 4 Technical Items

No.	Name	Comment
1	Discharge	Battery output power for load
2	Charge	Put the electricity into the battery through the charger
3	Full charge	The battery is fully charged with 100% SOC
4	Standby	Ready for charging or discharging
5	Turn-off	Turn-off battery output
6	SOC	State of charging (Useable capacity)
7	Battery voltage	Voltage between the battery B+ /B -
8	Single-string voltage	Single-cell voltage
9	Alarm	Indicates that the battery is in an abnormal state
10	Protection	Battery stops charging or discharging
11	Fault	Battery or BMS is damaged and need to be replaced
12	Over discharged	Battery is lack of electricity, and need to be charged in time

## 5 Product Overview

### 5.1 Brief Introduction.



**ELESHELL-10.2HV** is a lithium battery energy storage system with an operating voltage range of between 46.4~57.6v, it is used for household energy storage applications, in cooperation with low voltage inverters to achieve home energy storage purpose.

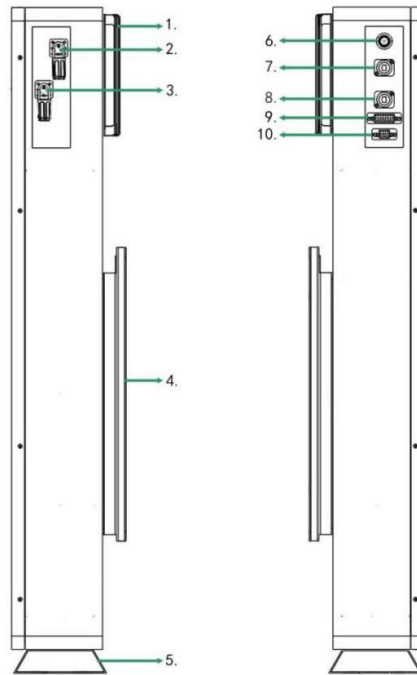
**ELESHELL-10.2HV** has a built-in BMS (Battery Management System) which can manage and monitor cells information, including voltage, current and the temperature. In addition, the BMS can balances battery charging to extend lifespan. BMS has the protections including over-discharge, overcharge, over-current, high / low temperature, etc.

It is equipped with a boost converter that is installed on the BMS board. The aluminum alloy cooling plate is exposed on the back of the battery, its main function is to boost the low voltage of 16 3.2V cells in series to 51.2V, which to match the voltage of the high-voltage system. The voltage is usually boosted by 8 times. After the boost, the output voltage range is 330-450V.

The system can automatically manage the charging status, discharge state, balance state. Multiple batteries can be connected in parallel to expand storage capacity to meet larger capacity and continuous power support time, **ELESHELL-10.2HV** support up to 15 parallel operations.



## 5.2 Hardware and Instructions



No	Items	No	Items
1.	Boost cooling plate	2.	Battery positive pole
3.	Battery negative pole	4.	Wall hanging plate
5.	Ground mounting plate	6.	Power Switch
7.	COM1	8.	COM2
9.	PAR	10.	48V

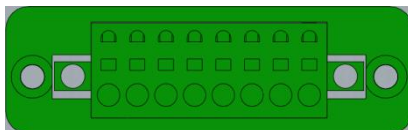
### 5.2.1 COM1/COM2 Port



	Definition description		Definition description
PIN1	RS485-A	PIN5	CAN2-H
PIN2	RS485-B	PIN6	CAN2-L
PIN3	TRIG+	PIN7	CAN1-H
PIN4	TRIG-	PIN8	CAN1-L

The COM1, COM2 (RJ45 port) is two same ports with three functions, connecting the upper computer to read battery parameter information, connecting the inverter to communicate, and and multiple battery parallel communication.

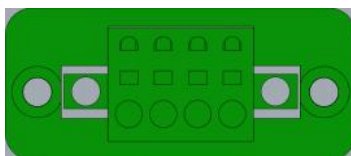
### 5.2.2 PAR



	Definition description		Definition description
PIN1	SW+	PIN5	DO1-NO
PIN2	SW-	PIN6	DO1-M
PIN3	DI1+	PIN7	SW+
PIN4	DI1-	PIN8	SW-

The PAR port is a one-button control switch that connects the battery switch power supply in series when multiple batteries in parallel. Another function is to confirm the battery dial address when the machine in parallel.

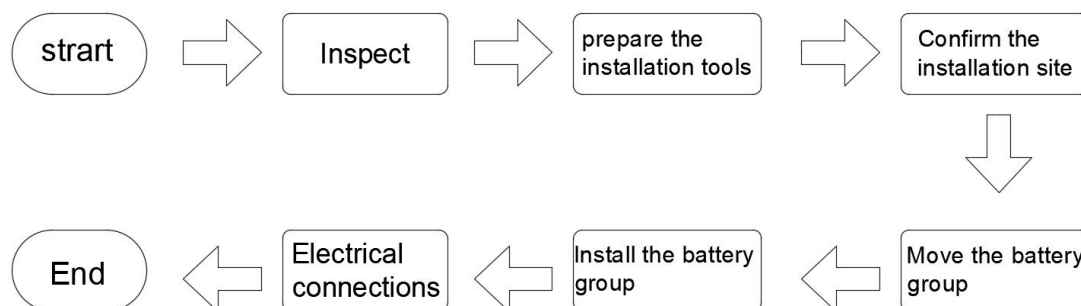
### 5.2.3 48V



PIN1	PWR_48+	PIN3	Backup Charger+
PIN2	PWR_48-	PIN4	Backup Charger-

The 48V port is an unboosted standby port with 48V voltage output and can be used for backup. There is a spare charging port, if the battery is low and needs to be charged by a DC charger, can be used to connect.

## 6 Installation Guide



Installation flow chart

## 6.1 Inspection Before Installation

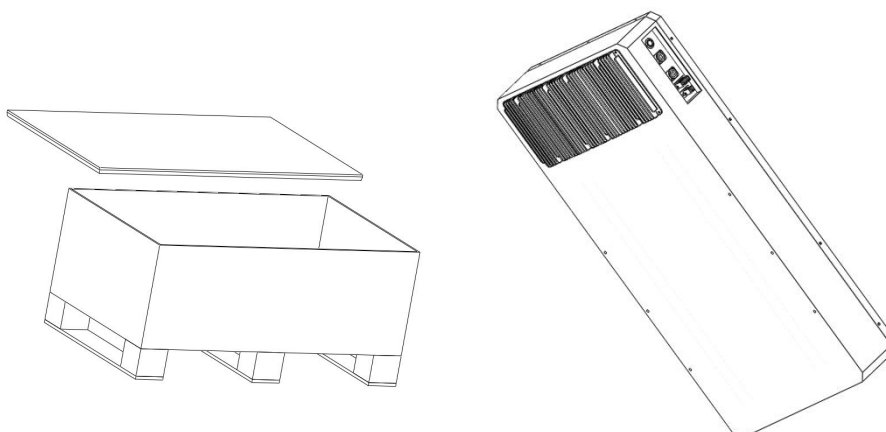
### 6.1.1 Check the Outer Packaging

Packaging materials and components may be damaged during transportation. Therefore, please check the packaging material before installing the battery. Check the surface of packaging materials for damage, such as holes and cracks. If any damage is found, do not unpack the battery and contact the dealer as soon as possible. It is recommended that you remove the packaging material within 24 hours before installing the battery.

### 6.1.2 Check Whether the Accessories are Complete

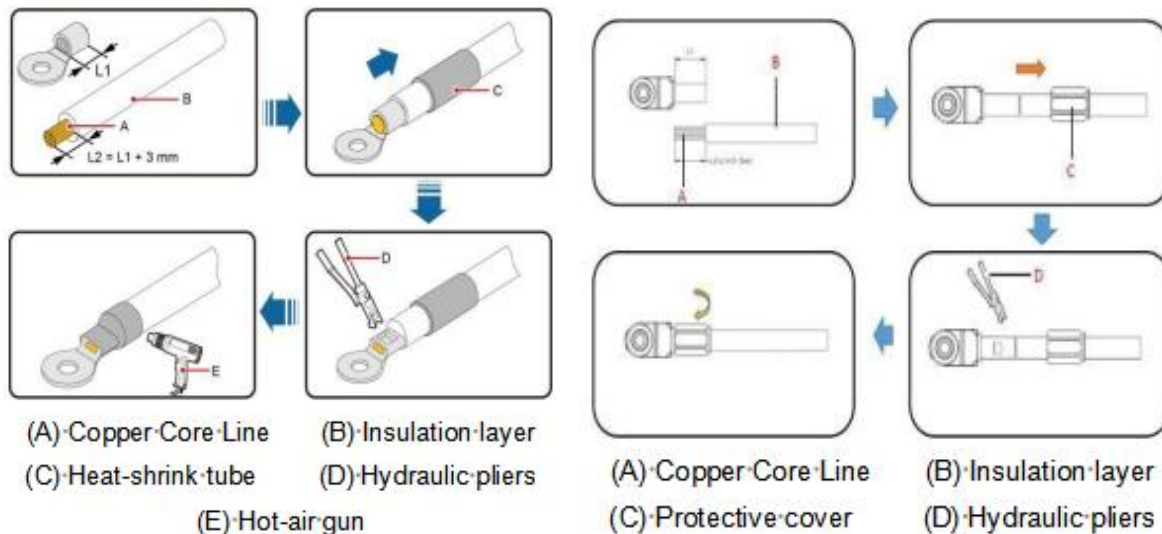
After opening the packing box, check whether the attached accessories are complete. If any damage or missing parts are found, contact your dealer.

### Accessories list in the package



<b>ELESHELL-10.2HV</b>					
No	Name	Model	Unit	Qty	Mark
1.	Battery	ELESHELL10.2HV	PCS	1	
2.	Wall hanging	Steel	PCS	1	
3.	Back hanging	Steel	PCS	1	
4.	Base	Steel	PCS	1	
5.	Phillips screws	M8*16	PCS	6	
6.	Internal expansion screw	M10*80	PCS	4	
7.	Upper communication cable		SETS	1	For adjusting
8.	Connector	125A, Orange +, Black -	SETS	1	
9.	Extra soft silicone wire	4AWG, black, 1.5M	PCS	1	For inverter connection
		4AWG, red, 1.5M	PCS	1	
10.	OT cord end terminal	25-10	PCS	2	Back-up
11.	Heat shrinkable tube	Ø12 (40mm)	PCS	2	
12.	PC plastic screws	M8*10	PCS	2	
13.	Communication cable	1+1 crystal head/1.5 m	PCS	1	
		Network cable 1m	PCS	1	
14.	Crystal head	8P/ gilding 3U	PCS	2	
15.	User manual	ELESHELL-10.2HV manual	PCS	1	
16.	Marks	QC	PCS	1	
		PASS	PCS	1	
		S/N	PCS	1	
		Mark	PCS	1	

Manufacturing instructions for power cable terminals:



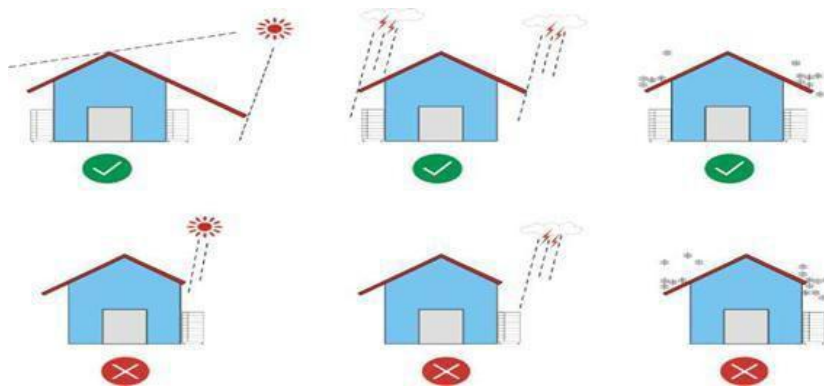
## 6.2 Tools

Type	Tools			
Installation tools	Measuring tape	Hammer drill	Socket wrench	Cross screwdriver
Protective equipments	ESD gloves	Safety goggles	Anti-dust respirator	Safety shoes

## 6.3 Installation Requirements

### 6.3.1 Installation Environment Requirements

1. Install the battery in an indoor environment.
2. Place the battery in a safe position away from children and animals.
3. Do not place the battery near any heat source, and avoid generating sparks.
4. Do not expose the battery to moist air or liquid.
5. Do not expose the battery to direct sunlight.
6. Do not expose the battery to a combustible gas or liquid.



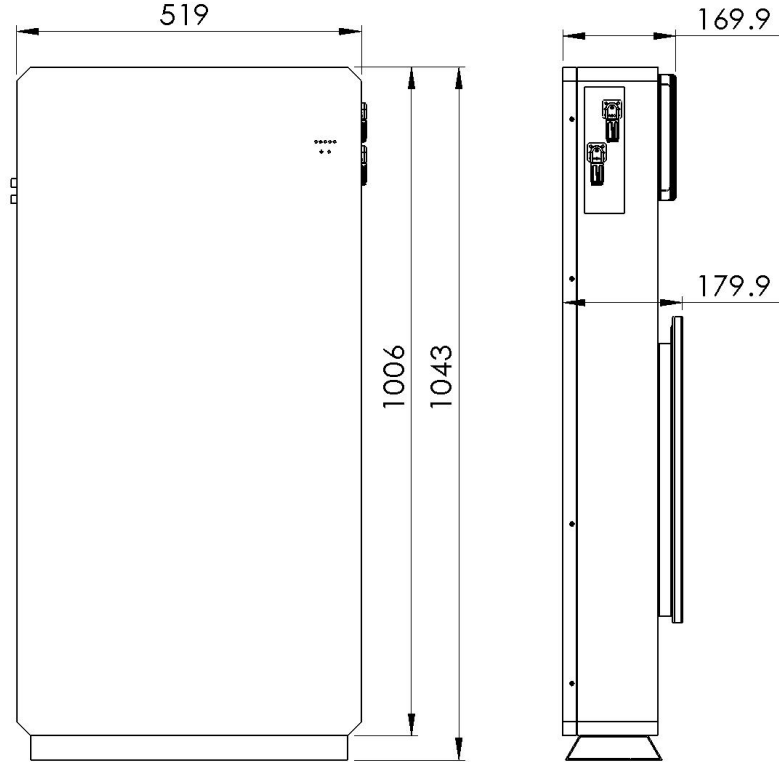
### 6.3.2 Installation Carrier Requirements

1. The mounting carrier shall be fire resistant. Do not install batteries on flammable buildings.
2. The mounting bracket surface shall meet the requirements of bearing requirements.

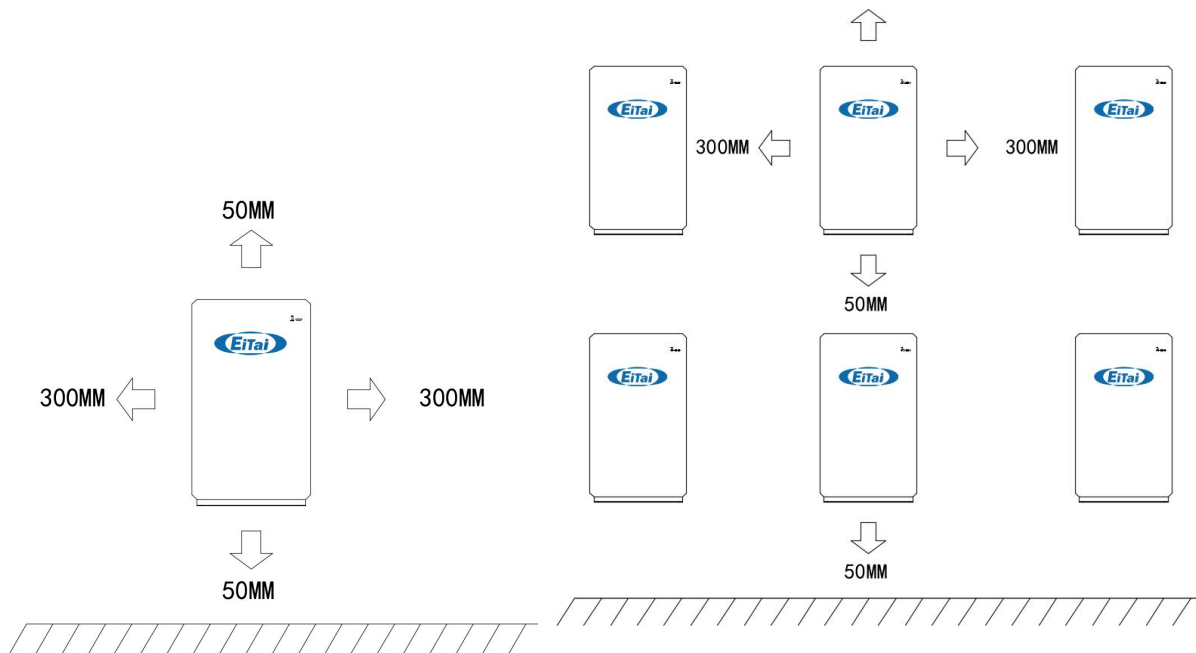


## 6.4 Installation Instructions

### 6.4.1 Overall Dimensions

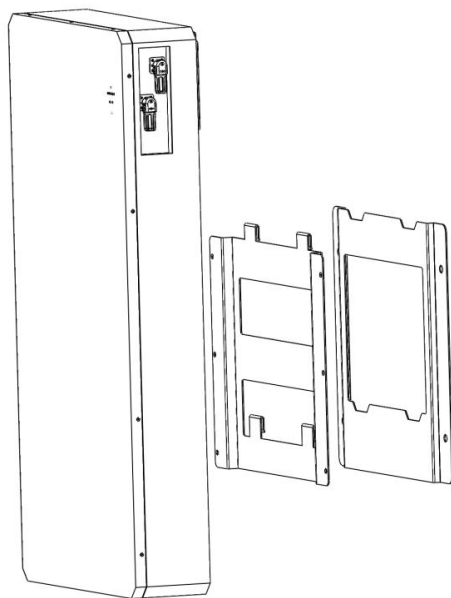


Minimum Installation distance between the battery pack and equipment:

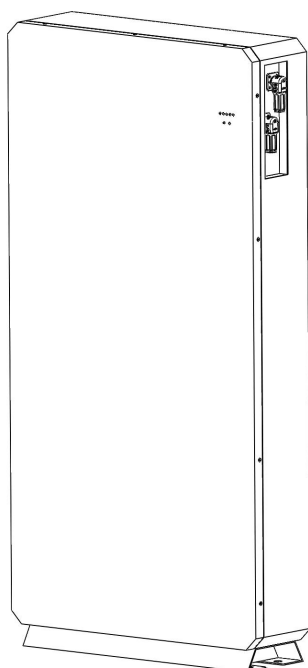


### 6.4.2 Fix the battery

Wall hanging: Make expansion screw holes on the wall according to the positioning punching board in the package, and lock the four-hole wall hanging sheet metal on the wall. Lock the six-hole sheet metal on the back of the battery. Lift the battery, align it with the card slot, and hang it on the sheet metal on the wall.



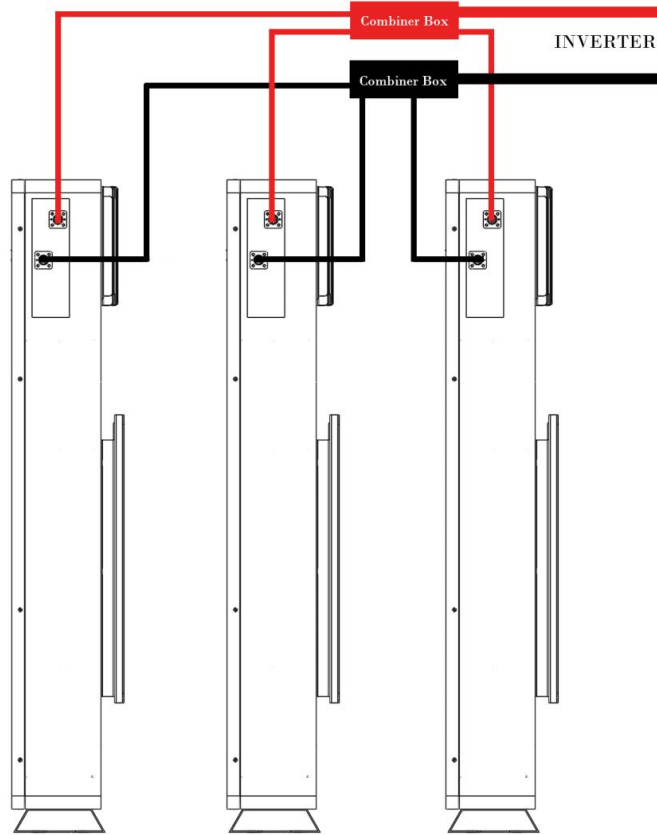
Ground mounting: Make expansion screw holes on the wall according to the positioning punching board in the package, lock the bottom plate with battery base and fix it on the ground.



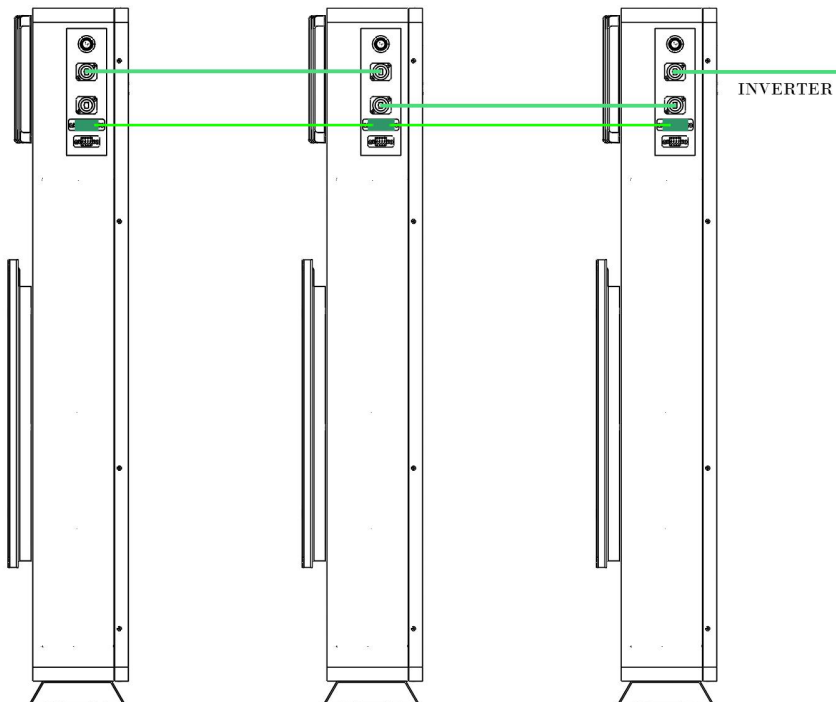


### 6.4.2 Connect the power cable

((Ensure that the voltage difference between parallel batteries is within 1V, the smaller the better.)



### 6.4.3 Connect the internal communication line



## 7 Cleaning and Maintenance

### 7.1 Cleaning Work

Please note: please turn off the power supply of the system before cleaning. It is recommended to clean battery regularly. If the shell is dirty, please use a soft and dry brush or dust collector to remove the dust. Do not use solvents, or corrosive liquids to clean the enclosure.

### 7.2 Maintenance

#### 7.2.1 Recharging Requirements During Normal Storage

The battery shall be stored in an environment with a temperature range of  $-10^{\circ}\text{C}\sim 45^{\circ}\text{C}$  and shall be maintained regularly according to the following table to 0.5C current is charged until 40%SOC after long storage.

Charging conditions during storage

Store the ambient temperature	Relative humidity of the storage environment	Storage time	SOC
Below- $10^{\circ}\text{C}$		Prohibit	/
$-10\sim 25^{\circ}\text{C}$	5%~70%	$\leq 12$ months	$30\%\leq\text{soc}\leq 60\%$
$25\sim 35^{\circ}\text{C}$	5%~70%	$\leq 6$ months	$30\%\leq\text{soc}\leq 60\%$
$35\sim 45^{\circ}\text{C}$	5%~70%	$\leq 3$ months	$30\%\leq\text{soc}\leq 60\%$
Above $45^{\circ}\text{C}$		Prohibit	

## 7.2.2 Recharging Requirements for Excessive Discharge

Charge the over-discharge (90%DOD) battery within the time of meeting the table below, otherwise the over-discharge battery module will be damaged.

Charging requirements for excessive battery discharge

Storage environment temperature	Storage time	Note:
-10~25°C	≤ on Day 15	The battery pack disconnected to PCS
25~45°C	≤ on Day 7	
-10~45°C	<for 12 hours	Battery pack connect to the inverter

## 8 Common Issues and Solutions

### 8.1 Common Issues and Solutions

The user can monitor the operating status, warning, and alarm information through the inverter LCD display.

1. The battery cannot be turned on, and the LED indicator lights all turn off the battery depth discharge and requires charging first. If the external charger supply voltage is 51V or above and the battery still cannot be opened, contact EITAI.

2. If a red light indicates a system abnormality, check the following values:

1) Temperature: Above 60°C or below 0°C, the battery protection turns on.

Solution: Move the battery to normal operating temperature range between 0°C to 60 °C.

2) Temperature: above 60°C or below -20°C, the battery cannot discharge.

Solution: Move the battery to normal operating temperature range between -20°C to 60 °C.

3) Current: if the output current is greater than 120A, the battery protection will turn on.

Solution: Stop using electrical appliances that exceed the maximum battery power load.

4) High voltage: If the battery voltage is above 57.6v or above, battery charging protection turns on.

Solution: The inverter will stop charging the battery if it sets the intelligent LI mode or a reasonable charging voltage.

5) Low voltage: The battery discharge protection is turned on when the battery discharges to 46.4V or lower.

Solution: Charge the battery until the red light is off.

Excluding the above five points, if the fault cannot be found, turn off the battery and contact EITAI.

3. In multiple battery parallel systems, the SOC LED are different. Before installing batteries in parallel, measure the voltage of each battery to ensure that the voltage difference of each battery is within 1V.

1) When the first installation, please charge in full first to balance the capacity gap;

2) If the minimum SOC LED indicator is different less than 1 of the maximum SOC LED indicator, the SOC LED indicator is restored within 10 minutes in normal operation;

3) Before expanding the battery capacity, charge the online battery to 45%-50% SOC. After expanding the capacity, charge the battery system to balance the capacity gap. Ensure that the capacity difference before the parallel does not exceed 10%. If the capacity gap is large, it will take about two cycles to balance the capacity gap. The actual balance time depends on the capacity difference and the charge and discharge current.

Excluding the above three points, if the SOC display still fails, contact EITAI.

## 8.2 Emergency

**Please cut off the power supply and turn off the battery in an emergency.**

1. If the battery pack is damp or immersed in water, do not get close to the battery, and then contact EITAI or an authorized dealer for technical support.

2. Do not use water to fire when a fire! Only dry powder extinguishers; place the battery pack in a safe area if possible.

3. Battery leaking the electrolyte If the battery pack leaks the electrolyte, avoid contact with leaking liquid or gas.

If someone is exposed to the leaking material, do the following immediately.

**Inhalation:** evacuate the contaminated areas and seek medical treatment.

**Contact eye:** Rinse eyes with running water for 15 minutes and seek medical treatment.

**Contact skin:** Wash the infected site with soap and water and seek medical treatment.

**Swallow in:** urge vomiting, and seek medical treatment.

**Battery damage:** Damaged battery is dangerous and must be treated with very carefully. Battery cannot be used or may be dangerous to person or property. If the battery pack is damaged, contact EITAI for handling.

### 8.3 Handling of the Battery System

- 1) The system treatment must comply with the locally applicable disposal regulations of electronic waste and second-hand batteries.
- 2) Do not treat the battery system along with household waste.
- 3) Avoid exposing the battery to high heat or direct sunlight.
- 4) Avoid exposing the battery to high humidity or corrosive environments.
- 5) Do not expose the battery to a combustible gas or liquid.



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